

# **ARCHERY CANADA**

## **Competition Development**

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### **Reference Manual**

**Coach Certification committee**

**11/9/2015**

# ARCHERY CANADA



## COMPETITION - DEVELOPMENT REFERENCE MANUAL INTRODUCTION





Programme  
national de  
certification des  
entraîneurs



## PARTENAIRES POUR L'ÉDUCATION ET LA FORMATION DES ENTRAÎNEURS

Le Programme national de certification des entraîneurs est un programme auquel collaborent le gouvernement du Canada, les gouvernements provinciaux et territoriaux, les organismes nationaux, provinciaux et territoriaux de sport et l'Association canadienne des entraîneurs.



Les programmes de cet organisme sont subventionnés  
en partie par le gouvernement du Canada

Canada

## INTRODUCTION TO THE MANUAL

As part of the new NCCP's Competency Based Education and Training, Archery Canada provides certification for instructors in the Recreation Stream and for coaches in the Competitive Stream. Within the Competition Stream, Archery Canada offers Competition - Introduction and Competition Development context materials and training. The third context, High Performance, is a combination of generic and sport-specific tasks combining in individualised independent study courses for coaches offered at NCI's for coaches operating at the international level.

In Archery Canada's Recreation Stream, the primary goal was to ensure beginning archers learned basic safety rules and skills. Those manuals and portfolios trained the coach to work efficiently in a group-oriented environment. The environment in the Competition Stream emphasizes working one-on-one as a coach/athlete team. The reference manual and workbook have been designed to enhance the skills of those coaches working personally with elite archers and their competitive careers. Though the Competition - Development coach may work with more than one elite archer at a time, the one-to-one relationship is the foundation upon which the archer and coach will grow and improve.

There is a major departure in the presentation of material and the path toward certification in the Competition – Development context. Unlike all other Archery Canada contexts, the candidate must have the following pre-requisite NCCP multi sport courses completed in order to attend the Archery Canada's Competition – Development workshops:

Making Ethical Decisions (on-line evaluation for this context)

Coaching and Leading Effectively

Managing Conflict

Developing Athletic Abilities

Leading Drug-free Sport

Prevention and Recovery

Psychology of Performance

The workshop tasks for each Chapter, and the accompanying workbook exercises, and log book develop the coach's ability to plan, organise, analyse performance factors and *so/ve problems* specific to the athlete's needs. The Competition - Development coach will be challenged to implement NCCP theoretical knowledge to respond appropriately to archery-specific situations and training concerns. These exercises propel the Competition - Development coach along the continuum of knowledge acquisition and personal experience in

preparation for mastery of the High Performance context. **Competition – Development certification is required in order to coach at Canada Games.**

As the central theme of this context, the coach will produce a viable ***annual training plan*** designed to meet a specific archer's individual needs in an elite competitive environment in accordance with **Archery Canada's Long Term Archer Development Model**. The coach is expected to implement this plan in an ethical, caring fashion, and then analyse it for strengths and weaknesses. During this process, the coach grows and learns, not just the archer.

The coach reference material and workbook refer to the NCCP's multi-sport modules. Tasks and theoretical knowledge are added where coaching in archery exceeds the NCCP material. This non-integrated approach allows the coach candidate to apply the theory to coach elite archers successfully.

## OBJECTIVES OF THE COMPETITION - DEVELOPMENT COACH REFERENCE MANUAL

The coach will transform the competitive archer into an elite competitive archer using skills and information in the Competition - Development reference material and practical assessment. The coach will prepare archers psychologically, physiologically, technically and tactically to compete successfully at The Canada Games and/or first international championship. The coach and archer will keep track of the progress toward one annual plan goal using a log book or diary.

### LEARNING OUTCOMES OF THE COMPETITION

#### DEVELOPMENT REFERENCE MANUAL AND WORKBOOK

The coach will be able to:

1. Define, evaluate and implement an ethical, working coach philosophy that will provide leadership for the athlete as a person and bring satisfaction to the coach.
2. Plan, implement and evaluate an annual training programme for an archer defined in the Archery Canada's Long Term Athlete Development Model's "Train to Compete" stage leading to "Shoot to Excel" stage who is interested in competing in one of the four disciplines of archery (Indoor/Outdoor Target, 3D, Field, Ski-Arc).
3. Through regular training sessions in a safe environment, teach the archer intermediate psychological strategies and coping skills to enhance elite performance during the archer's next competitive year.
4. Through regular training sessions in a safe environment, evaluate and implement archery-specific physical training programmes to enhance elite performance and improve lifestyles. Use biomechanical principles to refine archer form.
5. Through regular training sessions in a safe environment, evaluate and tune the archer's equipment to satisfy the demands of the archer's chosen discipline(s) to enhance elite performance.
6. Through regular training sessions in a safe environment, prepare the archer tactically to compete successfully in the archery discipline of choice at the elite level.

## HOW DOES A COACH TURN A NOVICE COMPETITOR INTO AN ADVANCED COMPETITOR?

Definition of Archer:

LTAD Phase: Train to compete, Train to Excel

Timeframe in the athlete's career is 2-5 years interested in competitive archery

Archer desires to improve competitive performance

Archer agrees to train regularly

Competitive experience:	Canada Games
OR	More than one national championship
OR	Major Regional Games
OR	Member of provincial team to national championships

There must be a progression in the archer's learning in the following areas:

1. How to take ownership of the training plan
2. Increase intensity of training to +3 days per week
3. Utilise an annual training plan with more than 1 seasonal or annual goal
4. Increase volume of training including weight training, arrows shot, and mental exercises
5. Keep an archery diary of training and competitive performance, observations
6. Refined equipment needs, experimentation and back-up equipment
7. Increase biofeedback skills – enhance self-analysis of performance
8. Set long-term goals, e.g. quadrennials
9. Role as a team member – engage in team-building exercises
10. Refined psychological skills – concentration, maintaining performance under greater stress
11. Strength training and more muscle-specific training programme (age specific)
12. Nutritional needs and travel – jet lag, hydration
13. Adherence to current anti-doping regulations – possible member of testing pool
14. Financial sources to support increased tournament costs
15. Consolidation of form skills, based upon biomechanical principles

## **HOW DOES A COACH USE THE MANUAL, WORKBOOK, LOG BOOK AND COACH WORKSHOPS TO PREPARE THE ARCHER FOR ELITE COMPETITION?**

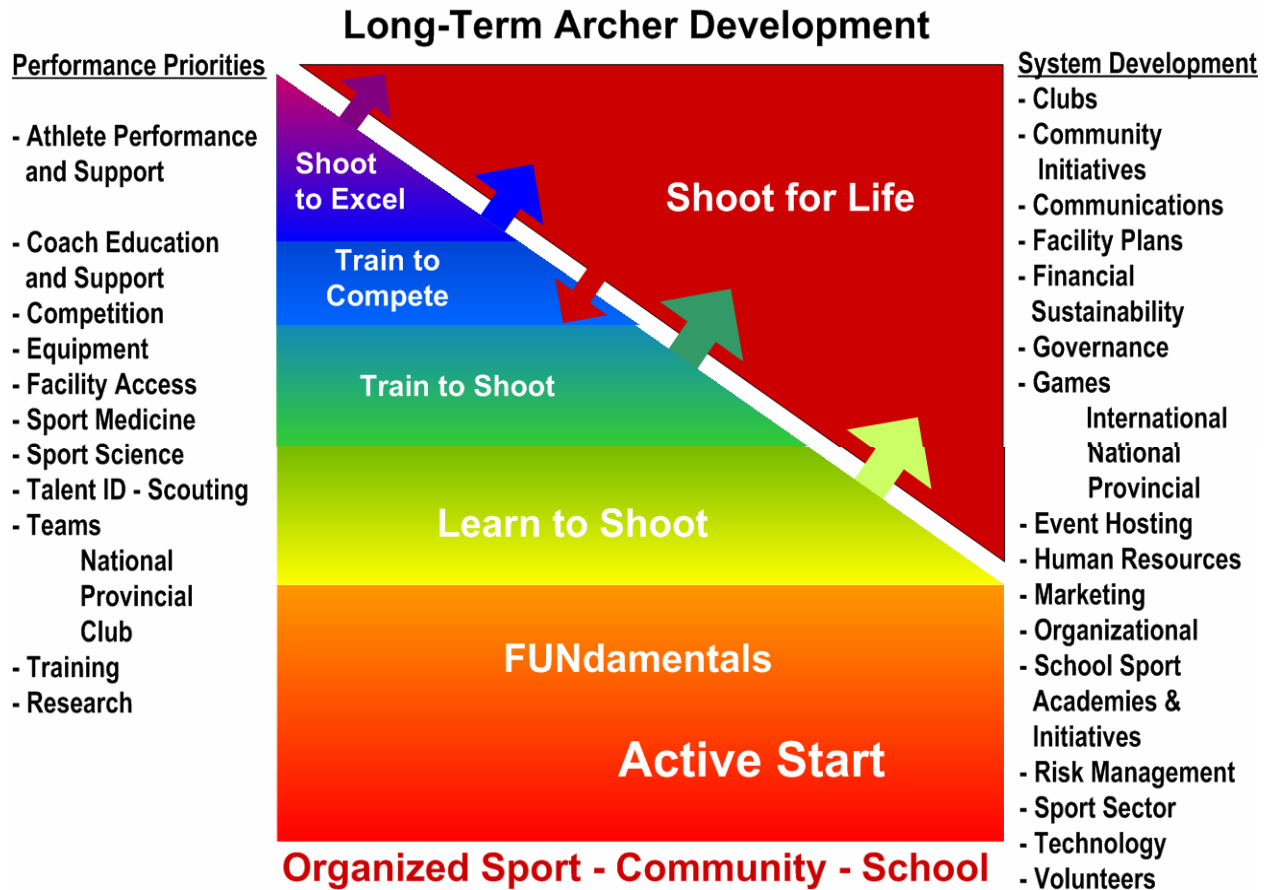
1. As soon as you receive the manual and workbook, read chapters 1-6 in the textbook before the date of the first workshop.
2. Complete all of the exercises marked as “**PREP WORK FOR THE WORKSHOP**” BEFORE attending the workshop. The coach is obligated to read the material and complete the related assignments listed in the workbook.
3. Bring your reference manual and workbook along with all those required exercises to the first workshop.
4. Be prepared to complete all remaining tasks in time for the second workshop.
5. Participate in the second workshop.
6. Complete the coach log book and submit the archer log book/diary.

## **BACKGROUND KNOWLEDGE**

Archery Canada has developed a Long-Term Archer Development Model that links the pathway of the archer and the coach. In this context, the coach is working with the archer in the “Train to Compete” phase, working toward the “Train to Excel” phase.

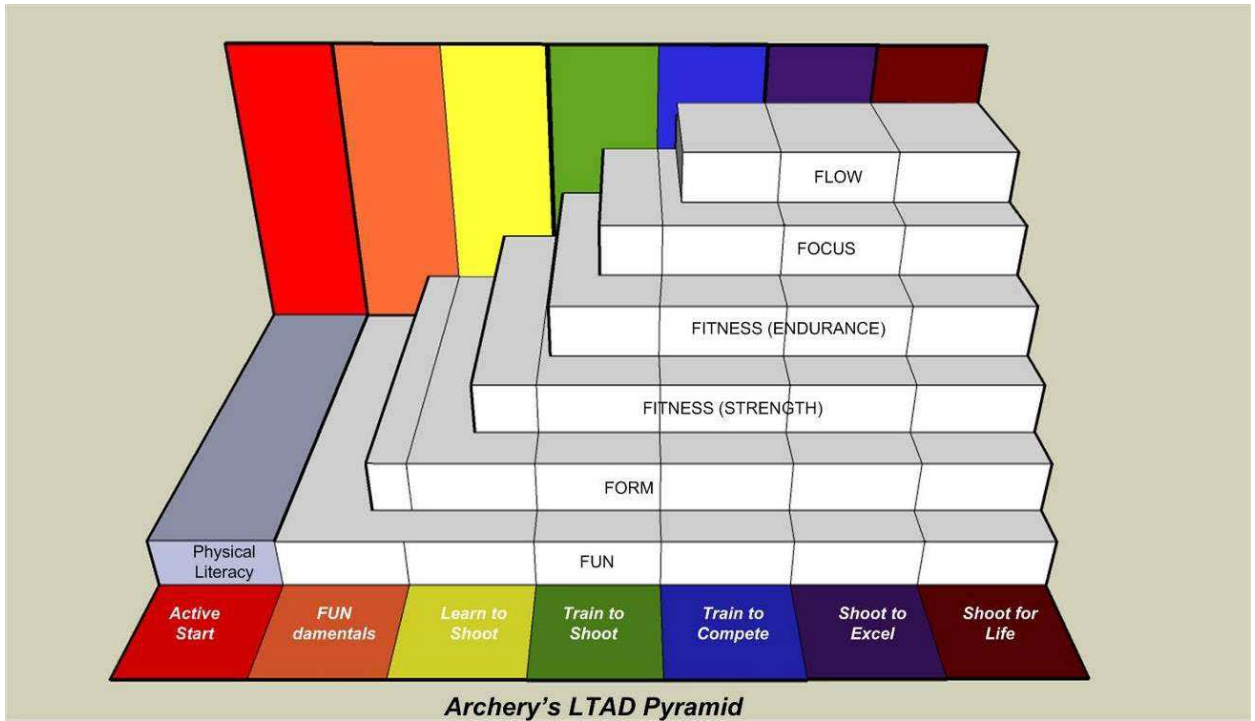
Take the time to read over some of the highlights of this important document. Be prepared to discuss this information with the workshop Facilitator. The whole document, use the links on the Archery Canada website.





ARCHERY LTAD FRAMEWORK	Shoot for Fun			Shoot to Excel			Shoot for Life	
LTAD STAGE	Active Start	FUN damentals	Learn to Shoot	Train to Shoot	Train to Compete	Shoot to Excel	Shoot for Life	
TRAINING YEARS	0 years	0 - 4 yrs	1 - 4 yrs	2 - 8 yrs	4 - 10 yrs	7+ yrs	Enter any age after growth spurt	
TRAINING PYRAMID	FUN	100 %	60 %	40 %	20 %	15 %	10 %	FUN
	FORM		40 %	40 %	25 %	20 %	15 %	FORM
	FIT-STR			20 %	25 %	15 %	15 %	FIT-STR
	FIT-END				20 %	20 %	20 %	FIT-END
	FOCUS				10 %	20 %	20 %	FOCUS
	FLOW					10 %	20 %	FLOW
OTHER SPORTS	MANY ACTIVITIES	3+ OTHER	3+ OTHER	2 OTHER	1 OTHER	ARCHERY ONLY	AS DESIRED	
DISCIPLINE/DIVISION	NONE	ONE (entry)	2-3	2-3	1-2 (specializing)	ONE (specialized)	AS DESIRED	
QUALITY ARROWS/WK	ZERO	< 75	75-150	150-500	600-1000	600-1000+	AS DESIRED	
TRAINING HRS per SESSION/WK	NONE	< 45 min < 3 hrs/wk	< 90 min 3 hrs/wk	<120 min < 8 hrs/wk	<150 min < 14 hrs/wk	180 min+ 12-20+ hrs/wk	AS NEEDED	
COMP RATIO %	NONE	100 T : 0 C	90 T : 10 C	85 T : 15 C	80 T : 20 C	70 T : 30 C	AS DESIRED	
COMP FOCUS	NONE	FUN ONLY	CLUB/LOCAL	PROVINCIAL	NATIONAL	INTERNATIONAL	AS DESIRED	
COACHING	NONE	INSTRUCTOR OF BEGINNERS	INSTRUCTOR OF INTERMEDIATES	INTRODUCTION TO COMPETITION	COMPETITION DEVELOPMENT	COMP HP (LEVEL 4/5)	AS DESIRED	

**The Long-Term Archer Development**



**COMPETITION – DEVELOPMENT  
REFERENCE MANUAL**



**CHAPTER 1**

**THE COACH**



# OBJECTIVES OF CHAPTER I: THE COACH

Present a viable, ethical working philosophy of coaching

Evaluate the coach's present skills inventory in the four training components

Plan and implement tasks that will strengthen the coach's skills inventory

## LEARNING OUTCOMES OF THIS CHAPTER

The coach will be able to:

1. Implement a viable and ethical coach's working philosophy (modus operandi)
2. Behave ethically in coaching at all times, dealing successfully with outside forces detracting from coaching performance
3. Produce a self-evaluation of current coaching skills
4. Produce a self-analysis of psychological preparedness in order to coach elite competitive archers
5. Demonstrate time-management skills

### COACH REFERENCE MANUAL

Introduction

- i) Philosophy of Coaching
  - Values and Ethics
- ii) Leadership Style and Communication
- iii) What should a Coach be able to do in this context?
  - Time Management Skills

## APPENDICES

Appendix 1: The NCCP Code of Ethics

Appendix 2: Code of conduct from the Canadian Professional Coaches Association

Appendix 3: ARCHERY CANADA Anti-Abuse & Anti-Harassment Policy

Appendix 4: Canadian Centre for Ethics in Sport Mandate

Appendix 5: ARCHERY CANADA Coach Evaluation Information for Competition - Development Context

## WORKBOOK TASKS

### PREP WORK FOR THE WORKSHOP 1

Coach Philosophy (using NCCP material as a base)

Leadership Self-Evaluation, Reaction and Exercise #1 Coach Behaviour

Application of the Theory – Start Planning

- iv) Self-evaluation Exercise #1 inventory of present coaching skills in the 4 training components
- iv) Self-evaluation Exercise #2: inventory of psychological preparation
- iv) Self-evaluation Exercise #3: inventory of current time management skills

v) Case studies:

1. Intervention during a tournament
2. Intervention during a major competitive event
3. Intervention when performance deteriorates

vi) Self-evaluation Exercises #1, #2 & #3: **Follow-up 1 year later**

vii) Opportunities for Professional Development in Coaching

## Introduction

Within the coaching certification programme there is delineation between the recreational stream and the competitive stream. Most coaches in the Competition – Development context, no longer spend time teaching large beginner groups. Instead, the coach's time is concentrated on one-to-one training sessions, bringing the coach and the archer together as a team. Commitment to this relationship should be viewed as long-term by both parties.

The coach and archer travel together toward meaningful goals and personal satisfaction. There will be many shared experiences and memories, for it is the process and **not** the outcome that will provide the lion's share of the experiences. To insure those memories are positive ones, the archer-coach relationship must be built upon trust, fairness and open communication.

The good archery coach understands the importance of fairness and commitment. But what guiding principles will help when coaching decisions have to be made? How will the coach know if the decisions are correct or not? To what degree does the coach, particularly the volunteer coach, commit time and effort to each archer? What does the coach need out of the relationship in order to feel satisfied? These are fundamental questions.

If the coach does not have a clear idea of what is important, both coach and archer will suffer. If the coach does not commit to a code of conduct, or method of operation (modus operandi), the coach and archer will suffer.

Therefore, before the coach can help any individual, there must be time for *critical reflection* and personal assessment. The coach must understand the responsibilities that come with the extra challenges of striving for excellence. Refer to your coach workbook from the NCCP Multi-sport Module "Coaching and Leading Effectively" to fulfil some of the requirements in this chapter. Keep in mind also, that your workbook from "Making Ethical Decisions" and "Drug-free Sport" will be important also in order to contribute to the ARCHERY CANADA workshop.

This chapter reinforces the coach's philosophy as well as the concrete skills that are necessary in any competent coach in this context. It reinforces leadership skills and open communication.

Finally, there are personal assessment instruments and guidelines for further professional development. Exercises and case studies can be found in the workbook.

## i) Philosophy - The Foundation for Good Coaching Decisions

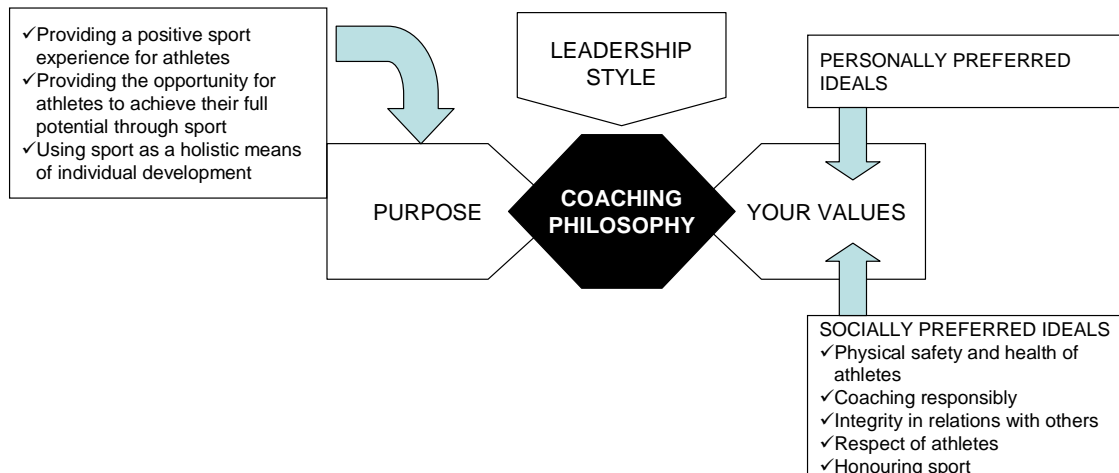
If someone asked you, “Why do you coach archery?” what would you say? Many coaches are former archers who felt the need to help others. They put their own bows aside for a while to concentrate on correcting others’ form problems, refining skills, or repairing equipment. As time went by, more club members and acquaintances begin to “expect” support from the helpful individuals. And, in the end, the former-shooter-turned-helper stands behind the line instead of on it full-time. Does this scenario sound familiar to you?

The question remains then, “why”. Why keep coaching? What satisfies you, challenges you, makes you strive to be better? Your personal coaching philosophy is the basic reason for the way you work, the way you treat your athletes, the way you behave and the decisions you make in practice and during tournaments.

**PREP WORK FOR THE WORKSHOP 1:** Read Archery Canada’s code of ethic - pages 19 -21 in this manual. Turn to the workbook Chapter 1 to the pg. 1 section entitled, “Coaching Philosophy” Insert the philosophy that you created from the Multi-sport Module. If you wish to revise it since the time that you created it, space is provided in the coach workbook.

Be prepared to share your philosophy in the workshop. More importantly, if you revised your philosophy, you should be prepared to explain what led you to make this re-assessment.

### Elements of Your Coaching Philosophy





### **Ethics - Why are they important in archery?**

Now that you have established the “why” of coaching, you must consider the “how”. Your personal views on the **value** of sport and striving for excellence will colour how you treat your athletes. Those values will be the basis of your coaching decisions, too. Sincerity of purpose, fair play, attitude, flexibility, integrity and respect for the athlete by the coach will have a great bearing on the standard of conduct the archer adopts, too.

Review the NCCP and C OF C Codes of Conduct in Appendix 1 and 2 (pg. 37 and 38) of this chapter, and the ARCHERY CANADA’s Code of Ethics (pg. 19). These *values* are considered the absolute minimum in coach behaviour. How does this relate directly to archery? Here are some examples.

1. If you only care about winning, you will end up abusing your athletes. Coaches who put the **outcome** ahead of the **process** have little respect for the archer as a human being.

Cheating through the use of performance-enhancing drugs is not a serious problem in archery. But counselling an archer to use beta-blockers or alcohol is unethical for two reasons: the spirit of fair play has been violated, and the long-term health of the athlete is put at risk. Archery Canada endorses the federal government’s “Canadian Policy of Doping in Sport” and expects its coaches to adhere to it. More on this topic can be found in NCCP’s “Drug-free Sport” and in subsequent chapters in this reference manual.

Likewise, the coach who insists the archer be dedicated to one sport only from a very early age may do permanent physical harm. This is just as unethical as pushing athletes to perform at major events when they are injured. It is not only a sign of abuse, it is a sign the coach does not care for the athlete as a human being. Refer to Archery Canada’s **Long Term Archer Development Model** for more information on the correct way to lead an archer through the stages from initiation to active for life.

Cheating in archery is a problem in another area though. Whether the archer specializes in field, 3D, target or Ski-Arc, the archer must call the value of the arrow fairly. Coaches who instruct the archer to call arrows “in” when there is serious doubt are clearly in violation of the principles of fair play. The coach projects an improper role model, and projects the message that it is acceptable to enhance scores in order to win. Success through effort and skill become secondary.

And, what happens to the individual later in life? The coach has taught the archer that *outcome* is worth cheating for in anything, not just sport. What happens if the archer is caught cheating? How will that individual ever regain credibility? The archer’s behaviour also reflects poorly on the coach. How will the coach regain credibility, even if there was no counselling to cheat?

It takes a lifetime to build community respect; it takes one random act to destroy it.

How will you motivate your archers to perform to their anticipated potential? **Motivation through fear, intimidation or humiliation is unacceptable.** Coaches, who put winning ahead of everything else, will be abusive physically, emotionally and/or mentally. If the coach seeks power and control over the archer, the coach will produce either a submissive human being or a rebel.

Likewise, motivation through manipulation will lead to personal disaster. Coaches who struggle *negatively* with mature archers and associate coaches usually expect to control and manipulate others. This philosophy usually leads to a close-minded approach. Innovation is lost because there is fear to take a chance or appear to make a mistake.

2. Discrimination or favouritism when working with more than one archer is detrimental to the club, team and individual development.

Some coaches have a subconscious tendency to rank an archer's ability and potential to improve. This usually occurs when the coach is presented with an archer who has very good basic technique and has an impressive competitive track record before asking for coaching assistance.

Biases affect the quality of communication between archer and coach. All archers deserve the same amount of clear, concise instruction regardless of perceived potential in order to maximise the potential they do have. Some archers may need the information given to them using different words, phrases and images; but this is normal in the communication interchange. The quality of feedback is also affected by the coach's perception of ability and potential. In order to avoid this pitfall, the coach needs to look at sport from the archer's perspective and needs.

<b>General Coaching Tips for Maintaining Ethical Behaviour</b>
When in doubt or faced with an ethical dilemma, think about the "do no harm" principle.
Never "second-guess" yourself on decisions made with integrity, intelligence, thoroughness, and based on accepted values.
Make sure you are clear about your coaching values and that you can talk about them in a way that is clear, simple, and easily understood by everyone.
Cross-reference your coaching values and principles with the NCCP Code of Ethics and the Archery Canada Code of Ethics.
Pay attention to what is important to kids in establishing your ethical standards.

### **Archery Canada's Code of Ethics**

**Sport challenges everyone involved – players, coaches, officials, directors and parents – to do their best honestly and fairly. To ensure that players, coaches, officials, directors and parents are aware of their responsibilities, Archery Canada has adopted the following Code of Ethics.**

#### **Coaches shall:**

- Act at all times in the best interest of the development of the athletes as a whole person
- Accept both the letter and spirit of the rules of the sport
- Accept and support the role of the officials to ensure the competition is conducted fairly and in accordance with the established rules
- Act with integrity in performing all duties with the athletes, their parents, other coaches and officials
- Strive to be well prepared so your coaching duties are carried out with competence
- Ensure that equipment and facilities meet safety standards and are appropriate to the age and ability of all athletes.
- Treat others with respect.
- Ensure that any physical contact with a young person is appropriate to the situation and necessary for the player's skill development
- Obtain appropriate qualifications and keep up to date with the latest coaching practices and the principles of growth and development of young people.
- Maintain the highest standards of personal conduct and to support the principles of Fair Play

#### **Fair Play considerations:**

- Learn and follow the rules of sport
- Recognise and respect differences in the athletes
- Provide equal opportunity and support to all athletes
- Encourage athletes to always do their best
- Encourage athletes to be respectful in both victory and defeat
- Set an example. Behaviour and comments should be positive and supportive.

**Officials Shall:**

- Place the safety and welfare of the participants above all else.
- Modify rules and regulations to match the skill levels and needs of young people.
- Compliment and encourage all participants.
- Be consistent, objective and courteous when making decisions.
- Condemn unsporting behaviour and promote respect for all opponents.
- Emphasize the spirit of the game rather than the errors.
- Encourage and promote rule changes, which will make participation more enjoyable.
- Be a good sport. Actions speak louder than words.
- Keep up to date with the latest trends in officiating and the principles of growth and development of young people.
- Treat others with respect.
- Set an example. Behaviour and comments should be positive and supportive.

**Athletes Shall:**

- Conduct themselves in an honourable manner both on and off the competition field
- Accept both the letter and spirit of the rules of the sport
- Accept and support the role of the officials to ensure the competition is conducted fairly **and in accordance with the established rules**
- Not knowingly break the rules, but divulge any breach of the rules as soon as it becomes known
- Not take any actions that could be interpreted as an attempt to intimidate or demean opponents, team mates or officials
- Maintain the highest standards of personal conduct and support the principles of Fair Play
- Accept any penalty that the governing body of the Archery Canada deems appropriate if the athlete is found to be in violation of the code of ethics or rules of the competitions
- Treat others with respect. Respect the rights, dignity and worth of all participants involved in the sport.
- Set an example. Behaviour and comments should be positive and supportive.

**Directors Shall:**

- Involve athletes in planning, leadership, evaluation and decision making related to the activity.
- Give all athletes equal opportunities to participate.
- Create pathways for people to participate in sport not just as a player but as a coach, judge, administrator etc.
- Ensure that rules, equipment, are modified to suit the age, ability and maturity level of young players.
- Help coaches and officials highlight appropriate behaviour and skill development, and help improve the standards of coaching and officiating.
- Ensure that everyone involved in the sport emphasizes fair play, and not winning at all costs.
- Set an example. Behaviour and comments should be positive and supportive.
- Make it clear that abusing people in any way is unacceptable and will result in disciplinary action.
- Treat others with respect. Respect the rights, dignity and worth of every person involved in the sport.

**Parents Shall:**

- Remember that children participate in sport for their own enjoyment, not the parents'.
- Encourage children to participate, not force them.
- Focus on the child's efforts and performance rather than winning or losing.

- Encourage children always to play according to the rules and to settle disagreements without resorting to hostility or violence.
- Never ridicule or yell at a child for making a mistake or losing a competition.
- Remember that children learn best by example. Appreciate good performances and skilful plays by all participants.
- Support all efforts to remove verbal and physical abuse from sporting activities.
- Respect officials' decisions and teach children to do likewise.
- Show appreciation for volunteer coaches, officials and administrators. Without them, your child could not participate.
- Treat others with respect. Respect the rights, dignity and worth of every person involved in the sport.
- Set an example. Behaviour and comments should be positive and supportive.

### **Sample Code of Conduct for Athletes**

During training and sport events (if applicable), we want to observe the following:

1. Athletes having fun and enjoying themselves.
2. Practice sessions and activities that, by design and by implementation, promote self-esteem in athletes.
3. Athletes learning the fundamental technical abilities of the sport.
4. Athletes making new friends by demonstrating positive attitudes and tolerance.
5. Athletes having fair and equal opportunity to participate in practice activities and games/competitions, regardless of skill level. Consequently, parents of children who are more skilled should not expect that their child receive greater attention and/or playing time.

Our code of conduct can be summarised as follows:

1. Listen: Listen carefully to those who are talking to you.
2. Respect:
  - Others (coaches, team-mates, officials, opponents, parents).
  - The equipment and facilities loaned to you for your use.
  - The environment.
3. Work: Give your best effort at all times, both individually and as a team.

Coach's Responsibilities:

1. Be the programme leader and be aware of all that is happening.
2. Plan and lead fun, safe, and purposeful practice sessions.
3. Involve parents in the programme, and clearly communicate what is expected of them (parents entrust their children to the programme leaders during practice sessions and competitions, and should not intervene with their children during these times).
4. Create an environment that will promote all the values identified in this code.

### Sample Code of Conduct for Parents

As adults, we increasingly want to define our rights and responsibilities. Take a few moments to reflect upon our rights and responsibilities as parents of children involved in organised sport. Do we have a code of conduct that guides our behaviour and expectations?

#### Our Rights

The stakeholders of sport, i.e. athletes, coaches, officials and activity hosts, must:

- Act with respect for themselves – demonstrate dignity, modesty, fairness, justice, maturity, leadership, a positive attitude.
- Act with respect for others in word and in action.
- Act with respect for the environment (human and physical).
- Create a sport environment that is fun, safe, and conducive to learning.
- Respect the facilities and material to which they have access.
- Know the rules of the sport.

#### Our Code of Conduct as Parents

Together, as a team of parents and athletes, we should identify acceptable behaviours (i.e. in the stands, on the sidelines) that demonstrate respect for others, and behaviours that promote a positive learning environment. These behaviours should be based on the values that are implied in the section “Our Rights” above. Reflect on these guidelines and what your role might be as a parent in upholding this code.

Examples of behaviours that demonstrate respect:

• For ourselves:
1. Accept a mistake made by an archer or an official without yelling
2. _____
3. _____

• For others:
1. Do not yell instructions to the players during the game
2. _____
3. _____

• For the environment:
1. Establish a respectful atmosphere among the spectators
2. _____
3. _____

## Sport as a Discrimination-Free Zone

*Every individual is equal before and under the law and has the right to the equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on race, national or ethnic origin, color, religion, sex, age or mental or physical disability.*

– Canadian Charter of Rights and Freedoms

One of your shared responsibilities with participants and parents is to ensure that discriminatory behaviour on the bases described in the charter and in the NCCP Code of Ethics is not tolerated in your sport environment.

Discrimination **occurs when an individual or group is treated unfavourably or unequally because of *prejudice* or *stereotyping*.**

**Prejudice** is the use of prejudgment, or having a preconceived opinion about someone.

**A stereotype is the broad, often inaccurate, belief about the characteristics of a cultural, ethnic, or racial group, used to describe an individual thought to be a member of that group.**

**Harassment** is comments or conduct that should reasonably be known to be unwelcome to another, and can include actions such as jokes that isolate a particular group or groups, verbal slurs and insults, and condescending or intimidating behaviours.

What Can I Do to Create a Discrimination-Free Zone With My Team?

There are many influences on participants that affect their ability to treat each other fairly and with respect. For example, the participants may have been exposed to racist or sexist behaviour all around them at school, at home, and at play.

The best thing you can do as a coach is to watch what you say and do, to intervene if someone on or around your team acts in a discriminatory way, and to encourage the participants and their parents to intervene themselves if they see or hear this type of behaviour.



## What Can I Do if I Witness Discriminatory Behaviour?

Understand clearly that not responding is actually interpreted by others as a response; this passive response can indicate that you are OK with what was said or done. A passive response, although leaving you at little personal risk, does nothing to change or stop the behaviour from happening again.

An aggressive response usually seeks to shame the person who has shown the discriminatory behaviour. This type of response usually escalates the situation and does not model respect for others.

### Choose a Positive Response to Intervene Effectively

<p>Passive response "doing nothing"</p> <p><b>Not recommended</b></p>	<ul style="list-style-type: none"> <li>• Goal is to ignore the behaviour</li> <li>• Sometimes an attempt is made to rationalize the behaviour</li> <li>• Assumes the other person will not stop/change the behaviour even if an intervention is made             <ul style="list-style-type: none"> <li>• Considers time on task and/or personal safety as more important</li> </ul> </li> </ul> <p><i>Examples: Laugh along with a discriminatory joke, or saying nothing when a discriminatory remark is made</i></p>
<p>Aggressive response "confronting"</p> <p><b>Not recommended</b></p>	<ul style="list-style-type: none"> <li>• Goal is to stop the behaviour in the short term</li> <li>• Comes across as judging the person, not the behaviour</li> <li>• Usually results in the other person wanting to retaliate</li> <li>• Often based on a sense of superior authority, strength, or numbers</li> <li>• The safety of the person whom you are confronting is also at risk now</li> </ul> <p><i>Examples: "I can't believe you said that. How ignorant can you be?" or "Don't you know that what you are saying is wrong?"</i></p>

<p>Positive response “seeking change”</p> <p><b><i>Recommended</i></b></p>	<ul style="list-style-type: none"> <li>• Goal is to stop the behaviour in the short term and to change the behaviour in the long term</li> <li>• Names the behaviour as unacceptable</li> <li>• Points out what is needed in the situation</li> <li>• Does not judge the other person</li> <li>• Is based on modeling respect</li> </ul> <p><i>Example: “Please do not say that; it is hurtful. How about treating that person as you would like to be treated, and as we agreed to treat one another as team members?”</i></p>
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By choosing a positive response and intervening when you witness discriminatory behaviour, you are modeling respect for others, and attempting to educate for change.

Inclusion is the welcoming and providing of full access to teams and programs for participants with a disability in your community.

Inclusiveness means active involvement of participants with a disability in all aspects of the team or sport program. It does not mean that the focus of the team or sport programme should be on the participants with a disability, but rather that they should play just as integral a role as any other member of the team or, participant in the programme.

<ul style="list-style-type: none"> <li>• People-first language is used (i.e. language that does not demean a particular person or group)</li> <li>• Posters and other materials that demean a particular group are not displayed or exchanged (e.g., posters, cards, magazines, cartoons, videos/DVD's, screensavers)</li> <li>• Name calling is not tolerated</li> <li>• Jokes that poke fun at specific populations are not tolerated</li> <li>• Every participant is given equitable coach attention</li> <li>• Every participant is given equitable playing time in community sport</li> <li>• Every participant has a say in developing the team code of conduct</li> <li>• The team code of conduct outlines behaviors that will promote a discrimination-free zone and this code is enforced by all</li> <li>• Initiation ceremonies are not practiced</li> </ul>
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## ii) Leadership Style and Communication

A **leader** guides, directs, influences and controls the actions and behaviour of others toward the achievement of certain goals. Each coach has an individual personality and leadership style. The coach has a powerful influence on the athlete. **The coach must lead by example, acting as a role model to athletes and other coaches.**

***But how does one lead?*** In order to be effective, the coach should:

- a) Help others recognise their potential, developing their latent capabilities
- b) Empathise with people and problems
- c) Act in a responsible, ethical manner at all times
- d) Assist individuals in attaining their goals
- e) Plan well-defined objectives and goals
- f) Be organised
- g) Direct the operation to its conclusion
- h) Co-ordinate all efforts
- i) Be imaginative in problem solving
- j) Be enthusiastic, inspirational
- k) Be tenacious in spite of setbacks and upsets
- l) Demonstrate endurance in spite of mental and/or physical strain
- m) Have the courage to make decisions and the flexibility to make changes when necessary
- n) Respect the opinions of others
- o) Be able to maintain harmony among the group.

There are several types of leadership styles that the coach may use depending upon the maturity of the athlete(s) and the situation(s). The coach must decide which style feels comfortable and allows for growth and success of everyone concerned.



### P. 2

**PREP WORK FOR THE WORKSHOP 1:** Now turn to the workbook Chapter 1 pg. 2 - the section entitled, “Self-Assessment” and fill in the leadership self-assessment tool. Compare it to what you filled in during the Multi-Sport Module for “Coaching and Leading Effectively”.

Compare the work you completed during the NCCP workshop with the expected leadership styles found in the **Archery Canada’s Long Term Archer Development Model**. Did you change any of your answers since that workshop? Discuss changes and the reasons for any changes with the workshop facilitator. When you have completed the exercise, return to the reference manual.

### **Coach Behaviour**

The coach's behaviour has a significant impact on the archer's performance. This can be a positive or negative influence, because the actions and demeanour of the coach can affect the archer emotionally. If the coach exhibits negative behaviour, the archer will pick up on these emotions and reactions. Instead of concentrating on process and skill, the archer's attention is diverted by the coach's actions. In some cases, the coach's behaviour can add to the archer's anxiety.

Many times coaches fail to realise that **they** are the reason archers over-react in certain situations. Factors affecting the athlete's attitude toward the coach include:

- the coach's level of antagonism toward the athlete;
- the coach's attitude toward the athlete/opinion of the archer's ability;
- the level of communication and how information is exchanged;
- sharing problem-solving;
- sharing and assuming responsibilities;
- being able to initiate changes or training;
- tension, which the coach creates by expressing negative emotions.

An archer may not realise the coach is displaying these negative tendencies and affecting performance. Some archers think that coaches are supposed to be authoritarian and unbending. Other coaches say nothing or act in certain ways as a defensive strategy. This strategy may have been developed over time to deal with difficult people and situations, but what the archer sees, is someone who is cold and unapproachable. Therefore, without realising it, a coach may be adversely affecting the archer's performance without noticing it until it is too late and the archer either quits or finds another coach.

**PREP WORK FOR THE WORKSHOP 1:** Now turn to the workbook Chapter 1 pg. 3 to the section entitled, "**Application of the Theory: - Why do archery coaches react a certain way to situations?**" When you have completed the exercise, return to the reference manual.

### **Communication**

The archery coach has frequent opportunities to enhance the well-being of their athletes both mentally and physically. Take advantage of that. Use training situations to teach life skills, not just archery form. Both archer and coach progress faster when there is open, two-way communication.

When you fix shooting-form problems, the coach should comment on the positive aspects of the archer's efforts first; then point out the areas that need improvement; then motivate the archer to try again. Use positive terms to describe what was done well and how to improve on other form elements. Emphasis should be placed on the quality of your feedback and its appropriateness.

Personalising behaviour and support is also essential to archer well-being. Archers can exhibit high trait anxiety. The archer perceives a lack of accomplishment and support. When praise and empathy are used, there are greater feelings of personal accomplishment for both the coach and archer. This, in turn, makes your job easier and more enjoyable. Negative communication by the coach can lead to negative archer self-talk. This will compound the problem as well as lead to feelings of frustration for the archer.

Those coaches using dispraise as a coaching style suffer from emotional exhaustion and de-personalisation sooner than those who empathize. De-personalisation is one common reason for coach “burn-out”. **Burn out** is a psychological, emotional and physical withdrawal from an activity that was enjoyed and pursued previously. Coaches who burnout quickest usually have poor coaching styles and negative behaviour patterns. Often coaches burn out from the demands of the system, or having too many jobs to do other than coaching archers.

Consequently, the fatigue associated with these other tasks may cause some coaches to use dispraise when coaching. If a negative training environment exists, athletes will band together to communicate amongst themselves, leaving the coach isolated. Work on your communication style to keep archers, and you, satisfied.

**PREP WORK FOR THE WORKSHOP 1:** Feedback and communication style

During the NCCP “*Coaching and Leading Effectively*” module, you spent considerable time reviewing feedback and communication styles. Review this material before the Archery Canada Workshop 1.

**PREP WORK FOR THE WORKSHOP1:** Intervention and Listening

During the NCCP “*Coaching and Leading Effectively*” module, you spent considerable time reviewing intervention techniques and listening effectively. **Make sure that you have your Leadership Plan from the NCCP workshop.** During the first Archery Canada workshop1, you will be asked to complete the 3 archery-specific case studies on intervention skills. (See pages 18 to 20 in the workbook)

**PREP WORK FOR THE WORKSHOP 1:** Complete Workbook **Exercise #1 (all 3 sections) on pgs. 3 - 6. Be prepared to discuss Exercise \$1 with the facilitator and other candidates.**

### iii) What should a Coach be able to do in this context?

A coach is a person who challenges athletes to reach their greatest potential, athletic or otherwise. *A good coach* listens to the athlete's desires and aspiration first and foremost. It is, after all, the athletes who commit their lives to the attainment of personal goals and objectives. A good coach will have a positive effect on athletes, moulding and guiding their physical, moral and social development through the sport culture. The archery coach should be the athlete's resource centre. **As the resource centre, the coach guides the archer through the development of a training plan, assisting in mental, physiological, technical and tactical training.** The coach must work with the archer to plan these training components annually, and later, in the High Performance context, to plan quadrennial components. A good coach persuades the archer that sticking to a training plan is essential for success.

A *good coach* must be able to observe skills and behaviour, and analyse them quickly. An expert coach responds immediately, providing accurate feedback to the athlete. The coach must be able to *react* creatively to a number of varied competitive situations, communicating effectively with the archer **when intervention is required.** The expert coach can produce/create solutions to either complex yet well-defined problems OR ill-defined situations. This ability has been described as the "art" of coaching.

#### WHAT DOES THE COACH NEED TO BE ABLE TO DO TO PREPARE THE ARCHER?

ESTABLISH an agreement to commit to training and competition with the archer, and family member for youth

LIAISE with family members, athlete support network

LIAISE with training facility management as required

ADMINISTRATE, e.g. adhere to deadlines for tournament registration, travel and accommodations, focus on event coach skills

DESIGN an appropriate plan for the individual with input from the archer

MONITOR the plan for the individual, e.g. keeping a diary for each archer, progression, re-testing

UTILISE coaching style appropriate for nurturing athlete independence

INTERVENE in practice and competition as appropriate for this context

#### ASSESS:

- General Strength and specific archery muscle strength, balance
- Equipment suitability for level of competitive and age appropriateness
- Ability to cope with greater stress levels in higher levels of competition
- Financial capacity to increase number of competitions per year and increased costs
- Individual form based upon biomechanical principles
- Individual training needs – working with experts
- Ability of archer to adhere to a training regime
- Ability to work with the media
- Athlete's progress – re-test
- Performance using a variety of observation techniques, e.g. video, possibly Dartfish

## TEACH:

- Age-appropriate strength training, using experts as required
- Mental Skills: Coping Strategies – what to do when performance is not optimal, e.g. alternate focus, physical state, equipment failures
- Effective training methods
- Refined biofeedback skills, using experts as required
- Importance of equipment experimentation, need for back-up equipment
- Tournament preparation – simulation; being a member of team
- Media relations, using experts as required
- Team building
- Basic nutritional needs for performance, e.g. hydration, balanced diet, sleep
- Ethics, e.g. anti-doping education and testing pool requirements, using experts as required
- Form using biomechanical principles – training the muscles, using experts as required
- Funding sources availability and fund-raising opportunities

The expert coach must be able to:

- 1) Identify all relevant elements/factors of a situation
- 2) Draw from experiences and accepted models of response
- 3) Pay attention to future implications
- 4) Keep the best interests of the athlete in the forefront
- 5) Demonstrate mastery of a wide range of skills that are widely implemented in archery
- 6) Stay up-to-date in learning information found in different fields and integrates it
- 7) Communicate and denote leadership, even under stress
- 8) Implement activities in the integrated annual plan
- 9) Be responsible for and accountable to other coaches/mentors

Besides showing leadership and communication styles that reflect an ethical and logical coaching philosophy, a good archery coach should demonstrate ability in the following areas:

- Work one-to-one with the athlete
- Periodize physiological, psychological and technical factors in the training plan
- Determine performance factors as a basis for coaching decisions

Can you fulfill these requirements? Self-evaluation, that is, coming face-to-face with your own strengths and weaknesses, is essential if you are to grow in coaching skills and competency. Beware of complacency!

There is no end-point to your coaching knowledge and experience. It is only through critical reflection of who you are, what you think you know now, what you have experienced to date and what you have learned from those experiences that a good coach develops into a better coach. And, every coach can get better psychologically, technically and philosophically. It is a challenge laid before each of us. It should never be forgotten during your career in coaching.

**Ask yourself:**

- Do you know whom you are coaching today, this week, this month?
- Do you know how long each training session will be and how long it will take you to prepare for each one?
- Did you leave enough time in your schedule this month to answer all the administrative needs of your coaching correspondence, club's needs, or provincial and national archery association tasks?
- Do you know what tournaments you are attending this season?
- Did you leave adequate time in your schedule for personal needs, family concerns and your own leisure time?

Some people are able to schedule in all the necessary tasks and commitments in professional and coaching aspects of their lives with enough time to relax and share leisure pursuits with their loved ones. Other people just never plan their time well enough to stay ahead of the demands. These coaches are always missing deadlines, rushing to “put out fires”, get “caught up”, and complaining that there is no “down-time”. Which one of these stereotypes fits you best?

A coach must be a self-starter. A good coach has to be organised since many other people are depending upon the personal coach to be organised, to guide, and to lead. But if the coach does not know the path's direction or the tasks that need to be completed along the way, archers and their families will lose faith, and perhaps, interest.

*What can the coach do to become better organised?*

Here's a suggestion to help you organise your time effectively.

1. Buy a daily planner in whichever form you feel comfortable with, a large calendar, paper or electronic pocketbook, or both.
2. Before you start each day, open your planner and record all the things you want to accomplish for that day. This is your “To Do” list. Include all appointments, tasks and commitments. Did you include time for meals, sufficient rest, and personal needs?
3. Assess how much time each task, appointment, coaching session will take, writing in the estimate beside each one.



4. If there is not enough time to accomplish all the tasks you wanted, you must break these down further into the following A, B and C categories:
  - A = high priority, must be done today
  - B = could be done today, or tomorrow
  - C = needs to be done, but there is still time
  
5. Re-arrange your tasks accordingly. Choose all “A” tasks and their time-lines. From the time that is remaining, select the most pressing “B”. Record the remaining “B” tasks and all “C” items throughout the next week in your planner.  
Did you lose all your leisure pursuits as “C” items? If you did, re-think your day!
  
6. Review your day once more. Now act!
  
7. As you proceed through the day, check off all the tasks you complete. This is a little reward to yourself to finish what you started. It also keeps you on time. Sometimes it is hard to control the length of time appointments and coaching sessions actually take.

Remember your planner is an estimate, and a guideline. If you are falling behind during the day, adjustments will be needed. Reduce timelines for other tasks or pull out some of your “B” tasks until tomorrow. **Never reduce sleeping, meal times or family times** in order to get other things done. You will live to regret these short cuts.



P. 7 - 9

**PREP WORK FOR THE WORKSHOP 1:** Now turn to the workbook Chapter 1 section entitled, “**Application of the Theory – Start Planning.**” Pg. 7 to 9 Complete and return to the reference manual.



P. 10 - 17

**PREP WORK FOR THE WORKSHOP 1:** Complete **iv) Self-evaluation** Pg 10 to 17 (all 3 exercises ) to evaluate where your strengths and weaknesses are presently, as they pertain to coaching theory. You will notice many references to the “Annual Plan”. The coach is expected to provide long-term leadership to the archer in an organised fashion. You may feel your present skills inadequate. As you work through the reference manual, you should be able to add to your existing repertoire of coaching knowledge and skills, thereby raising your level of competency and preparedness.



P. 21 - 28

**Follow-up:**

One year after the first workshop - just prior to workshop 2 - repeat **iv) Self-evaluation** to see how you have progressed. See workbook pgs. 21 to 28

### **Opportunities for Professional Development in Coaching**

As a coach candidate in the Competition – Development context, you have been required to increase your knowledge base in a variety of areas before taking the Archery Canada workshop. Once the Archery Canada workshop and its tasks have been completed, it is important for the coach to continue learning, interacting and sharing ideas and challenges with other coaches and sports specialists. The learning does not end with the end of this course.



Fill out the **Coach Professional Development Plan** in the coach workbook pg. 29 to 33. This is your next step in your educational base and experience. Commit to at least one or two of the components within the next 18 months following the Archery Canada workshop.

**P. 29- 33**

## REFERENCES

- Corlett, J. (1998). The Red Queen Effect: Avoiding Life's Treadmill. In Fifteenth Annual Conference on Counseling Athletes proceedings, Springfield College Counseling and Psychological Services Department, p. 19.
- Haney, C. J., Long, B. C., and Howell-Jones, G. (1998). Coaching as a Profession: Ethical Concerns. In *Journal of Applied Sport Psychology*, Vol. 10, No. 2 September, p. 240-250.
- Lintunen, T. (1997). Development of a Conceptual Model for the Psychology of Coaching. In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II*, p. 343-346.
- Serpa, S., Paula-Brito, A., Lacoste, P. (1997). Development of the "Coach's Anxiogenic Behaviours Inventory" (CABI). In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II*, p. 617-619.
- Solomon, G. B., Golden, Jr., A. J., Ciapponi, T. M. & Martin, A. D. (1998). Coach Expectations and Differential Feedback: Perceptual Flexibility Revisited. In *Journal of Sport Behavior*, Vol. 21, No. 3, p.298-310.
- Treutlein, G., Janalik, H. & Hanke U. (1997). The Heidelberg Procedure for Diagnosing and Modifying Coaches' Behaviour (HDVT) A Suggestion for Positive Impact on Interaction between Coaches and Athletes. In *International Journal of Physical Education*, Vol. XXXIV, Issue 1, 1st quarter, p.9-17.
- Tsorbatzoudis, H., Barkoukis, V., Iordanoglou, D. (1997). Characteristics of the Coach's Version of the Leadership Scale for Sports (LSS). In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II*, p. 703-705.
- Turkington, T. (1992). The Turkington Coach Performance Evaluation Model. In *British Columbia Archery Association Evaluation of Coaches*.
- Vealey, R. S., Armstrong, L., Comar, W. and Greenleaf, C. A. (1998). Influence of Perceived Coaching Behaviors on Burnout and competitive Anxiety in Female College Athletes. In *Journal of Applied Sport Psychology*, Vol. 10 (2), Sept., p. 297-318.
- Wang, J. and Ramsey, J. (1997). Overcoming Barriers and Improving Coach and Athlete Relationships. In *ICHPER.SD*, Vol 36 (1), Fall, p.35-3

## Appendix 1: The NCCP Code of Ethics

### 1. Respect for athletes

The principle of **respect** for athletes challenges coaches to act in a manner respectful of the dignity of those involved in sport. This principle is based on the basic assumption that each person has value and is worthy of respect. Acting with **respect for participants**, means that coaches:

- Do not make some participants feel more or less worthy as persons than others on the basis of gender, race, place of origin, athletic potential, color, sexual orientation, religion, political beliefs, socioeconomic status, marital status, age, or any other conditions.
- Have a responsibility to respect and promote the rights of all participants. This is accomplished by establishing and following procedures for **confidentiality** (right to privacy), **informed participation** and **shared decision-making** (right to self-determination - athletes' rights), and **fair and reasonable treatment** (right to procedural fairness). Coaches have a special responsibility to respect and promote the rights of participants who are vulnerable or in dependent positions, and therefore less able to protect their own rights.
- Interact with others in a manner that enables all participants in sport to maintain their dignity.
- Build mutual support among fellow coaches, officials, athletes, and their family members.

### 2. Coaching responsibly

The principle of **coaching responsibly** carries the expectation that the activities of coaches will benefit society in general, and athletes in particular, and **will do no harm**. Fundamental to the implementation of this principle is the notion of **competence**, which implies that coaches should be well-prepared and possess up-to-date knowledge of their discipline so that they will be able to maximize benefits and minimize risks to athletes. In addition, *coaching responsibly* implies that coaches:

- Act in the best interest of the participant/athlete's development as a whole person.
- Recognise the power inherent to the position of coach.
- Are aware of their personal values and how these affect their behaviour.
- Acknowledge the limitations of their knowledge and competence in their sport.
- Accept the responsibility to work with other coaches and professionals in sport in the best interests of the athletes.

### 3. Integrity in relationships

Behaving with **integrity** means that coaches are expected to be honest, sincere, and honourable in their relationships with others. Acting on these values is possible when coaches have a high degree of self-awareness and the ability to reflect critically on how their views and opinions influence how they interact with others.

In coaching, **critical reflection** questions existing assumptions about the values and practices that govern coaches' actions. The essential component of critical reflection is an attitude based on

- (i) open-mindedness, i.e. an active predisposition to hear more than one side of an issue;
- (ii) active inquiry, i.e. asking why things are done the way they are; and
- (iii) sincerity, i.e. coaches being genuine in their coaching relationships.

The principle of **honouring sport** challenges coaches to recognise and promote the value of sport for individuals and teams, and for society in general. *Honouring sport* implies that coaches:

- Act on and promote clearly articulated values related to coaching and sport.
- Encourage and model honourable intentions and actions.

## Appendix 2: C OF C Code of Conduct

### I. Respect for Participants

The principle of respect for participants challenges coaches to act in a manner respectful of the dignity of all participants in sport. Fundamental to this principle is the basic assumption that each person has value and is worthy of respect.

Acting with respect for participants means that coaches

- i. do not make some participants more or less worthy as persons than others on the basis of gender, race, place of origin, athletic potential, colour, sexual orientation, religion, political beliefs, socioeconomic status, marital status, age or any other conditions;
- ii. have a responsibility to respect and promote the rights of all participants. This is accomplished by establishing and following procedures for confidentiality (right to privacy); informed participation and shared decision-making (right to self-determination - athletes' rights); and fair and reasonable treatment (right to procedural fairness). Coaches have a special responsibility to respect and promote the rights of participants who are in vulnerable or dependent positions and less able to protect their own rights;
- iii. interact with others in a manner that enables all participants in sport to maintain their dignity; and
- iv. build mutual support among fellow coaches, officials, athletes and their family members.

In being faithful to the principle of respect for participants, coaches would adhere to the following ethical standards:

#### Key Words and Ethical Standards

##### Respect

- 1.1 Treat all participants in sport with respect at all times.
- 1.2 Provide feedback to athletes and other participants in a caring manner that is sensitive to their needs, e.g., focus criticism on the performance rather than on the athlete.
- 1.3 Respect the areas of expertise, experience and insights of others in sport by considering carefully their opinions.
- 1.4 Do not engage publicly (e.g., statements, conversations, jokes, presentations, media reports) in demeaning descriptions of others in sport.
- 1.5 Be discreet in non-public conversations about athletes, coaches or other participants in sport.

### Rights

1.6 Recognise athletes' right to consult with other coaches and advisors.

1.7 Respect athletes as autonomous individuals and refrain from intervening inappropriately in personal affairs that are outside the generally accepted jurisdiction of a coach.

### Equity

1.8 Treat all participants equitably within the context of their sporting activities, regardless of gender, race, place of origin, athletic potential, colour, sexual orientation, religion, political beliefs, socioeconomic status and any other condition.

1.9 Use language that conveys respect for the dignity of others (e.g., gender-neutral terms) in written and verbal communications.

1.10 Do not practice, condone, ignore, facilitate or collaborate with any form of unjust discrimination in sport.

1.11 Act to prevent or correct practices that are unjustly discriminatory.

### Empowerment

1.12 Encourage and facilitate participants' abilities to be responsible for their own behaviour, performance and decisions.

1.13 Respect as much as possible the opinions and wishes of participants when making decisions that affect them.

1.14 Give athletes the opportunity to discuss, contribute to and agree with proposals for training and for performance standards.

### Informed participation

1.15 Provide athletes with the information necessary for them to be meaningfully involved in the decisions that affect them.

1.16 Communicate and co-operate with family members, involving them in appropriate decisions pertaining to an athlete's development.

1.17 Clarify the nature of coaching services to participants, i.e., athletes, parents, family members or significant others.

Confidentiality

1.18 Determine, in consultation with athletes and others, what information is confidential.

1.19 Keep confidential any information about athletes or others gained through coaching activities and believed to be considered confidential by those persons.

1.20 Share confidential information only with the consent of those requesting confidentiality or in a way that the individual(s) involved cannot be identified.

1.21 Exercise discretion in recording and communicating information to prevent this information from being interpreted or used to the detriment of others.

1.22 Clarify and implement measures to protect confidential information, e.g., restricting access to confidential records.

Mutual support

1.23 Encourage a climate of mutual support among all participants in sport.

Extended responsibility

1.24 Encourage participants to respect one another and to expect respect for their worth as individuals.

1.25 Keep informed on current issues related to respect for participants, e.g., gender equity.



## **II. Responsible Coaching**

The principle of responsible coaching carries the basic ethical expectation that the activities of coaches will benefit society in general and participants in particular and will do no harm. Fundamental to the implementation of this principle is the notion of competence - responsible coaching (maximizing benefits and minimizing risks to participants) is performed by coaches who are well prepared and current in their discipline.

In addition, responsible coaching means that coaches

- i. act in the best interest of the athlete's development as a whole person;
- ii. recognise the power inherent in the position of coach;
- iii. are aware of their personal values and how these affect their practice as coaches;
- iv. acknowledge the limitations of their discipline; and
- v. accept the responsibility to work with other coaches and professionals in sport.

In being faithful to the principle of responsible coaching, coaches would adhere to the following ethical standards:

### Key Words and Ethical Standards

#### **Professional training**

2.1 Be responsible for achieving a high level of professional competence through appropriate training.

2.2 Keep current with relevant information (knowledge), coaching and teaching skills and research through personal learning projects, discussions with colleagues, workshops, courses, conferences, etc. to ensure that coaching services benefit and do not harm others.

#### **Self knowledge**

2.3 Evaluate how personal experiences, attitudes, beliefs, values, socioeconomic status, sexual orientation, individual differences and stresses influence actions as coaches and integrate this awareness into all efforts to benefit and not harm others.

2.4 Engage in self-care activities that help to avoid conditions (e.g., burnout, addictions) that could result in impaired judgement and interfere with the ability to benefit and not harm others.

Beneficence

2.5 Coach in a way that benefits athletes, removes harm and acts consistently for the good of the athlete, keeping in mind that the same training, skills and powers that coaches use to produce benefits for athletes are also capable of producing harm.

Coaching limits

2.6 Take the limits of knowledge and capacity into account in coaching practice; in particular, do not assume responsibilities if insufficiently prepared for them.

2.7 Recognise and accept when it is appropriate to refer athletes to other coaches or sport specialists.

2.8 Refrain from working in unsafe or inappropriate situations that significantly compromise the quality of coaching services and the health and safety of athletes.

Athlete's interest

2.9 Ensure that activities are suitable for the age, experience, ability, and physical and psychological conditions of athletes.

2.10 Prepare athletes systematically and progressively, using appropriate time frames and monitoring physical and psychological adjustments.

2.11 Refrain from using training methods or techniques that may harm athletes; monitor innovative approaches with care.

2.12 Be aware of significant pressures in athletes' lives, e.g., school, family and financial pressures, and coach in a manner that fosters positive life experiences.

2.13 Consider athletes' future health and well being as foremost when making decisions about injured athletes' ability to continue participating.

2.14 Strive to be fully present, physically and mentally, in the performance of coaching duties.

Safety

2.15 Ensure that athletes train and perform in suitable and safe settings.

2.16 Make athletes aware of their responsibilities for participating safely in sport.

Sexual relationships

2.17 Be acutely aware of power in coaching relationships and, therefore, avoid sexual intimacy with athletes, both during coaching and during that period following coaching during when imbalance in power could jeopardise effective decision-making.

2.18 Abstain from and refuse to tolerate in others all forms of harassment, including sexual harassment. Sexual harassment includes either or both of the following:

- i. the use of power or authority in an attempt to coerce another person to engage in or tolerate sexual activity. Such uses include explicit or implicit threats of reprisals for non-compliance or promises of reward for compliance.
- ii. engaging in deliberate or repeated sexually oriented comments, anecdotes, gestures or touching, if such behaviours
  - a. are offensive and unwelcome;
  - b. create an offensive, hostile or intimidating working environment; or
  - c. can be expected to be harmful to the recipient.

### Colleagues

2.19 Act toward other coaches in a manner characterized by courtesy, good faith and respect.

2.20 Collaborate with other coaches and colleagues from related disciplines.

2.21 Communicate and co-operate with health practitioners in the diagnosis, treatment and management of athletes' health-related needs.

2.22 Use discretion for resolving disputes with colleagues, e.g., deal with differences of opinion constructively on a personal basis and refer more serious disputes to appropriate bodies.

### Extended responsibility

2.23 Encourage others, when appropriate, to coach responsibly.

2.24 Recognise and address harmful personal practices of others in sport, e.g., drug and alcohol addiction, physical and mental abuse, misuse of power.

2.25 Assume responsibility for the actions of athletes and other supervised individuals with regard to the principle of responsible coaching.

### **III. Integrity in Relationships**

Integrity means that coaches are expected to be honest, sincere and honourable in their relationships with others. Acting on these values is most possible when coaches possess a high degree of self-awareness and the ability to reflect critically on how their perspectives influence their interactions with others.

In being faithful to the principle of integrity in relationships, coaches would adhere to the following ethical standards:

#### Key Words and Ethical Standards

##### Honesty

3.1 Explore mutual expectations with athletes in an honest and open manner, giving due consideration to the age and experience of individuals.

3.2 Accurately represent personal coaching qualifications, experience, competence and affiliations in spoken and written communications, being careful not to use descriptions or information that could be misinterpreted.

3.3 Make athletes and others clearly aware of coaching qualifications and experience.

3.4 Notify other coaches when working with those coaches' athletes.

##### Sincerity

3.5 Honour all promises and commitments, both verbal and written.

3.6 Act with an enthusiastic and genuine appreciation for sport.

##### Honour

3.7 Know the support and abide by sport's rules, regulations and standards.

3.8 Take credit only for the work and ideas actually done or generated and give credit for work done or ideas contributed by others.

##### Conflict of interest

3.9 Do not exploit any relationship established as a coach to further personal, political or business interests at the expense of the best interests of their athletes or other participants.

3.10 Be clear about and avoid abusing relationships (e.g., with athletes, assistants, officials, administrators, board members) and avoid other situations that might present a conflict of interest or reduce the ability to be objective and unbiased in the determination of what might be in the best interests of athletes.

3.11 Declare conflicts of interest when they arise and seek to manage them in a manner that respects the best interests of all those involved.

Self-awareness

3.12 Evaluate how personal experiences, attitudes, values, social context, individual differences and stresses influence coaching activities and thinking, integrating this awareness into all attempts to be neutral and unbiased in coaching.

3.13 Recognise and reveal whether personal views are based on facts, opinions, conjecture, theory, beliefs, etc.

Extended responsibility

3.14 Encourage athletes and other participants to develop and maintain integrity in their relationships with others.

**IV. Honouring Sport**

The principle of honouring sport challenges coaches to recognise, act on and promote the value of sport for individuals and teams and for society in general.

Honouring sport means that coaches

- i. act on and promote clearly articulated values related to coaching and sport;
- ii. encourage and model honourable intentions and actions in their coaching practice;  
and
- iii. show high regard for and promote the value of sport in Canadian society and around the world.

In being faithful to the principle of honouring sport, coaches would adhere to the following ethical standards:

## Key Words and Ethical Standards

Spirit of sport

4.1 Advocate and model the fundamentally positive aspects of sport, e.g., sporting and human excellence, fair play, honest competition and effort, self-discipline, integrity, personal growth and development, respect for the body, challenge and achievement, the joy of movement, and other positive aspects identified by participants.

4.2 Actively seek ways to reduce potentially negative aspects of sport, e.g., winning at all costs, playing to the letter of the rules at the expense of the spirit of the rules, exploiting unfairly competitors' weaknesses, focusing on sport to the harmful exclusion of other aspects of athletes' lives, initiating and supporting potentially harmful training regimes, and other negative aspects identified by participants.

Respect for the rules

4.3 Accept both the letter and the spirit of the rules that define and govern sport.

4.4 Actively encourage athletes and other participants to uphold the rules of the sport and the spirit of such rules.

Respect for Officials and other coaches

4.5 Accept the role of officials in ensuring that competitions are conducted fairly and according to established rules.

4.6 Refrain from abusive personal attacks on officials and other coaches, especially when talking with the media.

Drug-free Sport

4.7 Support initiatives that encourage the spirit of sport (see also 4.1, 4.2).

4.8 Actively discourage the use of performance-enhancing drugs; support athletes' efforts to be drug-free.

4.9 Refrain from encouraging the use of alcohol and tobacco in conjunction with athletic events or victory celebrations at playing sites.

Positive role model

4.10 Maintain the highest standards of personal conduct and project a favourable image of the sport and of coaching to athletes, other coaches, officials, spectators, families, the media and the general public.

4.11 Project an image of health, cleanliness and functional efficiency in personal habits and appearances, e.g., refrain from smoking while coaching; refrain from drinking alcoholic beverages when working with athletes.

Responsibility to coaching

4.12 Promote and maintain the highest standards of the coaching discipline.

4.13 Encourage measures to improve the quality and availability of coaches' professional services.

4.14 Encourage measures that promote education, knowledge development and research in the field of coaching.

4.15 Develop the coaching profession by exchanging knowledge and experiences with colleagues, athletes and students and by being participants, course facilitators or master course conductors in courses and internships.

4.16 Uphold the responsibility to coaching by bringing incompetent or unethical behaviour to the attention of appropriate regulatory committees in a manner consistent with the ethical principles of this code, if informal resolution or correction of the situation is not appropriate or possible.

Extended responsibility

4.17 Encourage athletes and other participants to honour sport on a lifelong basis.

## Appendix 3: ARCHERY CANADA - Anti-Abuse & Anti-Harassment Policy

### **Archery Canada, Inc**

### **Harassment Policy & Guidelines**

#### **1. Preamble**

1.1 The *Federation of Canadian Archers* (herein after referred to as *ARCHERY CANADA*) is committed to the achievement of equal opportunity including the establishment of a sport environment in which all members have the opportunity to contribute to the sport to their maximum potential. As such the *ARCHERY CANADA* has a zero tolerance policy, meaning no level of harassment is acceptable. The goals of the policy are to:

resolve a situation fairly and in a timely manner

prevent further harassment

diminish the harm to a complainant and liability to the *ARCHERY CANADA*, its Directors, staff and members.

#### **Policy**

**The *Archery Canada* will not tolerate any form of harassment or abuse and undertakes to protect all members regardless of their race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, disability, age, marital status, family status or record of offence, from harassment or abuse by other members of the association with whom they have contact.**

1.2 This policy is directed towards the protection of members from harassment that may occur during *Archery Canada* business and events, where there may be repercussions in the work environment adversely affecting members' archery relationships. The definition of *ARCHERY CANADA* business and events are those activities that receive direct *ARCHERY CANADA* financial support, in whole or in part.

1.3 The Federation of Canadian Archers (herein after referred to as *ARCHERY CANADA*) operates in accordance with The London Declaration (attached) and is committed to its 12 provisions.

#### **2. Definitions of Harassment and Abuse**

##### **2.1 Definition of Harassment**

Harassment can generally be defined as behaviours including comments and/or conduct which is insulting, intimidating, humiliating, hurtful, malicious, degrading or otherwise offensive to an individual or groups of individuals or which creates an uncomfortable environment. Harassment may include:

- 2.1.1 Harassment is a form of discrimination. Harassment is prohibited by legislation in each province of Canada.
- 2.1.2 Harassment is offensive, degrading and threatening. In its most extreme forms, harassment can be an offence under Canada's Criminal Code.
- 2.1.3 Harassment may include:  
sexually oriented comments  
  
racial or ethnic comments
- 2.1.4 Harassment may occur between peers or someone in a position of power and an adult in a subordinate position.
- athlete to athlete,
  - coach to coach,
  - parent to coach,
  - coach to athlete
- 2.1.5 For the purposes of this policy, sexual harassment or abuse is defined as unwelcome sexual advances, requests for sexual favours or other verbal or physical conduct of a sexual nature when:
- submitting to or rejecting this conduct used as the basis for making decisions,
  - which affect the individual
  - such conduct has the purpose or effect of interfering with an individual's performance, or
  - such conduct creates an intimidating, hostile or offensive environment.
- 2.1.6 Types of behaviour which constitute harassment or abuse include, but are not limited to:
- written or verbal abuse or threats
  - the display of visual material which is offensive or which one ought to know is offensive
  - displaying of sexual explicit, racist or other offensive or derogatory material
  - unwelcome remarks, jokes, innuendoes, or taunting about a person's body, attire, age, marital status, ethnic or racial origin, religion, or sexual orientation, etc.
  - sexual, racial, ethnic or religious graffiti
  - practical jokes, which cause awkwardness or embarrassment; endanger a person's safety, or negatively affect performance
  - unwelcome sexual flirtations, advances, remarks, invitations or requests whether indirect or explicit, or intimidation
  - leering (suggestive staring), or other obscene or offensive gestures
  - condescension, paternalism, or patronizing behaviour which undermines self-respect or adversely affects performances or working conditions
  - unwanted physical conduct such as touching, kissing, patting, pinching
  - vandalism
  - physical or sexual assault
- 2.1.7 Some behaviours that might be described as harassment when directed towards an adult, may constitute abuse when directed towards a child or youth by any person with power or authority over the person harassed
- 2.2 Definition of Abuse



Child abuse is any form of physical, emotional and/or sexual mistreatment or lack of care which causes damage, emotional or physical, to a child or youth. Common characteristics or abuse against children and youth are abuse of power or authority, or a breach of trust.

Emotional abuse is an attack on a child/youth's self-esteem.

- It is behaviour by a person in authority that damages a child/youth psychologically
- It can be name-calling, threatening, ridiculing, berating, intimidating, isolating, hazing or ignoring a child's needs

Physical abuse is when a person in authority injures or threatens to injure purposely. It can be slapping, hitting, shaking, kicking, pulling hair or ears, throwing, shoving, grabbing, hazing or excessive exercise as a form of punishment.

Neglect is inattention to the needs of the child athlete. This may occur when:

- equipment is unsafe
- no-one intervenes when a child/youth is being harassed
- injuries are not adequately treated
- athletes are made to compete with injuries

Sexual abuse is defined as a younger person being used by an older child, adolescent or adult for the sexual stimulation or gratification of the older individual. It can take two forms: contact and non-contact.

### **3. Reprisal**

3.1 As part of their right to freedom from harassment, *Federation of Canadian Archers* members are protected from reprisal or the threat of reprisal. Reprisal may include situations in which a member is:

- denied or threatened with denial of promotional, advancement, training, or other related opportunities or benefits (e.g. team selection, etc.)
- disciplined or threatened with disciplinary action
- dismissed or threatened with dismissal on the sole basis of:
- rejecting the sexual advances of a person in authority who could or who could be perceived to have influence over archery-related decisions affecting the member
- having made a complaint of harassment

3.2 Reprisal may also include situations involving co-member(s) who, because the member has made a complaint of harassment, continue or escalate the harassment; ostracize or isolate the member; and/or engage in any behaviour with the intent to intimidate, threaten, humiliate, hurt or adversely affect the performance or working conditions of the member.

### **4. Responsibility**

4.1 Board/committee members, affiliated club executives, staff, coaches, managers and judges of the *ARCHERY CANADA* are responsible for preventing and discouraging harassment by:

- undertaking and upholding the principles of this policy;
- not engaging in behaviour contrary to this policy and ensuring that all members are treated fairly and equitably
- communicating the *ARCHERY CANADA*'s objective to create and maintain a harassment-free sport;
- not allowing or condoning behaviour contrary to this policy;

- taking all complaints of harassment seriously by investigating complaints in a thorough and sensitive manner and taking prompt action to resolve the situation in accordance with procedures outlined in the following sections.

4.2 Any person who has authority to prevent or discourage harassment will be held responsible for failing to exercise this authority.

4.3 All members of the *Federation of Canadian Archers* have a responsibility not to harass any other member. Members who experience harassment are encouraged to make it known to the harassed that the behaviour is offensive and/or to report the incident(s) according to the following complaint procedures. Members who witness harassment or who become aware that a member is being harassed are encouraged to report the incident according to the complaint reporting procedure that follows.

## 5. Complaint Reporting

5.1 ARCHERY CANADA members who experience harassment are encouraged to make it known to the harasser that the behaviour is offensive and if it continues, report the incident to the ARCHERY CANADA's Vice President of Administration through the ARCHERY CANADA national office. If this avenue is either unavailable or inappropriate, complaints may be made directly to:

- any member of the Federation of Canadian Archers Board of Directors or staff member
- any chair of any Federation of Canadian Archers committee
- any Federation of Canadian Archers coach, judge, or manager
- any executive member of a club affiliated with the Federation of Canadian Archers.

5.2 A person who has authority to prevent or discourage harassment is considered responsible for failing to exercise that authority.

5.3 In the event that the complaint is lodged against the ARCHERY CANADA Executive Director, the Vice President of Administration will be responsible for all procedures outlined in the section entitled Complain Investigation and Resolution.

5.4 Members are encouraged to report incidents of harassment. Members who bring the incident(s) to the attention of the ARCHERY CANADA will receive the full support of the *Association*. Complaints will be addressed in a sensitive, responsible and timely manner. If a member brings a complaint to one of the above and if, after 14 days, the member has not received an interim reply and believes that the complaint has not been satisfactorily resolved, the member should then bring the complaint directly to the Executive Director.

5.5 Members who experience harassment because of their sex, race, religion, ethnicity, place of origin, disability, age, sexual orientation or family status are specifically protected under the Human Rights Code and have the right to file their complaint with their Provincial Human Rights Commission. If a member wishes to lay criminal charges, she/he should consult a lawyer. The member has the right to sue under the civil code, anyone who had an opportunity to do something about the harassment.

## **6. Complaint Investigation and Resolution**

6.1 The complaints reporting procedure sets out to a number of avenues for reporting incidents of harassment. Once a complaint is reported immediate action must be taken as follows:

- 6.1.1 The complaint must be documented and immediately forwarded to the Executive Director, who must inform the Executive Committee of the complaint as quickly as possible.
- 6.1.2 The Executive Committee must immediately appoint a tribunal to investigate the incident(s). The tribunal must be impartial. The tribunal members are to have no association or connection whatsoever with the reported incident. If appropriate, the Tribunal Chair will be the Vice-President of Administration. If inappropriate, the ARCHERY CANADA President will appoint a member of the ARCHERY CANADA Board of Directors
- 6.1.3 The complaint must be documented and immediately forwarded to the chair of the tribunal. The tribunal will appoint an investigator
- 6.1.4 The Executive Director must ensure that an investigation is initiated.
- 6.1.5 No later than ten (10) days after being appointed, the Tribunal Chair shall recommend to the Executive Director if a hearing is justified in each particular case. A further hearing shall be necessary if the investigator has reasonable grounds for believing that the conduct complained of took place and was harassment.
- 6.1.6 Upon the Executive Director being informed by the Tribunal Chair that a further hearing is justified, the Executive Director shall immediately advise the Tribunal Chair of the need to appoint a three-member (3) hearing panel as soon as possible. The hearing must be independent and must have no association or connection whatsoever with the incident or the individuals involved. In the event that the complaint implicates the Executive Director, the ARCHERY CANADA Executive Committee will appoint the members
- 6.1.7 The Chairperson of the hearing panel, via the ARCHERY CANADA office within ten (10) days of its establishment, shall receive written submissions from the complainant, at his or her own expense, sent through the national office, setting out in detail the alleged harassment, the arguments establishing the harassment and all evidence in support of the complaint. An individual or documentation assembled from other sources may submit the evidence in the form of sworn affidavits to the national office. Copies of all materials submitted to the hearing panel must be provided to the alleged harasser.
- 6.1.8 Upon the conclusion of the ten (10) day submission period, the alleged harasser shall then have a further ten (10) days to submit to the hearing panel Chair, via the ARCHERY CANADA office, a reply, at his or her own expense, sent through the national office, which may include evidence of the same type as permitted to the complainant.
- 6.1.9 No later than five (5) days after receiving all written documentation the hearing panel shall hear arguments from both the complainant and the alleged harasser, at their own expense. The individuals may appear in person or may be represented by legal counsel. In appropriate circumstances, telephone conference calls are an appropriate mechanism for conducting the oral hearing. Translation costs, if necessary, will be the responsibility of the complainant and alleged harasser.

- 6.1.10 Within five (5) days of hearing the oral evidence, the members of the hearing panel, after deliberation with each other, which may be by telephone, shall submit their written decision, with reasons, to the Executive Director. The Executive Director will then advise the complainant and the alleged harasser of the decision of the hearing panel. Copies of the decision and reason will be given to all parties. Should the proceedings implicate the Executive Director, and appointed member of the ARCHERY CANADA Board shall act instead.
- 6.1.11 In the event the hearing panel finds in favour of the complainant the matter shall be promptly referred to the ARCHERY CANADA Executive Committee for determination of appropriate sanctions to be imposed on the harasser. .
- 6.1.12 As soon as possible but in any even within (10) days of the hearing, the panel shall present its decision to the ARCHERY CANADA Executive with a copy provided to both the complainant and respondent. This decision shall contain:
- a summary of the relevant facts
  - a determination as to whether the acts complained of constitute harassment as defined in this policy
  - disciplinary action against the respondent
  - measures, if any, to remedy or mitigate the harm or loss suffered by the complainant, if the act constitutes harassment
- The Executive Director shall advise the harasser, in writing, of the sanctions imposed by the Executive Committee
- 6.1.13 In the event the hearing panel finds that there was no harassment the matter will be at an end.
- 6.1.14 If the panel determines that the allegations of harassment are false, vexatious, retaliatory or frivolous, their decision may direct disciplinary action against the complainant.

6.2 All complaints of harassment must be investigated by the appointed tribunal to determine the nature and circumstances of the incident(s) and to determine appropriate resolution. During the investigation of a complaint the Tribunal shall:

- interview both the complainant and the alleged offender as soon as possible;
- interview any witnesses;
- document the situation accurately and completely;
- state an opinion as to the validity of the complaint;
- inform the ARCHERY CANADA Executive Committee of the remedial action that was decided, if any
- conduct the investigation with the utmost confidentiality and sensitivity; and
- caution persons who are questioned not to discuss the case with members or employees.

6.3 Remedial action shall be taken without delay. Sanctions imposed on the offender must be applied with an understanding of the seriousness of the misconduct and follow the general principles of corrective discipline.

6.4 It is the responsibility of the Tribunal to ensure that a complainant who lays a complaint in good faith is neither penalized nor suffers any prejudice as a result of making the complaint. Correspondence pertaining to a complaint shall not be placed on the complainant's personal files.

- 6.5 When determining appropriate disciplinary action, the Panel shall consider factors such as:
- the nature and severity of the harassment
  - whether the harassment involved any physical contact

- whether the harassment was an isolated incident or part of an ongoing pattern
- the nature of the relationship between the complainant and harasser
- whether the harasser had been involved in previous harassment incidents whether the harasser admitted responsibility and expressed a willingness to change
- whether the harasser retaliated against the complainant

6.6 In recommending disciplinary sanctions, the panel may consider the following options, singly or in combination, depending on the nature and severity of the harassment:

- verbal apology
- written apology
- letter of reprimand from the organization
- a fine or levy
- referral to counselling
- removal of certain privileges of membership or employment
- demotion or a pay cut
- temporary suspension with or without pay
- termination of employment, contract or position if authority for a determined period of time
- expulsion from membership

## 6.7 Appeals

Both the complainant and respondent shall have the right to appeal the decision of the panel

In accordance with ARCHERY CANADA's Appeal Policy

- Either party, within thirty (30) days of being informed by the Executive Director of the result of the hearing panel, may appeal the decision of the hearing panel and/or the sanctions imposed by the Executive Committee to the ARCHERY CANADA Board of Directors. The full Board of Directors will consider the appeal at its next normal meeting. The Board of Directors shall obtain copies of all of the arguments and evidence presented to the hearing panel and shall review this material prior to the next Board Meeting. The complainant and the alleged harasser, or their representatives, shall, at their own expense, have the right to make a further oral presentation at the Board of Directors meeting. The Board of Directors shall have the right to substitute a new or sanction and such decision or sanction imposed by the Board of Directors, on appeal, shall be final.
- No member of the Association shall be involved in any fashion on the appeal of any decision in which he was involved, either as an investigator or as a hearing panel member. Either party may appeal the Board's decision, at their own expense, to the Sport Dispute Resolution Centre of Canada

6.7.1 The SDRCC is available as a last-resort step should all internal ARCHERY CANADA processes fail to resolve disputes or harassment cases. SDRCC provides independent mediation and arbitration services at a low cost to the defendant and the plaintiff. The SDRCC goal is to avoid litigation. Under the scope of SDRCC:  
 "Any member of a national sports organization (possibly defined as a Canadian amateur athletic association registered as a charitable amateur athletic organization which may include NSF, MSO, NSC) who is directly affected by a decision of the Board, of any committee of the Board or of any other group or individual who has been delegated authority to make decisions on behalf of the NSO or its Board, has the right to appeal that decision."

6.7.2 Either party may make application to SDRCC only after all internal ARCHERY CANADA processes have been exhausted.

## **7. Confidentiality**

7.1 The ARCHERY CANADA recognizes that it can be extremely difficult to come forward with a complaint of harassment and that it can be devastating to be wrongly convicted of harassment. ARCHERY CANADA recognizes the interests of both the complainant and the respondent in keeping the matter confidential.

7.2 Information or material in any form, regarding the investigation or circumstances surrounding the investigation, or the results of the investigation, shall only be released or divulged to those persons directly involved with the complaint, these include the complainant, accused/offender, Tribunal chairperson, ARCHERY CANADA Executive Committee and ARCHERY CANADA Executive Director. The identity of tribunal members, other than the chairperson, will not be made public.

## **8. Prevention / Education**

8.1 The ARCHERY CANADA recognises that an education program is an essential component to preventing incidents of harassment. The ARCHERY CANADA is committed to:

- building awareness, and commit to creating a harassment-free organisation and ensure that awareness is properly reflected in policies and procedures.
- build the commitment into the organisation's culture,-values and mission statement
- include these policies and procedures in manuals, handbooks guides and agreements
- educate individual members identifying steps they're responsible for taking, if they are harassed and provide contacts they can call for help and advice, if they are unable or unwilling to confront the situation themselves.

**Expectations for Fairness in Sport**  
**A Declaration, enacted by the Federal-Provincial/Territorial Sport Ministers**  
**At their 2001 Conference, August 10, 2001, London, Ontario**

The Federal and Provincial/Territorial Sport Ministers believe that Canadians share a vision that ethics and ethical behaviour are integral to sport. The Ministers endorse this vision, which requires that:

- |              |   |
|--------------|---|
| Principle    | 1. There be a firm and public commitment to the principle that lasting and meaningful athletic performance can only be achieved through fair means.   |
|              | 2. Participants in sport and physical activity will do so in a manner that adheres to the highest ethical principles.   |
| Participants | 3. Those who participate in sport will receive from their fellow athletes, coaches and officials, and parents/guardians and spectators, fairness and ethical treatment in a safe and welcoming sport environment, free of harassment and abuse.   |
|              | 4. Their sport system will help to advance the widest array of athletic goals of all participants, with or without disability, without discrimination and in spite of barriers based on personal circumstances.   |
| Reciprocity  | 5. Spectators to sport events can witness the activities without being subjected to abuse, interference or violence from others.  |
| Barriers     | 6. Coaches will be appropriately valued by their athletes, and their athletes, parents/guardians and supporters, that they will receive fair treatment and respect for their valuable contribution to sport, and that they will be free of harassment and threats of violence under any circumstance. |
|              | 7. Sport officials will not be interfered with in the execution of their duties and will be respected for their decisions by athletes, coaches, parents/guardians and spectators.   |
| Spectators   | 8. Sport volunteers will be respected and recognized for their efforts to make sport participation possible and rewarding for athletes of all ages.   |
|              | 9. Parents/guardians are assured that their children participating in sport will receive fair treatment from coaches, volunteers and spectators.  |
|              | 10. The sport system will provide just treatment in cases of disputes in sport and that there are proper and accessible mechanisms that are available in a timely manner to resolve disputed issues through due process.  |

Coaches

11. Athletes, coaches and team officials representing Canada in the international sport arena will conduct themselves, in both victory and defeat, in a manner that brings pride to all.
12. Sport organizations in receipt of public funding, will be fully accountable for the use of such resources and will be transparent and democratic in their organizational life.

Officials

Volunteers

Parents/  
Guardians

Dispute  
Resolution

Behaviour

Transparency



## Appendix 4: Canadian Centre for Ethics in Sport Mandate

About CCES:           Mission

Responsibility for fair and ethical sport in Canada is shared by athletes, coaches, sport organisations, governments and the general public. The CCES assists Canada's amateur sport community to fulfil this responsibility in a way that is effective and publicly accountable.

Canadians expect the institution of sport, as broad and diffuse as it may be, to adhere to high moral and ethical standards. From the physical and moral development of our youth to the presentation of our national character on the world stage, sport represents a powerful social, cultural and economic force in our pluralistic society—a force upon which the sport community must exercise diligence and stewardship to ensure a positive, productive and healthy sport environment for all Canadians.

Over the past decades, society's image and expectations of sport have evolved. The Canadian public expects the world of amateur sport to act responsibly and to model the kind of values, moral and ethical conduct, which should be communicated through the experience of sport. Indeed, the integrity of sport is intimately tied to the integrity of our society as a whole. Both the moral and the financial health of amateur sport in Canada are matters of significant public interest.

The current amateur sport environment in Canada is characterised by the kind of turbulence, uncertainty and financial pressures which, when taken together, create increased difficulties and challenges for sport to recognise, maintain and exercise its traditional roles of celebrating excellence and development of young Canadian athletes. In facing these challenges, the integrity of Canada's sport system remains a key element in ensuring that young athletes will be able to reach their potential and that Canada's contribution as a sporting nation on the world stage can continue to flourish.

**The mission of the Canadian Centre for Ethics in Sport is to foster ethical sport for all Canadians. The CCES achieves this mission through research, promotion and education relevant to ethics in sport, including fair play and drug-free sport. As well, the CCES administers Canada's domestic anti-doping programme, while at the same time exercising international leadership in advancing a doping-free, fair and ethical environment for sport worldwide.**

<http://www.cces.ca/>

Appendix 5: ARCHERY CANADA Coach Evaluation Information for Competition - Development Context

**NCCP Evaluation Guidelines for the Coach in Competition - Development Context**

<b>NCCP Outcomes</b>	<b>Criteria</b>	<b>Required to be part of ARCHERY CANADA training (T) or evaluation (E) programme if outcome applies</b>
<b>I. Analysing Performance</b>	Detect technical elements that have to be improved or refined to enhance performance and/or to prevent injuries	<b>T E</b>
	Correct technical elements that have to be improved or refined to enhance performance and/or to prevent injuries	<b>T E</b>
	Detect tactical elements that have to be improved or refined to enhance performance	<b>T E</b>
	Correct tactical elements that have to be improved or refined to enhance performance	<b>T E</b>
	Evaluate if athlete's sport-specific fitness level is adequate for performance and for continued progression in the sport	<b>T</b>
<b>II. Plan a Practice</b>	Identify logistics and appropriate background information for practice	<b>T E</b>
	Identify appropriate activities in each part of the practice	<b>T E</b>
	Design and sequence activities appropriately within the practice to enhance performance or create optimal adaptations	<b>T E</b>
	Design an Emergency Action Plan	<b>T E</b>
<b>III. Design a Sport Programme</b>	Outline program structure based on training and competition opportunities	<b>T E</b>
	Identify appropriate measures to promote athlete development	<b>T E</b>
	Integrate yearly training priorities for Archery into own programme	<b>T E</b>

	Organise and sequence training priorities and objectives on a weekly basis to optimise adaptations	<b>T E</b>
<b>IV Provide Support to Athletes in Training</b>	Ensure that the practice environment is safe	<b>T E</b>
	Make interventions that enhance learning and are aimed to at improving the athletes' performance.	<b>T E</b>
	Make adjustments to practice based on athletes' response to the training task	<b>T E</b>
	Implement protocols and methods that contribute to the development of athletic abilities relevant to sport	<b>T E</b>

<b>V. Support the Competitive Experience</b>	Implement procedures to promote readiness for performance: Pre-competition	<b>T E</b>
	Make decisions and interventions that promote sport-specific performance: During competition	<b>T E</b>
	Use the competitive experience in a meaningful manner to further athletes' development: After competition	<b>T E</b>
	Implement procedures to promote readiness for performance: Pre-competition	<b>T E</b>
	Oversee logistics/support to create favourable conditions for performance	<b>T E</b>
<b>VI. Manage a Programme</b>	Manage administrative aspects of program and oversees logistics	<b>T E</b>
	Develop strategies to address and resolve conflicts in sport	<b>T E</b>
	Take appropriate measures to promote drug-free sport	<b>T E</b>
	Develop and implements fair selection procedures	<b>T</b>
	Implement recruitment and talent identification procedures	<b>T</b>
<b>VII. Make Ethical Decisions</b>	Apply an ethical decision making process.	<b>T E</b>

		<b>PORTFOLIO</b>	
<b>Document</b>		<b>Evaluation Procedure</b>	<b>Timeline</b>
1.	Make Ethical Decisions	Central on-line evaluation procedure	12 months
2.	Emergency Action Plan	Send to Evaluator	6 months
3.	Practice Plan	Send to Evaluator	6 months
4.	Annual Plan w/athlete	Send to Evaluator	2 months
5.	Direct observations by LF	During the workshop #1	
6.	Direct observations by LF	During the workshop #2	6-12 months
7.	Annual Plan evaluation	Send to Evaluator	12 months
8.	Self Assessment	Send to Evaluator	12 months

<b>I. Analysing Performance</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Detect and correct cause for inconsistent performance	<ul style="list-style-type: none"> <li>- Demonstrates observation skills based on biomechanical principles</li> <li>- Detect inconsistencies in performance due to: <ul style="list-style-type: none"> <li>o Shooting form</li> <li>o Mental abilities</li> <li>o Physical abilities</li> <li>o Social abilities</li> <li>o Equipment</li> <li>o Nutrition</li> <li>o Travel strategies and routines</li> </ul> </li> <li>- Use of advanced diagnostic procedures and professional referrals to improve athlete performance</li> <li>- Use of diary by coach and athlete</li> <li>- Use of advanced visual observation techniques (motion analysis programmes, i.e. Dartfish)</li> </ul>
2. Evaluate athlete readiness for performance at National and International competitions	<ul style="list-style-type: none"> <li>- Evaluate <ul style="list-style-type: none"> <li>o Shooting form</li> <li>o Mental abilities</li> <li>o Physical abilities</li> <li>o Social abilities</li> <li>o Equipment</li> <li>o Nutrition</li> <li>o Travel strategies and routines</li> </ul> </li> </ul>
3. Determine when appropriate effective interventions in competition in conjunction with athlete input	<ul style="list-style-type: none"> <li>- As pre-arranged pre-event in log book</li> </ul>
4. Communicate the result of the analysis to athlete/participant and team	<ul style="list-style-type: none"> <li>- Effective communications techniques – use of visual, verbal and written communication</li> </ul>

support staff if applicable	
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<b>II. Plan and Design a Practice</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Knowledgeable of LTAD stages appropriate to athlete	- Reference LTAD “Train to Compete” leading towards “Shoot to Excel” stages
2. Follow LTAD and Annual Plan when designing Practice plans	- Use Annual Training Plan as a base for cycles in the practice plans (Meso –Micro)
3. Promote “complete” athlete development	- Inclusion of athlete’s needs outside the sport in the design of the Practice and Annual Training Plans
4. Incorporate appropriate resources to achieve desired training effects.	- Use of other professionals ( e.g. Sport Psychologist) - Periodic use of visual observation
<b>III. Plan and Design a Sport Programme</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Use LTAD stages to establish Sport Programme	- Develop an annual plan - Develop micro cycle plans - Establish annual goals - Reference LTAD “Train to Compete” leading towards “Shoot to Excel” stages
2. Programme - specific to discipline - to include advanced skills, physical preparation, mental readiness, equipment needs, nutrition and event preparation	- Advances skill training specific to athlete needs and discipline (3D, Field, Target) - Athlete specific exercise and warm up program - Bio-feedback strategies established - Intermediate relaxation and concentration skills exercises - Back-up equipment in place - On field sport-specific nutrition needs consistent with healthy eating habits - Event planning strategies (travel, nutrition, environment)
3. Programme to include sport and personal goals with success indicators.	- Maintenance of diary or activity log by coach - Maintenance of diary or activity log by athlete - Regular review of goals for each cycle
<b>IV. Providing Support in Training</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Verify that facilities and equipment pose no safety risks	- Ensure the presence of an EAP at practice venue - Follow “Train to Compete” LTAD guidelines regarding selection of equipment
2. Integrate tournament structure/procedures and policies into training sessions	- Use of National and International rule books - Use of Team Selection Documents - Use of anti doping guidelines - Design training activities to simulate tournament

	<ul style="list-style-type: none"> <li>format</li> <li>- Use of on-line competition opportunities</li> </ul>
3. Provide guidance about choice for discipline specialisation	<ul style="list-style-type: none"> <li>- Knowledgeable of all archery disciplines (i.e. 3D, Field and Target)</li> <li>- Making the athlete and other stake holders part of the decision making process</li> <li>- Active leadership role in designing/implementing goals during the practice session relative to the chosen discipline</li> </ul>
4. Promote self esteem and personal growth	<ul style="list-style-type: none"> <li>- Periodic review of goals and performance indicators</li> <li>- Knowledgeable of opportunities for National and International training and competition</li> <li>- Encourage the archer to read and discover activities and role models in the chosen discipline to discuss with the coach</li> <li>- Use of an <u>archer</u> diary or log to identify individual needs</li> <li>- Archer &amp; coach identify roadblocks to performance goals and develop remedial strategies</li> </ul>
5. Adapt the activity for individual needs and abilities	<ul style="list-style-type: none"> <li>- On-going review and modification of Annual Training Plan</li> <li>- Use of a <u>coach</u> diary or log to identify individual needs</li> </ul>
6. Make interventions that promote and support learning	<ul style="list-style-type: none"> <li>- Specific refinements to technical and mental training <ul style="list-style-type: none"> <li>o <u>Train to Compete</u> process per LTAD</li> <li>o Intermediate psychological skills</li> <li>o Fine tuning / equipment maintenance</li> <li>o Sport-specific physical training routines</li> </ul> </li> <li>- Use of de-brief sessions after training session</li> </ul>
<b>VI. Ethical Coaching</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Apply an ethical decision making process	<ul style="list-style-type: none"> <li>- Complete MED Evaluation Tool</li> <li>- Signed the NCCP Coach's Code of Conduct</li> </ul>
2. Knowledgeable of a course of action for dealing with situations that are not consistent with the values and philosophy of the NCCP	<ul style="list-style-type: none"> <li>- Aware of "on field" and "off field" appeal and complaint procedures</li> </ul>
3. Knowledgeable of anti-doping regulations	<ul style="list-style-type: none"> <li>- Familiar with CCES procedures and resources</li> </ul>
4. Aware of coach associations	<ul style="list-style-type: none"> <li>- Membership in PSO, NSO and relevant coaching associations i.e. Coaches of Canada</li> </ul>
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<b>V. Support the competitive experience</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Knowledgeable of competition	<ul style="list-style-type: none"> <li>- Event specific rules and venue considerations</li> </ul>

formats, rules and customs	- Knowledge of cultural norms for region
2. Knowledgeable of specific nutritional needs of athlete during competition	- Adequate food and hydration available on the Field of Play - Knowledge of accessibility of required foods
3. Design appropriate competitive warm-up activities	- Dynamic muscle warm up routine on Field of Play – as prescribed by ARCHERY CANADA & Regional Coaches Council
4. Interventions during competition	- Minimal Intervention on form inconsistencies - Minimal Intervention on attitudinal issues; loss of competitive state - Intervention as needed if equipment failure occurs - Minimal Intervention as needed if archer fails to hydrate/eat adequately
5. Debrief after competition	- Use of debrief strategies and tactics related to <b>annual</b> plan goals recorded in log book
6. Behave respectfully toward participants, officials, parents, and spectators	- Ensure compliance with ARCHERY CANADA Athlete Code of Conduct and the NCCP Code of Conduct - Ensure compliance with Team Member Agreements

<b>VI. Programme Management</b>	
What the coach must be able to DO	What the evaluator must SEE as evidence
1. Have a coaching philosophy and key principles guiding programme decisions to the participants/athletes and other stake holders.	- Written statement of “Coaching Philosophy”
2. Knowledgeable of talent ID programme	- Contact with Provincial High Performance programmes to locate National Team candidates - Works with existing ARCHERY CANADA structure
3. Coach to be aware of administrative and reporting duties	- Communicates with athlete, stake holders and provincial sports governing bodies as needed (i.e.: financial reports, athlete progress reports) - Demonstrates an ability to work with assistants and stakeholders - Communications with PSO, NSO and other sport agencies as needed (i.e.: coaching activity reports, tournament reports, athlete progress reports and talent ID reports)
4. Aware of International Competitive Calendar	- Communication with NSO and other International Sport organizations through appropriate channels - Inclusion for appropriate International events in athlete’s plan
5. Demonstrate management skills	- Communicates with athlete and sports governing bodies as needed - Display good time-management (i.e.: use of daily calendar)
6. Demonstrate conflict management resolution skills	- Knowledge of PSO and NSO Anti-Harassment and Abuse Policies - Use Sport Dispute Resolution Centre of Canada (SDRCC) Conflict Resolution Module Training



**COMPETITION – DEVELOPMENT**

**REFERENCE MANUAL**

**CHAPTER 2**

**THE PLAN**



## OBJECTIVES OF CHAPTER 2: THE PLAN

Design, implement and evaluate a specific ethical annual training plan.

Review and implement theories concerning periodization, goal setting and training that affect planning.

Utilise psychological, physiological, technical and tactical information from the reference manual to provide a safe training environment for the elite competitive archer.

### LEARNING OUTCOMES OF THIS CHAPTER

The coach will be able to:

1. Design, implement and evaluate an ethical annual training plan for one archer at the Train-to-Compete or Shoot to Excel stage, compound or recurve, in one archery discipline.
2. Integrate theories on periodization, goal setting and training into the annual plan for an elite competitive archer participating in one archery discipline.
3. Integrate the psychological, physiological, technical and tactical needs of the athlete into the plan for one archery discipline.
4. Provide a safe training environment for the archer and the coach.
5. Plan provincial team training camp.
6. Solve problems arising from the implementation of the plan.

## COACH REFERENCE MANUAL

### Introduction

- How will the coach complete the major assignment?

### i) Establishing the Foundation

- goals of the athlete/SMART goals
- inventory of the athlete's needs
- one-to-one working agreement (athlete, coach, parent/spouse/school)

### ii) The Building Blocks

- Main Components of an Annual Plan
- Intentions, Objectives, and Priorities
- Overview of Structure, Progression, Adjustment and Evaluation
- Developmental Needs and Archer's Interests
- Athletic Development

### iii) Organising the Plan - Periodization

- Structure of an Annual Plan - Periods and Phases of a Sport Plan
- Creating the **Hypothetical** In-Class Plan
  - Primary and secondary tournaments within the annual plan
  - Physiological, psychological and equipment initial testing/re-testing
  - Equipment needs
  - Tactical concerns
  - Archery skill level requirements
- Assessing the **Hypothetical** In-Class Plan
  - Common Issues and Possible Solutions

- iv) Planning a Practice
  - Structure of a Practice
  - Planning a Practice – things to consider
  - Key Elements
  - Optimal Order of the Activities
  - Practice Planning Tips
  - Steps in Choosing/Designing Activities for a Practice
  
- v) Risk Management and the Emergency Action Plan

## **WORKBOOK TASKS**

### **PREP WORK FOR THE WORKSHOP**

SMART Goals - Application of the Theory

viii) Exercise #5: Emergency Action Plan for your club or training facility

- iv) Exercise #1: The archer, the discipline of choice, the preliminary plan
- v) Exercise #2: A meso-cycle
- vi) Exercise #3: A micro-cycle
- vii) Exercise #4: Plan the Practice
- ix) Exercise #5: Planning for the Future
- x) Exercise #6: Planning a provincial team training camp
- xi) Case Study:
  1. Did the plan work?

## Introduction

In ARCHERY CANADA's Recreation Stream, the archery coach was trained to design lesson plans and work mainly with groups. If club programmes ran well, the contact between Instruction of Intermediate Coaches and class members was scheduled regularly. Sessions may run throughout a season and finish up for the year when the weather changes. The Club Coach in this situation works with the archers for an extended period of the year, but then may not see those archers again for 3-4 months.

However, a Competition Stream coach is expected to develop a special one-on-one relationship with an athlete who wishes to excel. There is no relationship to a group setting or basic form correction. Instead, each archer works toward personal goals throughout each season during a year or longer. There must be longer-term commitment to the individual and skill development. The archer will need guidance and direction, for the next competitive year, and for years to come. The archer's long-term needs and goal fulfillment adds extra responsibilities to the coach. The coach needs to provide direction and logical progression for the archer-coach team. In order to do a good job, the Competition - Development coach must learn to build an annual plan properly. With respect to long-term athlete development, the annual plan is just the beginning. If the coach candidate has taken the NCCP "Plan a Practice" workshop, this chapter will provide a review; for the coach candidate who has not taken that course, this chapter defines the process to create, implement and assess an annual plan.

Once the coach is comfortable with the design and implementation of an annual plan, a quadrennial plan is the natural extension of the process. Developing quadrennial plans is covered in detail in the context High Performance.

### Where do you start?

The good archery coach and the archer set long-term goals together. Once realistic goals are in place, the athlete's current skills must be assessed. Next, a working agreement, or contract should be negotiated so that each member of the coach-archer team know what is expected and what to expect. This includes keeping a coach **and** an archer diary/logbook.

Next the coach must create a workable timetable to keep both members of the team organised. Tournaments need to be selected for specific reasons. Time must be allocated for testing, learning, re-testing and evaluation in each one of the four training components. Special personal events and commitments must be listed.

Now the coach takes all this information and builds a **plan** overview for the year. Once this general overview has been reviewed and agreed upon, the coach breaks down the **plan** into shorter time segments targeting specific goals and events, and designing specific practice sessions to teach skills and prepare the archer for competition. Finally, the coach gives the archer a useful, easy-to-follow, monthly training chart detailing daily goal(s), workload and intensity.

As you go through this chapter, you will be asked to make a preliminary plan. It will be very theoretical. This complements the NCCP's multi-sport Modules Part A and B, "Plan a Practice" and "Design a Sport Programme". Then, as the coach reads through the reference manual and completes the exercises, the coach will create a detailed, archer-specific plan to submit to the Facilitator for assessment.

The coach will implement the plan and evaluate its effectiveness once the first workshop is over. With practice, the competition coach will become comfortable with planning and make a greater positive impact on athlete development.

### **How will the coach complete the major assignment?**

1. The coach candidate is responsible for reading all 6 chapters in the reference manual and **completing all the exercises**. Also, the coach will create an **annual plan for an archer** (Chapter 2, Exercise #1 in your workbook) that includes **no more than 2-3 major competitive events**. The coach will be asked throughout the reference manual to refer back to the plan to fill in information. The draft plan will be submitted to the workshop Facilitator.
2. Next, the coach answers Chapter 2, **Exercise #2. Meso-cycles** should be logical breaks in your archer's year for the archery discipline of choice. For the purpose of this context, a meso-cycle will equal one season. There is room to list the goals for one meso-cycle which refer back to your work from the chapters and your assessment of the archer. Make sure all 4 training components are addressed. Check the TIME and VOLUME directions of each cycle. One draft cycle will be submitted to the workshop Facilitator.
3. **Exercise #3** details a micro-cycle of one month. When the whole process is finished, the coach will produce one monthly training calendar that the archer can tack up to the bedroom wall or fridge. A quick referral to this calendar should tell the archer and coach what is to be expected each day that month, and what volumes, intensities and goals need to be tackled. A sample is provided. **Remember: this tool is produced for the archer's benefit so there can be a greater chance that the training plan will be followed daily.**
4. Finally, Exercise #4 takes a look at **one day** in the micro-cycle. Pick a day in your calendar that contains several tasks or goals. Analyse it. Ensure it is reasonable given the archer's lifestyle, commitments and obligations. Use the material on the following pages for "Planning a Practice". This task includes the creation of an **Emergency Action Plan** for your club.
5. Section viii) deals with only one **case study** - you. This is a follow-up assessment 12 months from now with your workshop Facilitator. It is the last task in the process. In some ways, it is the most important task of all. You will have learned to create, monitor and modify the plan to fit the needs of a real athlete who you work with. Your Evaluator will be interested in your progress and conclusions.

Note: Under certain circumstances, the case study may be completed in less than 12 months. Ask your Facilitator for details.

## i) **Establishing the Foundation**

Before a coach can begin to work long-term with an archer, three things have to be known:

- Where does this **athlete** want to go with this sport/what is “success”?
- What skills and abilities are present, and are they sufficient to fulfill the goals?
- What is the archer willing to commit to given the present/future demands of the sport?

Once these questions have been answered, the **coach** needs to go through the same process.

- What do you consider “success” for this archer/for yourself?
- What skills and abilities will you need to have to support the archer’s efforts?
- What are you willing to commit to, given the demands of elite competitive sport?

Since you have gone through the process of establishing your own coaching philosophy already (Chapter 1), it will be a lot easier for you to come up with answers than it will be for the archer. Keep this in mind as you work through the goal-setting exercise, and working agreement.

### **- Goals of the Athlete/SMART Goals**

Where does this archer want to be in 1 year? 5 years? 10 years? What kind of life experiences and performances will be acceptable, positive, rewarding? How can the archer and coach achieve the dreams?

Establishing meaningful goals, and monitoring the progress towards them, is essential for training elite athletes in the long-term. Therefore, the initial goal-setting exercise is extremely important. Good goals give the coach and archer direction and purpose. Goals motivate. Goals give a basis and reason for all the work and fun ahead.

Setting the right kind of goals usually reduces frustration (for more details, see Chapter 3: Psychology). Remember: when goals are met, this is success; when the archer fails to meet a planned goal, it is never viewed as failure. The goal is simply re-assessed, evaluated and perhaps put on a different time-schedule. Goals *are just guidelines*, not life-or-death promises etched in stone. Goals should lead the athlete through the various levels of skill development and challenges. For example, the archer should start with provincial and national championships. Then the next phase would be biannual world regional championships, biannual world championships, and finally quadrennial Olympic/Paralympic Games, Masters Games, World Games (High Performance context).

It must be remembered that goal-setting is not done in isolation. The following information applies equally to the coach as well as to the athlete and the support network (parents/spouse). After SMART goals are set, there must be opportunity to assess, reflect and discuss issues, dreams and necessities.

Refer to your NCCP module “Psychology of Performance” for more information on goal-setting.

What are “SMART” goals?

Review the characteristics of appropriate goals listed below. Archery-specific examples are given for each. **SMART** goals are:

**Specific      Measurable      Atttractive      Realistic      Tangible**

Let’s look at each of these components in more detail.

**Specific:**

A win-at-all-costs orientation, and focusing on outcomes rather than process, is a VERY poor way to set goals. It increases state anxiety. Not only that, there is nothing specific about winning as a goal. It is beyond the individual’s *direct* control.

*Poor* goal statement: I will beat all my competitors by 20 points at the national 3D championships.

*Good* goal statement: I will shoot 90% of my arrows with proper form and use agreed upon concentration techniques at the 3D National Championships.

**Measurable:**

Continuing with the same example of the 3D shooter, there must be methods of assessment so that progress towards goals can be analysed statistically. Perhaps the training goal was to increase accuracy in distance estimation by the time the nationals roll around. The good goal is measurable, tells the archer how to practice, how to check up on results and how to show in real terms if there has been an improvement.

*Poor* goal statement: I will estimate all my targets better at the nationals.

*Good* goal statement: Using a rangefinder, I will check all my distance estimations when roving.

I will record this information in a journal at tournaments. I will record where all my hits were and what kind of animal target it was, before the arrow is removed.

By the end of June I want to be no more than 3 meters out on 80% of the targets.

By the end of July I want to be no more than 2 meters out on 80% of the targets.

By the 3D nationals I want to be no more than 2 meters out on 90% of the targets.



Attractive:

If the archer and the coach are going to work hard, the goals have to provide some incentive, yet be measurable and controlled.

*Poor goal statement:* If I make the world team I get to go to Europe

Good goal statement: If I have succeeded in fulfilling 90% of my goals, I'm going to take two weeks' vacation in Hawaii.

If I have fulfilled 80% of my goals, I'm going to take a week's vacation in Banff.

If I have fulfilled 75% of my goals, I'm going to take a week's vacation at a lake-side cottage.

The first statement is definitely attractive and most new archers fall into this trap. Making the team and travelling is exciting, but it can not be a reward for meeting personal goals. It is dependent upon outside forces: wind, illness, other competitors and team selection criteria. Going to the world championships is not a reward. Just shooting in a world championship is not an indication that goals were met due to adequate skills. Making the team without adequate preparation may spell disaster when performance at major events is well below normal training scores.

The second statement shows that goals were met and what percentage was acceptable according to the *plan*. It motivates the archer to achieve a higher yet realistic percentage of goal attainment. If all of this work and goal achievement means the archer makes the team that is a by-product of proper training, not the sole reward.

Realistic:

This is a tough one to assess since the athlete's perception of what is possible in a certain time frame may be very different from the coach's view. Here is a very common example:

*Poor goal statement:* I want to make the next Paralympic team.

Good goal statement: I feel I have a sufficient amount of time to achieve my goals.

The first statement has no basis in skill acquisition, tournament preparedness or experience. It's a dream and dreams are fine, with certain proviso:

- First, there must be a logical progression and timetable for skill acquisition and consistency.
- Secondly, regular training and tournament experience at progressively higher levels of elite competitive stress must be considered.

- Thirdly, these two components do not necessarily correspond to arbitrary competition timetables, world championships and major international games. The rate of progression is dependent upon the individual and life circumstances.

The second statement eliminates time constraints. There may be dreams as big as the Paralympics, but there are also many other goals to be met along the way that should provide inner satisfaction. The coach must direct the archer's attention away from the "hype" and appeal of extrinsic reward by setting daily, weekly, monthly, and annual goals.

If the journey towards the goal is not an enjoyable experience, the external reward at the end will be hollow. The process is the important factor to great performance, not the desire for an end result.

### Tangible:

Some aspects of goal-setting are automatically tangible. The archer increases the volume of arrows per session (use ARCHERY CANADA's LTAD chart as a reference). The archer is able to shoot more arrows well before fatigue sets in. But some desired goals are not as concrete. However, they are still measurable if the goal statement is worded correctly.

*Poor* goal statement: I'm going to mentally prepared for the team trials.

Good goal statement: I'm going to record all the arrows that I shoot with good concentration and focusing just on the target. I'll write them down for all training sessions and competitions.

By the time I go to the trials, I want my ability to concentrate properly in a tournament to increase from 70% to 85% of all arrows shot.

Who is judge if the arrows were shot with good concentration? The coach and the archer can compare what they see and feel in training. There should be agreement on what constitutes a well-shot arrow from a psychological point of view.

For instance:

- Did the archer's eyes move off the centre of the target on the shot?
- Did outside noises or other people distract the archer's concentration?
- Did the wind distract archer causing changes in rhythm or tightness in the body?
- Was the conscious mind thinking of positive things before the subconscious mind took over?
- Did the archer's attention stay on the sensation of the shot until after the arrow was in the target?

If the archer and coach define the “well-shot arrow” and the archer meets the criteria, then the arrow was shot properly, then that counts as one. The coach should keep track in his/her diary/logbook and notes should be compared after tournaments are finished.

Add up the number of arrows shot properly out of the total arrows for the round and find the percentage. Record it in the diary. That’s how the coach and athlete make each goal “touchable”. Eventually the archer judges internally, but should keep track and may wish to continue to write it down.

Now turn to the workbook pg 1 Chapter 2 section entitled, “**Application of the Theory – Using SMART goals**”. Complete it and return to the reference manual.

### Sample Goal Setting Exercise

This section outlines a collaborative goal-setting process that coaches and athletes might use to complete the homework assignment.

The steps in this process are as follows:

- Establish the importance or meaning of the individual experience
- Identify areas that need work, and do this in terms of outcome or process goals
- Specify goals for the season
- Determine the criteria for success
- Develop a road map for success
- Develop a monitoring and evaluation process

The table below provides an example of how to apply this process to team goal setting.

Goal-Setting Steps	Notes
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Goal-Setting Steps	Notes
<p><b>1. Establish the importance or meaning of the individual</b></p>	<p>The archer:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reflects on the importance of being involved in archery.</li> <li><input type="checkbox"/> Is invited to share thoughts and feelings with the coach and family (if applicable).</li> </ul> <p>Coach may use <i>personal examples</i> if necessary.</p> <p><b>Rationale:</b> A mutual awareness of the relevance of being in archery may increase cohesion and commitment.</p>
<p><b>2. Identify areas that need work</b></p> <p><b>Question:</b> <i>What evidence is there that we need to work on X and Y?</i></p>	<p>Identify whether the issues raised apply to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Competition results</li> <li><input type="checkbox"/> Self-improvement goals, e.g. personal fitness level or performance level</li> <li><input type="checkbox"/> Process goals, e.g. the way results are achieved</li> </ul> <p>Identify whether the archer needs to work on physical conditioning or on technical, tactical, or mental skills.</p> <p>Highlight the relationship between outcome and process goals.</p> <p><b>Rationale:</b> It is important to identify whether goals are related to ongoing behaviour or to outcomes, such as championships.</p>
<p><b>3. Specify goals for the season and the year</b></p> <p><b>Question:</b> <i>What exactly do we want to achieve this year?</i></p>	<p>Clearly identify goals. Note whether the goals are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Competition results</li> <li><input type="checkbox"/> Self-improvement goals</li> <li><input type="checkbox"/> Process goals</li> <li><input type="checkbox"/> Long-term goals</li> <li><input type="checkbox"/> Short-term goals</li> </ul> <p>The archer contract includes acceptance of the goals, and the goals can be posted for the archer to refer to.</p> <p><b>Rationale:</b> Specifying and recording goals is a public record of committing to them.</p>
<p><b>4. Determine the criteria for success</b></p> <p><b>Question:</b> <i>How will we know we have achieved our goals?</i></p>	<p>Develop a list of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Outcome criteria —changes the archer wants to see in performance or results</li> <li><input type="checkbox"/> Process criteria — behaviour that will have to observe to know the archer on track</li> </ul> <p><b>Rationale:</b> Establishing clear criteria for success is important. It allows the archer to self- monitor and to recognise whether goals are being met.</p>

Goal-Setting Steps	Notes
<p><b>5. Develop a road map for success</b></p> <p><b>Question:</b> <i>What behaviour/actions are necessary for us to achieve these goals?</i></p>	<p>The archer &amp; coach brainstorm strategies for achieving its goals (outcome or process). Be very specific about the strategies, and record them.</p> <p><b>Rationale:</b> Knowing where you want to be is only one part of the puzzle. Establishing a road map for success is critical to setting and achieving goals.</p>
<p><b>6. Develop a monitoring and evaluation process</b></p> <p><b>Questions:</b> <i>How will we know ...</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <i>We're on track?</i></li> <li><input type="checkbox"/> <i>We're achieving our goals?</i></li> <li><input type="checkbox"/> <i>If we need to adjust our goals?</i></li> </ul>	<p>Coach designs a monitoring and evaluation process. It could, for example, involve:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Observing athlete behaviour (see Coach Workbook examples)</li> <li><input type="checkbox"/> Holding regular archer-coach meetings</li> <li><input type="checkbox"/> Conducting regular fitness or skill assessments</li> <li><input type="checkbox"/> Integrating mental-skill simulations into practices</li> </ul> <p><b>Rationale:</b> Establishing a way of monitoring and evaluating progress is critical for motivating athletes and for adjusting goals when necessary.</p>

### **What did you learn?**

In summary, the coach leads and directs the archer to become a balanced person. Life goals must be included along with archery goals because the athlete is not just an archer, the athlete is a human being.

Setting proper goals for yourself and the archer makes motivation a lot easier for both of you.

Now that you have tried to make SMART goals for yourself, you need to complete one for one of your archers.

Refer to your Workbook pg. 35 Chapter 2 for a worksheet.

Also, read the section in **Chapter 3** (reference manual pg. 193 -195) **on goal-setting's importance** to the psychological well-being of your archer.

### **- Inventory of the Athlete's Needs**

Before the coach can lead the athlete towards the chosen goals, the athlete must be assessed at the present skill and preparation level. The coach will be able to base coaching

decisions on these findings. You can not help the archer improve if you are not aware of the athlete's present strong and weak points. You cannot know that you have progressed if you did not know what performance level you started at. Since the athlete will improve in certain areas more quickly than in others, assessment is done on a regular basis.

In archery, the assessment matches the four areas of preparation:

Mental	psychological ability to stay motivated, funnel competitive anxiety into success
Physical	physiology and fitness, biomechanical efficiency, consistent archery form
Technical	equipment selection, appropriateness and tuning
Tactical	knowledge of the discipline's special training and elite competitive demands



Now to the workbook pg. 38 Chapter 2 section entitled, "THE INVENTORY". Finish assigned tasks and then return to the reference manual.

#### P. 38 - 43

##### - One-to-one Working Agreement

The good archery coach never takes anything for granted. Sometimes very important issues can be over-looked. One such issue is the coach-athlete relationship. In particular, mutual dedication, commitment and expected behaviour must be discussed and agreed upon. Though some coaches may feel uncomfortable with the word "contract", there should be a working agreement between the coach and the archer/support network. The support network can include parents, spouses, siblings, children, training specialists, the work place and/or school.

In the Chapter 2 Workbook, the coach will find *sample* working agreements. Note the similarities between them. This is done purposely to show the team effort involved. It reinforces the level of mutual trust, communication and dedication necessary in order to propel the archer towards the chosen goals. It is simply a guideline to be considered, then altered and personalised to meet the needs of you and your archer(s).

#### **SUMMARY**

The archer and coach must establish "ground-zero" as a starting point. There has to be a planned course of action and definition of success. Along the way, the working relationship that develops must be open, two-way and effective. These criteria are the foundation of

athletic success. Do not short-change or hurry this process or both you and your archer(s) will feel the negative results in poor performance, frustration and premature retirement.

## ii) The Building Blocks

After the coach-archer relationship has been established as the foundation of the plan, it is time to put the elements of the annual plan overview in place. This process involves fact-finding, utilisation of the athlete skills-assessment and some trial and error.

A **plan** has is a progression of activities that the coach designs to lead the archer from where he/she is right now (a relatively inexperienced competitive archer) to where you and the archer have agreed to go (an elite competitive career). This sequence of activities takes into account many important variables, such as the type, number, frequency, duration, and content practices, adapted to archer's age and archery experience.

The goal of the plan is to foster athletic development and archery form over time. In the beginning the coach may feel that this job is a bit of a juggling act. There may be some confusion trying to put all the pieces into the plan so that it all makes sense. That is why the Competition - Development coach reference manual has the overview plan on transparencies and in electronic format. As the coach record the requirements for each training component into the competitive calendar, the training plan takes shape. Once all component transparencies are laid one on top of the other, the coach can identify over-load situations quickly and change the way the plan is broken down. The coach can chose to colour-code the electronic version if that is the preferred method.

To help the coach with the annual planning process, the reference manual and workbook guide you through the process with a specific but imaginary example. The Facilitator will supply washable coloured markers to produce this theoretical plan. When it is finished and evaluated, erase it and use the same transparencies again as you work through the chapters in this reference manual to create a realistic plan for one of your archers. If you have any questions about this exercise, please consult with the Facilitator. Once the coach has experience planning, it may not be necessary to use the transparencies and the coach can build the plan using computer software or pencil-and-paper.

Let's get started:

### Identify the Main Components of a Plan

#### **Time:**

There is a well-defined beginning and end (i.e. 1 month before the indoor season starts to 1 month after the last outdoor tournament takes place)

It could vary in length, ranging from a few weeks to several months (check your tournament schedule)

As part of the long-term development of the athlete: where the archer is starting from, what the archer did before, and what the archer should be able to do at the end of the plan? (*The archer could remain in the same phase – this is acceptable*)

**Events:**

This includes practices, preparatory competition\*, regular competition, championships, tests, re-tests, etc.)

Social events (awards ceremonies, non-archery commitments/events, etc.)

Administrative events (registration, equipment purchase, fund raising, parent meetings, etc.)

\* The coach must be aware of event selection criteria either at the provincial or national level.

**Intentions, Objectives, Priorities and Contracts:**

Take into account the archer's interests, and individual needs (see below)

Take into account archery's elite competitive demands

Have a clear purpose and philosophy (why it exists), focus (development, excellence), desired outcome (goals and objectives), and method of operating (rules, policies, procedures)

Prioritize objectives, events, time devoted to certain activities, etc., given any constraints that apply, e.g. end of school year exams, finances.

Share the plan's intentions, objectives, and priorities with the archer's support group which reinforces coach-archer choices and decisions

Have intentions, objectives, and priorities that are consistent with the values of the coach and the organisation, e.g. Canadian Centre for Ethics in Sport, FITA, ARCHERY CANADA, your provincial archery association and club.

**Structure:**

Planned, organised activities

Provide certain services to athletes

**Progression:**

Intentions, objectives, and priorities may change as the season progresses. The training activities and content may have to change as the archer's rate of development varies from the plan's initial expectations. This is normal!



**Adjustment and Evaluation:**

The archer progresses from a given starting point. This progression may occur in different ways: technical/tactical mastery; physical condition and tolerance of fatigue; attitudes (work, athletes' behaviour, commitment, discipline); performance, etc.

The coach must assess the archer's starting point to identify what can realistically be accomplished in the short, medium, and long term and choose the appropriate methods for doing so: such decisions normally require some form of evaluation (see Archer Inventory)

It must be accepted that adjustments will probably be required en route, even if the initial plans were carefully laid out

Developmental Needs and Archer's Interests

The plan must reflect the needs and interests of the athlete. When creating the plan, keep in mind that an archer:

- Is at a particular point in the long-term development process in archery. The time the archer spends in a programme must help the archer progress toward subsequent stages, taking into account their current level of performance. Check for too many tournaments on the initial wish-list that the archer gives to you.
- Does not have the same experience, the same background in sports, or the same performance capabilities as other archers who you may have worked with in the past. People have specific needs, including physical, emotional and psychological challenges. You may have to adapt some activities and/or equipment in order for your archer to train and compete successfully.
- Can be at very different stages of physical or cognitive development or display highly variable levels of maturity, as compared with other archers in your group at the same chronological age. Assessment is important in your one-to-one relationship. Communication with the archer and the archer's support group is an on-going two-way process.
- Does not all have the same objectives or motivation with regards to the sport of archery. You must take this fact into account and propose activities that will keep the archer interested.

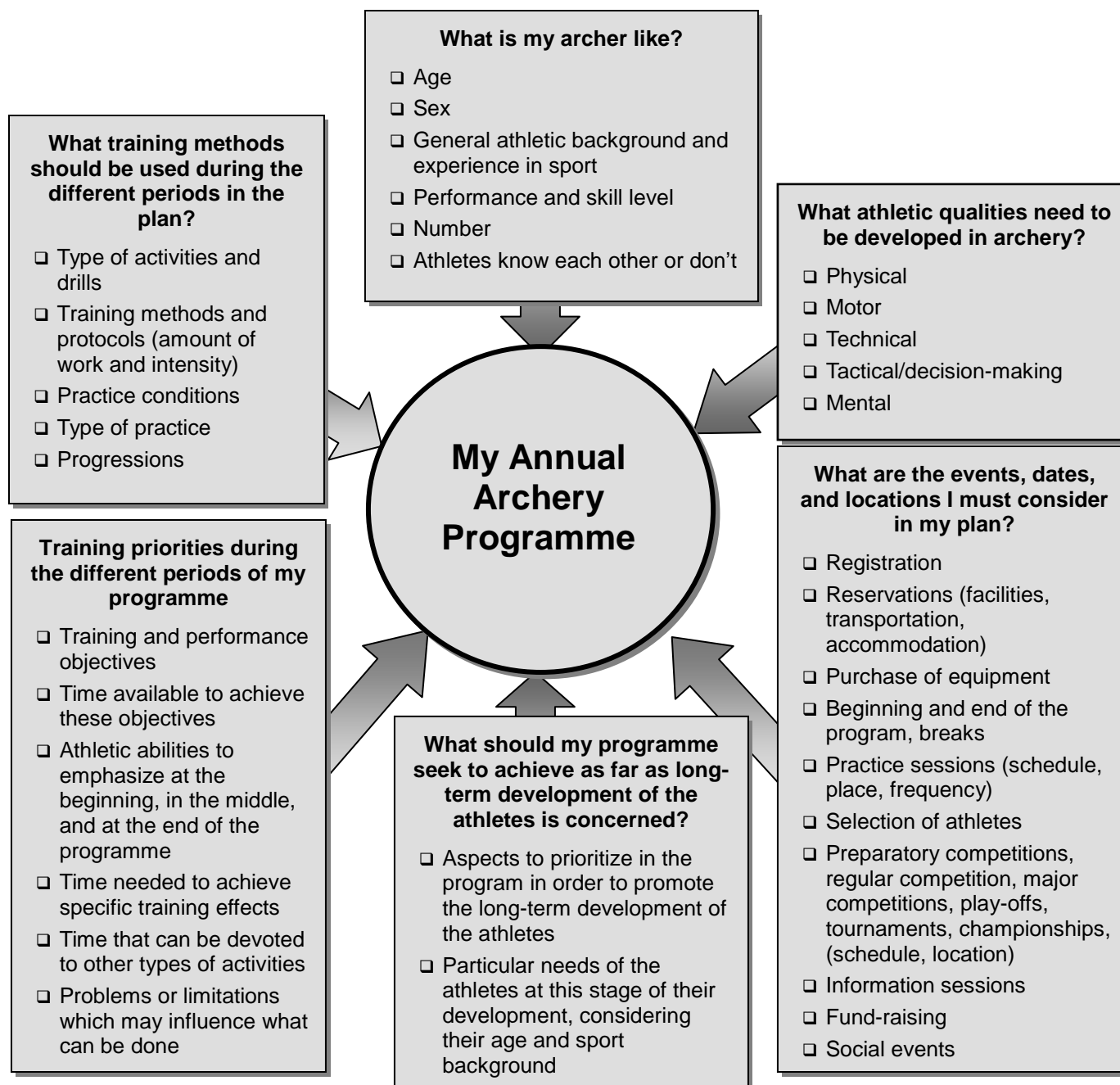
Athletic Development

The main challenges when designing a sport programme are to do the following:

- Establish training priorities by identifying the athletic and technical abilities that are most in need of training, given the sport and age of the athlete (assessment tool).
- Establish realistic objectives for sport-form development and competition performance in archery for the archer's age and athletic experience, and the available practice/training time.
- Set up training opportunities that provide an adequate and gradual preparation before competition begins. In Canada, the General Preparation Phase and the Specific Preparation Phase are often drastically shortened (even omitted).
- Ensure that there is a logical progression over the length of the programme so that the archer can reach a suitable level of archery form in time for the major competitions.

- Make sure that the content of the practices (i.e. the activities, their length and intensity, and the practice conditions) is related to the programme's main development objectives.
- Be fully aware of the time required to develop various athletic abilities, as well as the amount and frequency of training required to make significant improvements. Some components take longer to train and internalise than others, such as coping strategies and learning to shoot in wind and rain.
- If the archer has never trained seriously in the past, then the coach should anticipate some training effects from the programme's activities. The coach needs to be aware of this progression and provide follow-up. The coach will need to evaluate whether or not the archer is making the desired progress, and be able to adjust programme activities as required.

Note: This section of Chapter 2 and Chapter 4's section on physical training assume that the coach-candidate has taken the NCCP Multi-Sport Module "*Developing Athletic Abilities*".



### iii) Organising the Plan - Periodization

An annual plan is a useful guide to the coach, but is very difficult for most archers to follow and implement. The success of any plan is its implementation. Therefore, the next task is to break down the plan into manageable sections or cycles. There are usually logical breaks or changes in emphasis during the length of time the plan is designed for.

Use the following terms to break down the archer-specific plan:

Macro-cycle	long period of time, for instance, a quadrennial or annual plan
Meso-cycle	smaller time periods the correspond to seasons or natural breaks in the competitive year, in this case, e.g. Indoor season and outdoor season, 5-6 month blocks
Micro-cycle	smaller time periods which could be a month or week
Practice Session	one day of training within the micro-cycle

Work with the Learning Facilitator to define a micro-cycle in the *hypothetical* plan. The analysis is meant to validate the annual plan. The process to design a practice plan is important to ensure that both the coach and the archer know what is supposed to be accomplished on a daily basis. This is important in order to complete the plan and meet the goals. The coach should reflect on this process. Ask for clarification as required.

The coach candidate's major task to become certified in this context is to produce, implement and evaluate an annual plan for one of your archers.

## Structure of an Annual Plan

### Periods and Phases of a Sport Plan

Archery coaches know that consistent form and evaluation of the relationship between equipment and the archer need a certain amount of time to develop and test. The time it takes to do this properly allows us to divide the season into periods.

Periods promote the progressive development of athletic abilities and prepare the archer for the major competition the archer will participate in during the season. These periods are Preparation, Competition, and Transition. Each has a specific role and purpose in the logical progression of the recreational archer toward a positive introduction to competition.

Period	Beginning	End
<b>Preparation</b>	First practice in the plan	First “official” competition in the plan
<b>Competition</b>	First “official” competition in the plan	Last competition in the plan
<b>Transition</b>	Last competition in the plan	Last structured training activity in the plan

Each period is usually subdivided into smaller units called phases.

The **Preparation Period** is usually divided into three phases:

1. General Preparation Phase (GPP)
2. Specific Preparation Phase (SPP)
3. Pre-Competition Phase (PCP)

The **Competition Period** is usually divided into two phases:

1. Regular Competition Phase (RCP)
2. Major Competition Phase (MCP)

Competition Period phases may be completely distinct, or the regular and important competitions may overlap varies. In Canadian archery, oftentimes the order of tournaments is not progressive. In some provinces, championships are held after the national championships. This is regrettable, but that is the current situation.

The **Transition Period** is usually not divided into smaller units. The Transition Period generally occurs after the last competition of the season. It is a time for physical, mental, emotional, and social recuperation. It follows a period of high intensity in training and competition. This recuperation can be achieved by complete rest or active rest, where athletes drastically reduce their training volume and intensity, as well as participate in other physical or sporting activities just for fun.

**Note:** The main characteristics of each period and phase of the plan and the priorities and objectives of each are covered later.

The next chart establishes what should be accomplished within each phase.

The following two charts list basic training activity objectives and training methods.

#### Objectives of Periods and Phases of Annual Plans

Period	Phase	Objectives And Priorities	Training Methods
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Period	Phase	Objectives And Priorities	Training Methods
<b>Preparation</b>	<b>General Preparation Phase</b> Recommended length: 6 to 8 weeks, or more	<ul style="list-style-type: none"> <li><input type="checkbox"/> General development of physical, motor, and mental athletic abilities</li> <li><input type="checkbox"/> Acquisition of new technical abilities and skills</li> <li><input type="checkbox"/> Consolidation of already acquired technical and tactical abilities</li> <li><input type="checkbox"/> Progressive increase in the quantity of work done during practices</li> <li><input type="checkbox"/> Improvement of athletes' weak points</li> <li><input type="checkbox"/> Establishment of general objectives related to athletic development</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Large proportion of general activities and exercises; small proportion of specific competition activities</li> <li><input type="checkbox"/> Training and practice conditions fairly stable and predictable, or controlled by the coach</li> <li><input type="checkbox"/> Average intensity lower than that of later phases</li> </ul>
	<b>Specific Preparation Phase</b> Recommended length: 3 to 5 weeks, or more	<ul style="list-style-type: none"> <li><input type="checkbox"/> Progressive development of physical conditioning adapted to the sport</li> <li><input type="checkbox"/> Specific development of the primary physical, motor, and mental athletic abilities required in the sport</li> <li><input type="checkbox"/> Improvement of athlete's weak points</li> <li><input type="checkbox"/> Consolidation of already acquired technical and tactical abilities</li> <li><input type="checkbox"/> Acquisition of new tactical abilities and knowledge</li> <li><input type="checkbox"/> Progressive increase in the quantity of work done during practices</li> <li><input type="checkbox"/> Progressive increase in activity intensity, approaching competition-level intensity toward the end of this phase</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Greater proportion of specific or competition exercises, decrease in the proportion of general activities and exercises</li> <li><input type="checkbox"/> More specific and less predictable training and practice conditions; conditions controlled by the coach more frequent than random conditions</li> </ul>
	<b>Pre-Competition Phase</b> Recommended length: 2 to 3 weeks, or more	<ul style="list-style-type: none"> <li><input type="checkbox"/> Preparation of athlete for future competitions</li> <li><input type="checkbox"/> Maintenance of physical, motor, and mental athletic abilities of low or moderate importance in the sport</li> <li><input type="checkbox"/> Specific development of the primary physical, motor, and mental athletic abilities required in the sport</li> <li><input type="checkbox"/> Consolidation of already acquired technical and tactical abilities</li> <li><input type="checkbox"/> Increase in activity intensity, to be at competition-level intensity toward the end of the phase</li> <li><input type="checkbox"/> Stabilisation of the quantity of work done during practices</li> <li><input type="checkbox"/> Identification of more specific performance objectives</li> <li><input type="checkbox"/> Stress management and emotional control when outcome is important</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Large proportion of specific or competition exercises, and small proportion of general activities and exercises</li> <li><input type="checkbox"/> Specific training and practice conditions</li> <li><input type="checkbox"/> Conditions controlled by the coach more frequent than random conditions</li> <li><input type="checkbox"/> Participation in a few preparatory and "non-official" competitions</li> </ul>

Period	Phase	Objectives And Priorities	Training Methods
<b>Competition</b>	<b>Regular Competition Phase</b> Length: variable	<ul style="list-style-type: none"> <li><input type="checkbox"/> Validation and confirmation of learning and progress made by athletes during training</li> <li><input type="checkbox"/> Achievement of performance goals</li> <li><input type="checkbox"/> Maintenance of the primary physical, motor, and mental athletic abilities required in the sport</li> <li><input type="checkbox"/> Consolidation of already acquired technical and tactical abilities; maintenance of recently acquired ones</li> <li><input type="checkbox"/> Stabilisation of or decrease in the quantity of work done during practices and maintenance of an intensity similar to that found in competition</li> <li><input type="checkbox"/> Stress management and emotional control when outcome is important</li> <li><input type="checkbox"/> Acquisition/implementation of game plan</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Very large proportion of specific or competition exercises, and very small proportion of general activities and exercises, unless the latter are required to correct persistent shortcomings</li> <li><input type="checkbox"/> Specific training and practice conditions similar to those of competition; conditions controlled by the coach less frequent than random conditions</li> <li><input type="checkbox"/> Practice simulation of situations likely to be encountered in major competitions</li> <li><input type="checkbox"/> Use of specific competition situations or of less important competitions as difficult practices or as tests in which athletes experiment; include psychological stress during training only when athletes have a high success rate in the execution of technical skills</li> </ul>
	<b>Major Competition Phase</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Implementation of game plan with the aim of achieving a performance in competition</li> <li><input type="checkbox"/> Achievement of performance goals when the stakes or competition level are higher</li> <li><input type="checkbox"/> Stress management and emotional control when outcome is very important</li> <li><input type="checkbox"/> Recovery from fatigue and stress due to participation in regular and major competitions</li> <li><input type="checkbox"/> Rather than trying to increase the length of practices, make sure that their frequency is maintained and the intensity remains high</li> <li><input type="checkbox"/> High success rate when performing actions in training (precision and consistency); high cooperation within the group</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Very large proportion of specific exercises</li> <li><input type="checkbox"/> Random conditions more frequent than conditions controlled by the coach</li> <li><input type="checkbox"/> Exercises and activities intended to refine preparation</li> <li><input type="checkbox"/> Insertion of frequent breaks in practices so as to avoid fatigue and maintain a high degree of intensity</li> </ul>



Period	Phase	Objectives And Priorities	Training Methods
<b>Transition</b>	Length: variable (2 to 8 weeks)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Recovery and regeneration</li> <li><input type="checkbox"/> Healing of injuries sustained during the Competition Period</li> <li><input type="checkbox"/> Decrease in the length, frequency, and intensity of sport activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Active rest</li> <li><input type="checkbox"/> Very large proportion of general activities and exercises</li> <li><input type="checkbox"/> Participation in activities other than organised competitive activities</li> <li><input type="checkbox"/> Participation in sports with different physical and motor requirements, with or without competition, without stress</li> </ul>

## Activity Planning Guidelines for Various Stages of Skill Development

Recommended Practice Conditions	Training Objectives		
	Acquisition Movement patterning – learning new skills	Consolidation Correct execution in variable conditions	Refinement Minor improvements
<b>Surrounding environment</b>	Stable and predictable, free of distractions, safe; private training session if possible	Increased variability and distractions in the environment, but not to the point where movement patterns deteriorate	Competition conditions
<b>Decision-making</b>	Simple decision-making, maximum of 2 options	More complex decisions to make, increased frequency of decision-making, and more options (3-4)	Complex decisions, as many options and at the same frequency as in a competition
<b>Speed of execution</b>	At athlete's own pace; do not introduce tournament timing limits yet	Make sure that the archer's sequence meets the time limits as imposed by the rules before participating in a tournament	Simulate competitive conditions
<b>Number of repetitions</b>	High	High	As many as possible
<b>During training, the emphasis should be on...</b>	Global execution of good posture, core strength and consistent archery form, particularly if the coach has introduced changes to form and/or equipment	Maintaining the archery form and some performance consistency under a variety of conditions and under stress	Creating conditions that stress the specific elements that need adjustments

Summary Table: Training Methods

Athletic Ability	Training Objective	Number of Weeks Required for Significant Improvement	Training Frequency	Training Time (Minutes)	
				Minimum:	Up to:
<b>Archery Technique</b> (Also look at Motor Abilities section below)	Acquisition	4-6	3 or +	30	60-90
	Consolidation	3-4	2 or +	20	60-90
	Refinement	Variable; several months or more	2-3 or +	20-30	60-90
<b>Tactics</b>	Acquisition	4-6	2	20	45
	Consolidation	Variable; 3-4	2	20	45-60
	Decision-making	probably several	2	As needed for event	As needed for event
<b>Aerobic Endurance</b>	Development	6	2-3	20-30	60-75
	Maintenance	<i>Not applicable</i>	1	20-25	60-75
<b>Aerobic Power</b>	Development	6	2-3	20	55-60
	Maintenance	<i>Not applicable</i>	1	12-15	55-60
<b>Speed</b>	Development	4	2-3	15	45-50
	Maintenance	<i>Not applicable</i>	1	10	45-50
<b>Speed-Endurance</b>	Development	4	2-3	18-20	45-50
	Maintenance	<i>Not applicable</i>	1		45-50
<b>Maximum Strength</b>	Development	<i>Seeking systematic development of this athletic ability in young athletes is NOT recommended</i>			
	Maintenance				
<b>Strength-Endurance</b>	Development	4-5	2	10	30-35
	Maintenance	<i>Not applicable</i>	1	10	30-35
<b>Speed-Strength</b>	Development	4-5	2	5	12
	Maintenance	<i>Not applicable</i>	1	5	12
<b>Flexibility</b>	Development	3-5	2-3 or +	12-15	50-55
	Maintenance	<i>Not applicable</i>	1	5-8	50-55
<b>Motor Abilities (agility, balance, co-ordination)</b>	Development	probably several	2-3 or +	probably at least 10-15	probably 20-45
	Maintenance	<i>Not applicable</i>	probably at least one	probably at least 10-15	probably 20-45

Element	Progression Parameters in a Annual Archery Plan			
	Beginning of Plan	↔		End of Plan
<b>General exercises</b>	Large proportion	↓ proportion	Small proportion	Small proportion
<b>Specific exercises</b>	Small proportion	↑ proportion	Large proportion	Large proportion
<b>Competition exercises</b>	Small proportion	↑ proportion	Large proportion	Large proportion
<b>Movement specificity</b>	Low to moderate	Moderate to high	High	High
<b>Athletic abilities that are important in archery</b>	Development	Development	Maintenance	Maintenance
<b>Athletic abilities that are moderately important in archery</b>	Development Maintenance	Maintenance	Maintenance	Maintenance
<b>New technical elements</b>	Introduction Acquisition Correct execution	Consolidation; ↑ success rate during execution	Consolidation Technical element variations	Consolidation; maintenance; refinement; link with more advanced elements
<b>Acquired technical elements</b>	Consolidation Increase success rate during execution	Consolidation Technical element variations	Consolidation or maintenance; link with more advanced elements	Maintenance or refinement
<b>Tactical knowledge</b>	Correct link between technical and rules	Acquisition of basic tactics	Variation in basic tactics	Variation in basic tactics
<b>Tactical elements (decision-making)</b>	Recognition of certain tactical situations	Read and react appropriately to situation (conditions controlled by the coach)	Vary responses according to demands of the situation (conditions controlled by coach and random conditions)	Vary responses according to demands of the situation (random conditions)
<b>Mental preparation</b>	Self-knowledge Setting objectives	Concentration	Emotional control (anxiety)	Emotional control (confidence)
<b>Types of practices</b>	Choose according to the types of skills to be learned			
<b>Practice conditions</b>	Predictable Stable	↑ in unpredictability and consequence of errors	Unpredictability and consequence of errors similar to competition	Unpredictability and consequence of errors similar to competition
<b>Activity complexity</b>	Simple to moderate	Moderate; progressive ↑	High	High
<b>Activity intensity</b>	Moderate	Progressive ↑;	Close to	Competition

Element	Progression Parameters in a Annual Archery Plan			
	Beginning of Plan	↔		End of Plan
during practices		approaches competition intensity	competition intensity	intensity
<b>Amount of work during practices: general</b>	Moderate; progressive ↑	Progressive ↑; high	Levelling-out and progressive ↓	Progressive ↓; moderate
<b>Amount of work during practices: particular considerations</b>	↑ in number of repetitions, constant length of effort	Progressive ↑ in length of effort and number of repetitions	Progressive ↑ in length of effort, ↓ in number of repetitions and recovery	Maintenance of length of effort and recovery time, ↓ in number of repetitions

**Legend:** ↓ : decrease    ↑ : increase

### Combining Athletic Abilities in Training

In archery, training involves technical elements, as well as some physical abilities, but not all. Separate training will be required in the plan. The following table shows how some athletic abilities can be combined for training purposes provided the characteristics of the activity and the practice conditions are appropriate.

<b>This Training Priority...</b>	<b>Can be Combined in Training With...</b>
<b>Technical Elements</b>	Some tactical elements and decision-making skills; strength-endurance; agility; balance; co-ordination
<b>Tactical Elements/ Decision-making</b>	Some sport-specific technical elements; strength-endurance; agility; balance; co-ordination
<b>Aerobic Endurance*/Aerobic Power</b>	N/A
<b>Speed</b>	N/A
<b>Speed-Endurance</b>	N/A
<b>Speed-Strength*</b>	N/A
<b>Strength-Endurance*</b>	Some sport-specific technical elements; some tactical and decision-making elements
<b>Flexibility*</b>	Some phases of technical execution
<b>Agility</b>	Some sport-specific technical elements; some tactical and decision-making elements; co-ordination
<b>Balance</b>	Some sport-specific technical elements
<b>Co-ordination</b>	Some sport-specific technical elements; agility

\*Denotes athletic abilities that lend themselves well to individual training outside the practice sessions directly under your control. Ensure that the athletes actually do train as required and that they use appropriate methods (duration of effort, intensity, work-rest ratios).

- Creating the **Hypothetical In-Class Plan**

During the coach workshop, candidates will work together to create and then assess a hypothetical plan. The planning process is time-consuming. But, with practice, the coach becomes quicker at making decisions about training activities and their timing. The process will make more sense to you when you plan one of your own archer's training plans and evaluate its success.

The hypothetical archer

**The Goal:** The archer wants to compete well at the next Archery Canada outdoor target championships.



**Process:** Turn to Chapter 2 Workbook page pg. 46 entitled "The Planning Process". Use Excel spread sheet template for each of the 4 tasks below for the hypothetical archer and start creating the plan. Complete each component in order.

**P.46 - 48**

**Task 1:** Select that the one major event of the season, and minor tournaments that the archer would benefit archer preparation – use the list of events on page 46 in the workbook

**Task 2:** Assess archery skill level – use information on skill level pg. 48 in the workbook

**Task 3:** Add specific training requirements; - Use specific training needs on pg. 48 in the workbook

**Task 4:** Slate in physiological, psychological and equipment initial testing and re-testing – use information on pg. 49 of the workbook

**Task 5:** Look at the spread sheet vertically and horizontally for an overall assessment. Is the plan "doable" – after all components have been entered

- Assessing the **Hypothetical In-Class Plan**

• First check horizontally, in terms of tasks and benchmarks throughout the season. Have you left sufficient **TIME** to get the major tasks accomplished before major events?

Have you left sufficient time for testing?

**P. 49**

Is re-testing going to be an asset, or will it become an interference to progress?

- Now, look at the plan vertically. Look down through to see if you have put too many tasks into the same week or month.

The coach must ensure that the total **VOLUME** of work and demands on the archer are not so great that a drastic decline in archery performance occurs, leading to depression and frustration. Take a look at the first month. Is it too busy? Do you have too many testing sessions, weight training and form correction blocks in the same month? Check this volume of work and volume of arrows now for each month.

What did you find out? Use the information below to fix the problems that you found. Share your thoughts with others in the group and the Learning Facilitator.

### Common Issues and Possible Solutions

Some common planning issues are listed below, with possible solutions.

Possible Issue	Solutions to Consider
<b>The plan is too short to allow any significant athletic development</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Encourage the archer to participate in other sports with similar demands and in other sports that may help them develop other types of skills; postpone weight training</li> <li><input type="checkbox"/> Enrol athletes in sport schools or camps so that they continue their development and avoid losing too much sport fitness</li> </ul>
<b>The Preparation Period is too short</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Extend the Preparation Period by starting practices earlier before the first regular competitions</li> <li><input type="checkbox"/> Use some of the early season competitions as a continuation of the Preparation Period where results are not as important</li> </ul>
<b>There is not enough competition</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Include simulated competition in your practice sessions</li> <li><input type="checkbox"/> Organise friendly or unofficial competitions</li> </ul>
<b>Practice sessions are too short</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Do the general warm-up before you go onto the field or into the facility</li> <li><input type="checkbox"/> Train the motor abilities (agility, balance, co-ordination, etc.) or some physical abilities (flexibility, endurance, strength) outside practice sessions so that you can spend as much of the available time as possible on sport-specific activities</li> </ul>
<b>There is not enough practice or preparation time to enable significant athletic development; not enough training opportunities <u>between</u> competitions</b> <i>(Refer to the ARCHERY CANADA's LTAD model in the Introduction to ensure that you have met the prescribed ratio of practice to competition.)</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Extend the Preparation Period; i.e. begin practices earlier in the programme</li> <li><input type="checkbox"/> Use some of the early-season competitions as a continuation of the Preparation Period where results are not as important</li> <li><input type="checkbox"/> Increase the number of practice sessions between competitions</li> <li><input type="checkbox"/> Provide athletes with programmes for activities they can do on their own between practice sessions so that you can focus on important sport-specific elements during practice sessions</li> <li><input type="checkbox"/> Do not let performance in the most recent competition or preparation for the next competition dictate all the content of the practice sessions</li> </ul>



Possible Issue	Solutions to Consider
<b>The Competition Period is too long, there are too many competitions, or too many “important” competitions</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Re-assessment the number of competitions for the season and consider not taking part in certain competitions</li> <li><input type="checkbox"/> Consider some early-season competitions as part of the Preparation Period where results are not too important</li> <li><input type="checkbox"/> Priorise competitions and focus on those that lead to the next stage in the development process</li> </ul>
<b>Practice sessions are too long</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> If possible, reduce the length and increase the frequency of practices</li> <li><input type="checkbox"/> If you can book only long periods of time in facilities, include frequent breaks during practices and plan fun activities</li> </ul>
<b>Practice sessions are too frequent</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> To avoid fatigue, alternate hard training days with easy days during the week</li> <li><input type="checkbox"/> Build in a rest day every 2-3 days of practice</li> <li><input type="checkbox"/> Build in an easy session or a rest day the day after a competition, especially if the competition is particularly demanding</li> <li><input type="checkbox"/> Avoid planning a tough practice session the day before a competition</li> </ul>
<b>There is too much emphasis on winning or short-term performance</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Evaluate the archer’s ability to apply elements from practices to competition, rather than on performance</li> <li><input type="checkbox"/> Re-define the plan’s objectives if there seems to be too much emphasis on competition results</li> </ul>
<b>Athletes begin to specialise too soon</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> If archers have not mastered basic archery skills, some disciplines such as field and 3D will be too difficult to perform well in</li> <li><input type="checkbox"/> Introduce activities to train the motor abilities (agility, balance, co-ordination, etc.) that athletes can practise in their free time</li> <li><input type="checkbox"/> Maximize active engagement during practices and create activities that call on the motor abilities</li> </ul>

NEXT: 1. Identify the Preparation, Competition and Transition periods of the plan.



**P.50**

2. Identify the phases:

General Preparation Phase (GPP)

Specific Preparation Phase (SPP)

Pre-Competition Phase (PCP)

Regular Competition Phase (RCP)

Major Competition Phase (MCP)



**P.52**

3. Identify any meso-cycles and all of the micro-cycles in the plan.

As soon as the assessment of the overall hypothetical plan has been done, the smallest unit must be dealt with, the training or practice session. The next sections of this chapter introduce the coach to these concepts, as well as creating an emergency action plan (EAP).

## Summary

The coach knows the importance of methodical planning. Organising the plan for a specific archer is quite an undertaking. It requires time, patience and vision. There may be unforeseen problems along the way, such as injury or poor weather, which will make the original plan impossible to follow. Modifications will be needed. This is only natural.

Use this reference manual and workbook to make the job easier. Just as you break down the skill for the archer to understand and improve, so Periodization will help the coach to break down the training plan into workable segments.

### iii) Planning a Practice



#### Structure of a Practice

**P. 61**

Wasted time – it is a common problem in the training process when there is no planned progression with goals for each training session. A well-structured practice has five parts:

#### The introduction:

The coach prepares the site and equipment, welcomes the athlete. The coach outlines what will be taking place during the practice and assesses the whether or not the archer has recovered from the previous practice.

#### The warm-up:

Many archery coaches overlook this important aspect of the practice. There is a general reluctance among archers to warm-up properly also. It is as if the archer does not view himself/herself as a real athlete, or that the level of physical activity required to shoot a bow does not require warm-up. This is seriously-flawed thinking.

The good archery coach designs activities that gradually activate the archer and prepares the archer physically and mentally to effectively perform the main part of the practice. The warm-up consists of two parts: (1) general and (2) specific. The general warm-up aims to raise the body temperature until it is sweating, to allow for progressive muscle stretching. The specific warm-up, designed for the particular sport, aims to prepare the warmed muscles for the types of movements to be performed in the main part, and therefore the movements should mimic those of the main part, gradually building in intensity and range of motion.

#### The main part:

The coach ensures a smooth flow of activities that are challenging for the athletes, and that help them to improve archery skills and abilities. It is not enough to have the archer “just shoot arrows”. There should be a progression with specific goals for the session.

Fitness improvement will have to be dealt with in separate practice sessions unless the coach is able to build in a day-long training session with shooting first and fitness/strength training second. The activities chosen must be not only appropriate for the sport, but also for the athletes' age, fitness, and ability levels.

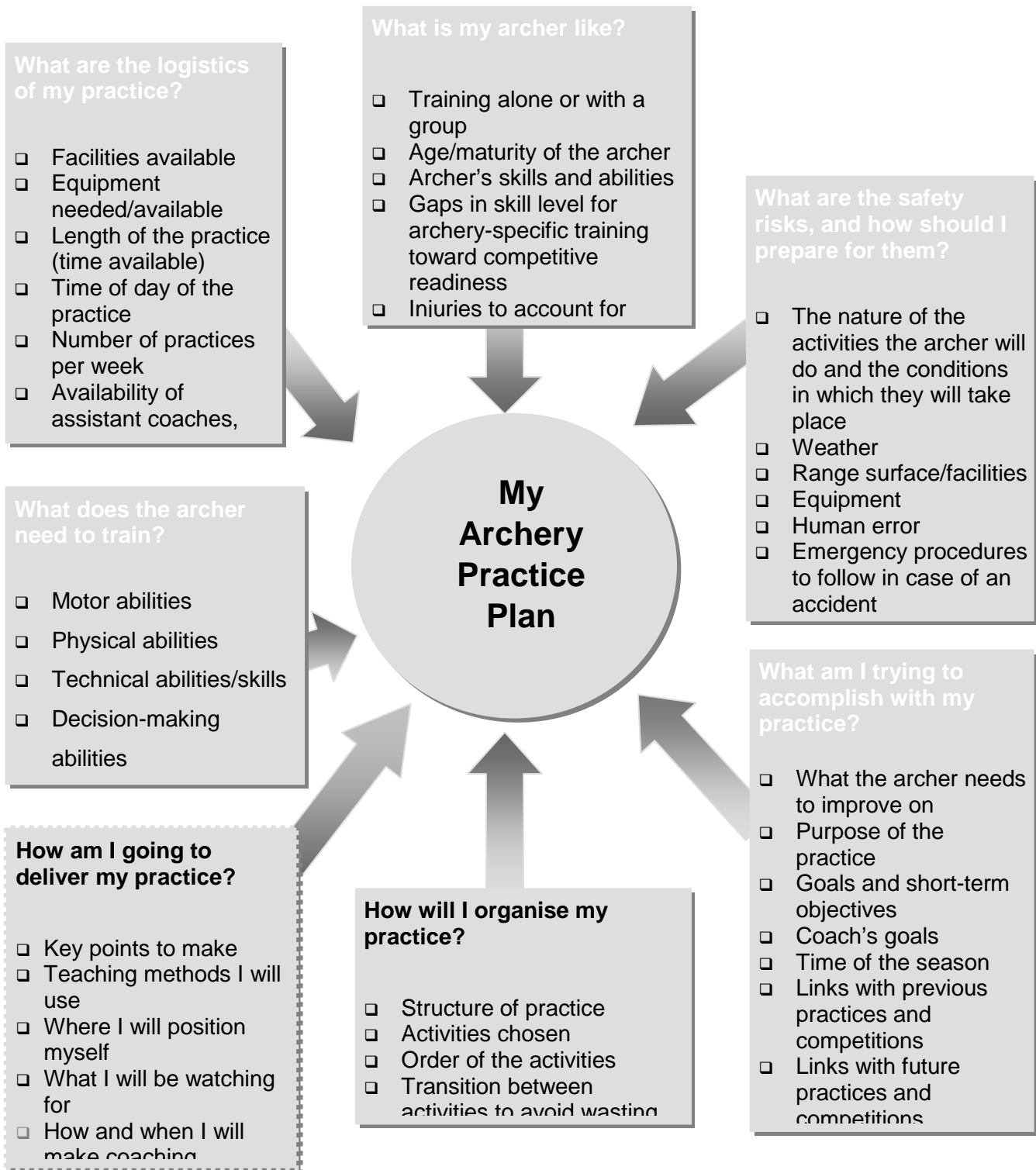
**The cool-down:**

To initiate the recovery of the body, the good archery coach allows time for low-intensity transition activities between the more intense efforts of the main part and the end of the practice. This can be as simple as shooting close-up to the archery targets with eyes closed, emphasising smooth flow and power. The coach also plans for some time to stretch.

**The conclusion:**

The coach provides some comments on the practice as well as an opportunity for feedback from the archer. The coach ensures the practice ends on a positive and friendly note. Some information about the next practice or tournament is also provided.

## Planning a Practice – things to consider



Key Elements of a Practice

<p><b>Introduction</b></p> <p>Purpose is to greet athletes and let them know what will be taking place</p>	<p>Variable</p> <p>2-3 minutes</p>	<p><b>Before practice begins:</b></p> <ul style="list-style-type: none"> <li>• Inspect facilities</li> <li>• Organise equipment</li> <li>• Greet each athlete</li> <li>• Assess the energy level of each athlete</li> </ul> <p><b>At the beginning of practice:</b></p> <ul style="list-style-type: none"> <li>• Review the goals of the practice and the activities planned</li> <li>• Give safety instructions specific to the activities planned</li> </ul>
<p><b>Warm-up</b></p> <p>Purpose is to prepare the body for the efforts that will be produced during the main part</p>	<p>5-10 minutes</p> <p>8-15 minutes</p>	<p><b>General warm-up:</b></p> <ul style="list-style-type: none"> <li>• General exercises or games to loosen muscles and raise body temperature</li> <li>• Progressive stretching</li> </ul> <p><b>Specific warm-up:</b></p> <ul style="list-style-type: none"> <li>• Brief activities that athletes already know that mimic the movements of the main part (may even be the same activity, but at lower intensity)</li> <li>• A gradual increase in intensity that will not tire the athlete</li> <li>• A quick transition between the end of the warm-up, the explanations/instructions given for the first activities of the main part, and the activities themselves</li> </ul>
<p><b>Main part</b></p>	<p>Variable;</p>	<p><b>Three or more activities linked in the proper order</b></p>

<p>Purpose is to engage the archer in activities that will help to improve sport- specific skills and abilities</p>	<p>usually 30-60 minutes or more</p>	<ul style="list-style-type: none"> <li>• Activities that challenge the athlete to learn and improve while being enjoyable</li> <li>• Athlete engaged most of the time in an activity (i.e. not standing around or waiting)</li> <li>• Archer allowed lots of practice time for each activity</li> <li>• Activities that are to be adapted to the age, fitness, and ability levels of the archer</li> </ul>
<p><b>Cool-down</b></p> <p>Purpose is to begin recovery</p>	<p>5-10 minutes</p>	<ul style="list-style-type: none"> <li>• A gradual decrease in intensity</li> <li>• Stretching, especially of those muscles most used</li> </ul>
<p><b>Conclusion</b></p> <p>Purpose is to debrief and inform about next practice or competition</p>	<p>3-5 minutes</p>	<ul style="list-style-type: none"> <li>• Provide and ask for feedback on what went well and suggest how improvement can be made</li> <li>• Inform about the next practice or competition (e.g. logistics, goals and emphasis)</li> </ul>

### Optimal Order of the Activities in a Practice

<b>Early in the Practice:</b>	activities to acquire new techniques, skills or motor patterns; that develop or require co-ordination or balance
<b>Then consider:</b>	activities to develop or require strength; to develop or require strength-endurance
<b>Later in the Practice:</b>	activities to consolidate skills already acquired; that develop flexibility

### Practice Planning Tips

- Always include a warm-up in your practice plan. Never skip or rush the warm-up, as this may lead to injury. Consider having athletes warm-up before the practice begins if you are short on time, for instance if facilities are only available for a limited period of time.
- Plan to use assistants or parents who can help with score-keeping or audio-visual recording. Make sure your assistants are familiar with your practice plan, and give them simple and clear tasks to do.
- In your choice of activities; avoid activities and games that eliminate people - those archers who need the most practice at what you are doing will likely get bumped first.
- When you plan an activity that involves opposition, pair up athletes with similar ability levels so that they can challenge each other and each has a fair chance of success.
- Think of all the skills required to perform the drill! A drill or an activity might be relevant to your sport or to the long-term goal you have in mind, but the skill or fitness level of your athletes AT THIS TIME maybe such that they cannot really benefit from it.
- Be realistic about the actual number of skills your archer can learn over the course of a season. For some skills, it may take a lot of time and practice for an athlete to go beyond the acquisition stage (see the Skill Development Model described earlier in this document).

- Always make sure archery fundamentals are well mastered before planning for more advanced techniques. However, the coach can begin developing tactical and decision-making skills early on by putting your athletes in more complex event-specific situations which require them to use their observation skills, analyse the situation, and work at coming up with possible solutions, e.g. shooting in the wind, 3D, or unmarked field.
- Plan for fun - Find a way to develop a skill or ability through a game or activity that the archer will enjoy doing. Ask your archers which activities they prefer and use them with variations to achieve specific goals.
- Be creative when athletes have to do a lot of repetitions, in the acquisition and consolidation stages of skill development. Although your archer may have to work on the same fundamental movements from one practice to another to acquire the correct motor patterns, use a variety of activities or games in which these movements have to be performed, and look for new and fun ways of doing them to avoid monotony.
- Take time to talk to your archer about his/her performance and what is important to work on improving next.
- Tasks that do produce marked fatigue or muscle soreness should not be practiced every day, and recovery between practices must be longer. Alternate the days where these skills or tasks are performed with recovery days or with days where other, less fatiguing skills are practiced.
- Motor tasks that do not produce extreme fatigue or muscle soreness can be practiced every day.
- Be aware of the athlete's physical capabilities before you ask them to do physical activity (Growth and Development), and athletes with a disability.
- Simulate elite competitive situations in practice. Include all elements of the competition in your practices, e.g. rules, competition protocols, how to interact with officials, show respect for opponents, treat others appropriately, etc.
- Refer to the listing in this reference manual which tells the coach all of the skills that should be taught to archers given their age and experience in the sport as a key element of your development plan or model.



- The first time you simulate an elite competitive experience, it may not be as successful as you might like. The archer may need more time to learn it. Give the activity a name, so that the archer will recognise it immediately in the future.
- Find out what your archer likes and dislikes about practice. Keep a file or a list of favourite drills, activities and games. Don't be afraid to repeat a game or drill.
- Practice does not make perfect, it only makes permanent. Perfect practice makes perfect, permanently.
- Keep a binder that has EVERYTHING in it: medical information, player information, minimum scores required (if applicable), directions, differences in rounds/events, rules, etc. Keep a written or electronic record of what you do in practice.
- Make a list of EVERYTHING. Make a TO DO LIST (generic sheet) for every day/practice.
- Try to keep things as simple as possible.

### Steps in Choosing/Designing Activities for a Practice

As emphasized throughout this document, effective practice planning requires making good activity choices. By taking into account (1) the specific needs of participants and (2) the characteristics and demands of each activity, you can select the type and conditions of practice that are most appropriate. You increase the probability that the desired learning or training effects will occur. As a summary, the procedure below is recommended when planning the activities of a practice.

- Step 1** Determine what you want the athletes to be able to do. This may be a long-term goal that may take several practices or even weeks to be achieved.
- Step 2** Assess the nature of the task you want the archer to be able to do as far as the skills (open vs. closed; discrete vs. serial vs. continuous) and the athletic abilities (physical, motor, tactical, and mental) involved.
- Step 3 \*** Given the nature of the task and its demands, determine whether it is appropriate to the age and developmental stage of the athletes, as well as the stage of skill development they are at. If your answer to this question is yes, then proceed to step 4; if the answer is no, return to step 1 and make the necessary adjustments.

- Step 4 \*** Decide whether the task needs to be broken down into distinct parts or if it should be executed as a whole.
- Step 5** Determine the type of practice that is most appropriate (massed vs. distributed; constant vs. variable).
- Step 6 \*** Determine the practice conditions that are most appropriate.
- Step 7** Given your logistics and the equipment available, select or design sport activities that meet the above criteria.
- Step 8** Define the measures of success for the activity.
- Step 9 \*** Identify potential risk factors associated with the activity, and take them into account in the activity design.
- Step 10 \*** Think about the best way to give the explanations and instructions to the archer to make it easy to understand what the activity is about and how it should be performed.

**Notes:** Steps marked with an asterisk (\*) involve some consideration to safety.



**P.24** Athlete(s): \_\_\_\_\_ Date: \_\_\_\_\_

Location: \_\_\_\_\_ Start time: \_\_\_\_\_ Total Duration: \_\_\_\_\_

Objective(s):

Equipment:

<b>Activities</b>	<b>Key Points/Messages</b>
<b>Goals:</b> Athletic abilities, type of effort, length, intensity, movements, etc.	Guidelines, safety, etc.
<b>Introduction</b> (duration =     min)	
<b>General warm-up</b> (duration =     min)	
<b>Specific warm-up</b> (duration =     min)	
<b>Main part</b> (duration =     min)	
<b>Cool-down</b> (duration =     min)	
<b>Conclusion</b> (duration =     min)	



**P. 25**

Practice session date: \_\_\_\_\_ Athlete: \_\_\_\_\_

Name of the activity: \_\_\_\_\_ Warm-up ( ) Main part ( ) Cool Down ( )

Duration: \_\_\_\_\_ Objective(s): \_\_\_\_\_

Equipment needed: \_\_\_\_\_

Description: *(Athletic abilities to be trained, purpose, movements, types of effort, intensity, duration, etc.)*

Directions/guidelines to give athlete: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Success criteria: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Risk factors/safety guidelines to give to athlete: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Notes/comments: \_\_\_\_\_

\_\_\_\_\_

#### iv) Risk Management and the Emergency Action Plan



##### Environmental risks

**P. 64**

Factors related to the weather and/or its effects on the site or location where the sport takes place.

##### Equipment and facilities risks

Factors related to the quality and operating conditions of the equipment and the facilities

##### Human risks

Factors related to the participants and to the people who are associated with them, such as parents, coaches, officials, and event organisers. Human risks may also be related to a participant's individual characteristics (e.g. height, weight, level of physical preparation, ability) or behaviour (e.g. carelessness, panic, aggression). Human factors related to coaches include their training and experience, their supervision of the participants, as well as their decisions they make about situations in which they place the participants.

#### Strategies for Managing Risk

Information to gather	Actions to take
<ul style="list-style-type: none"> <li>• Risks of the activity</li> <li>• Participants' medical information</li> <li>• Participants' emergency contact information</li> <li>• Facility safety checklist</li> <li>• Past injury reports</li> </ul>	<ul style="list-style-type: none"> <li>• Planning</li> <li>• Designing an Emergency Action Plan</li> <li>• Inspecting equipment and facilities before the practice</li> <li>• Informing participants and parents</li> <li>• Supervising activities</li> </ul>

##### Heat and Humidity as Risk Factors

- During exercise, the muscles produce heat. This heat must be dissipated otherwise the body runs the risk of "overheating." Over-heating can result in serious, potentially harmful side-affects. Sweating is one of the heat-dissipating mechanisms of the body. When sweat evaporates, it cools off the body.
- Most sport activities lead to heat production and sweating. Evaporation of sweat works best when the air is dry. In moist, damp air, sweat cannot evaporate easily and cooling off is more difficult.

- If the air temperature is high during vigorous activity, participants can lose a significant amount of water through sweating. Most archery activity will not produce excessive sweating, but hydration is very important to health and performance and the coach must monitor the new competitor to make sure that liquid replacement is on-going.
- High temperatures and high relative humidity make it hard for the body to dissipate heat. Heavy sweating occurs, but the water loss does not help to cool off the body. Under these conditions, participants run the risk of over-heating,
- Water lost as a result of heavy sweating can lead to dehydration. Dehydration can reduce performance, decrease the body's ability to dissipate heat; and endanger health.
- Thirst is not a good indicator of a need for water. In fact, dehydration has already started if a participant feels thirsty.
- During most exercise conditions, the rate at which participants lose water exceeds the rate at which they can absorb it by drinking. This is accentuated during exercise in a hot environment. Therefore, participants need to drink fluids before they are thirsty.
- Children run a higher risk of over-heating when exercising in the heat, because their sweating mechanism is not fully developed. In addition, children tend to not drink enough during exercise, in particular if the beverage is not flavoured.

### Humidex

The humidex describes how hot and humid weather feels to the average person. What to do if the humidex is above 30 C, in particular if it exceeds 35 C:

- Tell participants to bring extra water or sport drinks; ensure there will be access to water during the practice or the competition, and bring a big jug of fluids.
- Tell participants to dress in loosely fitting, lightweight, and light-coloured clothes.
- Plan for low-intensity activities.
- Plan for shorter work bouts, with frequent and longer pauses.
- Schedule practices early in the morning or during the evening; avoid the hours between 9:00 and 18:00 if possible.
- Consider changing the location of the practice to a shaded area, or ask participants to bring umbrellas to create shade during breaks.

- Consider exercising indoors, in a facility with air conditioning.
- Consider alternatives to physical exercise.

#### Other Safety Measures to Avoid Heat Injuries

- Plan for participants to have enough time to get used to the environment they will face in competition. Insisting on heat acclimatization may mean not entering competitions if participants cannot train in a similar climate for approximately two weeks beforehand.
- In order to protect participants (in particular, young children) against the potentially harmful effects of ultra violet (UV) rays, the following is recommended: they should wear a hat or a cap with a visor; clothes should cover the upper part of the body, the neck, the arms and the legs; sun screen lotion (protection factor of 30 or more) should be applied on the exposed skin, including the face and the hands BEFORE the skin becomes over-heated. Participants should not expose their body to the sun without effective protection when the UV index is high.
- Before exercise, participants should drink 400 to 600 ml of fluid.
- During exercise, participants should drink 150 to 250 ml of fluid every 15 minutes. Remind participants to drink. Lead by example and never restrict archers from drinking during a practice or a competition.
- After exercise, participants should re-hydrate by drinking as much fluid as thirst dictates, and even force them to drink.
- Beverages should be cool (8 to 10°C) and not too sweet. Children prefer flavoured sport drinks and these promote drinking.
- Tell the participants to bring a personal water bottle with cold fluids to each practice or competition. Make sure each bottle is clean and well identified. Inform their parents about the importance of hydration.
- Tell the participants to monitor their hydration level by checking their urine. If it is dark, there is not much of it, and it has a strong smell, the participants are most likely dehydrated and should force themselves to drink.

***NB:*** Pay particular attention to these measures during the first few hot days of spring or summer, when participants are not yet acclimatized to hot and humid weather.

#### Cold as a Risk Factor

- The colder the environment, the faster the archer's body temperature will decrease.
- During exercise in a cold environment, the skin can become wet as a result of sweating or exposure to rain. A wet skin surface cools the body faster than when it is dry.

- Temperature may drop considerably once the sun has set which can increase the level of risk associated with exercising in a cold environment quickly.
- The wind magnifies the perception of cold and increases the rate at which the body loses heat. This effect can be further amplified if the skin is wet.
- In cold weather, high humidity makes the temperature feel colder than air temperature indicates it is.
- Cold, dry air makes it difficult to breathe for some asthmatics, although it is generally easier to tolerate the cold when the air is dry.
- Skin can freeze when exposed to very cold temperatures, and when this happens circulation slows. Tissue can be damaged if frostbite is prolonged and extensive. Extremities (e.g. toes, fingers, nose, and ears) are particularly at risk in cold temperatures because the body shunts blood flow to central organs and tissues to maintain the body's core temperature.
- In severe cold, brain function can slow down, and so risk of further injury in prolonged exposure increases.
- Children get cold much faster than adults and their skins more prone to freeze. People with less body fat usually have less tolerance for cold than those with more body fat.
- Muscles and other soft tissues that are cold are more susceptible to injuries such as pulls and tears in particular if the efforts produced are sudden and intense. Archers tend to train too early in the spring and cause injury as well as poor form.
- In very dry cold environments, water vapour lost through breathing and evaporation of sweat from exposed surfaces may lead to dehydration.
- Wearing appropriate clothing can be a challenge when shooting in the cold. Clothes must protect against the cold, but at the same time they must not impair the body's ability to get rid of the heat produced during exercise. Heavy clothing is cumbersome and interferes with movement. Thin clothing often offers little protection from the cold and the wind. Layering is important to provide warmth while maintaining string clearance and the ability to allow the upper body segments to line up behind the bow, to the target.
  - The type of fabric worn can either wick water from the body surface (i.e. synthetics such as polypropylene or Gore-Tex™ which results in less risk of heat loss, or trap it there (i.e. cotton or nylon) which results in greater risk of heat loss.

### Safety Measures to Avoid Cold Injuries

When exercising in the cold:

- Ensure participants wear sufficient clothing for the conditions, and layer clothing as follows:
  - Layer closest to skin: Polypropylene, close fitting (wicking effect)
  - Second layer: Fleece or wool, slight room between first layer and second layer for “trapped air” effect



–Third layer: Wind-breaking, water repellent, breathable layer

- When it is very cold, ensure exposed surfaces are kept to a minimum.
- Once the body has warmed up, and if the temperature is not too cold, consider removal of the second layer of clothes during exercise to avoid excessive sweating. Have participants add a layer or use blankets to keep warm during breaks or pauses.
- Apply antiperspirant on feet before exercising to lessen sweating of the feet (which is usually followed by cooling of the feet). Doing the same on the palm of the hands may reduce the feeling of cold for people who tend to sweat a lot in their gloves or mitts.
- Ensure participants hydrate when they exercise in the cold.
- Bring children inside when they say they are cold.
- Once a person suffers serious frostbite, the risk of subsequent frost bites to the same area may be increased.
- When the weather is cold and participants must train outdoors, hold your practices between 11:00 and 14:00 as these tend to be the warmest hours of the day. Be aware that temperature drops quickly when the sun sets.
- If possible, choose areas that are protected from the wind; avoid activities in open areas.
- Have participants or their parents bring a change of clothing, especially socks and underwear. Try to find a warm and protected spot to change.
- Inform participants and parents that a hat should be worn at all times; over 30% of body heat may be lost through the head. Ensure ears are covered.
- Allow additional time for warming up for training and competition. It takes longer to get the body warmed up and ready for archery in cold weather than it does in warm weather.

Managing Risks

<b>Gathering Information</b>
<ul style="list-style-type: none"> <li>• Phone numbers and addresses of participants, parents, emergency numbers</li> <li>• Medical conditions of participants</li> </ul>
<b>Planning</b>
<ul style="list-style-type: none"> <li>• Ensure that the activities are appropriate for the age, fitness and ability level of participants</li> <li>• Ensure that the practice starts with a warm-up, and that the activities include progression and challenge</li> <li>• Adjust activities so that all members can participate</li> </ul>
<b>Designing an Emergency Action Plan</b>
<ul style="list-style-type: none"> <li>• Design an effective Emergency Action Plan and update when necessary</li> </ul>
<b>Inspecting equipment and facilities</b>
<ul style="list-style-type: none"> <li>• Know how to check archery equipment properly to ensure it is safe to use</li> <li>• Take inventory of equipment (collective and individual)</li> <li>• Check the first aid kit</li> <li>• Check the safety of the facility</li> <li>• Check the archer's equipment for safety</li> </ul>
<b>Informing participants and parents</b>
<ul style="list-style-type: none"> <li>• Inform the parents and the participants of the risks inherent to the sport</li> <li>• Explain the safety procedures and check for understanding</li> <li>• Highlight safety during the practice</li> </ul>

Preventing sport-related injuries

<b>Before the annual plan starts</b>
<ul style="list-style-type: none"> <li>• Have a medical profile completed for each archer</li> <li>• Inform parents of possible risks</li> <li>• Ensure facilities and equipment meet established safety requirements</li> <li>• Create and fill in a facility safety checklist</li> <li>• Review last season's injuries and/or common injuries in archery</li> </ul>
<b>During the year</b>
<p><b>Before a practice or competition</b></p> <ul style="list-style-type: none"> <li>• Inspect equipment and facilities</li> <li>• Meet with the officials</li> <li>• Prepare an Emergency Action Plan</li> <li>• Plan specific safety measures for the practice/competition</li> </ul> <p><b>During a practice or competition</b></p> <ul style="list-style-type: none"> <li>• Inform participants of specific safety measures relating to activities, facilities and equipment</li> <li>• Ensure there is proper supervision</li> <li>• Evaluate participants</li> <li>• Ensure that fair play principles are followed</li> </ul> <p><b>After a practice or competition</b></p> <ul style="list-style-type: none"> <li>• Store equipment safely</li> <li>• Fill in an accident report if necessary</li> </ul>
<b>After the annual plan is completed</b>
<ul style="list-style-type: none"> <li>• Keep an accident/injury report log</li> </ul>

<b>Participant Information Card</b>	
Name _____	Date of Birth ____/____/____
Person to be contacted in case of emergency _____	
Phone numbers: Day _____	Evening _____
Alternative contact: _____	
Phone numbers: Day _____	Evening _____
Family doctor: _____ Phone number _____	
Hospital insurance number _____	
<u>Relevant medical history</u>	
Medications _____ _____	
Allergies _____ _____	
Previous injuries _____ _____	
Does the participant carry and know how to administer his or her own medications? _____	
Other conditions (braces, contact lenses, etc.) _____ _____	

**Note: Medical information is confidential. These cards must only be available to authorized individuals**

Fill out a participant information card for each of your athletes.

## Emergency Action Plan Checklist

### Access to telephones

- Cell phone, battery well charged
- Training venues
- Home venues
- Away venues
- List of emergency phone numbers (home competitions)
- List of emergency numbers (away competitions)
- Change available to make phone calls from a pay phone

### Directions to access the site

- Accurate directions to the site (practice)
- Accurate directions to the site (home competitions)
- Accurate directions to the site (away competitions)

### Participant information

- Personal profile forms
- Emergency contacts
- Medical profiles

### Personnel information

- The person in charge is identified
- The call person is identified
- Assistants (charge and call persons) are identified

- *The medical profile of each participant should be up to date and located in the first aid kit.*
- *A first aid kit must be accessible at all times, and must be checked regularly. See the appendices for suggestions on contents for a first-aid kit.*

### First-aid kit

A complete first-aid kit is essential. This kit must be carefully prepared in order to treat the most common injuries. Furthermore, it must be accessible to those responsible for the participants. Here is a list of what a first-aid kit should contain. Always remember to replace any supplies you use and check medication for expiry dates.

<b>Content</b>	<b>Use</b>
<b>Medical record</b>	<ul style="list-style-type: none"> <li>• important information in case of an emergency</li> </ul>
<b>Disinfectants</b>	<b>Use</b>
<ul style="list-style-type: none"> <li>• Soft antiseptic soap</li> <li>• Antiseptic cream</li> <li>• Antiseptic solution</li> <li>• Peroxide</li> </ul>	<ul style="list-style-type: none"> <li>• all skin lesions</li> <li>• laceration requiring cleaning before dressing can be applied</li> </ul>
<b>Dressings</b>	<b>Use</b>
<ul style="list-style-type: none"> <li>• Ocular</li> <li>• Aseptic (sterile gauze, 50, 75, 100mm rolls)</li> <li>• Adhesive bandages ("Band-Aid" type and butterfly closures)</li> <li>• elastic bandages (100 and 150mm)</li> <li>• triangular bandages and safety pins</li> </ul>	<ul style="list-style-type: none"> <li>• cover and close the eye</li> <li>• dry compression</li> <li>• protection of minor lesions</li> <li>• compression</li> <li>• multiple uses but primarily to act as an arm support in case of a fracture</li> </ul>
<b>Drug products and ointments</b>	<b>Use</b>
<ul style="list-style-type: none"> <li>• Zinc ointment</li> <li>• Xylocaine spray</li> </ul>	<ul style="list-style-type: none"> <li>• scratches or blisters</li> <li>• sore burns</li> </ul>
<b>Other useful items</b>	<b>Use</b>
<ul style="list-style-type: none"> <li>• cleaning solution for foreign bodies</li> <li>• scissors</li> <li>• tongue depressor</li> </ul>	<ul style="list-style-type: none"> <li>• dislodge foreign bodies</li> <li>• common use</li> <li>• multiple uses</li> </ul>

<ul style="list-style-type: none"><li>• body temperature thermometer</li><li>• chemical cold bags</li><li>• plastic bags</li><li>• phone number list</li><li>• tools</li><li>• adhesive tape (37.5mm)</li></ul>	<ul style="list-style-type: none"><li>• check body temperature in case of trauma</li><li>• for sprains (if you don't have access to real ice )</li><li>• for ice cubes</li><li>• ensure quick response (cell phone, pen, paper, 2 quarters, participants' emergency records)</li><li>• minor repair of equipment</li><li>• support wounded joints</li></ul>
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ITEM	First Aid Kit Checklist				Date: _____			Checked by: _____				
Surgical Gloves												
Peroxide												
Soft antiseptic soap												
Antiseptic Wipes												
Band-aids												
Butterfly bandages												
Sterile gauze pads												
Self-adherent wrap												
Second Skin												
Triangular bandage												
Safety pins												
Juice box												
Plastic bags for ice												
Tweezers												
Duct tape												
Emergency Action Plan												
Medical contact information												



**List of Archers in My Training Sessions**

**Telephones:** 911 if available \_\_\_\_\_

Ambulance \_\_\_\_\_

Police \_\_\_\_\_

Fire Department \_\_\_\_\_

Name of Athlete sex (M/F)	Birthdate (YYYY/MM/DD)	Address	Known medical conditions	Implementation procedure	Emergency contacts	Telephone

### Facility Inspection Form

Facility: \_\_\_\_\_ Date: \_\_\_\_\_

Inspected by: \_\_\_\_\_

**Corrections:** add    replace    modify    discard    clean    repair    check

ITEM	ADEQUATE	INADEQUATE	CORRECTIONS	OBSERVATIONS
<b>Equipment</b>				
Club security				
Shooting line				
Waiting area				
Buttresses				
Stands				
Safety nets / berm				
Controlled access to shooting area				
Timing system				
Line control system				
Target faces				
Target pins				
<b>Individual Safety</b>				
Bows				
Sights				
Stabilisers				
Arrows & points				

Quivers				
Armguards				
Finger tabs/releases				
<b>First-Aid kit</b>				
EAP & procedures				
Other				

The facilities manager gets one copy, and the coach keeps a copy for his/her files.

Facilities Manager Name: \_\_\_\_\_ Signature: \_\_\_\_\_

Name of Coach: \_\_\_\_\_ Date (YYYY/MM/DD): \_\_\_\_\_

Signature of Coach: \_\_\_\_\_

**Accident Report Form**

Date of report \_\_\_\_/\_\_\_\_/\_\_\_\_

YYYY / MM / DD

**Patient Information**

Last Name	First Name
Street Address	City & Province
Postal Code	Phone
E-Mail	
Sex _____ Height _____ Weight _____	Date of birth ____/____/____ Age _____
Known medical conditions or allergies	

**Incident Information**

Date and time of incident medical support arrival	Time of first intervention	Time of
____/____/____ ____AM PM	____AM PM	____AM PM
Year / Month / Day		
<b>Charge Person description of the incident:</b> (what took place, where, what were the signs and symptoms of the patient)		

**Patient description of the incident:**

**Event and conditions:** (what was the event during which the incident took place, location of incident, surface quality, light conditions, weather conditions).

**Actions or intervention taken:**

After treatment, the patient was: (circle one)

activity                      sent home                      sent to hospital or a clinic                      returned to

**Accident Report Form**

Page 2

Date of report \_\_\_\_/\_\_\_\_/\_\_\_\_

YYYY / MM / DD

<b>Charge person</b> Role (coach, assistant, parent, official, bystander, therapist)	_____
Last Name	First Name
Street Address	City & Province
Postal Code	Phone
E-Mail	Age ____

<b>Witness</b> Role (coach, assistant, parent, official, bystander, therapist)	_____
Last Name	First Name
Street Address	City & Province
Postal Code	Phone
E-Mail	Age ____

<b>Witness</b> Role (coach, assistant, parent, official, bystander, therapist)	_____
Last Name	First Name
Street Address	City & Province
Postal Code	Phone
E-Mail	Age ____

**NOTES**

Form completed by:

Print name \_\_\_\_\_

Signature \_\_\_\_\_

## Emergency Action Plan

**Purpose:** Get professional care to the injured athlete ASAP

**Charge Person** - Should have specific training in the care of injuries

### **Responsibilities**

1. Clear the risk of further harm to the injured person by securing the area and shelter the injured person from the elements
2. Designate who is in charge of the other participants
3. Protect yourself (wears gloves if he/she is in contact with body fluids such as blood)
4. Assess ABCs (checks that airway is clear, breathing is present, a pulse is present, and there is no major bleeding)
5. Wait by the injured person until EMS arrives and the injured person is transported
6. Fill in an accident report form

### **Call Person**

#### **Responsibilities**

1. Call for emergency help
2. Provide all necessary information to dispatch (e.g. facility location, nature of injury, what, if any, first aid has been done)
3. Clear any traffic from the entrance/access road before ambulance arrives
4. Wait by the driveway entrance to the facility to direct the ambulance when it arrives
5. Call the emergency contact person listed on the injured person's medical profile

### NUMBER CARD

**Locations of Phones (example)** Equipment room - main floor    Pay phone in main lobby (need 50¢)

**Phone Numbers**

**(examples)**

Emergency	911	Hospital	555-1234
Ambulance, Police, Fire	911	Doctor's Office	555-1234
		Campus Security	555-1234

**Details of Location** (to be read over phone to emergency dispatcher) **(example)**

Athletic Complex.    Trafalgar Road north of the Q.E.W.    Enter main college drive.    Go to the very end of the drive.    Turn left to the Athletic Complex.    Enter by the main lobby doors.

**Draw a map of the location**



### Steps to Follow when an Injury Occurs

**Note:** it is suggested that emergency situations be simulated during practice in order to familiarise coaches and athletes with the steps below.

#### **Step 1: Control the environment so that no further harm occurs**

- Stop all participants
- Protect yourself if you suspect bleeding (put on rubber gloves)
- If outdoors, shelter the injured participant from the elements and from any traffic

#### **Step 2: Do a first assessment of the situation**

If the participant:

- is not breathing

*Activate*

- does not have a pulse
- is bleeding profusely
- has impaired consciousness
- has injured the back, neck or head
- has a visible major trauma to a limb
- cannot move his/her arms or legs or has lost feeling in them

*EAP!*

If the participant does not show the signs above, proceed to Step 3

#### **Step 3: Do a second assessment of the situation**

- Gather the facts by asking the injured participant as well as anyone who witnessed the incident
- Stay with the injured participant and try to calm him/her; your tone of voice and body language are critical. If possible, have the participant move himself/herself off the playing surface.

Do not attempt to move an injured participant.

**Step 4: Assess the injury**

Have someone with first aid training complete an assessment of the injury and decide how to proceed. If the person trained in first aid is not sure of the severity of the injury or there is no one available who has first aid training, activate EAP.

If the assessor is sure the injury is minor, proceed to step 5.

*Activate*

*EAP!*

**Step 5: Control the return to activity**

Allow a participant to return to activity after a minor injury only if there is no:

- Swelling
- Deformity
- Continued bleeding
- Reduced range of motion
- Pain when using the injured part

**Step 6: Record the injury on an accident report form and inform the parents**

## Head Injuries and Concussions

Head injuries and concussions can occur in many sports, either in training or during competitions. Because of the potentially grave consequences of injuries to the head, coaches must take certain precautions and should enforce strict safety measures when dealing with them.

What is a concussion?

A concussion is an injury to the brain that results from a hit to the head. It shows itself through a **temporary alteration in the mental status of the individual, and may also be accompanied by some physical symptoms.**

Some common causes of concussions

The situations that may result in head injuries vary from sport to sport. Some common causes include:

- direct blows to the head, face, jaw, or neck
- collisions from the blind side, or hits from behind
- hard fall on the buttocks, or whiplash effect
- poor quality or failure to wear protective sport equipment (shock absorption).
- the environment (e.g. obstacles near playing surface)
- significant differences in the skill level, age, or size of participants
- poor physical condition, or insufficient strength in the neck and upper body musculature.

Symptoms of a concussion

Symptoms observed in the case of a concussion include headache, dizziness, loss of consciousness, nausea, lethargy, memory loss, confusion or disorientation (lack of awareness of time, place, date), vacant stare, lack of focus, ringing in the ears, seeing stars or flashing lights, speech impairment, balance impairment, and problems with sight.

Managing a participant with concussion symptoms

The following short-term measures should be implemented in the event of a concussion:

- An unconscious participant, or a participant with significant changes in mental status following a head injury, must be transported to the emergency department of the nearest hospital by ambulance. This is a grave situation, and ***the participant must be seen by a medical doctor immediately.***

In such a situation, ***the Emergency Action Plan must be implemented.***

- A participant showing *any* of the concussion symptoms should not be allowed to return to the current practice or competition.
- A participant showing concussion symptoms must not be left alone, and monitoring for the deterioration of his/her condition is essential. He/she should be medically evaluated as soon as possible following the injury. The circumstances of the injury should be recorded and communicated to the medical personnel.
- If any of the concussion symptoms reoccur, the participant's condition should be considered serious, and the individual *must* go immediately to the hospital.

#### Managing the participant's return after a concussion

Although a participant may have been given the authorisation to return to regular training and competition, this must be done gradually. The participant must be re-evaluated periodically during the weeks that follow his/her return, to ensure that there are no reoccurring symptoms.

Following are a series of steps to assist coaches in managing the return to training or to competition of a participant who has suffered a concussion. Each step should take at least one day, although proceeding through each step may take longer depending on individual circumstances (Step 5 applies predominantly to sports that involve body contact).

- Step 1 No activity, complete rest; if no symptoms are observed for one full day, move to Step 2.
- Step 2 Low-intensity continuous exercise such as walking, jogging, or cycling on a stationary bicycle; if no symptoms are observed, move to Step 3.
- Step 3 Low-intensity, sport-specific activity without contact; if no symptoms are observed, move to Step 4.
- Step 4 Moderate-intensity sport-specific training activities without body contact; if no symptoms are observed, move to Step 5.
- Step 5 Regular practice with body contact if it is required by the sport (no hard impact); if no symptoms are observed, move to Step 6.
- Step 6 Return to regular training and to competition.

If symptoms do reoccur, the participant must immediately stop any form of activity and be examined by a medical doctor before resuming training or competition. It is extremely important for the participant, the coach, and the medical personnel to be open and frank when evaluating the participant's condition. If reoccurring symptoms are not disclosed, the participant may suffer permanent damage.

### **Coach Liability**

1. As a Coach, you must have liability insurance
2. Ensure that your athletes are covered as well
3. Keep a medical profile card for each member
4. Prepare a current EAP (keep it handy)
5. Keep an adequate first aid kit (ideally, you should have first aid training)
6. Check equipment for safety
7. Teach safety rules (post) review
8. Check venue for safety
9. Check equipment for appropriateness to athlete
10. Teach equipment repair and maintenance
11. Ensure that your athletes maintain a standard of fitness and skill level appropriate to the tasks you assign
12. Do not leave participants unsupervised
13. Pursue your own training, professional development and coaching certification
14. Be familiar with, and adhere to, applicable standards, both written and unwritten, as well as internal policies and rules governing the facility, archery and your programme.
15. Work with your sport organisation to establish an “assumption of risk” agreement in your programmes.
16. You control your own practice or athletic activity. Stop the activity if it poses an unreasonable risk.

More than ever before, coaches are aware of the risks and responsibilities they assume when they coach. These risks and responsibilities include those that are legal in nature. No matter what their certification, experience, employment or volunteer status, sport discipline, or location of residence, coaches at all times have a legal obligation to provide a safe environment for participants.

To understand this obligation more fully, the coach must understand some key legal principles including negligence and liability. In order to fulfil this obligation, the coach must also understand concepts and techniques related to risk management. With this knowledge, the coach can determine the applicable standard of care, can assess his or her own coaching situation for risks, and can put in place appropriate measures to manage these risks.

## Negligence

Negligence is a legal term with precise legal meaning. The term relates to standards of behaviour that the law expects, and understanding the law of negligence is an essential first step in learning how to provide a safe environment for participants.

In general terms, negligence refers to behaviour or action that falls below a “reasonable standard of care.” The law in Canada demands that we behave in a particular way so that others who might be affected by our actions are not exposed to an unreasonable risk of harm. The standard of behaviour the coach is expected to meet is what is termed an “objective” standard. As adults and as coaches, we are all credited with the same general intelligence and sensibility, and thus the law expects each of us to behave in a reasonable fashion when confronted with similar circumstances.

The law does not expect a coach to be *perfect* in his or her behaviour, only that the coach is *reasonable* and act as other reasonable coaches would act in the same circumstances.

It is widely accepted that there is a certain amount of risk in many sport activities and that such risk is knowable, foreseeable, acceptable, and, depending on the sport, even desirable. What is unacceptable in sport is behaviour that places participants in a situation of unreasonable risk or danger.

A coach’s conduct is **negligent** when all four of the following conditions occur:

1. a duty of care exists (such as that which exists between a coach and a participant)
2. that duty imposes a standard of care that is not met by the coach
3. a participant, or other person, experiences harm
4. the failure to meet the standard can be shown to have caused or substantially contributed to the harm.

For the coach, the “standard of care” is the most important of the above elements. The standard of care is what the coach *should* do in a given situation. Standard of care is difficult to define precisely because it is influenced by the risk inherent in the surrounding circumstances. Thus, the duty to act responsibly remains constant, but the specific behaviour required to fulfil that duty will change with the circumstances.

To determine what the **standard of care** is in any given circumstance involves looking to four sources:

- **Written standards** - these are government regulations, equipment standards, rules for a particular sport or facility, ARCHERY CANADA rules coaching standards and codes of conduct, and other internal risk management policies and procedures.
- **Unwritten standards** - these are norms or conventions in a sport, an organisation, or a facility that might not be written down, but are nonetheless known, accepted, and followed.
- **Case law** - these are court decisions about similar situations. Where the circumstances are the same or similar, judges must apply legal principles in the same or similar ways. Earlier decisions of the court are a guide, or precedent, for future decisions where the facts are similar.
- **Common sense** - this means simply doing what feels right, or avoiding doing what feels wrong. Common sense is the sum of a person's knowledge and experience. Trusting one's common sense is a good practice.

The responsible and prudent coach is familiar with written policies that govern him/her, is aware of unwritten norms and practices, knows something of the case law as it applies to coaches, and has learned to trust his/her intuitive judgment and common sense.

### **Liability**

Where all four conditions of the legal definition of negligence have been met, negligence of the coach may be established. What follows then is the question of liability. While **negligence** refers to conduct, **liability** refers to the responsibility for consequences of negligent conduct. Responsibility may lie with the coach who was negligent or with another person or entity entirely.

For example, an insurance policy transfers the financial liability for negligence to an insurance company. A valid waiver of liability agreement might eliminate liability entirely. An injured participant may be partially responsible for his or her injuries and thus may share liability with the negligent coach. And a sport organisation may be vicariously liable for the negligent actions of its coach, whether he or she is an employee or a volunteer.

Liability can also refer to responsibility for the consequences of conduct that fails to meet a pre-determined legal standard other than the standard of care in a negligence situation. In addition to the liability that can arise from negligence, liability can also arise when a law is broken or when a contract is breached. The prudent coach ensures that these types of liability are avoided by adhering to laws and complying with contractual agreements.

In summary, an understanding of the legal meaning of *negligence* answers the coach's question, "How does the law expect me to behave?" The follow-up question is, "How can I be sure that my behaviour will meet this expectation?" The answer to this question lies in risk management.

### **ARCHERY CANADA Liability Insurance**

Our membership in the national archery organisation gives us a five million dollar liability insurance policy. Contact your provincial archery organisation or the ARCHERY CANADA for more details. A coach can display his/her certificate of qualification to parents, athletes, and club administration, and insurance is a must to protect the club and the coach. Some clubs insist on certification before they are invited to coach in their clubs. If you are conducting your training sessions at a rented facility, make sure that all parties are listed on the certificate of insurance.

### **Risk management**

Risk management is defined as "reducing the chances of injury or loss by taking steps to identify, measure, and control risks." This means that the coach spends time thinking about potentially risky situations, decides which situations might pose serious risks, and determines what practical steps he/she can take to minimize those risks. The common ingredient in all these tasks is common sense.

There are four strategies for controlling risks, all of which are important to the coach:

- **Retain the risk** - the risk is minor and it is inherent in the sport activity, and the coach is willing to accept the consequences, so he/she does nothing about the risk. In sport, this is often a legitimate risk-management strategy.
- **Reduce the risk** - the risk is moderately significant and the coach takes measures to reduce the likelihood of the risk occurring, or the consequences if it does occur, through careful planning and supervision and education of participants.



- **Transfer the risk** - the risk is significant and it is transferred to others through contracts, including waivers and insurance.
- **Avoid the risk** - the risk is severe and the coach decides to avoid whatever may cause the risk.

A word of caution for coaches: there is no template, formula, or checklist for managing risk. The law expects coaches to provide a safe environment for participants, but what that means for a coach's conduct will vary with the circumstances, including the age and skill level of participants and the environment in which the coaching activity occurs.

#### Legal Questions and Answers (FAQ)

The following are frequently asked legal questions about coaching. Answers to these questions have been provided by the Centre for Sport and Law.

#### 1. **What are the major differences between provinces/territories regarding the law and how does this impact me as a coach?**

Laws in Canada can be divided into *public* laws (those laws that govern relations between the state and individuals) and *private* laws (those laws that govern relations between and among individuals and private entities – this area of law is also referred to as **civil law**). In Canada, public laws are generally in federal jurisdiction while private laws are generally in provincial jurisdiction.

The most well-known body of public law in Canada is the Criminal Code: this applies to everyone, regardless of province/territory of residence. Civil law varies from province/territory to province/territory, but not greatly. Examples of civil law relevant to coaches and varying slightly from one province/territory to another include human rights law, occupier's liability and the law of defamation.

An important distinction between criminal law and civil law is that there is a different 'standard' of proof, where the standard of proof refers to the certainty with which something must be proven. In criminal matters, guilt must be proven 'beyond a reasonable doubt' (a fairly high standard), while in civil matters, fault must be proven 'on a balance of probabilities' which means with a certainty that is greater than 50 percent.

This is a lower standard of proof than the criminal standard. Thus, a person charged with a criminal offence could be found not guilty, while the same allegation made under civil law might be upheld.

In criminal law penalties are imposed and may include fines, restrictions on activities, restitution (paying back the person harmed), or imprisonment. In civil law, the penalties take the form of monetary compensation. The amount of compensation will depend on the cost to reimburse the harmed person for their expenses and lost income, and will also attempt to place a monetary value on any injury that the person sustains. The courts can also require a person to perform a certain service (such as following through with a contractual promise) or to refrain from doing something in the future.

**2. Are paid/contracted coaches subject to a different standard than are volunteer coaches?**

Yes and no. Paid and volunteer coaches of equivalent knowledge, skill and certification, performing equivalent duties within a sport setting, will likely be held to the same legal standard of care. They will, however, have different entitlements and privileges in other areas of the law – for example, a volunteer does not have the rights an employee has under employment standards legislation.

Depending upon the circumstances of a coaching activity, paid and volunteer coaches could be held to the same or similar standard. However, coaches who are paid and coaches who are not paid will usually have different duties, obligations, and scope of authority. This will influence the standard of care to which they will be held. This standard is not dictated by whether or not they receive payment for their services, but rather is dictated by the scope of the coach's responsibility and the nature of the relationship between the coach and the participant. The standard of care is constant in that it is always a reasonable standard; however, what is reasonable will vary according to the circumstances in which the paid coach and the volunteer coach find themselves.

**3. Are coaches who are also physical educators held to a different standard?**

Yes and no. Children are required by law to go to school and when in school they are under the authority and care of school officials, including teachers. Thus, a teacher has a statutory duty to stand *in loco parentis*, a legal term meaning that he or she stands in the place of a parent with respect to his or her students. As such, teachers have duties and responsibilities equivalent to that of a 'prudent parent', and must behave as a parent would behave in caring for their child. Coaches who are not in a school setting do not stand "*in loco parentis*" in the same way that teachers do, and are not required to meet this statutory duty.

Both coaches and teachers have specialised skills and knowledge and have a responsibility to provide a reasonable standard of care. The standard of care for anyone is determined by written standards, unwritten standards, case law, and common sense.

The coach who is also a teacher will be held to written and unwritten standards that govern coaching (such as coaching manuals, rules of the sport, coaching code of conduct) as well as written and unwritten standards that apply to teachers (such as teacher manuals, school board policies, and duties imposed by statute upon teachers). The coach in the school setting must fulfil both roles and must adhere to standards that apply to both coaching and teaching activities.

#### **4. How would a judge describe a “reasonable and prudent person” when referring to a coach?**

A coach will be held to an objective standard of behaviour that is what an average and reasonable coach would do, or not do, in the same circumstances. *Black’s Law Dictionary* defines ‘reasonable care’ as that degree of care which a person of ordinary prudence would exercise in the same or similar circumstance.

A coach has special skills and knowledge and is not the same as a ‘person of ordinary prudence’, thus the reasonable standard for the coach will be that standard expected of a reasonably prudent coach having similar knowledge and skill and finding themselves in similar circumstances. Keep in mind that the standard is objective, meaning that it is determined not by what a coach *did* or *did not* do in a situation, but by what a coach *ought* to have done, or *ought not* to have done. It might be tempting to believe that if a coach obtains less training and gains less knowledge, he or she will be held to a lesser standard. This is not the case, as the circumstances may well require a coach of greater knowledge and skill, and *that* will form the benchmark against which the coach’s conduct will be measured.

**5. Are there differences in liability if you are a head coach or an assistant coach?**

Yes. The head coach and assistant coach have different degrees of responsibility and authority. The behaviour required to meet the standard of care is influenced by this.

**6. What is jurisprudence?**

Technically, jurisprudence is defined as the “philosophy of law” or the “science of law”. For everyday purposes, jurisprudence refers to legal principles and how they have evolved over time. The law is not static; it continually evolves to reflect changing community standards. Jurisprudence refers to the principles that are reflected in our laws, both in legislation and in common law (also referred to as “judge-made” or the accumulated body of court decisions).

**7. If I am required to sign multiple codes of ethics or conduct, to which will I be held, or will I be held to all?**

You will be held to all of the codes you execute, within the specific jurisdiction in which they have been signed. In other words, if you sign a code with your provincial sport body it may hold you to it for the activities you undertake for it or within its jurisdiction. If you sign a code for a local sport club, it may hold you to it for activities you undertake with and for the club.

There may also be situations where your activity is subject to two or more codes at the same time, such as if you are coaching at the Canada Games. Unless the codes specify clearly which one might take precedence, or “trump” the others, then all may apply simultaneously. This can create difficulties if any of the terms in different codes are contradictory.

**8. Is special liability insurance a requirement for coaches?**

Special liability insurance is not a requirement for coaches, but is highly recommended as a risk management measure. Ideally, organisations that employ or engage coaches should include the coach as an insured party under their general liability insurance policy. Coaches should confirm this is the case and if it is not, the coach should insist that the policy be revised accordingly. As a last

resort, an individual coach can purchase his or her own insurance, but this may be difficult to obtain and expensive.

**9. What happens if I am uninsured? Are my personal assets at risk?**

The purpose of liability insurance is to cover the costs that an individual might have to pay in the event they are sued, or are required to compensate another person for loss or damage. Insurance may also cover the costs to defend oneself or to otherwise respond to an allegation of wrongdoing, even where such an allegation may prove to be untrue.

The vast majority of coaches never find themselves in situations where they need insurance. However, if they do and they are not covered by an insurance policy, then they will be personally responsible for paying these costs. This could mean tapping into savings and other personal assets.

It is also important to note that insurance policies and coverage vary widely and a given insurance policy may not cover all of the coach's circumstances or all financial obligations.

**10. What are my responsibilities if an accident occurs? Must I accompany a participant to the hospital?**

The coach's responsibilities begin long before an accident occurs. The coach should have an Emergency Action Plan that identifies who does what in the event of an accident, and should have on hand all the necessary information to contact emergency and medical authorities as well as parents/guardians, and to inform medical professionals of the medical history of the injured person.

A coach does not necessarily have an obligation to accompany a participant to the hospital. It will depend on the nature and severity of the injury, whether or not there is another responsible person available to accompany the participant, and whether the remaining participants can be properly supervised should the coach be required to leave. The coach will have to make informed decisions about these matters depending on the circumstances. The Emergency Action Plan provides guidance for this decision-making, which is why it is so important to have prepared in advance.

- Long-term Goals - The Quadrennial Plan



**P.65**

It will become obvious that not all goals will take place in one year's time. There will be certain aspects of the archer's present skill level that will require planning, work and training for several years. This is particularly true when coaching youth. The coach should be looking towards a progression in terms of physical strength, increased skill level demands, equipment and shooting longer distances. Feel free to use the chart entitled "Common Issues and Possible Solutions" below during your archer-specific annual plan for those goals and tasks which will need to be monitored and enhanced as the archer develops beyond this annual plan.

Turn to the Chapter 2 workbook pg. 65 task entitled **Exercise #6 "Planning for the Future"**. Complete it and return to the reference manual.

-Planning a provincial Training Camp



**P. 66 -68**

Turn to the Chapter 2 workbook pg. 66 task entitled **Exercise #7 "Planning a Provincial Training Camp"**.

Complete it and return to the reference manual.



**P. 69**

- Case Study – did your plan work?

Use pages 69 - 71 and re do the calculation done as Task 5 for the hypothetical plan – as part of the evaluation of your "real" YTP.

**To be completed for Workshop 2**

**COMPETITION – DEVELOPMENT  
REFERENCE MANUAL**



**CHAPTER 3**

**PSYCHOLOGICAL PREPARATION**



## OBJECTIVES OF CHAPTER 3: TRAINING FOR PSYCHOLOGICAL PREPARATION

To review theories of: Teaching and Learning, goal-setting, motivation, personality, concentration and confidence as they relate to the elite athletic experience in archery.

To integrate psychological training techniques into the annual plan.

To teach the coach skills that will prepare the archer and coach mentally for the stress of competition.

### LEARNING OUTCOMES FOR THIS CHAPTER

The coach will be able to:

1. utilise various teaching styles and communication modalities to assist archer learning
1. design, implement and evaluate psychological tests and skills that will assess athlete preparedness.
2. integrate psychological training appropriately into the annual plan
3. teach basic theoretical coping skills that will increase the archer's ability to deal successfully with competition.
4. design strategies for improvement, if and when problems arise.



## COACH REFERENCE MANUAL

### Introduction

#### Part I: TEACHING AND LEARNING – A Review

- Creating a Positive Learning Environment
- Recognising Preferred Learning Styles
- Key Elements of Each Step in the Teaching Process

#### Intervention and Feedback

#### Part II: PSYCHOLOGY AND ARCHERY

##### i) A Review of Theoretical Factors Contributing to Perceived Competitive Stress

- Maslow's Hierarchy of Needs
- Motivation: extrinsic versus intrinsic gratification
- Personality
- Stress and Anxiety

##### ii) Assessing Perceived Elite Competitive Stress

- Personality assessment
- Identify and analyse "stressors" which detract from performance
  - Concentration and Focus

##### iii) Neutralizing Perceived Stressors

- Teaching coping skills to the archer
- Face the stressors head on - confidence training
- Alternative forms of mental training
- Reducing external distractions
- Refining focusing and centering skills

##### iii) Goal-setting

- Mental Training and the Plan
- Review the Plan

APPENDIX 1: Vocabulary Tables for Different Learning Styles

**WORKBOOK TASKS**

Learning Styles Questionnaires for Archers

Preferred Learning Style Checklist

**PREP WORK FOR THE WORKSHOP:**

Maslow's Self-Assessment & Athlete Assessment

Positive Behavioural Patterning

Coaching and stress

Negative Stressors and Coaching

- iv) Exercise #1: Fear of failure
- v) Exercise #2: Fear of success
- vi) Exercise #3: Making the team
- v) Case Studies:
  - 1. The best practice-archer in the world
  - 2. Target panic (anxiety)

## Introduction

The competition coach must employ a variety of techniques in order for the archer to learn and prepare for competition successfully. Not all archers learn in the same manner or at the same speed. Some concepts are easy to figure out and internalise, while others are so difficult to understand that the archer can become frustrated. It is important, therefore, for the coach to make sure that the communication loop with the archer is as effective as possible. Part I of this chapter reviews NCCP's Multi-sport Module "Teaching and Learning" theories briefly, and applies them to working with an archer one-on-one. If the coach wishes more detailed information, refer to the NCCP module or Archery Canada's Competition – Introduction reference manual.

Part II highlights the psychological aspect of training and competition in preparation for competition. Regardless of discipline or equipment style, the elite competitive archer can succeed only when the mental aspect of the sport has been trained and honed. This point can not be emphasized enough. Too many times, archers and their coaches spend an inordinate amount of time on equipment tuning or shooting technique, while ignoring the role psychology plays in successful preparation and execution of the skill. Yet this is the most exciting and creative aspect of coaching elite competitive archers!

The coach is expected to have completed NCCP's "Psychology of Performance" module before registering for the Archery Canada workshop. Reference materials and workbook assignments will be needed to complete this chapter. The goal is always to relate this material directly to the archery coach's circumstances and challenges. It is hoped that this combination of reference material will enhance the coach's learning and preparation.

In terms of **ARCHERY CANADA's Long-Term Archer Development Model**, the coach should realise that elite archers come to you with a repertoire of mental and coping skills, but some have partial or incomplete knowledge or can not apply them successfully. Do not assume that archers in the "Train to Shoot" and "Train to Compete" stages have sufficient training and experience with mental preparation and anxiety control skills. The Competition – Development archery coach must be prepared to train this performance component.

Aspiring archers come to the coach with a desire to excel. The coach assesses the archer's form to define it and refine it if and when necessary. The coach assesses the archer's equipment, matching it to the discipline's demands. These performance components are visual, tangible, and easily measurable. But hidden from view is the most important factor of all: the archer's perception of success. If these are unrealistic, the archer will face difficulties down the road. With careful planning and attention to goal-setting and mental preparation, success can be achieved in a positive, supportive atmosphere that will keep the archer in the sport for life.

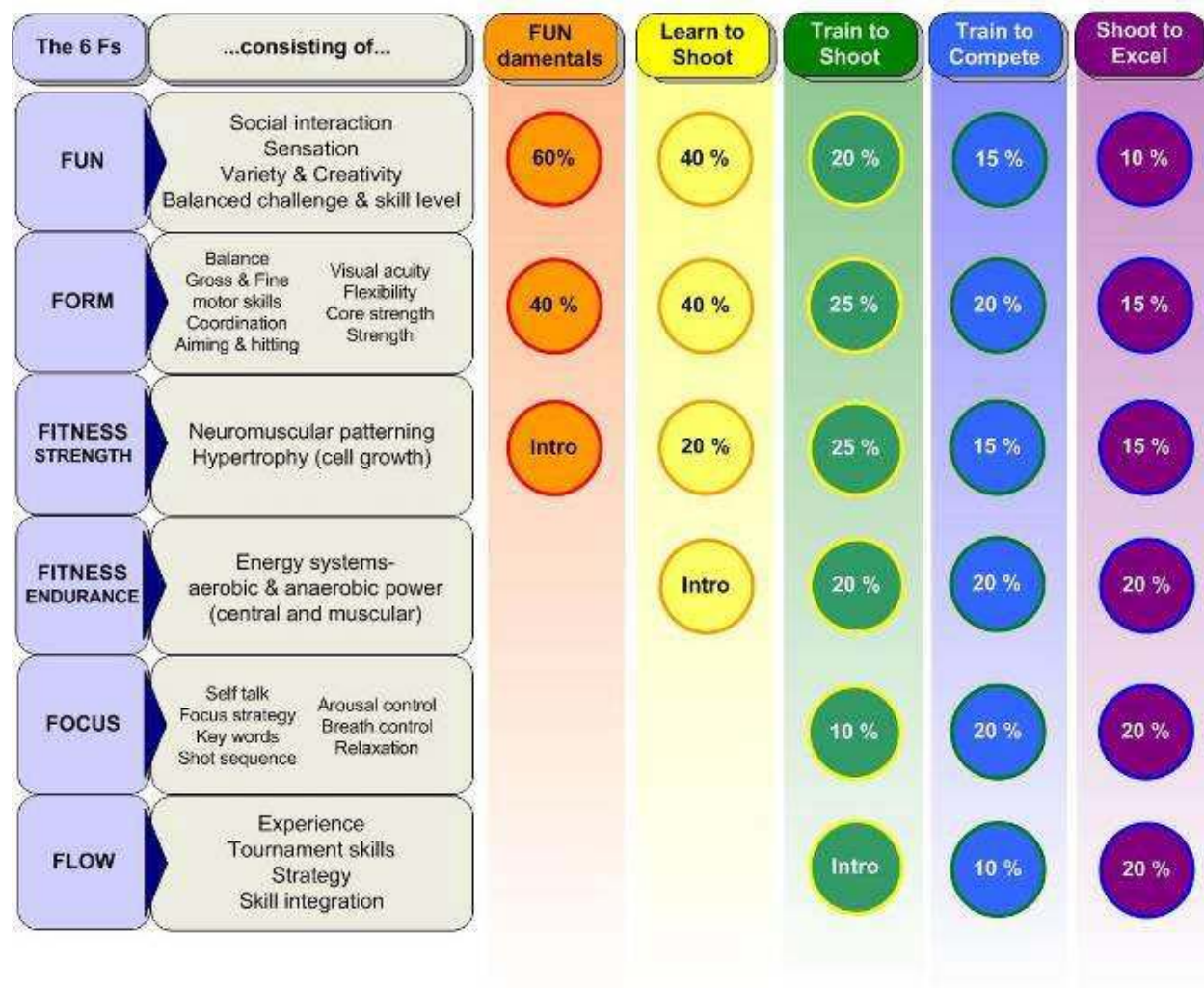
**How does the coach prepare the athlete?** In part the answer lies in the adequate mental preparation of the coach. The coach must know how to handle the stress, and the ups and

downs, of training and competition, not just the athlete. The coach is the leader who moulds the archer's mind as well as body. The good archery coach leads by example, implementing mental training techniques with adequate theoretical knowledge. Moreover, the archery coach plays a pivotal role in the process and outcome since the coach establishes the training regime and the standards of acceptable performance on a daily basis. Therefore, while reading through this chapter, coaches should reflect on how their attitude towards competition and how the normal training atmosphere shape archer values and measurement of success, self-esteem and failure.

Review ARCHERY CANADA's LTAD information

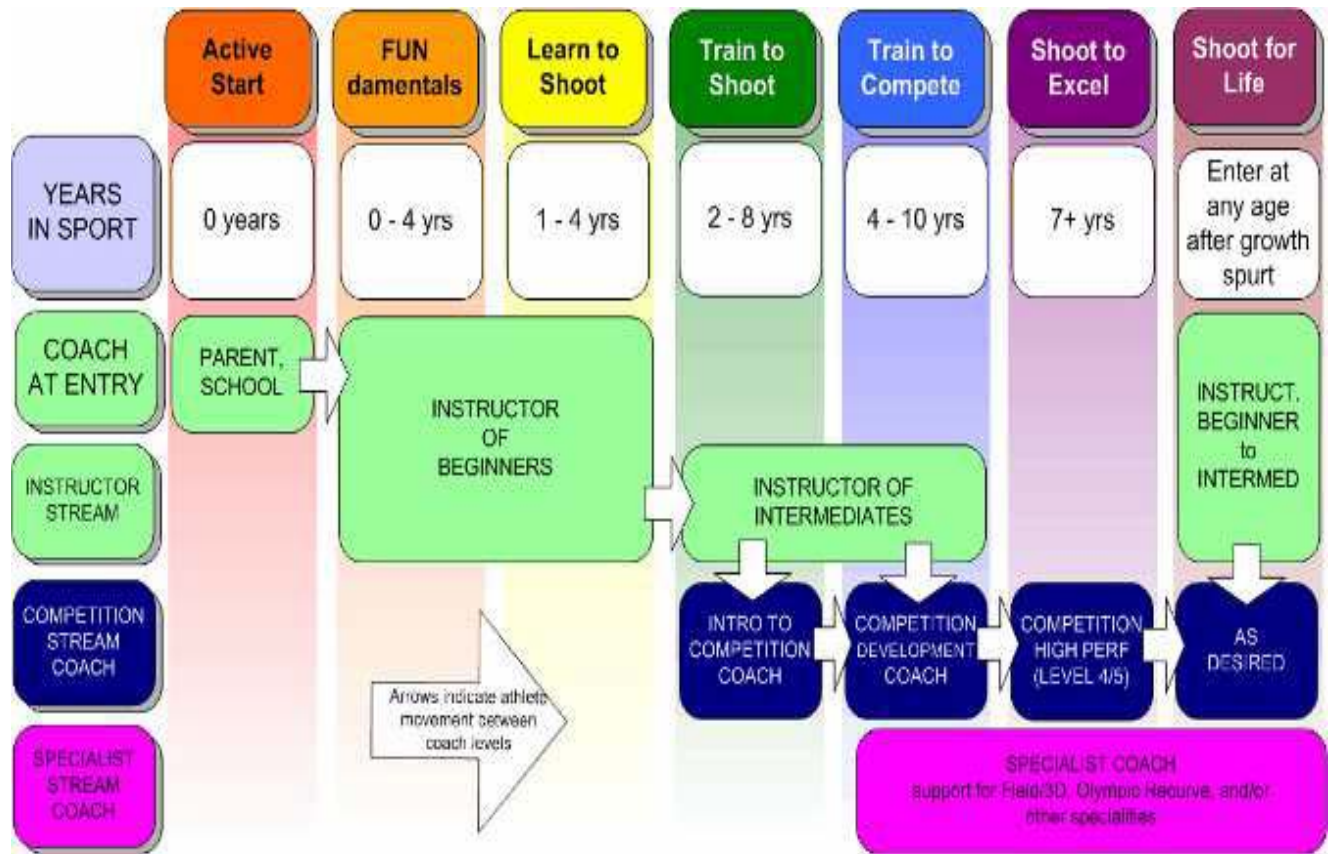
### Balancing Physical, Motor and Mental Training Factors.

**% Training Time in Physical and Mental Factors Across LTAD Stages**



Review ARCHERY CANADA's LTAD information

**Coaching Contexts and LTAD Stages**



## **Part I: TEACHING AND LEARNING – A Review from Competition Introduction**

What does the coach need to teach the archer in the Competition Development context?

- Age-appropriate strength training, using experts as required
- Mental Skills: Coping Strategies – what to do when performance is not optimal, e.g. alternate focus, physical state, equipment failures
- Effective training methods
- Refined biofeedback skills, using experts as required
- Importance of equipment experimentation, need for back-up equipment
- Tournament preparation – simulation; being a member of team
- Media relations, using experts as required
- Team building
- Basic nutritional needs for performance, e.g. hydration, balanced diet, sleep
- Ethics, e.g. anti-doping education and testing pool requirements, using experts as required
- Form using biomechanical principles – training the muscles, using experts as required
- Funding sources availability and fund-raising opportunities

In order to achieve this, the good archery coach will understand that the learning environment has to be positive, giving concise feedback and information, and ensuring that the archer has understood the information by implementing it successfully.

### Creating a Positive Learning Environment

#### General Principles

1. Interact more with your archer when it is needed more

Feedback should inform and encourage archers who have difficulty executing skills correctly.

2. Ensure that the archer is actively involved

Spending too much time organising equipment and having long periods of inactivity during the practices may cause archers to lose interest and behave in an undisciplined manner.

3. Adapt the degree of difficulty of the practices to the archer's abilities

Practices must involve tasks that create a degree of uncertainty in athletes; i.e. they must believe, but not be absolutely certain, that they can execute the task correctly. This kind of task presents them with an interesting challenge. The practice should be challenging for both able-bodied archers and athletes with a disability.

4. Define what successful performance looks like

Without clear objectives to achieve or information on how they are doing, archers live in a climate of uncertainty and ambiguity that may promote dependency on the coach or loss of interest in the activity.

5. Give specific, constructive feedback

Provide specific information that will make archers think. Avoid sharp criticism, as it can have a negative effect on learning and development.

6. Improve the scope of feedback

When coaches give feedback to archers, they often use the same messages over and over again. Sometimes the coach does not need to give any feedback. The quality and credibility of your feedback are more important than the quantity.

### Recognising Preferred Learning Styles

There are 3 ways an individual learns a new skill or absorbs information. Though an archer can learn in any or all of the 3 ways (called modalities) at the same time, there will be a preferred one. If the coach can identify the preference, the communication can be more effective. Here are descriptions of learning styles. Which one do you fit into? Which one does your archer fit into?

#### **TASK 1: Preferred Learning Style Checklist – Workbook 73 - 80**

Discover your preferred learning style. Each of us learns through all three styles. A number of us have a preferred or dominant learning style. This checklist assesses the strengths of your senses — visual, auditory, and kinaesthetic.

If you are primarily a **Visual Learner**:

You are particularly sensitive to the visual aspects of your environment. You live in the present. You are aware of what is going on around you, and you very quickly bring up images from the past in order to make sense of what is happening to you.

You are affected by art and beauty, order and disorder. You have a very fine sense of nuances of colour and form. You pick up details. As a coach, you can identify your archer's handwriting. You recognise people easily by their appearance, some aspect of how they look, or their location in a particular setting. You take in your surroundings as points of reference that you capture in a flash.

You have a good sense of orientation so you are able to locate where you are on a plan or map, and you do not have to ask the way. You believe that a clear explanation or document requires illustrations, diagrams. When there are no visual pieces, you immediately draw something on the board: you believe it is easier, clearer than any verbal explanation.

You are creative. There are always ideas bouncing around in your head. Athletes sometimes say you speak a little too quickly. It is not always easy to follow your explanations, which are often full of picturesque details. Sometimes you forget to define exactly where you want to go with it. However, you have a sound sense of how to synthesize information, and you are as able as anyone to describe the main points. You just allow yourself to get carried away by your rich imagination.

Aspects You Should Pay Particular Attention To



- You have to learn how to enter the world of auditory people. If you understand them better, you will find their long explanations less tiring. Provide just the right word, and they will be satisfied; your explanation will make more sense for them. Even easier: get them to give a name to your activities or exercises or to summarise the main points of your message. That way you will satisfy their need for words, and you will frame how long they can talk. The archer will appreciate your activities better.
  
- Kinaesthetic people often seem to you to be too “slow”. Use your creativity to create imaginary journeys for them: they will revel in your images. They will experience multiple sensations that they will find overwhelming. Begin your explanations by saying: “Imagine yourself walking...visiting...touching...” Any action verb will do, provided you cause them to be mentally active in the course of their reflection. Ask them what they feel when they create these images. If you are able to keep them in contact with their own feelings, they will become more creative and be more interested in your activities. They remind everyone (and yourself) that you are also a body capable of experiencing sensations, feelings and needs. They will add some human depth and breadth to your sometimes overly detached view of the world.
  
- Teach others to use their eyes more, especially to remember movement patterns or diagrams outlining certain tactics such as aiming off in the wind or shooting uphill or downhill on field and 3D courses. You excel in this area because you perceive any visually-based strategy as being more effective.

#### Recommended Teaching Methods for **Visual Learners**:

##### General Observations

- They often do better when you show them rather than tell them. They may have difficulty understanding oral directions.
- They may have difficulty with oral directions or appear confused with a great deal of auditory stimuli.
- They have a tendency to watch your face when they are read or spoken to.
- They like to look at books and pictures.
- They like things orderly and neat. They often dress in an attractive manner.
- They can generally find things that are lost and seldom misplace their own things.
- They can often recall where they saw something some time ago.
- They notice details. They are good proofreaders, see typing errors, and notice if your clothing has a flaw.
- They can find pages or places in a book quite easily.

- They often draw reasonably well — at least with good balance and symmetry.
- They may use few words when responding to questions; they may rarely talk during practice.

#### Recommended Teaching Methods

- Give visual directions and demonstrations as often as possible.
- Use visual aids such as film, videos, images, overheads, books, magazines, slides, panel boards, etc.
- Use colour-coding systems and visual aids.

Refer to Appendix 1 for preferred vocabulary to engage this type of learner.

#### If you are primarily an **Auditory Learner**:

- You are receptive to the auditory aspect of your environment and that you readily call up sounds and words heard in the past to help you make sense of what is happening to you.
- You are sensitive to the harmony of sounds, the meaning of words, the rhythm of things. You have a fine sense of the various ranges of tonality: the bass and treble are very familiar to you. You recognise people primarily by the tone of their voice. You remember the names of your athletes. You have clever methods to help you do that. You like to choose just the right word. You like to talk and to tell stories. You like to sing or, at the very least, you appreciate the musicality of what you say or hear.
- You like to listen to people, discuss, or play with ideas. Your athletes like your careful elocution: you take pleasure in talking. Your voice is melodious, well ordered. You usually breathe through the middle of the thorax by filling your lungs well, which enables you to maintain a regular rhythm.

#### Aspects You Should Pay Particular Attention To

- The previous aspects can sometimes work against you as well: you take such pleasure explaining that you may occasionally forget that your archer soon “turns off” and is unable to pay attention to purely auditory sources of information. Be sure to provide some visual support to revive interest and regain attention. It will also make the archer’s task easier when you supplement your explanations with concrete examples that will enable the archer to create internal images. Abstract terms tend to be too much in the realm of sounds alone.

So what about kinaesthetic people? Words alone will always be an empty vessel for them, unless you can also appeal to their senses and their need for physical sensation. Choose the words that complement their preferred sense.

### Recommended Teaching Methods for **Auditory Learners**

#### General Observations

- They are often referred to as talkers and are seldom quiet. They tell jokes and tall tales and are full of excuses for why something is not done.
- They follow oral instructions easily.
- They may have difficulty with written work and copying. They often have rather poor handwriting and may draw badly. They have trouble reproducing figures and letters they have seen, and they generally have poor visual memory.
- They remember spoken words or ideas quite well. They may answer better when questions are explained to them verbally compared to when they must read them.
- They like musical and rhythmic activities.
- They tend to memorise easily, and they often know all the words to songs.
- They may appear physically awkward. They often have a poor perception of space and may get lost in unfamiliar surroundings.
- They have poor perception of time and space and often do not keep track of time easily.
- They often have mixed laterality (left hand – right footed).

#### Recommended Teaching Methods

- Teach them to talk through the steps in a task or activity.
- Encourage them to think out loud, and listen to what they are saying.
- Use tape-recorded instructions, and lots of audio equipment in the learning process.

Refer to Appendix 1 for preferred vocabulary to engage this type of learner.

If you are primarily a **Kinesthetic Learner**:

- Among the many perceptions that you form at any given moment, you are particularly sensitive to those that you feel. From time to time, you pause to check your feelings, and this is your way of being in contact with what is going on around you.

- You are aware of the ambiance, the relationships between people. You have a keen sense of the state of mind of those who you are speaking with. You are passionate: your archers appreciate the way you “rev them up”. You are warm and spontaneous. Sometimes, you let yourself get carried away by your emotions: your archers are afraid of your anger. You are very emotional, and you do not like delicate situations when you have to control yourself. You know how to grab your archer’s attention because you express yourself in concrete terms, with a fairly slow delivery. You often call on your emotions and the archer’s.
- As you follow your inspiration of the moment, you have a tendency to improvise. The outcome is often positive. You are always available to answer your athletes’ questions: you adapt to the needs of the moment. You are able to remain attentive to them and not feel too restricted by rigid plans.

#### Aspects You Should Pay Particular Attention To

- You would be even more effective if you took more frequent pauses to re-frame what is being said: a plan, key ideas on the blackboard, and to summarise the essential elements of what is to be learned. Otherwise, your archer may get the impression that you are changing the subject abruptly. The archer needs to be involved in the process to acquire a more global vision of the practice if they are to understand the general meaning of the plan.
- For primarily visual learners, your many expressions and gestures are a valuable source of information. Anecdotes, a concrete and dynamic approach help them create vivid mental images. You can have them synthesize what has already been said or done or describe how this fits into the larger picture: they will be very good at this exercise. The rhythm of your presentation may seem too slow to them: mental pictures are created very quickly in their minds, so much so that you may not be capable of keeping pace with the way they interpret information. Have them respond, so that you can benefit from their brightly coloured examples and images.
- Athletes who are primarily auditory may become frustrated: they like structured practices, and activities that are planned, described in precise, well-thought-out terms. Have them comment on a technique or summarise an important explanation, because they often link things in a subtle way. Do not hesitate to recognise your differences in your conception of knowledge. Learn to rely on their strong points: “What word would you use to describe this?”, “How would you classify the various ideas we’ve heard today?” Thanks to your primarily kinaesthetic sense, you practise your profession with great sensitivity. This is one of your great attributes: to teach in a lively, unexpected and sometimes unusual way. <sup>1</sup>

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<sup>1</sup> Translated from an adaptation of: La programmation neuro-linguistique, by Reine Lépineux, Nicole Soloeilhac, and Andrée Zerah, Nathan, 1984.

## Recommended Teaching Methods for Kinaesthetic Learners

### General Observations

- They move around a lot and are considered hyper-active.
- They seem to want to feel and touch everything.
- They are usually quite well co-ordinated.
- They enjoy working with their hands. They like to take things apart and to put things together.
- They may truly enjoy writing things down.
- They use concrete objects as learning aids, especially ones that can be manipulated easily.
- They learn best by doing and exploring the environment.

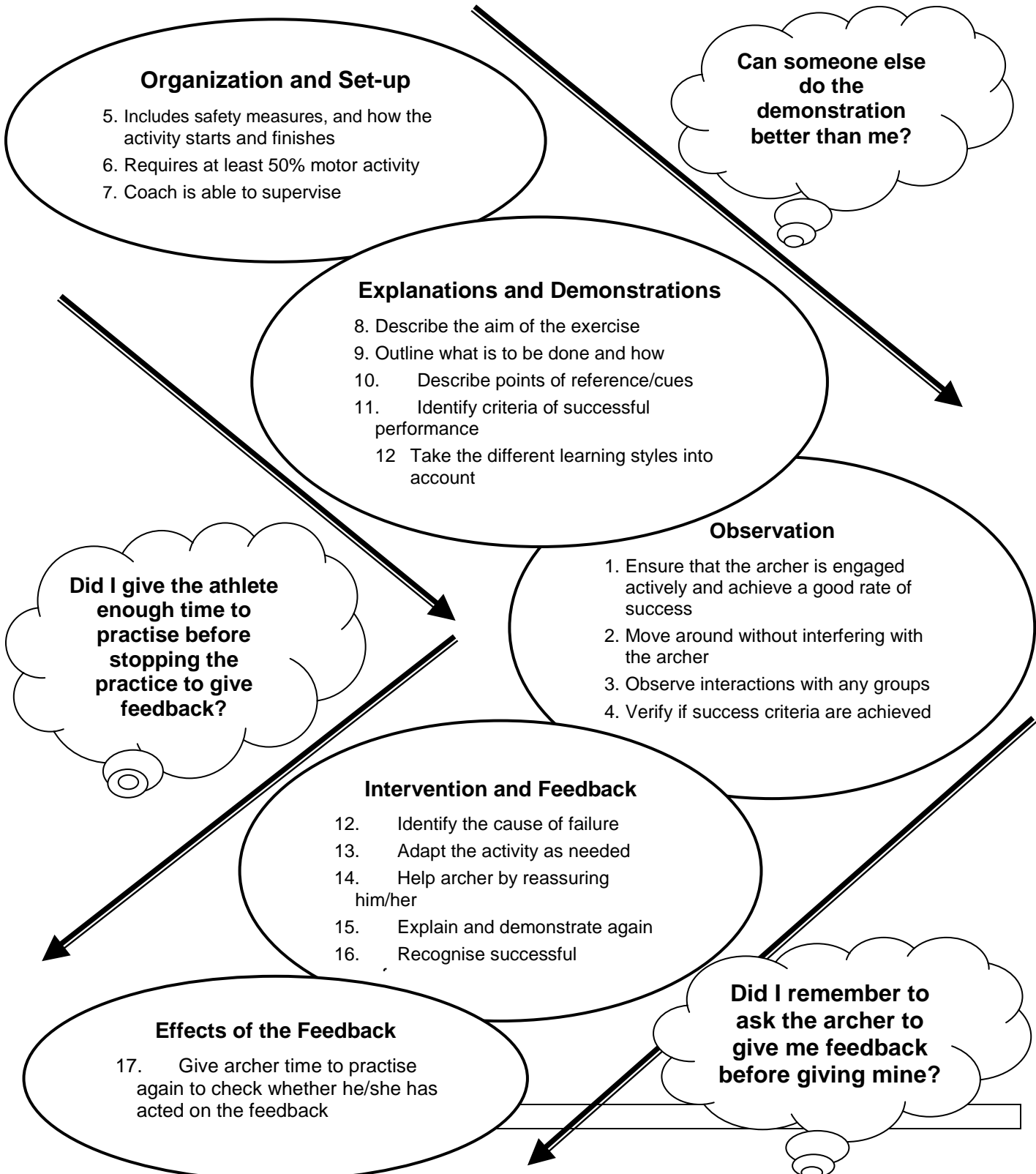
### Recommended Teaching Methods

- Use movement exploration.
- Have them tap tempos.
- Use all the concrete, manipulative devices possible in the teaching/learning mode.
- Employ role playing where possible.
- Let them help you create learning aids.

Refer to Appendix 1 for preferred vocabulary to engage this type of learner.

### Key Elements of Each Step in the Teaching Process

The following is only an overview of this topic. It was covered in detail in ARCHERY CANADA's "Competition – Introduction" reference manual. It is also available through NCCP's Multi-sport Module "Teaching and Learning" and "Coaching and Leading".



**Step 1: Organisation and Set-up**

- Think about how to start and finish an activity or a drill in a safe environment.
- Organise the activity in a way that enables athletes to progress at their own pace.
- Ensure the archer has the maximum possible amount of practice time, staying active 80% of the time.
- Plan what equipment will be needed ahead of time, for the training session.

**Step 2: Explanations and Demonstrations**

- Tell the archer the object of the exercise or drill.
- Give the archer some short, clear, simple cues or reference points (what to look for or feel while performing that is observable by the coach and easily understood by the archer).
- Show and tell the archer what successful performance will look and feel like (how will the athlete know that he or she has succeeded?).
- Use appropriate words, movements, or visuals for the archer's preferred learning style.

**Step 3: Observation**

- Ensure that archer gets involved in the activity quickly (rapid transition).
- Ensure the archer understands the instructions you provided.
- Ensure that the activity or drill is appropriate for archer's skill level; that the archer is able to achieve the desired outcome most of the time.
- Be sure to watch the archer from at least 3 different vantage points.

**Step 4: Intervention and Feedback**

First: Success or Failure?

Before providing any feedback, you must first determine whether or not the archer is succeeding in the activity.

Second: Types of Intervention

Once you have determined whether the archer is experiencing success, you need to choose an appropriate type of intervention.

### Third: How to Phrase Feedback

The coach assesses the quality of the performance; he or she makes some kind of assessment or judgement or, the coach tells the archer how to execute the skill next time or, the coach describes to the archer what he or she has just done.

When providing feedback to athletes, aim to do the following:

- Offer positive feedback more often than negative feedback.
- Offer specific feedback more often than general feedback.
- Strike a good balance between descriptive and prescriptive feedback. Descriptive feedback that is both specific and positive may influence the athlete's self-esteem in a positive way.

### Key Points on Giving Feedback

- Feedback must require some reflection or cognitive effort on the part of the learner. Feedback must be seen as supporting information that the learner is expected to interpret and use in an active way. It should require some analysis and decision making by the learner. Feedback must encourage the archer to be an independent and autonomous learner and to look for solutions to the particular challenges posed by the practice. The longer term objective is for the archer to be able to maintain and modify performance without the coach's intervention.
- Very frequent feedback does not promote learning. In other words, more is not necessarily better.
- Feedback *given during the execution of the task* may lead to short-term performance improvement but is not optimal for promoting learning.
- Summary feedback involves giving feedback after several attempts at or repetitions of a task in a way that gives (1) an objective view of tendencies observed during execution of a movement or (2) information about the average performance achieved after several repetitions. Summary feedback is not as effective as instantaneous feedback, but it does lead to superior learning and retention of skills. Compared with instantaneous feedback (that is, feedback given after every repetition), summary feedback does not lead to rapid, short-term acquisition of new motor skills. However, it leads to superior long-term learning and better retention of skills.



Feedback should be given only when the difference between the athlete's performance and the desired result requires it. Bandwidth feedback refers to the practice of providing feedback only when performance is outside an acceptable range of correctness, for instance if performance is more than 25% worse than the acceptable target result. The target result can be either the form of the movement or the precision of the execution.

Motor learning research indicates that using a relatively large bandwidth is beneficial for learning. This tends to reduce the frequency with which feedback is provided and to promote summary feedback. This in turn may encourage the archer to compare less successful attempts with those that fell within the acceptable range of performance. Also this should develop a degree of archer autonomy, as well as the ability to analyse performance internally. The coach may ask the archer to compare the self-analysis with the coach's information about correct or incorrect execution of the task.

To promote greater learning, feedback should direct the attention of the learner to some external focus of attention or to the expected effects of the movement, rather than to the way the movement is performed, for instance the change in the bow reaction when the bowhand position is executed properly. When a movement is being performed, focusing too much attention on the way it is being executed (for example, thinking about the exact position of the thumb in the grip) may delay motor learning. During the execution of the movement, it seems to be more effective to draw the athlete's attention to some external element or to the expected outcome of the movement (the bow moves toward the centre of the target upon release) rather than to internal elements (e.g. feeling each finger of the bowhand) during its execution. This topic is known as "focus of attention".

Examples of Situations that Refer to an  
Internal Focus of Attention

*Concentrating on ...*

1. the force exerted *by* a certain body part during movements
2. keeping a specific part of the body in a certain position during movement
3. paying attention to the arm's position during the follow-through
4. focusing on feeling the movement during release

Examples of Situations that Refer to an  
External Focus of Attention

*Concentrating on ...*

5. the force exerted *on* the bow during movements
6. keeping the bow in a certain position during movement
7. paying attention to the pendulum-like action of the shoulders during draw-time
8. focusing on the target and the arrow's landing point

**SUMMARY: Self-assessment**

Turn to the Teaching and Learning self-assessment in the Coach Workbook in Chapter 3 pg. 81 - 82. This questionnaire will allow you to reflect on your current coaching practices. The items that are listed in the self-assessment are the evidences that an Evaluator will be looking for during assignments and observations. They will help determine if you have the required abilities/competencies. The self-assessment form will help you identify areas of strength and areas for improvement.

Rate your ability to use effective teaching methods to optimise archer learning.

Once you have completed the self-assessment, begin Part II of Chapter 3.

## **Part II: PSYCHOLOGY AND ARCHERY**

### **i) A Review of Theoretical Factors Contributing to Perceived Competitive Stress**

Coaches have witnessed first-hand, or through the media, athletes who have either risen to the occasion and performed to their potential, or succumbed to the pressures associated with elite competitive performance.

Why does this happen? Why does one athlete feel stress during an event while another does not?

Why does an athlete feel nervous in a competition one time and not notice tension or stress at another event?

Why do some athletes show visible signs of stress but state verbally that nothing is wrong?

The old saying “perception is reality” clearly relates to athletic performance. The athlete perceives stress or outcome and the fear manifests itself in a physiological and/or psychological response effecting performance. In order to understand why athletes react the way they do, we have to understand what motivates them to compete in the first place.

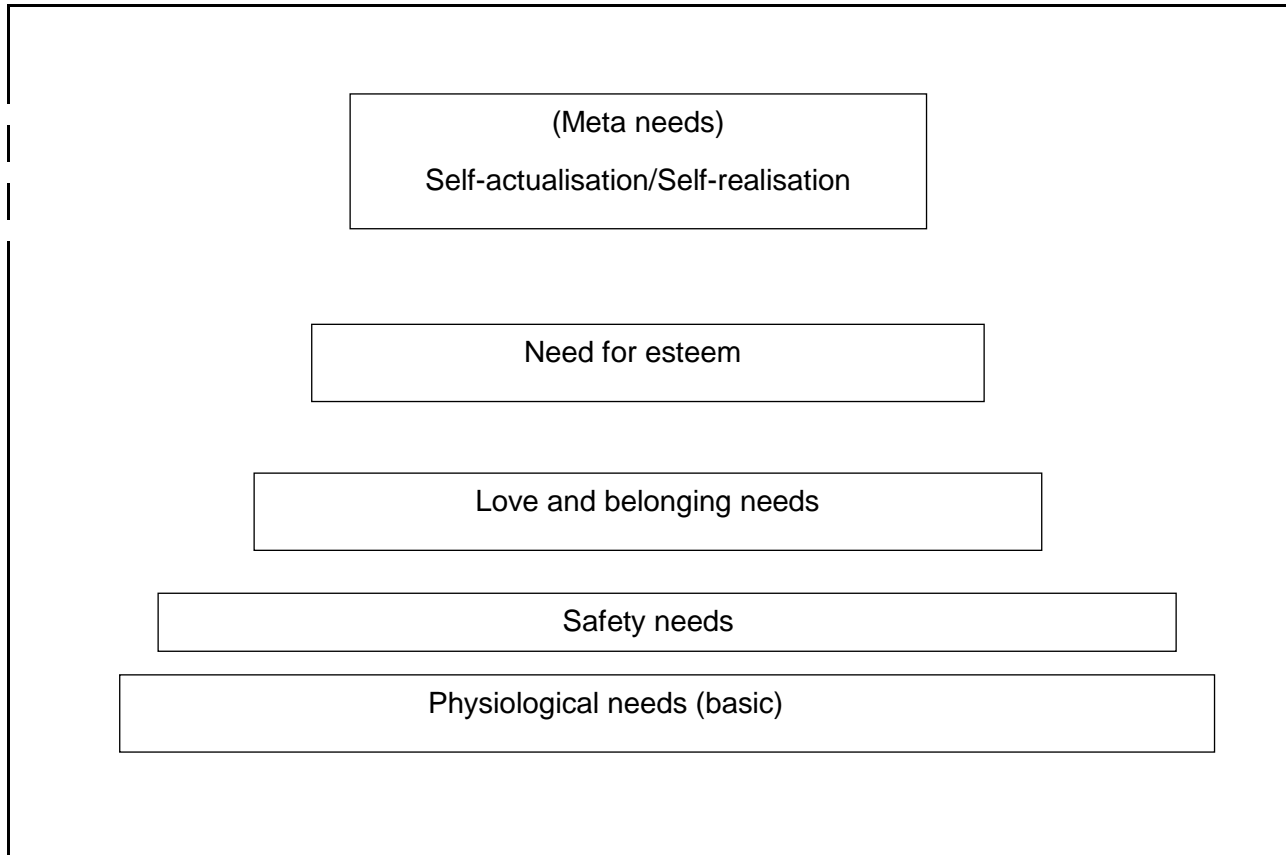
First, let us review the theories that attempt to explain why an archer would want to compete in the stressful world of international-level sport. This desire stems from generalised human needs, generalised interaction with the environment, and finally, individual needs based on personality. When the archery coach understands these basic concepts, it is easier to analyse the archer’s actions and responses to stress.

Then we will look at ways the coach can anticipate athlete response. Finally, there will be suggestions for coach/athlete training to overcome anxiety that detracts from performance.

It is expected that the coach has completed NCCP’s Multi-sport Module “Psychology and Performance” prior to taking the Archery Canada workshop. This topic is discussed in detail in reference manual for that course. Also, the coach should refer to Archery Canada’s Competition – Introduction Chapter 3 for basic mental preparation or NCCP’s multi-sport module for similar reference material.

This chapter examines psychological preparation of the elite archer that may or may not have been covered in the multi-sport courses. Some NCCP material may be repeated in order to provide better continuity.

- **Maslow's Hierarchy of Needs to Self-Actualisation**



Review Maslow's pyramid. This theory states that each of us has needs. Maslow grouped them into five categories or steps. Everyone must satisfy each level of need starting at the bottom and working up. Each step must be completed in order. No step can be missed. If they are, the person feels negative stress. Also, when a foundation step is removed by life circumstances, we have to travel down to that step, fix what is wrong, and then resume the journey upwards.

Only when all these external needs are satisfied can an individual set personal goals, dictate personal needs and define success in satisfying those needs. Since stress is not necessarily a bad thing; some individuals take on extra challenges in order to increase the stress in their lives, but only in specific areas such as sport. If, however, the individual takes on these challenges without completing the pyramid in order, the individual will not be able to perform to their potential.

For example, it is hard to keep your concentration during a major event in your life if you are deprived of sleep, starving or thirsty. These are defined, as basic/physiological needs. Young athletes who have inadequate nutrition, hydration and sleep can not devote their total energies to archery. Their attention is pre-occupied.

Once these basic needs are met, safety of the person becomes important. If the archer has adequate housing and does not fear physical violence or abuse, the archer feels safe at home and during training. The environment is conducive for training and competing. When the person is physically and psychologically safe it is possible to seek out and receive love from others. This next step reflects one reason why people join sporting activities to begin with. The social atmosphere in sport with family and friends satisfies the human desire to belong and share affection. People who do not feel loved, or feel that they belong, do not have high self-esteem.

When the individual has completed these three steps, the athlete can begin to take greater *public* risks. The archer strives to achieve as an athlete, student, family or community member in front of an audience. The public, therefore, judges the person's performance and deems whether it is worthy of giving esteem. The individual receives gratification from the recognition, praise and support of others by attaining meaningful community-based goals. The community values the performance and identifies with it.

However, the complete athlete/person strives for the top of the pyramid. Now the personal goals are set without thought to the opinions of others. Achieving personal success is rated by one's own values and not the opinions and/or acceptance of others. Those needs have been filled already, and though the archer will still need love and support from those in the community, the archer does not compete just to please them. This is the pinnacle of independence and self-reliance. This is what the good archery coach strives to instil. Outside pressures no longer exist; only the pressures the athlete self-imposes, willingly. Like the archer, the coach must have basic needs satisfied in order to project an aura of inner calm and success. Archer and coach together can take risks without fear of failure. They have agreed on their own definition of "success".

**Turn to Chapter 3's workbook** pg. 84 and complete **TASK 2: Maslow's hierarchy of needs self-assessment & athlete assessment**. This exercise should be completed in advance of the workshop. During the workshop, discuss your assessment of the athlete's progression toward self-actualisation with the Facilitator.

In summary, everyone has general needs that must be met. When needs are not met, the individual is pre-occupied at that level trying to satisfy those needs. The coach can use this theory to determine how independent and self-reliant the archer is and WHY the archer responds to training and competition in certain ways.

The next training step involves open dialogue with the archer to ascertain why certain needs have not been met. Then an action plan needs to be developed to satisfy those needs on the way to total self-actualisation.

**- Motivation: Extrinsic versus Intrinsic Gratification**

Over the years, sport psychologists have categorised an athlete's reason to compete into these 6 general areas: Social experience, Tension release, Health and fitness, Vertigo, Physical feelings of stress and work, and finally Beauty. An archer could give one or more of these reasons for participating. For many archers, it is the exquisite feeling of body alignment in harmony with the bow, arrow and target and the physical nature of shooting which stimulates the athlete to train and compete year after year.

The archer needs to experience these sensations in order to be happy or gratified. Gratification motivates the athlete to compete regularly. When these feelings of happiness come from the act of moving or shooting, gratification is said to be "**intrinsic**" or internally motivated.

However, when happiness comes from using participation in sport for some other reason unrelated to the act of shooting the arrow, gratification is said to be "**extrinsic**" or externally motivated. Motivation to compete relates to Maslow's theory in the difference between step 4 (need for esteem) and steps 5 (full development of one's abilities). Winning, beating another opponent, or perceived acceptance by peers are examples of extrinsic motivation. Ultimately, this is detrimental to performance if these are the KEY or ONLY reasons the archer competes.

Obviously, a coach would run into fewer problems if all archers were motivated internally. Outside stressors or internal anxiety would be easier to identify and deal with. How can the coach spot internally motivated archers? Highly motivated athletes have the following behaviours:

1. They set realistic objectives.
2. They have a strong desire to succeed and detest failure.
3. They rarely attribute failure to other people or external factors.
4. They are not easily discouraged by setbacks or poor performances.
5. They are high-spirited and determined.
6. They will commit to rigorous training regimes.
7. They train regularly and often, seriously.
8. They arrive to train on time and ready to participate until the last possible moment.
9. They keep up-to-date on sport-related developments that may be used to their favour.
10. They are organised, keep diaries and records of training, competition, and analyse both.
11. They appear unaffected by elite competitive stress.

These behavioural traits point to **intrinsic** gratification. Outside forces whether good or bad have little impact on these athletes. They do not compete solely for the attention and accolades of others, but for one or more of the six general reasons listed at the top of this page. These athletes remain self-contained and enjoy the sport for its own sake. Intrinsic motivation is the prime determining factor whether or not an individual will stay in archery over many years or not.

In contrast to the internally-motivated athlete, the archer who looks outside of the physical activity to receive gratification will develop a perception of success that is totally dependent upon forces beyond the archer's control. Since winning is only relative to who showed up and performed well on a particular day, using winning or ranking in the medals as a source of gratification can lead to trouble. Few archers are ever in the position to earn money or gain media attention. It may be difficult for the coach to believe that some athletes use the sport in order to earn such recognition or "show off". However, those motives are present.

**If the archer is consumed with beating another competitor, the goal is outside of the individual's direct control.** If earning money offered at tournaments is the only reason to feel good about oneself, then the archer is equating financial reward with earning self-esteem.

Should the archer continue to use these external motivators as the meaning of assessing success and self-image then the archer soon marries every performance to building or loosing self-esteem. Everything is fine, if the archer wins. But if the archer does not win, it is not the performance that loses but the archer's identity and feelings of self-worth. Losing equals not being first. Losing means the archer is no longer valuable to the community. Do not allow your archers to travel too far down this path if you want them to stay in the sport for more than a few years.

### **How do you help the athlete?**

1. Get your archer involved in other activities that promote self-esteem in a non-threatening environment. If the archer's feelings of self-worth are measured only by success in archery, the athlete does not have a broad base of life experiences to draw upon. Expand that base.
  
2. Internalise success through the joy of physically shooting the arrow, not focusing on outcome. Design training activities that emphasize the sensation of shooting and not the score. Get the archer involved in helping others and giving back to the sport.
  
3. Make sure you are reinforcing goals and behaviours that reflect *internal* goals. As one of the chief motivators in your athlete's life, your coaching style must complement this philosophy.

In summary, the well-balanced archer competes to satisfy internally-motivated needs. However, it is not possible to feel this way every time a major tournament is scheduled in the annual plan. The good archery coach always leads by example, stressing the physical pleasure of shooting a good arrow no matter where or when. When coach reminds the athlete of the real reason to compete and train daily, it is easier for the archer and coach to keep a healthier perspective toward competition.

### **TASK 3:**

In your chapter 3 workbook pg. 85 complete the exercise entitled "***Application of the Theory – Positive Behavioural Patterning***". Then return to this reference manual.



### **- Personality**

All athletes use need training and dedication to achieve something meaningful in life. This commitment separates the elite competitive archer from the normal population. Over the years, sports psychologists have attempted to define what traits make elite athletes different. What makes a good athlete? Is it their upbringing (environment)? Is it a genetic trait passed down from the parents (heredity)? Why are some people more anxious than others? Can a coach pre-select a great archer with a battery of written test? Let us review the theories and findings to date.

Personality Factor Inventories were used in the 1970's to pre-select the perfect type of athlete for a particular sport. Though it was never the only test used, it gave the coach some insight into the athlete's make-up. Refinements have been made over the years and new tests have appeared on the market. But the basic question this type of test tries to answer remains the same: Is it possible to assess the athlete's personality to ensure success in a chosen sport?

Test groups for archery are always small. Sample sizes are not scientifically acceptable, but archery results were similar to those in other individual sports. Archers tended to be intelligent, venturesome and more extroverted than team-sport players. They were more tough-minded and assertive than the general public. Do these results apply to every successful archer? Perhaps they do. But there are other factors that need to be considered as well.

### **Anxiety**

What is it?

All archers feel some sort of anticipation or emotional change before major events. This feeling is referred to as anxiety. Anxiety is the normal response to psychological stress and reaction to stimuli, in other words, competition. Anxiety can be a positive emotion when it reflects excitement or eagerness to perform well because the athlete feels well prepared and because he or she has coping responses in place to meet the demands of the task.

It is influenced by the level of competition, the presence of certain competitors, the number of spectators, an unfamiliar location, lack of experience or memory of poor experiences, and/or an unfamiliar routine such as travelling and eating different foods. Such feelings usually occur because the athlete does not feel well prepared. Then anxiety is a negative emotion.

### **Types of Anxiety**

Somatic or physical anxiety is a positive or negative set of physiological responses to performance usually experienced immediately before the start of the competition. This anxiety takes the form of feelings of excitement, increased heart, increased breathing rate, etc.

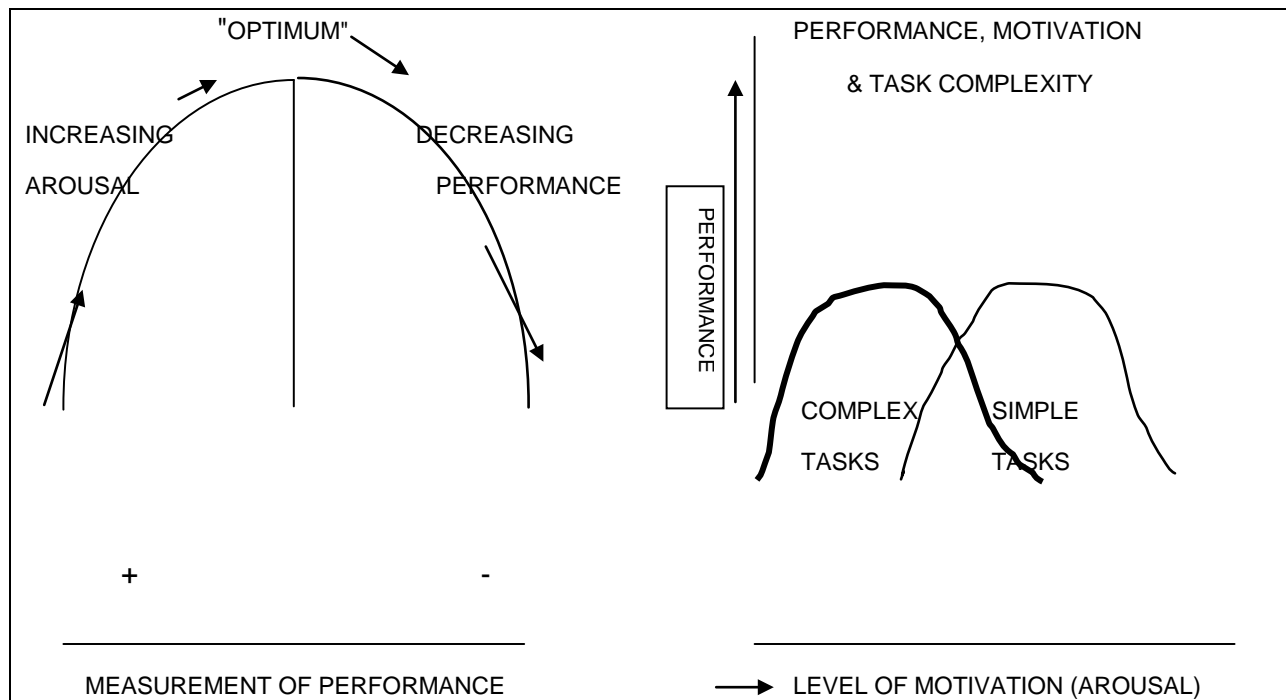
Cognitive or mental anxiety is a positive or negative response that indicates excitement or worry, depending on how the athlete perceives the demands of the task. For example, the athlete may feel uncertain or apprehensive, worry, or experience self-doubt regarding the performance process or outcome.

Trait anxiety is a tendency to respond to a threatening situation, person, or event with high or low levels of anxiety. Some people are born with a tendency towards being anxious in normal daily life. It is a personal character trait to be more or less anxious (apprehensive or excited). The level of anxiety usually increases with the amount of perceived uncertainty during an event or activity.

State anxiety is the feeling of apprehension or excitement that an athlete perceives in the here and now, i.e. at this precise moment in time and given the present situation.

State/Trait anxiety inventories have been used to predict optimum levels of anxiety in individual athletes. Tests such as the Competitive State Anxiety Inventory (CSAI-2) measure the athlete's normal anxiety level and anxiety under stress. What are researchers looking for? All athletes exhibit certain physical and psychological signs of stress. Questionnaires can be filled out to assess how much anxiety the archer feels and then compare the answers to the athlete's performance on the same day. These results, over time, are plotted on a graph. A common pattern developed as testing in many sports continued to be assessed.

Researchers found that athletic performance and the level of anxiety had a consistent relationship. This is known as the "Inverted U Theory" shown below.



The graph shows the perfect relationship of perceived stress (arousal) and performance. Remember: this is applied *to the individual*. There has to be just the right amount of anxiety to motivate the archer to perform. The graph on the right shows that a complex task such as archery needs lower levels of perceived stress, particularly as the demands on performance increases.

#### Why is Anxiety Relevant to Sport Performance?

- Anxiety can be functional — it can improve performance by facilitating appropriate thoughts or actions.
  
- Anxiety can be dysfunctional — it can detract from performance by causing inappropriate thoughts, feelings, and behaviours.

Anxiety states are normal, and every athlete experiences both positive anxiety and negative anxiety in competitive or evaluative settings.

Each athlete should seek to identify and understand the specific causes of his or her anxiety and the resulting consequences for performance. Athletes should also learn coping mechanisms that will help them manage their anxiety and therefore improve their performance.

Several skills can help athletes control their anxiety, including breathing control exercises, mind-to-body relaxation exercises, body-to-mind relaxation exercises, visualisation strategies, positive self-talk, and thought-stopping techniques. These may be developed individually and then combined into routines that athletes can develop, refine, and implement in practice. (See below)

Athletes who have more stress than they can handle fail to perform to “expected” standards. It is the archer’s **subjective** appraisal of a particular competitive situation and attitude towards the event that causes competitive stress. The athlete perceives the demands of the task do not match present shooting abilities. The lower the archer’s perceived ability to compete against others, the greater the symptoms of pre-competitive anxiety. However, if the athlete perceives that the skill level is adequate, there is no self-doubt. The athlete can control the anxiety attacks and stress actually helps the athlete to perform better.

<b>Common Causes of Negative Anxiety</b>	
<b>Somatic (physical)</b>	<b>Cognitive (mental)</b>
Tiredness/loss of sleep	Fear of disappointing others (e.g. mom, coach)
Poor/lengthy travel arrangements or other organisational problems	Fear of making a fool of themselves by failing at the task, especially when others are watching
Changes in environmental condition	Fear of not being skilled enough or fit enough to meet the challenge
Chronic adrenalin rush	Fear of injury
Physical tension/tightness	Perceived importance of the competition
Changes in physiological states (e.g. increased heart rate, pulse rate)	Poor travel arrangements or other organisational problems
	Changes in variables not in the athlete's control
	Other aspects of life that cannot be successfully "parked"
	Interruptions from others before or during competition (e.g. media, significant others)
	Poor decisions by officials
	Lack of social support

### Definition of Stress

A situation that demands physical or mental energy can result distress, particularly if the individual feels incapable of handling the perceived demand. Competition, then, meets the definition and it is normal for an archer to find a tournament stressful.

### Myths about Stress

#### Myth #1: Stress is bad

Stress can lead to anxiety: being excited, being uneasy or being worried. But anxiety can be positive (excitement that contributes positively to performance) or negative (worry that detracts from performance). When athletes become overly-anxious and their anxiety level exceeds their coping abilities, performance in competition may suffer. However, stress may also be positive, and stimulate athletes to excel or surpass previous performances.

### Myth #2: Some athletes do not experience stress

As the figure above shows, all athletes may experience the stress of competition, and anxiety is a common and natural response to such stress. However, some athletes do not become overly anxious when exposed to stress; instead, they experience heightened awareness and usually can hardly wait for the competition to start. This is positive anxiety.

Negative anxiety usually occurs in athletes who dwell on things that are very difficult or impossible for them to control or who don't feel prepared for the challenge they are facing. Negative anxiety is often linked to fear about what others will think of the athlete if he or she does not perform well.

Every athlete has an Ideal Performance State (IPS), a state in which he or she is completely prepared and poised for perfect performance. The IPS is a reflection of the athlete's preparation in all four components: Physical, Mental/emotional, Technical and Tactical. Developing the mental-training skills of the archers you coach is therefore critical to helping them achieve their IPS at key competitions. The preceding graphs go a long way to explain why some archers are able to relax enough to stay calm at a local tournament, but fail to relax enough to shoot the same scores when competing nationally.

Mental Strategies Used By Successful Athletes (Weinberg and Gould, 1999)
9. To enhance confidence, successful athletes practise specific strategies to deal with adversity during competition.
10. They practise routines to deal with unusual circumstances and distractions before and during competition.
11. They concentrate wholly on the upcoming performance, blocking out irrelevant events and thoughts.
12. They use several mental rehearsal methods before competition.
13. They don't worry about other competitors before a competition, focusing instead on what they can control.
14. They develop detailed competition plans.
15. They learn to regulate arousal and anxiety.

**Application of the Theory**

How can a coach tell when the archer is experiencing too much stress? The coach does not need to use scientific tests to start with. Begin by watching for the following symptoms:

<b>Physical</b>	
Increased pulse rate above normal training rate	Increased blood pressure above normal training rate
Increased breathing rate above normal training rate	Normal rate of perspiration increases above normal training rate
Demonstrates nervous movements	Increased muscle tension particularly in the neck area
Complains of nausea/cramping	Develops headaches
<b>Mental</b>	
Complains of fatigue early in the event	Looks depressed
Complains of dizziness/vertigo	Appears confused
Appears tense/angry	Appears to panic or over-react to situations

**What should the coach do if these symptoms are very obvious?**

If the coach feels that a more formal assessment would help the archer understand the elite competitive experience better, a respected sport psychologist could be hired. Be sure to check references and areas of expertise when a sport psychologist is recommended. There has to be open, trusting relationships among all partners. The process takes considerable time since tests must be done before and after numerous training events and competitions. The sport psychologist works with the coach to assess the archer's strengths and weaknesses. Then a remedial plan is developed with activities and exercises. Many high-profile sport federations feel a professional sport psychologist is a definite asset and a vital member of the athlete's support staff. *However, the financial impact on the training budget is considerable.* The decision to use a specialist should be made only after consultation with the athlete, coach and other significant support-providers.

The coach can take personal control of the situation by:

- teaching the athlete to set realistic goals in order that perceived and real ability make a closer match. (Review Chapter 2: The Plan)

- communicating your observations to the archer; why you feel these responses to elite competitive stress do not help the archer's performance
- ensure *your* coaching style and communication to your archer is the same in tournaments as it is in normal training sessions
- creating training situations with higher stress levels than the archer would normally face in competition
- teaching relaxation techniques
- teaching focusing techniques
- using biofeedback devices such as heart rate monitors, teach the archer to develop control
- restricting the number of high-level competitions or threatening situations in the plan
- scheduling low level aerobic work-outs in some cases before every event since exercise reduces muscular tension
- teaching the archer a set thought pattern at specific times before and during tournaments
- monitoring progress through use of the coach diary/log book for each archer

In summary, the archer's personality traits combined with motivating forces and needs can be modified to enhance performance.

Some archers will experience higher levels of anxiety normally, and still be able to compete to "expected" levels of performance.

Tournament performance is affected by the archer's perception of the ability to compete. The coach must observe the archer closely to predict athlete response to stressful situations. Then

the coach needs to build psychological training component into the annual plan. The goal of the training regime is to teach archers to identify stressors, teach the correct perspective to competition, and let the archer fix the problem from within.

There are plenty of views in the sport psychology literature with regard to arousal and anxiety and their effects on performance. The coach should work on the following:

Athletes and their coaches must learn what the ideal arousal or anxiety level is for each athlete and seek to create conditions that reproduce that level to increase the probability of achieving the best possible performance.

How athletes interpret their arousal and anxiety levels around a competition (e.g. "it is a bad thing and I am going to fail" or "it is a good thing and I will perform better as a result") greatly influences whether their performance will improve or deteriorate as a result of that anxiety.

Weinberg and Gould (1999) offer the following practical guidelines regarding stress, arousal, and anxiety:

1. Identify the optimal combination of arousal-related emotions needed for best performance.
2. Recognise how personal and situational factors interact to influence arousal, anxiety, and performance.
3. Recognise the signs of increased arousal and anxiety.
4. Tailor coaching and instructional practices to individuals.
5. Help athletes become more confident; it will help them cope better with stress and anxiety.

Turn to your workbook pg. 88 and complete the **TASK 4: Application of the Theory – coaching and stress**.



## ii) **Assessing Perceived Elite Competitive Stress**

Not all archery coaches have access to professional sport psychologists. Some may not want to work with one at all. Regardless, the good archery coach needs some guidelines to test for tournament preparedness. There are some simple questionnaires available on the market. Some books listed in this chapter's reference section have examples.

The following section gives the coach simple tools of assessment which can be done at the home club and during tournaments. The coach is encouraged to alter, improve and individualise the assessment questionnaires in the Coach Workbook. Keep in mind that questionnaires should be short. Athletes will complain bitterly if the sheet has too many questions, or if you are asking the same questions over and over.

Remember: you are comparing the archer in training to the archer during competition. The results do not and should not be transferred to other archers. Fill out the questionnaire as objectively as possible. For younger archers, parents could be asked to fill out these questionnaires, too, to give you a different perspective. Of course, you will want the athlete to fill one out as well. The results should be discussed with the athlete and evaluated. Together, the coach and archer can make training exercises to improve the archer's reaction to stress.

### **TASK 5: Application of the Theory - Personality Assessment**

Patterns in performance and stress levels do not present themselves with one or two samplings. This is an on-going process that both coach and archer have to commit to. This takes time and diligent recording by the coach and archer. Otherwise, it will not work. Use these questionnaires at regular intervals and times (see task below) during the annual plan.

Copy the questionnaire "**The State I'm In**" (archer version) and "**The Way I See It**" (coach version) in the Chapter 3's workbook pgs 89 and 90. Administer this test to one of your archers (a) two days before an event or training session, (b) two hours before the event or training session, and (c) directly after the next time they compete. Make sure you complete the coach's version as well.

### **What did you learn?**

Neither you nor your athlete will learn much from answering these questions during the first few training sessions. These questionnaires become more significant in the days and hours leading up to tournaments. If the annual plan has been thought out well in advance, these questions can be asked and evaluated at local and club-level tournaments first. The results are compared with those found at training sessions.

As the archer progresses through the season and more difficult or stressful tournaments are scheduled, a pre-event behaviour and performance result pattern can develop. Moreover, the coach and the archer become more observant of pre-event behaviours and can identify problem areas more easily.

While some signs occur in many athletes, each athlete will tend to show focus and anxiety problems in his or her own way. One of your key responsibilities as a coach is to learn the tell-tale signs of each athlete you coach so that you can spot when intervention might be needed.

In the long run, the inventories of state anxiety levels show both the coach and the archer how and when the archer starts to feel competitive stress at the elite level. The coach can begin to identify behaviour patterns, which help the archer during competitions, and alter those patterns that detract from performance.

### **- Identify and Analyse Stressors which detract from Performance**

In order to prepare the athlete mentally for a tournament, it is necessary to weed out the *situational* factors that cause stress to the individual. These are different from the ones listed above which have to do more with perception of ability to shoot than with the real world. Although the coach can not anticipate all the stressors an archer may experience, the coach should expose the archer to as many variables as possible through simulations in practice and questionnaires. Either way, the goal is to identify the “stressor”, confront the fear and deal with it in a positive way.

#### The Five Senses

People interact with the environment through their senses. Some people are more receptive to stimulus from one or two specific senses. The coach should be aware of this. If the archer is more aware of tactile forces, then blisters, heat and tight-fitting clothing may be sources of distraction. Other archers may dislike the sound of the wind in their ears. Most archers are distracted visually, however, and that fact has to be addressed since it can make the biggest impact on concentration during an elite competitive event. When the mind is distracted, the body feels unsettled. It is harder to concentrate on the task at hand.

#### Environmental Factors

Some archers let environmental factors distract them to the point that performance suffers. The archer has allowed forces beyond human control to cause stress. That being said, not every archer is going to feel self-confident or comfortable in rain, wind, heat or cold. There exists some level of self-doubt. There are questions about the ability to perform under certain conditions. However, the archer should never be encouraged to shy away from training in adverse weather conditions. The worst weather day in practice may turn out to be the best conditions available during a national championship.

#### Competition Site

A new venue, a big leader board, the sound of the crowd, the countdown clock, commands from the announcer, no place to put your bow near the line, these are all common distractions which cause some archers considerable stress. The higher the archer strives in the competitive arena, the more likely the competition venue will be new, different and foreign. Just the fact that the archer has never seen the site may initiate anticipation and anxiety. If the coach does not address this concern, the stress most definitely will affect performance.

The factors listed above may be viewed as positive stressors, since stress is not always negative.

**WORKSHOP TASK:** With the workshop Facilitator, list 3-4 Stressors that may enhance performance.

Next, turn to Chapter 3 Workbook pg. 91 to the exercise entitled "**TASK 6: Application of the Theory – Negative Stressors and Coaching**".

What is Attentional Control, and why is it important to performance?

Attentional Control is the ability to actively direct one's attention to relevant cues in the environment, to maintain that attention for the necessary period of time, and to be fully aware of the situation. The words attention and concentration can be used interchangeably.

All athletes and coaches know that the ability to concentrate on a task for its duration is very hard to do and that it requires regular practice to be able to do so. Athletes therefore need to be fully aware of all the things that get in the way of a successful performance, and they need to control their response to such distractions. Athletes develop Attentional Control by learning to select and concentrate on task-relevant cues and factors and to dismiss any irrelevant stimuli.

**Concentration** in sport may be thought of as a relaxed state of being alert, allowing rapid changes in focus as the flow of the elite competitive situation changes.

Concentration represents a natural, relaxed state of mind that allows athletes to receive and interpret relevant information. Successful athletes do not have to strain to pay attention, and they can narrow their focus to the relevant factors or stimuli at any given time during a game or performance.

Concentration is the ability to pay attention to relevant stimuli or internal or external performance cues.

**Focus** is the ability to concentrate on the present while performing as opposed to the future or the past.

Re-focus is the ability to focus on a task again following a break in concentration.

Attentional control is the ability to concentrate, focus, and refocus.

### Processing Information during Competition

Information processing during performance needs to be automatic or consciously controlled.

*Automatic* information processing refers to the ability to process cues easily, rapidly, consistently, and economically. This comes with practice and experience. Athletes do not need to pay deliberate attention to perform exceptionally well.

*Controlled* information processing refers to the ability to consciously process information. Athletes do this by paying deliberate attention to the critical phases of skills or tasks. This type of information processing is common among beginners or novices, as well as when skills are more complex and the athlete is not yet totally familiar with the required movements.

### Attentional Dimensions

According to Nideffer (1976; 1981), attention exists along two dimensions:

- Width            broad or narrow
- Direction        internal or external

Athletes often have to shuttle between an internal and external focus and between a broad and narrow focus, for example, shooting one arrow in a target tournament on a windy day.

Recent research shows that, during the execution of a skill, an external focus of attention will likely result in better performance than an internal focus (Lee et al., 2001). There is more information on this topic in the NCCP multi-sport module Teaching and Learning.

Attentional Control can be developed using simple drills such as shuttling exercises, focused visualisation, and self-talk strategies.

<i>Broad</i> Attentional Focus	Perceiving and interpreting many cues at the same time  Example: Shooting on a windy day with the wind gusting and changeable
Narrow Attentional Focus	Perceiving and interpreting only one or two cues at the same time  Example: Aiming off in the wind in order to compensate for the force of wind dragging the arrow sideways and downward
Internal Attentional Focus	Directed inward, toward perceiving and interpreting cues that the performer feels or thinks  Example: Feeling the strength of the upper body and alignment of the shoulders with the bowhand in order to shoot the arrow strongly in cross-wind
External Attentional Focus	Directed outward, toward perceiving and interpreting cues in the surrounding environment that the performer can usually see or hear  Example: Shooting a tournament with the countdown clock showing time remaining to shoot

### The Relationship between Mental-Skill Strategies

Mental skills are interdependent. Consider the following:

- Being able to focus and concentrate on a task requires being in control of one's emotional state
- Visualising requires being focused
- Visualising requires being in control of one's emotions
- Maintaining an ideal emotional state requires thinking positively about one's performance

Integrating skills of emotional and Attentional Control is therefore a critical component of an effective mental training program.

### Self Awareness and Mental Preparation

Mental skills are applicable in both sport and everyday life. To perform reliably in sport and life, however, athletes need to be able to identify their ideal performance state (IPS), understand their strengths and weaknesses in terms of their IPS, and develop strategies to build on their strengths and improve their weaknesses. This is true for all aspects of performance, but it is perhaps the hardest to do in the area of mental preparation because it demands that athletes:

- Understand their inner states (thoughts, feelings, emotions) and typical reactions
- Understand their beliefs and values
- Recognise their uniqueness as a performer

In other words, mental-training strategies are different for each athlete because each athlete is a unique person who thinks and reacts in his or her own way. Moreover, developing mental skills is a life-long process that it requires individual self-awareness, self-responsibility, and self-direction.

### Objects of Focus

Since archery is a “closed” activity, requiring few rapid shifts in attention from internal to external focus of attention, we can look immediately to the Objects of Focus that the athlete concentrates on at a given time. Objects of focus can be internal or external, broad or narrow (Nideffer, 1976, 1981).

	Narrow	Broad
<b>Internal</b> <b>Perceived internally by the athlete; usually sensations of the body/body parts or thoughts</b>	<b>Examples:</b> 16. Orientation of body in space 17. Arm/leg position 18. Posture 19. Thoughts, feelings, self-talk 20. Visualising individual performance	<b>Examples:</b> 21. Visualising tournament setting, possible competitors and actions of judges and score-keepers 22. Visualising tournament round's timing, environment and rules
<b>External</b> <b>Can be seen, heard, or touched by the athlete</b>	<b>Examples:</b> 23. Target 24. Bowhand and stringhand 25. Start signal	<b>Examples:</b> 32. Movement of wind flags 33. Fans in the stands 34. Reading the slope of the hill in field or the optical illusion in 3D

	<ol style="list-style-type: none"><li>26. Wind flags</li><li>27. Other archer(s) using the same target butt</li><li>28. Playing surface/terrain/water</li><li>29. Trajectory of arrow</li><li>30. Time clock</li><li>31. Place to leave bow while scoring and collecting arrows</li></ol>	
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Note: The Teaching and Learning module presents more detailed information regarding what athletes should focus on during their performance. Please refer to Chapter 6.



### Process for Improving Focus

Successful athletes can minimise the effect of momentary losses in concentration. Improving athletes' focus involves the following steps. This process generally takes place over a season.

It is expected that the coach has completed NCCP's Multi-sport Module "Psychology and Performance" prior to taking the ARCHERY CANADA workshop. This topic is discussed in detail in reference manual. Also, the coach should refer to ARCHERY CANADA's Competition – Introduction Chapter 3 for basic mental preparation or NCCP's multi-sport module for similar reference material.

### Visualisation Exercises

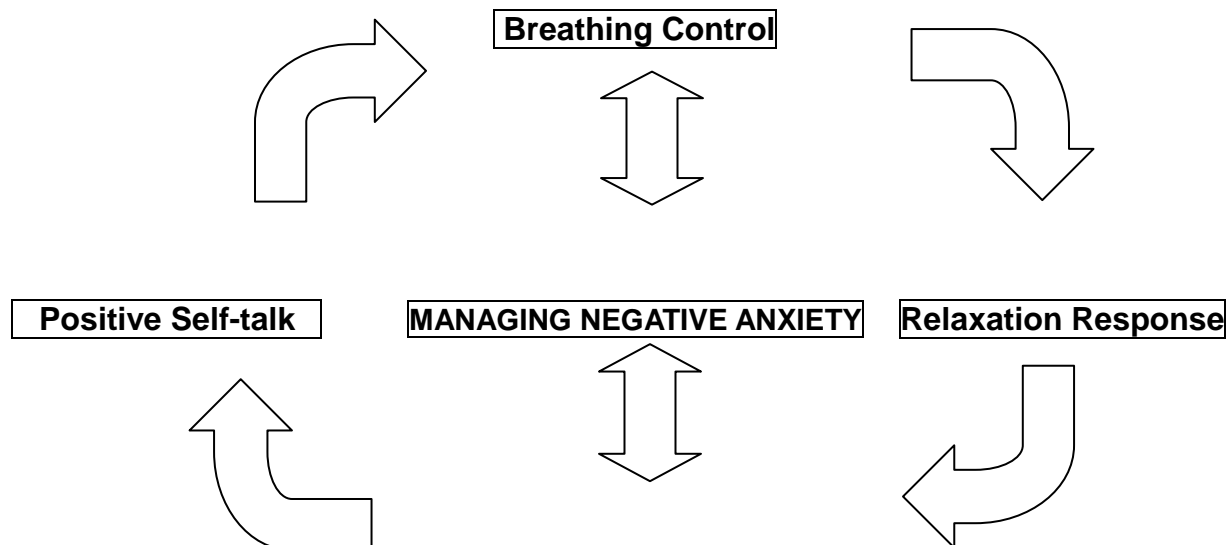
#### Key Points

Feeling relaxed is a pre-requisite of effective visualisation. Begin with a familiar image to help athletes buy in, such as the target or the bow.

Visualisation and imagery are often used interchangeably. However, there are subtle differences:

- Visualisation generally involves *seeing the actual skilled performance* or routine.
- Imagery is more creative and often *combines an image* such as a graceful swan or a powerful animal or machine *with powerful words* that in themselves create images.

Note: You are also training focusing skills, e.g. focusing on feelings, sounds, etc. Creative imagery and visualisation both double as a focusing skill. The diagram below illustrates how emotional and attentional control skills are interrelated.



## **Visualisation of Sports Skills**

Emotional and Attentional control exercises are mutually dependent.

Some techniques may be used for gaining emotional control, increasing focus, and energising.

Relaxation and focusing skills can be combined into one routine.

Skills of Emotional and Attentional control are mutually dependent. In other words, to relax, you have to focus, and it is important to relax if you want to focus. Similarly, to visualise, you need to focus, and it is a great asset to be able to visualise well if you want to focus on excellent performance.

In order to summarise the work in this chapter, fill in **TASK 7: Coach's Self-assessment** in the Chapter 3 coach workbook pg. 92.

### iii) Neutralizing Perceived Stressors

*The good archery coach* learns about the archer through careful, objective observation and open dialogue. It is not the coach's role to dictate what the archer will not be afraid of, or ridicule the source of the fear. It is the coach's responsibility to neutralize the perceived threat to the individual with skilful intervention techniques and moral support.

#### - Teaching Coping Skills to the Archer

The successful athlete strengthens mental skills and eliminates inappropriate emotional responses to performance outcome. This is true whether it is in practice or competition. How does the coach help the archer get to that point? Through the annual plan, the coach provides opportunities to learn and implement coping strategies for the archer in practice and competition.

First, the archer must be aware of physiological responses to competition.

Second, the archer needs to identify the psychological source of these responses.

Third, the coach and archer design a plan of attack to breakdown the cause-response tendencies.

Last, the coach and archer build new coping responses that work best for the individual.

### REVIEW THE PLAN

Turn to the annual plan and record Coping Skills teaching and training into the plan. There should be more evaluation and teaching sessions in the general preparation phase. In the pre-competitive phase, implementation and assessment should be highlighted. In the competitive phase, evaluation and refinement will be important.

After this task has been completed, turn to the Chapter 3 Workbook pg. 93 - **TASK 8: "Application of the Theory: - Face the Stressors Head-on - Confidence Training"**.

How does the coach follow through? New technique to reduce stress:

Review the ARCHERY CANADA and NCCP reference manuals for relaxation techniques. This is one area that can help the archer reduce perceived stress. This is just the beginning. The good coach encourages visualisation. It is the combination of proper visualisation, and relaxation that best prepare the archer to cope with competitive stress. When the archer relaxes with eyes closed physically, the archer's sequence should be present in the mind's eye.

*Remember*, in order for visualisation to be effective it must be:

- 1) clear
  - 2) correct and,
  - 3) stimulate muscle fibers.
- 1) With practice, the archer should be able to see every segment of the execution of the shot from stance to follow-through internally (as viewed from inside the body not viewing a television or monitor. This technique can be useful for some form corrections, but the sensation must accompany the visuals).

If this can not be done, the coach should guide the archer through the skill in slow motion, physically, and then mentally. In this way, the archer feels the form precisely and does not gloss over key elements. The image must be controlled and vivid in order to benefit the archer the most. When the archer can control the image in slow-motion, it is time to speed it up to real time so that the relaxation and imagery can be used during real competitions, not just in cozy places, lying on the floor. The archer must be committed to the long-term benefits in order to keep up the training and practice this skill just like any other part of archery training.

- 2) Since visualisation enhances skill acquisition, it only makes sense that the form the archer imagines in a relaxed state is the correct form for that archer.

Have the archer tell you in detail what is clear and understood about the form. Any areas, which are unclear or “fuzzy”, are usually the segments of the shooting sequence that the subconscious has not learned thoroughly. The archer should ask the coach to clarify any statements that cloud the archer’s understanding of what is expected in shooting the arrow properly. Shooting mental arrows then assists the skill and its consistency. Ensure the archer feels good about shooting the arrow properly

- 3) Visualisation is more than “seeing yourself on television”. If that is all the archer “sees”, then there is minimal benefit. The archer must imagine the arrows being shot from inside, just as the shot is seen while aiming in real life. Be very specific with your archer(s). Ensure that the archer can “feel” the arrow being shot during all parts the visualisation.

#### New thought pattern:

Confidence training begins with replacing negative self-talk with positive cues. If the archer’s goals are SMART, the archer’s perception of success will make positive self-talk easier to do.

- i) Practise the behaviour pattern you are trying for during practice sessions, and later during competitions.
- ii) Simulate the next competition physically as close as possible. Have the archer simulate the tournament by visualising what it might look like. Talk about the image the archer has created to make sure it is realistic, and to see if perceived stressors are present already.
- iii) Teach the appropriate coping behaviour for that archer in that situation. Teach realistic behaviours. Make sure the behaviours can be adapted to any situation, e.g. I always get lumped in with \_\_\_\_\_ (fellow competitor) who I find really irritating. My response in the past has been to stay by myself and remain quiet. This isn’t a good reaction since I know I shoot better when I am happy and talkative.

So, next time I have to shoot with \_\_\_\_\_ I'm going to imagine they are somebody else (or a fish, or a cartoon character, etc.). I'm going to enjoy the other people in my group and stay happy. If I don't like the other people in my group, I'm going to remember groups I did enjoy shooting with and remember things we did or said that made me laugh.

Training goal:

The archer will practice relaxation and shoot 6 mental arrows daily for the first two weeks.

The volume of mental arrows to be shot will be increased by 6 every two weeks until (#) arrows are reached. I will change the mental training programme slightly every month to avoid boredom.

The archer will be successful in changing the existing behaviour response 90% of the time this season.

**REVIEW THE PLAN**

Record the days, and number, of mental arrows that must be performed throughout the year. After the skill has been honed, decrease the number of repetitions for maintenance. Increase the numbers slightly before each major tournament so that site simulation can be added to the visualisation process.

- Alternative Forms of Mental Training

“Autogenic” training is a good alternative for those archers who have trouble implementing either relaxation techniques or concentration. The focus is on temperature and weight, or perceived temperature and weight in strategic parts of the body such as:

- warmth in limbs and stomach
- heaviness in limbs
- control of heart rate and respiration

This process takes several weeks and teaches the archer to isolate the feeling in specific areas of the body, e.g. left leg. After the archer can control the feeling by thinking about it, the thought is changed to an abstract such as an arrow. When the archer sees the arrow, the body feels warm and heavy. This puts the archer into a trance-like state.

Yoga, Tai chi, and transcendental meditation are specialised disciplines that use breathing, relaxation and muscle control to achieve harmony of mind and body. There is also an important connection between movement and breathing that can be transferred to the action of shooting an arrow with an over-arching emotional attitude based in calmness and focus.

Many people from all walks of life find these exercises calming and peaceful. If you feel the archer would benefit from one of these disciplines, there should be a commitment to attend sessions regularly until the skill is mastered. You may wish to participate also in order to better understand the new concepts the archer is learning.

The archer can utilise new thought patterns with auditory aids. There are some general tapes, CD's and/or internet downloads available commercially which will stimulate relaxation responses and increase imagery. But, the most significant ones are tailor-made, archery-specific, audiocassette tapes or CD's that use archery terms and words the archer feels totally comfortable with. The coach and archer need to work together to build an inventory of tapes/CD's for tournament preparation and specific simulation. These individualised auditory training aids are much easier to make once the archer has learned how to relax "on-cue" and stay relaxed while the images are produced in conjunction with the words on the tape.

Remember: Make sure the voice is calming, reinforcing, and positive in tone, and allows enough time for the archer to complete the visualisation properly.

#### - Reducing External Distractions

##### Sequencing Form

Before any archer can achieve elite-level performances, the individual's sequence of shooting an arrow must be ingrained into the archer's subconscious. The archer must exhibit control over both the physical and mental act of shooting the arrow. Sequencing is knowledge of key elements for the archer to produce and reproduce in the same order, regardless of environmental factors. The coach must train the archer to view each arrow as a separate entity on its own. It is started and executed exactly the same no matter what is happening in the surrounding area.

Total concentration on the archer's part is essential if the sequence is to be executed correctly during a competitive event. Focusing on the task at hand also limits the amount of time the archer can spend in dwelling on outside distractions. Only things that are important to the execution of the arrow must activate the archer's awareness level. It is a totally unemotional process.

The problem with this process is the natural tendency to become autonomic. Shooting the arrow becomes so ingrained in the subconscious mind that the conscious mind can introduce new thoughts. The more the archer knows the form pattern, the less attention is paid to it, particularly to visual attention. Slight mistakes creep in, but worse than that, now outside distractions have a fertile playing field in the archer's mind. This is where breathing and relaxation exercises play a pivotal role in combating distractions and re-focusing attention.

If the archer has been taught what to think in between arrows, in between ends, while scoring, while walking, whenever there is “spare time”, then the distractions can not pierce the subconscious pattern. Breathing exercises become a cue to start the thought pattern and break the archer’s attention away from negative influences. This cue will bring down heart rate and even out breathing patterns. The archer must be able to face the competitive situation calmly, dispassionately with fears in check. Breathing becomes the cue to focus on the execution of the next arrow. Keep the archer in the present. Then there is no time to worry about the past or anticipate the future.

- Refining Focusing and Centering Skills

Focusing and centering skills have been covered in other reference manuals. Experiment with these or other techniques and exercises to find the one(s) that work best for the archer.

When the archer practices these exercises, it is a good idea to write down what thoughts came in to disturb and concentration. Have the archer note how far along in the exercise the concentration was maintained and what thought caused distraction. If it something simple such as the clothing was too tight, that can be altered. If the distraction came from worry or anticipation, this must be addressed immediately.

**REVIEW THE PLAN**

Mental preparation is essential to consistent form and performance. This component deserves your attention when training elite archers. Double-check the plan when you have completed some of the other chapters.

Make sure that mental preparation has been given enough time to be ingrained. When tournament schedules change or life circumstances are altered, it is always a good idea to review the psychological component and alter the time frame.

Turn to Chapter 3’s Exercises pg. 95 - 102 and Case Studies pg. 103 - 104 complete all the tasks.

### iii) Goal-setting

It is far easier to motivate an archer on a day-to-day basis when there is a clear understanding of what is to be accomplished, how many arrows need to be shot and what other components need to be trained and why all these elements are important to success. The coach controls the volume of work, the intensity of training and the degree of mental preparation as well as the steady increase in competitive stress and challenge.

Conversely, if the coach chooses a haphazard approach to training, the athlete is more likely to pick inappropriate, unrealistic goals far beyond the present skill capabilities.

*This is where the archer's psychological problems start.* More often than not, the whole exercise leads to frustration. Look at the flow chart to the right.

The initial cause of frustration is the inability to meet a goal. If this is compounded by externally based gratification, an emotional response occurs. This is translated into several behavioural problems. Either the athlete stays in the sport and remains unhappy, or the athlete leaves the sport and remains unhappy.

Neither of these outcomes is acceptable.

*How can the coach help?*

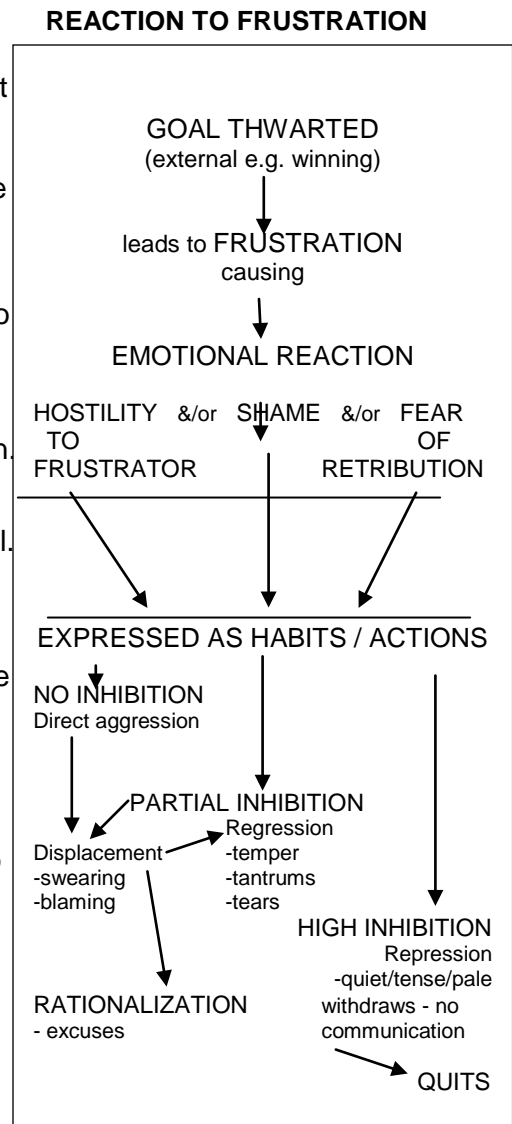
Achievement-motivated athletes respond very positively to goal setting, because goal setting gives them consistent opportunities to succeed by meeting the objectives they set. The coach should lead the archer through this exercise because athletes who use goal-setting effectively tend to:

- Suffer less from anxiety and stress
- Concentrate better on the task
- Show higher levels of self-belief and self-confidence
- Show greater control over the performance process

Your responsibilities in the area of mental preparation include:

- Building a psychologically healthy environment with the archer
- Making basic mental skills part of regular training or finding someone who can assist in this area
- Helping the archer integrate mental-skills training into performance preparation
- Helping the archer prepare for all possible events and situations
- With the archer, using goal-setting to map out a journey to success.

Although you can set up the framework, conditions, and process by which the athletes you coach can develop their mental abilities, athletes will be successful in the long term only if you help them develop independence and self-direction in all areas of mental preparation.





Go back and review the exercises on SMART Goal-setting in Chapter 2: The Plan. Put your archer through this process and correct as many problems as you can. The coach must remain calm and unemotional. Remember that you are to be a *facilitator* in your archer's goal-setting. For athletes to take ownership of goals and to feel motivated to achieve them, the athletes themselves must set the goals. Once you gather the information above, you can support your athletes as they set measurable, achievable goals.

Listen to the athlete's opinions and concerns. Redirect those concerns and fears into positive goals and outcomes. In some cases, athletes pay "lip-service" to you and the plan while secretly harbouring the same old frustrations. When this occurs, the coach may wish the advice of a sport psychologist.

### Benefits of Collaborative Goal-Setting

- Goals and priorities are clearer.
- Commitment and motivation increase.
- The definition of success is clearer.
- Archer's confidence and sense of accomplishment increase, and morale improves.
- Coping mechanisms improve because goal-setting helps keep winning and losing in perspective and helps athletes manage challenges one step at a time.
- Athletes mature by taking increased responsibility for their directions.
- Problem behaviour decreases as self-responsibility increases.
- Athletes develop an appreciation for goal-setting as they benefit from achieving their goals; this often transfers into other areas of life.
- Athletes show increased empathy for the needs and rights of others on the team.
- Communication improves, as goal setting provides a forum to express needs and desires related to sport performance.
- Athletes are happier and have more fun, because having fun in sport is usually directly linked with feeling successful and meeting challenges.
- Athletes perform better because they have achievable, challenging milestones to aim for.

Here are a few ideas for making sure that the archer's needs for achievement are fulfilled:

- Point out individual improvement.
- Keep written records of progress in diaries/logs.
- Schedule competitions with suitable opponents.
- Meet regularly to discuss progress and re-evaluate goals.

## Types of Goals

*Outcome* goals are about WHAT you achieve.

- Competition results are outcomes. These results may include ranking in a league or position in an individual tournament. These are ABSOLUTE outcomes. Since *external* factors can affect the athlete's ability to achieve these goals, achieving these goals is not always within the athlete's control.
  
- Self-improvement goals are measurable changes in performance. For example, improvements in fitness levels, higher score averages, smaller diameter groups sizes at all distances and endurance over the course of the tournament, are self-improvement goals. These goals may be independent of results-type goals (e.g. you may improve your score but not win the tournament); self-improvement goals may be viewed in RELATIVE terms for each athlete. Achieving self-improvement goals is usually more within the archer's control than achieving competition results. In some sport psychology literature, self-improvement goals are referred to as performance outcome goals.

*Process* goals are about HOW you achieve goals.

- Process goals are the means by which goals are achieved, for example, achieving fitness goals by attending all practices, training five times a week, going to weekly meetings, and monitoring fitness monthly. Developing team cohesion to improve the team's standing in the league is another example of a process goal.

To become really meaningful, both outcome and process goals must be related to a time period, either the long or the short term.

*Long-term* goals are goals that are to be realised by the end of a season (or even later in some cases).

*Short-term* goals are the small steps taken right away to reach the desired long-term goal.

The types of goals you set and the nature of these goals varies. There is absolutely nothing wrong with setting long-term dream goals such as making the national team or competing at an Olympic Games. In fact, most athletes who eventually achieve this type of goal did have it as one of their dream goals in their early competitive years.

Setting long-term and short-term process goals that are both progressive and measurable makes it possible for athletes to chart a path toward a dream goal and find satisfaction and motivation along the way. (Refer to SMART Goals in Chapter 2.)

### Planning for Mental Preparation within a Season

While there are no hard-and-fast rules about when to develop mental skills within a season, there are some widely accepted general guidelines.

Mental Skill	Time of the Season			
	Beginning	Middle	Around Key Competitions	End
<b>Setting Goals</b>	35. Meeting 36. Identify goals 37. Set goals 38. Outcome goals (What do we/I want to achieve?) 39. Process goals (How do we/I achieve these goals?)	40. Monitor 41. Assess 42. Re-evaluate	43. Re-evaluate	44. Meeting 45. Debrief 46. Re-evaluate
<b>Managing Focus</b>	47. Introduce skill 48. Develop athlete awareness 49. Develop basic skill 50. Assess basic skills 51. Refine basic skills	52. Simulation 53. Develop performance routines 54. Refine performance routines	55. Refine performance routines 56. Implement (performance routines)	57. Debrief
<b>Managing Negative Anxiety</b>	58. Introduce skill 59. Develop athlete awareness 60. Develop basic skill 61. Assess basic skills 62. Refine basic skill	63. Simulation 64. Develop performance routines 65. Refine performance routines	66. Refine performance routines 67. Implement (performance routines)	68. Debrief

### Planning for Mental Preparation within a Practice

As was the case for planning for mental preparation within a season, there are no hard-and-fast rules for when to develop mental skills within a practice. However, there are some widely accepted general guidelines.

There are of course many more options and the key to successful mental training is to find creative ways to integrate it into your day-to-day practices so that it becomes a habit for the archer.

#### During the Introduction

- Allow a few minutes for chatting so that archer can start to focus on the practice.
- Gauge arousal level, and do relaxation or energising exercises if necessary.
- Set goals for the practice, or remind archer of the goals for the practice.
- Provide a visual of drills/rounds that archer will do during the main part. This helps the archer start to create visual images. Have the archer rehearse mental arrows before shooting begins. This could be incorporated into breathing and focusing exercises in the warm-up.

#### During the Warm-up

- To stimulate shifts in focus, include a variety of activities that change frequently.
- Make the movements of the specific warm up similar to the movements that athletes will perform in the main part. That way, athletes can get a feel for what they'll be doing while they're visualising it.
- Check with individual athletes to make sure they understand their goals for the practice.
- Set cue words for the activities/drills.

#### During the Main Part

- Gauge arousal level and focus before each new activity/drill.
- Ask athletes to visualise successful performance while collecting arrows from the butt.
- Say cue words before and during each attempt, and ask athletes to do the same mentally while executing the shot.
- Ask athletes to re-focus and visualise after each shot, especially to reinforce a successful image after a poor shot.
- Video-tape the archer to show successful execution of the shot and to create positive mental images.

#### During the Cool-down

- Include relaxation, and return to calm exercises.
- Check if individual and group goals for the practice were met.

#### During the Conclusion

- Check if goals for the practice were met (cont'd).
- Ask the archer what went well and what needs improvement.
- Set goals for the next practice/competition.

In summary, perceived stress usually develops from poor or ill-defined goals. The good archery coach initiates positive goal setting and reinforcement through the annual plan.

Implementation of good goal-setting and follow-up assessment reinforces intrinsic, or natural, gratification. It changes the archer's definition of failure. Success is no longer driven by outcomes. Success comes through living the *process*. Keep track of this process through use of the coach's diary/log book.

### **REVIEW THE PLAN**

Turn back to your annual plan. Record suitable times during the annual training plan for testing and assessment.

An organised coach assesses athletes on a regular basis. Remember that in the beginning, these questions will have to be answered and discussed more often. As the archer begins to see a pattern of behaviour and performance developing, there may be less need to use questionnaires. Exercises can be enhanced to include simulations. Frequency is determined by such things as: whether or not the athlete is coping well with tournament stress; whether you have been teaching new mental skills; or if there has been an unexpected set-back in training.

Discuss this with the workshop Facilitator in the second workshop.

## REFERENCES

- Breus, M. J., O'Connor, P. J. (1998). Exercise-induced anxiolysis: a test of the "time out" hypothesis in high anxious females. In *Medicine & Science in Sports & Exercise* Vol. 30 (7) July: 1107-1112.
- Blumenstein, B., Weinstein, Y., et al (1997). The Effects of Music On Motor Performance. In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part I*: 133-135.
- Blumenstein, R., Bar-Eli, M. Tenenbaum, G. (1997). Mental Training in Elite Sport Incorporating Biofeedback. In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part I*: 130-132.
- Brook, N. (1996). How to prepare athletes to maintain control in high level competition. In *Athletics Coach*, Vol. 30, No. 3 Autumn: 10-19.
- Chevalier, N., (1988). Understanding the Imagery and Mental Rehearsal Processes in Athletics. In *SPORTS* Vol. 8, No. 10.
- Federation of Canadian Archers (1984). *Level IV Coach Manual*, Ottawa, Canada.
- Goldberg, A. (1998). Training Rut Busters. In *Fitness Swimmer* Vol. 6, No. 2: 22-23.
- Goldberg, A. (1998). *Sports Slump Busting*, Human Kinetics, Champaign, Illinois.
- Hall, H. K., Kerr, A. W. (1998). Predicting Achievement Anxiety: A Social-Cognitive Perspective. In *Journal of Sport & Exercise Psychology*, Vol. 20 (1) March: 98-111.
- Herrigel (19 ). *Zen and the Art of Archery*.
- Kerr, J. H. et al (1997). Effects on Archery Performance of Manipulating Metamotivational State and Felt Arousal. In *Perceptual and Motor Skills*, Vol. 84 (3) June: 819-828.
- Kim, B. J., Seong, C-H., (1997). Participation Motivation, Enjoyment, and Stress In Korean Youth Sport. In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part I*: 360-362.
- Klavora, P., Daniel, J. V. (1979). *Coach, athlete and the sport psychologist*. Twin Offset Limited, Toronto, Canada.
- Lee, T.D., Ezekiel, H.J., Wishart, L.R., Letho, N.K., & Marley, T.L. (2001 and 2002). *The Physiotherapy Client as a Problem Solver (parts 1-4)*, Physiotherapy Canada.
- Mikio, T., Hirohisa, I. (1997). Diagnostic Methods of Athletes' Psychological Competitive Abilities and Psychological States Before and During Competition. In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II*: 490-492.
- Muangnapoe, P., Morris, T. (1997). An Exploratory Test of a Modification of the Martens et al. Theory of Competitive Anxiety. In *International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II*: 507-509.

- Nougier, V. (1997). Attention In Sport: A Cognitive Process? From Perception to Action. In International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part I: 36-38.
- Orlick, T. (1986). *Psyching for Sport, Mental Training for Athletes*. Leisure Press, Champaign, Illinois.
- Peach, S. J., Thomas, S. M. (1998). Ego Threat and the Development of Competitive Trait Anxiety in Elite Junior British Tennis Players. In *European Journal of Physical Education* Vol. 3, (1): 51-64.
- Robazza, C., Bortoli, L., Nougier, V., (1997). Physiological Arousal and Performance in Archery: A Preliminary Investigation. In International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part I: 573-575.
- Shambrook, C., (1997). Adherence to Mental Skills Training, helping athletes to stick with their programmes. In *Coaching Focus*, issue 35, summer: 20-21.
- Solomon, G. B. et al (1998). Coach Expectations and Differential Feedback: Perceptual Flexibility Revisited. In *Journal of Sport Behaviour*, Vol. 21, No. 3 Sept.: 298-310.
- Srebro, R. (1997). Mental Training in the Tennis Centers in Israel. In International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II: 652-654.
- Suinn, R. M. (1997). Mental Practice in Sport Psychology: Where Have We Been, Where Do We Go? In *Clinical Psychology: Science and Practice* Vol. 4 (3), Fall: 189-207.
- Target, C. and Cathelineau, J. (1990). *Pédagogie sportive*. Vigot. Collection Sport et enseignement.
- Unestahl, L. E. (1982). *Inner Mental Training*. VEJE, Orebre, Sweden.
- Vealey, R. S., Armstrong, L., Comar, W. (1998). Influence of Perceived Coaching Behaviours on Burnout and Competitive Anxiety in Female College Athletes. In *Journal of Applied Sport Psychology*, Vol. 10 (2) Sept: 297-318.
- Vella-Brodrick, D. A., Macrae, K. (1997). Expert Opinions on the Constituents of Mental Imagery. In International Society of Sport Psychology IX World Congress of Sport Psychology Proceedings, Part II: 741-743.
- Wang, J., Ramsey, J. (1997). Interpersonal Communication--Overcoming Barriers and Improving Coach and Athlete Relationships. In *ICPHER.SD*, Vol. 36 (1) Fall: 35-37.
- Wiggins, M. S., (1998). Anxiety Intensity and Direction: Preperformance Temporal Patterns and Expectations in Athletes. In *Journal of Applied Sport Psychology*, Vol. 10, (2) Sept: 201-211.
- Weinberg, R.S., & Gould, D. (1999). *Foundations of Sport and Exercise Psychology* (2nd Edition). Champaign, IL: Human Kinetics.

## APPENDIX 1: Vocabulary Tables for Different Learning Styles

The following pages contain lists of words preferred by people with different learning styles. You can use the information in these lists to find suggestions for the most appropriate words or phrases to use with each type of learner.

## Vocabulary for the Visual Person

**Verbs**


---

notice	look at	look at	show
shine	clarify	distinguish	visualize
light up	lighten	hide	catch sight of
imagine	discern	illustrate	mark out
paint	depict	observe	appear
seem	discover	expose	scan
inspect	fix	glow	sparkle
blaze	illuminate	dazzle	

**Adjectives**


---

remarkable	dark	luminous	somber
brilliant	light	blurred	vague
clear	lucid	imaginative	clairvoyant
picturesque	cloudy	spectacular	coloured
deep	far-sighted	hazy	outlined
loud	obscure	obvious	distinct
expressive	limpid		

**Adverbs**


---

brilliantly	expressively	distinctly	vaguely
clearly	lucidly		

**Nouns**


---

remark	perspective	look	objective
burst	clarity	graph	illusion
snapshot	sharpness	point of view	imagination
clairvoyance	screen	cloud	spectacle
painting	observation	forecast	image
aspect	view	panorama	discovery

**Expressions**


---

see life through rose-coloured glasses	take your bearings
take stock of	before your very eyes
open your eyes wide	scattered to the four winds
look furtively	face-to-face
see someone in their true colours	without a shadow of a doubt
take a close look	to the naked eye
only have eyes for	be blindingly obvious



## Vocabulary for the Auditory Person

**Verbs**


---

hear	speak	say	listen
express	harmonize	question	shout
relate	moan	sound	put into dialogue
yell	ask	cry out	burst out
amplify	mention	recount	ask about
alarm	inform	discuss	articulate
announce	declare	compose	narrate

**Adjectives**


---

harmonious	melodious	musical	discordant
solemn	oral	loud	calm
orchestrated	high-pitched	vocal	audible
talkative	dissonant	deafening	amplified
deaf	strident	piercing	nasal
shrill	muffled	hollow	

**Adverbs**


---

harmoniously	noisily	of course	in harmony
solemnly	orally	loudly	deafeningly

**Nouns**


---

harmony	dialog	(in) tune	(out of) tune
click	question	cry	groan
listening	sound	request	shout
roar	din	word	speech
tone	discussion	voice	announcement
declaration	tonality	amplification	burst

**Expressions**


---

play a wrong note	lend an ear
whispering	have somebody's ear
hear voices	be in tune
ring true	sound false
turn a deaf ear	experience the whole gamut
echo	different version
sharp cry	put the accent
get through to	be all ears
have an earful of	bawl out
out loud	talk through your hat
burst your eardrums	overhear

## Vocabulary for the Kinaesthetic Person

**Verbs**


---

soften	sensitize	touch	firm up
soothe	warm up	move	solidify
feel	cool down	shock	weigh down
relax	contact	shake	hit
break	irritate	press	carry
seize	grab	flatter	boost

**Adjectives**


---

soft	relaxed	concrete	firm
sensitive	insensitive	tender	solid
gentle	warm	cold	heavy
light	tepid	shocking	touching
trying	ticklish	agitated	striking
brittle	irritable	pressing	moving

**Adverbs**


---

softly	in contact with	concretely	firmly
sensitively	insensitively	tenderly	solidly
gently	warmly	coldly	heavily

**Nouns**


---

softness	feeling	contact	firmness
sensitivity	insensitivity	tenderness	solidity
gentleness	warmth	coldness	heaviness
lightness	mildness	shock	test
contact	agitation	blow	breakage
irritation	pressure	movement	emotion

**Expressions**


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have good sense	have your feet on the ground
be open-handed	take to heart
pretty as a picture	have a good nose
put your finger on	make an impression
come to blows	be fed up
get on your nerves	fuel your arguments
get stuck into	cry your eyes out
be a stickler for principles	get on your high horse
come out of your shell	stand on your own two feet
be as meek as a lamb	
look as if butter wouldn't melt in your mouth	

**COMPETITION – DEVELOPMENT**

**REFERENCE MANUAL**



**CHAPTER 4**

**PHYSIOLOGICAL PREPARATION**



## OBJECTIVES OF CHAPTER 4: PHYSIOLOGICAL PREPARATION

To review theories on motor learning, motor behaviour, reaction time and Biomechanics as they relate to archery.

To review theories in training the athlete's energy systems.

To analyse, assess and correct, if necessary, archer posture and form.

### LEARNING OUTCOMES FOR THIS CHAPTER

The coach will be able to:

1. integrate and evaluate training theories into the annual plan to meet the archer's need in the chosen discipline.
2. provide basic, drug-free, nutritional information for archery
3. produce a Biomechanical profile of one provincial level archer, assess it, and design coaching strategies for improvement.
4. assess the impact of growth patterns in youth and its relationship to archery
5. test basic fitness levels, cardiovascular health and core strength requirements (age-specific)
6. identify muscle imbalances and correct poor posture.
7. identify form and/or equipment that could lead to future injuries.

## COACH REFERENCE MANUAL

### Introduction

What is physiology? Archery-specific research findings

Archery Canada's Long-Term Archer Development Model

General Information - Definitions of Athletic Abilities

### Part I: TRAINING THE BODY

- i) Anatomy and Anthropometrics in archery
- ii) Energy systems requirements for archery
- iii) Strength, flexibility, co-ordination and balance training for archery
- iv) Archery injuries and preventative strategies
- v) Nutritional demands of archery
- vi) Drugs, ethics and archery performance
- vii) The young archer/the female archer

### Part II: ARCHER FORM

- i) Skill level: arrows "in the bank" - motor learning, motor behaviour, Kinesthetic
- ii) Biomechanics
- iii) Why make changes? What really matters?
- iv) When to make changes? Periodisation versus archer needs
- v) Tools of Assessment, archer strengths and weaknesses
- vi) Exercise #1: Biomechanical Analysis of an Archer

### REFERENCES

### GLOSSARY OF TERMS – biomechanical growth & development

APPENDIX 1: Technique Analysis of the 10 Basic Steps to Good Archery Form

APPENDIX 2: Resource material on Energy Systems

APPENDIX 3: Guidelines for Developing Athletic Abilities in low importance in Archery

APPENDIX 4: NCCP Guidelines on growth and development

APPENDIX 5: Form Analysis sheets – 3 variations

## **WORKBOOK TASKS**

Anthropometric Measurement

Testing for muscle imbalance

Assessment first: Strength

Assessment first – Flexibility

Motor Behaviour - Application of the Theory

Why make changes? What really matters?

Archer Biomechanical Analysis

### **PREP WORK FOR THE WORKSHOP 1**

Draft a Cardio-vascular training session workbook pg 4

## **INTRODUCTION: WHAT IS PHYSIOLOGY?**

The human body is a fascinating, complex organism. Since the beginning of time, human beings have sought to understand how it works, what structures are under the skin, why we grow and how we reproduce. As a science, Physiology studies the cells, nerves, muscles, cardiovascular system and hormonal characteristics that make us “human”.

*Sport* Physiology re-defines this search to answer the question: how does the body adapt physically to strenuous activity? Scientists study changes in blood volume, blood flow, muscle chemistry, the electrical activity of the nervous system, and respiration in order to determine how the body adapts, and how far it can be pushed to perform under stress.

The archery coach needs to apply research from the scientific community in order to assist the athlete's desire to increase performance. The vast majority of research, however, deals with sports that have very little in common with the demands of fine motor activities. A limited number of studies have used archers. Regardless, the fundamentals of physical training remain the same for everyone. Particularly in the area of physical training and fitness, the coach can adapt theoretical knowledge to meet the individual needs of the archer during the correct training phase.

### Archery Specific Research Findings

In the mid-1970's archers were tested for cardiovascular fitness and other general fitness parameters. The sample size was always quite small and testing times were hit-and-miss. In the early 1980's Canadian archers were exposed to both physiological and psychological testing and compared with elite competitive archers from the United States, Japan and Australia.

#### Physiological and medical studies:

Peter Van Handel and Topper Hagerman (1982) examined the body composition/segment ratios and strength of U.S. competitive and junior competitive archers. Using an underwater weighing technique to estimate lean body weight, fat weight and percent fat, these investigators found that with only one exception elite competitive male archers had percent fat values that were normal for non-endurance or non-weight type sports (range 9.7 to 26.6%). Most of the women archers, however, were considerably fatter than the athletic population and even non-athletic, sedentary adults. Because obesity could produce fatigue and pose a health problem, it was recommended that 3 of the 16 male and 12 of the 16 female U.S. competitive and junior competitive archers should undertake a weight reduction programme. In addition, 7 of the 13 male and 6 of the 9 female members of the Canadian national team were similarly advised.

Also examined with this same group of 32 U.S. archers, was upper body segment lengths, specifically shoulder to elbow, elbow to wrist, elbow to waist, etc. One consistent ratio found was the shoulder to elbow/elbow to wrist was less on the right compared to the left arm. The leaner males also had greater segment lengths (especially shoulder to elbow) than women of similar body height. In terms of performance factors, for recurve shooters, it is recommended that the wrist/elbow relationship be longer than the elbow/shoulder length, but this should never be used as the sole determinant for archer recruitment for elite competitive competition.

In terms of strength the grip of U.S. archers was greater for the dominant limb (i.e. right-hand for right-handed archers). The draw poundage was more related to grip strength than it was to the height or weight of the archer. For most male and female archers the dominant right arm was also stronger in arm extension than the non-dominant.

In April 1983, Canadian archers were tested at Arizona State University. Dr. D. M. Landers & F. S. Daniels reported the following results.

1. **Strength:** leg and grip strength was compared with bow draw weight measurements.

a) Leg Strength

The quadriceps to hamstring ratio is important for balance, agility, and steadiness. The hamstring strength should be at least 50% or .50 of the quadriceps strength.

b) Grip Strength

Using a dynamometer, no unusual results were found in this test. The Canadian women showed stronger grips than most other female athletes including the U.S. female archers.

c) Draw Force

Two strength measures were taken:

- 1) Dynamic strength through an entire draw; and
- 2) Static strength at three positions in the draw:

early in the draw, midway through the draw, and at full draw.

The strength measures were made on an Ergenics strength machine. The archer held on to a stationary post with the bowhand and pulled a handgrip in a draw motion. For most archers, especially the males, the full draw force was greater than the intermediate draw force. This can be explained by the use of more muscles in the shoulder and upper back when the arm is posterior to the back. An interesting result was found in that relative to body weight, the top American male archer was much stronger in the full draw position than all other male archers. The superior strength that top U.S. men exhibited at full draw suggests a greater use of large core muscle groups.

2. **Reaction Time**

a) Visual Reaction Time

This test is used for a variety of sports to perceive where images occur in short periods of time, and where in the field of vision they occurred. Previous archer data show the male average to be 172.6 milliseconds and the female average to be 188.5 milliseconds. The Canadian male archers were 13.0 milliseconds slower than the average athlete. The Canadian women were 2.0 milliseconds slower than the U.S. women were.

b) Clicker Reaction Time

A bow, without the shooting string, was modified with a pressure cylinder to simulate an arrow being drawn through the clicker. The draw time for the cylinder ranged from 4-8 seconds. The archer held the bow up and simulated the draw position. A button built into a handgrip was attached to the hand that drew the string. The hand closed to depress the button that



approximated the tension on the string at full draw. The clicker was hidden from view by a cardboard blinder attached to the cylinder. A clock started, as soon as the clicker made contact with the bow. When the clicker released, the archer opened the string hand as quickly as possible to simulate the arrow's release. This release motion stopped the clock. Anticipation of the click was eliminated by randomly varying the time of clicker release. The random timing involved moving the piston to different positions each trial. The archers had to rely solely on their auditory and kinaesthetic senses as cues to respond and stop the clock. The average clicker time for all archers was 191.08 milliseconds.

c) Anticipation Time

A sequentially flashing track of lights was used. The lights turned on and off from left to right in front of the seated archer. The archer pressed a hand-held button to stop the light as close to the end of the track as possible without being late. The timing of the light flashes was decreased gradually. Canadian women had slightly better anticipation times than the men. Top archers recorded smaller reaction times (therefore, quicker response) than most national team members.

d) Visual Acuity

The 1983 tests showed that Canadian archers had below-average acuity particularly at the focal length for aiming at targets outdoors. It was recommended that archers have regular vision tests and wear corrective lenses.

e) Hand-eye Dominance

This research showed that hand-eye dominance is an important factor in shooting. Individuals, who shoot with the hand that is on the same side as their dominant eye, perform better than those with cross dominance.

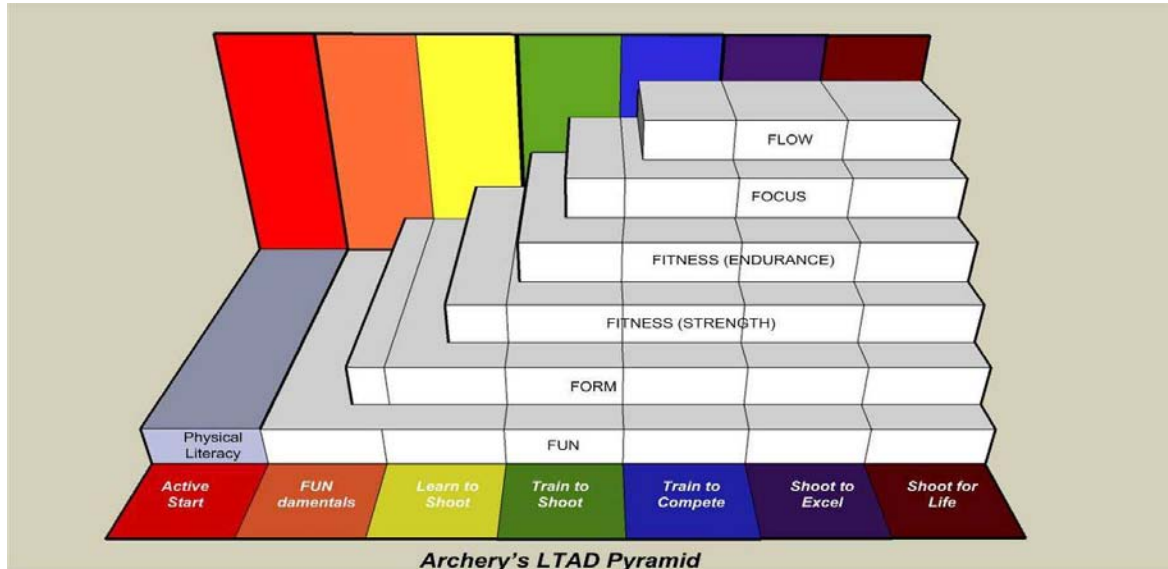
### Summary

Archery-specific testing can give the coach insight into the physiological characteristics of top performers. With this information, the coach can prepare future archers and train them to meet those levels. Can the coach simulate these types of tests in the club setting? The answer is no, not very well. As well, some tests used in the past such as holding the full-draw position to exhaustion or to some arbitrary time have caused muscle cramping and sore muscles.

However, one test might be useful for outdoor shooters who face windy conditions during tournaments. Check to measure the archer's accuracy if the shot is held at full draw 2-4 seconds longer than normal and then released. If the archer can not control the shot at all target distances to the same degree, then perhaps the archer's draw weight is too great. Strength training would have to be increased and then re-testing would need to be fitted into the annual plan.

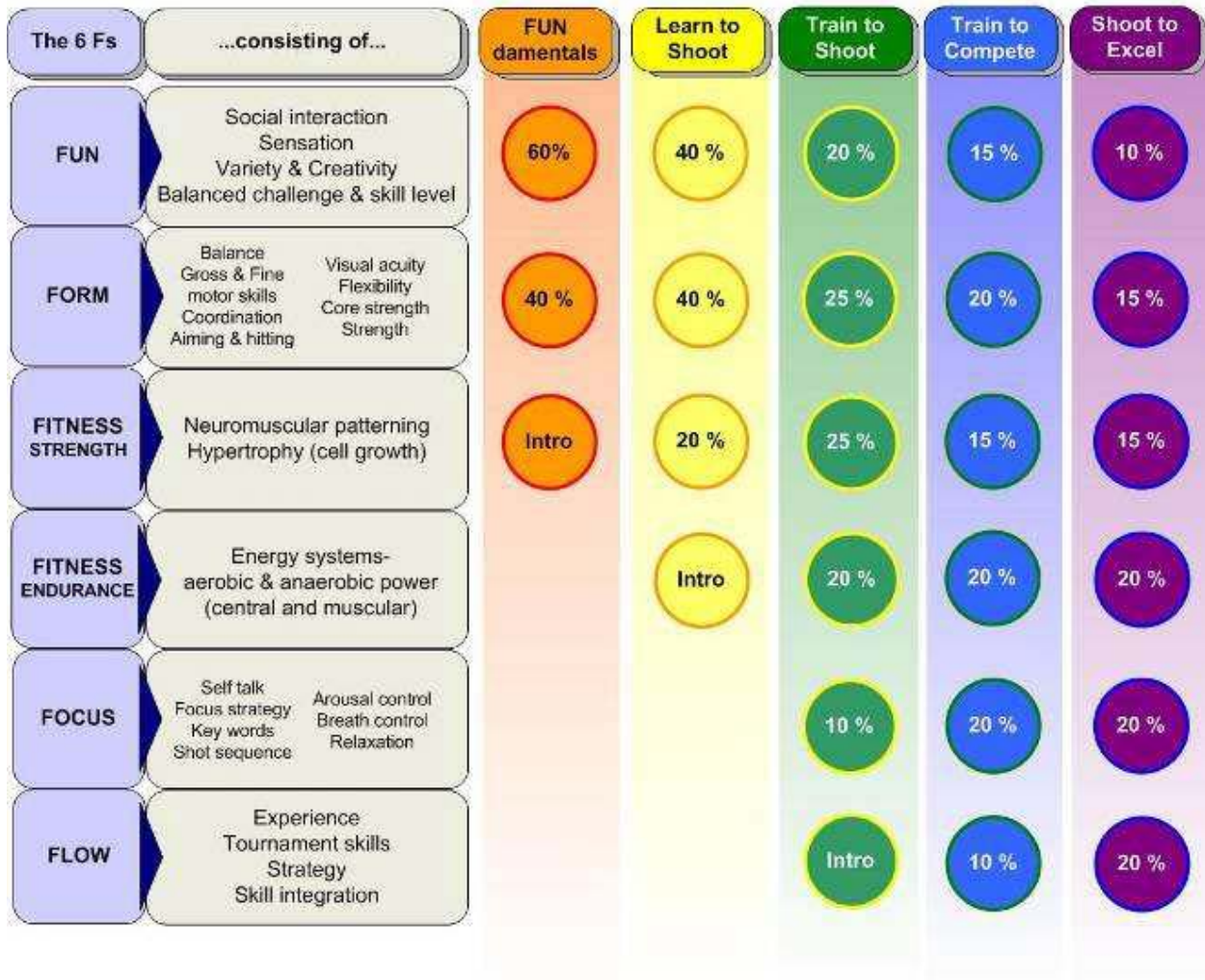
## Archer Canada's Long-Term Archer Development Model

This coaching context provides support to archers in the Train to Compete leading to the Train to Excel phases for both able-bodied archers, and archers with a disability. Before we begin to look at physical training, it is important to review the training pyramid in the Shoot to Excel group and what the ratios are for form, fitness-strength, fitness-endurance, focus and flow.



ARCHERY LTAD FRAMEWORK	Shoot for Fun			Shoot to Excel			Shoot for Life	
LTAD STAGE	Active Start	FUN damentals	Learn to Shoot	Train to Shoot	Train to Compete	Shoot to Excel	Shoot for Life	
TRAINING YEARS	0 years	0 - 4 yrs	1 - 4 yrs	2 - 8 yrs	4 - 10 yrs	7+ yrs	Enter any age after growth spurt	
TRAINING PYRAMID	FUN	100 %	60 %	40 %	20 %	15 %	10 %	FUN
	FORM		40 %	40 %	25 %	20 %	15 %	FORM
	FIT-STR			20 %	25 %	15 %	15 %	FIT-STR
	FIT-END				20 %	20 %	20 %	FIT-END
	FOCUS				10 %	20 %	20 %	FOCUS
	FLOW					10 %	20 %	FLOW
OTHER SPORTS	MANY ACTIVITIES	3+ OTHER	3+ OTHER	2 OTHER	1 OTHER	ARCHERY ONLY	AS DESIRED	
DISCIPLINE/DIVISION	NONE	ONE (entry)	2-3	2-3	1-2 (specializing)	ONE (specialized)	AS DESIRED	
QUALITY ARROWS/WK	ZERO	< 75	75-150	150-500	600-1000	600-1000+	AS DESIRED	
TRAINING HRS per SESSION/WK	NONE	< 45 min < 3 hrs/wk	< 90 min 3 hrs/wk	<120 min < 8 hrs/wk	<150 min < 14 hrs/wk	180 min+ 12-20+ hrs/wk	AS NEEDED	
COMP RATIO %	NONE	100 T : 0 C	90 T : 10 C	85 T : 15 C	80 T : 20 C	70 T : 30 C	AS DESIRED	
COMP FOCUS	NONE	FUN ONLY	CLUB/LOCAL	PROVINCIAL	NATIONAL	INTERNATIONAL	AS DESIRED	
COACHING	NONE	INSTRUCTOR OF BEGINNERS	INSTRUCTOR OF INTERMEDIATES	INTRODUCTION TO COMPETITION	COMPETITION DEVELOPMENT	COMP HP (LEVEL 4/5)	AS DESIRED	

### % Training Time in Physical and Mental Factors Across LTAD Stages



It is expected that the ARCHERY CANADA coach candidate has completed successfully the NCCP's multi-sport Competition - Development multi-sport workshop module "Developing Athletic Abilities". This chapter reviews that course material only as it applies to archery.

<b>Definitions of the Athletic Abilities Required in Most Sports And Relevant Importance in Archery as a Precision Sport</b>	
<b><i>Physical Athletic Abilities</i></b>	
<b>Strength-endurance</b>	The ability to perform repeated muscle contractions at intensities below maximum strength ( <i>normally, 15 to 30 repetitions or more</i> ). <b>IMPORTANCE IN ARCHERY: HIGH</b>
<b>Maximum strength</b>	The highest level of tension generated by a muscle or muscle group during a maximum contraction, regardless of the duration of the contraction. <b>IMPORTANCE IN ARCHERY: HIGH</b>
<b>Flexibility</b>	The ability to perform movements about a joint without sustaining injury. <b>IMPORTANCE IN ARCHERY: MODERATE</b>
<b>Speed-strength</b>	The ability to perform a muscle contraction or overcome a resistance as fast as possible ( <i>normally, very brief efforts of 1 or 2 seconds</i> ). <b>IMPORTANCE IN ARCHERY: MODERATE TO LOW</b>
<b>Aerobic stamina</b>	The ability to sustain a dynamic effort over an extended period of time ( <i>normally, efforts lasting several minutes, or even hours</i> ). <b>IMPORTANCE IN ARCHERY: LOW</b>
<b>Speed-endurance</b>	The ability to sustain efforts at near-maximum speed for as long as possible ( <i>normally, very intense efforts lasting between 8 and 60 seconds</i> ). <b>IMPORTANCE IN ARCHERY: LOW</b>
<b>Speed</b>	The ability to rapidly move the body or a part of the body, or to execute a series of movements, in an all-out effort of very short duration ( <i>8 seconds or less</i> ). <b>IMPORTANCE IN ARCHERY: LOW</b>
<b><i>Motor Athletic Abilities</i></b>	
<b>Co-ordination</b>	The ability to perform movements in the correct order, and with the right timing. <b>IMPORTANCE IN ARCHERY: HIGH</b>
<b>Balance</b>	The ability to achieve and maintain stability. <b>IMPORTANCE IN ARCHERY: HIGH</b>
<b>Agility</b>	The ability to execute movements or change body position and direction quickly and effectively. <b>IMPORTANCE IN ARCHERY: LOW</b>

### Training Specific Athletic Abilities

On the following pages, the coach will find helpful information to train specific athletic abilities. Unfortunately, there is little information available on the optimal training frequency and the minimal amount of time necessary for a training response for some motor abilities that are important to the sport of archery, i.e. balance and co-ordination. Train these abilities regularly as part of other exercises, particularly during the first few weeks of the annual plan.

#### ***Training Athletic Abilities: Summary and Key Points***

<b>Athletic Ability</b>	<b>Activity Requirements</b>
<b>Maximum Strength</b> (high for archery)	<b>Note:</b> <i>In many cases, the sport itself does not provide good opportunities to develop this athletic ability; see detailed guidelines</i>
<b>Co-ordination</b> (high for archery)	<input type="checkbox"/> Activities that involve a sequence of actions that must be performed in a given order <b>Note:</b> <i>Improvements more likely to occur if activity is performed when the athlete is not tired</i>
<b>Balance</b> (high for archery)	<input type="checkbox"/> Activities where difficult or unusual positions must be assumed and maintained <u>OR</u> <input type="checkbox"/> Activities where normal movements are performed in unusual positions <u>OR</u> <input type="checkbox"/> Activities where balance is challenged by external factors or an effort is required to maintain balance (e.g. shooting in the wind or on sloping terrain)
<b>Speed-Strength</b> (moderate for archery)	<input type="checkbox"/> Movements or actions that require jumping, bounding, or quick pushing <u>OR</u> <input type="checkbox"/> Movements or actions that require accelerating objects as quickly as possible
<b>Strength-Endurance</b> (moderate for archery)	<input type="checkbox"/> Repeated muscle contractions that are sustained for several seconds <u>OR</u> <input type="checkbox"/> Several sub-maximal muscle contractions performed consecutively at a constant rate
<b>Flexibility</b> (moderate for archery)	<input type="checkbox"/> Controlled movements of large amplitude <u>OR</u> <input type="checkbox"/> Controlled movements in which the muscles are stretched and where the position is maintained for 20 to 40 seconds <b>Note:</b> <i>No external force should be exerted on the limb or the articulation</i>

## Developing and Maintaining Strength

	<b>Strength-Endurance</b>	<b>Maximum Strength</b>
Type of effort	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets); alternate muscle groups involved	Training this athletic ability in young athletes is NOT recommended
Mode/type of movement	Tractions, pulling actions, extensions, flexions, etc., using own body weight, free weights, or machines	
Intensity	Sub-maximal; use of body weight; if free weights or machines are used, athlete must be able to lift load at least 10 times	
Length of a repetition	3 – 4 sec	
Number of repetitions per set	10 – 15, or +	
Number of sets per exercise	2 – 3	
Number of different exercises	5 – 8	
Total number of repetitions	100 – 300 or +	
Length of recovery/repetition	Not applicable	
Type of recovery/repetition	Not applicable	
Recovery between sets	30 sec – 1 min	
Stop before if ...	Quality of execution decreases; marked fatigue occurs during execution	
Min-max length of protocol	10 min; 32 min	
Significant improvements in...	4 – 5 weeks	
Development	2 times per week	
Maintenance	1 set per exercise, once a week	

sec: second    min: minute    h: hour

## Developing and Maintaining Speed-Strength and Flexibility

	<b>Speed-Strength</b>	<b>Flexibility</b>
Type of effort	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets); alternate muscle groups involved	Progressive extension of the body part involved, followed by a maintaining of the position; alternate body side if applicable
Mode/type of movement	Jumping, bounding, tractions, pulling actions, extensions, using own body weight, free weights, or machines	Passive stretching; no external resistance should be applied on the limb or the joint
Intensity	Speed of movement as fast as possible; sub-maximal (use of body weight; if free weights or machines are used, athlete must be able to lift load at least 15 times)	Stretch should be performed until a light feeling of discomfort is felt in the muscles
Length of a repetition	Less than 1 s during the contraction phase of the muscle group	20 – 40 sec
Number of repetitions per set	6 – 8	2 (1 each side)
Number of sets per exercise	2 – 3	2 – 4
Number of different exercises	2 – 3	6 – 8
Total number of repetitions	24 – 72	24 – 64
Length of recovery/repetition	Not applicable	Not applicable
Type of recovery/repetition	Not applicable	Not applicable
Recovery between sets	30 sec – 1 min	15 – 30 sec
Stop before if ...	Quality of execution decreases; marked fatigue occurs during execution	Some pain is felt
Min-max length of protocol	5 min; 10 min 30	12 min; 54 min
Significant improvements in...	4 – 5 weeks	3 – 5 weeks
Development	2 times per week	2 – 3 times per week
Maintenance	1 set per exercise, once a week	1 set per exercise, once a week

sec: second    min: minute    h: hour

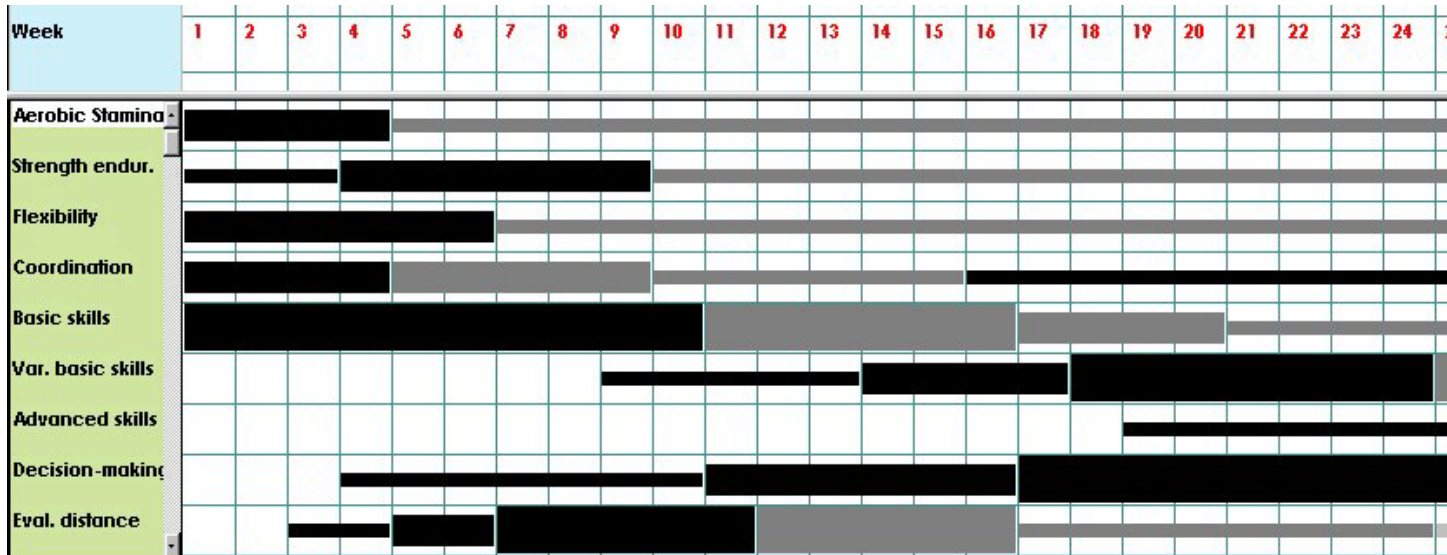


## Developing and Maintaining Speed

<b>Speed</b>		<b>Speed of Movement</b>
Type of effort	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)
Mode/type of movement	As sport-specific as possible	As sport-specific as possible
Intensity	All-out; as fast as possible	As fast as possible
Length of a repetition	5 – 8 sec	Generally less than 1 sec
Number of repetitions per set	4 – 5	4 – 5
Number of sets	2 – 4	2 – 4
Total number of repetitions	8 – 20	8 – 20
Length of recovery/repetition	60 – 75 sec	10 – 15 sec
Type of recovery/repetition	Active, very low intensity	Active, very low intensity, passive
Recovery between sets	Active, low intensity (5 – 6 min)	Active, low intensity (2 – 3 min)
Stop before if ...	Archer can no longer maintain a high speed	Form of movement deteriorates, speed of movement decreases
Min-max length of protocol	16 min 40 s; 46 min 40 sec	5 min; 16 min 20 sec
Significant improvement in...	4 – 6 weeks	4 – 6 weeks
Development	2 – 3 times per week	2 – 3 times per week
Maintenance	1 set, once a week	1 set, once a week
<b>Speed-Endurance</b>	<b>(short efforts)</b>	<b>(long efforts)</b>
Type of effort	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)
Mode/type of movement	As sport-specific as possible	As sport-specific as possible
Intensity	All-out	Controlled, but almost all-out
Length of a repetition	15 – 20 sec	30 – 40 sec
Number of repetitions per set	3 – 5	2 – 3
Number of sets	2 or 3	2 or 3
Total number of repetitions	6 – 15	6 – 9
Length of recovery/repetition	1 min 30 sec – 2 min	2 – 3 min
Type of recovery/repetition	Active, very low intensity	Active, very low intensity
Recovery between sets	Active, low intensity (6 min)	Active, low intensity (6 – 8 min)
Stop before if ...	Archer no longer maintains high speed	Archer no longer maintains high speed
Min-max length of protocol	19 min 30 sec; 47 min	18 min; 48 min
Significant improvements in...	4 – 6 weeks	4 – 6 weeks
Development	2 – 3 times per week	2 – 3 times per week
Maintenance	1 set, once a week	1 set, once a week

Type of Exercise	Characteristics	Examples	Mostly used ...
<b>General Exercises</b>	No sport-specific elements; no elements encountered when performing movements in competition Set of exercises borrowed from various forms of physical activity or other sports	<ul style="list-style-type: none"> <li>❑ Strength-training exercises for different parts of the body</li> <li>❑ Running in the woods</li> <li>❑ Rolling, bounding, etc.</li> </ul>	Beginning of the Preparation Period
<b>Specific Exercises</b>	Some sport-specific elements, or certain parts of movements performed in competition	<ul style="list-style-type: none"> <li>❑ Mimetics or shooting with eyes closed at close range, working on posture</li> <li>❑ Mimetics or shooting with eyes closed at close range, working on speed of release of the string</li> </ul>	End of the Preparation Period and beginning of the Competition Period
<b>Competition Exercises</b>	Execution of sport-specific movements or tasks in the same conditions encountered in competition, taking into account particular aspects such as rules, the presence of opponents and equipment	<ul style="list-style-type: none"> <li>❑ Training at target speeds based on competition intensity</li> <li>❑ Execution of whole routines at the level of difficulty of competition</li> <li>❑ Simulation of competition situations</li> <li>❑ Games, directed games, exhibition games</li> </ul>	Second half of the Competition Period  The weeks leading to important competitions

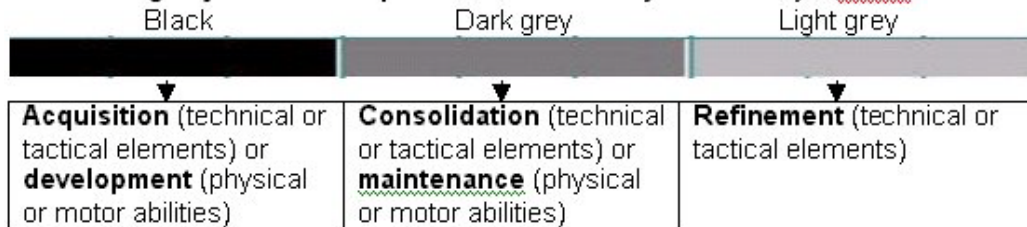
Sample Plan for Competition – Development, Precision Sports



The **training emphasis given to a specific athletic ability** is shown by the thickness of the band:



The **training objective for a specific athletic ability** is shown by a colour code:



**REVIEW THE PLAN**

Turn back to your annual plan. Have you included physical training other than shooting arrows?

From your initial archer assessment, you will learn which athletic abilities must be improved.

Until then, suggest suitable times during the annual training plan for training athletic abilities, if you have not done so already. Testing times should be marked on the training plan.

Re-assessment may be inserted once or twice each year.

Frequency is determined by such things as: whether or not the athlete is still growing; whether bow weight has been increased; if there has been an injury or a sudden on-set of pain while shooting. Discuss this with the workshop Facilitator.

Remember that testing and re-testing should not occur near major events. Some athletes experience stiffness from executing specific exercise tests.

**PART I: TRAINING THE BODY**

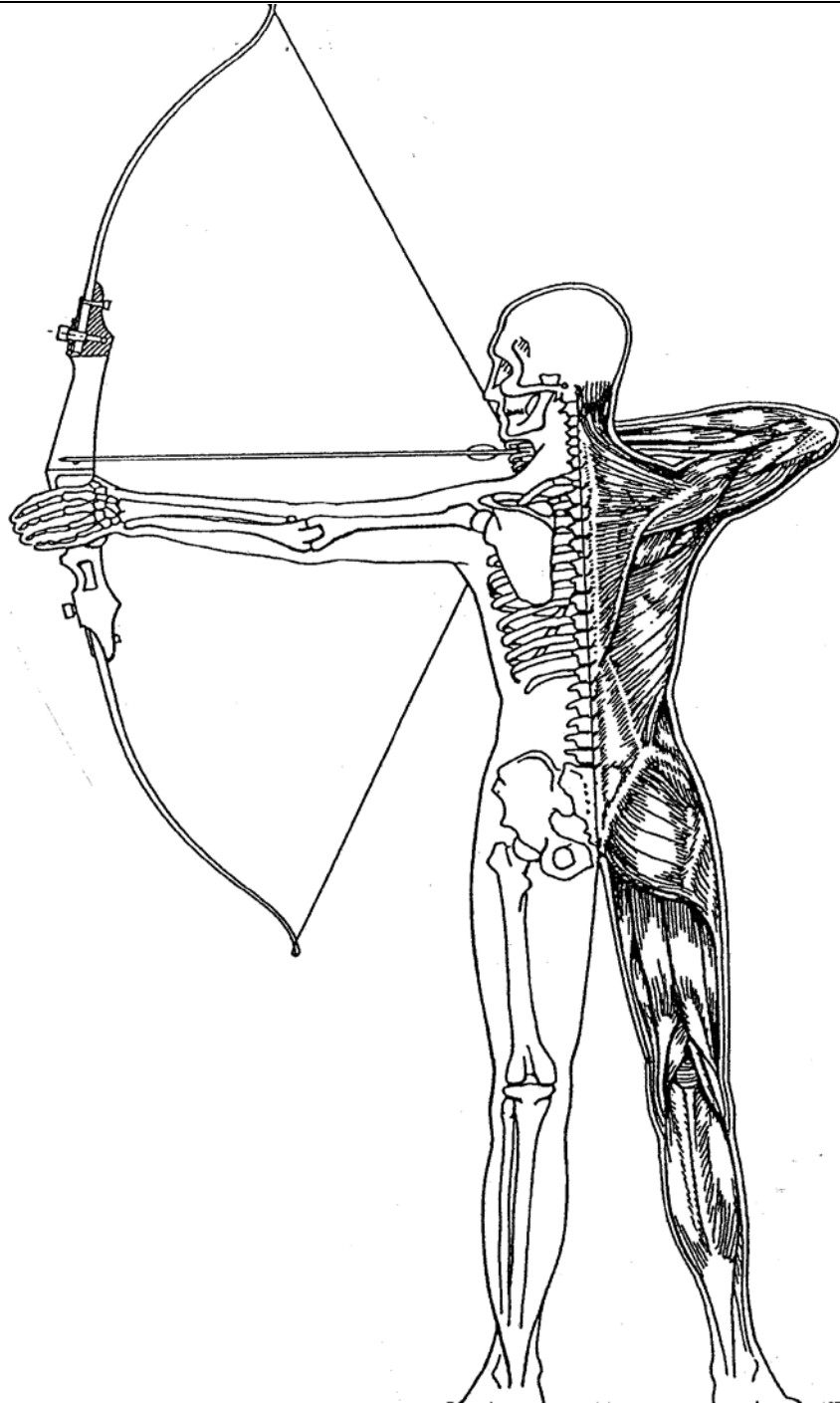
- i) Anatomy and Anthropometrics (measurement of body segments) in archery
- ii) Energy systems requirements for archery
- iii) Strength training for archery
- iv) Archery injuries and preventative strategies
- v) Nutritional demands of archery
- vi) Drugs, ethics and archery performance
- vii) The young archer/the female archer

**i) Anatomy and Anthropometrics in Archery****Anatomy:**

Listed below is a quick overview of archery-specific muscles, and their action. The terms used to describe muscle action are listed so that the coach can describe movement properly.

<b>Term</b>	<b>Muscle action</b>
Abduction	movement of a body part away from the plane that splits the body into two equal halves left and right (opposite of adduction)
Adduction	movement of a body part toward the plane that splits the body into two equal halves left and right (opposite of abduction)
Depression	lowering a body part yielding to gravity when standing OR the same movement with the body in other than standing (opposite of elevation)
Elevation	raising of a body part against gravity when standing OR the same movement with the body in other than standing (opposite of depression)
Eversion	bending the foot or hand outward at the joint (opposite of inversion)
Inversion	bending the foot or hand inward at the joint (opposite of eversion)
Flexion	bending at a joint, decreasing the angle (opposite of extension)
Extension	straightening at a joint, increasing the angle (opposite of flexion)
Pronation	rotation of forearm and hand to the palms-down position (opposite of supination)
Supination	rotation of forearm and hands to palms-up position (opposite of pronation)

<b>Muscles used in the act of shooting an arrow</b>	<b>Action</b>
Flexor digitorum profundus	closes fingers
Flexor digitorum sublimus	closes fingers
Flexor carpi radialis	flexes wrist palm-ward and from side of side
Flexor carpi ulnaris	flexes wrist palm-ward and from side of side
Extensor carpi radialis	extends wrist
Extensor carpi ulnaris	extends wrist
Pronator teres	pronates forearm
Triceps brachii	extension of the elbow joint
Teres Major	draws humerus (upper arm) down and backward, inward rotation of the humerus
Deltoid anterior	abduction, elevation, inward rotation of humerus
Deltoid posterior	abduction, depression, outward rotation of humerus
Trapezius	tilts head backward, elevates shoulder joint, adducts scapula (shoulder blade)
Serratus anterior	positions the scapula relative to the ribcage
Rhomboids major & minor	adducts scapula
Sternomastoid	tucks chin in, rotates head, raises sternum in deep breath
Spinea erector	extension, lateral flexion and rotation of spine

**Skeletal and Muscular Requirements of the Archer in the Full-Draw Position**

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## Anthropometrics

What it means to the coach

*The archery coach* is faced with a variety of body types to train. Some people are tall with long arms; some are short with broad shoulders. Anthropometrics studies the measurement of the human body, comparing bones and structures relative to muscles, bones, joints and body segments.

At first, the coach may feel this information is unnecessary. However, you, as the coach, are concerned with the following: body alignment at full-draw, efficiency of movement, and elimination of technique that could lead to injury.

The coach must realise that each archer will be faced with physical challenges due to naturally occurring, structural limits. How does the body composition affect form and alignment?

Recognise that some archers will be physically unable to achieve perfect alignment of the string elbow while maintaining a classic square anchor position on the face. This occurs simply because the combined relative lengths of the forearm, upper arm and shoulder width make it impossible to achieve this position no matter how much the archer tries to rotate the shoulder.

Archers using a finger release will be faced with greater challenges than release aid archers due to the effort required in order to keep the fingers squarely on the string.

Turn to Chapter 4 Workbook pg. 106 exercise entitled **TASK 1: Application of the Theory – Anthropometric Measurement**. With permission granted from those involved measure the upper body of at least one archer using the chart in the workbook.

## Muscle Balance

How does it affect training?

Natural muscle balance refers to the strength of muscle pairs acting upon a joint. For example, the biceps and triceps work as a unit to stabilise the extended bowarm at full draw. However, the term can refer to the muscle development on each side of the spine also. When one group of muscles, or one side of the body, is stronger than its partner, there is an imbalance or “asymmetry”. Slight muscle imbalances are normal and go unnoticed day-to-day. Participation in some sports magnifies them, sometimes leading to career-ending injuries. **Archery Canada’s Long-Term Archer Development model** suggests that archers in the “train to shoot” stage leading to the “train to compete” stage should be engaging in one-two other sports. These other sports should promote fitness, core muscle strength and if possible muscle symmetry.

How does shooting an arrow affect this balance?

People will tend to do certain tasks with a preferred side of their body. Individuals may or may not do all tasks with the left or right hand. Society as whole favours the use of the right hand so



that a large percentage of archers will exhibit greater strength on that side of the body prior to any involvement in archery. Since archery is an asymmetrical activity, there is a tendency to develop strength and muscle mass unevenly. The most common example of this is the over-development of upper back muscles on the draw-side of the spine as compared to the bowarm side. Taken to extremes, this problem causes curvature of the spine, i.e. scoliosis. So shooting a large volume of arrows without total physical training will compound any natural imbalances. Therefore, one of the main goals of strength training in archery is to counteract the asymmetry of muscle groups.

What can the archery coach do to offset imbalances?

Regular monitoring and a properly structured physical training programme can prevent injury. The coach must work with the archer (and perhaps a sports specialist) to design strength training programmes that will not only strengthen the archer, but also keep muscle strength balanced on both sides of the spine. Young archers will not be able to weight train fully, but can move their own body weight in specific actions. As well, they should be encouraged to participate in a variety of sports which co-ordinate the use of body segments in a rhythmical manner, e.g. swimming, running or biking. Adult archers can be assessed and “over-train” the weaker muscle groups with resistance training. These issues are covered later in the chapter.

A good archery coach monitors posture while shooting, corrects misalignment of the spine. The coach should give the archer good reasons for standing up straight with the hips tucked into a “pelvic tilt” and keeping the core muscles strong during the shot: (a) less discomfort in the lower back; (b) less string contact with the body, and (c) easier to use all muscles properly to feel the power from the draw to follow-through.

How can the coach determine if an archer has muscle imbalance or not? Turn in the Chapter 4 Workbook pg. 107 to the exercise entitled **TASK 2: Application of the Theory – Testing for muscle imbalance**. These simple tests in the club setting will give you a basic understanding of your archer’s abilities.

## **REVIEW THE PLAN**

Turn back to your annual plan. Suggest suitable times during the annual training plan for anthropometric testing and reassessment of posture and muscle balance. Re-assessment may be inserted once or twice each year. Frequency is determined by such things as: whether or not the athlete is still growing; whether bow weight has been increased; if there has been an injury or a sudden on-set of pain while shooting. Discuss this with the workshop Facilitator.

Remember that testing and re-testing should not occur near major events. Some athletes experience stiffness from executing specific exercise tests.

Sample training chart (Full training charts are located in the Workbook.)

<b>TOPIC</b>	1	2	3	4	5	6	7	8	9
<b>EVENTS</b>									
international									X
national									
regional									
provincial							X		
club	X	X	X	X	X	X		X	
<b>COMPONENTS</b>									
<b>Psychological</b>									
relaxation/imagery									
concentration									
simulation									
other									
<b>Physiological</b>									
Form	X				X				
test/re-test									
biomechanical analysis									
fitness: C-V, Strength									
<b>Equipment</b>									
selection & purchase									
tuning sessions									
testing sessions									
<b>Specialised</b>									

<b>Training</b>									
foul weather training									
field/3D/Ski-Arc training									
<b>Comments</b>									

## ii) Energy Systems Requirements for Archery

It is expected that the ARCHERY CANADA coach candidate has completed successfully the NCCP's multi-sport Competition - Development multi-sport workshop module "Developing Athletic Abilities". This chapter reviews that course material only as it applies to archery.

### Defining the Activity

Archery requires the precise repetition of a fine motor skill, lasting 8-10 seconds each, over a 4-6 hour period, on one, two or four consecutive days. In most cases, the event is timed allowing for a minimum amount of rest in between repetitions; and there is, generally, a 5 to 15 minute pause in between bouts of activity depending upon the discipline. The exception is Ski-Arc, being a continuous activity combining all-out cardiovascular activity with only minimal rest time while shooting arrows. This discipline will be dealt with separately.

### The Relationship between the Athletic Abilities and Energy Systems

The table below outlines the relationship between the physical athletic abilities and the body's energy systems.

This table highlights two distinct components that apply to each energy system: its power and its endurance. The power of an energy system refers to the rate at which it can produce energy; in other words, power is about the amount of energy the system can produce per unit of time. The endurance of an energy system refers to the length of time it can operate at peak power or at a fairly high percentage of its peak power.

<b>Athletic Ability</b>	<b>Athletic Ability Subset</b>	<b>Primary Energy Systems and Components</b>	<b>Primary Energy Source(s)</b>
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Athletic Ability	Athletic Ability Subset	Primary Energy Systems and Components	Primary Energy Source(s)
Speed-Endurance	Speed-endurance (20 - 30 sec)	Anaerobic alactic (Capacity/Endurance)	CP, Muscle glycogen
		Anaerobic lactic (Power)	
	Speed-endurance (45 - 75 sec)	Anaerobic lactic (Capacity/Endurance)	Muscle glycogen
Strength and Muscular Qualities	Maximum strength (Neural activation)	Anaerobic alactic (Power)	Phosphagens (ATP and CP)
	Maximum strength (Hypertrophy)	Anaerobic alactic (Capacity/Endurance)	CP
		Anaerobic lactic (Power)	Muscle glycogen
	Speed-strength (light resistance)	Anaerobic alactic (Power)	Phosphagens (ATP and CP)
	Speed-strength (moderate resistance)		
	Strength-endurance		Anaerobic alactic (Capacity/Endurance)
Anaerobic lactic (Power and Capacity/Endurance)			Muscle glycogen

The level of development of the various energy systems has a significant impact on the level of development of all athletic abilities but flexibility, balance, and co-ordination.

### Energy Systems and the Archer

From this description, what is the nature of effort required of the cardiovascular system in archery?

Effort in archery is intermittent, broken, requiring duration and stamina. All energy system demands are sub-maximal. Therefore, general physical conditioning is recommended in order to reduce fatigue over the total tournament. The sport's demand is primarily on the **aerobic endurance/capacity energy system**, due to the length of time needed to compete, by definition over 3 minutes.

However, the demands the upper body makes can not be ignored. The action of shooting an arrow within the time allowed limits the recovery time within a range of 5 to 30 seconds. By definition, this is an **anaerobic process**. The aerobic system does not have a chance to be utilised. The work-to-rest ratio does not allow for passive rest. The secondary system to be trained, therefore, is the archer's **alactic capacity**.

Why should the coach be concerned about an archer's cardiovascular system if requirements are sub-maximal?

When archers are fit, they feel better about themselves and appear to handle elite competitive stress better. Training for increased *aerobic capacity* allows the athlete to continue to perform at the same level of fine motor skill required throughout the entire tournament. The fit archer's heart and lungs transport oxygen and nutrients to muscle cells more effectively. Efficient oxidation and removal of waste products produced by shooting arrows would increase as well.

Training the *alactic* system capacity allows stored ATP to be used longer without incurring as much glycogen breakdown and withstanding higher concentrations of lactic acid in the bloodstream and muscles. On a cellular level, this increased capacity raises the lactic acid threshold higher so muscles do not feel as tired and sore after several days shooting. When lactic acid is under control, muscles contract stronger and archery form appears smoother, effortless.

It is often assumed that the three energy systems work in sequence during exercise, and that one kicks in after another has been exhausted. But the body does not work that way. Instead, there is interplay among the three systems, especially at the beginning of an exercise, and the specific characteristics of the efforts produced largely determine which system dominates.

At the beginning of an effort, both anaerobic systems contribute more than the aerobic system. The anaerobic alactic system prevails during the first few seconds, followed very quickly by the lactic system.

Although small initially, the contribution of the aerobic system increases progressively as exercise duration increases, and it becomes dominant after 90 seconds to 2 minutes of continuous effort.

The overall amount of energy the anaerobic systems can produce is always low. But these systems can provide energy very quickly for short, high-intensity efforts.

The figure below compares the interplay among the energy systems to the workings of a reservoir system:

The amount of energy each system can produce is represented by the size or capacity of a reservoir, and its peak power is represented by the diameter of a pipe connected to a tap.

How wide the energy tap opens depends on the energy needs of the muscles per unit of time; this in turn determines the amount of energy provided by each system/reservoir.

At Rest

- The energy needs of the muscles are small, as shown by the smallest pipe.
- Most of the energy is provided by the aerobic system using fat and glucose as energy sources.
- The “exercise energy taps” don’t have to be turned on.

When Exercise Begins...

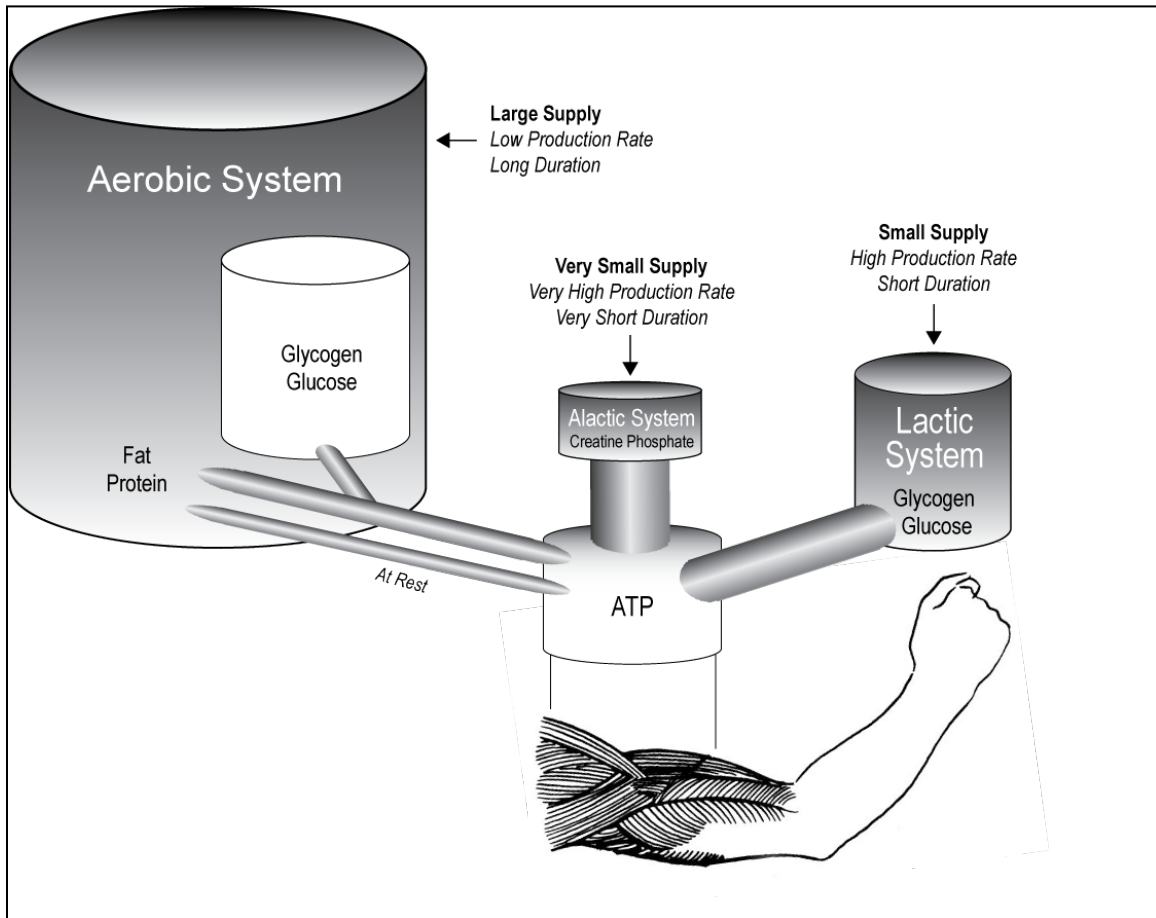
- The energy needs of the muscles increase several times compared to the needs at rest.

To meet this demand, the exercise energy taps are turned on.

- Both anaerobic systems contribute more than the aerobic system.
- The anaerobic alactic system prevails during the first few seconds, followed very quickly by the lactic system.
- Because of the large diameter of its pipe, the alactic reservoir provides most of the energy during the first few seconds, but it empties very quickly because of its small capacity.
- Although its capacity is somewhat larger, the lactic system reservoir also gets emptied fairly rapidly, especially if the energy demands are very high.
- As the exercise energy taps open, all three reservoirs can be accessed. Each system can therefore supply energy at the beginning of an exercise, but not at the same rate and in the same proportions.

As Exercise Duration Increases...

- Although small initially, the contribution of the aerobic system increases progressively as exercise becomes longer.
- It becomes dominant after 90 seconds to 2 minutes of continuous effort.
- The overall amount of energy the anaerobic systems can produce is always low. But these systems can provide energy very quickly for short, high-intensity efforts.
- The flow from the aerobic reservoir is smaller than that of the anaerobic systems. Despite this lower rate of energy production, the aerobic system produces energy for much longer.



**Note:** This figure illustrates only general concepts and should not be viewed as an exact representation of the energy systems.

For more information about training the energy systems for youth and for athletes with a disability, refer to the section following in this chapter as well as information in Chapter 6.

### Training for Ski-Arc

Archers must be very physically fit in order to compete successfully in this discipline. It combines archery skill with the more famous sport of Biathlon. As with Biathlon, the athlete must be able to ski as quickly as possible over varying terrain and then slow the heart rate down immediately in order to control the sight pin movement when shooting at a variety of targets from different positions.

The physical demands of the activity change dramatically. Training now must stress not only aerobic capacity, but aerobic endurance as well. The goal is to bring the skiing heart rate down to a resting heart rate for the individual within one minute. That is a very high demand on any athlete. The ski-archer must increase Maximum Aerobic Power and elevate the lactic acid threshold in order to reduce muscle fatigue. Training methods should include a combination of:

long, slow distance work; aerobic interval training; pace/tempo training and anaerobic interval training.

Total work volume will increase. Meso-cycles and micro-cycles will require more monitoring. As well, interval and continuous training must be included every week. The intensity of training must be at least 65% for the base fitness level, to 80% of VO2 Max in interval training. Rest periods have greater significance for proper regeneration. Diet, sleep and hydration play even greater roles in performance and training. Lastly, if your archer plans to compete successfully in this discipline, ensure that cardiovascular and strength training do not interfere with archery form. Programmes should include tapering and maintenance elements in advance of major tournaments. Do not over-look the amount of actual skiing time needed in the annual plan as well.

**Application of the Theory:**

Can an archery coach train the energy systems without a sport science expert?

Yes. Start by training the archer's aerobic capacity first in the General Preparation Period. The archer must train 3-4 times per week. When aerobic capacity development has shown improvement, reduce this to a maintenance level of training, 1-2 times per week. Then the alactic capacity development is added. Training sessions should overload the cardiovascular system first, allow for adaptation and recovery, and then progress to a higher level of difficulty.

Refer to your in-depth study of the body's energy systems in the NCCP's Competition Development Multi-sport Module entitled "Developing Athletic Abilities".

Sample training chart (Full training charts are located in the Workbook.)

TOPIC	1	2	3	4	5	6	7	8	9
<b>EVENTS</b>									
international									X
national									
regional									
provincial							X		
club	X	X	X	X	X	X		X	



<b>COMPONENTS</b>									
<b>Physiological</b>									
Form	X				X				
test/re-test									
biomechanical analysis									
fitness: C-V, Strength	CV4/S3	CV4/S3	CV4/S3	CV4/S3	CV4/S3	CV4/S2	CV4/S2	CV3/S2	CV3/S2

During the Specific Preparation Period and the Pre-competitive Period, both aerobic and alactic capacity systems can be trained while strength training becomes more archery-movement related. Assess the archer's total energy output including volume of arrows. Determine if the archer is expending too much physical activity.

**NOTE:**

When you actually implement the annual plan, look for:

- signs of fatigue
- lethargy
- mood swings
- complaints of tiredness and sore muscles
- dramatic drop in volume of arrows shot during archery training sessions.

These are indications that the archer's system is too stressed. If this happens, reduce the intensity of fitness training to one of the development levels or cut out one session per week.

By the time the archer has entered the Competitive Period and Peaking Phase, all systems should be on maintenance so that the fitness levels are not lost, and total concentration can be placed on shooting major tournaments.

**PREP WORK FOR THE WORKSHOP 1: TASK 3: Application of the Theory - Designing a Cardiovascular training session** Workbook pg.109

## REVIEW THE PLAN

Turn back to your annual plan.

Note:

You may submit the work that you did for the NCCP Multi-sport module “Developing Athletic Abilities” for physical preparation ONLY if it was designed for the archer you are working with now AND it has been reviewed and updated to meet the requirements listed below.

Breakdown the General Preparation Period into meso- cycles for the development and maintenance of the chosen energy systems. There may not be sufficient time in an annual plan to start strength training programme before the competitive period begins, but there should be sufficient time to allow for cardiovascular fitness increases.

Meso-cycles can be monthly, or seasonal. They should reflect the competitive needs of the archer’s chosen discipline at the elite level.

Then look at micro-cycles. Each micro-cycle should last 2-4 weeks, depending upon the archer. Work with the workshop Facilitator to establish these breaks in the annual plan.

Suggest suitable times during the annual training plan for cardiovascular testing and re-assessment. Schedule time to re-test the archer every 8-12 weeks. Discuss this with the workshop Facilitator. Remember that testing and re-testing should not occur near major events. Some athletes experience stiffness from executing specific exercise tests.

Next, look at the Specific Preparation Period and repeat the steps listed above. By this time, general aerobic fitness levels should have improved. The coach would add the alactic-training component at this point, but the number of training sessions would stay the same per week. Record the training days.

The volume of arrows during the Pre-competitive Period should increase, so there may not be as much time available for physical training. By combining workout sessions with shooting sessions, the archer can still improve cardiovascular fitness.

**Remember:** shooting sessions must precede workout sessions in the day. It should be noted also that this is the last time during the Annual Plan when increases in cardiovascular fitness

are desired. Pay greater attention to the fine motor co-ordination and skill requirements after this point. Record in combined sessions.

A maintenance programme for cardiovascular fitness is suggested for the Competitive Period and Peaking Phase. One to two sessions of relatively easy workouts per week are required. Finish this part of the Plan. Make sure you schedule one last re-assessment and leave space for cross training and active rest activities after the competitive period is over.

### **iii) Strength, flexibility, co-ordination and balance training for archery**

#### Strength Requirements - Defining the Activity

All fine-motor sports require strength and stamina in order to repeat precise muscle movement accurately throughout an elite competitive event. Archery requires strength in both upper body and lower extremities at the elite level. The archer who exhibits strength in only one of these areas can not compete to full potential, and therefore, risks injury. Why are upper-body and lower-body strength required in an activity that appears to the casual observer, to lie solely on shoulder and arm strength?

- Lower Body Strength

The upper body position that all archery coaches strive for in their athletes can not be maintained and replicated if the archer's legs and torso do not provide a strong enough base of support. Some archers exhibit poor posture because they do not realise the importance of the leg muscles and the abdominal muscles in providing support for the alignment of the shoulders at full draw and follow-through. Other archers have insufficient muscle tone in order to maintain good posture throughout the shot. The good coach will make the archer aware of these issues.

This is particularly true of field archery, where the archer's upper and lower body must be strong to maintain the archer's body stability when shooting uphill and downhill. Of course, lower body strength is essential for Ski-Arc in order to complete the course quickly without fatigue.

Therefore, adequate leg, and torso strength are critical to a complete annual plan. Exercises for the abdominal group, latissimus dorsi, gluteal group, quadriceps, hamstrings and gastrocnemius muscles should be included in any strength-training plan. Refer to Appendix 2. Balance exercises and flexibility should be included in the regime also. Refer to Appendix 3 for basic flexibility exercise selection.

When working with athletes with a disability (wheelchair or amputee), active torso muscles must be utilised and the coach should work with a classifier or a trained professional in order to understand which muscles and muscle groups the archer can activate. The coach can work with the archer and the specialist in order to keep the archer's upper body active and strong when lifting the bow, while aiming, and the completion of the follow-through. When working with blind archers, if there is no other physical challenge, and muscle activation is normal in the torso and legs, proper use of the entire body should be encouraged.

- Upper Body Strength

The upper body strength requirements are more noticeable. Strength programmes are highly recommended to prevent the on-set of back and shoulder injuries, and to keep the bow stable at full-draw.

**NOTE:** Upon assessment, if the coach finds that the archer's core muscle strength and leg strength is insufficient, upper body strengthen exercises can not begin yet. Once the larger muscle groups have been strengthened, then the smaller, longer muscles connecting the shoulders to the arms will be safe to perform.

Archery coaches can see inherent weaknesses in two areas: bow draw weight control; and bow mass weight control.

1. Shoulder/upper back strength must be greater than the draw weight/peak weight of the bow.

What archery coaches commonly refer to as "stamina", is the ability to pull the bow properly hundreds of time without detriment to form or accuracy. This should **not** be accomplished merely by shooting more arrows. Whole muscle groups integral to upper body stability and stamina are not properly exercised during the act of shooting.

When shoulder/upper back muscle groups are over-trained in a specified manner, without overall conditioning, the result is more likely to be chronic injury than increased stamina.

2. With regard to the bow's mass weight, the archer should have enough strength to maintain consistent form to repeat the following movements easily:

- raising the bow;
- keeping the archer's spine in an upright position during the execution of the shot;
- setting the bow shoulder in the shoulder girdle as the arrow is drawn;
- keeping the both shoulders parallel with the arrow at full draw;
- controlling the reaction of the bow on the follow-through.

For younger archers, there is a greater concern with sufficient strength in order to combat gravity and the mass weight of the bow at full draw. This problem is explored further in Section vii of this chapter, the young archer/the female archer.

#### Guidelines for Strength Training in Archery

Archers must achieve upper body strength without "bulking up". Large muscles, particularly in the arms, detract from body alignment with the arrow and the bow vis-à-vis the target. There can be string clearance problems in the upper and lower arms as well. So the archer needs maximal strength without hypertrophy.

The coach must be cautious in acceptance of popular strength-training programmes listed in magazines or purported by some fitness centres and on-line "help". The upper body strength exercises shown in magazines are designed for general muscle development and much greater muscle mass than an archer needs. Many times these programmes have exercises that are counter-indicative for archery. The weight resistance recommended may be too great and

repetitions too few to benefit an archer. This danger must be avoided. Keep in mind that training programmes must be individualised in order to produce the desired results.

Contrary to recent research findings, some fitness regimes are still basing workouts on one maximum repetition (RM) instead of successfully completed repetitions. Testing itself in these instances may cause injury to the archer. If you, the archery coach, decide to use strength-training experts, insist that you be present for both the testing phase and the programme design to ensure:

- a) Exercises are done properly;
- b) The exercises chosen do not incorporate actions that could detract from the archer's form;
- c) Repetitions are high and resistance is low (relative to popular training regimes) and appropriate for the level of conditioning/experience of the archer;
- d) The number of strength exercises during a session will be limited to 6-8 and
- e) The exercise programme is introduced at the appropriate time in the annual plan.

If you wish to incorporate exercises shown in popular magazines, use these same guidelines before including them in your athlete's workouts.

Before we look at assessing an archer's physical strength, review NCCP's section on training athletic abilities on the following pages, dealing with archery-specific needs.

### ***Training Strength: Summary and Key Points for Archers***

<b>Athletic Ability</b>	<b>Activity Requirements</b>
<b>Maximum Strength</b> (high for archery)	<i>Note: In many cases, the sport itself does not provide good opportunities to develop this athletic ability; see detailed guidelines</i>
<b>Speed-Strength</b> (moderate for archery)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Movements or actions that require jumping, bounding, or quick pushing <u>OR</u></li> <li><input type="checkbox"/> Movements or actions that require accelerating objects as quickly as possible</li> </ul>
<b>Strength-Endurance</b> (moderate for archery)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Repeated muscle contractions that are sustained for several seconds <u>OR</u></li> <li><input type="checkbox"/> Several sub-maximal muscle contractions performed consecutively at a constant rate</li> </ul>

## Guidelines for Developing Strength

In most sports, development of the various types of strength (maximum strength, speed-strength, strength-endurance) is difficult to achieve through the sport or activity itself.

In addition, certain guidelines must be followed to avoid injuries, particularly among children and beginners.

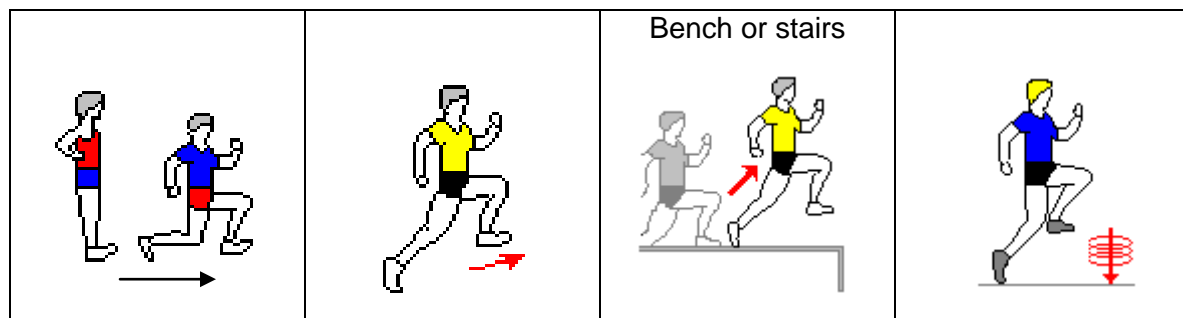
Specific strength-development methods, as well as particular safety measures, must be considered and implemented. The following considerations are provided for guidance, and they are aimed at young athletes getting started in strength training, but the same could be true for all archers in this LTAD phase.


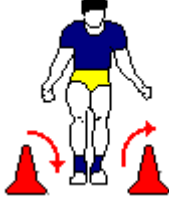
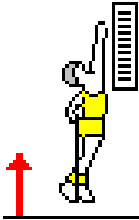


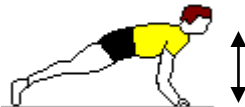
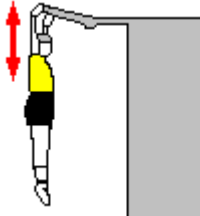
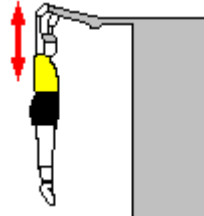

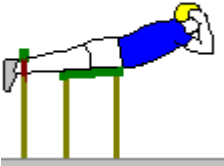
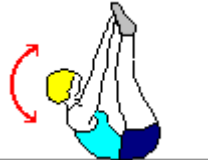

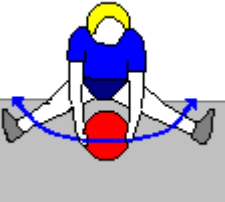



Examples of strengthening exercises using body weight and light weights are provided on the next page.

- In general, exercises involve localised muscle masses. In most of these exercises, the resistance is provided by the body weight of the athlete or by relatively light weights.
- It is recommended that athletes avoid heavy loads. Ensure that athletes are able to perform at least 12 to 15 consecutive repetitions of each exercise. Under such conditions, strength-endurance becomes the primary ability trained.
- The speed of execution must be moderate and controlled; athletes must end the exercise when the quality of execution starts to deteriorate.
- It is possible to use jumping or hopping exercises; the speed of execution and muscle contraction are higher, and these exercises will therefore develop speed-strength (muscle power).
- Avoid exercises that could excessively overload the spine (compression stress).
- While developing strength, aim for muscle balance; for instance, develop both the upper- and lower-body muscle groups, the muscles in front and behind body segments, and muscles on both the right and left sides.

### Basic Strength Exercises Using Body Weight or Light Implements

(Illustrations provided by CardiSport, www.cardisport.com)



			
Hands shoulder width 	Hands wider than shoulders 	Palms facing forward 	Palms facing backward 
With or without twist 			Light bar 
Medicine ball 	Medicine ball 	Medicine ball 	Soft ball (tennis) 

Now turn to the Chapter 4 workbook pg 110 -113 - **TASK 4: Application of the Theory: Assessment first: STRENGTH, and Suggesting Strengthening Exercises for archers.**

Consider the Simulated Draw Exercise and the Ball-against-the-wall Exercise in the process.

### Flexibility Requirements - Defining the Activity

Range of motion in the shoulder joints is important. If muscles are shorter than required for the movement of the bow shoulder into position, or for the rotation of the head of the humerus in the stringhand shoulder girdle, the muscles will pull harder on tendons, connective tissue and muscle insertion into the bone. Chronic injury can result as the archer repeatedly draws the bow into the anchor position. Flexibility should be viewed as preventive care to avoid or reduce injury over the archer's career.

For more information on archery-related injury and prevention, read section iv) on the following pages.

### Guidelines for Developing Flexibility

**Note:** The points below relate to the method of developing flexibility called static stretching. Examples of stretching exercises for the main muscle groups are provided on the following page.

- Flexibility exercises should be preceded by a light warm-up involving continuous, dynamic efforts (e.g. light running for 5 minutes).
- The exercises are performed without the help of a partner and without the application of external force on the limb or joint.
- The muscle or muscle group must be stretched in a controlled and gradual manner, without any interruption of the movement, until a slight tension is felt. Once the muscle is slightly stretched and relaxed, the athlete must hold the position for 20 to 40 seconds.
- The athlete should breathe slowly and deeply when performing a stretch.
- Exercises should be performed on both sides.
- Each exercise can be repeated 2 to 4 times during a practice session.
- Quick, sudden movements should be avoided when stretching, especially when the muscle is not sufficiently warm.
- The cool-down period of a practice session is a good time to perform flexibility exercises because muscles are normally adequately warmed up at that point, and flexibility does not involve intense effort. While athletes are stretching, the coach can gather feedback concerning the practice session and can provide his or her feedback or information as required.



Basic Flexibility Exercises

(illustrations provided by CardiSport, [www.cardisport.com](http://www.cardisport.com))



Now turn to the Chapter 4 workbook Pg. 114 **TASK 5: Application of the Theory: Assessment first – FLEXIBILITY.**

### Co-ordination Requirements - Defining the Activity

Archery requires the co-ordination of many small muscle groups and the ability of the nervous system to remember very precise movements. Archery coaches often rely on the repetition of the act of shooting an arrow in order to increase the archer's co-ordination of movement, or timing to execute the shot. For some individuals, particularly for those who have limited body awareness or under-developed biofeedback loop, this may not be enough.

### Guidelines for Developing Co-ordination

- The activity must involve a sequence of actions that are performed in a given order.
- The level of difficulty of an activity aimed at developing co-ordination is determined primarily by the number of movements or actions that must be performed; beginners and children should not have too many movements or actions to perform in sequence (2 or 3 are sufficient).
- The actions or movements can be general in nature, or specific to the sport, depending on the desired goal. For young children, priority should be given to general coordination activities instead of sport-specific ones.
- Basic motor patterns must be mastered **before** the athlete tries a more complex sequence of actions. For instance, if athletes are not able to control basic motor patterns (e.g. running, jumping, rolling, turning, throwing and catching, jumping on one leg while maintaining balance, or lifting an arm and the opposite leg simultaneously), they should not attempt more advanced coordination activities.
- Sequences of movement can be designed for specific body parts (e.g. arms only, or legs only), for several body parts at a time, or for the entire body; co-ordination activities can also take the form of agility games (e.g. "follow the leader").
- It is important to ensure that the sequence of movements is correctly executed, as the neuromuscular system tends to memorize motor patterns as they are learned in practice; for this reason, movements should be performed at low speed or intensity during the initial learning phase and then progressively accelerated to full speed.
- It is desirable to create conditions that require athletes to perform movements in various directions or use their weaker side.
- An activity can be made more challenging by:
  - Increasing the speed of execution
  - Adding new movements
  - Modifying the order in which the movements must be performed
  - Combining various actions already mastered but performing them in an unusual manner (e.g. dribbling the ball while squatting; running in the snow, sand, or water)
  - Adding restrictions (e.g. less time, less space, increased accuracy, unstable environment)
  - Adding uncertainty (e.g. performing the action with the eyes shut)

These variations have to be presented gradually, and only after the basic sequence of actions is mastered.

- It is better to repeat movement sequences more frequently for less time than to repeat them less frequently for more time. In other words, learning tends to be more effective if you have two 5-minute motor sequences four times a week than if you have one 40-minute practice session once a week.

### Balance Requirements - Defining the Activity

Balance, like co-ordination, is an underlying basic skill in archery. It may be less apparent to the coach who is working with an archer who specialises in indoor shooting, but it is still quite important. For the field or 3D archer, balance is required over uneven terrain. Maintaining balance over the center of gravity is important for good posture, minimal string contact with the torso and keeping the relationship of the shoulders to the hips in any stance.

### Guidelines for Developing Balance

- Although their primary focus is slightly different, some co-ordination or general motor development activities may also contribute to the development of balance.
- In general, developing balance requires creating conditions in which the athletes assume an unusual position or posture (e.g. stand on one foot, stand on one foot and crouch, jump on a low bench and stay in position, hopping on one foot, on the spot, forward, backward) and are asked to maintain it for a specified period of time.
- It is also possible to develop balance by performing normal movements in unusual conditions, for instance walking backward, with eyes closed, on heels, on a slope or a narrow and unstable surface (by drawing a line on the ground or placing a rope on the floor), etc. However, it is important to avoid excessively difficult situations that could cause falls or injuries.
- The use of large exercise balls (stability balls) can also present interesting motor challenges and can help develop balance. By using such balls, athletes make simple everyday activities such as sitting, standing, or trying to maintain a horizontal body position much more difficult. Again, it is necessary to take appropriate safety measures to minimize the risk of a fall.
- To improve static balance and stability, athletes must lower their centre of gravity (for instance by bending the knees or flexing the hips), make the base of support larger (for instance by widening the legs), increase the number of contact points on the ground if this is possible (for instance by putting one hand on the ground), and ensure the weight is evenly distributed on each contact point.

For a detailed guideline for Developing Athletic Abilities in low importance in archery, please refer to APPENDIX 2.

## REVIEW THE PLAN

Turn back to the annual plan. Mark in a time in the General Preparation period for **strength** assessment, usually at the same time as **cardiovascular** assessment. Now, match re-testing times as well, and slate-in a final assessment during the post-competitive phase.

Decide whether your archer's strength programme will be revised at the same intervals as the cardiovascular programme or not. Discuss your decision with the workshop Facilitator.

### iv) Archery Injuries and Preventative Strategies

It is expected that the ARCHERY CANADA coach candidate has completed successfully the NCCP's multi-sport Competition - Development multi-sport workshop module "Prevention and Recovery". This chapter reviews that course material only as it applies to archery.

#### Defining the Activity

Compared to contact sports, archery is inherently safe for the participant. Granted, it is a weapons sport. Still, incidents of accidental injury are very rare. Therefore, the archery coach looks for repetitive-action type injuries and designs the Annual Plan to prevent these types of injuries from happening in the first place.

By and large, the most common injury-prone area of the archer's body is the rotator cuff. This muscle group often referred to as the "shoulder girdle", can become chronically injured due to poor archery form and/or poor equipment selection. Exercises to strengthen this important group of muscles are outlined below.

In this reference manual, other areas will be highlighted as well. The coach will learn to identify biomechanically inefficient movements which can lead to injury; identify appropriate treatment for chronic versus immediate injuries; and identify the psychological implications to the injured archer.

This reference manual *in no way* is intended to replace the medical expertise available today. The archery coach's goal is prevention through planning and preparation. The care and remediation of serious injury is the responsibility of a qualified medical specialist.

#### Form-related Injuries

Common archery injuries are related directly to form problems that cause the body segments to wear down with repetitive use. Poor body alignment and/or posture lead to excess stress on delicate joints and ligaments causing pain and dysfunction. These problems must be dealt with immediately before they become chronic.

When assessing the archer, look for the following:

- 1) for shooters using a finger-release, excessive blistering, callusing or skin irritation of the shooting hand, particularly the ring finger;
- 2) for all shooters, bowarm shoulder and elbow pain, lower back pain, upper back pain, and pain during the draw or upon release;
- 3) hesitation or pain in the shoulder girdle of the stringhand during the draw or upon release.

Since pain is the body's way of telling the archer something is amiss, the coach should never ignore the athlete's complaints, or try to mask it with a local anaesthetic, or use the "grin and bear it" philosophy during practice and preparation. Even worse, many archers will use those very tactics themselves to hide the fact from the coach. The coach's observational ability is critical. Small changes in the way the bow is held, drawn or released may alert the coach to the problem.

What should the coach do?

The archer must be confronted. Communication must open and honest. The coach should state the importance of dealing with the injury directly, for the archer's own benefit. Handled properly, injuries do not necessitate extended lapses in training or a shortened competitive season. But if the coach and/or archer refuse to recognise the importance of the injury, long-term damage will result. Often the only remedy then will be complete cessation of training and shooting for an extended period of time.

Let us look at some major sport-specific concerns.

### 1) Sore fingers

Excessive torque in the string hand leads to blisters, burning and calluses. There are three major form-related habits that produce these problems.

- a) The first cause is the initial placement of the fingers on the string. The third finger may not sit squarely on the string, but more toward the tip of the finger. Calluses will develop on the outside edge of the fingertip since disproportionately more weight sits on a smaller surface area of the finger. Why does this happen?

Sometimes the reasons are anthropometric. Compare the relative lengths of the three fingers of YOUR string hand. Are the index and ring fingers fairly similar in the length? Some people's ring finger is very much shorter than the middle and index fingers. Physically, the archer can

not place the third finger squarely on the string with all fingers in the distal joint as taught in beginner archery.

Another cause is the shape of the lower jaw. Look at the shape of your own jaw in a mirror. Some people have square jaws, but others have more oval or even pointed jaws. For those archers using a low anchor, the alignment of the hand along the length of the jaw may be giving good contact, but if the jaw line is not square, the anchor position draws the hand and elbow upwards. This may not allow the third finger to hold on to the string securely.

For some archers, the movement of skin against subcutaneous tissue in the fingers may cause skin pinch around the string. Some people have fleshy finger segments, which tend to get trapped and pinched against the string. This will develop a painful blister proximal to the joint.

b) The second instance of torque usually occurs as the archer is pulling to the anchor position and completing the shot. Compound shooters with a high anchor will alter the hand position in order to achieve a consistent position on the face. With a high anchor on the face, there is less room for the fingers or hand to make contact on the face without distortion of the string and/or the face. The high anchor often leads to rotating the wrist area away from the face resulting in torque or “dog leg” in the string

Finger shooters may experience sore fingers as a result of pronating the wrist (turning the wrist away from the face) at release. It is this torquing of the string that causes the finger soreness.

c) Another cause of sore fingers is general tension in the string hand while the bow is drawn and held. Soreness can result from excessive contact of the fingers with the arrow, from the back of the hand being cupped at full draw or a rotation of the wrist in the anchor position. When any of these form habits occur, the archer actually rips the skin while trying to perform a clean release.

### Preventative Strategies - Form analysis

The solutions are obvious, but the correction to the archer's form will not happen quickly. The archer will complain of awkwardness. Also, archers who have shot with a fairly consistent torque on the string may be loath to change what appears to be a “winning technique”. They would rather put up with the pain. The archer and coach together must weigh the benefits and drawbacks of staying with the existing form.

Note: When changes to existing form are decided upon, they must be incorporated very early in the annual plan. You are asking the archer to re-learn the technique. *Daily* training is required for as much as 3 weeks. Group patterns will change, distribution of the weight among the three fingers will feel different, and the drawing arm elbow position may be hard to alter. All of these

changes take time and should not be rushed. That is why all form changes should be done early in the Annual Plan.

How does the coach fix the problem? What does the coach look for?

1a (i) The relationship of the fingers and their relative length:

If the third finger is short, the string position may have to be moved proximally on the middle finger, or as it is sometimes referred to as “high” on the joint and away from the fingertips.

Another term used is “deeper hook”. This will allow the third finger joint to contact the string. Make sure that the skin on the middle finger is pulled back away from the string during the initial placement of the fingers so that there will be no pinching as the string is drawn.

The majority of the weight of the draw should be on the middle finger, then the ring finger and then the index finger in order to keep the string straight in the archer’s hook and reduce the tendency to place extra weight on the third finger. Watch to make sure that the archer does not allow the third finger to slip off the string while anchoring.

1a (ii) Assessment of the jaw line:

If the archer’s face is oval or the chin appears pointed, a shelf-style finger tab or modified tab may be required for those archers using a low anchor position. Tab modification can produce proper contact of the anchor position along the jaw line, while allowing better alignment of the elbow position behind the arrow. If tab modification does not solve the problem, or is not a desirable option, then the position of the anchor on the jaw line may have to be moved forward slightly. This will be a minimal change in order to preserve string elbow alignment with the arrow.

The most difficult change that may be necessary is the lowering of the draw elbow. By changing the drawing action of the shoulder on the string side, the full draw elevation of the elbow must come down. The elbow should not be dropped below perpendicular. The archer will feel it very awkward, even impossible, to execute at first. Use lightweight equipment if necessary. Again, using a mirror to allow the archer to see the difference will help. This change in elevation should be done in stages, since the rotator cuff muscles will be stressed differently until the new form is internalized.

1b (i) Rotation of the fingers during draw and anchor:

The position change of the fingers on the string is usually undetectable to the archer. Using a mirror to show the archer the problem, the athlete can usually fix the problem without the

coach's help. The coach only needs to draw the archer's attention to WHEN the rotation is happening and what the anchor position should look like at full draw. Have the archer pay attention to the feeling, usually a stretch along the forearm, as the new position is achieved. This is critical. The archer will not be able to see the new position during regular shooting, and so must visualize it and feel it without prompts or external cues.

Note: Rotation may diminish with a "deeper hook".

#### 1b (ii) Torque upon release

In most cases, the premature relaxation of the wrist joint upon release produces a sideways motion off the string, which can cause finger soreness. The coach must reinforce that the archer's forearm position, or pronation, remains the same from pre-draw to follow-through.

#### 1c Tension

Even with advanced archers, the coach should not over-look basic technique. Check for arrow pinch at full draw, just as you would for a beginner.

If the archer has been looking after equipment concerns, ensure the string's middle serving is thick enough to keep the arrow placement securely on the string while the archer is aiming.

Some archers mistakenly believe that the string should be held near the fingertips in order to get a quicker release. This is not true. The "cupped" position the hand assumes when this is done is totally inefficient for consistent performance. If the archer can not hold the string effortlessly with the back of the hand "flat", the bow's draw weight is too great. The archer may have forgotten basic technique and is using biceps, wrist flexors and finger flexors rather than back and shoulder muscles to execute the shot. Archers using a clicker tend to have this problem as well due to the mistaken belief that it will help them "get through" the clicker faster. In effect, the cupped hand is shortening the overall draw length that the clicker has been measured for in order to activate properly when anchor and sufficient core strength have been achieved to draw the arrow through the clicker and complete the shot process.

Finger numbness may occur and is not always avoidable. If the archer's nerves tend to lie close to the skin's surface naturally, the nerves will be pinched every time the archer draws the bow. Temporary nerve damage is a possibility. Feeling will return to the fingers usually in the off-season.

#### Modifications:

The type of finger tab used can help relieve soreness and numbness. Through experimentation, the archer may find that a certain material or number of layers incorporated into the tab reduces the pain without sacrificing performance. In no way should the tab interfere



with the archer's grip depth or anchor position. The coach should record group size in the target while experimenting to ensure certain tabs, which feel comfortable, do not create an accuracy problem.

Adding finger protection without altering the tab can be achieved by layering elasticized tape to the injured fingers or wearing a thin glove on the finger, secured around the wrist. *These strategies should be viewed as temporary solutions until form changes reduce wear and tear.*

## 2) Bowarm shoulder and elbow pain, lower back pain, upper back pain, and pain during the draw

### a) Bowarm shoulder and elbow

Tournament anxiety can produce physical stress in some archers. Certain muscle fibres of the trapezius can become taut. In particular, the band of muscles running from the back of the neck to the shoulder seems quite susceptible. Some archers keep these muscles flexed and tense for extended periods of time. Eventually the rotation of the archer's head to achieve the proper anchor position will be hard to duplicate. This in turn will affect perception, string alignment and pulling ability. The coach needs to teach greater biofeedback skills to the archer and relaxation strategies during tournaments in order to reduce this tendency. (See Chapter 3)

Chronic bow shoulder and elbow injury can result from:

- Needless hyper-extension of the elbow joint
- Insufficient strength to control the bow's total mass weight at full draw without hyper-extension of the elbow or elevation of the humerus in the shoulder girdle

The coach must assess whether or not these are equipment-related concerns. (See next section)

### b) Lower back pain

After a medical assessment to make sure there is no bone misalignment or a disk problem causing the pain, assess the archer's shooting stance and clothing. People, for fashion reasons or "comfort", insist on training in clothing and footwear that is harmful to the body structure. Shoes and heel height damage the body's natural balance by rotating the hip joint out of the center of gravity. This causes lower back stress. Belts, or pants with tight waistbands, pull on the hips and change the natural hip position. Again, very simple things can affect an elite competitive archer's ability.

If the archer does complain of lower back pain, an analysis of the archer's posture and degree of body lean will be required. Having a forward lean "into the bow" at full draw may reveal that the archer does not have sufficient torso strength to hold this position. That "stretched-out" feeling or need for string clearance may have to be sacrificed for a healthier body alignment. Strengthening exercises, for this area of the body, are required. Stomach and back muscles should be of equal strength. Hip flexors and hamstrings must be conditioned also. Flexibility in

the hip joint is often over-looked but essential. These exercises should be incorporated into the annual plan as early as possible. Maintenance will be important during the competitive phase.

### c) Upper back pain

Scoliosis caused from over-shooting without proper strength training causes the greatest amount of pain. If the archer relies solely on the pulling ability of the string hand instead of working both shoulders and the lower back during the draw, the likelihood of shoulder injury increases dramatically. Even if the archer's form may be correct, in sheer number of arrows shot without corrective exercises, this problem has become chronic. Exercises to "over-train" the weaker side of the spine may reduce the discomfort. Professional help may be needed.

### Preventative Strategies

- Make sure the archer has good basic posture with and without the bow. If the archer slouches normally in life, the coach likely will see this habit transferred to the shooting stance. The archer should stand up tall, have equal weight over the arches on both feet, and be able to maintain this body position during the draw, anchor and follow-through segments of the shooting process.
- Make sure the archer understands that both shoulder girdle muscles must be engaged BEFORE the bow is drawn. Particularly for compound shooters, the shoulder muscles and core muscles of the torso (front and back) must be active and strong before the draw reaches the peak weight position of the cam(s).
- Be analytical and take nothing for granted when you start working with an archer. Re-assessment prevents new problems from starting. Muscle force and balance must occur equally on both sides of the spine in the shooting position.
- Proper *individualized* form can prevent injury. For most archers, neither "basic" archery form, nor "the winner's form" will work.
- A complete physical training programme should be part of every archer's Annual Plan. The archery coach should include exercises which will target muscle groups particularly vulnerable to stress and imbalance for each individual.
- The archer should warm-up and warm-down properly and sufficiently during every training session and competitive event.

### 3) Rotator Cuff Injuries

The action of drawing the bow puts the shoulder into a precarious position. The head of the humerus can not fit exactly into the shape of the shoulder joint. Lack of sufficient muscle strength in deep torso muscles, shoulder girdle muscles and/or biceps and triceps can increase the likelihood of injury.

This is discussed in detail in the Biomechanics section in Part II of this chapter. Improper drawing technique into the anchor position can increase the risk of injury. If this should be amplified by poor equipment selection, the archer could suffer a career-ending injury.

Review the exercises below that were designed specifically to strength the Rotator Cuff.

## Specific Exercises For The Rotator Cuff

### External Shoulder Rotation

**Major muscle groups:** Rotator Cuff - Posterior Deltoid

This movement is usually weak and should be stressed. Hold elbow close to side. Hold hand in toward stomach. Rotate hand as far away from stomach as possible

### Internal shoulder rotation

**Major muscle groups:** Rotator Cuff- Pectoralis Major – Latissimus Dorsi - Terres Major

This is normally a very strong movement.

Hold hand out to the side with the elbow tucked in; move the hand through a full arc toward the stomach.

### Internal / External Rotation at 90 degrees

Perform an external or internal rotation, but raise the elbow 90 degrees from the side. Use either pulleys or dumbbells when performing this exercise

### Posterior Flys

**Major muscle groups:** Rhomboids - Middle Trapezius - Posterior Deltoid

This exercise helps archers improve the draw part of the shooting motion.

Lie on bench. The hands are in front and under the bench. Lift the weights out to the side. Pinch the scapula together and pull in toward the midline of the back. Return to starting position.

### Lateral Raises

**Major muscle groups:** Middle Deltoid - Supraspinatur

Stand or sit with hands at side, and hold dumbbells with thumb facing down. Raise hands from sides, keeping thumbs pointed at the floor until the hands are at 90 degrees; then slowly lower the hands to the hips.

### Diagonal Pull Downs

Stand, and extend the arm over the head. Grab the high pulley, and pull the arm down across the body to the opposite hip. Return to the starting position.

Still holding the same pulley, turn a full 180 degrees so that the arm is extended over the opposite shoulder. Pull the arm down and across the body to the opposite hip.

### Diagonal Pull Ups

Start with the arm at the side. Grab the bottom pulley and pull it up and across the opposite shoulder.

**Note:** If no pulleys are available, both pull ups and pull downs can be done with dumbbells. Lie on back, and hold a dumbbell in one hand. Start with the arm over the head, pull the arm down and across the opposite hip, and return to the starting position. Then, start with arm extended over the opposite shoulder, pull down and across to the opposite hip, and return to the starting position.

### **Equipment-related injuries**

a) In order to control the bow, archer strength must be greater than the bow's total **mass** weight. This is a major concern for young compound shooters who have few choices in high performance bows. Most chronic spine injuries can be traced back to too much bow weight either in the bow itself or by adding too much stabilisation weight. Shoulder, elbow and lower back problems result from the archer trying to keep the bow steady in the air while aiming.

Injury can result from poor equipment selection and the coach will see that the archer:

- Is unable to control the bow's mass weight at full draw without hyper-extension of the elbow;
- Can not draw the bow without a shift in the torso/hips
- Can not draw the bow without elevating the bow shoulder out of line with the arrow

#### What should the coach do?

Check to make sure the archer can hold the bow without rolling the elbow joint inward and locking it. Shed any unnecessary weight until the bow can be controlled at full draw throughout the practice session or tournament.

b) Archer strength must be greater than the bow's **draw** weight. Particularly in compound bows, peak weight must be controlled without distortion to the upper body, hip movement or "sky-jacking" (the archer is unable to draw the bow while pointed at the target). Chronic shoulder injuries result from excessive draw weight. Scoliosis of the spine can result as well.

#### What should the coach do?

If the bow can not be drawn, aimed and released with the body in both shoulders aligned behind the bow, then the draw weight has to be reduced. Insist on strength training in the annual plan. If the archery discipline requires a relatively high bow weight in order to complement archery form, increases must be incorporated into the plan slowly. Extra equipment expense may result.

The coach must plan additions to draw weight in the annual plan, but this may have to wait until after the competition phase is complete for the season.

Large jumps in bow draw weight for recurve shooters (over 4-6 pounds) should be avoided. They can cause injury. The process must be gradual, and tailored to the physical abilities of the individual. Top-of-the-line recurves have a small adjustable draw weight, which allows for a more gradual weight increase than was available previously.

A one-half turn on each limb bolt (approximately 1.5 pounds on most bows) per week for compound shooters will not affect performance or cause injury.

c) Bow slings, which allow the bow to travel too far out of the hand on follow-through, can give the elbow a snapping action. This can develop into tendonitis. (Tendonitis means the tendon has become inflamed.) This problem can occur also in supraspinatus and subscapularis. By reducing the bow sling length, the bow reaction is restricted. This takes pressure off the elbow joint as the bow moves out of the hand.

d) Stabiliser number and positioning, with their relative mass weight displacement, have changed over the years. Some of these changes actually caused injuries. The purpose of stabilisation needs repeating. *Stabilisers should reduce torque in the bow and assist archer form, making the bow easier for the individual to control, not for the current world champion.* The coach should ensure torso and leg strength exercises are included in the Annual Plan to support the upper body's work.

### **The Chronically-Injured Athlete**

There is another, personality-related reason, why archers get injured. It has nothing to do with fitness, form or equipment. It has to do with personal expectations and fear.

Look for:

- the archer who tries too hard and the archer who boasts about shooting through injury as a sign of masculinity or desire to become the “martyr”
- the over-achiever with masochistic tendencies
- the archer who uses injury as a weapon against the coach or parent (inability to cope with competitive stress at the elite level)
- the archer who uses injury in order to escape from the rigors of the tournament or training plan
- an archer who walks into a medical centre, complaining of pain, but its source can not be located (psychosomatic injuries) and,
- “painless” injury to avoid competition.

In all the cases listed above, the archer uses injury as hiding or attention-getting mechanisms. Sometimes the coach will be hard-pressed to understand the underlying reasons for such behaviour. Honest discussion of feelings and perception between athlete and coach is the only approach to take. It may be too late in the archer's personality development to eliminate this behaviour, but the coach should try to establish reasons why they exist and counteract these tendencies if at all possible.

### **Rehabilitation**

The injured athlete suffers both physically and mentally. With the help of sport specialists, the archery coach can speed up the recovery process. The Annual Plan will need to be adjusted. Depending upon the amount of time off from training, the coach may need to repeat the pre-

competitive phase, reduce bow weight, re-tune equipment or completely scrap the competitive season. The most important thing to keep in mind is the athlete's recovery. Yes, some tournaments are very important, and special, viewed as once in a lifetime. But the archer's long-term recovery and safe return to competition should be the only goal the coach has in mind. For more information on this topic, the archery coach is encouraged to take the NCCP's module "Prevention and Recovery" in the Competition Development context.

### Ice versus Heat

Ice has been a highly successful treatment in archery-related injuries. The quick-thinking, prepared coach can apply ice to skin injuries. However, ice is beneficial in reducing inflammation and muscle stiffness, too. Ice will control the amount of blood entering the injured area without rupturing the tiny capillaries, which are trying to repair the torn fibres. Ice packs wrapped in a towel or triangular bandage should be applied directly after shooting occurs in shifts of 15-20 minutes on, 15-20 minutes off for at least one hour. Massaging with the ice pack is helpful also. If the archer plans to shoot again that day, for example after a lunch break at a tournament, ice should not be applied 20 minutes before shooting recommences. Manual massage and a slow, complete warm-up should take place during this time. Icing down after competing may be necessary on a regular basis. Make sure the archer is prepared for this and is self-disciplined enough to apply it every time, too.

Heat usually does not allow blood to flow to the injured in a controlled manner. More damage in fact may result when heat opens the blood vessels quickly and allows too much blood to surge into the area. Application of heat should be at a low temperature and clothing should be worn to protect the skin. Heat can be used over an extended period of time this way. The best treatment times are found to be 20 minutes on and 20 minutes off. After this, the effects are lost unless a very low temperature is used. One should never sleep with heat on. Some lineaments in oils or creams may soothe the affected area. Massage is an important factor when applying lineaments.

### **Therapy**

The archer will be faced with recovery and regeneration of muscle strength, stamina, speed of contraction, flexibility and control in the damaged area(s). Depending upon the severity of the injury, the process could be quite long. Range of motion, without pain, must be achieved first. Muscle control, particularly in a fine-motor sport, may return quickly, but strength of contraction and muscular stamina will take longer. Modifications to the annual plan will have to be made to suit the individual's recovery rate, not some arbitrary time frame.

The archery coach may not feel qualified to help the archer recover quickly and safely. If a sports specialist has recommended treatment or exercises, the coach should monitor the archer's adherence to the schedule. The exercises need to be performed properly, too, or further injury could occur.

### ***Psychological Recovery***

Disappointment, anger and frustration usually result when injury affects the competitive season. The archery coach must counsel the archer to overcome these normal feelings. Include the archer in club or team events and activities. Bring the archer to tournaments and give the archer something meaningful to do.

But, more than anything else, the coach must be a good listener. Get the archer to express the feelings inside. The archer can speed up the return to shooting by releasing any negative feelings, assessing them, and replacing them with positive thoughts about recovery.

A positive attitude is essential. Visualising the healing process happening in a very detailed manner can assist the archer through the rehabilitation period. This would be a good time to increase the number of mental training sessions and the sophistication of the mental simulations used in each session. Recovery time for co-ordination (timing) as well as good form will be faster if the archer imagines arrows shot correctly over and over again. This will help maintain muscle memory.

### **TASK #6: *Application of the Theory: Assessment of Possible Injury caused by Archery Form***

Watch the videotape provided during the workshop using Dartfish or Kinovea (free) software. List the possible injuries, which could result, if this archer's form is not corrected in your workbook pg. 116.

### **REVIEW THE PLAN**

Slate in times during the Annual Plan when the following tasks will be done:

1. Evaluation of form/technique
2. Changes to equipment a) bow weight increases b) mass weight increases

Be sure that increases in bow weight and/or mass weight do not conflict with increases in resistance training levels. Remember to keep evaluation of form in the earlier phases of the plan, and re-evaluation on a regular basis. Discuss your choices with the workshop Facilitator.

## v) Nutritional Demands

It is expected that the ARCHERY CANADA coach candidate has completed successfully the NCCP's multi-sport Competition - Introduction multi-sport workshop module "Basic Nutrition". This chapter reviews that course material only as it applies to archery.

### Defining the Activity

With the exception of Ski-Arc, the sub-maximal activity level of all other archery disciplines infers that, generally, archers need nothing more than a balanced diet, proper hydration and moderate consumption in order to perform well. The caloric intake level should reflect the sub-maximal nature of the sport. A good diet and sufficient intake of fluids are important for health, growth and maturation, and may also have a significant effect on the ability of your athletes to train and perform well in competition. Maintaining good dietary habits plays an important role in establishing a healthy lifestyle. This may also help athletes perform to their best and promote faster recovery, for example when there are several sessions or competitions on consecutive days.

*Quality* caloric intake is a coaching concern. The average archer's intake of proteins, lipids and carbohydrates is excessive for the energy requirements while there tends to be a deficiency of vitamins A and B1. The problem is not due to lack of information. The average Canadian archer has access to popular magazines on health and fitness for information on nutrition. School children, archers and archery coaches have the traditional "Canada Food Guide" to follow and basic charts such as the one listed below. Junk food and excessive volumes of food are rampant problems in our Western society and combine to make many archers obese. On the other hand, those archers striving to control their weight may suffer performance decrements because of "crash" or fad diets, which leave the body to perform with a poor or insufficient energy base. Those archers who rely on food supplements to give them a perceived advantage may be ignoring basic nutritional guidelines while receiving minimal benefits.

*The archery coach* should be able to *apply* basic nutritional theory to assist the elite archer. The coach should have an introductory level knowledge of healthy diets, supplements, weight-reduction plans and tournament strategies for hydration and nutrition. Finally, the coach should prepare the archer for travel and food differences since the provincial-level archer will start to travel further a-field to compete. This chapter is not trying to make you an expert in sport nutrition! You will find information and simple, practical recommendations about diet and hydration before, during, and after activity, both in practice and in competition. These recommendations will help you inform and influence your athletes and their parents on

- the importance of a good diet and hydration, and
- (2) how to put in place simple steps that will be useful for both the general good health of the athletes and their performance.

Specific challenges like weight management, special diets, commercial products, combining foods based on their glycemic index, vegetarianism, and eating disorders are well beyond the scope of this chapter in conjunction with the NCCP Multi-sport module on Nutrition. If you have



questions on these topics, or if you are not sure what to recommend in certain situations, do not hesitate to consult an expert in sport nutrition.

Be aware of how much influence you can have on your athletes and their parents, and avoid making comments that could be misinterpreted, for example on an athlete's weight or size. If you are not an expert in sport nutrition, avoid giving advice on how to lose or gain weight. It could do more harm than good. It would be useful to consult an expert.

For more information on sport nutrition, consult the following page of the Coaching Association of Canada website. The Sport Medicine Council of Canada produced a very good resource available, to both the coach and the athlete. The Sport Nutrition Advisory Committee produced "Sport Nutrition for the Athletes of Canada" (SNAC). It is a fun and interesting way for the coach and the athlete to learn about nutrition and design a better diet.

### A Balanced Diet

The following information is provided as a guideline for the coach to use. Some archers will desire more from one food group than from another. This is quite normal. The coach should monitor the archer's diet to ensure that a minimum number of servings in each group are ingested every day. The coach can do this formally or through casual observations recorded in the coach's diary/logbook. Review the Canada Food Guide on the following pages with your archer.

An athlete's diet must be well balanced, supplying adequate energy and nutrients for optimum performance and providing for the repair and maintenance of tissues and for growth.

However, athletes should pay attention to the following:

1. Eating a variety of foods — foods from each group should be eaten every day (grain products; vegetables and fruits; milk products; meats and alternatives).
2. Sufficient energy intake — there must be adequate dietary intake to meet the energy demands of training, competition, and body weight maintenance. Energy requirements vary according to age, gender, body composition, and amount and type of physical activity (related to exercise intensity and volume). In general, judged sports, such as archery, gymnastics, diving, skating, and equestrian require less energy than endurance events like triathlon, swimming, cycling, cross country skiing, road racing, speed skating, etc.
3. Sufficient carbohydrate intake — provided by the "grain products" food group, carbohydrate is the main energy source athletes rely on in most sports. Whether they are involved in high-intensity, short-duration events or in endurance events, athletes use carbohydrate as their main source of energy. Carbohydrate stored in muscles can be depleted after 75 – 90 minutes of moderate to high-intensity activity.
4. Sufficient fluid intake — the need for water increases during exercise because of the loss of fluid caused by sweating and increased ventilation. This is important for all sports, as dehydration can lead to a marked decrease in performance.
5. Sufficient protein intake — an athlete requires slightly more protein than a sedentary person to provide for adequate maintenance of muscle mass and repair of tissues.

Points to remember when reviewing the archer's dietary habits:

1. During certain stages of growth and reproduction, the need for calcium and vitamin D is greater than at other times.
2. Energy requirements are high during the teenage years.
3. Extra Vitamin C from the Fruits and Vegetable group can not make up for the shortage of Vitamin D that occurs if the Milk and Milk Product group is neglected.
4. Calcium needs are highest during growth spurts. Some foods made with milk contribute to calcium, but do not contain enough milk to qualify as a full serving.
5. Bread and Cereals are an inexpensive source of carbohydrates, proteins, iron and several B Vitamins if chosen correctly.
6. All white flour is enriched with thiamine, riboflavin and niacin. This means all commercially baked and home-baked goods contain these nutrients.
7. Cantaloupes, strawberries, citrus fruits and vegetables such as broccoli, green peppers and Brussels sprouts are excellent sources of Vitamin C. The coach should be aware that these vegetables might cause intestinal gas build up that the archer might find uncomfortable.
8. Orange, yellow and dark green vegetables and fruits have carotene that is converted into Vitamin A by the body.
9. Prunes, raisins, apricots, peas, beans, broccoli and green leafy vegetables are sources of iron. Over-cooking can destroy these benefits.
10. Potatoes provide Vitamin C, folic acid, thiamine and fibre.

11. Out of the 35 amino acids the body needs each day, 12 of them must be ingested through food. The body will not be able to make the other acids without this base group. Digestion of proteins and fats will be curtailed.

<b>Food Group</b>	<b>Recommended minimum servings for an archer</b>
<b>Grain Products</b>	Minimum of 6 servings
<b>Vegetables and Fruit</b>	Minimum of 7 servings
<b>Milk Products</b>	3-4 servings
<b>Meat and Alternatives</b>	Minimum of 2 servings
<b>Oils and Fats</b>	Minimum of 30 to 45 mL (2 to 3 Tbsp) of unsaturated fat
<b>Other Foods</b>	Minimize – there just isn't room for extra energy coming from foods that are not nutrient-rich

#### Changing Lifestyles

Archers, like other people, have certain food preferences that they establish over the years. For the mature archer, it may be difficult for the coach to change eating habits or meal composition. For the younger archer, it may be difficult for the coach to change the traditional family cooking habits and meal complements. Regardless, the coach should advise the archer of nutritional pitfalls and suggest simple alternatives when diet adversely affects performance/health.

#### Suggestions:

For proteins, the archer could try macaroni and cheese, whole grain cereal with milk, baked beans and bread, beans and rice, casseroles in which one or more animal protein combines with beans, pasta or rice. This is not too difficult or expensive a change to make.

A steady diet of meat could be augmented with poultry, white-fleshed fish, skim milk, cheese and vegetable proteins such as dried peas, beans and lentils. All of these are inexpensive alternatives.

Snack foods that provide nutritional quality without adding greatly to caloric intake include: milk, yogurt, cheese, raw fruits and vegetables, sandwiches, hard-boiled eggs, unsweetened fruit juices, vegetable juices, tossed salads, crackers and muffins. Peanuts, pistachios, and mixed nuts are also healthful snack foods but have higher caloric value.

The biggest challenge is making lifestyle changes that can last throughout the archer's career. Just as fad diets capture people's interest for a few weeks or months, the archer's commitment may wane with time. Be prepared for this.

### Nutrition and Tournaments

Breakfasts can be anxious times for coaches and archers. Most tournaments start quite early in the morning. Travelling to the tournament site must be included in the morning's preparation time. The coach should have alternate plans for the archer to have breakfast if mornings are rushed. Large breakfasts should be avoided as they take too much time to digest (2-4 hours). The archer may complain of stomach pains or no appetite in the morning. The archer may enjoy a milkshake-type instant breakfast, which can be substituted for solid food. In some instances, archers will experience nausea and vomiting. If this occurs regularly, a psychological assessment of stress factors might be in order. In the meantime, make sure the archer stays hydrated.

The Best Choices when Breakfast is the Pre-Event Meal:

Cereal — with low-fat milk	Yogurt — low-fat, plain or fruit	Fruit
French toast and/or pancakes – with no added butter or margarine	Egg dishes — not fried	Ham or steak — if lean/not fried (small amounts)
Potato — not fried	Rice — not fried	Noodles, pasta
Toast — with limited amounts of butter/margarine	Muffins — try jam or jelly, not butter	Beverages: bottled water, fruit juice - fresh, canned, cartons
Skim milk	Ovaltine	

The following foods are high in fat, difficult to digest, or nutrient poor for breakfast:

Whole milk, cream	Fried eggs	Side bacon, sausage
French fries, hash browns	Fried rice	Cream or butter sauces
Doughnuts & Danishes	Pastries & Croissants	Butter, margarine

On a competition day, the aim is to ensure proper hydration and sufficient energy to allow the athlete to meet the demands of the activity. As a result, the focus should be on ensuring that:

<input type="checkbox"/>	the amount of food consumed is appropriate given the type of effort to be performed
<input type="checkbox"/>	the majority of food ingested is carbohydrate
<input type="checkbox"/>	the fat content of the food ingested is low, because it is slow to digest
<input type="checkbox"/>	enough water is drunk

### Recommended Foods - General

During tournaments nutrition and hydration are very important. Advanced preparation is crucial, particularly for field and 3D. Either the archer or the coach, or both should plan portable, well-balanced snacks and refreshments so the archer never feels hungry during the day, or bloated because too much was consumed. Light lunches of salads, sandwiches and fruit with water would be preferable to burgers and fries. And, the archer should try to eat foods at tournaments, which match those eaten at home or during training. Travelling to exotic places may be exciting, but the archer may have to bring familiar foods from home, in order to keep a balanced diet with enough caloric intake.

The pre-event meal must be high in carbohydrate (65-70% of total calories consumed). Fat and protein, which take longer to digest, should be consumed in smaller amounts. For instance, pasta, rice, cereals, potatoes, bread, low-fat granola bars, and dry cookies are all appropriate, as they are easy to digest and absorb.

Since pre-competition “nerves” can upset the stomach, athletes should be familiar and comfortable with the food. They should have tried it before, preferably in pre-exercise or training conditions. This is not always possible. Also, if the archer must eat restaurant food, the preparation may be different from home-style cooking and this could lead to discomfort.

The Best Choices when Lunch or Dinner is the Pre-Event-Meal before competition or training:

Fruit and vegetables, fruit and vegetable juices — fresh, canned, cartons	Meat, fish, poultry — broiled, roasted, baked, barbecued, poached (reasonable portions; trimmed fat; skin from chicken removed)	Meat alternatives — beans, peas, and lentil dishes if these are familiar foods; gas produced when these foods are not part of the usual diet can cause discomfort.
Soups — broth-based	Vegetables — steamed, boiled, baked	Cold cuts — turkey, chicken, lean beef, lean ham (reasonable portions)
Potatoes — baked, boiled, mashed (without butter/margarine)	Pasta — plain or tomato or vegetable sauce	Bread — rolls, crackers, all breads
Rice — steamed, plain	Noodles — plain	
Salads — bean, peeled fresh vegetables, fruit salad, low-fat cottage cheese (small amount of dressing)	Desserts — fruit, yogurt (low fat), custards, puddings	Cheese — in moderation

Foods to Avoid or Limit before competition or training because they are high in fat or nutrient poor:

Protein-rich food, because they are slow to digest and are not needed as fuel during exercise	Alcoholic beverages such as wine and beer, because they can have a dehydrating effect	Cookies, crackers, chips, granola bars
Cream soups	Fried fish, meat, poultry	Buttered, sautéed, creamed vegetables, or soufflés
Fried potatoes	Butter or cream sauces	Salad dressing
Pâté, sausages, processed meats, liverwurst	Potato and macaroni salad, creamy coleslaw	Pies, ice cream, pastries

#### Foods to be Wary Of

The following foods are not well tolerated before competition or practice and should therefore be treated with caution:

Spicy foods may be difficult to digest before exertion.  (When travelling in other countries, athletes can bring a few favourite spices if they are already used to them.)	Fibre-rich foods like whole-grain bread, cookies, whole-wheat cereals, and dried fruits (prunes, etc.) stimulate digestion and induce elimination. These foods should be avoided <i>before</i> exercise, especially if the athlete has diarrhoea.	Gas-producing foods like cabbage, broccoli, onions, and carbonated drinks make some athletes feel bloated.
Coffee, tea, cola, and chocolate may cause diarrhoea, which can have a dehydrating effect.	Alcoholic beverages can impair performance and have a dehydrating effect. In archery, alcohol is a banned substance.	

#### Digestion Period

The meal size and food choices will vary depending on the time between eating and performing. Athletes must allow sufficient time for digestion. High kcal meals, especially those high in fat content, take longer to digest than lighter snacks.

The guidelines below should be used when planning meal times relative to a training session, a competition, or a series of competitions held on the same day. Coaches should be aware of individual tolerance levels for food. Experiment with these guidelines in practice to establish an appropriate protocol for each athlete.

MEAL SIZE	APPROXIMATE CALORIC VALUE	TIME TO ALLOW FOR DIGESTION
large	500-800 kcal or more	3-4 hours
smaller	300-500 kcal	2-3 hours
small snack or blender/liquid meal		1-2 hours, or whatever the athlete's own tolerance indicates

If the athlete will be competing within the next 2 hours, small quantities of carbohydrate are the best choice: fruit, beverages, low-fat crackers, bread, yogurt, and/or well-cooked pasta. The athlete should also drink plenty of water. (When the athlete is travelling, bottled water should be used.)

Snack Suggestions during a tournament include: peanut butter sandwich on whole wheat bread, bananas and other non-messy fruit, vegetable juice, water, nuts, dried fruits, crackers, unsweetened fruit juices, bran muffins and granola bars (without chocolate).

The following suggestions apply to food served in cafeterias/restaurants or prepared for bag lunches taken to sport venues:

- Hot dishes (e.g. meat, casseroles, rice) should be served hot (not warm).
- Cold foods (cold cuts, salads, milk, dessert, sandwiches) should be served cold (not warm).
- If the meals at the venue have NOT been refrigerated, do NOT eat salads prepared with mayonnaise (e.g. macaroni, potato, or creamy coleslaw) or egg-based dishes (including custards).
- Foods should be served either hot or cold, and should be consumed within one hour of preparation.

### Hydration

The average person needs to take in at least 1.4 litres of water per day just to counteract the normal amount of water loss during a 24-hour period. Increased physical activity or higher environmental temperature will increase the volume required to maintain the right amount of fluids in the body. Water replacement is necessary when sweating occurs.

Dehydration occurs when the athlete does not drink enough fluid in time to replace what has been lost. The archer and coach must determine how much fluid and electrolytes are actually lost during a performance. Archery, except for Ski-Arc, does not demand the same energy requirements as other activities. Examples of archery activities, which require re-hydration strategies, are Ski-Arc, field tournaments, and target events shot in hot, humid conditions.

## Effects of Dehydration on Performance

Some Canadians have experienced the side-effects of dehydration when competing in warmer climates in the Americas, Europe and Asia because the core body temperature went above acceptable limits during exercise. But, even if the archer is travelling to areas within Canada for the first time, special attention should be paid to this nutritional area in order to avoid poor performance. Dehydration is associated also with premature fatigue.

Ironically, dehydration reduces the capacity of the digestive system to absorb water. Archers should not wait until they are dehydrated before they drink, as this slows re-hydration and causes gastric cramping. It is well established that the sensation of thirst is not a good indicator of an individual's level of dehydration. When thirst manifests itself, approximately 2% of body mass has already been lost. Consequently, one cannot gauge dehydration by referring to the sensation of thirst. During exercise, it is important to drink on a schedule rather than according to thirst. If thirst were the only point of reference used for determining fluid needs following profuse sweating, re-establishing optimum hydration could take 24 to 48 hours.

### Drinking Fluids before Activity

Archers should drink plenty of fluid every day, particularly before a practice session or competition. Archers who are well hydrated have the following characteristics:

1. Sweating that starts sooner and is more abundant
2. An enhanced rate of absorption of the fluids consumed during exercise

In practical terms, this means drinking 1.5–2.5 cups (400–600 ml) of fluid 2 to 3 hours before exercise. This allows time for excess fluid to be excreted as urine before the exercise starts.

To ensure complete hydration, drink 0.5–1.5 cups (150–350 ml) of fluid about 15 minutes before exercise.

### Amount of Fluids to Drink during Activity

Archers should drink enough fluid to maintain fluid balance throughout the exercise. The amount of fluid an individual can tolerate during exercise varies from one person to another, but usually ranges between 10 and 15 ml per kg of body weight per hour.

Body weight (kg)	Approximate quantity of fluid absorbed by the body in one hour (ml)	
	from ...	to ...
30	300	450
40	400	600
50	500	750
60	600	900
70	700	1050
80	800	1200
90	900	1350



Rather than drinking large amounts of fluid at one go, it is better to drink 0.5–1.5 cups (150–350 ml) of fluid every 15 to 20 minutes, or as much as one can tolerate without feeling any discomfort.

Athletes rarely consume enough fluid to maximise the absorption capacity of the digestive system or to balance fluid losses. Increased fluid intake during exercise will improve fluid balance for most athletes.

#### Precautions

To encourage athletes to drink plenty of fluids bring several bottles or containers of water or sport drinks. For reasons of good hygiene, do not allow them to share bottles or containers with other people.

What should the archer drink?

Hydration is important before the event begins, then drink fluids 10 - 30 minutes after the event begins. If the event does not allow for “bathroom breaks” the archer and coach must work together to judge how fast the archer’s stomach empties and how much water the kidneys re-absorb. Otherwise the archer will have a full bladder too soon in the event.

Cold fluids do not speed up this process any faster than lukewarm or hot ones do. The coach should experiment to find the temperature that quenches thirst without causing stomach cramps. Lukewarm fluids are recommended for Ski-Arc activities. In winter activities drinks with 13-15% carbohydrate are recommended since sweat loss is not as great. However, most archers require only water or mixed fruit drinks of low levels of carbohydrates, sodium, vitamins and glucose electrolytes in extreme conditions. Sometimes mineral water is all that is required.

In summary, it is constant re-hydration that is important in archery, not so much the popular “sport thirst quencher” of the day, since archers generally are performing at sub-maximal cardiovascular levels. Sport drinks containing carbohydrate are recommended for activities *lasting more than 60 minutes without interruption*. When exercise lasts less than one hour, consuming a sport drink will probably not improve performance significantly. In this circumstance, drinking water should be adequate unless it is hot and humid, in which case a sport drink is recommended. Therefore, the coach and archer must agree that the athlete will drink as often as the coach feels necessary depending upon the environmental circumstances and difficulty of the event course.

Recent studies show that children’s consumption of fluids is increased when drinks contain carbohydrates (40–80 grams per litre) and *a little* sodium. It is suggested that the coach encourage this type of drink rather than plain water to ensure that children take in enough fluids when they exercise in hot weather.

#### Re-hydration after Activity

After an exercise where sweating has been profuse, it is extremely important to replace fluid. This sensation of thirst is not a good gauge. Consequently, forced hydration is often necessary. The colour and amount of urine are an easy way for athletes to monitor their dehydration level.

Scanty, dark urine signals a need for more fluid, in which case athletes should force themselves to drink more fluids. Plenty of clear-coloured urine usually indicates adequate hydration.

It is possible to estimate how much fluid an individual has lost during exercise by weighing before and after the activity. The difference in kg represents the amount of fluid lost, in litres, since one litre of water weighs one kg. For each kg of body weight lost, at least 1.0 litre of fluid plus an extra 0.5 litre should be consumed. It is important to drink more than one litre per kg of body weight lost to account for urinary losses.

### Strategies for Promoting Recovery

#### a) Nutrition between Competitions

When there are two or more competitions on the same day, it is primarily the time available between periods of activity that will determine the quantity and type of food consumed. The principles described in this section should be respected.

In general terms, it is better to consume snacks high in carbohydrates between each competition and wait until the end of the day to consume a more substantial meal. It is also important to ensure that athletes consume enough fluid between each event.

#### b) Recommendations for Replenishing Reserves after Activity

For rapid recovery, it is important that athletes re-fuel immediately after a practice session or competition, especially if another physically demanding event or training session is scheduled the following day.

Athletes should:

##### 1. Drink plenty of fluids.

At least 1.0 litre (4 cups) of fluid per kg of body weight lost during exercise, plus 500 ml is recommended. Refer to “Re-hydration after Activity”, for re-hydration strategies. To re-hydrate between competitions on the same day, follow the guidelines for hydration during activity.

##### 2. Consume carbohydrates soon after activity.

As soon as possible after exercise, preferably within 30 minutes, athletes should consume carbohydrates. This procedure should be repeated every 2 hours until the next meal. This allows muscle energy stores to be replenished at a faster rate than if the athlete waits until mealtime to consume carbohydrate-rich foods. Athletes usually find it easier to consume liquid carbohydrate (fruit juices, sweet drinks, etc.) rather than solid foods, since exercise dulls the appetite.

Body weight (kg)	Approximate quantity of carbohydrate to consume up to 30 minutes after activity and every two hours until the next meal-time
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Body weight (kg)	Approximate quantity of carbohydrate to consume up to 30 minutes after activity and every two hours until the next meal-time
30	45 grams
40	60 grams
50	75 grams
60	90 grams
70	105 grams
80	120 grams
90	135 grams

Examples of foods containing approximately 50 grams of carbohydrate:	Examples of foods containing approximately 50 grams of carbohydrate and 10 grams of protein:
700 ml of sport drink	300 ml of milkshake
500 ml of fruit juice or soft drink	400 g of fruit yoghurt
3 average size pieces of fruit	bowl of cereal with milk
1 large Mars bar	300 ml of liquid meal supplement
3 muesli bars	2 English muffins with peanut butter
2 pancakes with maple syrup	
60-gram packet of jelly beans or jujubes	

The meal after exercise should be high in carbohydrate, adequate in protein, and relatively low in fat. Carbohydrate-rich foods should constitute the meals and snacks that follow an intense effort; to ensure carbohydrate stores in the muscles can be replenished quickly.

Moderate amounts of salt and a few portions of salty foods should be consumed, for example, tomato or vegetable juice, pretzels, canned soup or bouillon, pickles, ketchup, soy sauce, salsa, cheese, salted nuts.

At least three portions of potassium-rich foods (vegetables and fruit) are recommended, for example, vegetables, potatoes, fruit juices and fresh fruit, dried fruit.

Think ahead: Non-perishable foods can be brought to the competition or training site if food choices are limited there.

### **Task #9 – Nutrition and Tournaments** Workbook pgs. 136 – 138

Complete scenarios A, B and C

## Supplements

It is expected that the ARCHERY CANADA coach candidate has completed successfully the NCCP's multi-sport Competition - Development multi-sport workshop module "Drug-free Sport". This chapter reviews that course material only as it applies to archery.

General vitamin supplements, which can be purchased at a local pharmacy, may ensure the archer receives the advised minimum daily requirement. This may not be sufficient to help those female archers who lack iron. Specialised iron and calcium vitamins may be required.

However, there is a greater concern to the health of the archer than general supplementation to a balanced diet. Every year or two, "wonder vitamins" or tonics or amino acids are introduced on the market.

You are not an expert in this field; consult a specialist. The coach is strongly advised to research all that is known about the supplement before the archer begins taking it. Many times conflicting research reports will be published. Some published reports come from the product manufacturer; some come from independent laboratories. In either case, in particular when dealing with young archers, a coach must be extremely cautious about findings and claims. The long-term development and health of the athlete could be at risk if supplements are administered indiscriminately.

### Drugs, ethics and archery performance

#### Defining the Activity

The world of the elite athlete is one of heightened competition and close scores. In 1981 at the FITA World Target Championships in Punta Ala, Italy, the gold and silver medal winners were decided on the last arrow by a judge's call. In 1983, first and second place was decided by number of 10's. With the match play format used at the world and Olympic levels, any archer can win or lose by one point, or closest arrow to the middle. Participants from many countries can be expected to be in contention for gold medals.

Into this tough arena an archer brings all the practiced skills, equipment knowledge and tournament experience available. However, many archers, like other top international athletes, feel that there must be something to calm the nerves and heighten awareness. This desire to have "an edge" against the competition may provoke the archer to experiment with banned substances.

Through the Olympic Oath, sports promise to uphold the rules. The Oath confirms the importance of fair play. No archer should have an unfair/artificial advantage over another. Fair Play is a great idea, but not everyone adheres to the concept. The temptation to cheat is powerful in some sports. Medals and spin-off financial endorsements lure some athletes into making the wrong decisions. When discovered, their future dreams are shattered and most likely their health is shattered or permanently altered.

The archery coach is responsible for the education and well being of the archers being trained. It is your duty to discourage any attempts, half-hearted or real, to take unfair advantage of opponents. Athletes may be able to point out others who cheat and win. It is your job to point out all those archers who win and *don't* cheat.

Socially acceptable drugs are just as harmful to an athlete's health and performance. Smoking and alcohol binges are tolerated in Western society but have negative effects on cardiovascular health and general fitness. Be a good listener when athletes discuss social drug abuse. Reinforce healthy lifestyles at all times.

Drug use in archery has been limited mainly to the use of alcohol and beta-blockers. Since both of these substances are banned, at prescribed levels, by the international archery federation (FITA), penalties are clear and severe. An athlete tested positive at a FITA World indoor Championship in 1997. The archer lost the medal earned during the event and was banned from internationally sanctioned archery events for the prescribed two years.

The coach should be aware of the pharmacological names and the brand names of the drugs on the CCES list. If you are not sure, ask your pharmacist. Over-the-counter, non-prescription drugs such as cold and allergy medications contain substances, which can produce positive test results. There is an increasing number of athletes claiming to be asthmatic in order to obtain prescriptions for certain banned substances. Make sure that any archer you coach, who really does have this condition, uses medication which is not banned or applies for a Therapeutic Use Exemption certificate, stating that it must be used. This proviso is available for other diseases as well, and must be confirmed and supported by the appropriate agencies.

Testing - Make sure each your archers know the rules and procedures.

FITA's medical committee has decreed that, at all major world Games, Olympics, Paralympics, Pan American, Commonwealth, FISU and related test events, and FITA World Championships compulsory urinalysis will take place. All medallists are required to submit to the test as well as those archers randomly selected.

The good archery coach prepares the archer for the possibility of being tested. Young archers in particular can be very reluctant to have a stranger watch the urination process. Explain the procedure in a matter-of-fact, non-threatening tone. This will go a long way to easing the archer's discomfort.

The procedure:

The selected athlete is assigned a monitor or marshal who must stay in close contact with the archer from the time the last arrow is shot until the sample is given.

The athlete **MUST** go directly to the testing area and wait until two witnessed urine samples can be given.

It is the athlete's right and responsibility to ensure that both samples, labelled "A" and "B", are properly recorded and sealed.

The archer is then allowed to leave the testing area.

Only notice of positive tests from the “A” sample will be communicated to the team leader or Chef-de-Mission for the Games. The athlete’s representative and the athlete will be required to attend the opening of the “B” sample. If both samples are found to be positive, the athlete will face penalties. When CCES tests at pre-selected ARCHERY CANADA events in Canada, or at random testing during the competitive and non-competitive seasons, record of the test being performed is sent to the ARCHERY CANADA national office and kept on file.

Archery-Specific Drugs of Note, Abuse and Negative Side-effects

Benzodiazepine	In limited doses, is known to make people aware of any type of body sway
Complications:	In larger doses, depending upon the individual, the substance causes loss of fine motor movement control.
Alcohol	A depressant to the nervous system which can reduce performance anxiety
Complications:	modified mood changes make behaviour unreliable at events Impairs co-ordination and speech In larger doses and prolonged use causes liver disorders
Vitamins	In large doses can give euphoria
Complications:	Certain vitamins such as niacin will have deleterious effects on kidneys Skin rashes, redness and itching Toxicity in non water-soluble vitamin groups
Beta-adrenergic blockers	Propranolol counteracts adrenaline and is prescribed for high blood pressure Reduces anxiety
Complications:	May have negative effects on adrenal glands Dangerous for asthmatics

## REVIEW THE PLAN

Record the times during the year when nutrition and weight-control will be assessed and re-tested. Nutritional education may require weekly or monthly sessions with athletes individually or in a group. Talk to your athlete(s) about drug abuse, socially or for competitive advantage. Open dialogue and honesty are key. Allow plenty of time for discussion, such as a road trip to a tournament.

Ensure that these educational sessions and meal planning sessions are done in the off-season or general preparation phase. This gives the athlete time to adjust to new food combinations and caloric intake during training and exercising. Review of tournament nutrition should be done in the pre-competitive phase. Discuss your choices with the workshop Facilitator.

### vii) The Young Archer/the Female Archer

#### Defining the Activity

Children as young as 4 years old can be taught to shoot a bow competently and enjoy hours of recreation. Adherents to the sport of archery always pride themselves on the universal appeal and adaptability it has, allowing all age groups and both sexes participation and competition opportunities. This is truly one of the great aspects of the sport. Males and females can participate due to the different bow weights and arrow lengths available. Competitively, there are equipment and age divisions for both sexes worldwide. Therefore, the elite archery coach may be asked to train very young archers, both male and female, and must be able to design plans that reflect their unique needs. At this level, young people and female archers are striving to become provincial and national team members, with special needs requiring considerable coaching expertise and understanding.

In this chapter, the coach will be able to:

- apply theories on adolescent physiology, psychology, social and emotional needs;
- identify growth spurts and anticipate the physical changes which relate to archery equipment needs;
- gauge the amount and intensity of training desirable to ensure development of the whole person and maintain fun; and
- address the unique physical and psychological needs of the elite female archer in the Annual Plan.

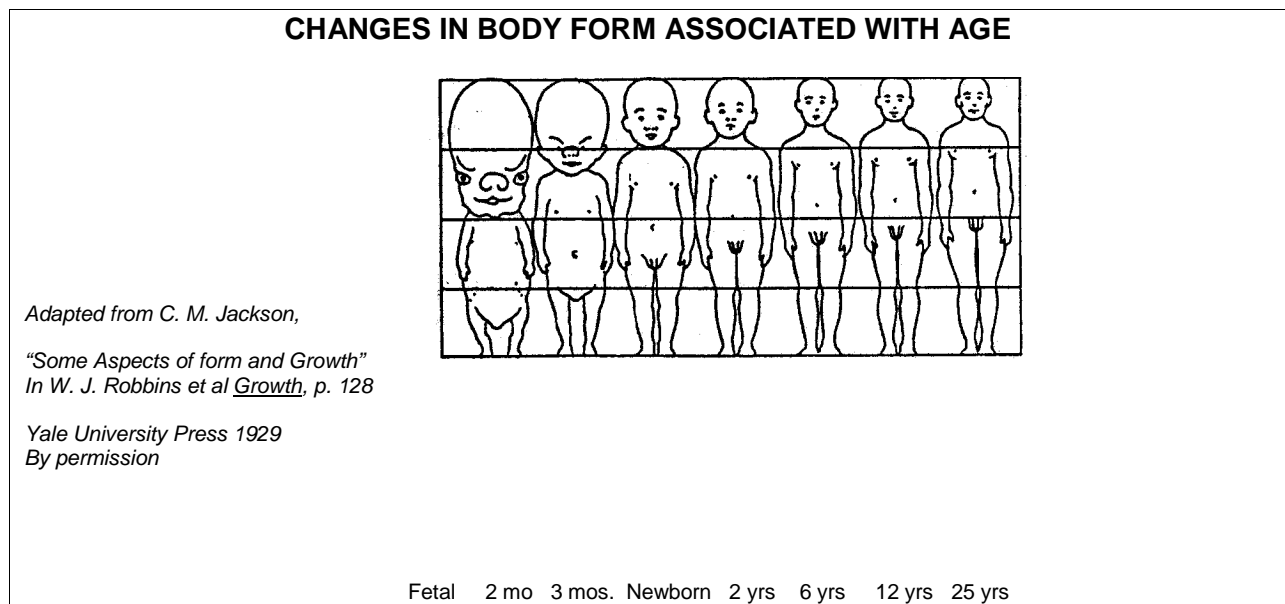
#### The Elite Adolescent Archer

The life of any top young athlete differs greatly from the average person. The lifestyle of a young athlete differs from that of an older athlete. The younger archer's desires, priorities, problems and strengths must be understood since these factors affect performance. The archery coach needs to apply basic developmental theory to help the young athlete grow and succeed, not only as an archer, but also as a person. If you are an archery coach working with young people, your Annual Plan should show extra physiological and equipment assessment times which will not appear on plans for older archers.

### Physical Growth and Development

From the age of 9 or 10, most youth exhibit an accelerated growth spurt that may last 4-6 years. Within that growth spurt are smaller physiological changes, which happen at their own genetic rate. This genetic rate has very little to do with age and the coach must be prepared to handle each young archer as an individual with specific needs at specific times. The endocrinal changes during this time affect the archer's muscle development, height, limb lengths, percentage body fat, center of gravity, personality, sleep patterns, weight and of course sexual maturation. On the positive side, during this period reaction time, movement times, percepto-analytical and general motor skills improve. All of these changes present the archery coach with challenges and coaching decisions.

Please refer to ARCHERY CANADA's Long-Term Athlete Development Model for further details.



If one of these characteristics changes in the pre-competitive phase, the coach can make suitable changes to the training programme. However, these changes are just as likely to occur in the middle of the competitive phase, or unfortunately at times just before the major competition of the season. How the coach chooses to handle these changes can have a direct effect on current and perhaps future performance.

The coach can observe some changes quite easily. Clothing that suddenly looks tighter or shorter indicates a physical growth spurt. Increased acne shows hormonal changes. But, some other changes are not nearly so easy to detect. Does the archer appear more self-conscious and make negative statements about appearance, size or getting along with others? Is there more tension in the family home? Is school work being done, and are grades at the same level



as other years? Is the archer eating more or less at home, and what kind of foods are being eaten or abused? In conjunction with both the archer and the archer's family, the coach should be consulting and on the lookout for these not-so-obvious changes. They are signals that the athlete's body and chemical make-up are making adjustments that could affect performance negatively.

There are two other areas that are archery specific, which the coach should monitor during the age period listed above: A) physical training and, B) archery form/equipment.

#### Athletic Abilities: Growth and Development Considerations

The table on the following page presents information on when to emphasize and when to avoid training certain athletic abilities.

These guidelines represent the opinion of experts in the fields of growth and development and training; as such, they apply to most sports. However, for sports in which athletes specialize at a very young age, such as gymnastics, some of these guidelines may seem to differ from the training approaches commonly used. If this is the case, (1) exercise judgement both when interpreting guidelines and when implementing sport-specific training methods, and (2) consult with recognised experts where necessary to ensure that the training activities are appropriate, safe, and adapted to athletes' physical maturity.

At the same chronological age (e.g. 12 years of age), there can be significant differences in physical maturity. It would not be unusual for some athletes to be ahead of or behind the general training guidelines for their age by 2 or more years.

Athletic Abilities	Developmental Age in Years															
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aerobic Power (intense, short efforts of 2-10 min)	F	☹	☹	☹	☹	☹			☹	☺	☺	☺	☺			
	M	☹	☹	☹	☹	☹	☹			☹	☺	☺	☺			
Aerobic Endurance (long efforts)	F	☹	☹	☹	☹		☺	☺	☺	☺						
	M	☹	☹	☹	☹	☹		☺	☺	☺	☺					
Speed-Endurance	F	☹	☹	☹	☹	☹			☺	☺	☺					
	M	☹	☹	☹	☹	☹	☹			☺	☺	☺				
Strength-Endurance	F	☹	☹	☹			☺	☺	☺	☺	☺	☺				
	M	☹	☹	☹			☺	☺	☺	☺	☺	☺	☺			
Maximum Strength	F	☹	☹	☹	☹	☹	☹	☹			☺	☺	☺			
	M	☹	☹	☹	☹	☹	☹	☹	☹	☹		☺	☺	☺	☺	
Speed-Strength (muscular power)	F	☹	☹	☹	☹	☹	☹	☹	☹			☺	☺	☺		
	M	☹	☹	☹	☹	☹	☹	☹	☹				☺	☺	☺	
Flexibility	F	☺	☺	☺	☺	☺										
	M	☺	☺	☺	☺	☺										
Speed (efforts of 8 seconds or less)	F	☺	☺	☺			☺	☺	☺	☺						
	M		☺	☺	☺				☺	☺	☺	☺				
Speed (fast cadence of movement, short efforts)	F	☺	☺	☺												
	M	☺	☺	☺												
Agility/Balance/Coordination	F	☺	☺	☺	☺	☺										
	M	☺	☺	☺	☺	☺										
Basic Techniques	F		☹	☺	☺	☺	☺	☺								
	M			☹	☺	☺	☺	☺	☺							
More Advanced Techniques	M							F	FM	☺	☺	☺	☺			
	F									☺	☺	☺	☺			
Tactics and Decision-making	F	☹	☹	☹					☺							
	M	☹	☹	☹					☺							

**Legend:** ☹ Should be avoided      ☺ Optimal training age      ☐ Not a priority  
 ☹ In moderation      ■ As needed by the sport  
 F Female      M Male

### A) Physical training and general fitness

The coach should look for:

- Can the archer still perform the cardiovascular segment of the training programme at the existing level without excessive tiring?
- Do the mass weights in resistance programme need to be reduced? \*
- Do weight machines (if used at all) need to be altered, e.g. Leg press machines, benches, standing positions from equipment?
- Is the overall volume of work (fitness and shooting) too taxing, causing increased fatigue?
- Is the shooting skill level going down the day after a fitness workout?
- Is the athlete re-hydrating sufficiently after each set? Is the degree of thirst or sweating a new problem?
- Does the archer suddenly feel very heavy in leg lifts or activities where the body or body segments need to be moved quickly?

*\* Only athletes who had passed through the initial puberty stage are candidates for weight training. Before the age of 13-14, bones, ligaments and muscles are still soft, weak and under-developed. It is too dangerous for the future well-being of the athlete to enter into any external weight resistance programmes. The athlete's own mass weight can be used in resistance training safely. In this case, can the archer move the body against gravity with the same ability and endurance? If not, the number of repetitions and/or amount of body movement against gravity should be reduced.*

If the athlete and coach answer “yes” to any of the above, the physical conditioning programme may have to be stepped back to the previous level in the Annual Plan. Accommodation may happen quite quickly. The coach will have to reassess the archer in 1-3 weeks to ascertain whether or not the plan can continue or whether further time is need in order for the archer to make the physical adjustment safely.

### B) Archery form and equipment

The beauty of the compound bow is its versatility in draw weight independent of draw length. Growth spurts in height do not necessarily correspond to growth spurts in growth or muscle mass. There may be times when the archer appears unable to hold the same draw weight that has been used in the past. Regardless of the archer's viewpoint, the bow weight must be turned down until the growth spurt has been accommodated. Then the draw weight can be added slowly to return to the original poundage.

That advantage does not exist for recurve bows. The recurve bow's advantage is in lighter mass weight. Generally speaking, the average elite recurve can be lighter in the hand, more able to stay steady during aiming, than a elite level compound bow. Stabilisation and sights can be stripped off the bow in order to reduce the mass weight further until the archer can control the bow at full draw without elevating the bow shoulder and swaying the body.

But, the recurve bow has, as always, certain mechanical disadvantages. Since energy is stored by opening the recurve limb, there is no way to adjust recurve draw weight to the archer's needs. Most intermediate-level bows do not have a weight-adjustment option and the coach is faced with looking for lighter weight limbs for the interim period. When the archer's strength has returned, the original limbs can be shot.

For the coach, either scenario creates a temporary delay in the individual's progress. There needs to be a time for the taller, awkward youth to incorporate these physical changes into elite level scores. For some archers, this change is hard to take psychologically. The coach must be prepared for that also (see Psychology - Chapter 3).

The coach must look for the following:

1. **For compound shooters**

**Observation**

Can the archer draw the bow into the "valley" smoothly? Is timing & control the same?

Is the archer standing up straight? Is the bow shoulder elevated? Is the string elbow lowered from its usual position?

Does the bow appear to be suddenly too heavy to hold up properly?

Have you checked the archer's real draw length, not the length the bow is positioned in?

Is the release aid still positioned in the hand so that the fingers/ hand contact the trigger mechanism &/or anchor properly?

Have you checked the alignment of the archer with the bow, arrow and target?

If changes to draw length have been made, the bow weight should be turned down, or remain the same? If changes to the bow have been made, did you check arrow size? Does the bow need re-tuning?

Is the archer able to shoot the same volume of arrows well?

Does the height of the peep need to be changed?

**Suggestion**

Reduce draw weight &/or draw length  
Stress fundamentals of aiming & holding  
Re-teach stance, reduce bow's mass weight

Re-teach body alignment and posture with a light weight bow

Reduce the mass weight of the bow for a 6-8 week period

Have the archer draw the bow with eyes closed to find a natural draw length

Depending upon the release aid design, modify string or wrist-strap length

Look for shoulder & head alignment with the string, and the bowarm position to the target

Always re-tune after bow mass weight and/or draw weight changes have been made

The coach must decide if the archer is honestly having problems with endurance

Though facial changes are hard to detect, the archer's head may be tipped nose downward in order to see through the peep

## 2. For recurve shooters

### Observation

Can the archer hold and aim while standing up straight? Is the timing and control the same?

Is the bow shoulder elevated? Is the string elbow lowered from its usual position?

Is the archer able to draw and hold the anchor position comfortably?

Is the clicker (or other draw-check device) in the correct position or just the usual position?

Have the groups in the target opened up? Has the volume of arrows per training session gone down recently?

Does the bow appear to be suddenly too heavy to hold up properly?

If changes to draw length have been made, should the bow weight be reduced or remain the same?

If changes to the bow have been made, did you check arrow size? Must the bow be re-tuned?

Does the height of the kissers button or shelf-tab need to be changed?

### Suggestion

Reduce draw weight  
Stress fundamentals of aiming & holding

Re-teach stance, reduce bow's mass weight

Re-teach body alignment and posture with a lightweight bow and/or elastic tubing

If the archer's form appears hunched up or the clicker is going off too soon, move it toward the archer slightly.

Reduce number of arrows per session for 1-2 weeks.

Reduce the mass weight of the bow for a 6-8 week period by stripping accessories

Lighter limbs may be required for at least 2-3 weeks

Always re-tune when changes are made to mass weight or draw weight

Check for head angle or change in anchor position

Use Appendix 4 to review the NCCP guidelines on growth and development. Compare this work with ARCHERY CANADA's LTAD base document. Use both documents as reference material when designing training programmes for youth.

### **REVIEW THE PLAN**

If you are designing the Annual Plan for a young archer, decide where periodic assessments will take place for physical conditioning and equipment with respect to possible growth spurts. These may be linked with normal assessment times, or made more frequently depending upon the age of the archer. Discuss your ideas with the workshop Facilitator.

## **The Female Archer**

*The archery coach* needs to design the Annual Plan keeping the physiological differences between males and females in mind. Some male coaches do not wish to work with female archers because of these differences. However, as you work your way through your coaching career, working with members of the opposite sex is bound to occur. Be educated and prepared to handle the needs of the archer regardless of gender. The coach will find that women are far more likely to be open and honest about their physical well-being when the coach can be confided in and trusted. This openness will assist the athlete's performance greatly.

### Menstrual Cycles

The natural function of the menstrual cycle can sometimes need special strategies for elite female archers. While some women are normally troubled very little at this time and perform very well; others may become abnormally tense, edgy, or feel lethargic. The biggest problem is usually abdominal cramping and nausea that does not allow the archer to stand up straight and feel strong. This, coupled with the usual excitement of a major competitive event, could affect performance negatively. Sometimes water retention can add to discomfort.

Each female is different. Younger archers will react to the natural cycle differently from older women. If you are coaching a young, pubescent female, be prepared to discuss the girl's health with her mother or guardian. Discussing the subject with "a stranger" may embarrass a young girl. Ask questions relating to energy level, duration of the flow, mood swings and severity of cramps. With this information as a foundation, work with the family to prepare for menstruation during a major tournament and design a plan of action, i.e. have supplies on hand such as hot water bottles, warm drinks, and aspirin-like medication, which will ease the archer through the worst part of the cycle.

Medical intervention to alter the normal body cycle away from major events can be an option, though not recommended. It should be sought only in cases where the on-set of menstrual flow *severely* detracts from performance. There must be agreement between the coach and athlete, or among coach, athlete and guardian, before this option is entertained. A trained gynaecologist can alter the cycles so the flow will not interfere if sufficient lead-up time is given. Even in these cases, the excitement of competition could trigger the early on-set of menstruation.

### Growth Spurts

Young girls change into young women quickly. The development of breasts, hips and an increase in percentage body fat may affect performance. Decreased string clearance and/or increased degree of string contact with the body may happen over the season. Changing the stance or leaning forwards from the hips should be a last resort. These changes, taken to extreme, can lead to permanent low back pain. For other ramifications, see the section above.

The coach's role is counselling patience and a positive attitude. These changes are natural and irreversible. Deal with them positively and the young woman will have better self-esteem. Complain about how the changes are making you work harder, and the opposite result will happen.

## Eating Disorders

This topic is of particular concern to coaches working with young women and girls. The fashion industry and spin-off doll manufacturers provide very poor role models and unrealistic expectations of what the female body should look like. Teenaged girls are at risk also because of their obvious maturation and changes in body fat. One irresponsible comment by a family member, friend or coach could send a young woman with low self-esteem on a terrible journey of starvation and long-term illness. Coaches working with elite adolescent females should work with the family to ensure a well-balanced diet is being consumed and processed daily.

Sometimes the coach's only clue that there is a problem is a sudden drop in performance and/or body weight. One advantage a coach has is clothing. In archery, clothing must be fairly tight fitting in order that the body does not come into contact with the string. It is not so easy for the young girl to hide the fact that she has lost weight. Close monitoring of arrow patterns in the target, group sizes, endurance and overall strength during training sessions will give the coach immediate feedback if weight loss is affecting performance.

The answer is not easy. The coach has to be pro-active, not reactive. If caught in the beginning of this spiral, the coach can use top-level, international archers as role models. Thin, anemic, under-weight women do not make top archers. Comments the coach makes about shooting, success and healthy eating are extremely important. The coach should reinforce at all times that under-weight archers can not compete properly. If archery is really an important part of this young woman's life, these comments will hit home. The coach should speak to the parents about this situation also. They may not be aware that a problem is developing.

## **REVIEW THE PLAN**

Regular coach-archer-family sessions should be part of the Annual Plan. If you are working with pre-pubescent or teenaged girls, slate in meetings between parents and coach to discuss these personal issues first. Then let the parents decide if the coach and athlete should talk more openly about physical change and archery performance.

Be flexible in your approach and suggestions.



**PART II: ARCHER FORM**

- i) Skill level and “arrows in the bank” - Motor Learning and Motor Behaviour
- ii) Biomechanics and archery
- iii) Why make changes? What really matters?
- iv) When to make changes? Periodization versus archer needs
- v) Tools of Assessment, archer strengths and weaknesses
- vi) Exercise #1: a biomechanical profile

## i) Skill level and “arrows in the bank” - Motor Learning and Motor Behaviour

### Introduction

Archery Canada’s Instructor of Beginner Archers and the Instructor of Intermediate Archers programmes are designed to teach basic archery form. For the most part, the basic steps are taught to the group, reinforced as a group, and practiced in unison. But in this context, the archery coach is supposed to be working with an individual one-on-one to improve upon each person’s basic form. The coach must be able to analyse the existing movement pattern for consistency and accuracy, and then make the necessary corrections without sacrificing performance for *extended* periods of time. Though this reference manual stresses training the total human being to become a great archer, it cannot be denied that the average coach needs these analytical skills above all. A truly gifted archery coach is one who can quickly and accurately assess an individual’s form and improve upon it through a logical, corrective progression.

In order to excel in an asymmetrical activity like archery the athlete is required to practice hundreds of thousands of repetitions for approximately ten years (see ARCHERY CANADA’s Long-Term Athlete Development Model). That is quite a commitment. There are no short-cuts in the process of skill acquisition and perfection.

Unfortunately, the practice or “arrows in the bank” may not have produced the desired success or results. When the archer approaches the coach for help and training, the coach inherits an athlete who has reached the current skill level defined by the:

- number of arrows shot,
- degree of refined biofeedback, and
- desire to succeed.

The coach should resist the temptation to “start again” with the archer’s form. What the archer really needs is the refinement of movement-patterns, not necessarily brand new movement patterns.

If agreed upon by both coach and archer, the archery coach needs to make necessary modifications to the form movements efficiently. In order to assist the archer, the coach has to understand how an archer acquires an athletic skill. Once the coach can apply theoretical information of movement patterns to the practical coaching situation, the archer’s skill level will improve. That is the *science* of coaching. The *art* of coaching, is when to apply science, and why.

### Performance versus Learning

One of the principal pre-occupations of coaches is how to maximise learning, even when only limited time is available. To achieve this goal, it is important to be familiar with some basic concepts related to how people learn skills and how effective coaches teach sport activities:

- Motor performance is the observable behaviour of the athlete when he or she is executing a task. It can be assessed using very precise criteria, e.g. the number of times the athlete shoots and hits the center of the target.

- Learning refers to the permanent change in motor performance or in the ability to carry out certain tasks or movements that occurs as a result of practice.
- Performance observed during a practice session is not necessarily a good indication of learning by the athlete. Establishing whether learning has taken place requires reassessing performance at a future date. Additional assessments make it possible to verify skill retention, i.e. whether the skill can be executed repeatedly and consistently.
- If the coach does not appreciate the distinction between performance and learning, there is a risk of incorrectly interpreting the extent of the athlete's progress and the athlete's ability to execute a particular task consistently and independently.
- When performance assessments are done, it is important to establish a distinction between performance in practice and performance when it is most important — in competition.

Learning has three distinct dimensions: motor, cognitive, and affective.

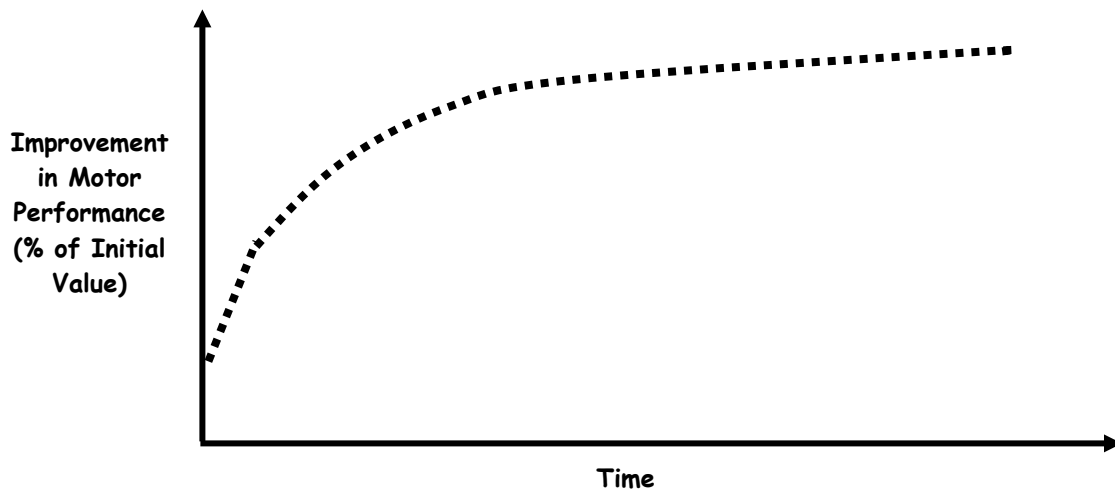
- The affective dimension concerns learning from the point of view of attitudes, values, and ethical behaviour. This dimension is closely linked to the self-esteem of athletes
- The cognitive dimension concerns learning from the perspective of the acquisition of knowledge, whether it be technical, tactical, or strategic knowledge. This dimension is as much about what the athlete knows (or does not know) as it is about what the athlete understands (or does not understand).
- The motor dimension concerns learning from the perspective of the execution of skills, techniques, or any other form of motor performance.

#### Rate of Improvement over Time

- When an athlete begins to practise, there is a rapid improvement in the ability to carry out a task or perform a particular movement, but the rate of improvement is much slower later on.
- Learning happens in stages and the rate of improvement varies from stage to stage.
- The quantity and quality of practice, i.e. the time and the number of repetitions, are the most important factors that lead to motor performance improvements and skill learning.

Refer to the graph on the next page.

### Rate of Improvement over Time



### Effects of Different Types of Practice on Motor Learning

Different types of practice can be used to teach skills, and their effect on learning and performance can vary.

Practices that emphasise repeating the same task many times under the same conditions (blocked practice) usually lead to a rapid improvement in performance. However, this improvement may not be stable or maintained over time.

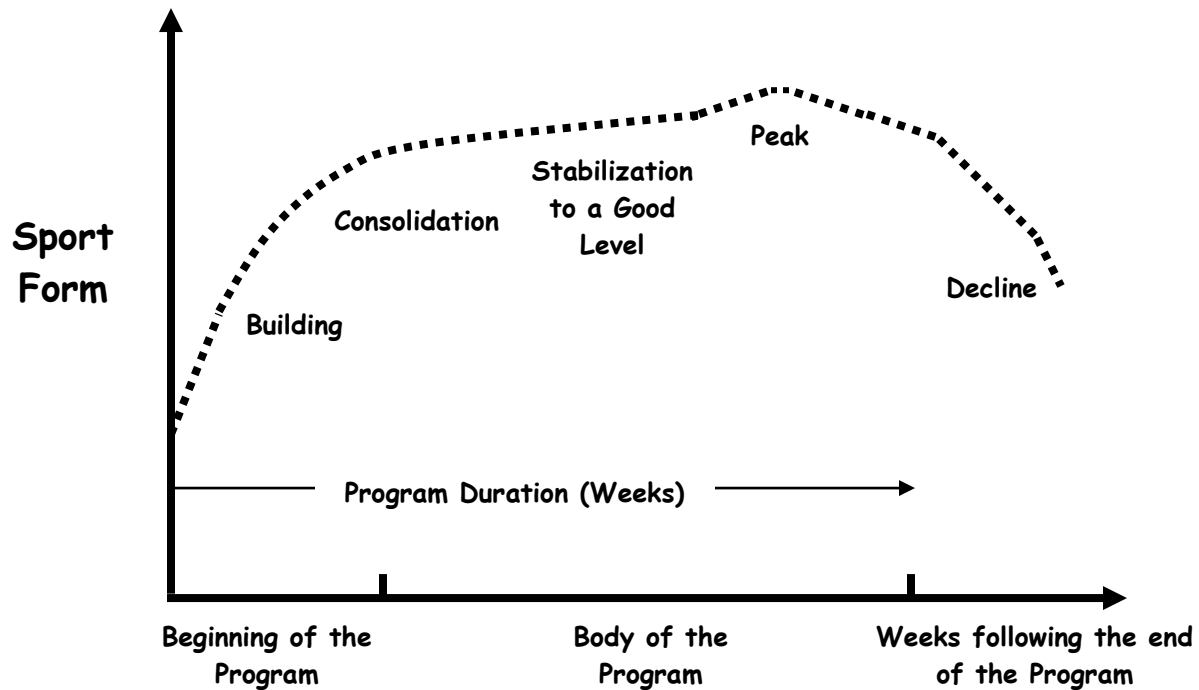
Practices that require some form of problem solving by the athlete (decision training) may not produce improved motor performance as fast early on but may lead to superior learning and retention of skills, as well as superior transfer of skill to the competitive environment.

### Progression of Sport Form

The first goal of training is to help athletes develop their sport form. However, it is important to know that sport form cannot constantly progress throughout an entire program, nor can it constantly be maintained at its highest level.

Generally speaking, sport form evolves according to a non-linear pattern during a season or throughout a programme. There is quick improvement in the beginning, a slowing down after several weeks, and finally a levelling off. Sport form can obviously decrease (go back to a previous level) if training is interrupted, for example, following a transition phase or if an injury occurs.

The following figure shows the general phases of sport form during a single season.



### Building Sport Form

During the building phase of sport form, there are two primary objectives: (1) develop the basic athletic abilities (physical, motor, and technical) and (2) progressively increase the amount of work that athletes can carry out. During the building phase, the intensity of the exercises and activities is not very high. Consequently, sport form is lower than will be observed later in the programme. This is a very important phase of any programme because it helps to build the foundations of sport form.

### Consolidating and Stabilising Sport Form

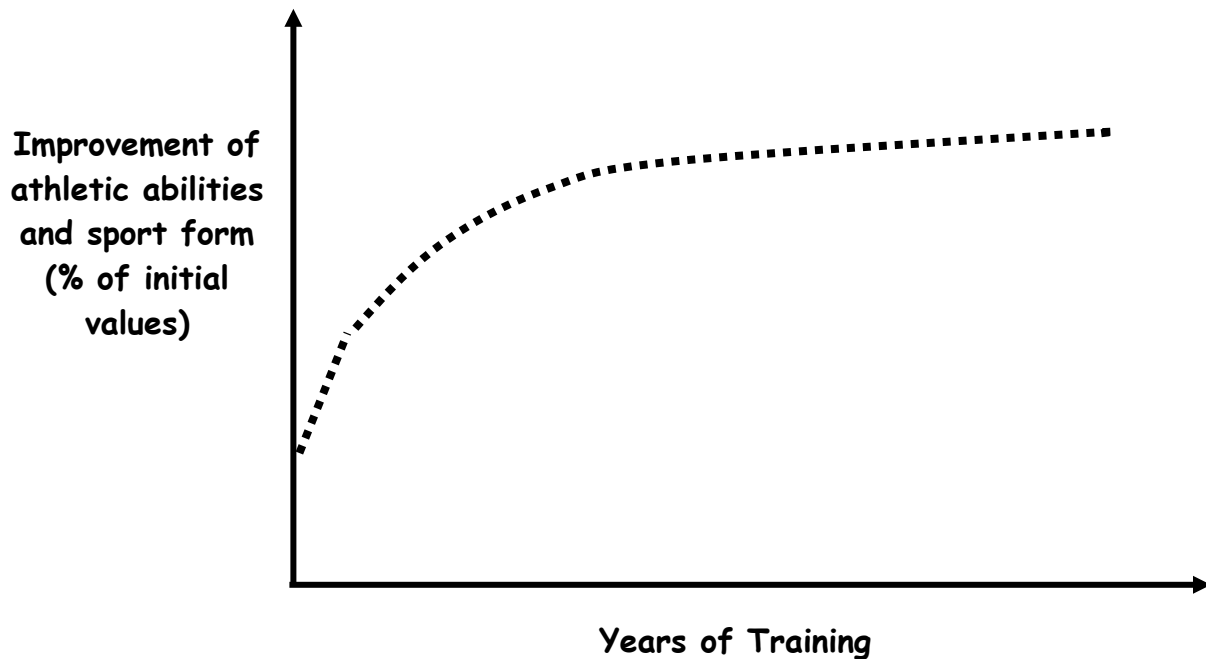
The second and third phases (consolidation, stabilisation) of sport form are characterised by an increase and a levelling off of sport form. During these phases, the training of athletic abilities becomes increasingly sport-specific. It has been observed that athletes generally reach peak sport form during the middle or the end of the stabilisation phase.

### Decline in Sport Form

The fourth phase usually occurs in the weeks after the end of the programme. It consists of a decline in sport form and performance capability because of a reduction in both the amount and intensity of training. This phenomenon is normal and necessary if athletes are to recover physically and mentally.

### Years of Training

The figure below shows how athletic abilities and sport form improve over a period of years.



Improvement in athletic abilities and sport form over several years of training is neither linear nor predictable. Moreover, improvement can vary from one person to another. Some people might have a marked response to a training stimulus, but others may improve less despite sustained commitment and work.

Athletic abilities usually improve fairly quickly at the beginning of a training program (first weeks and months), especially if the initial level is low. When this is the case, it is possible to achieve noticeable gains using a variety of methods.

Subsequently, the improvement rate levels out. Considerable training then becomes necessary to make small improvements in the performance level. As sport form and athletic abilities increase, the training activities must likewise become increasingly specific to the requirements of the sport if gains are to be made.

After a number of years of training, it can become very difficult to improve athletic abilities. The main objective then becomes maintaining performance capability. For most sports, developing an athlete who is capable of performing on the international scene is a step-by-step process that requires 8 to 10 years of training, and sometimes more. The initial stages, during which the athletes develop their motor skills and acquire the fundamental elements of their sport in terms of technique and physical condition, are essential. Unless athletes pass through these formative stages, the chances of long-term success are considerably reduced.

### Motor Learning Principles and Archery

In this section, *the archery coach* will become familiar with kinaesthetic awareness as it relates to archery and be able to implement basic motor learning principles which will ease the archer through any form movement pattern changes.

By the time an archer reaches the provincial and national championship level, a very specific, complex movement pattern has developed. The archery coach looks for efficiency and simplicity in this movement pattern. There should be economy of movement, fluidity, and consistency shot to shot. The archer must be able to perform the shot regardless of the shooting conditions or level of competitive stress.

### The Theory

How does the archer do this? The human nervous system is an information network that connects joint capsules and ligaments to the brain. The connectors are called “kinaesthetic receptors”. The nerve endings send a steady stream of signals to the brain when a joint is moved. Other specialised receptors work with muscles and tendons but these are subconscious transmissions and do not pertain to kinaesthetic awareness.

Kinaesthetic awareness is the internal perception of what the body should be doing and what it is doing. With this information, the brain sends out signals, to make small movement pattern modifications, in order to make the right movements happen again. Kinaesthetic awareness is extremely important in archery. This is the main way archers assess the shot and make small fine motor adjustments for future shots.

### Motor-Learning and Practice

When refining existing movement patterns, or when teaching new ones, the coach should apply these basic motor learning principles:

1. Memory of kinaesthetic awareness decays over time.
2. Recall of accurate, complex movement patterns will deteriorate without practice.
3. Limb position recall is heightened when the pattern is practised.
4. The movement pattern is smaller when visual aids are not used.

A successful archer is able to register information in the brain via biofeedback mechanisms or kinaesthetic awareness established through practice. Some archers can feel this better than others. The archery coach should assess the archer's awareness. If the coach, through questioning, finds the archer has very little awareness of how the arrow is shot, the coach will have to teach the archer to pay better attention to specific cues.

Here are suggestions to improve awareness. Alter and refine them to suit your needs, or add new ones of your own devise. Experiment with all 3 ways since each person responds better to one of the three learning modalities: aural, visual or tactile. You may find the archer learns more and retains more information in only one of these modalities.

1. Instruct the archer to shoot an arrow. Immediately after the arrow is released, have the archer visualise the shot and recall of the details. This exercise will train the archer to be more aware of neuron signals from the muscles back to the brain.

First the archer tells you what happened on the shot. Now YOU tell the archer what you saw and what you think happened on the shot. Also tell the archer where the arrow hit. This immediate feedback promotes skill development. Once the archer pays better attention to biofeedback cues, the archer will be able to estimate errors and small discrepancies without coach input.

Note:

*The coach should be aware that later on in the process communicating results immediately actually distracts the archer from processing movement-produced feedback. So, in order for the archer to continue to refine the internal process, reduce external input.*

2. Have the archer write down detailed descriptions of the form and what the archer imagines is happening. If the archer can not describe all the steps and cues to shoot an arrow, repeat the exercise until the whole shot is written down. The clearer the description, the more the archer is listening to the biofeedback. The greater the archer understands of the movement pattern, the quicker the archer can detect form mistakes and fix them.

3. Some people need an expert model to reinforce the desired movement pattern. Obtain videotape of top international archers performing in competition.

Review the tape alone first and then with the archer. Point out examples of movement patterns that you are trying to instil in the archer. Point out the kinematics or timing of the movements, which you wish the archer to emulate. Next, play the tape again in the shooting lanes while the archer is practising. The archer tries to model the movement pattern and thereby receives biofeedback from shooting arrows.

### Application of the Theory: Archery Skill Refinement

There must be a logical progression in skill acquisition training in order to internalise any necessary form changes in the shortest amount of time. If the coach and archer have decided



that some aspect of the form movement pattern *needs to be changed*, the coach begins these changes in the pre-competitive phase. Follow the progression below:

1. Since the movement pattern will be uncertain without visual aids, the coach would be advised to initiate the new learning pattern using a blank butt *at close range*.  
  
(General preparation and pre-competitive phases)
2. Use mirrors, videotape or digital photography to assist the athlete. The *visual* prompts will show the athlete the differences between what the athlete feels or think happening, and what is really happening. Sometimes these prompts work better than the coach's verbal feedback.
3. Once the archer has achieved some success *in altering* the movement pattern as the coach has requested the archer should attempt this pattern with *eyes closed* to reinforce the new motor pattern. Eyes-closed will speed up the kinaesthetic link between body and mind. The proprioceptors in the muscles will establish new cues to the archer during practice of the new form movement pattern.
4. After the archer has achieved a high degree of competency with the new motor pattern, the coach should use *visualisation* techniques to cement the new pattern. Then the archer must be able to repeat this pattern with visual cues and the target face at all distances, body angles and speed as required for the chosen discipline. This process takes time. Make sure you alter the Plan.
5. The final test is *competition*. Select non-threatening, training environments, and record how many times the archer was able to perform the new movement pattern properly out of the number of arrows shot during the event. Take a percentage.

The next goal is to improve on this percentage during the next tournament and add competitions of greater importance throughout the competitive phase. These tournaments should be specified in the annual plan.

## REVIEW THE PLAN

Record practice sessions in the plan dedicated to both form analysis and teaching kinaesthetic awareness. Record blocks of time when form is reviewed and changes to form are taught, reinforced, tested and assessed. Discuss your choices with the workshop Facilitator.

### **Motor Behaviour and Archery**

There have been several studies done to determine how the mind and body aim at a target. Most studies are not archery-specific, but do give the coach insight into the basic aiming process. The coach can utilise these findings for analysis of the archer.

The archery coach will understand principles in motor behaviour as they related to archery; detail archery aiming processes through sight aperture movement or sight window movement; differentiate between acceptable and excessive movement during the aiming process; and learn how motor behaviour affects elite performance. With this theory in place, the coach will be able to assist the archer's aiming process and motor behaviour in a elite environment.

#### Aiming and Motor Behaviour Principles

A probable relationship exists between the amount of movement during aiming and the archer's ability to get off the string quickly. Many archers seem to move excessively during the draw sequence. Some move into the center from the side or up or down. This movement pattern may or may not be efficient, and the archer may not realise that the movement during manual aiming is excessive for success.

Regardless of the target size, the movement pattern during draw to the anchor sequence must be as limited as possible. If the draw time is long from pre-aim to "settling in", the archer is unable to react to the target stimulus quickly. Since the archer uses visual cues to direct the aiming process, it is critical to performance that movement patterns relate specifically to the position of the target. This is particularly true of the bowarm action into full draw.

Therefore, the coach should not be reinforcing aiming skills at the same time as motor learning is being taught. Vision is a detractor during motor learning.

#### How does the archer line up the body to the target to aim?

Of all the digits on the bowhand, it is the THUMB that is actually the most accurate to track with. This accuracy is related to the dominant hemisphere in the brain. If the person has a dominant right hemisphere, the left thumb is the most accurate digit for tracking and memory.

Conversely, the right thumb should be the most accurate digit for aiming when the dominant hemisphere is the left side. In terms of hemisphere dominance, the coach may assume that a left-handed archer holding the bow in the right hand should be assisted in fine aiming by using the right thumb's proximal joint as a cue. The opposite is true for the right-handed archer.

Teach the archer to feel the aiming process with the large knuckle of the bowhand thumb (as the hand sits in the bow grip) as a direct line to the target.

### Eight Motor-behaviour Factors affecting Archery Performance:

Use the following checklist to assess the archer's efficiency.

#### 1. Reaction time and arrow pattern

Reaction time off the string is directly related to group size in the target: the faster the reaction time, the more consistent the groups. The archery coach should reinforce consistent release. This can be achieved just by counting out loud the desired number of seconds from anchor to release. Mental imagery of the desired timing can help this

#### 2. Angle of the Bow to the target

The angle of the body and its alignment varies with the distance to the target and target elevation. The angle of the bow and body to the target must show symmetry from the bowhand to the string elbow at full draw.

#### 3. Body and head position

This changes with the distance to the target and target elevation also. It has direct implications for a consistent anchor position. In outdoor target archery, the coach should analyse the body position at all 4 distances in the 1440 Round. For field and 3D, the coach must train the archer in a variety of positions, insisting that this angle of the bow and the body to the target remains as constant as possible.

#### 4. Recall of body and head position

Top archers can reproduce all body and head position *accurately* from memory. The archery coach should look for signs of tension and different positioning of the lower jaw, neck muscles and string position and pressure on the face and body. The archery coach should require this skill with or without the bow in predetermined training sessions. Mental imagery is key

#### 5. Visual acuity

Ensure the archer has the necessary visual aids: glasses, sunglasses, monocular on a headband. Ask the archer whether the target is kept clear at full draw. The archer must be able to focus clearly. If this is not possible, corrective lenses are necessary.

6. Tremors in the bow arm Mass weight of the bow may adversely affect performance due to the fact that it changes tremors in the bow arm, usually at the elbow. The coach should analyse the archer's equipment. Some tremors may occur from relaxation of the elbow, in order to avoid hyperextension. Discuss your findings with the archer. Experiment with the mass weight in order to see if tremors increase or decrease. If they increase with added mass weight, reduce the mass weight and increase strength training for the upper body. Concentrate on larger, deeper muscles of the torso first.

#### 7. Ability to reproduce the bowhand

The body alignment at full draw and the reaction on follow-through start with the hand position and pressure points in the bow.

8. Variations in body weight and transfer between the two legs  
(Balance)

Some archers become unsteady during the draw sequence or just prior to release due to body angle. Compound shooters may “roll over” the upper body when the compound wheel(s) roll(s) over allowing the hips to sway toward the target.

This must be analysed at various body angles using still photographs or videotape. Change the archer’s stance to increase consistency and stability will enhance performance. Pay attention to weight transfer during the draw and release.

Some of these topics will be discussed further in the Biomechanics section.

**TASK 7 Application of Theory - Motor Behaviour** Workbook pg. 117 - 118

The coach’s own observation skills are extremely important. The archer receives feedback from the coach. It has to be accurate. The archer has to make the small muscle group changes in order to produce the desired movement pattern. The coach has to be able to provide the correct progression and communicate this effectively to the athlete.

In order for the coach to improve observation powers, here are some questions to the coach should ask when the form is being assessed.

1. HOW does the archer apply muscular force or energy to shoot?
2. Is the archer STABLE enough to apply the degree of force needed to shoot?
3. Is the archer using all the MUSCLES required to contribute to the skill?
4. Is muscular force being applied in the right SEQUENCE?
5. Is the force applied at the right TIME? Is the force applied in the right DIRECTION?

## ii) Biomechanics

### Introduction

The science of coaching has progressed rapidly over the past twenty years. Since the early 1990's there has been far more interest in the Western Hemisphere in this aspect of coaching. Biomechanics is the application of Physics to analyse forces acting on living organisms.

Archery performance can benefit from the scientific analysis of form mechanics to heighten efficiency and accuracy. This chapter outlines the highly complex study of the physical mechanics of shooting an arrow. Suggestions for the coach working in the club setting are included in subsequent sections. From the information below the archery coach will be able to apply *basic* biomechanical principles to improve an individual archer's form efficiency.

### Defining the Activity

Shooting an arrow requires fine muscle movement with high standards of co-ordination among small muscle groups and muscle fibres. It has elements of static strength clearly demonstrated in the postural requirements of the lower body and extension of the bow arm toward the target.

It has elements of dynamic strength in the action of release. The act of drawing the string, bringing the archer to the full-draw position sets the muscles (active structures) into a pattern of contractions and balance around joints and aligns bones (passive structures). Bones provide the archer with the mechanical function of support, and leverage. Defining the base of support and the degree of leverage for the individual archer creates more efficient shooting.

### Theory: Basic Laws of Physics and Biomechanics

The purpose of this section is to review laws of Physics and Biomechanical terms as they apply to physically shooting an arrow. Those laws pertaining to equipment will be discussed further in the pertinent chapters.

#### A) NEWTON'S LAWS

1. Inertia equals mass. Mass is defined as substance or matter. Inertia is the resistance an object possesses to resist change. The greater the mass, the more stable the object and the more energy it takes to impart motion to the object.

Application: many archers add stabilisation and counter-weights to the bow in order to keep the bowarm in line with the target throughout the shot. It is harder for the archer to push the bow out of line with the target on the follow-through if it has sufficient mass to match the archer's physical strength.

- Physical strength is important for stability and maintaining equilibrium (balance) against outside forces.
- Stability is defined as the force required to maintain equilibrium. Equilibrium is a product of mass and the center of gravity (see below). Therefore, if the archer is not physically strong enough, heavy stabilisation will detract from performance. This is true particularly with women, youth and some masters.

2. Acceleration is proportional to the force acting on it, and inversely proportional to the object's mass. It is defined as the rate of change in velocity (speed).

An object can not change its speed or direction unless a force is applied to it. The amount of change in motion produced by a force on an object is proportional to the size of the force and inversely proportional to the weight of the object.

Application: most archers try to shoot as much bow draw weight with as light an arrow as possible in order to accelerate the arrow quickly. The speed of release off the string (whether fingers or release aid) is quicker and sharper when there is significant draw weight to pull against. This weight should be complemented with good muscular force. Archers using a finger release are able to transfer the energy more efficiently and group arrows tighter with significant draw weight.

3. Action and Reaction: When one object exerts force on another object, the latter exerts a reactive force equal to it and opposite in direction.
- Reaction is defined as a single force acting upon an object resulting in an action which occurs in the same direction as that in which the force was applied. If forces are applied from more than one direction, the ensuing action will occur in a direction that is the resultant of the forces' directions.

Application: at the instant of release, the archer's muscle tension controlling the string hand-side of the spine must equal the muscle strength of the bowhand-side of the spine in order for the arrow to fly directly toward the center of the target. Otherwise, the reaction will not be in the desired direction, and the coach can observe this during the follow-through phase. Tension is defined as pulling or stretching forces longitudinally through a body.

## B) FORCE

Next, the archery coach should consider the forces acting upon the archer.

- Force is defined as a push or pull that can change the state of motion.
- Kinematics is used to describe motion without regard to the force producing the motion, using only time and space.
- Kinetics is the study of forces causing or resulting from motion. The Forces acting upon the archer, which have greatest impact, are: gravity, friction and air resistance.

The direction of Forces can be:

- Linear - all parts of the body are moving along a path at the same speed in the same direction;
- Rectilinear - motion occurs along a straight line;
- Curvilinear - motion occurs along a curved line
- Centric - producing linear movement (translation) or eccentric producing translation and rotation

- Gravity is pulling down upon the archer's body, bow and the arrow. Gravitational force is always applied perpendicular to the earth's surface. In this chapter, we will concern ourselves with the archer's body. The archer is stable when the body's center of gravity

or line of gravity falls within the base of support, referred to as the ground surface area between the outside edges of both feet from heel to toes. Therefore, the width of the archer's stance and foot position dictates the surface area. Of course for an archer, a shift of weight and gravitational forces occurs when the bow is lifted and maintained at full draw. The degree of shift is dependent upon the amount of mass used and the distance it moved. Therefore, archers with heavier bow mass weight and/or longer arms will experience greater shifts in the center of gravity away from the natural body placement at full-draw than when standing still without the bow. The archer may be stable in this direction, but unstable anteriorly and posteriorly.

The Center of Gravity differs with the individual. Athletes with more torso or upper body mass have a higher center of gravity (CoG). Conversely, athletes with larger leg mass have a lower CoG. In archery, the lower the center of gravity, the more stable the archer. The closer the center of gravity is to the middle of the Base of Support, the more stable the archer. Gravity produces greater torque when the line of gravity or CoG is further away from the position of the feet on the ground.

- Torque is defined as a rotary or turning effect of a force.
- Friction is force that occurs when an object in motion comes in contact with another object. This could be a solid surface or air. There are 3 types of friction:

1. Static-friction is two objects at rest *resisting initial movement*. It occurs with solid surfaces. The amount of mass affects the amount of resistance. The Maximum Static Friction is equal the amount of force it takes to move the object.

Example: The degree of contact at the anchor position with the face and/or jaw line. As the release occurs, the hand travels backward from the anchor position causing friction on the face. The archer uses the feeling to check the accuracy of the release and follow-through.

2. Sliding-friction is caused by two resistive forces, *as objects slide and rub against each other*. It is easier to keep an object moving than to start it so Maximum Static Friction is greater than sliding friction.

Example: The finger release using a finger tab has sliding friction on the string upon release. Finger tabs should be designed to reduce the friction by providing a smooth surface for string movement. Mechanically, therefore, it is easier to keep an arrow moving under the clicker continuously and slowly than it is to draw the point of the arrow to the clicker, pause, and then start pulling again.

3. Rolling friction involves wheels and balls and as such is dealt with in the Equipment chapter.

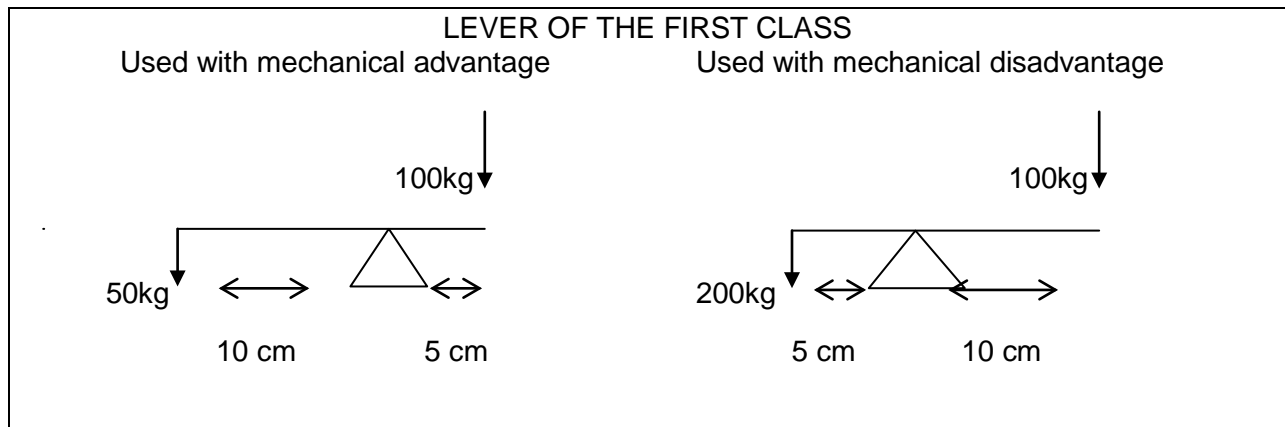
### Air Resistance

Drag and other aspects of air resistance will be discussed in the Equipment chapter. However, body shape, profile and pressure are factors affecting the archer's body as well in windy conditions. Wind is an external force that destabilises the archer. Clothing, center of gravity, existing base of support and the ability to hold the bow steady in the full-draw position must be efficient to begin with before preparing the archer to shoot in windy conditions.

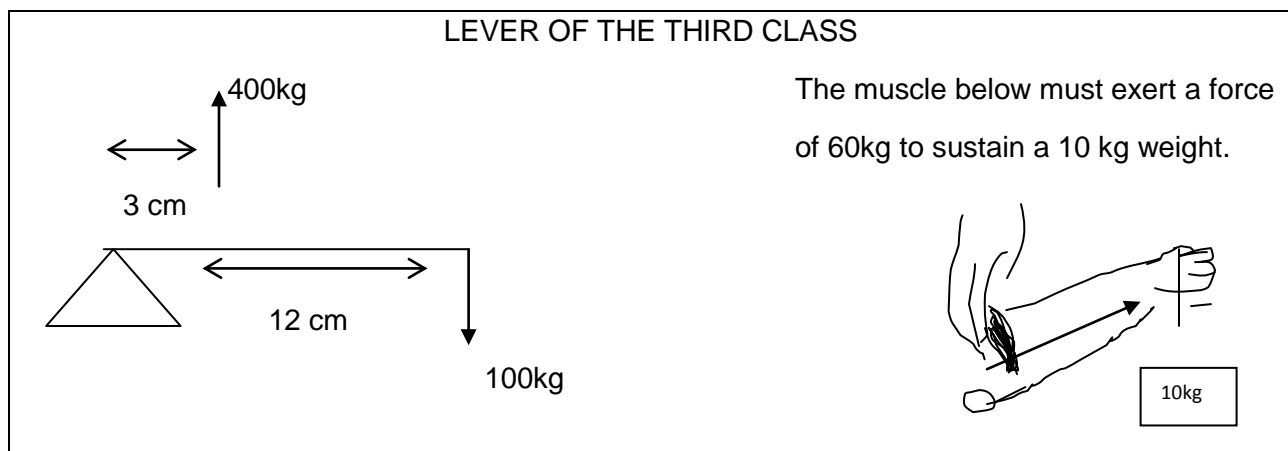
Increasing the base of support will increase stability. Increasing the base of support in the direction of oncoming force will increase stability. Lowering the Center of Gravity and shifting it toward the direction of the oncoming force (wind) will increase stability.

### C) LEVERS

A lever is a simple machine that transmits and changes mechanical energy from one place to another. There are two counter-acting elements or arms operating around an axis or fulcrum: the **force arm** which comes from muscle contraction, and the **resistance arm** which is provided by the weight of the archer's limb, the bowstring and the bow. Mechanical advantage occurs depending upon the length of the force arm relative to the length of the resistance arm. An example of torque or rotation around an axis is the action of the biceps muscle during a forearm curl. Torque produced by the muscle is an opposing force to the torque produced by the object (e.g. a dumb bell).



There are 3 classes of levers but the one that pertains to muscle contraction and doing Work (force x distance), is the Third Class Level.





The Axis of Rotation is at the distal end of the Force Arm, and furthestmost removed from the Resistance. The Force is being applied in the middle of the Resistance Arm. And, the Resistance Arm is the full length of the lever. Therefore, greater muscle contraction is needed to move a force if the athlete has long limbs.

Rotation can be produced in two ways:

- a) by transferring rotational momentum from the body part to the whole body, or
- b) by an off-center thrust or push that does not go through the axis of rotation.

- Axis of Rotation is defined as the rotation of a body segment around a joint.

Application: when the bow is drawn back, the string-hand forearm and the upper arm rotate towards each other while trying to keep the projectile trajectory in a straight line. This movement is not the same as pronation of the forearm.

However, the archery coach is constantly on the lookout for this production of rotational motion since an off-center thrust implies an imbalance of muscle tension in certain parts of the archer's form. The coach watches for the even contraction of both shoulder girdles during the draw to anchor.

#### D) JOINTS

Muscle contractions pull bones, to rotate around the joints, in the upper body during all preparatory segments of shooting an arrow up to the full-draw position. The role that joints and muscles play in the proper execution of the shot is of prime importance of the coach and archer. Therefore, this section will not deal with the joints of the lower body and lower spine since those joints provide weight bearing and support for the upper body.

Increasing the size of the force in any action will help to increase the speed of movement. The contributing forces from each muscle are combined, with the contribution of every joint and body segment to produce that force. When several segments are involved in increasing the size of the force, their sequence and timing is important. The motion is not simultaneous to each joint although there is some overlap. Joint forces of the larger segments should precede those of the small, outer segments. This principle of Joint Torque is directly applicable to the bow arm, back, shoulder and chest muscles in archery.

Application: as the bow is drawn, the archer feels the mass weight of the bow with the pressure point of the hand position. Resistance to this weight, as well as application of muscle contraction to pronate, extends and rotates muscles in the bowarm and shoulder combines to give sufficient tension to stabilise the bow at full draw.

The weight bearing however does not start with the 19 small muscles crossing the wrist, which make the hand move. *The force generated to initiate the draw must come from the torso muscles.*

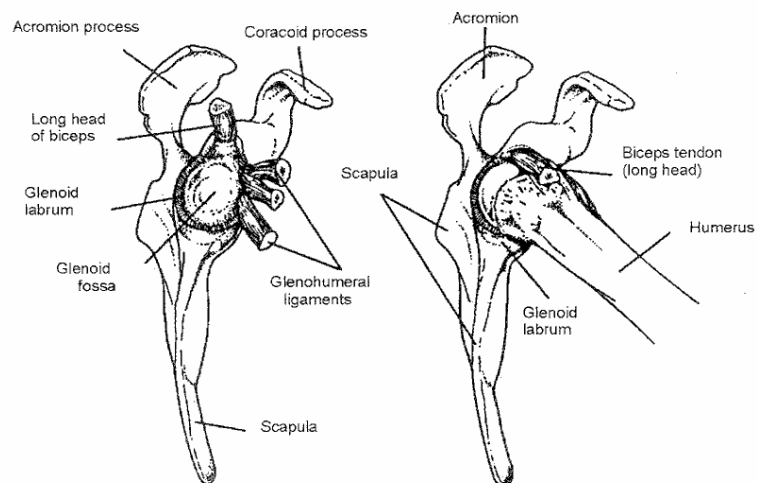
Various body parts in all movements contribute to the speed of the end part. Movement starts with the major muscle groups and progresses out toward the lesser muscle groups and small body segments. This principle is known as Summation of Body Segment Velocities.

The summation of all the body segments contracting in an archer determines the speed of release off the string (whether fingers or release aid). The length of time a force is applied and the size of the force work together to produce a resulting action. The same action can be obtained by applying either a larger force over a shorter time or a smaller force over a longer time. This is known as Impulse.

### Joint Action in the Upper Body

The major joint-areas are Glenohumeral, the ball-and-socket joint of the shoulder; the hinged elbow joint; and the ellipsoidal wrist joint. The curved surfaces of the joint give direction to joint motion when the muscles contract. The ligaments, attaching the muscle to the bone guide that the motion in the direction the muscle tension dictates. The shape of the bones at the joint and the range of motion or flexibility limit how far the joint can rotate the bones. Over-extension or repetitive use, particularly if the archer uses poor form techniques, causes injury to any one of the structures: joint, ligament, bone and muscle.

### THE SHOULDER JOINT



From "Basic Biomechanics"

S.J. Hall, page 148

The bones forming the Glenohumeral joint do not fit perfectly. The cavity or space created by the Glenoid is bigger than the head of the Humerus. There is a cushion or labrum (cartilage) coating the inside of the fossa or cavity to provide a smooth surface for joint movement. The stability of the joint is dependent upon the strength of the muscles holding the joint in place and contracting together.

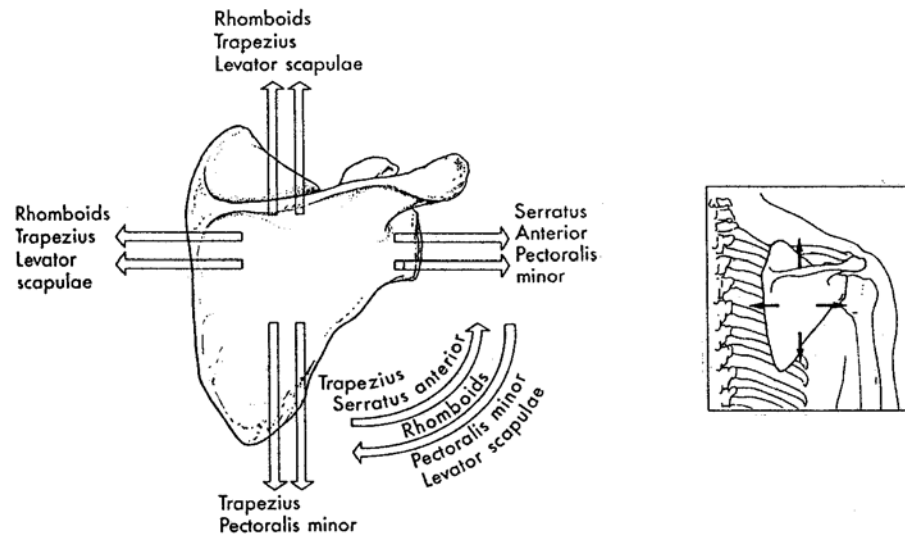
A joint is stable when there is a balance of muscle tension about the center of rotation. These two muscle forces must be equal and opposite.

Some of these stabilising muscles are attached to the clavicle or “collar bone” which rotates when the arm is raised and to the scapula which rotates also. The rest are attached either to major bones in the spine or the arm.

The group of muscles referred to as the Rotator Cuff all rotate the humerus: subscapularis, supraspinatus, infraspinatus and teres minor. All these muscles attach to the scapula. When the arm is lifted to up to 30°, the acromioclavicular joint rotates. Then between 30° - 60°, the scapula rotates. At 90°, the sterno-clavicular joint elevates. To create inward rotation of the shoulder joint (bow shoulder) tension is required in the following muscles: subscapularis, teres major, pectoralis major, anterior deltoid, latissimus dorsi and biceps. When outward rotation is needed (string shoulder) the muscles needed are: infraspinatus, teres minor and posterior deltoid.

Because so many small muscles are needed each time the archer draws the bow, over-use injuries can occur. The archer pinching muscles, during abduction and flexion can cause damage. The condition will be worse if poor technique has been practiced repetitively. This, in turn, causes inflammation (swelling). When muscles become weak, the head of the humerus becomes unstable and the deltoid muscle pulls the head too high in the Glenoid cavity. Then the serratus anterior becomes fatigued and does not rotate the scapula enough for other muscles to work. Also, the archer must ensure that the shoulders are “set down”, so that the head of the humerus settles deeply into the Glenoid fossa. Otherwise, the recoil shock of the release bow will travel up the bowarm and high into the shoulder area, where there is insufficient muscle mass to absorb such repeated shocks.

## ACTION OF THE SCAPULAR MUSCLES



From "Basic Biomechanics"

S.J. Hall, page 150

### Action of the Scapula

The muscles attached to this bone structure are significant to shooting an arrow. When the muscles contract, they orient the position and direction of the Glenoid and keep the head of the humerus in contact with the labrum. This stabilises the whole joint when the arm is elevated. How well the scapula performs also depends on the acromio-clavicular and sterno-clavicular joints and the muscles that rotate those joints. When these two muscles work properly, the shoulder is very stable as the arm is lifted (abducted).

The downward rotation of the scapula orients both bow shoulders, to be in line with the bow and target. This action relies upon the strength of both rhomboids and levator scapulae. The counteracting, stabilising muscles during this rotation must be strong as well: trapezius, serratus anterior, latissimus dorsi and pectoral muscles in the chest.

When these muscles are not strong, the scapula or shoulder blades tend to have a winged or protruded view to them. Archers with this "winged" tendency must contract the shoulder girdle muscles strongly before the bow is lifted to pre-aim in order to strengthen and stabilize the shoulder joint and avoid injury. However, all archers should contract the shoulder muscles in order to stabilize the scapula BEFORE the arm reaches 90°.

That is why the common archery term "back tension" is ***incomplete***. It does not fully explain the need to use the entire group of muscles on the chest and back which create rotation, elevate the arm and stabilise the archer's body position until the arrow is in the target. The whole torso must demonstrate "tension" but in a positive sense.

### The Elbow Joint

There are three joints within the elbow area for the two bones of the forearm. Both bones contact the lateral end of the humerus. The humero-ulnar joint is a hinge joint allowing flexion and extension of the elbow but only in one direction. The humero-radial joint is a gliding joint that restricts movement of the elbow in what is commonly referred to as hyperextension (bowarm). The third joint operates between the two bones of the forearm. The combination is considered to be a hinged joint because of the restrictions in degrees of freedom (movement). The radio-ulnar joint allows pronation and supination with the axis of rotation around the head of the radial bone. Pronation is used in the bowarm and supination in the string arm (finger release and some styles of release aids). The individual's ability to supinate and pronate is determined by the amount of internal and external rotation in the shoulder joint. The muscles stabilising this joint are the brachialis, biceps brachii and brachio-radialis for flexion and triceps and anconeus for extension. The archer's bowarm must demonstrate both strength and flexibility in these five muscles in order to achieve good body alignment string clearance and reduction of torque upon release. Since these muscles, and their ligaments, are also the joint's stabilisers, strength and flexibility must be maintained in order to avoid chronic injury.

### The Wrist Joint

Eight small bones connect the hand to the radius and ulna in the forearm. There are several joints making up the total wrist area, which connect the forearm to the numerous bones in the hand. Cartilage and 4 ligaments provide stability. Cartilage is a resilient tissue that is incredibly durable. It is comprised of 70% water, 25% proteins and 5% cells. Just as in the shoulder joint, articulating cartilage allows bones to glide and rotate against each other. Nineteen muscles cross the wrist from fingers to forearm. Each one has a specific function allowing the radio-carpal joint to move in the same precise pattern for each shot. The two actions of the wrist are flexion-extension and abduction-adduction. The archer needs strength and good biofeedback from these muscles for: placement of the hand in the bow (extension), orienting the angle of the knuckles with respect to the riser (adduction), and the ability to hold that position and maintain a constant pressure point throughout the shot.

### Summary

Biomechanical analysis to heighten efficiency and accuracy in the upper body is far different from teaching basic archery form. Now the archery coach must take this knowledge and refine it to suit the needs of competitive individuals being trained to excel. Coaches know the muscles in the archer's arms, shoulders, torso and neck must flex and rotate bones and structures so the release hand and string hand elbow will be in line with the bow, arrow and target. The difficult part is assessment of the archer's form. Is it efficient, repeatable and safe? Is there something inherently wrong with the movement pattern which limits the performance of the individual?

Though the answers to these questions may not be obvious at first, with practice the archery coach can identify those biomechanical factors affecting performance, adjust the movement patterns accordingly, and disregard the rest.

### iii) Why make changes? What really matters?

#### Introduction

How does the coach know if the archer's form is efficient or not? What really matters?

Does the coach need to assess every single aspect of the archer's sequence?

The short answer is, yes.

Does the coach need to make comments or changes about every aspect? No.

The provincial or national level athlete should show a skill competency already. It is a matter of priority.

Question: Is there a problem with the arrow pattern in the target *related to form or poor posture*? This problem must be viewed separately from, and in conjunction with, the archer's equipment. The psychological aspects have been dealt with elsewhere. Proper technique to prevent injury has been mentioned already. It will be reinforced as needed.

Where to begin?

As examples only, turn to your Coach Workbook pg. 119 - 127 - **TASK #8** to analyse two aspects of the archer's sequence from a biomechanical basis: **stance** and **string hand shoulder action**.

#### Summary

The coach should keep a record of the form assessment, talk about the findings with the archer, plan a logical progression of teaching skills with no outside pressure to perform.

Always look for the form correction that will make the **biggest improvement** in performance with the **smallest change** in movement patterns.

### iv) When to make changes: Periodization versus archer needs

#### Defining the Activity

There is no "quick-fix" to training a coach to be more observant of form inconsistencies. There is no quick cure for poor movement patterns, which have been ingrained in the archer's mind and body over time. Both the coach and the archer need to employ a logical progression from examination, discussion, options, planning and practice to complete subconscious incorporation of the new movement pattern. All of these things take time. Any change needs logical progression.

#### 1. Ask the archer first

Though you may have assessed what form movement patterns need to be changed or refined, it is essential to start with the archer's view of what is important. Many times, the archer is not able to see the whole picture and detail what is significant in the present form pattern. Be that as it may, the archer will be anxious to have these needs addressed. Therefore, the coach must be a good listener, assess the archer's concerns, answer the questions and deal with the issues.

## 2. Study the form

In an ideal situation the archer has come to you for help in a non-competitive phase of the year. This gives the coach more time to assess, evaluate, film and review the form movement patterns as they exist. The archer may be agitated about the amount of time the coach needs to assess, but this is the most important part of the whole process. The coach should advise the archer of the need to study all aspects of the sequence. If possible, the coach should film the archer from at least 3 angles in a variety of situations and body angles.

If the archer comes to the coach in the middle of a competitive season demanding form changes to increase performance, it is very important to the coach and the archer to wait. Do not give out advice without careful analysis. Do not let the sometimes-desperate nature of an athlete trying to do better influence your better judgement to hold off. The archer should be very open about other coaching contacts, and who they have worked with in the past, what they liked/disliked about that relationship, and why the archer is coming to you now.

In the past, when Canadian archery team coaches were hired by the Board of Directors through an application process, the coaches were well qualified but not cognisant of the archers and their form or needs. Training camps were necessary to bridge this void. When financial constraints make training camps impossible, the team coach needed enough experience and exposure to the current elite athletes in order to have credible input when the archer needed help. Most training camps, therefore, are limited to strengthening the archer's psychological preparation, and not involve changes to basic movement patterns. Only a solid, long-term relationship, between coach and archer, opens up lines of communication. Otherwise, the archer gets poor advice and the coach gets a bad reputation.

## 3. Assess what is most important

Biomechanical analysis of form can be practiced with the review of ARCHERY CANADA's Biomechanical Analysis videotape. The booklet takes the coach through numerous examples of national level archery form at 5000 frames per second. It is a good educational tool. However, the most important part of the learning process is ranking the movement patterns that need to be changed in terms of importance and greatest effect.

Note:

*Always ask yourself if what you have noticed is not a consequence of something else. For instance, a finger-release style archer who plucks the string upon release has created that problem before reaching the full-draw position.*

From the booklet's list of suggestions you may select from down when analysing the archer's form, consider which movement pattern needs to be changed or refined first which will make the greatest positive impact on performance. List the rest. Some, like equipment changes, can be looked after at any time during the pre-competitive phase. Others, like anchor position, muscle tension or aiming will need to be dealt with in a logical order, and given sufficient time.

#### 4. Back to the Archer

With all the information written down and ranked, it is time to discuss your findings with the archer. First, highlight the archer's strengths. Then make your suggestions, giving reasons why each is significant. Ask for the archer's input and opinion. Most archers who ask for your help will be more than willing to start on something new. You, as the coach, must not only get the archer's consent to make changes but commitment to *give the changes sufficient time to be integrated*. Not all archers have the patience to let changes take their natural time. Archers want results and they want them right away. The coach will have to secure a guarantee from the archer that time and patience will be essential if the archer is going to break into a higher performance level.

#### 5. The Annual Plan

Periodization is a well-worn term for breaking the year down into segments: non-specific, pre-competitive, competitive, post-competitive or active rest. This was discussed at length in the Annual Plan - Chapter 2. Make sure you review these principles. Also, remember that changes in form must not coincide with:

- large increases in bow weight;
- large increases in volume of arrows;
- large increases in physical fitness training programmes; or
- illness

All changes that have been agreed upon should be started no later than the non-competitive phase. If at all possible, they should be started in the non-specific or general preparation phase.

Give at least 8 weeks, minimum 4 sessions per week, for form changes to harmonise with the existing form movement-patterns.

Make sure mini-test tournaments are slated-in to the plan in order to give the new movement pattern a chance to be assessed and evaluated.

#### 6. Reasoning under fire

There are bound to be setbacks and down times for any archer. This is particularly true when new form movement patterns are being changed or altered in the sequence. Depending upon the personality of the archer and the patience level of the coach, there may be outbursts of frustration and anger during the learning and re-learning phase. There may be a tendency to trash the whole process. The coach must see the process through. If the new movement pattern fails under elite competitive situations then coach and archer must sit down to discuss possible reasons for non-compliance or inability to implement the movement as agreed upon. Perhaps the coach's communication method needs to be changed. Perhaps the archer is too worried about score and what others will think if the score level goes down during the learning process. These are all normal reactions for any athlete. The athlete wants to excel. The coach wants to assist and even propel the archer to greatness. BUT, it will not occur if there is not an open-mindedness to see change as an opportunity to experiment, learn and succeed. If, after the competitive phase, the new movement pattern has not improved performance then the



coach and archer may need to look for new strategies. That is the frustrating part of sport. It is never easy.

## REVIEW THE PLAN

The coach should return to the Annual Plan. Record the weeks when biomechanical assessment of form should take place, and when changes should be made, practiced, evaluated and tested.

Remember to read the Plan vertically not just horizontally to ensure that the archer is not overloaded with tasks and training. Discuss your choices with the workshop Facilitator.

### v) Tools of Assessment, archer strengths and weaknesses

The coach needs the following tools in order to record the good movement patterns, the archer's strengths and weaknesses.

- A one-on-one setting with no distractions for either coach or archer
- Pen and paper/rubber tubing/unstable platforms to simulate shooting conditions
- Video camera (with stop action if possible)
- Carpenter's plumb line, paper and magic marker
- Stop-watch
- Lots of time, no arbitrary deadlines

### Skills of Observation

1. Use the 2 Observation forms in your coach workbook in order to complete this task. Regard the archer from face on, behind and in line with the string elbow at full draw.
2. Have the archer shoot as many arrows as necessary in order for you to get a concise description of the archer's form using the checklist first.
3. Now, use the second observation tool to write down what things in the form caught your attention, both good and inconsistent. Write down what you think **caused** what you saw.
4. Use the Biomechanical Analysis summary sheet to priority rank what you think needs to be done, why, and in what order.

Make the archer shoot until you have watched all the parts of the sequence and understand the pattern's cause and effect.

Now videotape the archer from at least 3 angles so that you can point out your findings by referring to the tape for reinforcement of what you think causes inconsistencies. If there seems to be body sway, use the plumb line. Mark the stance and the body orientation to the target. Keep everything on file. Make the file accessible to the archer at all times.

5. Never make snap decisions. Be honest and open with the archer. If you are unable to make a rank-order and decision during this assessment session, tell the archer you want to review the

video and set another appointment date with the archer. It is not a matter of “saving face”. It is crucial to give good advice.

6. Discuss all your findings, good form and movement patterns in need of improvement in an open, non-confrontational manner. Make sure you highlight the archer’s strengths along the way since your assessment could produce anxiety and feelings of insecurity.

As reference, the ten steps to good archery form are listed on the following pages. Compare and contrast the established “benchmarks” of good form to the archer in front of you.

### Biomechanical Analysis

During the first Archery Canada Competition – Development workshop, the candidate coach will be given an opportunity to hone observation skills and assess archer form based upon biomechanical principles. The workshop Facilitator will guide you through this process using the forms in the Coach Workbook pgs. 128 - 135 - . As part of the overall assessment, the coach candidate will submit a written biomechanical analysis and video footage of the archer in the coach’s plan.

## REFERENCES

- Axford, Ray (1995). Archery Anatomy, Souvenir Press Limited, London.
- Bairstow P. J., Laszlo J. I. (1982). Complex movement patterns: learning retention and sources of error in recall. In Experimental Psychology Society 1982.
- Bennett S., Davids K., (1997). The effect of task constraints on the manipulation of visual information and the implications for specificity of learning hypothesis. In Human Movement Science vol. 16 (4) June: 379-390.
- Burkhart S., (1997). Arthroscopic Rotator Cuff Repair: indications and technique in Operative Techniques. In Sports Medicine Vol. 5, No 4 October: 204-214.
- Carr, G. (1997). Mechanics of Sport. Human Kinetics, Champaign, Illinois.
- Caulfield, C. A. (1991). Sport Nutrition for the Athletes of Canada Workbooks for Athletes and Coaches. Sports Medicine & Sciences Council of Canada, Ottawa.
- Cauraugh J. H., (1997). Skill Acquisition and Modeling: split-screen analyses. In Proceedings IX World Congress of Sport Psychology, Israel Part I: 184-186.
- Coaching Association of Canada (1981) Coaching Theory: Level III, Ottawa, Canada
- Coaching Association of Canada (1993) Task #4: Nutrition, Proceedings and Readings
- Coaching Association of Canada (1997) Task #1: Energy Systems, Proceedings and Readings
- Coaching Association of Canada Sport Nutrition Advisory Committee
- Codine P. et al (1997). Influence of sports discipline on shoulder rotator cuff balance. In Official J. Of the American College of Sports Medicine Vol. 29 No. 11 Nov: 1400-1405
- Dick F. W. (1982). Trends in training theory. In Athletic Coach, March p. 27-32.
- d'Hemecourt, P.A. Micheli, L. J. (1997) Acute and Chronic Adolescent Thoracolumbar Injuries. Sports Medicine and Arthroscopy Review, (Boston) Vol 5(3) Fall 164-171.
- Eichner, E. R. (1997). Ergogenic Aids. In New Zealand Journal of Sports Medicine Vol. 25(1).
- Federation of Canadian Archers (1984). Level IV Coach Technical Manual, Ottawa.
- Hall, S. J. (1991). Basic Biomechanics, Mosely-Year Book, Inc.
- Franke, W. Berendonk, B. (1997). Hormonal doping and androgenization of athletes: a secret program of the German Democratic Republic government. In Clinical chemistry 43:7, 1262-1279.
- Guyton, A. C., (1971). Basic Human Physiology: Normal Function and Mechanisms of Disease. W.B. Saunders Company, Toronto.
- Health Canada. Eating Well with Canada's Food Guide. Ottawa: Minister of Public Works and Government Services Canada, 2007.

Health and Welfare Canada. Nutrition Recommendations: The Report of the Scientific Review Committee. Ottawa: Minister of Supply and Services Canada; 1990.

Huebscher, J., Flachowski, G., Krink, A., Weber, C., Matthey, M., Winnefeld, K (1997). Influence of various physical exercises on the antioxidative system of untrained and trained subjects without and with additional vitamin E supplementation. In *Sportonomics (Muenchen)* 3(1) Mar. 3-7.

Jensen, C., Westgaard, R., (1997). Functional subdivision of the upper trapezius muscle during low-level activation. In *Eur. J. Appl Physiol* 76 #4: 335-339

Kramer, J.B., Stone, M. H., O'Bryant, H. S., Conley, M. S., Johnson, R. L., Nieman, D. C., Honeycutt, D. R. Hoke, T.P. (1997). Effects of single vs multiple sets of weight training: impact of volume, intensity, and variation. In *Journal of strength and conditioning research*, Champaign, Ill. 11-3, p. 143-147.

Landers D. M., Daniels F. S., (1983). Report to the Canadian Archery Team on 19 archers tested April 4-10, 1983 at Arizona State University.

Liu J. And Wrisberg C. A., (1997). The Effect of Knowledge of Results Delay and the Subjective Estimation of Movement Form on the Acquisition and Retention of a Motor Skill. In *Research Quarterly for Exercise and Sport* Vol. 68 No. 2 June: 145-151.

Kerrigan, D. C. Todd, M. K. Croce, U.D. (1998). Gender differences in joint biomechanics during walking: normative study in young adults. In *American journal of physical medicine & rehabilitation (Baltimore, Md.)* 77(1), Jan/Feb, 2-7.

Kostas, G. (1997). Gatorade Nutrition Corner. In *Handball* Vol. 47(3) June.

Kramer J. B. et al (1997). Effects of single vs. Multiple sets of weight training: impact of volume, intensity, and variation. In *J. Strength and conditioning research* Vol 11(3) August: 143-147.

Maguire, K., (1981). Prevention and Treatment of Sports Injuries. In *Australian Institute of Sport Canberra*.

Mortimer, B. K., (1997). Prediction of percent body fat in 18-26 year old men by skinfold caliper and underwater weighing methods. In *Microform Publications, Int'l Inst for Sport & Human Performance, University of Oregon*.

Mottram S. L., (1997). Dynamic stability of the scapula. In *Manual Therapy* 3(3)August, 123-131.

Nigg, B. M. Herzog, W. Ed.(1994). *Biomechanics of the Musculo-skeletal System*, John Wiley & Sons Ltd., Rexdale, Canada

Nosaka, K. Clarkson, P. M., (1997). Influence of previous concentric exercise on eccentric exercise-induced muscle damage. In *Journal of sports sciences (London)* 15(5), Oct. 477-483

Pearl, B. & Marsh, G. (1990). *Getting Stronger*, Shelter Publications, Inc., Bolinas, California.

- Provins K. A., (1997). The Specificity of Motor Skill and Manual Asymmetry: A Review of the Evidence and Its Implications. In *J. Motor Behaviour* No. 2 June: 183-192.
- Quinn J., Schmidt R., Zelaznik H., Hawkins B., Farquahar R. (1980). Target size influences on reaction time with movement time controlled. In *Journal of Motor Behaviour* V. 12, no. 4. 4.239-261.
- Schek, A. (1996). Athletic Drinks Rehydration: who, when with what? Abbreviated and edited translation *Leistungssport (Germany)* Vol. 26, N9. 4, July.
- Semjen A., Requin J. (1976). Movement amplitude, pointing accuracy and choice reaction time. In *Perceptual and Motor Skills*, no. 43, p. 807-812.
- Soar D. (1997). Building Stamina in B.C. Archery Association Training Exercises to improve archery technique Series Two: 23-24.
- Spence M., (1997). Applied Science: U.S. Olympic Committee engineers have developed a video overlay system that is improving talent with technology. In *Olympian* Vol. 23 #5: 22-23.
- Tsuji et al, (1976). Energy Metabolism and Fatigue During Archery Training. In *International Congress of Physical Activity Sciences, Quebec*.
- Turley, K. R., (1997). Cardiovascular responses to exercise in children. In *Sports medicine (Auckland, NZ)*, Oct. 241-257.
- Viitasalo J. T., Komi P. V. (1981). Effects of fatigue on isometric force and relaxation-time characteristics in human muscle. In *Acta Physiol Scand* III, p. 87-95.
- Westerterp, K. R. Goran, M. I. (1997). Relationship between physical activity related energy expenditure and body composition: a gender difference. In *International Journal of Obesity* 21(3), (Stockholm Press) 184-188.
- Williams, C. A. (1997). Children's and adolescents' anaerobic performance during cycle ergometry. In *Sports medicine (Auckland, NZ)* 24(4), Oct., 227-240
- Wong, M. Hunziker, E. B. (1998). Articular cartilage biology and mechanics. In *Sports medicine and arthroscopy review (New York)* 6(1), Jan/Mar, 4-12.
- Zatsiorsky, V. M. (1998). *Kinematics of Human Motion*. Human Kinetics, Champaign, Illinois.
- Zipp P., Arnold W., Rohmert W. (1978). Identification des points faibles de la Performance au Tir à l'arc. In *Leistungssport R.F.A.*, no. 5 p. 375-383
- Zuck G., (1997). The Elbow's Stabilizing Structures, An Evaluation of Medial and Lateral Ligaments. In *Sports Medicine Update* Vol. 12 No. 3: 8-11.

**GLOSSARY OF TERMS      Biomechanics**

Acceleration	the rate of change in velocity (speed)
Anthropometrics	study of all aspects of measurement of the human body
Axis of Rotation	the rotation of a body segment around a joint
Biomechanics	the application of Physics to analyze forces acting on living organisms
Equilibrium	product of mass and the center of gravity
Force	a push or pull that can change the state of motion
Friction	force that occurs when an object in motion comes in contact with another object
Inertia	resistance an object possesses to resist change
Kinematics	timing of the movements describe motion without regard to the force producing the motion, using only time and space
Kinetics	study of forces causing or resulting from motion
Kinesthetic Awareness	the internal perception of what the body should be doing and what it is doing
Lever	a simple machine that transmits and changes mechanical energy from one place to another
Mass	substance or matter
Stability	the force required to maintain equilibrium
Torque	a rotary or turning effect of a force
Work	force times distance

**GLOSSARY OF TERMS      Growth and Development**

<b>Ability</b>	The quality of being able to do something, especially the physical, mental, financial, or legal power to accomplish something.
<b>Adaptation</b>	Changes that occur in the organism as a result of the administration of a stimulus (i.e., training). Adaptations are usually specific to the nature of the stimulus imposed.
<b>Adolescence</b>	The period of physical and psychological development from the onset of puberty to maturity.
<b>Aerobic endurance</b>	Aerobic Endurance is the body's ability to exercise whole muscle groups over an extended period of time at moderate intensity, using aerobic energy. Your aerobic system uses oxygen to break down carbohydrates and convert them into lasting energy.
<b>Aerobic stamina</b>	The ability to sustain a dynamic effort over an extended period of time (normally, efforts lasting several minutes or even hours). Note: Intense efforts lasting between 2 and 10 minutes require a subset of this athletic ability referred to as maximum aerobic power.
<b>Agility</b>	The ability to execute movements or to move rapidly, with precision, and with ease.
<b>Balance</b>	The ability to achieve and maintain stability. There are three types of balance: (1) static balance: adopting a controlled body position in a stable environment; (2) dynamic balance: maintaining control during movement or stabilizing the body by performing muscular contractions to offset the effect of an external force; and (3) the ability to keep an object or another body under control either in a static or a dynamic manner.
<b>Biological age</b>	Age expressed relative to physiological and anatomical function and level of development in comparison to other individuals of the same chronological age.
<b>Childhood</b>	The period between birth and puberty.
<b>Chronological age</b>	Number of years and days since date of birth.
<b>Closed skill</b>	A skill that takes place in a stable, predictable environment by a performer who knows exactly what to do and when. A closed skill is therefore not affected by the environment and tends to be habitual. Movements follow set patterns, have a clear beginning and end, and tend to be self-paced, for example, a free throw in basketball or a serve in squash or tennis.
<b>Continuous skill</b>	A skill that has no particular beginning or end and lasts for many minutes, e.g. swimming or riding a bicycle.
<b>Coordination</b>	The ability to perform movements in the correct order and with the right timing.
<b>Cyclical sport</b>	A sport in which a movement is repeated over and over, e.g. swimming or running.
<b>Discrete skill</b>	A skill that features an easily defined beginning and end, and is usually of brief duration (e.g. throwing a ball).
<b>Early developer</b>	An individual whose growth spurts happen earlier than average.
<b>Flexibility</b>	The ability to perform movements of large amplitude about a joint without

	sustaining injury.
<b>Late developer</b>	An individual whose growth spurts happen later than average.
<b>Massed practice</b>	A sequence of practice and rest periods in which the rest time is much less than the practice time.
<b>Maximal aerobic power (MAP)</b>	The highest work rate or power output at which energy can be produced aerobically. MAP is determined by two factors: VO <sub>2</sub> max and mechanical efficiency. Under normal conditions, an intensity of 100% of MAP can be sustained for approximately 6 to 8 minutes.
<b>Maximal oxygen consumption (VO<sub>2</sub>max)</b>	Highest amount of oxygen that can be used by the body to produce energy when performing a particular form of exercise at maximal intensity.
<b>Maximum speed</b>	The highest rate at which a movement or a series of movements can be executed, or the ability to cover a given distance in the shortest possible time during an all-out effort of very short duration (8 seconds or less).
<b>Maximum strength</b>	The highest level of tension generated by a muscle or muscle group during a maximum contraction, regardless of the duration of the contraction.
<b>Motor ability</b>	The quality of being able to do something physical.
<b>Open skill</b>	A skill performed in an environment that is constantly changing and in which movements must be continually adapted. An open skill is predominantly perceptual and mostly externally paced, for example, a pass in football. Sports such as netball, football, and hockey usually involve open skills.
<b>Overload</b>	Making the training harder than the body is used to. In so doing, the body adapts and becomes stronger, faster, etc.
<b>Part practice</b>	The learning technique in which the task is broken down into parts for separate practice.
<b>Specificity</b>	A principle of training according to which adaptations are determined by the nature and magnitude of the training stimulus. This concept implies that, to maximize adaptation, the nature and the conditions of training activities must be designed to replicate closely those encountered in competition. Specificity therefore applies to variables such as type of activity, muscle masses involved, motor pattern, speed of movement, environmental conditions, power output, duration of effort, and cognitive and perceptual demands.
<b>Speed-endurance</b>	The ability to sustain efforts at near-maximum speed for as long as possible (normally, very intense efforts lasting between 8 and 60 seconds).
<b>Speed-strength</b>	The ability to perform a muscle contraction or overcome a resistance as fast as possible (normally, very brief efforts of 1-2 seconds).
<b>Strength-endurance</b>	The ability to perform repeated muscle contractions at intensities below maximum strength (normally, 15-30 repetitions or more).
<b>Variable practice</b>	A practice in which varying learning conditions are used, e.g. in baseball, hitting random pitches (fastball, curve, slider) versus hitting only fastballs.



## APPENDIX 1 Technique Analysis of the 10 Basic Steps to Good Archery Form

### Technique Analysis

#### Stance (step one)



Once the archer has the basic stance, clearance or other problems may manifest themselves. Consider the following:

**Regular Stance:** This offers the best alignment of the shoulders, but has the least amount of clearance. It can be advantageous for women or large chested men if the string can be pulled to the side of the chest to ensure clearance.

**Oblique:** This offers more chest clearance and a more solid base. The hips should still be close to perpendicular to the target.

**Reverse Oblique:** This is usually associated with more experienced archers. It can be used to improve the amount of pull transferred to the back. It does create some clearance problems.

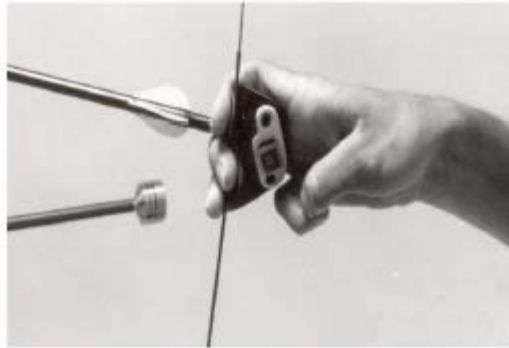
#### Nocking the Arrow (step two)



While this action may not be associated with accuracy, it still must be a technique that flows smoothly from quiver to arrow rest. The bow should be held as close to vertical as possible because it causes the least amount of interference with other archers on the line.

The process of nocking the arrow is also an opportunity for one last check of fletch and nock. The arrow should always be checked immediately after pulling from the target but this final check can add to the confidence of the shot.

### **Draw Hand and Arm (step three)**



**Recurve:** The draw hand must form a hook with the back of the hand straight from the first knuckles to the wrist.

The amount of hook should be at least to the lines formed on the inside of the last knuckle. A shallow hook may cause finger strain and does cause the string to roll off the fingers and the arrow to fall off the rest.

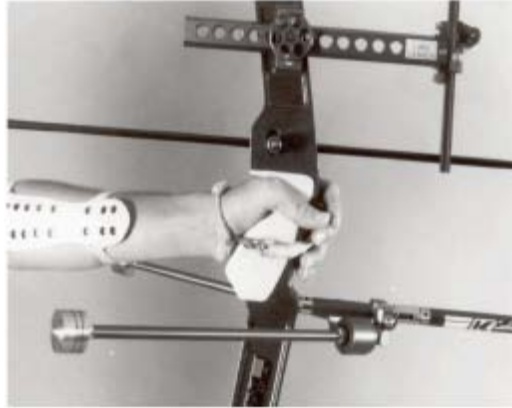
With a deeper hook, it is important to take more of the weight on the middle finger. This allows for less forearm strain and easier clearance of the other two fingers.

**Compound (with a release aid):** The attachment of the release to the string must not interfere with the arrow in any way. Rope release sometimes contacts the arrow nock. An additional nock locator is sometimes added below. Anchoring at the side of the face can cause deflection if the string contacts the cheek.

### **Bow Hand and Arm (step four)**

**Low Wrist:** This position is not possible on some bows as an almost vertical bow grip is required. Sometimes it can be accomplished by removing the bow grip. It has the advantage of stability and forgiveness and the disadvantages of naturally heeling the bow and overloading the lower limb. It is very tiring on the bow arm.

**Medium or Normal Wrist:** This is by far the most common hand position and the best for overall strength and consistency over many arrows. The weight of the bow must be taken only on the base of the thumb in such a way that the arm is in line with the pull on the handle.



**High Wrist:** The only part of the hand that contacts the bow with this hand position is the outer part between the thumb and index finger. Only the very upper part of the grip is in contact with the hand. Very little archer induced torque can be transferred to the arrow via the handle but it is very tiring to the hand and wrist.

**Bow Consideration:** Modern bows are capable of shooting arrow after arrow perfectly from a machine. However, the modern archer cannot replace that machine. The archer can transfer inconsistencies to the bow via the bow hand and grip.

The lower the hand position on the grip, the less likely small variations of hand position will be transmitted into large amounts of torque.

If however, the grip is high, the same small variance will be multiplied via this lever effect to the arrow. If the grip is too low, the archer may have a tendency to direct the bow with the palm causing undue torque.

**Bow Slings:** Most archers and coaches agree that the bow hand should be relaxed to allow the bow to react on its own. A tight grip also does not allow the bow to find its own centre of push during draw. If a light, relaxed grip is not possible due to fear of dropping the bow, then a bow sling should be used. If used, the bow sling should not interfere in any way with the bow hand placement or bow reaction.

**Bow Arm:** The bow arm and shoulder must also be in a straight line from the bow to the neck. The shoulders must always be parallel to the ground and not allowed to rise up during draw. In many cases it is also necessary to learn to rotate the elbow away from the string. This can take many months of practice but the gains in clearance are well worth the effort. The best test of efficient bow hand and arm is the amount of clearance for the bow string. You should beware of excessive arm guard slap and bow movement.

### **Drawing (step five)**

The draw is important as this is where the set of the shoulders and the strength of the shot is started. The whole process is one smooth, continuous flowing movement, which must be as consistent as possible.



There are many ways to begin the draw:

- pushing straight out with the bow arm
- pulling straight back with the string arm elbow
- pushing high then coming down
- thinking of pulling with the fingers with a chain through the arm, and pushing slightly upward and steadying down to the horizontal
- forcing the bow shoulder down, keeping the shoulders parallel to the ground

The draw arm must be brought back as one unit from the knuckles to the elbow as if the pull was coming from behind the elbow.

While watching the draw, you must ensure that the draw is constant in speed and is smooth and consistent. If any part is not correct, the shot must be aborted and started again. The consequences of not letting down doubtful shots can be disastrous.

#### **Anchor (step six)**



The anchor forms the basis of the archer's rear sight and therefore must be solid and consistent. Slight deviations here will be large at the target. The anchor should satisfy as many of the following points possible:

- the string is drawn as close to the eye line as practical
- the string touches as many reference points as possible (nose, chin, etc.)
- the hand is fully extended and relaxed
- all tension in the third joint of the fingers is eliminated
- the bow's weight is held with back and shoulder tension
- it allows for identical alignment of string and bow on each shot
- it allows for a 'clean' release
- it allows for good head position during aim, hold and release
- it allows the elbow and the draw arm to be aligned with the arrow departure line
- above all the anchor should be comfortable and easily duplicated

Anchors with a lot of facial pressure can cause deflection and seldom are any more consistent than those without.

**Sight Picture/String Alignment:** The anchor is the initial position of full draw, therefore it is necessary to note the string alignment as soon an anchor is attained. The more conscious the beginning archer is of it, the quicker it will become second nature. The inexperienced archer must find a suitable alignment point (the sight window or a non movable part of the bow) that can be easily and quickly attained. Shifts in group along the horizontal plane are clues to poor string alignment.

**Anchor Position:** The normal anchor position for recurve archers is to bring the string down the centre of the chin and nose with the string hand firmly resting against the jaw bone. This allows for a very consistent anchor that has a good sight picture and is quite easy to learn. Many recurve style shooters move the anchor to the side of the chin to allow for a longer draw and ease of pull. Care must be taken to ensure that the string still clears the nose and chin.

Many compound archers move the anchor quite a distance back on the face to bring the string peep closer to the eye and to allow for a longer arrow. The main disadvantage here is the archer is over extended and could have difficulty with hold and follow through. This style of anchor also causes problems in finding a consistent anchor and draw length.

In all anchor positions it is advisable to keep the teeth lightly clenched together without creating facial tension. This is especially important in anchors employing the jaw bone as a reference. The light clenching of the teeth ensures a consistent distance between the eye and the arrow. Archers who cannot achieve a firm bite should consult their dentist. Sometimes a plastic 'bite' can be used.

Barebow and many bow hunter style archers use the 'side of mouth' high anchor. This anchor is relatively consistent and is also very easy to learn.

### **Holding and Aiming (step seven)**



**Holding:** The coach must emphasize rhythm, consistency and timing in the hold phase. The hold phase requires adequate fitness to hold the bow without too much shaking for an entire tournament including extra arrows and shooting in windy conditions.

Over bowing is a problem faced by many archers. As a coach, you may have to do a lot of convincing if the bow is too heavy.

Holding at full draw too long will induce fatigue and unsteadiness, no matter what class of archer. The length of time at full draw will become more consistent as experience is gained. Fitter and stronger archers will resist fatigue longer.

**Aiming:** The whole shot success is determined by the quality of the aim. The archer must learn to achieve a consistent aim whatever style employed.

**The Sight:** When using a sight, the archer may shoot with only one eye open (monocular) or with both (binocular). Binocular is the recommended way of sighting as it causes less eye strain. This is usually attained by ignoring the other image. If this is not possible, a patch could be tried.

Whether to focus on the sight or the target is always a topic of heated discussion. The archer must give both an honest attempt and be ready to retry as form Improves.

### Releasing (step eight)



A satisfactory release is always clean and consistent. If this is achieved, the release is fast and hard to see. What is easy to see is a poor release. However, it is not as easy to determine the problem. Once basic form is mastered, the release is nearly an unconscious reaction.

**Release Aid:** If a release aid is properly set for tension or squeeze activation, the shooter will not be aware of the exact instant the release will let go of the string. This allows for a precise aim up to the moment of release without any apprehensions or flinches.

**Finger Release:** Plucking and/or flinching are often associated as release problems. This is seldom actually the case. If the entire shot process did not go correctly the detractors in the archers mind usually do not allow the release to flow unconsciously. Instead, the result is a collapse (flinch) trying to stop the shot, or a pluck (conscious release). The clicker and release were devised to help alleviate such problems.

**Live or Static Release:** These terms are most often referred finger release but can also be applied to the use of a release aid. Live refers to the string hand moving back on release. Static is when the hand does not move when the string is let go.

Both methods have been used with success although the live release is much more predominant among top shooters today. The static release usually indicates a lack of back tension and holding with the string hand rather than the back and arm.

### **Follow Through (step nine)**



The follow through usually shows the success of the shot. A smooth, flowing follow through usually means everything went well. Collapse or a jumpy finish usually indicates less than desirable results. The rule of thumb is that the archer keeps the bow up and in as close to shooting position as possible until the arrow hits the target. In the dynamic, explosive form of the last few decades, the bow and string arms usually move slightly toward the back on release. If either one does not move back, it usually denotes not enough tension in that area. An experienced coach can ascertain a great deal about the shot just by watching the follow through. You must watch carefully as a lot of archers know what the follow through should look like and sometimes forcibly arrive at this position after the arrow is gone.

### **Relaxation/Observation (step ten)**



Once one arrow has been shot, this step in reality, becomes step one for the next shot. This is because it is very important to put the entire last shot in the past. The archer cannot allow the success or failure of the last shot to interfere with making the next shot the best possible. Some time may be spent in observation, analyzing where the group is, or why a shot hit badly, but the mind must be cleared of the last shot before proceeding to the next.

## **APPENDIX 2: Resource material on Energy Systems**

### Energy-system Dominance

The next few pages present an overview of energy-system dominance in terms of three common patterns of effort:

- 1. Single, maximum efforts of various duration
- 2. Continuous efforts of varying intensity
- 3. Repeated efforts of various duration interspersed with recovery periods

During exercise, the dominance of one energy system over the others depends mainly on these four factors:

- Exercise intensity
- The duration of effort
- The number of efforts produced
- Recovery, if any, between efforts, as well as duration and type of recovery

Note: Given the athlete's age, training background, event specialisation, and even nutritional status, some variations may be observed in the energy system or systems that dominate in a particular type of effort.

The data presented in the following tables are therefore only general guidelines. Nonetheless, they provide a fairly accurate representation of the interplay among the energy systems and of the dominance of a particular system in specific exercise conditions.



## Common Patterns of Effort 1 Single, Maximum Efforts of Various Duration

The table below presents information on the estimated contribution of each energy system to total energy production during single, **maximum** efforts lasting from 1 second to 3 hours.

Athletic Abilities and Subsets	Duration of Effort	Estimated Contribution of Each Energy System (% of Total Energy Required During the Effort)			
		Anaerobic Alactic	Anaerobic Lactic	Aerobic	
				Glycogen	Fat
Maximum strength	< 0:03	> 95	< 5	0	0
Speed-strength	< 0:01	> 98	< 2	0	0
Strength-endurance	0:60	> 20	> 70	< 10	0
Speed	0:05	≈ 75	≈ 20 - 25	< 5	0
Speed/Speed-endurance	0:10	≈ 50 - 55	≈ 35 - 40	≈ 10	0
Speed-endurance	0:20	≈ 25 - 30	≈ 50	≈ 20	0
	0:30	≈ 20	≈ 55	≈ 25	0
	0:60	< 15	≈ 45 - 50	≈ 40	0
Speed-endurance/ Aerobic stamina (power)	2:00	< 5	≈ 30 - 35	> 60	0
Aerobic stamina (power)	4:00	< 2	< 20	≈ 80	≈ 0
	10:00	< 1	< 8	> 90	≈ 0
Aerobic stamina (power/endurance)	16:00	≈ 0	< 5	> 95	≈ 0
Aerobic stamina (endurance/power)	30:00	≈ 0	< 3	> 96	< 2
Aerobic stamina (endurance)	60:00	≈ 0	< 2	> 88	≈ 10
	120:00	≈ 0	< 1	≈ 70	≈ 30
	180:00	≈ 0	≈ 0	≈ 50	≈ 50

Here are some of the key things this table tells us about single, maximum efforts:

- The anaerobic energy systems are dominant in most types of resistance-training activities for strength, speed-strength, and strength-endurance, as well as in efforts requiring speed and speed-endurance.
- During continuous dynamic efforts such as running, cycling, skating, or swimming, the aerobic system dominates after 75 to 90 seconds of work at high intensity.

- For aerobic efforts lasting up to an hour, muscle glycogen is the most important energy source. In fact, muscle glycogen is the main energy source for all intense efforts, whether the lactic or the aerobic system dominates.

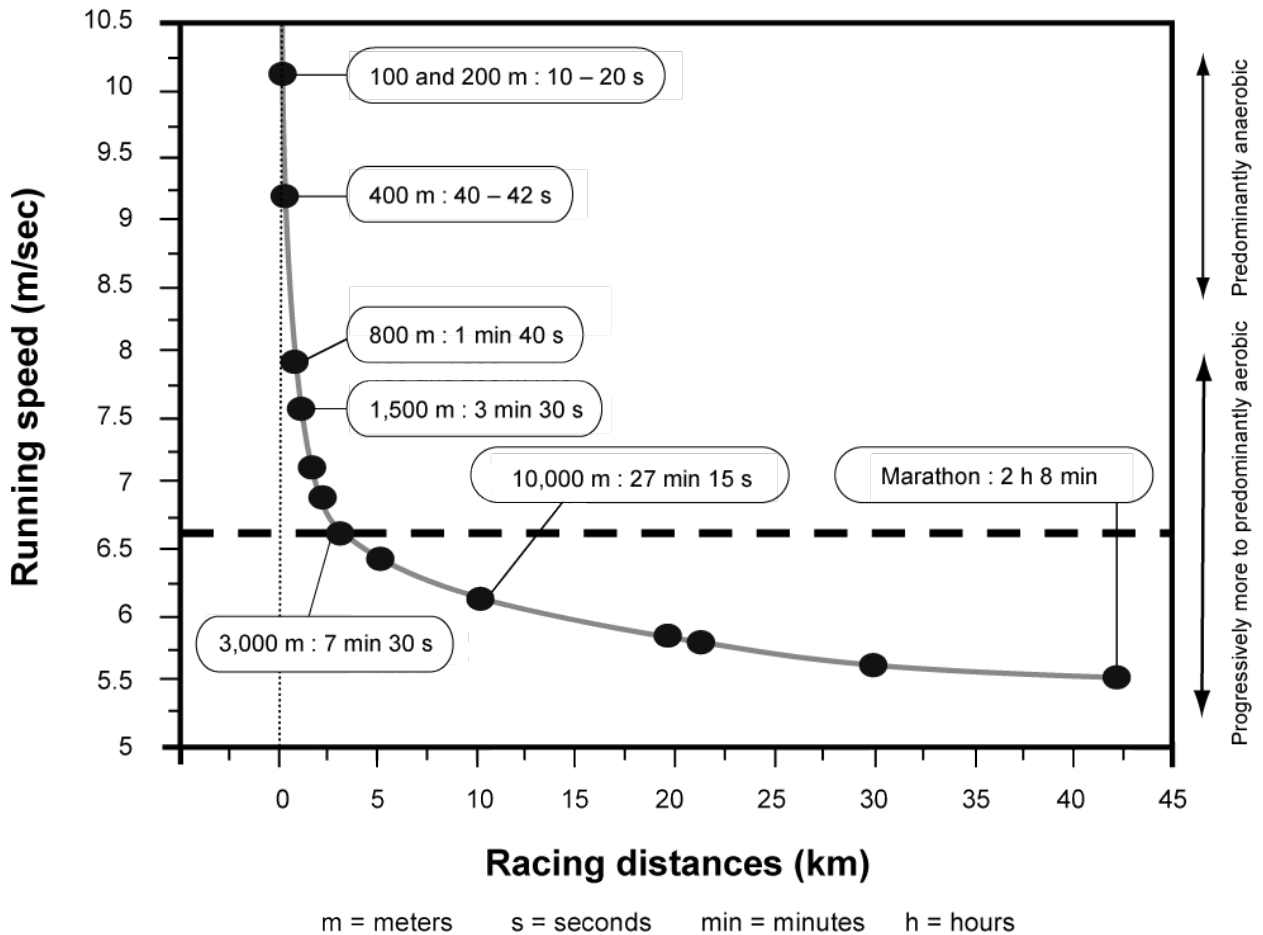
### **Relationship between Intensity and Duration of Effort**

The time for which maximum or near-maximum intensity can be sustained reflects the endurance of the primary energy system(s) involved.\

The powerful anaerobic systems have low capacity and can operate at peak power for *only a short time* and therefore have very limited endurance.

The aerobic system can function at various percentages of its own peak power for fairly long periods of time.

There is an inverse relationship between intensity (power output) and duration of effort: the higher the intensity, the shorter the time for which the effort can be sustained without a decrease in power output. The *power* and *endurance* components of the energy systems can be appreciated by examining the figure below, which shows world-class running performances by male athletes specializing in various distances in athletics.



In this figure:

- The average running speed sustained over a given distance corresponds to the power output/intensity of the exercise, while the time during which each maximal effort can be sustained indicates the upper limit of the endurance of the energy system(s) that dominates at a specific workload.

- Very high power outputs can be generated during short events, but intensity drops quickly as exercise duration increases.

- The horizontal dotted line corresponds to the average running velocity in the 3,000 m for world-class male runners. This intensity is a good indicator of the peak power of the aerobic system, and it helps to illustrate:

Look at:

- The considerable gap between the peak power output of the anaerobic and aerobic systems.

- The very limited endurance of the high-power anaerobic systems.

- The ability of the aerobic system to operate for extended periods at intensities that correspond to fairly high percentages of its own peak power.

For instance, very well trained endurance athletes can exercise at an intensity corresponding to 100% of the peak power of their aerobic system for approximately 8 minutes and can sustain intensities of 75 to 80% of their MAP for about 90 to 120 minutes.

#### Common Patterns of Effort 2 Continuous Efforts of Varying Intensity

In many sports, athletes must sustain continuous efforts for several minutes — or even hours — at a moderate to somewhat high intensity, but the pace is not always constant, and short, high-intensity efforts may occur at more or less regular intervals.

This is the case in sports like road cycling, cross-country skiing, and distance running, as well as in team sports, such as water polo or basketball, where athletes' shifts are long and sequences of play can be prolonged.

Once athletes in these sports reach the point where the aerobic system is supplying most of the energy:

- The energy needed quickly for high-intensity efforts that take place above the aerobic system's peak power is provided mainly by the *anaerobic lactic* system.
- Under these effort conditions, the contribution of the alactic system is likely to be quite low.

#### Common Patterns of Effort 3 Repeated Efforts of Various Duration interspersed with Recovery Periods

Most team, combative, artistic, or racquet sports involve repeated efforts in which intensity, duration, and recovery patterns may vary considerably. In the case of repeated bouts ranging from a few seconds to 2 or 3 minutes, the relative contribution of each energy system may be quite different from sport effort which deals with single continuous efforts.

The following play key roles in these differences:

- a) The pattern of depletion and replenishment of CP
  - b) The impact of CP depletion on power output
  - c) The type of recovery
- 
- a) Pattern of Depletion and Replenishment of CP

- The higher the intensity, the faster CP stores are depleted at the beginning of exercise. During an intense effort, CP stores can be almost entirely depleted in 10 to 12 seconds. If the effort is really all-out, stores can deplete in even less time.
- CP stores diminished at the beginning of an intense effort remain low as long as the muscles continue to work. Active muscles must therefore *recover* for CP to replenish.
- CP replenishes fairly quickly during the recovery that follows a short, very intense effort. But how fast CP stores replenish depends on how intense the exercise was. The table below shows how fast CP replenishes.

It takes CP stores about this long (min : sec)	To reach this percentage of their resting value after ...	
	An intense effort	A truly all-out effort
0:30	50%	40%
1:00	75%	60%
1:30	85%	75%
2:00	90%	80%
8:00	> 95%	> 90%

- If recovery between successive efforts is long enough, CP stores return to a level that allows the alactic system to play an important role in energy production during the first few seconds of another intense bout.
- If recovery is not long enough and the athlete performs another high-intensity effort, the lactic system — and eventually the aerobic system — has to produce more energy during the early part of the following bout.

#### b) The Impact of CP Depletion on Power Output

If several consecutive high-intensity efforts take place and recovery between them does not allow CP stores to replenish, the contribution of the lactic and aerobic systems to energy production increases in each successive effort. After a few repetitions, the lactic system may become dominant during work intervals, even if they are very short. After many repetitions, this can even be the case for the aerobic system if recovery time is short.

Since the peak power of these systems is lower than that of the alactic system, the athlete's power output tends to decline as the repetitions continue, *even though the athlete feels he or she is producing an all-out effort each time*. For instance, in sprinting, speed decreases, and it takes longer to cover a given distance.

#### c) Type of Recovery

As mentioned above, athletes must recover enough between bouts for CP stores to be replenished. But the type of recovery is also critical in this process. Here are a few key points about how the type of recovery affects the replenishment of CP stores:

- An active recovery between high-intensity bouts allows athletes to perform better in subsequent efforts compared to a completely passive recovery. If athletes want to repeat a series of short efforts at near-maximal power output, they should avoid complete inactivity during pauses and exercise very lightly (e.g., walk or pedal at low frequency against a very low resistance).
- Active recovery at somewhat higher intensities is **not** recommended, as it may interfere with the optimal replenishment of CP stores.

Even in exercise lasting only a few seconds, the alactic system is not always dominant, especially if (1) several repetitions take place and (2) recovery between each repetition is short.

#### Estimated Contribution of Each Energy System during Repeated Efforts

The two tables that follow provide information on likely energy-system dominance, given effort duration for high-intensity efforts with different types of recovery:

- In the first table, recovery is either passive (i.e., no activity whatsoever is performed) or consists of *very light* activity such as walking.
- In the second table, recovery consists of activity performed at an intensity lower than the effort bout, yet well above resting level (e.g., running at a moderate intensity after a sprint).

**Note:** If the efforts produced are all-out during the first few bouts, 1) the lactic system will likely become dominant over the alactic system sooner in the series, and 2) the aerobic system will likely become dominant over the lactic system sooner in the series.

Likely Energy-system Dominance in Consecutive High-intensity Efforts when Recovery Consists of *Complete Rest or Very Light Exercise* between Bouts

Duration of Effort (min:s)	Duration of Recovery (min:s)	W:R*	Energy System Likely to Dominate in Work Intervals as Of...			
			2 <sup>nd</sup> Rep	5 <sup>th</sup> Rep	10 <sup>th</sup> Rep	15 <sup>th</sup> Rep
00:05	01:00	1:12	Alactic	Alactic	Alactic	Lactic/Alactic
	00:30	1:6	Alactic	Alactic	Lactic	Lactic
	00:10	1:2	Alactic	Lactic	Lactic	Lactic/Aerobic
	00:05	1:1	Alactic	Lactic	Lactic	Aerobic
00:10	02:00	1:12	Alactic	Alactic	Alactic/Lactic	Lactic/Alactic
	01:00	1:6	Alactic/Lactic	Lactic	Lactic	Lactic
	00:30	1:3	Lactic/Alactic	Lactic/Alactic	Lactic/Aerobic	Aerobic/Lactic
	00:20	1:2	Lactic/Alactic	Lactic	Aerobic/Lactic	Aerobic
	00:10	1:1	Lactic/Alactic	Lactic	Aerobic	Aerobic
	00:05	2:1	Lactic	Lactic	Aerobic	Aerobic
00:20	03:00	1:9	Lactic/Alactic	Lactic	Lactic	Lactic
	01:30	≈ 1:5	Lactic/Alactic	Lactic	Lactic	Aerobic
	00:40	1:2	Lactic	Lactic	Aerobic	Aerobic
	00:20	1:1	Lactic	Lactic/Aerobic	Aerobic	Aerobic
	00:10	2:1	Lactic	Lactic/Aerobic	Aerobic	Aerobic
	00:05	4:1	Lactic	Aerobic/Lactic	Aerobic	Aerobic
00:30	05:00	1:10	Lactic	Lactic	Lactic	Lactic
	02:30	1:5	Lactic	Lactic	Lactic	Lactic/Aerobic
	01:00	1:2	Lactic	Lactic/Aerobic	Aerobic/Lactic	Aerobic
	00:30	1:1	Lactic	Aerobic/Lactic	Aerobic	Aerobic
	00:15	2:1	Lactic	Aerobic/Lactic	Aerobic	Aerobic

Duration of Effort (min:s)	Duration of Recovery (min:s)	W:R*	Energy System Likely to Dominate in Work Intervals as Of...			
			2 <sup>nd</sup> Rep	5 <sup>th</sup> Rep	10 <sup>th</sup> Rep	15 <sup>th</sup> Rep
	00:10	3:1	Lactic	Aerobic	Aerobic	Aerobic
<b>01:00</b>	05:00	1:5	Lactic	Lactic	Lactic/Aerobic	Lactic/Aerobic
	03:00	1:3	Lactic	Lactic	Aerobic/Lactic	Aerobic/Lactic
	02:00	1:2	Lactic	Aerobic/Lactic	Aerobic	Aerobic
	01:00	1:1	Lactic/Aerobic	Aerobic	Aerobic	Aerobic
	00:30	2:1	Aerobic/Lactic	Aerobic	Aerobic	Aerobic
	00:20	3:1	Aerobic/Lactic	Aerobic	Aerobic	Aerobic
	00:10	6:1	Aerobic	Aerobic	Aerobic	Aerobic
<b>01:30</b>	07:30	1:5	Lactic/Aerobic	Lactic/Aerobic	Aerobic/Lactic	Aerobic/Lactic
	04:30	1:3	Lactic/Aerobic	Aerobic/Lactic	Aerobic/Lactic	Aerobic/Lactic
	03:00	1:2	Lactic/Aerobic	Aerobic/Lactic	Aerobic	Aerobic
	01:30	1:1	Aerobic/Lactic	Aerobic	Aerobic	Aerobic
	00:45	2:1	Aerobic	Aerobic	Aerobic	Aerobic
	00:30	3:1	Aerobic	Aerobic	Aerobic	Aerobic
	00:15	6:1	Aerobic	Aerobic	Aerobic	Aerobic

\* W:R refers to work-rest ratio.

**Note 1:** The patterns of effort and recovery outlined in the table above are not necessarily optimal for the development of specific athletic abilities or energy systems and must not be interpreted as recommended training methods.

**Note 2:** Given the conditions specified, more than one energy system may contribute significantly during a particular work interval. In this case, the one most likely to dominate appears first.

**Note 3:** The absolute intensity of each effort may decline progressively over the repetitions.



Likely Energy-system Dominance in Consecutive High-intensity Efforts when Recovery Consists of *Moderate-intensity Exercise* between Bouts

Duration of Effort (min:s)	Duration of recovery (min:s)	W:R *	Energy System Likely to Dominate in Work Intervals as Of ...			
			2 <sup>nd</sup> Rep	5 <sup>th</sup> Rep	10 <sup>th</sup> Rep	15 <sup>th</sup> Rep
<b>00:05</b>	01:00	1:12	Alactic	Lactic	Lactic	Lactic
	00:30	1:6	Alactic	Lactic	Lactic	Lactic
	00:10	1:2	Alactic	Lactic	Lactic	Lactic/ Aerobic
	00:05	1:1	Alactic	Lactic	Lactic/ Aerobic	Aerobic
<b>00:10</b>	02:00	1:12	Alactic/Lactic	Lactic	Lactic	Lactic
	01:00	1:6	Lactic/Alactic	Lactic	Lactic	Lactic
	00:30	1:3	Lactic/Alactic	Lactic	Lactic/ Aerobic	Aerobic/ Lactic
	00:20	1:2	Lactic/Alactic	Lactic	Lactic/ Aerobic	Aerobic/ Lactic
	00:10	1:1	Lactic	Lactic	Aerobic/ Lactic	Aerobic
	00:05	2:1	Lactic	Lactic	Aerobic	Aerobic
<b>00:20</b>	03:00	1:9	Lactic	Lactic	Lactic	Lactic
	01:30	≈ 1:5	Lactic	Lactic	Lactic	Lactic/ Aerobic
	00:40	1:2	Lactic	Lactic	Aerobic/ Lactic	Aerobic
	00:20	1:1	Lactic	Lactic/ Aerobic	Aerobic/ Lactic	Aerobic
	00:10	2:1	Lactic	Lactic/ Aerobic	Aerobic	Aerobic
	00:05	4:1	Lactic	Lactic/ Aerobic	Aerobic	Aerobic
<b>00:30</b>	05:00	1:10	Lactic	Lactic	Lactic	Lactic
	02:30	1:5	Lactic	Lactic	Lactic	Lactic/ Aerobic
	01:00	1:2	Lactic	Lactic/ Aerobic	Aerobic/ Lactic	Aerobic
	00:30	1:1	Lactic	Aerobic/ Lactic	Aerobic	Aerobic
	00:15	2:1	Lactic	Aerobic	Aerobic	Aerobic

Duration of Effort (min:s)	Duration of recovery (min:s)	W:R *	Energy System Likely to Dominate in Work Intervals as Of ...			
			2 <sup>nd</sup> Rep	5 <sup>th</sup> Rep	10 <sup>th</sup> Rep	15 <sup>th</sup> Rep
	00:10	3:1	Lactic	Aerobic	Aerobic	Aerobic
<b>01:00</b>	05:00	1:5	Lactic/ Aerobic	Aerobic/ Lactic	Aerobic/ Lactic	
	03:00	1:3	Aerobic/ Lactic	Aerobic/ Lactic	Aerobic	
	02:00	1:2	Aerobic/ Lactic	Aerobic/ Lactic	Aerobic	
	01:00	1:1	Aerobic/ Lactic	Aerobic	Aerobic	
	00:30	2:1	Aerobic/ Lactic	Aerobic	Aerobic	
	00:20	3:1	Aerobic/ Lactic	Aerobic	Aerobic	
	00:10	6:1	Aerobic	Aerobic	Aerobic	
<b>01:30</b>	07:30	1:5	Aerobic/ Lactic	Aerobic/ Lactic	Aerobic	
	04:30	1:3	Aerobic/ Lactic	Aerobic/ Lactic	Aerobic	
	03:00	1:2	Aerobic/ Lactic	Aerobic	Aerobic	
	01:30	1:1	Aerobic/ Lactic	Aerobic	Aerobic	
	00:45	2:1	Aerobic	Aerobic	Aerobic	
	00:30	3:1	Aerobic	Aerobic	Aerobic	

\* *W:R* refers to work-rest ratio.

**Note 1:** The patterns of effort and recovery outlined in the table above are not necessarily optimal for the development of specific athletic abilities or energy systems and must not be interpreted as recommended training methods.

**Note 2:** Given the conditions specified, more than one energy system may contribute significantly during a particular work interval. In this case, the one most likely to dominate appears first.

**Note 3:** The absolute intensity of each effort may decline progressively over the repetitions.

### APPENDIX 3: Detailed Guidelines for Developing Athletic Abilities in low importance in archery

#### Guidelines for Developing Speed

- Activities must be dynamic (i.e. involve movement and changes of position) and be highly sport-specific; they must also closely replicate the particular movements for which increased speed is desired (adaptations are very specific).
- Movements must be performed at maximal or near-maximal speed.
- For speed to remain high, each repetition must be relatively short (approximately 5-8 seconds).
- Rest between repetitions has to be long enough to allow for sufficient recovery; this will enable the athlete to perform other repetitions at a high speed. Rest intervals can be as many as 12-15 times longer than work periods (e.g. 5 seconds of sprinting followed by 60 seconds of rest).
- Rest periods should consist of very light activity involving the muscles used during the work periods (e.g. a slow walk if the athlete was sprinting.)
- The total number of repetitions must not be too high; approximately 10-12 is the norm, as speed tends to decrease thereafter because of fatigue. It is a good idea to divide repetitions into sets (e.g. 2 sets of 5 repetitions each).
- To avoid injury, athletes should be well warmed up before performing intense exercise.
- Activities aimed at improving speed should be scheduled at the beginning of the main part of the practice session, when athletes are not yet tired.

#### Guidelines for Developing Speed-Endurance

**Note:** The systematic development of speed-endurance is **not** recommended before puberty.

- Activities should be dynamic (i.e. involve movement and changes of position) and be highly sport-specific; they must also include the particular movements for which increased speed-endurance is desired (adaptations are very specific).
- The movements must be performed at high speed, but *slightly below* maximum speed. Although high, speed should also be controlled so that it is possible to sustain the effort for between 10 to 45-60 seconds without any significant drop in intensity. For short efforts (e.g. 10-20 seconds), the controlled speed should be close to maximum speed; conversely, if the effort is longer (e.g. 20 seconds and more), speed will have to decrease.
- Rest between repetitions has to be long enough to allow for sufficient recovery; this will enable the athlete to perform other repetitions at a high speed. Rest intervals can be as much as 5-8 times longer than work periods (e.g. 20 seconds of effort followed by 2 minutes of rest; in this case, the duration of the rest period is 6 times the duration of the intense effort).

- Rest periods should consist of very light activity involving the muscles used during the work periods (e.g. jogging or walking after an intense run).
- For intense efforts lasting approximately 15 to 30 seconds, the total number of repetitions should be between 6 and 12. It is a good idea to divide the repetitions into sets (e.g. 2 sets of 6 repetitions each).
- For intense efforts lasting approximately 30 to 45 seconds, the total number of repetitions should be between 4 and 8. It is a good idea to divide the repetitions into sets (e.g. 2 sets of 4 repetitions each).
- It is also possible to develop speed-endurance in sport-specific situations by alternating high-intensity efforts of approximately 30 to 45 seconds with longer active recovery periods at a much lower intensity.
- To avoid injuries, athletes should be well warmed-up before engaging in intense efforts.
- Activities to develop endurance-speed should take place when the athletes are not yet tired.

#### Guidelines for Developing Aerobic Stamina

- The effort should be dynamic, and it should involve large muscle masses (running, cycling, swimming, skating, etc.).
- The sport itself can also be used to develop aerobic stamina (e.g. soccer, basketball, volleyball, judo); in this case, however, it might be necessary to modify the normal competition conditions of the sport to achieve the desired training effect (see below).
- The effort must be sustained for a few minutes (3 to 5, often more), and the athletes have to be active for most of that time (e.g. moving as much as possible).
- The speed of execution (i.e. the intensity) can vary, but it should not be lower than what would be considered a moderate intensity for the athlete's age.
- The same intensity or speed of execution may not be suitable for every athlete; it is important to recognise that work intensity may have to be individualised.
- The activity or exercise can be continuous (i.e. no rest periods) or intermittent (alternating periods of work and recovery).
- Fatigue may occur during low- to moderate-intensity efforts (e.g. 30 minutes of cycling or 20 minutes of running) because of the longer duration.
- If the efforts are intense, active rest periods may be included between periods of activity (e.g. 2 minutes of effort followed by approximately 1 minute of less intense effort, repeated for a total period of 15 minutes, or 1 minute of effort followed by approximately 30 seconds of rest, repeated for a total period of about 10 minutes); this type of intermittent effort usually allows athletes to maintain a relatively high intensity without causing too much fatigue.
- The same principles can apply to team sports, where athletes are asked to play non-stop in a limited area for 5 to 10 minutes; in this type of activity, all athletes must be moving at all times. Coaches should have extra balls, pucks, etc., on

hand to keep the level of activity high and to minimize recovery periods during the activity when the control implement is lost.

### Guidelines for Developing Tactics

- The activity should imitate elite competitive or real-play situations at athletes' performance level.
- Athletes must have a clear understanding of the desired objective for the situation/activity (e.g. quick transition to outnumber the opponent, surprise an opponent to gain an advantage in a particular situation).
- The situation should involve some degree of uncertainty and should present a number of options to athletes. Avoid stereotypical and predictable situations where the athletes do not have to think or focus.
- Athletes should be encouraged to be creative.
- The activity should be performed at game speed; in some cases, especially in the first few trials or to ensure that athletes have a clear understanding of the intent of the activity, the pace can be somewhat slower.
- Ask athletes about their choices or decision-making process to help them discover the options available to them. This approach requires athletes to reflect critically on their choices.
- Some examples of questions include:
  - What did you see in the situation?
  - What choices did you think you had, and what did you think would have been the possible outcomes of each?
  - What clues did you use to guide your choice(s)?
  - What were you hoping would occur as a result of your choice(s)?
  - What do you think is the best way to gain an advantage over the opponent in this situation? Why?
  - What can you do to hide your intentions from the opponent for as long as possible?
  - What actions can you take to make the opponent unsure about what you want to do or about where and when you will do it?

APPENDIX 4: NCCP guidelines on growth and development.

## Growth and Development Considerations, 3-5 Years

<b>General</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Cannot see the difference between what is real and what is not</li> <li><input type="checkbox"/> Lives in a world where imagination and imitation are predominant</li> <li><input type="checkbox"/> Highly dependent on parents</li> <li><input type="checkbox"/> Needs to have a well-established routine in daily activities</li> </ul>
<b>Psycho-social</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Highly individualistic, even egocentric</li> <li><input type="checkbox"/> May be afraid of strangers</li> <li><input type="checkbox"/> Boys and girls may be involved in the same activities without any problem</li> <li><input type="checkbox"/> Constantly compares self to others</li> <li><input type="checkbox"/> Recognition and appreciation of all that is done by parents and other close individuals is important</li> </ul>
<b>Learning</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Period of life where significant progress occurs in areas such as ability to learn, intelligence, and language; is capable of understanding concepts such as age, time, space, and morality (good-bad)</li> <li><input type="checkbox"/> Limited ability to concentrate (very short attention span); difficulty understanding abstract concepts</li> <li><input type="checkbox"/> Limited ability to reason and solve problems</li> <li><input type="checkbox"/> Cannot take into account most of the information or stimuli from the environment</li> </ul>
<b>Physical</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Growth rate is slightly reduced compared to the first two years of life; body proportions become more balanced; head is fragile</li> <li><input type="checkbox"/> Resting heart rate and heart rate during exercise higher compared to adults</li> <li><input type="checkbox"/> Development of the nervous system takes place at a very high rate during this period; growth of the brain is approximately 75% completed at three years of age, 90% at the age of six</li> <li><input type="checkbox"/> Hand-eye coordination is improved, as well as speed/rhythm of execution of fundamental movements; increased control of movements, which remain somewhat jerky</li> <li><input type="checkbox"/> Motor performance is highly linked to kinaesthetic and touch senses</li> <li><input type="checkbox"/> At age five, activities such as walking or running are usually well mastered and can be incorporated into games; 35 metres can be run in approximately 10 seconds</li> </ul>
<b>Preferences</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Likes activities that stimulate several different senses and the imagination</li> <li><input type="checkbox"/> Likes simple games with easy-to-understand tasks and rules</li> <li><input type="checkbox"/> Prefers individual activities, yet will share his or her environment of play with others</li> </ul>
<b>To avoid</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Any activity that is structured or requires attention</li> <li><input type="checkbox"/> Activities that feature repeated impacts or where there is a risk of collision</li> <li><input type="checkbox"/> Repetitive activities (to prevent boredom and also overuse injuries)</li> <li><input type="checkbox"/> Exposure to a cold or a hot environment</li> </ul>

- Comparisons with other children
- Emphasizing the result or performance

**Suggestions**

- Activities that feature a variety of motor experiences and emphasize the kinaesthetic sense (e.g. knowledge of the body and its parts, and their positioning in space)
- Encourage the child to use both sides of his or her body during the execution of new movements
- Simple explanations and manual assistance to the child during the execution of the movement
- All activities should take the form of games, be short and varied
- The instructions and the teaching must be specific, simple, and aimed at a very clear objective
- Creation of small groups where activities take the form of games, with focus on psychomotor development (balance, coordination, movements in all directions, various forms of movement); where possible, parents should be involved, thus creating an opportunity to consolidate a close relationship with the child through play
- Children need to be praised and complimented generously and regularly for their efforts

## Growth and Development Considerations, 6-7 Years

<b>General</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> At this age, the child remains fairly individualistic and self-centred; needs a lot of attention and must be in the company of an adult or in a small group</li> <li><input type="checkbox"/> High dependence on parents</li> <li><input type="checkbox"/> Acknowledges the coach as the leader</li> <li><input type="checkbox"/> Needs to have a well-established routine in daily activities</li> <li><input type="checkbox"/> Has no athletic or elite competitive background</li> <li><input type="checkbox"/> Interest in sport activities may begin to grow</li> <li><input type="checkbox"/> Many children participate in sports because their friends also participate</li> </ul>
<b>Psycho-social</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Rather individualistic; often tries to expand social circle and the number of friends, especially with individuals of the same sex</li> <li><input type="checkbox"/> Sometimes shy</li> <li><input type="checkbox"/> Is conscious of own feelings and emotions and of those of others toward him or her; can play on these feelings to obtain privileges</li> <li><input type="checkbox"/> Self-esteem is strongly linked to the perception of having succeeded</li> <li><input type="checkbox"/> Boys and girls can be involved in the same activities without difficulty</li> </ul>
<b>Learning</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Learns best by observing, quickly followed by doing</li> <li><input type="checkbox"/> Short attention span (a few minutes)</li> <li><input type="checkbox"/> Ability to reason is limited to what is readily observable</li> <li><input type="checkbox"/> May be afraid of the unknown</li> <li><input type="checkbox"/> Is likely to imitate and be highly imaginative; is often curious and wants to know everything</li> <li><input type="checkbox"/> Is aware of certain environmental stimuli</li> <li><input type="checkbox"/> The dominant side for manual dexterity is established</li> </ul>
<b>Physical</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Development of the nervous system is almost complete</li> <li><input type="checkbox"/> Rate of physical growth is constant, yet relatively slow; on average, little difference is observed between boys and girls with regard to height and weight</li> <li><input type="checkbox"/> Head is still very fragile; bones, tendons, muscles, and ligaments cannot sustain heavy loads</li> <li><input type="checkbox"/> Always seems to be moving; coordination is not very well developed; endurance is low</li> <li><input type="checkbox"/> Resting heart rate and heart rate during exercise are higher than for adults; resting heart rate is approximately 100 bpm</li> <li><input type="checkbox"/> Aerobic metabolism predominates during effort; low anaerobic capacity</li> <li><input type="checkbox"/> Sweating mechanism of children is not well developed, which reduces their capacity to dissipate heat during exercise; children are at an increased risk of heat injuries; children cool off rapidly and do not tolerate cold well</li> </ul>
<b>Preferences</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Enjoys individual activities, with some interaction with the group (e.g. tag); likes to throw, catch, hit, kick, run, jump, climb, and also other activities where the whole body is involved</li> <li><input type="checkbox"/> Enjoys all types of activities that require imagination or involve imitating an adult</li> <li><input type="checkbox"/> Games should encourage creativity and have few rules</li> </ul>



<b>To avoid</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Activities that require repeated impact or where there is a risk of collision</li> <li><input type="checkbox"/> Repetitive activities and activities that feature too much structure (to prevent boredom and overuse injuries)</li> <li><input type="checkbox"/> Exercising in a very cold or hot environment</li> <li><input type="checkbox"/> Using equipment that is not designed for children (i.e. too big, too heavy)</li> <li><input type="checkbox"/> Specialization in a sport or in a position</li> <li><input type="checkbox"/> Repetition of all-out efforts lasting between 20 and 60 seconds; work against a high resistance; prolonged aerobic endurance efforts</li> <li><input type="checkbox"/> Emphasizing the result or performance</li> <li><input type="checkbox"/> Negative elite competitive experiences</li> <li><input type="checkbox"/> Comparisons with other children</li> <li><input type="checkbox"/> Lengthy explanations</li> <li><input type="checkbox"/> Negative criticism</li> </ul>
<b>Suggestions</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> All activities should take the form of games; conditions in which activities or games take place should be varied to promote the development of a variety of motor patterns and skills</li> <li><input type="checkbox"/> Rules should be adapted to encourage a high degree of interaction between children and to increase the probability of success during the activity; modified, scaled-down equipment should be used</li> <li><input type="checkbox"/> Demonstrations should be highly specific, simple, and aimed at the achievement of a well-defined objective; duration of activities should be relatively short, and exercises should change frequently</li> <li><input type="checkbox"/> Children need to be praised and complimented generously and regularly for their efforts; feedback should focus on one point only; choose the most important one; children should be encouraged to be proud of their own performance and to congratulate others for theirs</li> <li><input type="checkbox"/> Basic motor abilities should be developed through games; techniques should be introduced in ways that stimulate the child's imagination (e.g. refer to a funny situation of the child's life, a cartoon)</li> <li><input type="checkbox"/> Encourage children to drink water, and in hot conditions, ensure that there are plenty of drinks available</li> </ul>
<b>Examples</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Relay or obstacle races</li> <li><input type="checkbox"/> Somersaults, pirouettes, jumps, runs, lateral movements, rope climbing, rope skipping, use of play structures, sliding, throwing, catching, passing a ball with hands or feet, hitting a ball</li> <li><input type="checkbox"/> Basic strength exercises using the child's own body weight (push-ups, pull-ups, squats with own body weight)</li> </ul>

## Growth and Development Considerations, 8-9 Years

<b>General</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Has a high degree of imagination; being active is very important; likes to work, learn, and accomplish things</li> <li><input type="checkbox"/> Still needs a well-established routine in daily activities</li> <li><input type="checkbox"/> Wants to act on his or her own; does not like conventions or norms, but will accept the coach's instructions if feels that he or she is helping to establish the rules and conditions governing the activity</li> <li><input type="checkbox"/> Very little or no athletic background</li> <li><input type="checkbox"/> Interest in sport activities is often high; many children participate in sports because their friends also participate</li> <li><input type="checkbox"/> Some early developers, particularly girls, may be entering puberty</li> </ul>
<b>Psycho-social</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Is still individualistic and self-centred, but shows an increasing interest in the group; wants to be accepted by others, and usually shows a great deal of loyalty toward the team</li> <li><input type="checkbox"/> Needs praise and positive feedback</li> <li><input type="checkbox"/> Self-esteem is strongly linked to the perception of having succeeded</li> <li><input type="checkbox"/> Is conscious of own feelings and emotions and of those of others toward him or her; can play on these feelings to obtain privileges</li> <li><input type="checkbox"/> Seeks the approval of others; may reject opportunities to interact with individuals of the opposite sex</li> <li><input type="checkbox"/> Boys and girls may be involved in the same activities without difficulty</li> </ul>
<b>Learning</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Accepts following instructions to learn faster and reacts favourably to positive feedback/praise; ability to concentrate and to pay attention is relatively good; can begin to make some generalizations</li> <li><input type="checkbox"/> The emphasis should be on motor development and the learning of skills in a variety of sports</li> <li><input type="checkbox"/> It is possible to start teaching the rules of the game and fundamental tactical principles</li> <li><input type="checkbox"/> Is capable of assessing the angles of moving objects (e.g. balls), yet may still have some difficulty distinguishing between right and left</li> <li><input type="checkbox"/> Ability to reason and solve problems is limited to what can be observed</li> </ul>
<b>Physical</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Physical characteristics are similar to children aged 6-7, but coordination and stamina are better; growth rate is slow, which tends to allow for a greater degree of motor control and autonomy</li> <li><input type="checkbox"/> The development of the nervous system is almost complete</li> <li><input type="checkbox"/> Reaction time is slow; shows an increased ability to make coordinated and quick movements</li> <li><input type="checkbox"/> Large muscle masses (e.g. the legs) show a greater degree of development compared to smaller ones (e.g. arms, hands)</li> <li><input type="checkbox"/> Very little potential for increased muscle mass (hypertrophy); strength gains result primarily from increased coordination and neural factors</li> <li><input type="checkbox"/> Resting heart rate and heart rate during exercise are higher than for adults; aerobic metabolism predominates during effort, and anaerobic capacity is low</li> <li><input type="checkbox"/> The sweating mechanism of children is not well developed, which reduces their capacity to dissipate heat during exercise; children are at an increased risk of heat injuries; children cool</li> </ul>

off rapidly and do not tolerate cold well
<b>Preferences</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Enjoys individual or group games and drills where athletes are paired</li> <li><input type="checkbox"/> Likes activities where the whole body is involved (e.g. jumping, running)</li> <li><input type="checkbox"/> Likes to assume some responsibility and to take part in decisions relating to games or activities played</li> <li><input type="checkbox"/> Prefers activities that will allow him or her to shine and to be successful</li> </ul>
<b>To avoid</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Activities that feature repeated impacts or where there is a risk of collision</li> <li><input type="checkbox"/> Activities that are too structured. Mechanical or highly repetitive approach to the teaching of fundamental techniques</li> <li><input type="checkbox"/> Use of equipment or balls that are not designed for children</li> <li><input type="checkbox"/> Specialization in a sport or a position</li> <li><input type="checkbox"/> Repetition of all-out efforts lasting between 20 and 120 seconds; work against high resistance; prolonged aerobic endurance efforts</li> <li><input type="checkbox"/> Exposure to a cold or hot environment</li> <li><input type="checkbox"/> Emphasizing winning and creating pressure to perform</li> <li><input type="checkbox"/> Comparisons with other children</li> <li><input type="checkbox"/> Negative elite competitive experiences</li> <li><input type="checkbox"/> Lengthy explanations</li> <li><input type="checkbox"/> Negative criticism</li> </ul>
<b>Suggestions</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Establish guidelines for acceptable behaviour, and act in a constant and predictable manner; however, accept each child unconditionally</li> <li><input type="checkbox"/> Children need to be praised and complimented generously and regularly for their efforts; feedback must focus on one point only; choose the most important one; emphasize the following: development of confidence, self-esteem, peer interaction, cooperation, having fun, putting winning and losing into perspective, and giving 100% effort</li> <li><input type="checkbox"/> Demonstrations must be highly specific, simple, and aimed at the achievement of a well-defined objective; duration of activities must be relatively short, and exercises must change frequently</li> <li><input type="checkbox"/> Focus on activities that are aimed at developing coordination, balance, and proper motor patterns; encourage participation in a variety of sports and activities; encourage the use of both right and left hands and feet whenever possible to enhance motor patterns and improve coordination; good age to use speed games</li> <li><input type="checkbox"/> Modified, scaled-down equipment should be used; set up competitive games where ability levels are matched</li> <li><input type="checkbox"/> Create opportunities for the child to demonstrate the progress he or she has made; rules should be adapted to encourage a high degree of interaction between athletes and to increase the probability of success during the activity</li> <li><input type="checkbox"/> Encourage children to drink water, and ensure that plenty of drinks are available when exercising in the heat</li> </ul>

## Growth and Development Considerations, 10-11 Years

<b>General</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Develops conscience, morality, and values</li> <li><input type="checkbox"/> May display a highly competitive attitude (wants to look like a competent performer)</li> <li><input type="checkbox"/> Marked distinctions between boys and girls begin to be visible, particularly toward the end of this period</li> <li><input type="checkbox"/> May want to break free from the authority of adults and may show a defiant attitude</li> <li><input type="checkbox"/> Athletic background may be highly variable among athletes; participation in sport activities is often done on an annual basis, in programs that can be relatively short (a few weeks)</li> <li><input type="checkbox"/> Time devoted to general training and acquisition of a variety of skills and motor patterns should be greater than time spent training for a specific activity, preparing for competition, or competing</li> </ul>
<b>Psychosocial</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Is usually very interested in group activities and creates strong links with a few friends</li> <li><input type="checkbox"/> Wants to enjoy a greater degree of autonomy and wants to help</li> <li><input type="checkbox"/> Shows a high degree of loyalty to the group</li> <li><input type="checkbox"/> Begins to be interested in individuals of the opposite sex, without showing it openly</li> <li><input type="checkbox"/> Expresses his or her feelings easily (e.g. anger, sadness)</li> <li><input type="checkbox"/> Boys and girls can be involved together in the same activities</li> </ul>
<b>Learning</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Begins to show some ability to deal with abstract concepts, yet prefers concrete examples</li> <li><input type="checkbox"/> Emphasis should still be on general motor development and the learning of skills in a variety of sports</li> <li><input type="checkbox"/> Fine motor control improves during this period</li> <li><input type="checkbox"/> It is possible to start teaching a few specialized techniques, as well as fundamental tactical principles; the rules of the games should be well understood</li> <li><input type="checkbox"/> Capacity to concentrate increases (can stay focused for approximately 10 minutes at a time)</li> </ul>
<b>Physical</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Strength and endurance gains are possible as a result of fitness training, but improvements are also directly related to growth; very little potential for increased muscle mass (hypertrophy); strength gains result primarily from increased coordination and neural factors</li> <li><input type="checkbox"/> Flexibility improves, but it should also be trained</li> <li><input type="checkbox"/> Reaction time is relatively slow; however good visual acuity and depth perception allow for better performance in throwing/catching exercises</li> <li><input type="checkbox"/> Sweating mechanism of children is not well developed, which reduces their capacity to dissipate heat during exercise; children are at an increased risk of heat injuries; children cool off rapidly and do not tolerate cold well</li> <li><input type="checkbox"/> In girls, the second half of this period marks the beginning of a major growth spurt that will last approximately 3.5 years; some girls may have their first menstruation as early as 11 years old</li> <li><input type="checkbox"/> In some boys, puberty will begin at the end of this period</li> </ul>
<b>Preferences</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Enjoys games that feature some competition, team games, as well as activities that require some form of effort or that represent some sort of physical challenge</li> </ul>

<b>To avoid</b>
<ul style="list-style-type: none"> <li>❑ Activities that feature repeated impacts or where there is a risk of collision; repetitive activities (to prevent boredom and overuse injuries); activities that feature too much structure; exposure to a cold or hot environment</li> <li>❑ Use of equipment that is not designed for children; repetition of all-out efforts lasting between 20 and 60 seconds; work against a high resistance; prolonged aerobic endurance efforts</li> <li>❑ Specialization in a sport or in a position on a team</li> <li>❑ Emphasizing winning and creating pressure to perform</li> <li>❑ Comparisons with other children</li> <li>❑ Unpleasant or unsatisfying elite competitive experiences</li> <li>❑ Mechanical or highly repetitive approach to the teaching of fundamental techniques</li> </ul>
<b>Suggestions</b>
<ul style="list-style-type: none"> <li>❑ Participation in several sports/activities should be encouraged</li> <li>❑ Rules should be adapted to encourage a high degree of interaction between athletes and to increase the probability of success during the activity; modified, scaled-down equipment should be used</li> <li>❑ Demonstrations should be highly specific, simple, and aimed at the achievement of a well-defined objective; duration of activities should be relatively short, and exercises should change frequently</li> <li>❑ Time when athletes are actively involved in activities during practices should be maximized</li> <li>❑ Children need to be praised and complimented generously and regularly for their efforts</li> <li>❑ Feedback should focus on one point only; choose the most important one; emphasize the development of confidence, self-esteem, peer interaction, cooperation, having fun, putting winning and losing into perspective, and giving 100% effort</li> <li>❑ Encourage children to drink water, and ensure plenty of drinks are available when exercising in the heat</li> </ul>

## Growth and Development Considerations, 12-15 Years

General
<ul style="list-style-type: none"> <li>❑ Period where major growth spurts occur; in each gender, large differences in physical maturation may be observed in individuals of the same chronological age; in general, girls develop earlier than boys</li> <li>❑ During this period, there often exists a large difference in maturity between boys and girls</li> <li>❑ Acquires moral concepts, values, and attitudes that make it possible to relate meaningfully to society; positive role models are important</li> <li>❑ Opinion of friends tends to be more important than that of the coach; athletes want to look like or be perceived as competent performers</li> <li>❑ This is a period of major change during which athletes are likely to challenge authority, be very critical, question decisions, and ask for justification</li> <li>❑ Competition becomes increasingly important to some athletes; time devoted to general training should be greater than time spent training specifically for a sport or time spent competing</li> </ul>
Psycho-social
<ul style="list-style-type: none"> <li>❑ It is important to separate boys and girls for activities and competition</li> <li>❑ Emotional instability may be observed because of the rate at which physiological changes occur</li> <li>❑ Shows a greater desire for independence; this can be a time of rejection of parental authority and, in general, a period when there is a high degree of confrontation with adults</li> <li>❑ Develops close relations with individuals of both sexes; enjoys being more independent and having more responsibility; a great deal of interest in sexuality is observed toward the end of this period</li> <li>❑ This period is important for the development of values such as respect for others, fair play, and a work ethic</li> </ul>
Learning
<ul style="list-style-type: none"> <li>❑ Begins to think like an adult; it is important to take into account the different maturity level between boys and girls; interests and abilities differ between the genders; challenges are often very appealing</li> <li>❑ Needs change on a regular basis; is highly curious; capacity to concentrate increases (can stay focused for 20 minutes or more at a time); increasingly capable of abstract thinking</li> <li>❑ This is a good period to consolidate the development of fine motor skills, to teach more complex tactical notions, and to encourage decision making in specific situations</li> <li>❑ Specialization by sport and for a position can begin; however, participation in a variety of sports that have different demands should be encouraged</li> </ul>
Physical
<p><b>Girls:</b> The development of secondary sexual characteristics (pubic hair, breasts) begins around 11-11.5 years of age. On average, the growth spurt begins shortly after that. Maximal growth rate (or peak height velocity, PHV) is normally observed between 11.5 and 12.5, and menarche (first menstruation) occurs approximately one year after PHV. During this period, body fat content tends to increase progressively, and typical female body forms (hips) appear because of the effect of hormones. As a result of these changes, performance often plateaus or may even decline for a short period of time. In addition, for a period of several months following menarche, girls may have difficulty sustaining heavy training loads. Girls should be counselled that this phenomenon is normal and that their performance will continue to improve after this temporary</p>

phase.

**Boys:** The development of secondary sexual characteristics (pubic hair, testes, penis size) occurs progressively around age 11. On average, the growth spurt begins at age 13, and PHV is reached at around age 14-15. Significant gains in muscle mass and in strength typically occur one year after PHV (i.e. at around ages 15-16) because of higher levels of testosterone; this age represents a good time to initiate strength training with heavier loads if this athletic ability is important in the sport.

- During the growth spurt, feet and hands tend to grow first, followed by the legs and arms; long bones are fragile during this time; growth is accompanied by an increase in body weight throughout the period
- As a result of the rapid growth spurts that occur during PHV, body parts can be disproportionate; this can have a direct effect on coordination and the ability to perform certain skills that had already been well mastered
- This period is well suited for the development of aerobic fitness, as well as flexibility
- Strength and speed-endurance training can begin toward the end of this period

### Preferences

- Enjoys challenges and the opportunity to accomplish individual feats
- Accomplishment of actions that are likely to be looked at or admired by peers/friends
- Activities that contribute to the development of fine skills/dexterity and that do not require too much strength, team games, situations where some form of competition exists

### To avoid

- Repetition of all-out efforts lasting between 20 and 120 seconds before or during PHV; work against high resistance; prolonged aerobic endurance efforts that involve impact on the joints (i.e. running on a hard surface such as asphalt)
- High mechanical stress (compression forces) on the long bones and the backbone, e.g. lifting heavy weights
- Programs where the number of competitions is greater than the number of practices
- Pressure to perform
- Negative elite competitive experiences

### Suggestions

- Time when athletes are actively involved in activities during a practice should be as high as possible
- Acquisition of more complex or sport-specific techniques; explanations can be more elaborate where appropriate; a high number of repetitions during drills is possible
- Give the opportunity to take decisions and to problem-solve
- Correct execution of movements must be emphasized if strength training is performed.
- Appropriate supervision of training activities is important to prevent unnecessary risks that adolescents may take
- Games emphasizing skill and dexterity
- Opportunities to meet or interact with sport role models (athletes or coaches); competitions or tournaments that involve trips; social activities among the team/training group
- When an athlete who has reached puberty experiences pain in the joints (e.g. shoulders, elbows, knees) or if he or she now seems to have difficulty completing workouts that previously posed no difficulty, training loads (amount-frequency-intensity) may have to be decreased to avoid undue stress on the athlete's body
- Depending on the maturity level, involvement in roles such as officiating or leading certain activities (e.g. leading a warm-up or cool-down)

## Growth and Development Considerations, 16-17 Years

<b>General</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> At the end of puberty, the individual is no longer a child but is not yet completely an adult, which can create some identity problems</li> <li><input type="checkbox"/> Late developers may still be experiencing the effects of puberty</li> <li><input type="checkbox"/> The athlete seeks greater autonomy and becomes progressively more mature emotionally</li> <li><input type="checkbox"/> Specialization in a sport or in a position may require year-long preparation; however, training may remain an annual process, particularly at the beginning of this period</li> <li><input type="checkbox"/> Training volume increases progressively from one year to another and may reach 15 hours or more per week, depending on the sport, at the end of this period</li> <li><input type="checkbox"/> In athletes who are training seriously, the amount of time devoted to general training, specific training, and preparing for competition or competing is approximately the same</li> </ul>
<b>Psychosocial</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Sexuality becomes very important and athletes seek intimacy with others</li> <li><input type="checkbox"/> Although a greater degree of independence is sought, friends remain very important</li> <li><input type="checkbox"/> Wants to be considered an adult</li> <li><input type="checkbox"/> Often, the coach will be a role model; the athlete will frequently reject parental authority</li> <li><input type="checkbox"/> Athletes become increasingly aware of their own values</li> <li><input type="checkbox"/> Social activities are very important</li> </ul>
<b>Learning</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Social awareness increases; as a result, athletes develop a broader range of behaviours; athletes also develop the ability to think logically</li> <li><input type="checkbox"/> Period when athletes begin to specialize in particular sports and develop broader strategic and tactical awareness</li> </ul>
<b>Physical</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Major physiological systems and functions are established; appropriate time to develop aerobic capacity; significant increase in strength and anaerobic capacity (speed-endurance)</li> <li><input type="checkbox"/> Power and speed can be trained</li> <li><input type="checkbox"/> Increase in muscle mass in boys because of the increased production of certain hormones, in particular, testosterone</li> <li><input type="checkbox"/> Growth in girls typically ends at 17-18 years, and at 19-20 years in boys</li> </ul>
<b>Preferences</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prefers to play the full game or activity, i.e. without modification of the rules or conditions of play</li> <li><input type="checkbox"/> Prefers activities that contribute to improving physical appearance or to creating particular status in the eyes of peers (e.g. sport, art, theatre)</li> <li><input type="checkbox"/> Group activities become important (e.g. movies, dances, parties, travel)</li> </ul>
<b>To avoid</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Strength training with very heavy loads (i.e., using a load that cannot be lifted more than 1 to 3 times consecutively)</li> <li><input type="checkbox"/> Development of certain muscle groups while ignoring antagonists (e.g. developing the quadriceps but not the hamstrings)</li> </ul>



**Suggestions**

- Delegate certain tasks, provide opportunities for athletes to solve technical-tactical problems and improve decision-making
- All athletic abilities can be trained and developed, relative to the degree of physical maturity of the individual
- Strength-endurance can be trained, without modifications, given the demands of the sport; if increased muscle mass is an important goal in the sport, this can be accomplished through strength-training programs using moderate loads in sets of 8-12 repetitions; all major muscle groups should be developed to avoid muscle imbalances (note: major increases in muscle mass should not be expected in females)
- Strength training with very heavy weights (1-5 repetition maximum, or RM) can be done by both sexes, but with caution and under the guidance of experienced coaches
- Include sessions dealing with officiating, strategy, and tactics
- Creating an assistant coaching role for some appropriately qualified athletes may improve self-esteem and peer acceptance
- Important time to work at developing respect for others, as well as concepts like fair play and work ethic
- Provide opportunities for athletes to observe and meet role models

## Growth and Development Considerations, 18 Years and Older

<b>General</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Major physiological systems and functions are established, which allows for the training of all athletic abilities</li> <li><input type="checkbox"/> Self-assured; chooses own path and goes out on his or her own</li> <li><input type="checkbox"/> Resists involvement in situations that may question self-image as an independent person</li> <li><input type="checkbox"/> The need to achieve may lead the athlete to strive for improved performance</li> <li><input type="checkbox"/> General training time may be reduced as the serious athlete concentrates on specialization and preparation for competition</li> </ul>
<b>Psychosocial</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Professional and family obligations lead to much less free time</li> <li><input type="checkbox"/> Intimate relationships are very important</li> <li><input type="checkbox"/> Financial independence provides greater opportunity for choice</li> <li><input type="checkbox"/> May become a member of a group of close friends</li> </ul>
<b>Learning</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Adults over 25 often have experience in a broad range of activities (e.g. sport, work, education), which can greatly improve learning and the transfer of knowledge and experience from one area to another</li> </ul>
<b>Physical</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Young men stop growing at around 20 years of age</li> <li><input type="checkbox"/> Strength, speed, and power are at their peak in the early 20s and may be maintained through to the early 30s</li> <li><input type="checkbox"/> Endurance reaches its peak toward the late 20s; after the age of 30, physical capacities begin to decline progressively</li> </ul>
<b>Preferences</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Activities that help relieve stress</li> </ul>
<b>To avoid</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Nothing; all athletic abilities can be trained</li> </ul>
<b>Suggestions</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Interaction with others is important and may take the form of participation in seminars, workshops, or sport training camps</li> <li><input type="checkbox"/> Individuals may seek roles and responsibilities in the management, organization, or promotion of activities and events</li> <li><input type="checkbox"/> Becoming a coach, official, or referee is one way of keeping this group engaged and committed; it also offers the opportunity for social interaction</li> <li><input type="checkbox"/> Engage in elite competitive activities and events in practices</li> </ul>

## Appendix 5: Form Analysis sheets (3 variations)

### Form Analysis Sheet #1

Date \_\_\_\_\_ Event \_\_\_\_\_

Name \_\_\_\_\_

Archer's particulars (age, style, right / left hand, etc.) \_\_\_\_\_

#### PRE SHOOTING:

Consult's Notes \_\_\_\_\_

Warm up \_\_\_\_\_ Length of Time \_\_\_\_\_

Stretching \_\_\_\_\_ Other Exercise(s) \_\_\_\_\_

#### 1. STANCE:

##### Foot Placement -

a. \_\_\_\_\_ Parallel Stance  
Apart)

d. \_\_\_\_\_ Open (Feet

b. \_\_\_\_\_ Oblique Stance

e. \_\_\_\_\_ Closed (Feet Together)

c. \_\_\_\_\_ Reverse Oblique Stance

f. \_\_\_\_\_ Feet Parallel

##### Weight Distribution -

a. \_\_\_\_\_ Even

d \_\_\_\_\_ Weight On Front Foot

b. \_\_\_\_\_ Weight On Toes

e \_\_\_\_\_ Weight On Rear Foot

c. \_\_\_\_\_ Weight On Heels

##### Lean and Sway

a. \_\_\_\_\_ No Lean

d. \_\_\_\_\_ No sway

b. \_\_\_\_\_ Leans Toward Target

e. \_\_\_\_\_ Forward sway

c. \_\_\_\_\_ Leans Away

f. \_\_\_\_\_ Backward sway

##### Shoulder Line

a. \_\_\_\_\_ Parallel

d. \_\_\_\_\_ Level

b. \_\_\_\_\_ Pointing to Right

e. \_\_\_\_\_ Pointing Up

c. \_\_\_\_\_ Pointing to Left

f. \_\_\_\_\_ Pointing Down

**2. NOCKING THE ARROW:**

While being loaded on the string, the arrow is pointed:

- |          |                    |          |             |
|----------|--------------------|----------|-------------|
| a. _____ | Directly at Target | c. _____ | Upward      |
| b. _____ | At Ground          | d. _____ | Other _____ |

Nocking process started before or after bow hand placement \_\_\_\_\_

**3. DRAW HAND AND ARM:**

String fingers placed on the string with bow pointed

- |          |                    |          |             |
|----------|--------------------|----------|-------------|
| a. _____ | Directly at Target | c. _____ | Upward      |
| b. _____ | At Ground          | d. _____ | Other _____ |

**4. BOW HAND AND ARM:**

The archer uses:

- |            |            |          |                 |
|------------|------------|----------|-----------------|
| a. _____   | Low wrist  | c. _____ | Medium (Normal) |
| Wrist      |            |          |                 |
| b. _____   | High wrist | d. _____ | Bow Sling       |
| Type _____ |            |          |                 |

**Pre Draw -**

Initial draw of the string was:

- |          |                |          |             |
|----------|----------------|----------|-------------|
| a. _____ | Above Parallel | c. _____ | Other _____ |
| b. _____ | Below Parallel | d. _____ | No Pre Draw |

**Draw Started -**

- |          |                    |          |                              |
|----------|--------------------|----------|------------------------------|
| a. _____ | Directly at Target | d. _____ | Bow Moving (U)p or<br>(D)own |
| b. _____ | Above Target       | e. _____ | Other _____                  |
| c. _____ | Below Target       |          |                              |

**5. THE DRAW**

Draw completed with bow pointed

- |          |                    |          |                              |
|----------|--------------------|----------|------------------------------|
| a. _____ | Directly at Target | d. _____ | Bow Moving (U)p or<br>(D)own |
| b. _____ | Above Target       | e. _____ | Other _____                  |
| c. _____ | Below Target       |          |                              |

**Draw Hand Action -**

- |          |                          |          |                     |
|----------|--------------------------|----------|---------------------|
| a. _____ | Directly to Anchor       | d. _____ | Draw made with stop |
| b. _____ | Low and Raised to Anchor | e. _____ | Overdraw            |
| c. _____ | One Continuous Move      | f. _____ | Other _____         |

**KLICHER – (Recurve)**

Klicker set \_\_\_\_Y \_\_\_\_N On point of arrow

\_\_\_\_\_

Consistent set \_\_\_\_ (Check Again After 50 Arrows)

- a. \_\_\_\_\_ Smooth Draw to Klicker  
 b. \_\_\_\_\_ Stops at Klicker  
 c. \_\_\_\_\_ Watches Klicker

**6. ANCHOR:**

- |          |                |          |                           |
|----------|----------------|----------|---------------------------|
| a. _____ | Centre of Face | c. _____ | High Anchor               |
| b. _____ | Side of Chin   | d. _____ | Floating (F) or Solid (S) |

**Anchor Aids -**

- |          |  |          |           |
|----------|--|----------|-----------|
| a. _____ | Peep Sight                                     | c. _____ | Tab Shelf |
| b. _____ | Kisser Button [to Teeth (T) or Lips (L)] _____ |          |           |

**7. HOLD AND AIM:****Bow Hand During Hold -**

- |          |                               |          |            |
|----------|-------------------------------|----------|------------|
| a. _____ | Relaxed                       | c. _____ | Wrist push |
| b. _____ | Movement During Draw and Hold |          |            |

**Bow Hand Wrist During Hold -**

- |          |               |          |                |
|----------|---------------|----------|----------------|
| a. _____ | Wrist Push    | c. _____ | Movement       |
| b. _____ | Inside Centre | d. _____ | Outside centre |

**Bow Hand Fingers During Draw and Hold -**

- |         |                     |         |                      |
|---------|---------------------|---------|----------------------|
| a._____ | Relaxed Open        | e._____ | Movement             |
| b._____ | Forced Open         | f._____ | Clutching            |
| c._____ | Holding Bow Lightly | g._____ | Gripping Bow Tightly |
| d._____ | Thumb Relaxed       | h._____ | Thumb Movement       |

**Bow Arm Elbow During Draw and Hold -**

- |         |              |         |          |
|---------|--------------|---------|----------|
| a._____ | Straight     | d._____ | Locked   |
| b._____ | Turned Out   | e._____ | Broken   |
| c._____ | Rotated Down | f._____ | Movement |

**Bow Shoulder During Hold and Aim -**

- |         |                    |         |                    |
|---------|--------------------|---------|--------------------|
| a._____ | Extended to Target | c._____ | Parallel to Ground |
| b._____ | Pushed Up to Neck  | d._____ | Movement           |

**Head Position During Draw and Hold -**

- |         |                                       |
|---------|---------------------------------------|
| a._____ | Positioned (B)efore or (A)fter anchor |
| b._____ | Movement                              |

**String (Draw) Hand During Hold and Draw -**

- |         |                                     |
|---------|-------------------------------------|
| a._____ | Hook: (D)eep (S)hallow (F)inger Tps |
| b._____ | Back of Hand Straight               |
| c._____ | Changes During Hold                 |
| d._____ | Finger Pinch                        |
| e._____ | Hand Turned Out at Bottom           |

Weight on fingers \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ (approx %)

**String (Draw) Wrist During Hold and Aim -**

- |         |                      |         |          |
|---------|----------------------|---------|----------|
| a._____ | Straight to Knuckles | c._____ | Bent In  |
| b._____ | Bent Out             | d._____ | Movement |

**String (Draw) Elbow During Hold and Aim -**

- |         |                     |         |             |
|---------|---------------------|---------|-------------|
| a._____ | Parallel With Arrow | c._____ | Below Arrow |
| b._____ | Above Arrow         |         |             |

**When Viewed From Behind -**

- a. \_\_\_\_\_ In Line With Bow Centre      c. \_\_\_\_\_ Right of Bow Centre  
 b. \_\_\_\_\_ Left of Bow Centre

**8. RELEASE:**

- a. \_\_\_\_\_ Live      d. \_\_\_\_\_ Straight Back  
 b. \_\_\_\_\_ Static      e. \_\_\_\_\_ Rotated from Face  
 c. \_\_\_\_\_ Dropped hand \_\_\_\_\_      f. \_\_\_\_\_ Moved Up

**Release Actions:**

- a. \_\_\_\_\_ Head Movement      c. \_\_\_\_\_ Eye Movement (Jump)  
 b. \_\_\_\_\_ Bow Arm Dropped

**9. FOLLOW THROUGH:****Bow Arm Action After Release -**

- a. \_\_\_\_\_ Bow Moves Right      c. \_\_\_\_\_ Bow Arm Drops  
 b. \_\_\_\_\_ Bow Moves Left      d. \_\_\_\_\_ Bow Torque

Body Movement Immediately After Release \_\_\_\_\_

Body Position Held Until Arrow Hits Target \_\_\_\_\_

**10. RELAX / OBSERVE:**

- a. \_\_\_\_\_ Stops Sequence  
 b. \_\_\_\_\_ Immediately Prepares Next Shot  
 c. \_\_\_\_\_ Signs of Emotion  
 d. \_\_\_\_\_ Uses Optical Check

**FORM ANALYSIS TOOL # 2 TO ASSESS ARCHER CONSISTENCY**

	EXHIBITED GOOD FORM	EXHIBITED INCONSISTENT FORM	WHAT IS CAUSING THIS?
STANCE & POSTURE			
BOWHAND & GRIP, BOWARM & ELBOW, BOW SHOULDER			
DRAWING HAND, (fingers/release aid) ACTION OF THE DRAWING ARM			
ANCHOR POSITION, CONTACT/PRESSURE			



HOLDING & AIMING			
RELEASING			
FOLLOW-THROUGH			

**Form ANALYSIS SHEET #3**

Archer's Name: \_\_\_\_\_

Initial Assessment Note any of the following:

1. Inconsistency in form:

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

iv) \_\_\_\_\_

2. Form Which Detracts From Performance:

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

3. Biomechanical Inefficiencies:

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

4. Equipment Inefficiencies:

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_

Review the video or have the archer shoot again.

Secondary Assessment      Is there anything you wish to add?

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_

**COMPETITION – DEVELOPMENT  
REFERENCE MANUAL**



**CHAPTER 5**

**TECHNICAL CONSIDERATIONS**



## OBJECTIVES OF CHAPTER 5: TECHNICAL CONSIDERATIONS

To evaluate the equipment needs of the elite archer in the chosen discipline.

To set-up, test and evaluate equipment performance within the Annual Plan using accepted tuning methods.

To list the benefits and detractors of modern archery equipment as they affect the elite archer.

### LEARNING OUTCOMES FOR THE CHAPTER

The coach will be able to:

1. evaluate the appropriateness and efficiency of the archer's equipment for the needs of the chosen archery discipline.
2. choose appropriate materials for arrows, strings, risers, limbs, cam(s) to produce and tune an accurate, forgiving set-up.
3. prepare the athlete's equipment to perform during competition.

## COACH REFERENCE MANUAL

### Introduction

- i) Analysing the needs of the discipline
- ii) Analysing the needs of your archer
- iii) Equipment trends:
  - arrows                      - risers                      - stabilizers
  - limbs                        - strings                    - releases
  - eccentrics                 - clickers
- iv) Tuning for speed or forgiveness
- v) The Plan and equipment selection, testing and evaluation

APPENDIX A: Basic Tuning Principles

APPENDIX B: String-making

## WORKBOOK TASKS

Check List of archer's equipment needs

Equipment experimentation tasks #1-4a

- vi) Exercises:
  1. The target archer - indoors vs. outdoors
  2. The field archer
  3. The 3-D archer
  4. The Ski-Arc archer

vii) Case Studies:

1. The effects of weather
2. The effects of physical tension
3. The young archer

## Introduction

### Defining the Activity

Archery is a unique combination of two factors: human skill and equipment. Success is related directly to the performance level of each factor. Some equipment will be suitable for some archers, while others of similar quality will not enhance performance. Why is this? What is suitable equipment for the archer? ***Much of the answer hinges on the athlete's ability to shoot consistent disciplined archery form.*** Though there are instances when poor equipment selection hampers an archer's development. In most cases, selection and tuning is archer-dependent.

The purpose of this chapter is to review the basic equipment selection and preparation for an elite archer and basic tuning principles. It must be noted that the archery industry constantly changes. Technical equipment manuals are soon out-of-date. Therefore, trends have been noted, and discussed, as of the date of publication and it is the coach's responsibility to update the material in this manual as trends and materials change.

Many times the ability of the coach to select and tune equipment is dependent upon personal interest and knowledge base. Some archery coaches dwell on equipment concerns to the detriment of all other aspects of training. Other coaches feel inadequate and so rely on other people to assist in the process of selection and tuning. The good archery coach is somewhere in between these two extremes.

The archery coach must:

First, assess the archer's interests and chosen discipline. The coach has to be aware of the current equipment rules for the chosen discipline before the process can continue. Rules change often in some disciplines. Refer to the appropriate rulebooks before continuing.

Secondly, the coach assesses the appropriateness of the equipment to the archer's body type, ability to shoot the necessary bow weight, form and financial resources.

Thirdly, the coach surveys the current archery manufacturing industry for selection.

And, finally, the coach allots sufficient time in the Annual Plan for experimentation, testing and performance evaluation during tournaments.

This chapter leads the coach through these steps.



### i) **Analysing the needs of the discipline**

Before the coach can make intelligent equipment choices, the archer must confirm the chosen equipment division(s), discipline(s) for training and competition. Keep in mind that many archers do several or all of these types of archery. Others only specialise in one. Regardless, the coach must evaluate the technical needs of each discipline as the first step in the tuning process for the season in question and its related goals. This chapter is broken down into:

Indoor Archery	Outdoor Archery:	Target
		Field
		3D/bowhunting
		Ski-Arc

**Indoor Archery** requires stable, consistent arrow flight. Since the closed environment, at short distances eliminates the tuning and draw weight challenges associated with outdoor shooting, the archery coach should look for the following characteristics in a good indoor set-up:

1. Sufficient draw weight, within the archer's capabilities, which allows the arrows to travel to the target without noticeable arcing. (Refer to ARCHERY CANADA's Long-Term Archer Development Model base document for bow weight charts for males and females)
2. Arrow selection will allow for good grouping.
3. Stabilisation which positively affects the follow-through when the bow is more or less parallel with the floor (aiming height).
4. Fletch should allow very quick stabilisation of the arrow to the target.
5. Clothing that does not impede arrow flight or string clearance.

<b>The following points are designed to initiate thinking and discussion.</b>
---

#### Points to Ponder:

1. Bow draw weight need only be the poundage comfortably drawn by the archer. Most archers can shoot consistent groups with draw weights as low as 24 pounds (peak weight) or 15

pound (holding weight). (Refer to ARCHERY CANADA's Long-Term Archer Development Model base document for bow weight charts for males and females)

*However*, if the archer shoots a compound bow at this light a weight, a release aid will provide better consistency and accuracy than a finger release will. This is due to the compound bow's slower string speed upon release before the full impact of the eccentrics takes over at peak weight. Such a light set-up makes the release very critical. So, if the archer uses a compound bow and releases with the fingers, more draw weight is advisable, or a cam/eccentric with less let-off.

2. Indoors, arrow flight is not as important as grouping ability. Trends come and go. The archery coach must distil all the information out there to come up with the best equipment set-up for the individual archer.

There are several arrow options available to the archer: aluminum, aluminum/carbon, and pure carbon. Some people feel that over-sized aluminum arrows increase score since there is a greater chance of cutting the scoring area lines on regulation target faces. The coach must be careful. Over-sized arrows are also very stiff arrows, particularly for recurve shooters using draw check devices that limit the total length the arrow can be cut to.

If the arrow size chosen was so large that it makes the archer's release overly critical, the coach would do better to stay with the suggested arrow size and teach the archer more consistent form.

However, it can not be denied that larger outside-diameter arrows do increase compound archer's ability to touch the inner ten-ring and shoot higher scores indoors. Check for good arrow grouping before deciding upon over-sized arrow shafts.

The ideal equipment set-up is one that allows the arrow to straighten out as quickly as possible and group tightly, consistently.

3. Most target face heights allow the bow to remain more or less parallel with the floor while the archer aims. Stabilisation is selected to assist the archer's aiming process and stabilise the bow through its long axis upon release, not just add mass weight.

Since the body angle is not as severe as it becomes for long-distance, outdoors, shooting, the stabilisation system need only work in this plane. The stabilisation system should enhance arrow flight and strike pattern consistency to steady the bow during pre-aim to full-draw, and then assist the archer's follow-through to the target.

The coach must take the time to experiment with various configurations including v-bars with rods in various angles between 0 and 90 degrees (parallel with the floor). Stabiliser length and mass must compliment the archer's ability to control the mass weight and assist arrow grouping.

As both recurve and compound archers train and progress in their skill level and confidence, a 3-spot face should be used. Some archers can not adjust to the 3-spot in a tournament situation after working solely with the FITA single-spot face. All archers striving long-term for the international level must be prepared to use the 3-spot face, regardless of equipment division. The coach will need to build this variable into the training plan.

4. Selecting the appropriate fletching gives the archer great advantage. It does not matter how much the fletching slows down the arrow flight since the distance is quite short. The ideal materials will straighten out the arrow flight within 5-6 meters of the bow. Whether the coach chooses feather or curled Mylar fletching, it is important that the indoor specialist work with materials that stabilise the arrow quickly. Therefore, if you are working with an archer who chooses to excel in both indoor and outdoor Archery, change fletching designed for speed and distance to those that will stabilize the flight quickly. Feathers, and their relative drag factor, are discussed below.

5. Clothing is often over-looked. It is a small point, but one that is neglected by coaches and archers. Make sure that attire, which is "comfortable" to shoot in, does not destroy all your hard work by interfering with the string or the arrow reaction upon release, thereby affecting tuning.

**Outdoor Archery:** Target  
 Field  
 3D/bowhunting  
 Ski-Arc

In contrast to the relative stability of indoor shooting environment, the coach who deals with the outdoor specialist faces a variety of additional challenges. Ambient temperature, humidity, wind, rain and terrain factor into the archer's equipment needs.

**Target** archery emphasizes archer skill at long distances regardless of the weather conditions. The equipment demands to consider are as follows:

1. Bow draw weight is very important. There must be sufficient peak weight/holding weight to ensure the arrow's trajectory is as flat as possible. But the chosen bow-weight must be within the archer's capability and control at all times.
2. The coach must select arrows that fly well and group consistently, and may have to fly consistently over long distances.
3. Stabilisation should compliment and enhance the stability of the bow and the archer when the bow is elevated above the horizontal position, e.g. for field archery and longer senior distances.
4. Fletching has to stabilise the arrow, with an efficient drag factor.
5. Outdoor clothing for various weather conditions must not interfere with arrow flight.

<b>The following points are designed to initiate thinking and discussion.</b>
---

Points to ponder:

1. Lighter draw weights are much more susceptible to archer inconsistency and wind when the arrow must fly over extended distances. The greater the distance, the heavier the draw weight required, regardless of arrow selection. Archers using lighter poundage bows may find outdoor archery very frustrating. (Refer to ARCHERY CANADA's Long-Term Archer Development Model {LTAD} base document for bow weight charts for males and females)

Young archers or archers in the Train to Shoot LTAD stage, therefore, who can not pull the draw weight necessary for the distances they are expected to shoot must either confine their activities to indoor shooting or embark upon an ambitious strength programme.

Developing a realistic strength-training programme is an important coach task. *Refer to the testing and evaluation exercises in Chapter 4.* Keep in mind that reaching the desired bow weight may take several seasons or annual plans.

Increments must be small enough for the individual archer to control. There is usually a slight loss of control or “different” feelings for the archer when poundage is increased initially. This is normal. If, however, the coach notices that the archer is not able to regain control and accuracy within a few sessions, the weight should be dropped back to the previous level, the process must be stopped and the archer’s strength re-evaluated.

2. Particularly, when the distance shot is beyond 50 meters, the arrow must follow a true line from the instant of release until it lands in the target. Not only should the coach be concerned with the material chosen (aluminum, aluminum/carbon, pure carbon), but also selecting the appropriate point weight, nock and fletch type (see section below).

Coaches should follow manufacturer’s guidelines *as a reference* and experiment with shafting, points and weights that may help the individual to achieve efficient arrow flight. The string material, serving material, string attachments and number of strands in the string and cables are all important factors to consider when tuning for long-distance shooting.

Those coaches working with young people who shoot recurves with draw check devices will have a greater challenge to ensure grouping as well as flight since arrow selection tends to be limited.

3. The target archer’s body angles change as the target distance increases. The bow is held higher in the air. The stabilisation must assist consistent arrow flight as well as stabilise the archer. This means that the archer must be able to control, and benefit from, the stabilisation regardless of the weather conditions, particularly in a crosswind. (Carry out experiment below.)

4. Though all fletching stabilises, some materials slow the arrow down too much for the distances being shot. Feathers’ drag, even when 2.5" long, is greater than most performance Mylar vanes, or other man-made synthetic materials. It should be noted that some materials work better with certain arrow rest styles while other rests only rip and tear the fletch. For those archers using a launcher-style rest, certain curled Mylar vanes may not clear the prongs of the

launcher. Drop-away rests may solve this challenge if they are set up properly. Certain plastics will be too heavy, in mass weight or too stiff in reaction, to stabilise arrows out of recurve bows. (Carry out experiment below.)

5. The typical archer's wardrobe consists of short-sleeve and long-sleeve tops for hot, cold, wet or dry conditions depending upon the day. The archery coach must ensure that whatever the choice or combination of clothing, it does not interfere with the string path. Test all clothing at the distances to be shot in order to ensure that tuning does not suffer due to clothing needs for outdoor conditions.

**Field/3D** archers have special needs due to the increased variance in shooting positions. The target information is important for them too, but the coach must consider the following:

1. Stabilisation must assist downhill and contoured-terrain shots (excluding Barebow).
2. Clothing must not interfere with downhill shots. The archer wears more mass weight.

**The following points are designed to initiate thinking and discussion.**

Points to ponder:

1. The field/3D shooter must be able to hold the bow in the perpendicular position regardless of the real challenges or optical illusions presented by the terrain. Experimentation with stabilisation configurations can assist archers especially those who are not allowed to use levelling devices in the sight aperture. Also, stabilisers may require some alteration to enhance downhill shots. This takes time and experimentation.

2. Since the bow angle needs to move above *and* below 90 degrees, the archer's body will be required to tilt downwards for some targets. String clearance is a major concern when the body is in this position. Also, due to the length of field and 3D rounds, the archer usually needs to carry extra clothing, food and fluid. Make sure that they are transported in such a way that there is no contact between the string and the body. The archer will have to train with this extra gear on in order to confirm this.

Refer to sections vii) and viii) Exercises for more examples.

**Sk-iArc** archers have all of the concerns listed above. The coach knows the archer will shoot from a variety of stances in cold weather. And, the coach should note the following:

1. Equipment must be extremely forgiving of form mistakes due to increased heart rate.
2. Fletching must stabilise the arrow quickly and still perform in cold, wet weather.
3. Stabilisation is limited by the rules.
4. Clothing and the shooting hand covering have very different purposes compared to other archery disciplines.

**The following points are designed to initiate thinking and discussion.**

Points to ponder:

1. The Ski-Arc participant is required to perform a fine motor task (shooting) immediately after performing large muscle, cardiovascular exercise. If the equipment set-up is too critical, the archer will miss the specialized targets and incur penalties. In order to facilitate the archer's skill level in the target range, the equipment should not be too heavy in draw weight. Nor should the bow be heavy in mass weight thereby increasing the resistance during skiing. The arrow flight must straighten out well regardless of the quality of the archer's release off the string. Test this initially indoors and then with elite competitive stress outdoors.
2. Only fletching that can stabilise the arrow over 18 meters should be used. If feathers are chosen, they should be treated with a water-repellent spray or powder in case the tournament is held in wet snow. Also, adhesives must be strong enough and flexible enough to hold the fletching to the shaft in cold weather conditions. This will require some experimentation.
3. The archery coach is limited in the selection of stabilisation by the rules of this discipline. A limited amount of mass weight for stability must be added without surpassing the stabiliser-length requirements in the FITA rules book. This means the archer's bow is specially tuned with very little stabilisation on it.
4. Clothing and hand protection must keep the archer warm, yet able to move freely. The archer will need to select man-made materials, which conform to the body and allow layered materials underneath. The clothing must not interfere during the shooting phase, or in taking the bow quiver on and off the body, in accordance with the rules. Also, the ski gloves must

allow firm pole grip and flexible string hand position. As well, the material must still be tough enough to resist wet weather conditions. Extra gloves are essential in case the material stretches during the event.



## ii) **Analysing the needs of your archer**

Now that the general equipment needs for each archery discipline have been outlined, it is time for the coach to become “archer-specific”. Regardless of equipment trends and current fads, the coach must assess the *appropriateness* of the equipment to the archer’s body type, form and financial resources. This task entails more than researching the trade magazines or listening to what the best archers in the world use.

For the coach, this analysis requires careful observation, logical thinking and a scientific approach. There can be little room for emotion or impulse buying. Whether it’s “a good deal” or “the best there is”, the final result has to be equipment which compliments the archer’s form, and leads to enhanced performance. The financial implications of your suggestions can never be overstated, particularly when working with young people. So, the coach owes it to the archer to take the time to make the right choice.

Complete Chapter 5 workbook task pg. 140 - 143 “**Check list**”.

### Priorities according to finances:

The coach may be training an archer who has a great deal of talent but very little financial support. Borrowed equipment is a fact of life in Canadian archery as club shooters make the jump to provincial and national status.

**The following points are designed to initiate thinking and discussion.**

### Points to Ponder:

1. If the bow is adequate, the majority of money available should be spent on arrows and different tuning possibilities. **The arrow is the most important aspect of tuning.**
  
2. If the bow is not adequate, find ways to alter it so good form is not jeopardised.  
This includes altering cables/string, changing limb weights, etc.
  
3. If finances are a problem, the coach may design a financial plan to assist archer savings. List purchases in order of importance to performance so the archer/family know what is needed and how much it will cost.

### iii) Equipment Trends

The archery manufacturing industry is in constant change: that is what sells product. *The archery coach* must stay current and well informed about the technological changes taking place that could improve archer performance. Always check to make sure that new products conform to existing shooting rules for the archer's discipline.

Some innovations have been particularly beneficial. For instance the introduction of carbon and carbon-composite arrows has meant that most archers can achieve faster arrow speeds without increasing draw weight. In particular, this has been a great asset to female Olympic style shooters who need flatter arrow trajectory at long distances, but who can not always control heavier draw weight.

However, many innovations have their drawbacks. Many times products are advertised on the North American, European and Asian markets that cater to a specific winning archer's needs or to a specialised archery discipline. The very latest technological advances seldom have been a factor in the first year on the market. There are always exceptions, but caution should be used in purchasing new equipment that has not been field-tested sufficiently. If finances are a concern, it is advisable to wait for production refinements, and usually, a lower price tag.

Most archery industry experimentation is done with male archers shooting arrows between 28-30" long and who are able to control average peak weight/holding weight of 55# or greater. This must be remembered whenever you coach people who do NOT fit this "standard".

NOTE:

*As the coach reads through this section, it must be assumed that time and money has been spent ALREADY in order that coach and archer together have an adequate variety of arrow spines, point weights/outserts, fletch, nocks and accessories with which to experiment.*

#### Arrows:      Factors Effecting Arrow Flight

Regardless of the type of bow used, or the model selected for the archer's individual needs, **it is the arrow selection and tuning** which is the key component to success.

Refer to Appendix A for basic arrow flight theory and application. This manual concentrates on factors affecting the individual archer's performance.

**The following points are designed to initiate thinking and discussion.**

### 1. Speed vs. Stability

It is obvious that some archery disciplines need one factor more than the other. Probably the hardest set-up to select for will be for 3D/field. Here, the arrow trajectory must be as flat as possible so the archer can compensate for miscalculated distances and still hit the highest scoring area. However, if in attempting to reduce mass weight to increase speed, fletch is so small that it does not stabilise sufficiently, the set-up is not effective. Very light weight arrows, selected for speed, may not be consistent in their flight characteristics, nor their durability.

Instead, the coach should experiment to find arrows that provide stability in all weather conditions, and consistency in strike patterns at all distances.

### 2. Aluminum versus Aluminum/carbon versus Carbon

Depending upon the age and ability of your archer, the coach will look for the best possible arrow. Aluminum is still the best economical purchase and provide top quality, easy tuning and certainly strength while being fairly light-weight.

On the other hand, the more expensive carbon fibre arrows may provide much better accuracy at longer distances. However, these arrows become much stiffer than aluminum when cut down to size. This factor is extremely important when tuning for archers using clickers as draw-check devices. Aluminum/carbon composites are popular in some disciplines, and expensive. Good arrow flight is fairly easy to obtain with them, but some experimentation may be required to achieve both good grouping patterns and good flight.

### 3. Barrelled versus Straight-shaft Design

Some expensive carbon/aluminum shafts have been barrelled in the middle in order to resist the bending action of deflection as the arrow leaves the bow and continues to the target. This idea was developed for flight shooting and requires the coach to tune not only the arrow, but also the point at which the barrel comes into contact with the bow (for archers using finger release). Again, for some archers, a traditional straight-walled shaft will allow greater accuracy with less tuning, particularly for those archers shooting shorter arrows and/or lighter draw weights.

### 4. Ballistics: what works versus trends

*The most efficient set-up is one that allows the archer to make small form errors and yet allows the archer to score well.*

How well the arrow clears the bow and arrow rest is the only real consideration. What works for one archer is usually not appropriate for another. If the arrow flight is as straight as possible and the strike pattern in the target is tight, then the set-up meets the ballistic requirements. Depending upon the archer's chosen discipline(s), arrow selection may need to take other factors into consideration.

Never should an arrow be selected because it is the latest, the newest, etc. History has shown that some first production runs for new arrow alloys and processes have been neither totally reliable, nor understood completely, for their performance characteristics.

When it comes to arrows, the archer and coach must go carefully. Arrows should never be switched close to the competitive season since experimentation and evaluation have been compromised.

In 3D divisions that specify the use of wooden arrows, the archer and coach must take the time to find a straight, matched set of the correct weight shafting to begin with. Point weight may be dictated by the current rules. The coach must be knowledgeable before purchasing quantities of wooden arrows shafts.

## Arrow Dynamics

Though an arrow appears to fly in a straight line, there are several physical forces acting upon the arrow which make it torque, flex and rotate when it first leaves the bow. Initially, upon release, the potential energy that had been stored in the limbs at full-draw is transferred into the nock-end of the arrow via the string. For a minuscule amount of time, inertia causes the arrow to bend as the point is at rest. The greater the point weight or mass, the greater the inertia.

The string is still attached to the nock of the arrow thereby imparting lateral (side-to-side) force to the nock as it cycles through its movement pattern. Therefore, regardless whether the archer shoots a compound bow or a recurve, there will always be some bending or “deflection” of the arrow upon release.

(See string oscillation path diagram below).

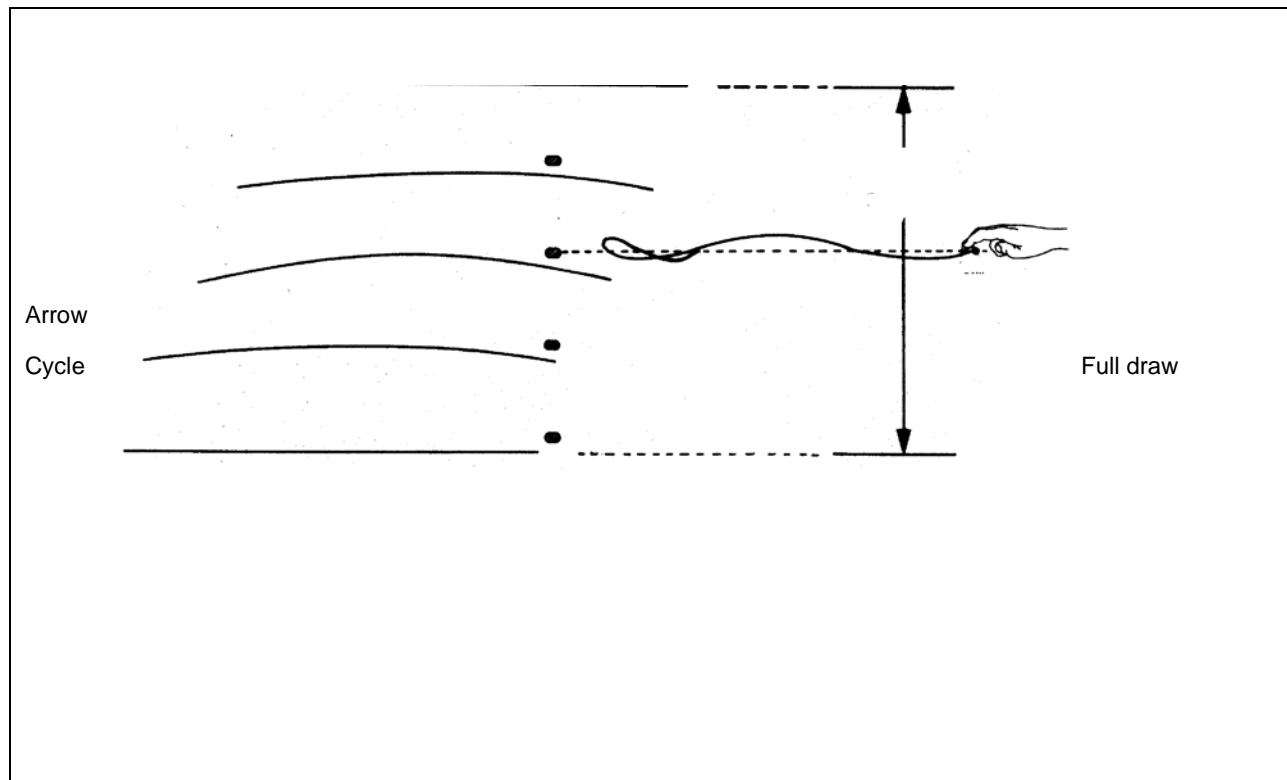
Archers using their fingers to release the string increase the amplitude of this oscillation significantly. The string moves sideways towards the archer's bow arm as it tries to get around the fingers. This string action causes the nock end of the arrow to move in the same direction, off the centerline of thrust of the string. Both the string and the arrow attempt to return to the midline of thrust. The point of the arrow is still against the sight window/arrow rest, so the middle of the arrow shaft flexes. The initial bend will have the greatest amplitude, followed by a series of lesser oscillations. How much it flexes depends upon the amount of arrow spine, arrow length and draw weight being used.

Archers who use a release aid properly impart much less lateral torque. Depending upon the tuning and type of arrow rest used, the arrow may bend up and down more than left to right for this archer.

When the string travel reaches approximately half of the brace height distance, it separates from the nock of the arrow. The string continues vibrate and oscillate until a state of rest is achieved.

This information is critical to coaches whose archer(s) use compound bows with very low brace height, or shoot bows with severely reflexed risers. Contact of the string (and/or cables) with the riser causes very poor arrow flight. *In order to have good arrow flight, powder testing should be done to ensure there is no string slap on any section of the face of the bow or attachments.*

#### STRING PATH OSCILLATION FROM FULL-DRAW POSITION TO BRACE HEIGHT POSITION

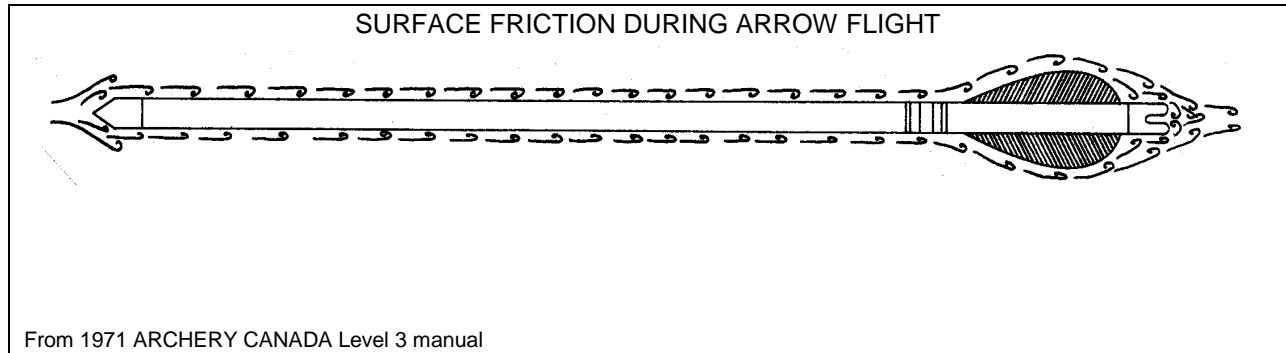


As the nock leaves the string, fletching imparts rotational forces along the length of the arrow as well as the flexing that started from the instant of release. Rotational forces affect arrow rest clearance so the coach must ensure that nock rotation correctly mirrors the arrow's flight pattern in order that fletch, in particular plastic vanes, will clear the rest and sight window cleanly.

Spray "jock-itch", "foot" or baby powder products on the arrow rest, bow sight window and floor under the rest. Instruct the archer to put an arrow on the rest carefully and shoot. After the arrow is shot, inspect the bow for loss of powder. The absence of powder shows a contact point, usually causing interference with clean arrow flight. Rotate the nock and work with the arrow rest height and position in the bow to eliminate the contact point(s).

## Drag

Drag applies to any projectile travelling through a medium such as air or water. An arrow passing through air towards the target has to deal with its effect. Bernoulli was the first scientist to record his observations of this phenomenon.



From the diagram the coach will notice the surface friction increases turbulence along the length of the shaft to the nock. Air eddies over the fletching and behind the nock as the arrow flies.

The coach must remember it is important to experiment with drag because:

1. The fletching material and profile will either reduce or increase this turbulence.
2. Archery disciplines that require quicker arrow stability, need greater fletch drag.  
e.g. Indoor, Ski-Arc and bowhunting
3. Arrow nock shape, profile and length will either reduce or increase this turbulence.

Materials for fletching today are of three varieties: feather, and Mylar and plastic vanes. The archery coach must select the fletching appropriate for the archery discipline and then experiment with its length and profile.

*Feathers* are extremely flexible, light weight and “forgiving” of arrow rest contact. They stabilise the arrow quickly since one side of the feather is smooth while the other side is rough causing optimum drag of the arrow shaft through the air. There is less mass weight than some plastic vanes (5") and little shape distortion or flutter in flight. Commercially manufactured die-cut turkey feathers come in 6 different lengths, both left-wing and right-wing. Profile is smaller with the shorter lengths. Feathers still perform after considerable wear. Water-proofing is advised



for outdoor shooting. Water-proofing, done properly, will not affect the performance of the feathers to control and stabilise arrow flight.

*The archery coach should consider this type of fletch for archers shooting indoors, Ski-Arc and, some 3D set-ups (in shorter feather lengths only).*

Mylar vanes are very popular in target archery where long distances require speed and stabilisation without excessive drag to slow down the arrow. The benefits are obvious since this type of fletch controls the arrow rotation like a feather would, without the rough surface area that increases drag. This fletching is generally manufactured in much shorter lengths than most feathers, which is also advantageous.

Modern manufacturers tend to make these vanes curled, left-wing or right-wing, in order to facilitate arrow clearance through “shoot-around” type rests, so they are not appropriate for some launcher-style arrow rests. Mylar vanes usually come in 4 to 6 different lengths and the curled profile is quite close to the shaft. Straight Mylar applied with a straight fletching clamp and only slight offset will clear pronged launchers better, but currently few manufacturing options are available.

*The archery coach should consider this type of fletch for archers shooting indoors, Ski-Arc, outdoor target and field shooting, and 3D (see rest exceptions above).*

Plastic vanes are usually mould-injected plastic polymers. Several manufacturing options are available in order to experiment with their mass weight. This type of fletching is usually the heaviest in mass weight. Smaller, low profile styles are recommended for elite archers. Since the material is the same on both sides and has little surface resistance, vanes will provide cleaner arrow rest clearance launcher-style rests. Manufacturers provide 6-10 different lengths to choose from and profile usually increases with vane length.

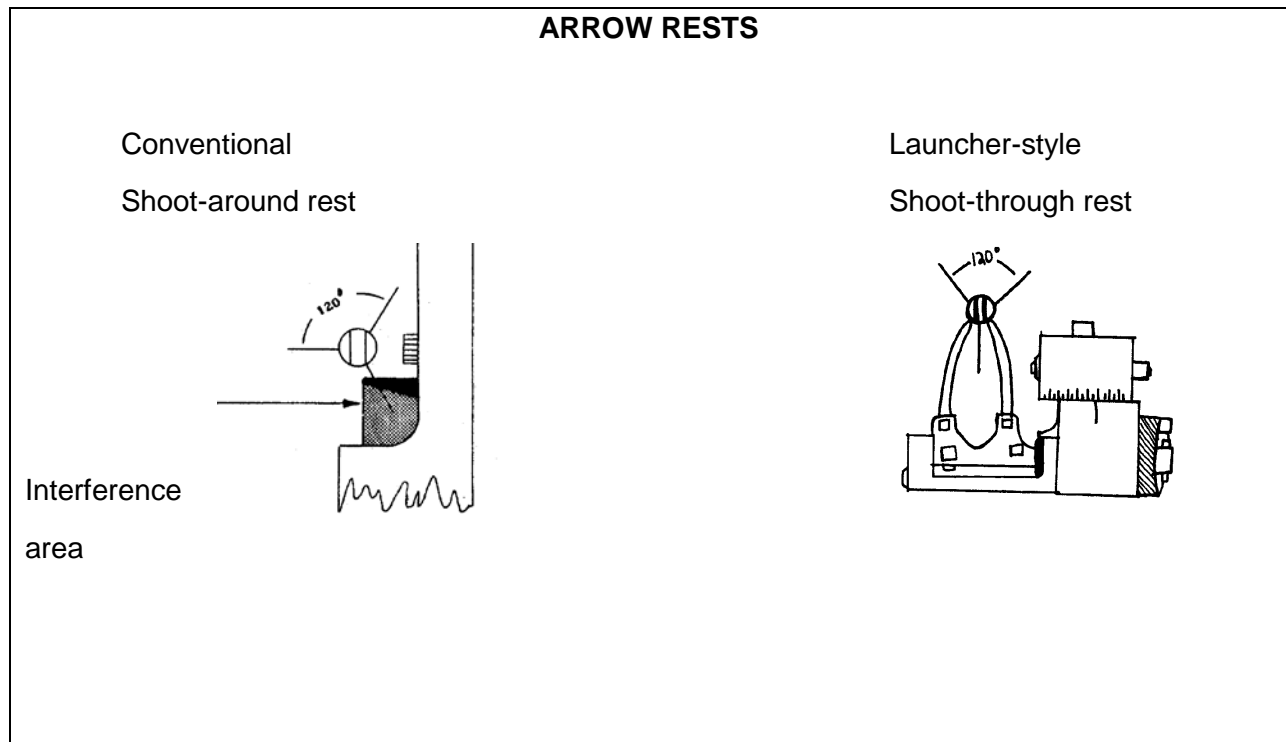
*The archery coach should consider this type of fletch for archers shooting Ski-Arc, outdoor target and field shooting, and 3D.*

### Indexing & Rest Clearance

Since fletch clearance is as important as center shot, and cushion plunger setting, in order for the arrow to leave the bow cleanly, the coach should powder test the arrow rest for signs of contact and wear. Easton® X7, X10 and carbon/carbon composite arrows allow for quick and easy nock rotation experimentation. Use the manufacturer’s nock tool to rotate the alignment of fletch to nock position. Only small adjustments should be made each time. Always re-apply powder and test again to ensure that the minimum amount of fletch contact has been achieved.

If the archer is using arrows that do not re-index without scraping and removing the nock, this process will take longer. Ensure that the arrows are straight to begin with and use only the same group of arrows each time, installing and checking for correct positioning of the nock on the taper.

Drop-away rests can alleviate many clearance problems, but must be set up properly in order to achieve the best tuned arrow flight. Pay particular attention to tuning the nocking point once the angle of the launcher has been determined and secured.



### Point of Balance and Point Weight

This is a variable, which should be experimented with no later than the pre-competitive period of the Plan. As soon as the arrow leaves the string, the arrow should rotate efficiently while the point directs the force trajectory towards the target. The coach and athlete together must dedicate enough time, money and patience to this process in order for it to be successful.

Though other factors such as fletch size, type and profile can affect POB, the point weight and point shank length are the primary determinants. Refer to arrow manufacturer catalogues for choices and combinations. The coach's main concern during the experimental phase is the consistent arrow flight and grouping in a variety of environmental conditions.

Aluminum arrows generally have 3 point weights to experiment with. Pure carbon or carbon/aluminum composites allow a far greater choice. The combined insert + point configuration, or break-off, point can alter the arrow's weight distribution towards or away from the point. This can either improve or detract from arrow flight consistency as it travels to the target. The experiment below will help the coach determine which choice is best.

It is not always possible to achieve both great arrow flight and great grouping. Group size and consistency is the primary goal and there could be better grouping qualities with one point-weight configuration over another.



Turn now to workbook Chapter 5 pg. 144 section entitled, "**Test #1**".

**P. 144**

## Bows

A bow is nothing more than a catapult. The limbs bend, wheels move, and compression of the limb against the riser produces elastic potential energy. Energy, or the ability to do work, is measured in “foot-pounds” or “Newtons” and is stored in the bow (potential energy) at full draw in order to propel the arrow through the air via the string (kinetic energy). Modern equipment makes this energy conversion as efficient as possible. Both recurve and compound bows meet very specific, rigid manufacturing standards in order to produce the fastest, most consistent arrow flight possible.

## Limbs

The following is a functional overview of what occurs each time that the bow is drawn.

In composite bow limbs, that is, bow limbs with more than one layering of material, there are three forces acting upon the limb during draw time.

1. The back or tensile layer must have an elastic quality so that it can be stretched during the draw.
2. The core or sheer layer hold the back and face apart to stop them from sliding on each other. Some compound bows have this feature. This is essential in the working of a stable recurve limb in an Olympic-style bow.
3. The face or compression layer must be able to withstand crushing as it is bent upon itself during the draw.

Specific materials will be used for each purpose in the limb. The materials are not the same lengths. Otherwise, the limb materials would be of differing lengths as the force is applied during the draw. The layers will not be of equal thickness. The outside layers will be thin. The core will be of various thicknesses depending upon the desired bow weight. The core can be natural, as in hard rock maple, or man-made as in high-density foam. The materials used must allow energy to dissipate over the entire surface and ensure that the limb will return to the resting position as quickly as possible.

In compound bows, fibreglass filaments are held together with epoxy-resin glues, and the stretch and compression factors are incorporated in the manufacturing process to reduce the amount of sheering in between the fibres.

Limb materials change with modern technological breakthroughs but many of the innovations never make it to the market place due to the high production costs of the materials themselves.

As mentioned above, some bow limb manufacturers have switched from natural wood fibres to something easier to control: syntactic foam. This high-density foam is shaped and compressed to the desired draw weight with greater consistency than wood will allow. In heavier draw weight bows, there is also a noticeable decrease in the mass weight of the limb since the foam weighs less physically than wood at certain poundage.

This is not to discount the value of wood as a core material. In composite recurve limbs, the production of reliable weight and strength is highly refined and dependable. Wood still provides excellent compression and recoil. In compound bows, wood is seldom used limbs do not bend and recoil to the same degree as the working recurve limb tip. The heavier weight and denseness of the material in a compound limb does not lend itself so easily to twisting, as does a recurve limb. Therefore, the consistency required can come from a moulded/sanded solid limb.

Not only has the limb core been altered through advances in modern science, but also the laminations are no longer simply fibreglass. Many top-of-the-line bows use ceramic glass fibres for strength, lightness and speed of return to brace height. Carbon fibres have been substituted as well to reduce the mass weight of fibreglass alone while maintaining strength and resiliency. Over the years, the materials and their reliability have improved with manufacturing and product refinement.

*The archery coach* works with the individual archer for the best possible combination while keeping within the archer's budget. The newer materials are more costly to produce and so are more expensive to buy, and to a certain extent "unproven". It should also be stated that some supposed technological advances make virtually no difference at all to performance and are merely cosmetic, for example small changes in riser designs.

The coach and archer *together* should research new developments carefully, particularly when looking at compound bows, in order to determine if a new purchase is either necessary or desirable.

### Limb and Riser Design

When we view a modern bow from the side, we can identify one of three basic shapes, which lend themselves to different functions and purposes. The bow shape while the limb is at rest can be defined: straight, deflexed or reflexed. Compound bow manufacturers tend to combine these shapes to offset some of the inherent drawbacks of each design. Let's review the options:

*Straight* limb design is seen purely in longbows. However, some older model compound bow risers utilised this design in order to produce a stable compression point which would store energy effectively and be easy for the archer to shoot well. The pivot point of the bow riser and

the hand position of the archer were aligned vertically. In the past, it was thought that this hand/bow pivot point provided the most stable and forgiving combination for the archer.

*Reflexed* limb and riser designs added more stress to the limb, giving greater cast in recurves and a great angle of thrust in compound bows. Some compound bow manufacturers increase this relationship by building out the limb bolt area on the back of the riser. When taken to extremes, the reflex design could make shooting difficult by moving the bowhand pivot point beyond the bow's pivot point (inside the face of the bow). In some compound bow designs, the smaller brace-height increases the likelihood of string contact. The appeal of these bows is obvious: speed. This desirable quality will be discussed further in the chapter.

*Deflexed limb* and riser designs push the riser section to the back of the bow's limbs. Viewed from the side, the bow appears to take a "D" shape away from the string. Effective use of this design factor makes it possible to construct a bow that is less susceptible to bowhand torque. In extremes, it has been found to reduce arrow speeds.

#### What should the coach look for?

Through experimentation, *the archery coach* must decide what type of equipment best suits the individual archer's needs, and is the most forgiving. The archery industry continually strives to make faster bows, storing and converting greater amounts of potential energy into kinetic energy. But these design attempts may be counter-productive to performance. Small modifications in limb and riser design could make a bow easier or harder to shoot, regardless of the sales pitch or purported technological advantages.

After all, the archer needs the *most efficient, forgiving* equipment set-up possible in order to perform consistently. In the final analysis, the coach should advise the purchase of the bow the archer is able to shoot well consistently, not the one with the most aggressive advertising campaign, or reputation.

Materials used in the risers have changed also. Some old ideas get re-cycled, improved upon and re-introduced as "new". Aluminum risers were available 20 years ago, but only cast. The problem with aluminum used to be its mass weight. No one questioned its superior strength to the popular magnesium risers of the 1970's and 80's. It was the mass weight that caused aluminum risers to disappear for quite a while.

Now, computerized technology has given rise to forged and CNC-machined processes. Forging or hammering the material under heat and pressure concentrated the minimum amount of aluminum for strength and durability. This process also allowed manufacturers to cut the riser well beyond the centerline without sacrificing integral strength. The extra space around the arrow rest allows for greater arrow adjustment and tuning, particularly for smaller-diameter carbon and carbon/aluminum arrows. This process is not as popular as it was in the 1990's.

The CNC-machined risers started out as an expensive but strong alternative. There is a great deal of wasted aluminum in the manufacturing process. However, as production efficiency increases, the prices continued to drop and more archers select this process.

Other developments are truly new with the advent of man-made substances. Carbon risers are extremely lightweight. Since the archery industry is driven in North America by bowhunter sales, a light mass weight bow provided the archer with less “slugging” through the bush. Very few of these risers have been purchased due to the high production costs. This riser material, like many other innovations in the industry, did not necessarily give increased performance value for the increased price. However, for those coaches working with extremely young archers, or those with problems controlling the mass weight of aluminum or magnesium risers, it is certainly a great advantage. Other materials have been used experimentally, but to date the high production costs leaves them at the prototype stage only.

*The archery coach* must weigh the pros and cons of these innovations. Equipment is only part of the answer to good shooting performance. The archer may be swayed by the advertising campaigns, paint colours and radical designs. Still, the least expensive risers, die-cast magnesium can provide your archer(s) with an economical, efficient, durable bow to compete with, if that’s what makes the arrow go in the middle.

#### Dynamic Balance versus Tiller

Dynamic balance refers to the synchronised bend of one limb to the other. Traditionally, the value for the distance between the lower end of the riser/limb butt and the string was smaller than the value for the distance between the upper end of the riser/limb butt and the string. This was due to the fact that the bow is held in the hand below the midline of the riser where the arrow sits at full draw.

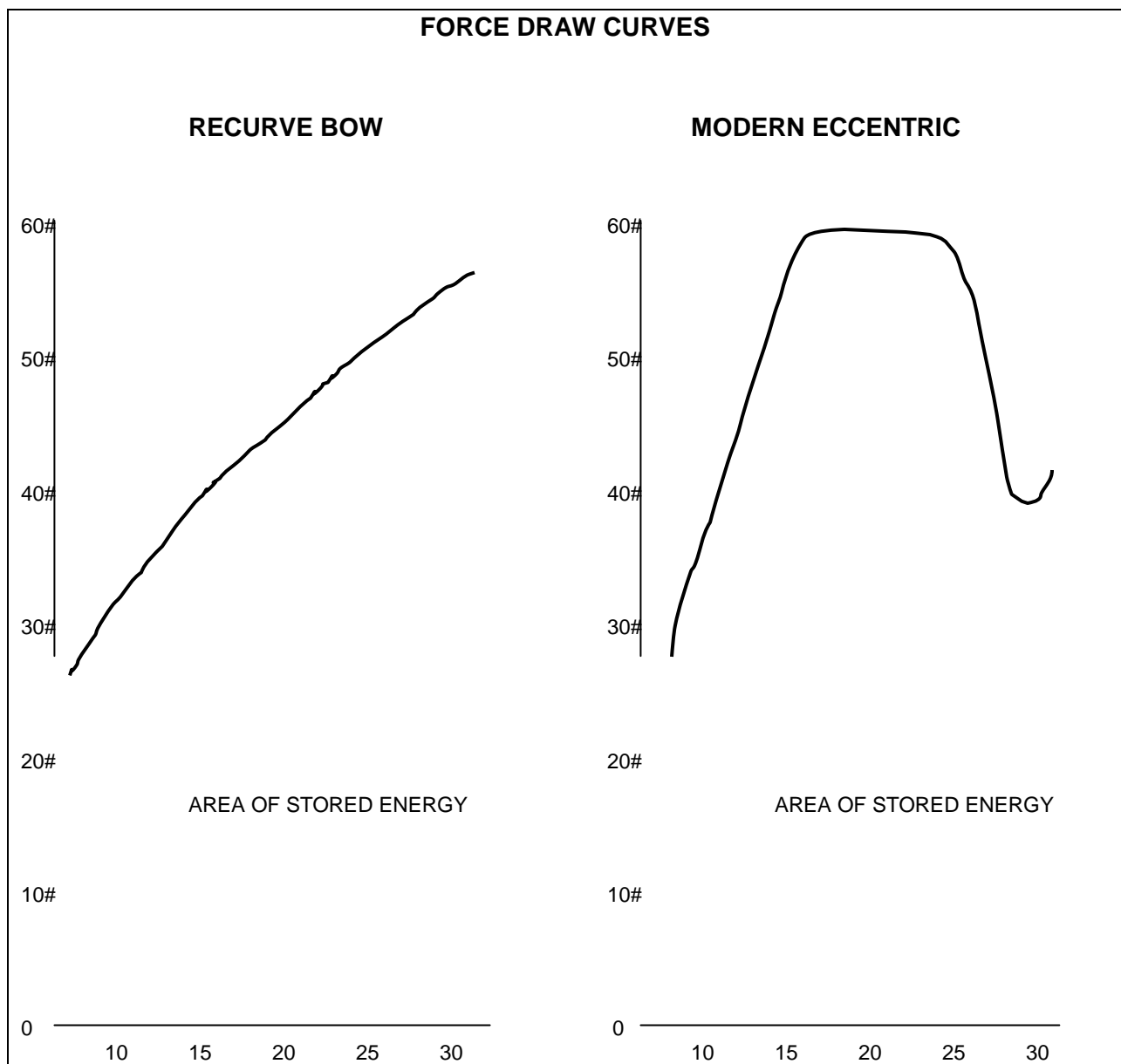
However, several bow manufacturers suggest that this is no longer a consideration due to the hybrid deflex/reflex shape of the riser section. Starting with compound bows, limb/riser design reduced the need for measurable differences between the upper and lower limbs since the force of the arrow was supposed to be aligned with the true middle of the riser. Some recurve manufacturers are utilising this concept, too.

Tiller, on the other hand, is *an adjustment* to the dynamic balance. Traditionally, the bowyer was the only person who could make the adjustment. Now, this can be adjusted by the coach, or archer. In compound bows, simply offsetting the number of limb bolt turns of the upper limb in comparison to the lower limb. In recurves, it is accomplished by changing the limb angle in the riser’s limb butts with integral threaded screw housings in the riser. Some manufacturers differ in their adjustment set-ups.

Tiller adjustments can change the strike pattern in the target from vertical to circular. Vertical groups in the target are quite obvious. Adjust tiller only after poor nocking point location has been corrected. Archers shooting with 3 fingers under the nock are not holding modern bows in the normally expected way, and this archer will benefit from the small adjustments made to the limb position. This is one of the very few reasons there is to change the dynamic balance.

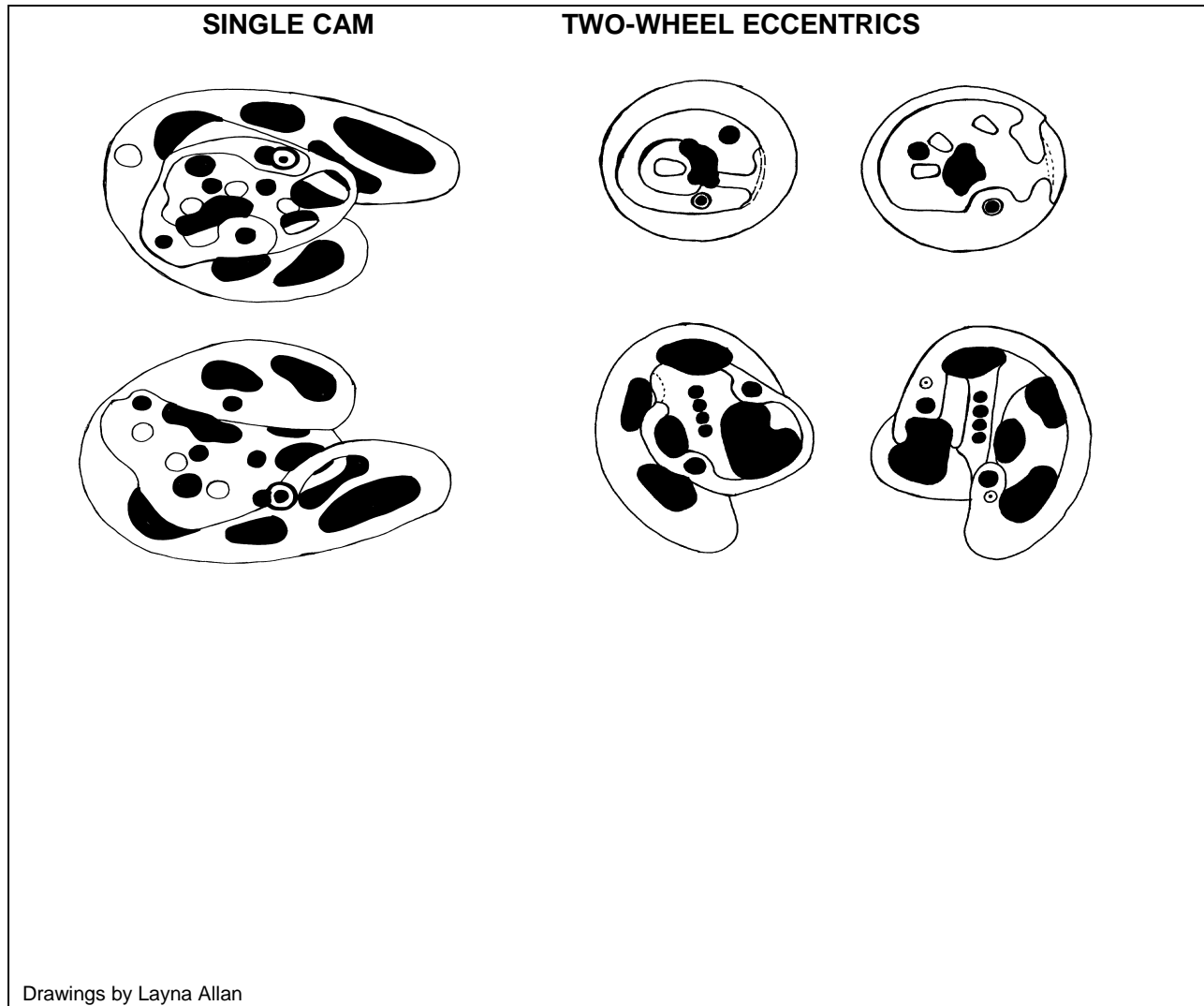
### Eccentrics

Compound bows continue to make up the lion's share of the market place so it is not surprising that recent developments have revolved around this type of equipment. A normal two-wheel or eccentric compound bow stores more energy than a recurve to begin with.









The archery industry continues to look for ways to increase the amount of stored energy under the draw curve, and arrow speed out of the bow. Part of the answer is in redesigning the eccentric. How?

1. By narrowing the width of the cam itself, the cable travel from one side of the wheel to the other, reduces the lag time from release to brace height.
2. By increasing the outside diameter of the “draw side” of the eccentric, the power stroke is longer.
3. By reducing the outside diameter of the “power side” of the eccentric, a larger step exists between the two sides of the eccentric causing a greater whipping action of the cable/string upon release, thereby increasing acceleration.

Not satisfied with the lag time factor during release, many innovative minds have returned to the concept of one eccentric (on the bottom limb) and one concentric or idler wheel at the other end. As this technology became more refined, the newer designs were not only quieter, but they also became as fast as conventional two-wheel designs. Coaches need to be aware of the history of the technology since an archer can come to a coach with equipment pre-chosen that could be quite old or have been purchased during the time that these changes and innovations were developing.

The added benefit of the single-cam design was the archer's ability to draw the bow to the full stop position known as the "back of the wall". In order to avoid the arrow going through a cycle of deceleration-acceleration-deceleration, a 2-wheel compound bow had to be drawn and held while maintaining the eccentrics in the "middle of the valley". The area of greatest let-off should correspond with the archer's proper draw length and anchor position. This position was not easy to replicate and was hard to shoot while maintaining good body alignment and muscle contraction. That is why some manufacturers re-instituted the old idea of "draw stops" which aligns the archer's full draw position with the correct cam position. The new one-cam designs may or may not use a draw stop device. Both these methods increase the likelihood of good archer form and muscle control.

Caution: Every year there are eccentric/cam designs, which cater to the "speed" side of the archery buying public. These bows are usually not necessarily appropriate for elite archery. The compound bow chosen for whatever discipline, even 3D, must be smooth to shoot, forgiving of form mistakes, and easy to tune. Otherwise, the archer has just purchased the fastest way to miss.

The archery coach must teach the archer to exercise good judgement when it comes to claims of speed. Remember, almost any bow will be able to produce faster arrow speeds if the ARROW is changed to a lightweight carbon/aluminum alloy.

### Strings

As the archer's skill progresses, the coach should assess the standard industry string that came with the bow to see if it really transferring the energy into the arrow as efficiently as possible. Though materials change, and hopefully improve, the coach's role in tuning means that a variety of string lengths and number of strands should be manufactured in order to compare and contrast the advantages and disadvantages of each variable. As well, for those compound bows using synthetic harness assemblies, the length of cables is also a factor. Due to the fact that compound bows strings and cables need to be made on a lathe using considerable tension, coaches generally do not build customised replacements. For recurve bows, however, there are quite a few options available that coaches and archers can experiment with and individualise. See Appendix B: String-making, for specific details.

The manufacturing industry continues to develop string material that will transfer energy effectively from the bow to the arrow without stretching or breaking. In the 1970's, Kevlar ® did a great job transferring energy due to its high tensile strength, but was inappropriate for most bows due to its correspondingly high breakage rate. Dacron ®, the workhorse of the string industry, is slowly giving way to polymers found in such products as Fast-flight ® by Brownell and BCY ® blends.

Therefore, the archer's form, and discipline needs, will force the coach to experiment beyond the basics.

1. Slightly shorter strings decrease bow draw weight in compound bows; increased brace height and can reduce cast in recurves. A shorter string may be necessary if there is too much string slap in a recurve limb or if the compound bow does not fit the archer precisely, or if there is string/cable contact with the riser/overdraw.
2. Slight longer strings increase bow draw weight in compounds; decrease brace height and increase cast in recurves if not taken to extremes.
3. Changing the number of strands in the string changes the mass weight and reaction time.



How does the coach find the right combination? Experimentation and careful observation are key. Now turn to workbook Pg. 146 Chapter 5 section entitled "**Test #2**".

**P. 146**

Stabilisation: carbon versus aluminum, sliding weight adjustment, necessity versus trends

Review of the theory

The main purpose of any stabilisation system is the stability of the bow upon release. *The archery coach* must take the time to experiment with this equipment variable. There are no easy quick-fix solutions. There is no rule etched in stone. The most important factor is not archer comfort; it is a matter of efficiency that forces the archery coach to find the best combination for each archer.

For all recurves and most compound bows, correct stabilisation can have a direct effect on bow reaction and more importantly, arrow tuning and flight. In most cases, the correct stabilisation should produce a circular strike pattern in the target as well as assisting the archer's aiming, release and follow-through.

However, if the archer grips the bow too much and/or does not use nor trust fully a wrist or bow sling, the full benefit of stabilisation will not be realised. The coach should ensure that the archer has full confidence in the sling so that the bow hand fingers will stay relaxed throughout the sequence. The archer is only gaining extra mass weight with the addition of stabilisers in this case. Bows will react differently with increased mass weight, but gripping the riser upon release reduces improvement to the arrow flight. Sling length should be adjusted so that the bow's reaction out of the hand is quick and short. The bow should not have much travel out of the hand (too long), nor torque (too long).

Though stabilisation configurations have changed very little over the past 20 years, the man-made materials in the rods themselves have changed. With the advent of carbon fibre tubing and carbon wrapping of aluminum cores in arrow building, manufacturers adapted the same techniques to produce stabilisers and attachments with similar composition. Since carbon fibres vibrate at a different speed from aluminium's reaction, the coach should experiment with as many different materials in combination as possible.

Vibration dampeners are available also. The coach should experiment to find the right combination of materials: hydraulics, spring-loaded devices, and rubberized attachments. Several manufacturers offer a variety of options.

Remember:

- Change only one variable at a time.
- Change only one length at a time.
- Change only one weight configuration at one time.

Added to the selection of materials, lengths and weights for the coach to choose from, modern commercially available stabilisation allow the weight distribution along the rods to be moved to counteract the vibration nodes that occur along the length of the rods. Sliding weights can be adjusted along independent, smaller rods (usually made of carbon) which make up the total stabiliser or v-bar rods. Again, the archery coach must experiment carefully to see whether or not these slight changes are cosmetic or beneficial to the individual archer and meet the rules of the chosen discipline.

What should the coach look for: THE CONSISTENCY FACTOR OF EACH STRIKE PATTERN. This is the true test of any set-up. It will be interesting of course to listen to the archer's opinion, but the only thing that really matters is the consistency for success.



P. 147

Now turn to workbook 147 Chapter 5 section entitled, "Test #3".

### Accessories

#### Draw check devices

A draw-check device is extremely useful to a recurve shooter when used correctly. When draw check devices first came on the market, they were used solely as a method to control target panic. However, a draw check device should never be used, by itself, to combat this psychological problem. It is a technical device that can increase archer accuracy. As the limbs of a recurve are drawn and store energy, the archer using a draw check can accurately tell how much the limbs have opened, thereby controlling the amount of energy they store and transfer to the string upon release. Also, the draw check assists the archer draw to the correct full-draw shooting position and muscle contraction.

#### Tuning:

Any draw check device (e.g. Clicker) which touches the arrow directly should have MINIMAL pressure on the arrow at brace height as the arrow sits on the rest. If the tension is too great, the draw check will actually deflect the point of the arrow laterally upon release. As well, if the archer tunes with a cushion plunger, excessive draw check pressure compresses the arrow against the pressure button, and alters the reaction of the string tension upon release.

Some compound shooters are now using clickers in conjunction with finger release and with release aids. Certainly the finger shooter will benefit since the full-draw position can be replicated successfully without the use of draw stops.

The release shooter is more questionable. If an archer shoots a release aid properly, the body position and muscle contraction during aiming should make a clicker/draw check device superfluous. However, if the style of release aid or the archer's form does not allow for the

correct muscle tension, squeezing through the shot while aiming, a draw check may assist as a teaching aid.

The coach must be careful of this combination. The release is supposed to be a surprise every time the archer aims and controls the shot. If the auditory cue of the clicker only serves to make the archer squeeze a trigger-style release pre-maturely, then you are definitely no further ahead.

Proper Clicker Installation     *If you are installing a clicker on the bow for the first time:*

- Install the clicker in the sight window closer to the back of the bow and halfway down its length or long enough that the arm of the clicker extends well beyond the arrow rest, even when rotated beyond the back of the bow.
- Make sure the arm extension of the clicker is in the middle of the adjustment range before drilling/gluing.
- Ensure the clicker is firmly attached to the bow with enough pressure on the arm to create a gentle, light tapping sound when the metal arm is drawn away from the bow and released.
- Have the archer draw a full-length arrow to the anchor position with eyes closed without the clicker.
- Mark the point where the shaft comes flush with the back of the bow.
- Repeat this several times until consistency is achieved.
- Now place the full-length arrow under the clicker and position it so its face edge lies on the back of the bow in the sight window.
- Have the archer draw again, making sure that the clicker contacts the marks on the arrow shaft.
- Depending upon the length of the points used, cut the arrow so that the total length of the arrow will contact the clicker in the same place your line on the full-length arrow did.

Releases

Most common among top elite archers is the “true” back tension release that does not use any trigger mechanism at all. A Roller-Sear-type mechanism or a stationary hook allows the release’s rope to angle off the post or holding point, disengaging from the string at the full-draw position. This release keeps the archer from anticipating the shot more than any other style. The release most commonly seen in archery however, is the trigger style that comes either in a caliper (2 arms) or gate (1 arm) configuration. The release may be a first-finger or thumb-style that is either hand-held or worn with a wrist strap.

Many archers now use these releases in conjunction with a small loop of release rope served into the string serving around the nocking point. The arrow still sits in its normal position under/between nock locators, but now the release aid does not attach to bow string, but to the

loop. This makes a quieter release for bowhunters, a more secure arrow position for those shooting shorter compound bows, and an exact draw length adjustment for fitting the bow to the shooter. As bows become shorter, it is also safer to use a loop because the surface of the nock stays in contact with the string surface better at full draw. For some youth bows, a loop may not work; the coach must experiment.

The archery coach must work with the archer to select the type of release, which assists the aiming and control aspects of the shooting sequence. Then the coach works with:

1. Release length
2. Release rope length
3. Loop behind the string length
4. Spring tension in the release

If the spring tension is too strong, the archer will not complete the shot properly, particularly if a trigger style release is used. If the spring tension is too light or weak, the release may let go prematurely or be too sensitive to the archer's touch. This must be tested in practice as well as under tournament conditions.



Now turn to workbook pg 148 - 149 Chapter 5 section entitled, "**Test #4**" and "**Test #4a**"

**P. 148 -  
149**



#### iv) Tuning for speed or forgiveness

As eluded to the previous sections, the ultimate archery set-up would be one that combines forgiving bow and arrow reaction with quick transfer of energy so the arrow travels out of the bow with a flat fast yet stable trajectory. This is not always possible. The coach may have to forsake one for the other. There is also the problem of dealing with a ready-made set-up that you have inherited with the archer.

#### REMEMBER:

1. The coach and archer must devote an adequate amount of time in the training plan to experiment, test and evaluate these changes.
2. Change only one variable at a time.
3. Document your changes and findings precisely.
4. Do not rely on "intuition" and personal preferences.

#### Tuning for **speed**:

- increase bow weight while decreasing arrow weight
- decrease arrow weight only by changing alloys and/or wall thickness
- decrease arrow length (overdraw or reflex handle)
- decrease fletch size/use man-made material
- decrease brace height
- switch to a polymer string material & experiment with fewer number of strands
- decrease string serving length (center and/or loops)

#### Tuning for **forgiveness**:

- increase fletch size or switch to feathers
- increase number of strands in the string
- increase length of string serving
- increase arrow weight slightly
- move the arrow rest over the pivot point in the riser

**v) The Plan and Equipment selection, testing and evaluation**



Complete an appropriate equipment test workbook pg. 150 -158 for the equipment style of your archer or create and record an equipment test used with your archer. Report on the results of the test in workshop #2

**P. 150 -  
158**

The coach should make. equipment concerns a priority near the end of the General Preparation phase review equipment performance. In conjunction with the archer (and family if applicable), discuss the needs, options and possible outcomes of changes to bow, arrows and/or accessories. Review the plan and record an evaluation meeting.

From that assessment, order the equipment so that it will arrive before the beginning of the Pre-competitive Phase. This is not always easy to do. Manufacturers do not run their operations to suit individual needs and more time may be needed to order large purchases such as bows and arrows. Supply shortages can wreak havoc on the well-planned coach, but they are a real possibility. If you are working with carbon/aluminum composites, there are a variety of point-weights, threaded insert/screw-in point combinations. There are several nock styles to choose from also. Ensure you have ordered enough units in the desired combinations so that experimentation can be done efficiently.

Return to the plan and record anticipated equipment sessions where the main goal will be to customize the new purchases to the archer, and ensure all other aspects of the set-up are repaired, in good condition and ready to be used constantly. There should be several of these sessions recorded into the training plan not only during the Pre-competitive phase, but the competitive phase also.

Record practice sessions where experimentation will take place. This is totally different. The archer may not shoot as many arrows, but the coach will do a lot of work. Ensure that all your repair and customising tools and machinery are available on those days. Preferably, those sessions will be one-on-one without a great deal of distraction.

Next, record testing and evaluation tournaments. There is no point in working in practice sessions only. The coach has to see what will happen to the tuning and bow reaction under elite competitive stress and a variety of weather conditions.

Finally, mark down a deadline date. After this date in the Annual Plan, the set-up is set for the season. Repairs and more supplies may be necessary, but the selection and tuning have been decided upon.

The archer can get to know the set-up intimately and feel comfortable with tried-and-true equipment. Further changes must wait until the post-competitive season arrives and final evaluations take place.



#### vi) Case Studies

- P. 159 - 161** - Turn to workbook pgs. 159 - 161 -. Record your suggestion to the scenarios. Limit responses to equipment consideration.

## REFERENCES

Jas. D.Easton, Inc. (1998). Easton Arrow Chart. Salt Lake City, Utah, USA.

Roemer, P. P. (1999). Newsletter 1999. Trueflight Manufacturing Company, Inc., Manitowish Waters, Wisconsin, USA.

Tekmitchov, G. (1998). Olympic Bow Risers in Archery Focus, Salt Lake City, Utah, USA May/June, pages 20-21.

Tekmitchov, G. (1998). Inside the Modern Bow Limb in Archery Focus, Salt Lake City, Utah, USA, September/October, pages 24-26.

Winke, B. (1998). Understanding Speed! In Inside Archery Gainesville, Florida, USA, pages 62-67.

Wise, L. (1998). Understanding the Single Cam Bow in Archery Focus, Salt Lake City, Utah, USA May/June, pages 38-39.

## Basic Tuning Principles

This test is recommended by most as a good basic and effective method. There are many variations. You and the archer must find a method with which you are comfortable and which works for you.

These instructions apply to both compound and recurve bows. Where differences are important they are mentioned as a note for either type of bow.

All adjustments mentioned are for right handed archers. The opposite will apply to left handed archers.

### Pre Tune Considerations

#### Bow

The bow's sight window must be cut past center, that is, the arrow rest must be able to be moved a full range from inside center to outside center. This ensures ample clearance and allows the bow to be tuned. All accessories should be mounted before the tuning process starts. Ensure the bow sight is mounted parallel to the string and parallel to the center of the bow limbs.

#### Center Shot

The amount an arrow can be moved inside the center of the handle is often referred to as the amount or degree of center shot.

An adjustable arrow rest or cushion plunger is used to allow adjustment for center shot. On a recurve bow center can be found by aligning the string to bisect the center of the limbs. Center shot is where it bisects the handle. With a compound bow, the eccentrics cause the string to be offset away from the handle, so the center of the limbs cannot be used. The thrust on the arrow in both bows is toward a point directly above the center of the grip. Using the center of the grip provides an excellent datum for true center. The movement of the bow's center shot is achieved by moving the arrow plate, either by adjusting the arrow rest or turning the cushion plunger.

On a beginner's bow, shims may be added or removed from behind the arrow rest.

**Note:** if the bow is suspended on its limbs between two chairs, the arrow will hang on the bow's center line.

#### Arrow Rest

Mount an arrow rest with a non-interfering support arm on the arrow plate or sight window. It is very important that the arrow and fletch can pass the rest area without contact. Some arrow rests have a support arm which moves away if the arrow makes contact.

These rests usually are drilled for use with a cushion plunger.

## Arrows

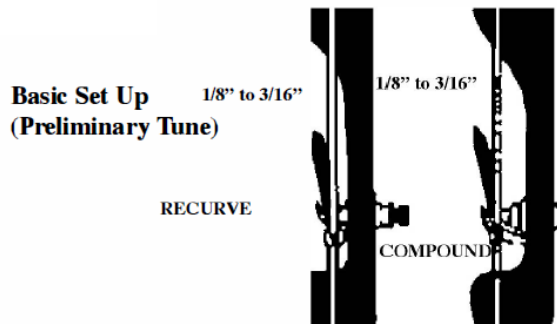
Ensure that all arrows being used for the tuning are exactly the same for size, weight, balance, type of fletch and point, etc. The process outlined requires at least three fletched and three unfletched arrows. Tape may be wrapped around the bare shafts where the fletch would be to exactly duplicate the weight and balance.

## Brace Height

This is the distance from the string to the bow's pivot point (grip or rest). The optimum is when smooth bow action, good arrow flight, little bow noise and tight grouping occur. Twisting the string clockwise will slightly shorten the string and increase brace height.

## Documentation

Remember, the entire tuning process requires careful documentation of each step. All measurements must be carefully recorded and each adjustment and its effect noted.



**Note** - Compound bow shot with a release aid will set with a zero center shot setting

The bow is now ready for fine tuning. The process described above will provide a basic tune for bows shot by beginners to novice. Once basic form is perfected and the archer is capable of grouping, fine tuning can be attempted.

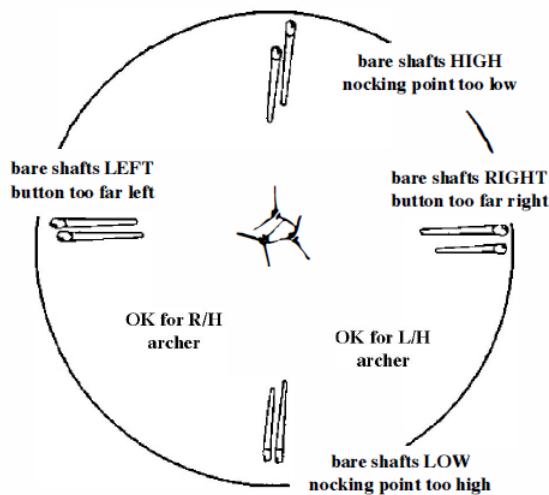
### The Bare Shaft Planning Test

The Bare Shaft Planning Test involves the shooting of groups of three arrows at 10 to 15 meters. It is recommended that the range be flat for consistency of stance.

Every advantage for best shots should be taken.

Honesty is also required. Any shot less than absolute best form should be redone. Sight the bow in so that the fletched arrows are hitting a small aiming spot marked on the buttress.

There are three main considerations in tuning the bow. These each have their own adjustments and must be adjusted individually.



### Proposing (Nocking Point Adjustment)

The up/down (vertical plane) movement of the arrow to the target is called "proposing" and indicates improper nocking point adjustment.

- Shoot the 3 fletched arrows to check the group. Now shoot the 3 unfletched arrows. The relationship of the unfletched group to the fletched group is the basis of the entire test.
- If the unfletched group is the same as the fletched group the bow and arrow combination are considered matched or tuned.
- For now, ignore where the unfletched arrows land on the horizontal plane and concentrate on their vertical displacement.
- If the unfletched arrows group above the fletched arrows then move the nock locator up. In the case of low impact, move the nock locator down. Once the 2 groups are the on same plane, clamp the nock locator in place. The nocking point is now set.

**Fish Tailing (Center Shot Adjustment)**

Movement of the arrows on the horizontal plane or left right indicates center shot misalignment or arrow mismatch. Follow the shooting steps for nocking point and note on which side of the fletched arrows the unfletched impact. A large off set (more than 6" or 15cm) indicates a serious mismatch of arrow to bow and fine tuning may not compensate. In all cases you and archer must strive for the closest possible group. Arrows that impact to the left are reacting stiff and those impacting to the right are weak. If the unfletched arrows impact left, decrease the amount of center shot (move the plate or plunger in) or decrease the amount of tension of the plunger. In the case of right impact, move the arrow plate or plunger out or increase the plunger tension.

**Clearance**

If any part of the shaft or fletch contact the bow while passing, erratic flight and poor grouping will be the probable result. The amount of contact is difficult to control and will no doubt cause misses for otherwise slight errors in form. Clearance should be checked after proposing and fish tail tests. Clearance can be checked by spraying talcum powder or using lipstick on the arrow rest area when shooting. Any contact will show by a break in the powder or lipstick transferred to the fletch. Repeat the process of spraying the arrow. If contact is experienced, try adjusting center shot, retuning for fishtailing.

Another method of attaining clearance is to rotate the arrow nock so the lower fletch moves away from the rest. If contact is serious and cannot be tuned away, stiffer shafts may have to be considered.



## Compound Variations

Nocking point adjustment for the compound is exactly the same, but the compound offers more latitude for fish tail adjustment. If the unfletched arrow impacts left, the previous adjustments can be enhanced by increasing the bow's peak weight. Keep increases to 1/2lb. increments. If it impacts right, decrease the weight.

### Right Impact:

- Stiffer cushion plunger spring
- Raise brace height
- Lighter points
- Heavier string or change from Fast Flight to Dacron
- Move rest back slightly
- Stiffer arrows
- If using a springy rest, try a weaker spring



### Left Impact:

- Softer cushion plunger spring
- Lower brace height
- Heavier points
- Lighter string or change from Dacron to Fast Flight
- Weaker (lighter spined) arrows
- Use a heavier spring on a springy rest



## Paper Tuning

Some archers prefer to know exactly how the arrow leaves the bow and flies to the target. This can be accomplished by the paper test. Suspend a large piece of plain newsprint more than an arrow length in front of the buttress. Stand as close as possible to the paper (just so the stabilizer doesn't touch) and shoot a fletched arrow through the paper. The tear in the paper will show the arrow's attitude in flight. The farther you are away from the paper the more the fletch will have stabilized the arrow.

The rules explained in the Bare Shaft Planning Test also apply here. If the tear is vertical, adjust the nocking point (proposing). If it is horizontal, adjust the center shot (fish tailing).



This tear indicates good arrow flight. The point and fletching enter the same hole.

This tear indicates a low nocking point. To correct, raise the nocking point 1/16" at a time until the low tear is eliminated.

This tear indicates a high nocking point with possible clearance problems or mismatched arrow spine. To correct, lower the nocking point 1/16" at a time until the high tear is eliminated. If the problem is unchanged, check the clearance. If the high tear persists, change the arrow spine (stiffer) or decrease the peak bow weight.

This tear indicates a stiff arrow for "finger release" archers.

To correct, try:

- increasing arrow point weight
- increasing peak bow weight
- using a lighter weight bowstring (fewer strands or lighter material)
- decreasing cushion plunger spring tension
- using a weaker spring or side plate on shoot around rests
- using a weaker spine arrow
- changing from a metal nock set to a tie-on

Release aid only.

To correct try:

- Moving the arrow
- checking for cable guard
- relaxing bow hand to
- increasing peak bow
- moving arrow rest



rest to the left in 1/16" increments  
adequate clearance past cables and

eliminate excessive torque  
weight  
toward arrow point.

This tear indicates a weak arrow for "finger release" archers.

To correct, try:

- checking for a clearance problem
- decreasing peak bow weight
- decreasing arrow point weight
- using a heavier bow string (more strands or heavier material)
- using a metal nock set
- increasing cushion plunger spring tension
- using a stiffer spine arrow
- using a stiffer spring or side plate on shoot around rests

Compound bows only.

To correct, try:

- moving the arrow rest out (1/32" at a time) away from the bow

Release aids only.

To correct, try:

- moving the arrow rest to the right in 1/16" increments
- checking for clearance at arrow rest assembly
- decreasing peak bow weight
- relaxing bow hand to eliminate excessive torque
- choosing a stiffer spine arrow

This tear shows a combination of more than one problem. To correct, follow the procedures that apply to your style of shooting, correcting the nocking point first.

Once you are satisfied with the flight and grouping of a particular set up, clamp the nock locator securely in place and serve above it to prevent movement.

Secure all adjustable parts tightly and document all measurements.

Note: the nock locator should not be squeezed so tight as to cause damage to the serving or the strands beneath.

These methods allow the archer to shoot with some confidence in his/her equipment. It is important to document all measurements when tuning is complete. One shaft should be kept without fletch for checking the tune periodically.

You and the archer must also realize two important points:

- The tune of any bow arrow combination is not finite.
- Grouping is the most important result of proper tuning.

There is no precise adjustment of any of the movable parts when tuning. The arrow will react properly to the bow and archer within a certain latitude of adjustment.

You and the archer should experiment with group size and its relationship to adjustments, and at all times documenting all findings. True flying arrows usually group best, but one should favor grouping to flight. An arrow flying with an attitude slightly nock high left will clear the bow better. If the practice schedule is kept up and documented, both tuning and form practice can be attained without a loss of valuable range time.

Many shooters employ two or more sets of strings and plungers. Once one set is working, they start from scratch with the other and get them working satisfactorily. Two objectives are then met: a double check on the tuning and the preparation of a back-up set.

If both give the same results, then the bow was tuned to maximum tolerance. If not, the better grouping of the two is set aside and the other worked on.

## **String Theory**

### **String Materials**

**Linen** - only used by some longbow or traditional archers

**Dacron** - developed in the early 1950's. It has been the mainstay in archery strings since then.

**Fast Flight** - introduced in the late 1980's. It is an ultra-drawn, extended chain, ultra-high molecular weight, polyurethane fiber. Simply put, it is stronger with less stretch than other string materials. It is 5 times more resistant to stretch (strength) than Dacron. It is now a very popular string material for tournament archers.

New materials are being introduced continually by the string manufacturers. Tournament archers are advised to research the specification for all the major string materials before making a decision. Experimentation is to be encouraged.

## APPENDIX B: String-making

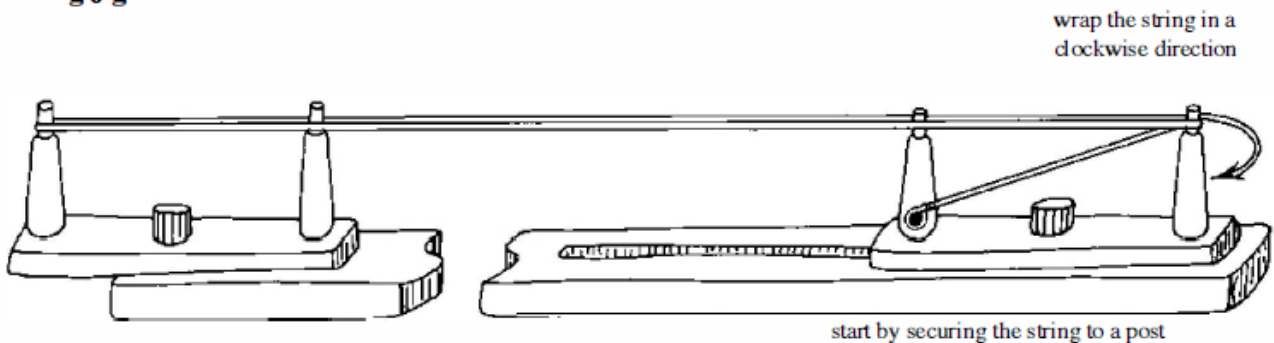
### Bow String Construction

The string jig can be made out of wood or metal, but metal won't bend as much under the pressure of a tight string. The base can be made out of a channel iron used in electrical work.

Bowstring materials are made with a right hand lay. This means that all serving and twisting must be in a clockwise direction. If you are not sure of which direction the string is twisted, take a single strand and slowly twist it in both directions. The direction that it tightens is the proper direction to induce the twists.

The jig must be set to the finished string length from tip to tip. This measurement

### String Jig



requires some experience. The amount of stretch of the material, any bend in the jig, etc., must be compensated for here. A good rule for recurves is that the string is about 3" less than the marked bow length. For example, a 68" bow requires a string of a approximately 65" long.

Most manufacturers are redesigning their limbs and eccentric hardware to handle the extra shock associated with this string material. Most compound bow manufacturers are adding Fast Flight as a substitute for cables with terminations for both the string and the cable in the eccentric.

Because of the stretch and forgiving nature of Dacron, it is used for many compounds and older recurve bows. Secure the standing end of the spool to the inner peg of one end of the jig and start wrapping the material around the outer pegs in a clockwise direction.

The number of strands depends on a number of factors: bow weight, nock size, materials used, etc. Consult the manufacturer's recommendations and experiment with nock fit.

When you have enough strands, secure the string on the post.

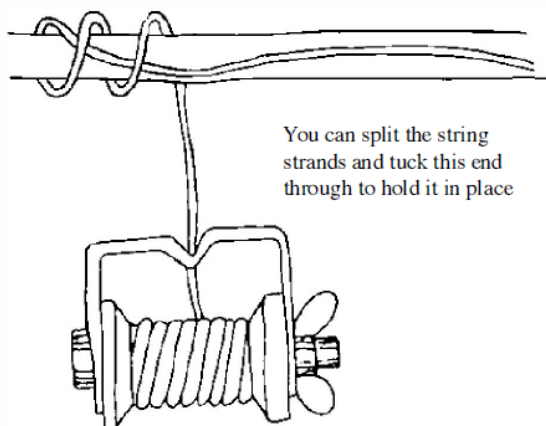
Now loosen the bolts and turn the pegs 90° to the base so you are at full length of the string. Move the pegs back and forth to ensure the jig is secure and the strands are uniformly tight over the entire distance. Tighten the jig to prevent movement.

Start serving at the end you have tied off. Move the server to the left side, split the strands and push the serving thread through. Move the thread end to your left.

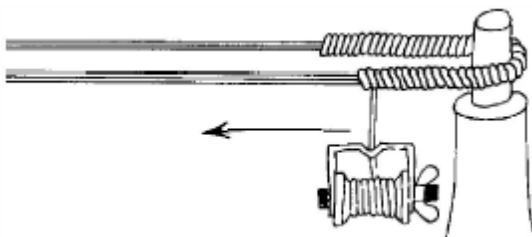
Start spinning the server over the stands; remember to wind in a clockwise direction. Serve about 12cm or 5". This illustration shows how to start the serving.

Serve one end at a time. Next, turn the jig back to full length, allowing the serving to overlap slightly.

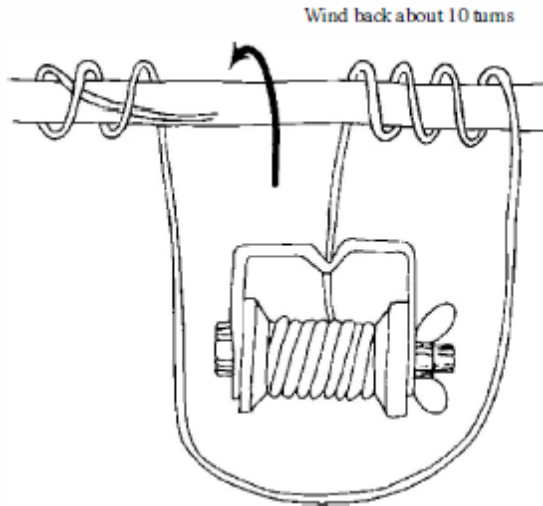
Keep the serving snug and neat  
Serve at least 10 turns to secure serving



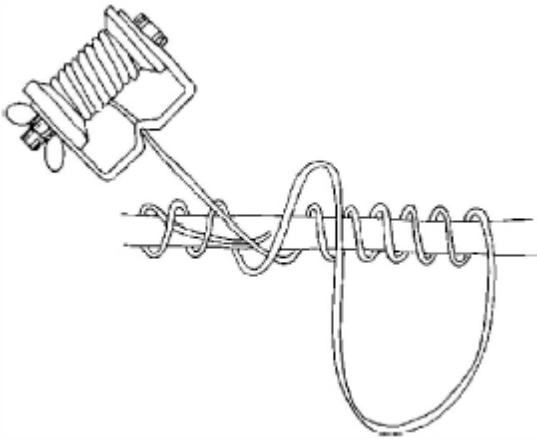
Ensure the string loop is large enough to fit over the limb tips or small enough for compounds. Now, start serving back over the loop serving. A recurve bow will require more serving, depending upon the amount of recurve at the tips. A compound only requires a few inches of serving.



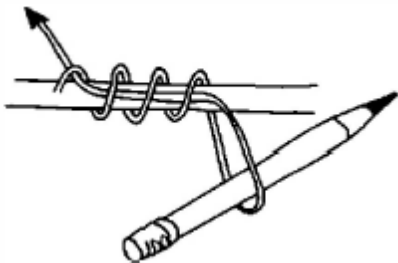
The following diagram shows how to finish the serving. Hold onto the bottom loop with your four fingers to give yourself room to wrap the server back on the string. Serve about 10 wraps to ensure that the serving will remain secure.



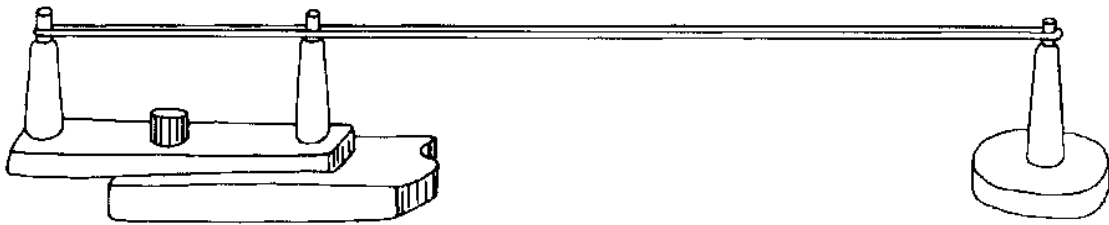
Now, start wrapping the bottom loop to tighten and wrap the serving on the left hand side. The loops on the right side will unwrap as the left side wraps. When this is done, pull the string with the server to take up the slack.



A pencil works well to keep pressure on the loop so it won't tangle.



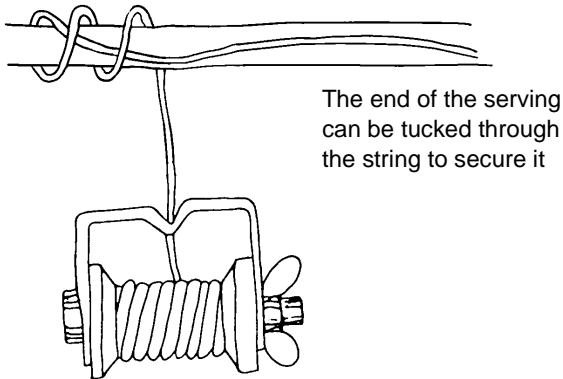
## Bow String Maintenance (center serving)



A simple portable wooden string jig can be clamped onto a table or work bench.

Slip the end loops of the string on the jig so the string is tight.

To make a center serving, start the serving at the bottom end of the serving. Move the server to the left side, split the strands and push the serving thread through. Serve about 10 wraps by hand to ensure that the serving will remain secure



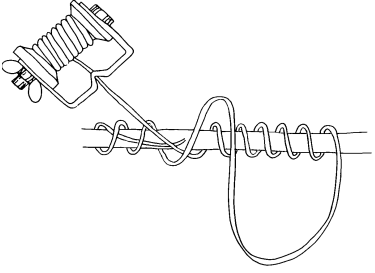
Keep the serving snug and neat by hand

Serve back at least 10 turns to secure serving

Start spinning the server over the strands; remember to wind in a clockwise direction. Serve about 12cm or 5in.

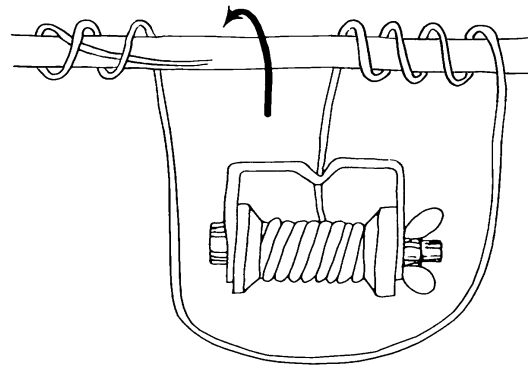
The following diagrams show how to finish the serving. Hold onto the bottom loop with your four fingers to give yourself room to wrap the server back on the string.



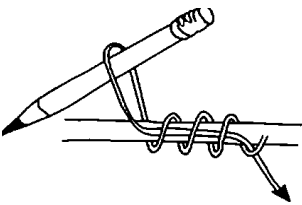


Wind back about 10 turns

Then, start wrapping the bottom loop to tighten and wrap the serving on the left hand side. The loops on the right side will unwrap as the left side wraps. When this is done, pull the string with the server to take up the slack.



A pencil works well to keep pressure on the loop so it won't tangle



**COMPETITION – DEVELOPMENT  
REFERENCE MANUAL**



**CHAPTER 6**

**SPECIALISED TRAINING**



## OBJECTIVES OF CHAPTER 6: SPECIALISED TRAINING

To identify special training requirements within the archery discipline of choice.

To identify special training requirements for elite youth, wheelchair and women.

### LEARNING OUTCOMES OF THIS CHAPTER

The coach will be able to:

1. plan, implement and evaluate training sessions that teach the archer accurate distance judgement.
2. plan, implement and evaluate training sessions that teach the archer how to shoot the elimination rounds successfully.
3. plan, implement and evaluate training sessions that teach the archer proper body alignment vis-à-vis the angled target for field and 3-D shooting.
4. plan, implement and evaluate training sessions that teach the archer to adapt to various environmental conditions successfully.
5. plan, implement and evaluate training programmes to assist the elite wheelchair archer.
6. plan for elite youth development through a growth spurt.
7. solve problems arising from any of the above.

## **COACH REFERENCE MANUAL**

### Introduction

- i) The young archer
- ii) The female archer
- iii) The wheelchair archer
- iv) Shooting on sloping terrain /Shooting in windy conditions/Environmental conditions
- v) Distance estimation
- vi) Preparing the athlete to travel
- vii) Match play/team event

## **WORKBOOK TASKS**

### Youth Growth profile

- viii) Exercises:
  - 1. Elite Wheelchair archer preparation
  - 2. Shooting on slopes
  - 3. Estimating Distance
  - 4. Travelling
  
- ix) Case Studies:
  - 1. The Windy Day
  - 2. The 13-year-old sensation
  - 3. Match Play versus FITA round
  - 4. Estimating distance with fixed pin sights

## **Introduction**

This chapter deals with training issues and preparation for specific conditions. With the exception of match play, the subjects deal with special outdoor archery requirements and how they could affect your archer(s). "Match Play" occurs indoors and outdoors at the national level. Match Play requires both emotional and mental control.

International competitions include elimination rounds and it requires some strategy as to whether the archer feels more confident starting the round. Does the archer feel confident, or more confident, answering the competitor's first 3 arrows in round 1 (if given the choice)? Can the archer handle ending up shooting the last 3 arrows against an opponent in a match?

Though a teaching manual such as this can not anticipate every competition situation and requirement, there are some general topics, which need special attention: youth, female athletes, athletes with a disability, environmental conditions and travel. When combined with discipline requirements such as varying terrain, elevation and distance estimation, and the coach can imagine how vital proper preparation is to both athlete and coach.

At present, you as a coach may not coach an archer involved in a particular discipline or event. However, situations change. A good archery coach can not be complacent with a certain level of knowledge, specialty area, or experience. The athlete's interest, and development, may challenge you at any time to expand your horizons. That is why all coaches should review the entire chapter and complete as many of the exercises outlined as possible.

Make sure that you are up-to-date on equipment and shooting rules first before you start to train the archer. Archery Canada's rulebook is available on-line and updated regularly. Differences between Archery Canada rules and international rules are mentioned specifically. In those circumstances, consult the international body referred to.

Beyond the provincial or national level, consult the governing body for that specific tournament to make sure that there are no differences from what is considered to be normal for the discipline. Differences should be trained for in advance so that the archer is mentally prepared and that the equipment will pass inspection or scrutiny.

### i) The young archer

It is expected that the coach candidate has read and understands fully Archery Canada's Long-Term Archer Development Model base document and has competency in NCCP's modules "Developing Athletic Abilities".

A normal adolescent, whether male or female, lives with contradictions and inner conflicts. There is at once, the desire for freedom and responsibility, vying with the childlike needs of dependence and protection. Refer to Maslow's Hierarchy of Needs for further insight. The battle for dominance between these opposing notions is fought many times, every day. Parents and coaches are never sure which side will win.

Since maturation is highly individual, *the archery coach* must remain athlete-centered, not so much goal-oriented during this period of development. Respect and patience will keep the athlete in the sport far longer than strict adherence to rigid training regimes. The philosophical basis of all training, for every athlete, is particularly true during this major development phase: TRAINING MUST BE FUN. Also, a good coach is in the business of skill development, not win at all cost.

#### Physiological Change

The athlete's development does not occur in a smooth, gradual progression but rather by jumps and spurts. This is due to the fact that four major systems of the body are undergoing rapid changes between the ages of 9 and 20. The growth rates of these systems are independent. As well, the inherited genetic make-up of the individual alters these growth rates and patterns.

Four Major Systems experiencing change:

The Lymphatic System (1) grows exponentially from birth. This development rate continues to escalate during puberty. There is a dramatic increase in body fluid volume and transport, as well as an increase in the production of disease-fighting cells. At the same time, and interrelated, are the increased growth rates of body size (2) and reproductive systems (3). Since the neural system is established before birth, all these changes put extra demands on the neuromuscular system (4) of the athlete. It is really no surprise that the normal adolescent lives in turmoil. Homeostasis (the body's desire to keep everything in balance) is completely out of order as the body adapts to all the changes at the same time.

Boys and girls grow at different rates. Boys generally tend to finish growing later, ending up taller. However, the coach must keep genetic history in mind. Look to the parents, aunts,

uncles and grandparents in order to anticipate adolescent height, muscle mass and limb length. This will help you anticipate equipment needs.

### Psychological Changes

The relationship between physiological changes and self-esteem is very strong during adolescence. The young person strives to be independent thinking, but winds up being group-dependent due to peer pressure. Criticism for appearing or acting different is absolutely savage at this age. The young person's ego becomes frail. Behavioural changes occur in order to conform, or to rebel. Depending upon the social circumstances, the adolescent makes choices. Some express "independence" by experimenting with alcohol, drugs, sex and fast cars in order to be accepted by the community. Some retreat to the computer, books and artistic pursuits. And, many turn to sports.

The young person who chooses elite sports keeps the social "baggage" and "Ugly Duckling" feelings, but seeks a positive way to demonstrate maturity and responsibility. The elite athlete, not the recreational archer, makes a commitment to change lifestyle and accept a more disciplined existence than most teens. The decision to train separates the adolescent from the school acquaintances, but offers an opportunity to bond with new friends who share common goals.

### Self-Esteem: Definition and Importance In Sport

What is Self-esteem?

Self-esteem is the way a person sees himself or herself. Self-esteem can be affected by comments, positive or negative, from others, including messages about the person's participation in sport.

### The Importance of Self-esteem in Sport

Sport gives athletes opportunities to acquire new skills and evaluate their abilities thanks to participation in competition. Athletes who have high self-esteem tend to learn better and perform better than those who do not. One of the most important stages in the development of self-esteem occurs between the ages of 6 and 11. So parents, coaches, and other adults who deal directly with children have an important role to play in the development of self-esteem of young people.

Even comments that seem harmless to the people making them may have a significant impact on others. Parents and coaches should always try to find something that the child does well, even though there are times when they must point out things that need to be improved. Positive reinforcement may focus on the way the athlete performs a particular skill or on behaviour not

directly linked to performance, for example, respecting the rules, being on time, looking after equipments, making others laugh, or helping others relax.

As a coach, what you say (verbally or through your body language) is extremely important in the eyes of the athletes, and you may have direct influence on their self-esteem. So you must always assess the potential impact of the words you say to athletes or the comments you make to them.

#### Indications that a Child is Lacking Self-esteem

The following reactions may indicate a lack of self-esteem in a child. The archer:

- avoids doing a task or responding to a challenge or gives up at the first opportunity.
- cheats or lies to avoid losing a game or getting a poor result.
- shows signs of regression and acts like a baby or in an immature way for his or her age.
- behaves extremely stubbornly to hide feelings of incompetence, frustration, or helplessness.
- makes excuses (“the coach is stupid”) or makes light of events (“this is a dumb sport anyway”).
- moves to the fringes of society by cutting or reducing ties with friends or other people in general.
- has mood swings, appears sad, weeps, has fits of anger or frustration, or has periods of silence.
- makes negative comments about himself or herself such as “I never do anything well”, “Nobody likes me”, “I’m not pretty”, “It’s my fault...”
- is sensitive to praise and criticism.
- is excessively worried about the opinion of others.
- is significantly affected by the negative influence of friends.
- helps too much or not at all in the house.

#### Helping Young People Develop Self-esteem

- Greet the archer warmly upon arrival, and make sure the archer is happy to be there.
- Show the archer that you are confident in his/her ability to learn and improve.
- Show the archer respect.
- Tell the archer what he/she does well.
- Show the archer that you appreciate him/her as a person.



- Communicate in a positive manner.
- Engage the archer in activities appropriate for the development level.  
Set realistic objectives and expectations based on athlete's abilities.
- Praise the archer sincerely and often; e.g. encourage them three or four times before making corrections.  
Encourage athletes to try without always putting the emphasis on results.
- Create situations in which the archer has a good chance of being successful.
- Be precise when you praise efforts or performance.
- Congratulate them on special achievements; recognise the archer's progress.
- Smile, wink, or nod to athletes to acknowledge efforts.
- Give the archer responsibility, participate in decision-making and give the opportunity to lead.
- Seek the opinion of the athlete, and encourage him/her to ask questions.
- Communicate to the archer the true joy of participating in sport.

#### Helping Young People Develop Confidence and Self-esteem

##### Making comments and giving feedback at practice

- Give simple, precise suggestions.
- Give athletes responsibilities.
- Encourage athletes. Be enthusiastic and constructive.
- Don't make it a chore — have fun!

##### Before and during practice — Listen to athletes

- Actively seek their input.
- Respect the archer's opinion.
- Show that you are flexible in your point of view.
- Value athlete participation.

##### Pre-competition communication

- Take the tension out of competition: have archer focus on process rather than on the final result.

- Be enthusiastic and constructive.
- Recognise archer's emotional involvement and learn to listen.
- Remind the archer what works well.
- Tell the archer that you have confidence in him/her.

After winning a competition

- Always make some comments.
- Enjoy the victory; be respectful of the opponents.
- Underline what has gone well.
- Point out what can be improved.
- Lay the foundations for future victories.

After a poor performance/not making the team/not making the cut:

- Recognise effort.
- Underline the strong points.
- Point out what can be improved; be respectful of the opponents.
- Be sure the athlete learns something from the experience.
- Play down the defeat, remind them that there will be other opportunities and that the important thing is to have done their best.

*The archery coach* must establish a challenging yet socially comfortable environment in order to attract and keep young people training and excelling during the teenage years. It is advisable to start youth groups well before the age of 9-10 so that a healthy life-style, with archery in it, is firmly established before the distractions of cars, clothes, sex and drugs tempt young people away from the sport.

### Relationships

It is expected that the Archery Canada coach candidate has completed successfully the NCCP Multi-sport module "Conflict Resolution".

Three relationships are discussed in this section: parent-athlete, coach-athlete and coach-parent. This triad is the basic support structure of the young archer's development and security. Each one of these relationships will flourish *only* in an atmosphere of mutual respect and self-worth. An imbalance in this triad causes stress and anxiety, usually affecting athletic performance.

#### Parent-Athlete

From birth to young adulthood, the archer has depended upon the parent(s) for the basic necessities of life, emotional stability and acceptance. You, as the archery coach, inherit the good attributes and the bad ones of this ready-made set of feelings, family circumstances and degree of dependence. Adolescent archers are no different from regular teenagers: they are testing the parent's dominance in order to break free, a little at a time, into the frightening world of total independence. This struggle is a two-way street. The parent(s) wrestle with this process also; not knowing when to let go; not knowing when letting go is too much, too soon.

The archery coach should keep the following points in mind:

1. Communication among the three interested parties must be open.

There should be no secrets. There should be no “double-standards”, no discrepancies between what is said in private and what is said so all can hear. Regular meetings should be held to assess performance, training and working relationships. All criticism should be written down and discussed as calmly as possible. Then, any changes agreed upon should be written down also, to review at a later meeting.

2. The coach does not replace the parent.

Though some coach-athlete relationships become very close, the coach must ensure that the parent (in particular the parent who is the same sex as the coach) does not feel threatened or isolated from the young person. Conversely, never assume that the archer likes or admires the coach (and the archery community) more than family structure. The coach plays a critical role to ensure that sport works with the family culture, not against it. The coach is part of the team, and yet is not the key player. The coach may be the captain, but not judge and jury.

3. The coach will make financial and time demands on the family.

Whether it is driving the archer to practice or footing the bill for the airfare to national championships, the higher up the ladder of success the archer goes, the greater the financial burden on parents and any siblings. Financial pressures can lead to behavioural changes. Comments may be made about “worth” of the activity and the coach. There may be agreement on the surface, but the coach should be aware of the family’s ability to support the archer’s goals without prying into the family’s finances. The family’s financial commitment to the archer may cause sibling resentment and jealousy in the home that creates greater stress. Few families handle this conflict well.

4. The family can, and will, make demands on the young archer which disrupt training schedules and, perhaps, secondary and major competitive events.

This is as inevitable as illness. There are certain things the coach has no control over. So, it is in everyone’s best interest that the coach appears not overly displeased, or makes counter-demands upon the archer. The dedicated elite athlete already feels the pressure to please both parent and coach.

5. There may be family interference, direct or indirect, at any time during the Annual Plan. Even though the smart archery coach gives the family ample opportunity to voice opinions and concerns, parental actions, words and deeds can derail your work at any time. Be prepared!

Coach-athlete

The trend in Canadian archery has been established: top archers stay with the same coach for a long time. Once the young person is comfortable with a coach, dependency develops. This dependency is both intellectual and emotional. An approachable adult will encourage young people to communicate more freely. Some take longer to do this than others, but during the many hours spent in training together there is bonding of coach and athlete. In short, it is called trust. Trust is the foundation of any good relationship. With a young aspiring athlete, trust and respect for their personal worth, regardless of performance, is the essential combination that allows the archer to grow in skill level, and as an individual. Never betray that trust.

Considerations:

1. Allow sufficient time on a regular basis for the archer to communicate feelings, doubts and fears, both verbally and in writing.

This is the real beauty of working in an individual sport. You can make the time to talk. Let the archer reflect on performances and feelings and organize these thoughts in a diary. Discuss these emotional issues and clear up the problems as quickly as possible. Help the archer to understand the importance of openness. Demonstrate your acceptance of their fears as real. Design situations and plan activities, which will train the archer to overcome these barriers to elite competitive performance.

2. Be approachable and open to the same degree you wish your archer to be.

Be yourself. You are a person, too. Show some emotion, especially enthusiasm. The archer can relate to this approach better than to an aloof, cool personality. The young archer may be looking for a friend as well as a coach. If you find it difficult to relate to teenage humour, interests and fears, perhaps you should be working with a different age group. If you do feel comfortable with young people, you will find friendship and acceptance, too. Remember you are training the whole person, not just an archer.

3. You are the single most important role model, other than family members.

Your actions, and prejudices, will be mimicked. Assess yourself first. Continue to exhibit good sportsmanship, caring, acceptance and attention to detail. Be consistent. Set your standards and expectations clearly and then stick by them. Your self-discipline will inspire similar tendencies in the young athlete, and give the archer a stable base of support to work from. Whether the young person desires a friend or just someone to help attain personal goals, the good archery coach provides a stable relationship.

4. When you are coaching more than one person in the same competitive division, go out of your way to provide equal attention to each individual.

There should be no favouritism. There may be accusations, no doubt, or at least some hard feelings. You, as the archery coach, are obligated to act impartially. Train each archer to the best of your ability; then stand back to regard what the archer does with the knowledge and the training. Be prepared to justify your reasons and time spent if the subject arises. You may feel

you are being fair to everyone; everyone may not see it that way. The phrase “perception is reality” was never more true than when dealing with aspiring young archers. The archery coach should devise questionnaires or some other form of assessment whereby archers can express their views on this topic.

5. Be prepared for change.

Give more responsibility with experience. Share decision-making powers as the archer develops. Let the archer lead, and catch the mistakes when they happen. Just like a good parent, teach the young person to be resourceful and independent. *The good coach* teaches the archer to establish priorities, set goals, follow plans, and make commitments. Do not deny this chance for personal growth, either for the archer or yourself, by withholding power.

### Coach-Parent

This relationship may be the most difficult of the three. It must be remembered that the only thing these adults have in common is the archer. There is usually very little else. The coach and parent represent two independent forces coming together for one single purpose. They are likely to see problems and issues differently. Great diplomacy may be required.

Remember, you as the archery coach have a single goal: *to get the job of training the archer done properly*. There may be other family issues you are not aware of. Be careful what you say and how you say it. Remember the fall-out from any problems between you and a parent affects the archer.

### Considerations:

1. If possible, search out other common interests.

Talk about non-archery activities, recreational pursuits, talents and interests. Find common ground. In archery, there is usually the common bond of enjoying outdoor activities. Start there.

2. Get the parent involved in meaningful ways.

Some possibilities are fund raising, travel arrangements, designing team uniforms, shopping for archery-specific clothing.

3. Keep practice and competitions open to parents.

Invite them to come. Ask them to drive. Ask them to stay. Tell them what you need, and what you don't need in order for everyone to progress in the sport.

4. State your philosophy of coaching and expectations clearly

Right from the beginning, the parent needs to know the level of commitment you expect. If they have never been involved with archery before, you may need to educate the parents on rules, competition protocol, and what kind of support is appropriate during tournaments. Communicate any changes in that commitment well in advance.

5. Be open to criticism.

Try to respond to it impersonally. There is a natural emotional bond the parent feels toward the child. Sometimes emotions cloud rational thinking. Harsh words said in haste can sour a relationship. You need the parent's co-operation. Listen to what is said. Answer the issues impersonally and get on with the training.

Sport-specific demands During Puberty

The various organisations, which run tournaments and write rulebooks, generally start to increase distances and decrease target sizes during the middle teenage years. The physical demands these changes make on the young archer are much greater for the outdoor disciplines than indoor. With this in mind, the following section deals with strength factors and bow weights for shooting international target, field and 3D rounds.

Turn to the coach workbook pg. 163 Chapter 6

**TASK #1: Sport-specific demands During Puberty** (WB pg 163)

**Task #2: Specific Youth Training Challenges** (WB pg 165)

**i) The young archer**

Turn to the coach workbook pg. 165 Chapter 165 - respond to **Parent-Athlete Scenario**

**ii) Relationships**

In this context, the coach candidate will consider the triumvirate relationship when working with youth. For older archers, substitute "parent" in the scenarios below for "spouse or significant-other".

Turn to the coach workbook pg. 3 Chapter 165 - respond to **Coach-Athlete Scenario**

Turn to the coach workbook pg. 3 Chapter 165 - respond to **Coach-Parent Scenario**

**REVIEW THE PLAN**

When working with an elite adolescent archer:

1. Begin long-term planning for the archer.

Determine which factors are critical training concerns for the years to come. List them in priority according to what factors will affect the archer's performance, as rounds become more difficult.

2. On the Annual Plan, record the times when increased strength training and increase draw weight must be slated into the plan. Remember to keep these special training needs away from major events. Try to slate these times into the off-season or active rest phase of the annual plan.

3. Discuss your conclusions with the workshop Facilitator.



## ii) The female archer

All athletes have the same basic needs. Something in their personalities makes them want to compete and excel. They need advice and security, training facilities, opportunities to compete, development of life skills, patience, determination and acceptance. Female archers are no different in this regard. Archery is more open to female equality than some other sports, but it is still a male-dominated environment at the club level in Canada.

Female athletes generally participate in sports for different reasons from males. The coach should be receptive to these differing needs. This section highlights those differences, independent of physiological characteristics, between sexes. Please refer back to the Physiology chapter for special considerations when training female athletes and the nutrition section for further details. Review the material on eating disorders.

Personal goals and social acceptance are blended together to a much higher, emotional, degree in female athletes. More often than not, female athletes are trying to please other people not themselves. If they come from a restrictive social or familial environment, they may be using sport as an escape, yet remain motivated to please others first. The female archer may transfer the need to please family to the need to please the coach. The athlete's priorities are out of whack. These feelings must be brought out into the open and dealt with as soon as possible.

The coach should lead the athlete through a process of listening, and sharing, ideas and concerns. The more open the female archer becomes the clearer her motivation for competing will become. Once the archer stops competing for others, the main goal becomes self-fulfillment. **Once the archer removes the judgement of others from the list of feared punishments, the female archer can accept performance setbacks without loss of self-esteem.** If the coach feels incapable of handling these problems and issues, a professional sport psychologist may be needed.

Social acceptance by coach and peers is of prime importance to younger female athletes. This tendency, along with normal competitive anxiety, makes female archers sometimes more emotional. The coach may be left standing in amazement when problems arise. All of a sudden social issues get blown out of proportion. Whether or not a female archer is getting along with training partners can change the quality and/or volume of any number of training sessions, the training atmosphere and team spirit you worked so hard to create. If parents get involved, the crisis can escalate. The coach must sort through the problems by opening lines of communication among/between injured parties, but the coach must also make the archers resolve the situation on their own. Coach interference or arbitration will only mask the underlying, lingering issues.

Even in today's "modern" society, young women still tend not to develop independent life-skills until later teens and early twenties. Why is this? Has modern technology robbed young people

of their desire to face reality and become self-reliant? The situation is so serious that some post-secondary educational institutions now provide programmes to encourage these life skills.

Again with respect to family background and role the female archer played in it, the coach may have to teach the female athlete to be more self-reliant, independent and decisive. You, as the coach, may need to teach time-management skills, Goal-setting, priority-setting and career planning. This reflects the need for the coach to deal with the archer as a whole person, not just an athlete. Otherwise, the female archer's success level will never reach full potential. Two-way communication is essential as well as an honest desire to hear-out all the concerns, regardless of how insignificant they may appear. Communication times are very important.

As a male coach, dealing with elite female archers, an ethical line must be drawn between caring and emotional involvement. Some female athletes become so dependent upon the coach that their desire to please develops into a willingness to include a sexual relationship.

Encourage emotional independence as well as technical independence when dealing with all female athletes. There is no room for emotional domination in the pursuit of excellence.

## **REVIEW THE PLAN**

If you are working with female athletes, plan for regular talk sessions or special "coffee-breaks" which give the archer a chance to speak openly in a non-threatening environment.

Keep reading. Introduce the female archer to articles written about self-determination and self-actualisation. If you find you are working with a female archer who needs to hone certain life-skills, record books to be read right in the annual plan as well as discussion times between the two of you.

### iii) Archers with a Disability (AWAD)

The majority of this section of the chapter deals with working with archers in wheelchairs. Amputees and visually-impaired archers also compete at the international level. Their needs will be mentioned during the information below. If you are working with an archer with a disability, Archery Canada has several regional coaches who specialise in this area; the coach is encouraged to contact Archery Canada's national office in order to use their expertise.

The greatest challenges for wheelchair archers are external, not internal. The normal, elite wheelchair archer experiences the same joy and frustration from competing as able-bodied athletes. It is architectural and terrain barriers which limit and challenge the wheelchair archer. This requires more attention to detail; attention to details which able-bodied people take for granted.

The wheelchair/amputee/blind archer can compete in sanctioned events and archery federation events. The International Paralympic Committee hosts Paralympic Games and FITA holds regular world championships. There are standards for performance to make these teams just as there are standards to make able-bodied teams. The aspiring AWAD archer needs to train and compete in a logical planned fashion no different from any other elite archer.

**Classification** should be done properly, early on in the coach/archer relationship. Equipment selection and the distances shot are determined by the level of ability/movement. This is the most significant consideration along with normal archer long-term goals. Canada has trained archery classifiers. Contact Archery Canada's office for information. The Canadian classifier can help you to establish the correct division for the archer in question. Then, at the international level, the archer will be assessed at his/her first major event by an international classifier. It is very important that the classification go well and that there are no surprises resulting in last-minute changes in equipment modifications and/or division changes.

#### Access to Training Facilities

Problems arise with facilities and transportation. Indoor training facilities are present already in order for the archer to have developed in the first place. Some clubs in Canada, but not all, are well-equipped for easy access outdoors as well. The coach should ensure that these facilities remain accessible, to suit the training needs and schedule of the archer. Weather conditions may alter the training facility outdoors. If conditions deteriorate, the coach should work with the club to correct the situation. When outdoor facilities are secured after club events, wheelchair accessible entrances and locks are essential. This gives the archer freedom of access and independence, the most important elements of all.

### Access to Transport

When planning any trip, the needs of the wheelchair archer differ from able-bodied. There must be room to transport athlete, gear and chair. When travel includes airplanes, the coach should work with the airlines well in advance to ensure seat assignments guarantee bulkhead seats, rather than normal ones. If the archer uses an electric wheelchair, special travel arrangements must be made in advance. If the archer is travelling alone, the airlines must be notified also. Ground transportation from home to airport and airport to competition site, hotel and surrounding areas in different cities, must be planned carefully in advance. Blind archers should travel internationally with a guide, particularly when the local language is different.

### Training considerations

Many paraplegics do not perspire the same way able-bodied people do. When shooting outdoors, make sure the archer has immediate access to an umbrella, water bottles, towels and spray-bottles. During competition, the archer stays on the line while another archer or an agent collects the arrows. Make sure the athlete has adequate food, clothing and repair equipment on hand at all times. Ensure the equipment and chair do not cause skin abrasions, discomfort or clearance problems.

And, finally, be sure you know the rules. Procure the most up-to-date rules book for Paralympic competition to ensure your archer fits into the accepted categories of competition. Otherwise, the archer may be disqualified.

## Other disabilities and suggestions

### Key points:

1. **Deaf archers**
  - agreed upon routine and person to watch for collect signal and resume shooting signal
  - written material handy to describe safety rules and basic archery form
  - portable chalk board in case demonstration does not correct form problem or answer can not be demonstrated
  - teaching ratio must be 1:1

**Key points:****2. Blind archers**

- design an adjustable post to stick in the ground (or tripod leg for indoors) that has a horizontal bar to touch the back of the archer's bowhand while aiming at full draw. The horizontal bar should be moved to assist the height for the aiming process; world championship distance is 30m
- get archer's permission to touch body parts involved in aligning shoulders, elbows, arms and feet
- shooting line should be covered with a textured material so that the archer can locate it and that shooting position independently of others
- coaching ratio must be 1:1

British Archery - blind archery link

<http://www.bbsarchery.org.uk>

**3. Shortened bowarms**

- use ABS plumbing and adhesive to increase the distance of the grip away from the bow and toward the archer so that more draw length is produced
- have range of bow weights available
- teaching ratio must be 1:1

**4. Cerebral palsy**

- use bicycle grips and other adjustable grips to alter the hand position so that the bow can be gripped independently
- use release aid style that works with the level of finger mobility available
- have range of bow weights available
- teaching ratio must be 1:1

**5. Amputee (upper body)**

- use ABS plumbing and adhesive to increase the distance of the grip away from the bow and toward the archer so that more draw length is produced
- use release aid style that works with finger(s) available
- if necessary, use teeth for release instead of hands
- investigate adaptive aids to suit the individual's needs
- have range of bow weights available
- teaching ratio must be 1:1

Possible answers include:

- concentration on fitness component depending upon lead up time to competition phase
- physical assessment by professional
- movement assessment by trained Archery Canada classifier
- psychological inventory of fears, strengths, willingness to change, adapt, past competitive history in other adapted sports
- special travel concerns for air and bus transport and exchanges
- tolerance to heat, which parts of the body do/do not sweat
- tolerance to direct sun
- experience travelling between time zones
- hydration and nutrition levels and current eating patterns/habits
- inventory of all current medications & current WADA rules
- adapted equipment inventory, needs and back-up
- what are some architectural barriers that can be anticipated at the major seasonal event and/or lead-up tournaments

## REVIEW THE PLAN

If you are working with an elite wheelchair athlete plan travel arrangements carefully, well in advance. Record the dates for national and international competitions.

Agree on a qualified travel agent for these trips. Record the dates you will make travel arrangements and ask for special services through your chosen travel agent. Also record dates to follow-up on these arrangements so that no last-minute problems occur.

Now, turn to the workbook pg. 166 Chapter 6 section entitled, “Exercise #1:**Elite Wheelchair archer preparation**”. If you are working with an elite wheelchair archer, complete the exercise. If you are not working with such a person at the present time, merely review the exercise. Then return to the reference manual.

#### **iv) Shooting on sloping terrain /Shooting in windy conditions/environmental conditions**

Outdoor shooting presents a variety of challenges not found in the indoor discipline. Whether it is the target archer shooting 90 meters on a blustery day, or the 3D/field shooter searching for sure footing on a muddy slope in the pouring rain, the extra demands on the archer need extra preparation and training.

Before the coach begins to train the archer's form to accommodate slope, the coach must assess the archer's fitness and strength. 3D and particularly international-level field shooters require the following:

- cardiovascular endurance
- muscular endurance
- low resting heart rate
- short cardiovascular recovery time from exercise
- low to average blood pressure
- upper body strength (absolute and relative) including the waist area
- lower body strength AND flexibility (particularly through the waist area)
- sense of body balance
- good vision
- good depth perception

These physical characteristics have been touched upon in the Physiology chapter. The difference in these disciplines, as well as Ski-Arc, is quick recovery time. The heart rate must slow down enough to control the shot and steady the bowarm for aiming. The more difficult the terrain, the more the heart rate needs to be controlled. Those archers interested in this form of archery at top competitive levels should be adding interval training to a sound fitness base as an essential part of the physical fitness component. With this sound fitness base, the archer can excel shooting field or 3D on uneven terrain. Once the coach is confident of the archer's fitness level and skill level, specific training can begin.

#### Shooting uphill and downhill

The archer must have excellent skill fundamentals in order to achieve any success in these conditions. Shooting on sloping terrain causes archery form to change. If the skill level is not high enough to begin with, the archer will experience frustration and disappointment.

On sloping terrain, arrow strike patterns in the target can be predicted due to the archer's:

- poor execution of the shot
- nature and degree of bow and/or body cant caused by terrain
- postural faults eg. Misalignment of the upper body and/or poor range of motion through the waist
- optical illusions caused by the natural setting around the target
- gravitational pull
- arrow velocity
- vision



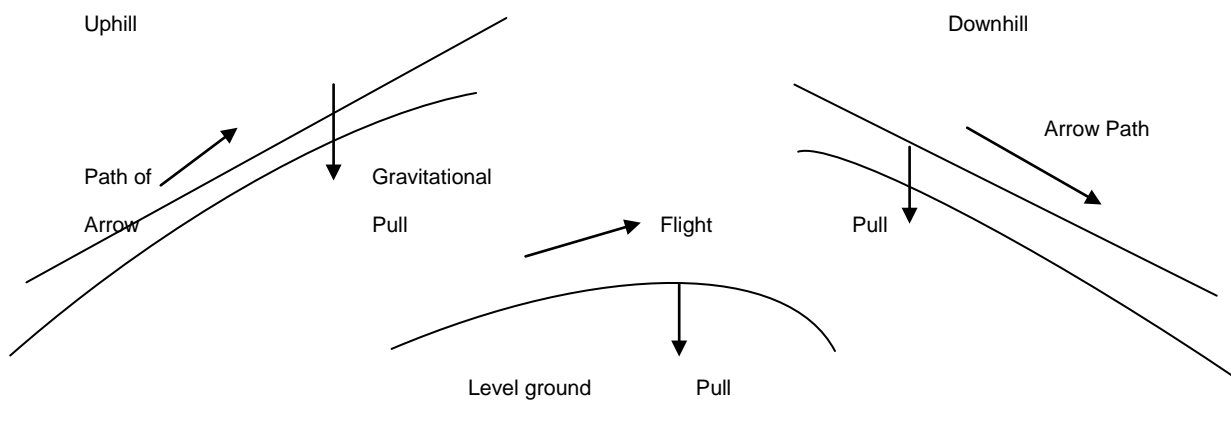
The archery coach's primary focus in the training process is simulation. The closer the coach can devise training situations which simulate the degree of slope and difficulty of competitive courses, the greater the archer's experience prior to competition. It is through simulation and use of video cameras that the archer learns how to correctly position the feet, the lower body and the upper body when executing the shot. The archer's body alignment to the target is critical, regardless of terrain or target angle. Unless the archer is allowed to use a scope for an aperture, there could be significant deviance in the arrows strike pattern horizontally. The coach should experiment with altering the archer's stance: closing the stance for downhill shots and opening it for uphill ones.

The coach's secondary concern is arrow velocity and bow tuning. Recurve shooters and those archers using lighter bow weights and/or shorter draw lengths are at a disadvantage compared to compound shooters and those able to shoot longer arrows and/or heavier draw weights. Body angle tends to be greater for those with slower arrow velocity. Body angle should be checked with regard to limb clearance (recurves) of the lower body while shooting. In some positions, a normal stance will be impossible to execute and avoid body/limb contact. When estimating distance on unmarked courses, degree of error is greater also. This is covered in a following section.

The third area of interest to the coach is clothing, nutrition and hydration during competition. In Canada, field and 3D shooters spend a great deal of time walking and shooting, with little time for food and liquid intake. Therefore, the archer must train with the extra weight of clothing and food in belt packs or fanny packs. The extra clothing can not interfere with the shot regardless of the body or bow angle.

### Slope Work

Look at the three diagrams below showing the direction of gravitational pull on the arrow.



The archer must learn to judge the effect of the slope on the gravitational pull during arrow flight. The arrow, like any other projectile, flies in a parabola. Gravity exerts its greatest effect on the arrow in the horizontal flight in pulling it away from the direction it was originally shot in, affecting it at right-angles to its flight path. If the arrow is shot upwards or downwards at a steep angle, the parabola will be flattened because gravity will not be pulling at right angles to the line of flight. This means that at very steep angles up or down, the archer has to be prepared to take off distance from the original sight-mark or gap method. How much the archer takes off the sight mark depends upon the power and efficiency of the bow, the weight of the arrow and the severity of the slope. This means the archer must practice various angles of slope to know what the equipment will do. The coach must be prepared to set-up field simulations in order for the archer to learn this. It is quite a lot of work and can not be short-changed.

So, for uphill and downhill slopes the coach must teach the archer:

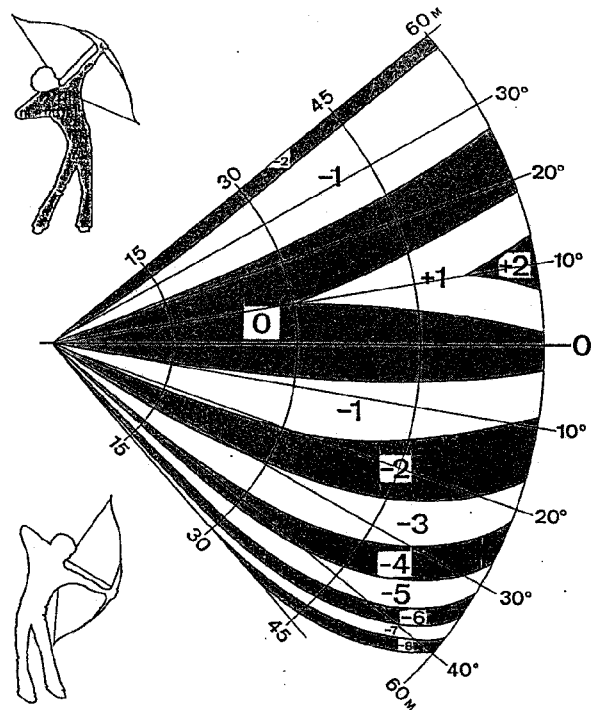
1. On shallow slopes, there will be little or no effect except at the longest distances.
2. On very steep downhill slopes, the archer needs to aim lower or take off distance even at comparatively short ranges.
3. On very steep uphill slopes, the archer needs to aim lower or take off distance up to 60 meters at 45 degree angles.

Slope is not just uphill or downhill.

Shooting across the slope or along contours

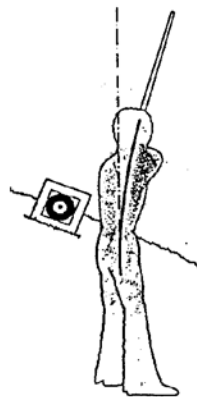
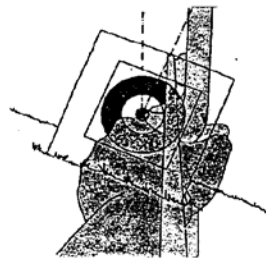
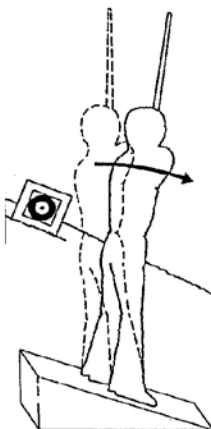
there is a tendency to shoot low with the downward slope. This is caused by poor execution of the shot. The terrain is causing the archer to cant the bow and/or the body.

The archer tends to lean into the hill too much and the arrow is now pointed down the slope.

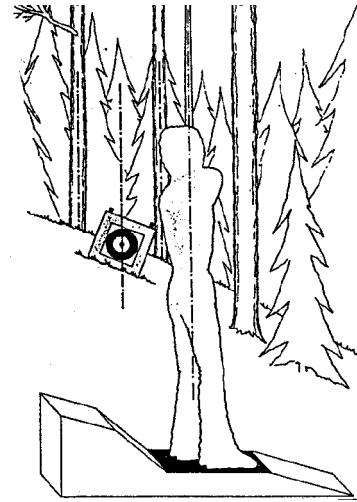
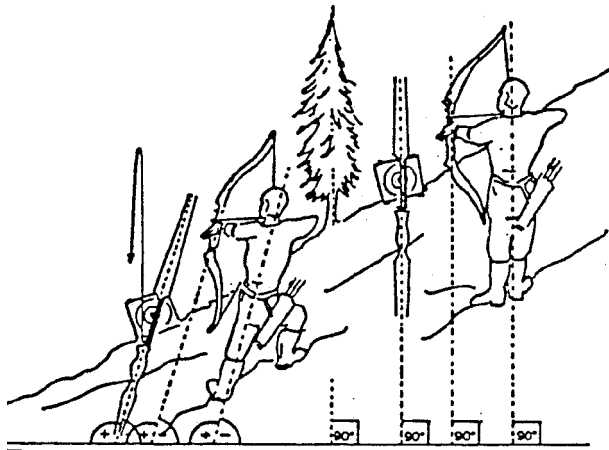


The optical illusion can be a result of:

- the slope the archer is standing on;
  - the slope the target is placed on;
    - visible lines of slope between the archer and the target;
    - and distant background effects.

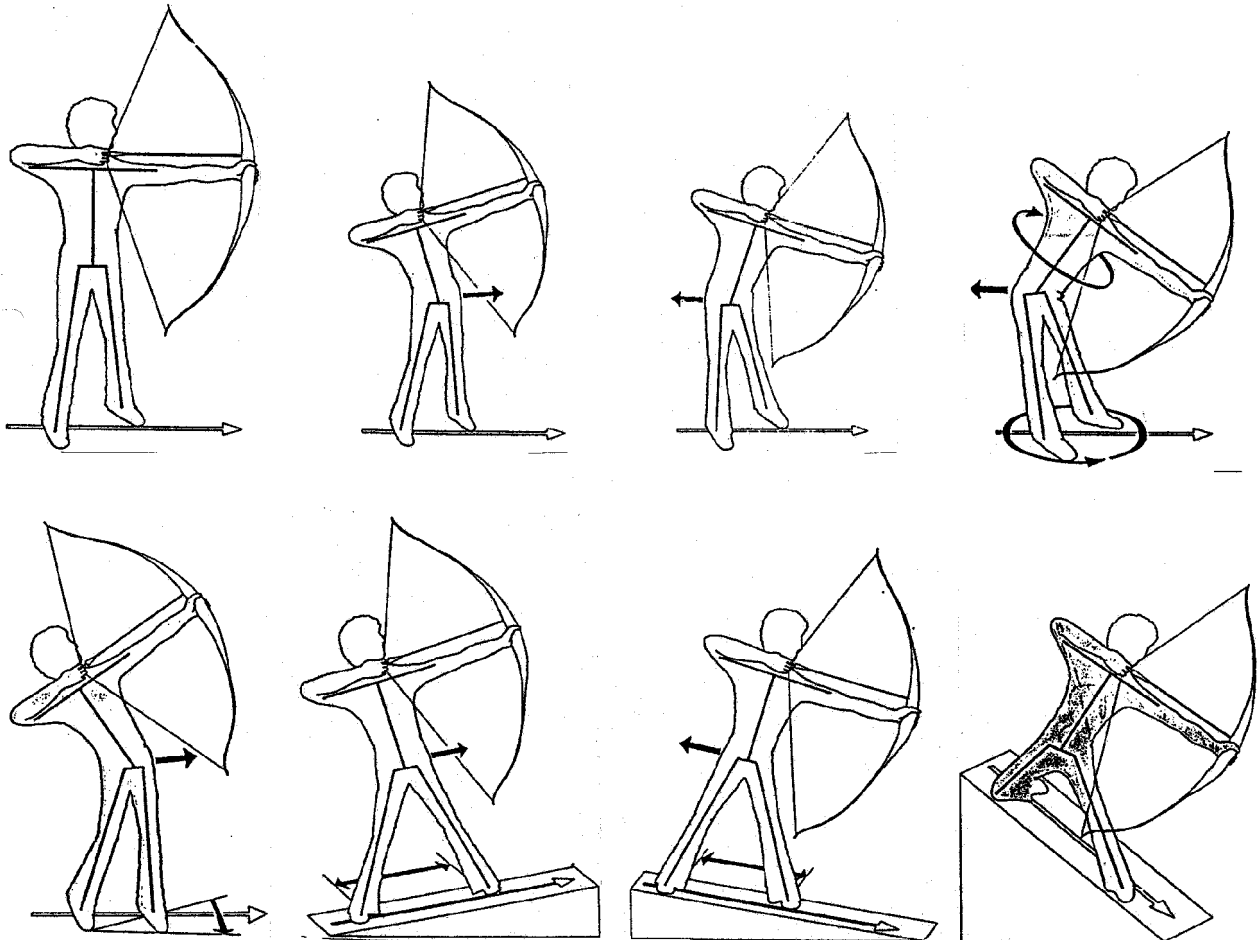


The bow must remain vertical regardless of terrain. The archer's body must be vertical also. The correct body position is shown on the right-hand side of the figure below.



### Body Position

Teach the archer to set the body alignment to the body first, not come to full draw and then tilt to shoot. Look at the illustrations below by L. G. Swensson. Notice the position of hips and shoulders in order to control the shot uphill and downhill.



## REVIEW THE PLAN

For those coaches working with 3D and field shooters, record times in the Annual Plan which evaluate, train and re-assess:

- body position shooting uphill and downhill (filming sessions)
- body position for angled targets
- clothing and added gear weight due to nutritional supplementation
- calibrate sight in 5 meter increments/gap pins for fixed-pin divisions (equipment check)

Now turn to the workbook pg. 168 Chapter 6 section entitled, "Exercise #2: Shooting on slopes". Complete the exercise and return to the reference manual.

### Shooting in windy conditions

The archer needs to practice in all types of weather conditions since all tournaments run "rain or shine" with the exception of lightning storms. Arrow drift is directly proportional to the loss of arrow velocity. If the arrow loses speed quickly, it will increase the drift factor. The archer must train in varying wind conditions in order to know how much the arrow will drift and how much to compensate for that reaction.

Factors affecting drift include: wind speed, bow weight and efficiency, string weight, arrow weight, fletch type *and the archer's mental ability to shoot proper form under windy conditions*. Some archers have been known to change brace height, cushion plunger pressure and nocking point to attempt better arrow flight in windy conditions. Wind is often variable. These equipment alterations lead to trouble later on, as conditions change. It is far more important to teach the archer how to shoot good form in windy conditions and how to aim properly.

Three types of wind affect the arrow flight: head wind, tail wind and crosswind. Air turbulence changes these prevailing winds also. General rule of thumb: head winds drive the arrows low; tail winds lift the arrows. Surrounding terrain such as berms, hills and buildings can cause turbulence at the butt, near the archer, or anywhere in between the two.

The coach teaches the archer:

1. How to stay relaxed in the arms and hands during wind storms while staying strong in the body torso and legs. The stronger, larger core muscles accept the weight of the draw. The archer pays close attention to keeping in line with the aiming point through shoulder alignment (both of them) and strength. Both hands must stay relaxed through the aiming process and release. For recurve shooters, watching for clicker movement before shifting the eyes to the target is essential for accurate timing, particularly in gusty conditions.

2. To use trees, flags, clouds, grass, skin sensations and listening skills to determine wind direction and speed. On 3D rounds, this is even more important since the first shot is the only shot.
3. To move the sight/aiming point immediately if the arrow does not hit in the middle. Practice is essential to know how much the sight is moved for various wind speeds. There is no excuse for the subsequent arrows to be shot in the same general area of the target face as the first one. The sight correction must be made at once so points are not lost.

Some archers are not comfortable aiming off the center of the target to compensate for wind drag. However, it is a tremendously useful skill for shooting in gusty conditions. Lateral wind not only draws the arrow to the opposite side of the face, it also makes the arrow drop usually. Example: The wind is striking the archer from the left. Instead of aiming in the red or blue ring at "9 o'clock", the archer should aim between 10 and 11 o'clock. The number of rings out of the center is determined by all the equipment factors mentioned above, plus wind velocity and angle. This demonstrates the need to train in these conditions as often as possible so that the archer experiences a variety of wind conditions and learns what the equipment set-up will do and how much compensation is needed. There is no shortcut in this learning process.

It is not easy to plan for wind shooting; it either is or is not windy. The important factor here is training the archer to enjoy the challenge of shooting well in windy conditions. The archer should continue with normal training sessions as scheduled, regardless of wind. Once the wind-session is over, find a calm place, perhaps indoors, where the archer can smooth out the form to feel comfortable again. This is particularly true after a full day shooting in a windy tournament.

### **Environmental Conditions**

Outdoor shooting requires attention to detail. The tackle box and supplementary gear need regular assessment to ensure the archer can handle changes in the weather. The following items should be on hand, on the field or target range for both the archer and the coach:

- 1 rain suit/shell
- 1 pr. Waterproof shoes/boots or winter boots & change of socks
- 1 pack. Each small and large plastic bags for bow scopes, telescopes, bow, etc.
- 3 dry towels
- 1 extra finger tab/release
- 1 telescopic umbrella
- 1-2 pr. mittens
- 1-2 pocket warmers
- dry clothing
- 1 sun hat
- 1 tube sun screen
- Repair kit

These extra supplies should be in a duffel bag or carried with the extra strings, guards, arrows, sights, fletching and other normal back-up equipment.

## Temperature

During the course of an outdoor tournament temperature ranges can swing as much as 10 degrees Celsius. Different physiological responses occur when the temperature drops or rises. In hot weather, the person's core body temperature rises. The body uses the arms and legs as cooling vanes because the blood vessels have dilated to allow the blood flow to the extremities where excess heat dissipates. When the body becomes cold, blood vessels constrict, decreasing blood flow to the limbs. Make sure the head is covered since as much as 50% body heat is lost through an uncovered head.

The best option is to provide the archer with layered clothing that does not interfere with the shooting process. The archer can then add or take off clothing as the weather conditions and body temperature dictate. The challenge has been to find warm clothing that does not interfere. Wool clothing is generally too bulky and special material which wick away body perspiration are expensive. Make sure the archer practices in all the possible clothing combinations available. Many archers make the mistake of never practicing in rain gear, etc. until the tournament day only to find out that sleeves and overall fit are totally unsuitable.

## Sun

Sunburn is the toxic reaction of the skin to uncontrolled exposure to ultraviolet light. Due to the length of time spent outdoors in practice or tournament, many archers suffer from sunburn regularly. Some common medication increases sun sensitivity. These include diuretics, antibiotics such as tetracycline, dimethylchlorotetracycline and sulphonamides, and tranquilizers. Other factors include the reflective characteristics of the ground surface (grass versus sand), time of day when shooting (10am to 3pm); altitude and skin type.

Strategies include: applying sun screen when the skin is at regular body temperature; keeping as much of the skin covered as possible; wearing tightly-woven white or light-coloured fabrics; wearing sunglasses or sunshades and a hat; staying in the shade whenever possible (using trees or an umbrella as cover). Apply wet hand towels as head covers when temperatures range between 35-43 degrees Celsius.

When sunburn occurs, bathe to cool down the skin temperature and apply cold cream or a solution of 1-teaspoon salt, Epsom salts or boric acid and make a compress for 10 minutes. Aspirin may relieve swelling.

The most important role the coach can play is teaching the archer to be prepared and training them to use sunscreen properly, taking precautions first before problems occur.

**v) Distance estimation**

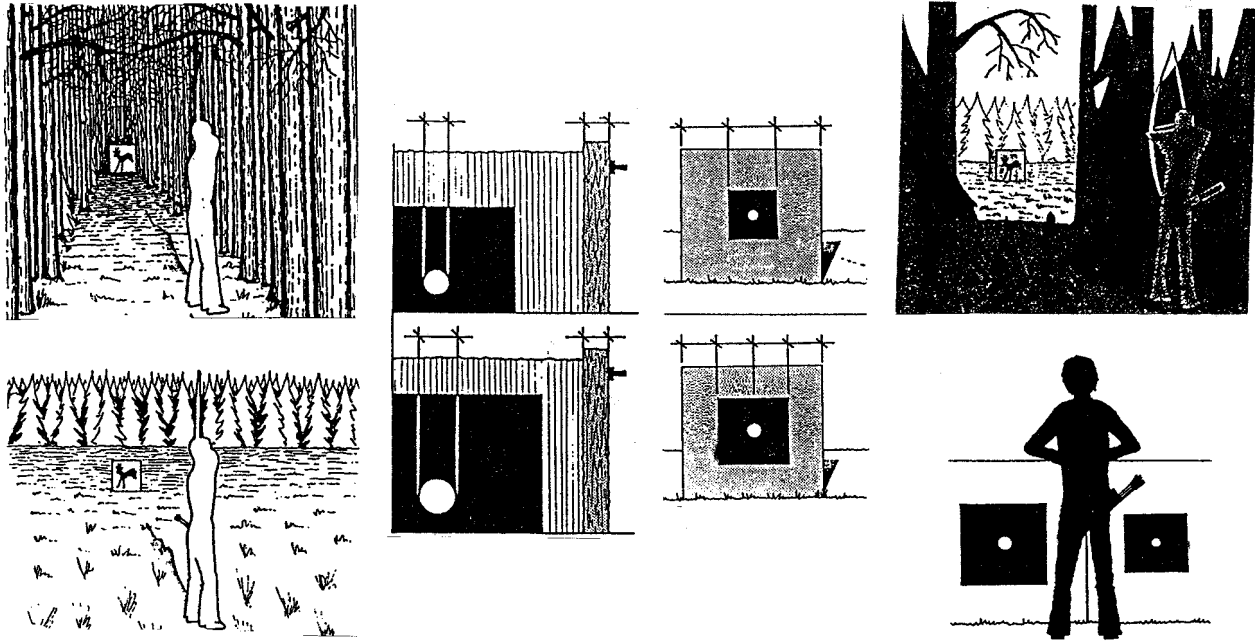
The 3D archer and world-level field archer will have one more specific skill to hone. Along with good shooting technique, adequate physical and mental preparation, nutrition and good equipment turning, this archer must be able to judge distance effectively in order to succeed. Some people have a natural ability to estimate distance; others must work at it through practice or through systems of measurement. The archery coach must be prepared to simulate competitive surroundings in order for the archer to experience as many different scenarios as possible. The use of a modern laser range finder, during practice, can aid the archer by providing feedback to estimation and where improvements need to be made.

In either round, minimums and maximums exist for distance and for target face sizes in field archery. Still, the archer must be able to estimate distance between the range of 10 and 60 meters to within 1-2 meters (using the appropriate-sized target face for field shooters). This is extremely important for those archers shooting light bow weights. This archer must be very accurate in estimation, as the margin of error is smaller than for those archers using stronger draw weights. Arrow speed, though regulated by certain associations, is also very important. The faster the arrow, the flatter the trajectory, and again the larger the margin of error when estimating distances. Therefore, the archery coach must analyse equipment from this perspective as well as simply tuning the best combination of arrow to bow. As well, the archery must be prepared to carry backup and repair equipment into the bush in case problems occur.

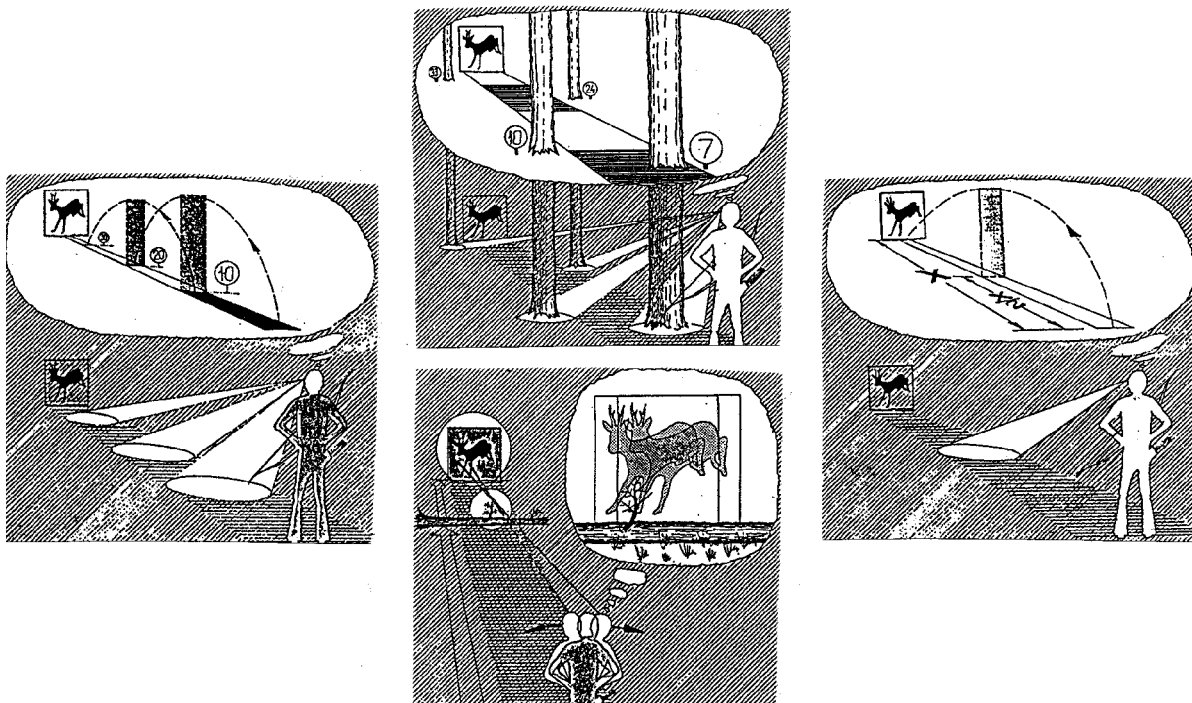
**Training**

Daily practice is very valuable. Whether or not the estimation practice takes place on the archery range or not, the archer should be practicing this skill regularly. On 3D rounds the same animal can be placed at any number of ranges, or angled, put in poor light, out in the open or shooting tunnels. This means the archer must learn to estimate distances regardless of surroundings. A field shooter has the extra clue of target face size, how many targets of that size have been shot, and knowing that only certain target sizes and faces are shot within a range of 15-20 meters. The butt may be angled, in lightness, dark tunnels, above the tree line or on severe slopes. Again, the archer must practice these situations.





If there is open ground between the archer and the target, break the distances down in several ways. First, find objects such as trees or ground tussocks which appear to be halfway between the archer and the butt, or that break up the distance into workable units. Estimate that distance. Secondly, compare that finding if the distance is broken down in 10 meters sections. The archer should estimate 10-meter chunks from the stake to the butt and from the butt to the stake. If the two totals are not within a meter of each other, throw out that estimation and start again. In practice, this would be a good time to verify the estimation with a laser range finder. Usually errors occur further out in distance or there were optical illusions, which tricked the archer.



If there is a dip in the ground or there is no reference such as being above the tree line or over water, the archer may need to use the sight aperture or fixed pins to gap the target and estimate the last few meters. Some aperture shapes will assist field shooters in estimating distance. Since there are rules for how many times the bow can be drawn without shooting the arrow, and time limits for archer placement at the stake, this technique should not be relied upon for all distance estimation. Nevertheless, when square target butts are used, this strategy has been utilized at the world level. Distance estimation, practiced on a regular basis, is the best strategy.

Now turn to the workbook pg. 169 Chapter 6 section entitled, “Exercise #3: Estimating Distance”. Complete the exercise and return to the reference manual.

## REVIEW THE PLAN

Record field/3D specific practice sessions. Record regular distance estimation practice throughout the general and pre-competition phases. Rec evaluation time for form, equipment and distance estimation in a variety of situations. Be prepared to spend more time in practice set-up and preparation for this archery specialist.

### vi) Preparing the athlete to travel

#### Biological Cycles and the Travelling Athlete

The human body possesses an internal “clock” which regulates the physiological functions during a 24-hour period. Though many people do not realise how much their lives are dictated by this normal or “circadian” rhythm, it has a great effect upon us. Endocrinal preparation for ingesting and eliminating food, as well as chemicals released by the brain to induce sleep are just two examples. On a physiological level, the body core temperature, white blood cell count and blood pressure also vary throughout the day in a specific pattern. Circadian rhythm has a significant effect on an athlete’s performance. Travelling disrupts this rhythm. Travel arrangements must be planned to reduce the amount of time the athlete is disrupted from the regular training schedule.

#### Disruptions and Athletic Performance

Our planet is divided into 24 time zones. The greater the number of time zone changes, the greater the disruption of the circadian rhythm, and hence the greater adverse effect on performance.

1 to 2 zones	little noticeable change
3 to 5 zones	noticeable disorganization of body functions
6 to 8 zones	consideration disruption of body functions
9 to 15 zones	marked changes in body’s behavioural capabilities

Travel duration should not be confused with the number of time zones crossed. Some flights between North and South America will require few time zone changes, but many hours of flying time and flight connections. Conversely, travel between North America and Asia may be a direct flight with few flight connections, but as many as 12 time zones may be traversed. In the latter case, the circadian rhythm is totally disrupted. Meals and more importantly, sleeping times are completely out of synchronization with the athlete's new training environment.

The individual athlete will have unique range of tolerance to changes to the body's cycle. Most athletes will experience greater performance decrements when travelling eastward because the body adjusts more easily to a lengthening rather than a shortening of the day. So your athletes may demonstrate fewer symptoms travelling westward. "Jet Lag", the term commonly used to describe the physical and psychological feeling during extended air travel, affects everyone. Not only do travellers suffer from sitting in cramped airplane seats, have their bodies pressurised and de-pressurised, but they are also exposed to re-cycled, dry air. These factors alone should be addressed by the coach and archer regardless of the athlete's previous travel experience.

Appropriate preparation can reduce the performance effects of travel but it will not eliminate them and no medication has been found effective to date. The coach must be prepared then to look for telltale signs in slight behavioural changes. The symptoms may present themselves upon arrival at the destination, during ground transportation and accreditation exercises, and/or at pre-competition meetings. Watch carefully for these possible symptoms:

- decreased reaction time
- greater than normal changes in body temperature
- confusion, inability to make simple decisions
- lethargy
- lack of appetite
- disruption of sleep patterns
- inability to concentrate, follow instructions
- inability to train
- on-set of cold-like symptoms
- moodiness, irritability

How does the coach prepare the archer?

The coach's role is to educate the athlete to prepare mentally and physically for travel. Planning for travel is essential for both the coach and the archer(s). When the athlete is aware that these changes will occur, and that they can affect performance negatively, the athlete is more likely to be compliant with advice.

A basic rule for any archer is:

When athletes have adequate rest, healthful meals on a regular basis, and a proper balance of activity and rest, athletes will be relaxed and function efficiently.

If funding and time permit, there should be a minimum of one day per time zone change acclimatization before serious training takes place. However, it is not always possible, for monetary reasons or scheduling, to leave several weeks in advance. There will always be individual differences for the coach to consider. Some people will need more time than this.

Certain strategies may be employed. The coach may wish the athlete(s) to follow an adaptation plan before, during and after the flight in order to reduce performance loss. Changing sleep patterns before leaving though has not been found effective. Some suggestions are:

- alter home practice times two weeks before leaving to match tournament times abroad
- ensure the archer is sleeping and eating regularly before departure
- re-hydrate regularly on flights (almost every twenty minutes)
- have the athlete walk around before, during and after the flight
- wear loose-fitting, comfortable clothing and shoes to travel in
- eat at regularly spaced intervals
- use candy or gum to keep the throat moist and reduce excess middle-ear pressure changes
- agree upon a wake-up time very near the next meal time in the new time zone
- eat the meal that the local time zone requires, not the one your athlete would be eating at home
- drink plenty of fluids and make sure the area of the face receives some sunlight
- regulate the amount of waking time, and as nearly as possible, assume the local sleeping patterns
- reduce all activities initially, then add light exercise to facilitate the adjustment to the new rhythm
- wait at least two days before resumption of training.

Recovery time is highly individual. Travel stresses athletes differently. Though the coach may be travelling with a team, not all members may be ready to resume training. The coach and the archer must assess the athlete's transition objectively. If, in the coach's opinion, the archer exhibits few telltale signs of jet lag, training may resume. If not, the archer may be encouraged to go to the practice venue, walk around, and become oriented to the field and facilities. Mental rehearsal on the tournament site will be more beneficial to the archer than hurrying the process to shoot real arrows. Alternate physical activities such as brisk walking should be employed.

Often, team coaches insist that all members comply with a strict training plan. This is inappropriate at the elite level.

Turn to the workbook pg. 170 Chapter 6 section entitled, "Exercise #4: Travelling". Then return to the reference manual.

### **REVIEW THE PLAN**

Look at your athlete's annual plan. Pick out the major events and assess them geographically, topographically and climatically. Record enough lead up time in the training chart for development of adaptation strategies for this (these) events.

Discuss your findings with the workshop Facilitator.

### vii) Match play/team events – Archery Canada Open

International rules and rounds change over the years. The latest efforts to make target archery more appealing to spectators and television have meant adding a new dimension to the sport: shoot-off style elimination rounds. These are organised for individuals as well as teams. Since the archery coach is working with archers approaching the provincial and national level, those coaches working in the outdoor target or FITA field disciplines need to train their archers for the added stress and skill level of these sudden-death rounds. Elimination rounds are used at the Canadian national level and specific internationally registered events. This type of competition is found also in 3D archery at national championships.

#### Individual Match Play and 3D Finals

These elimination rounds have a prescribed number of arrows to be shot at a limited number of targets or ends. In 3D and field Eliminations, the finalists add up the total number of points after a certain number of animals or targets have been shot. The finalists shoot together in the same group according to equipment style, age and sex. In target archery a limited number of timed passes or ends are shot per round at 70 meters (60 m for cadets) between two people in the same division. The highest score determines which one goes on to the next round until only two archers are left for gold and silver medals. Thus, the elimination process could be repeated for several hours. There also can be a great deal of waiting between match-ups. The archers are allowed to practice, but it is a difficult tight-rope to walk between shooting too much in between rounds, and not keeping up the rhythm and form in time to compete again.

The Archery Canada Open is the last event shot during the outdoor national target championship. It is a double-elimination round that allows the archer to lose one match but still remain in the competition until a second loss. Though this does not replicate exactly the tournament format at the international level, it was designed at the request of Canadian archers who were not able to experience enough head-to-head matches in single-elimination events. The format is a good training ground for the elite archers who are attending the world championships.

Either way, this format requires concentration over a limited period of time and every arrow counts. The archer must remain calm and completely focused on the one arrow to be shot while ignoring the results of the competitors. This is very difficult to do when the scores are being announced as soon as the arrow hits the target. There is a time limit per end and then per arrow in the medal rounds. This adds to the archer's distraction and anxiety level also. The successful archer is the one who re-focuses on the next arrow and the technique required in order to shoot it properly.

The archery coach should record the shoot-off format on videotape to instruct the archer(s) and use the experience to add training sessions to the annual plan. Commercially made tapes are available as well, which give the sound and feel of the tournament experience. The archery coach must simulate the elimination round in practice and arrange mini-tournaments if possible

so that the archer learns to control the adrenaline rush and learn to thrive off of the head-to-head competition now in use.

Strategically, there is another consideration that runs contrary to everything coaches teach elite archers. There may be times when shooting your best actually puts you in a very poor position during the first elimination rounds. If the coach pays close attention to all scores, the first elimination round match-up is predictable. The archer and coach should determine who will shoot first according to the grid or ladder that assigns the matches. In this way, the coach can prepare the archer for a new opponent and most likely a target butt assignment change.

Sometimes, this target butt assignment change takes the archer to a different part of the field of play. The coach should look for differences in wind and lighting conditions for the next matches.

### Team Rounds

The Fred Usher Cup (outdoor target championships) and COPARCO's Multi-site Indoor Championship of the Americas (MICA) event have team elimination rounds. The team round is fast-paced and requires practice. The elimination rounds are shot at 70 meters outdoors (60 meters for cadets), and at 18 meters indoors. Stay current with the rules in case there are changes to the round(s). Use videotaped events to record how the round is shot and the timing necessary.

Some specific training goals would be:

- getting archers and equipment on and off the line efficiently
  - a) practice team member movement off and on the waiting line
  - b) decide if the coach will play an active part in this process
- deciding which archers shoot in which order
  - a) some archers do not mind the count-down clock or shooting on the yellow light
  - b) some archers have a faster shooting rhythm than others and might go first/last
  - c) some archers get more emotional if they have to wait longer, third
- deciding what help the coach and team mates can/will give and when
- getting the required number of arrows shot within the time limit
- keeping score levels for each individual at the same level during team rounds
  - a) the goal for each person would be to shoot their average for 3 arrows at the distance for the team round.

**REVIEW THE PLAN**

During the pre-competitive season the coach should be slating in specific training sessions for both individual and team elimination rounds. If competitive rounds are not available in your province, organise unofficial ones for local archers. Record these training opportunities in the annual plan.

**viii) Case Studies**

Now turn to the workbook pgs. 171 -174 and respond to the 4 case studies.



## REFERENCES:

- Adams, G., (1979). Factors in Programming Training for the Young Athlete, Scotland.
- Blair, S., Blair, A., (1998). Working with Youth Athletes: A Slightly Different Ball Game. At Fifteenth Annual Conference on Counseling Athletes, May 28-31, 1998.
- Burkes-Miller, M. E., (1998). The Female Athlete Triad: Information for the 90's. At Fifteenth Annual Conference on Counseling Athletes, May 28-31, 1998.
- Ethridge, K. (1995). Professional Archery Technique. Different Densities Publications, Rogersville, Tennessee.
- Millar, K. J., (1993). InfoClub bulletins, Working with Wheelchair Archers. Federation of Canadian Archers, Ottawa.
- Orlick, T. (1980). In Pursuit of Excellence. The Coaching Association of Canada, Ottawa.
- Reilly T., Atkinson G., Waterhouse J., (1997). Travel fatigue and jet-lag. In J. Of Sports Sciences Vol. 15 (3) June: 365-369.
- Stamp, D. (1979). Field Archery. Adam & Charles Black, London England.
- Tanner, J. M. (1979). Physical Growth. In Carmichael's Manual of Child Psychology, P. H. Mussen, ed., 3rd ed., Vol.1.
- Watson, E., Lowry, G. H., (1962). Growth and Development of Children, Year Book Medical Publisher, Inc., Chicago.
- Wenger, H. (1990). Suggested Codes For Strategies To Offset the Influence of Environment on Performance. Victoria, Canada.
- Williams, C. A. (1997). Children's and adolescents' anaerobic performance during cycle ergometry. In Sports medicine (Auckland, NZ) 24(4), Oct., 227-240
- Wiebe, J. (1995). British Columbia Archery Association Field Shooting Guide from the Swedish text by L. G. Swensson and Leif Janson with illustrations by L. G. Swensson

**Web links - Athletes with disability**

CAC - Coaching Athletes with a Disability

Coaching Athletes with a Disability is a manual designed to provide grassroots coaches who have never worked with athletes with a disability with basic information, guidelines, and tips that will assist in creating conditions for effective participation and inclusion  
[coach.ca/files/Coaching\\_Athletes\\_Disability\\_update092011.pdf](http://coach.ca/files/Coaching_Athletes_Disability_update092011.pdf)

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