Federation of Canadian Archers

Reference Material

Instruction of Intermediate Archers

The National Coaching Certification Program is a collaborative program of the Government of Canada, provincial/territorial governments, national/provincial/territorial sport organizations, and the Coaching Association of Canada.

Partners in Coach Education

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Instruction Intermediate Reference Material
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Coaching Association of Canada

National Coaching Certification Program

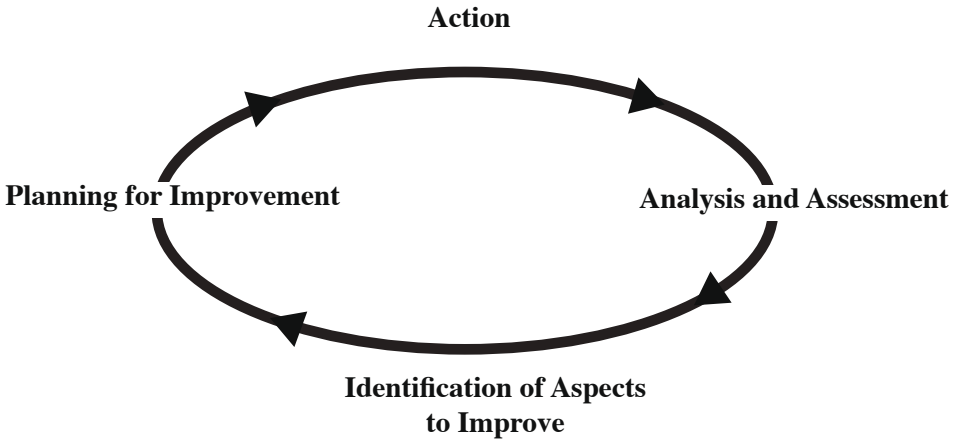
TEACHING AND LEARNING

INTRODUCTION

The teaching process may be broken down into five main phases: (1) designing learning activities; (2) setting up the activities; (3) delivering the activities; (4) assessing the learning; (5) adjusting and re-tooling. The first phase (activity design) is when you plan your training and practice sessions; this is the starting point for your teaching. You will find more specific material on this area in the "Planning a Practice" module.

In the present module, we intend to focus on the teaching process, and on specific aspects and skills that relate to what you do when you are with your athletes in a practice session. Of course, you must always keep in mind that the actual sport content of what you teach remains an essential part of an effective teaching process. On the other hand, you will also see in this module that the best technical knowledge or planning skills may turn out to be ineffective if certain principles of effective teaching are not respected. This module aims at providing you with opportunities to better understand these principles, while also engaging you in some reflection on your own teaching. It is also designed to equip you with some tools to help you improve your teaching skills.

Although it is not realistic to expect anyone to improve his/her teaching abilities significantly in six hours of training, one of our goals is to provide you with some very concrete means to continue developing your teaching skills on your own. This will be done through the "self-monitoring" process shown below.



This module will enable you to get involved in each step of this process by: (1) showing you how to use some tools designed to assess teaching effectiveness; (2) providing you with the opportunity to use some of these tools; (3) showing you how to analyze the data in order to identify specific aspects of your teaching you may wish to work on to be more effective.

Planning a Practice

Who are my athletes?

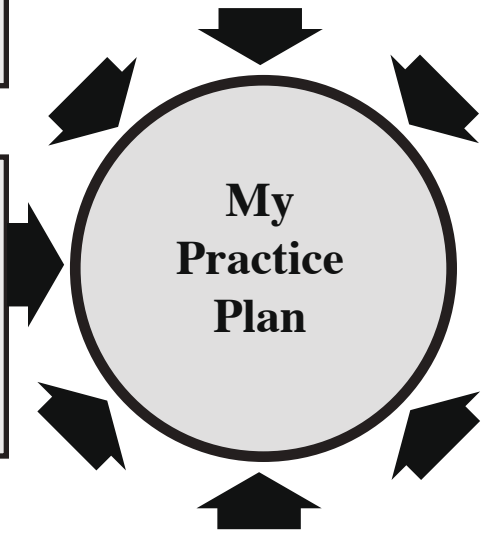
- Number of athletes in attendance
- Age/maturity of athletes
- Skills and abilities of athletes
- Gaps in abilities of athletes
- Injuries to account for
- Reasons why athletes are involved

What are the logistics of my practice?

- Facilities available
- Equipment needed/available
- Length of the practice (time available)
- Time of day of the practice
- Number of practices per week
- Availability of assistant instructors and their experience

What are the safety risks and how should I prepare for them?

- The nature of the activities the athletes will do and the conditions in which they will take place
- Weather
- Playing surface/facilities
- Equipment
- Human error
- Emergency procedures to follow in case of an accident



What do athletes have to train in my sport?

- Motor abilities
- Physical abilities
- Technical abilities/skills
- Decision-making abilities
- Mental abilities

What am I trying to accomplish with my practice?

- What athletes need to improve
- Purpose of the practice
- Team goals and short-term objectives
- Goals of instructing staff
- Time of the season
- Links with previous practices and competitions
- Links with future practices and competitions

How am I going to deliver my practice?

- How can I create a good learning environment?
- What teaching strategies and methods should I use?
- How will I explain and demonstrate?
- Where will I stand when the athletes are practicing?
- What must I be looking for when the athletes are practicing?
- When and how must I intervene?
- How often?

How will I organize my practice?

- Structure of practice
- Activities chosen
- Order of the activities
- Transition between activities to avoid wasting time

Definitions of Performance and Learning

One of the principal preoccupations for instructors is how to maximize learning (or the achievement of a particular motor performance), even when there is only limited time available. It is important to be aware of some basic concepts in sport pedagogy and motor learning.

Distinction Between Performance and Learning

- Motor performance is the observable behavior of the athlete when he/she is executing a task; it can be assessed using very precise criteria, for example the number of times the athlete throws and hits the target.

- Learning refers to the permanent change in the motor performance or in the ability to carry out certain tasks or movements as a result of practice.

- Performance observed during a practice session is not necessarily a good indication of learning by the athlete. If and when the objective is to establish whether learning has taken place, a reassessment of performance at a future date is required. This repeated assessment enables to confirm retention of skill.

- If the instructor 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.

- In addition, when performance assessments are done, it is important to establish a distinction between the level of performance of a skill or the execution of a particular task in practice, and the level of performance when it is most important, i.e. in competition. The definitions presented here are a synthesis of views expressed by several experts in motor learning and sport teaching, notably Lee, Target, Cathelineau, Siedentop and Rink.

Dimensions of Learning

- **The affective dimension** concerns learning from the point of view of attitudes, values, and ethical behavior. This dimension is closely linked to the self-esteem of athletes. Later on, we will consider how to recognize a lack of self-esteem in the athlete.

- **The cognitive dimension** concerns learning from the perspective of the acquisition of knowledge, whether it be technical, tactical, or strategic. It is as much about what the athlete knows (or does not know) as 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 Relative to the Amount of Practice Over Time

- When an athlete begins to practice, 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.

Effects of Different Types of Practice on Motor Learning

There are different types of practice that can be used to teach skills, and their effect on learning and performance can vary.

Practices that emphasize 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 person carrying out the task (known as "decision training") may not produce as rapid an improvement in motor performance early on, but lead to superior learning and retention of skills, as well as superior transfer of skill into the competitive environment.

Assessing Teaching Effectiveness

Organization

- Promotes maximum practice time
- Reflects sport-specific procedures that are proven
- Equipment is available and ready to be used
- Enables a rapid transition between explanations and activities, and between each activity
- Optimal use of space, time, and equipment available
- Instructor freed up to supervise activities better
- Promotes individual attention to athletes

Safety

- Type of practice and conditions in which activities take place during practice
- Weather
- Site and practice area
- Equipment
- Level of fatigue of the athletes
- Behavior of the athletes

Observation and Supervision of Activities

- Active supervision (moving around to observe all the athletes)
- Constant scanning of practices
- Observing performance from different vantage points
- Comparing observed performance to relevant success criteria
- Interventions are done individually (mostly) and with the group (as needed)

Explanations and Demonstrations

- Done in conditions similar to those the athletes will face
- All the athletes can see and hear
- Sufficient number (2-3) of reference points identified
- Safety factors identified
- Include some criteria to enable athletes to evaluate their own performance as they practice

Learning Environment

- Athletes are actively engaged most of the time
- Opportunities exist to interact with athletes who need the most attention
- Degree of difficulty of exercises is adapted to the skills level of the athletes
- Signs of boredom are recognized and the task is adapted as needed

Feedback

- Is specific (accurately outlines what to correct and how)
- Is positive and constructive to promote self-esteem
- Nonverbal feedback is coherent with verbal feedback
- Is coherent with success criteria identified for the task
- Is formulated clearly and in a manner that draws the attention of the athlete on the right things
- Is provided at the right time and frequency

Self-Esteem

What is Self-Esteem?
Self-esteem is the way a person sees himself/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 participants opportunities to acquire new skills and evaluate their abilities thanks to participation in competition. Participants who have high self-esteem tend to learn better and achieve better performance 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 years. So, parents, instructors and other adults who intervene 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 the participant. Parents and instructors 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 aspects which are not directly linked to performance, for example, respecting the rules, being on time, looking after equipment, making others laugh or helping others relax.

As an instructor, what you say (verbally or through your body language) is extremely important in the eyes of the participants, and you may have direct influence on their self-esteem. So you must always assess the potential impact of the words you choose to say to participants 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:

1. The child avoids doing a task or responding to a challenge, or gives up at the first opportunity.

2. The child cheats or lies in order to avoid losing a game or getting a poor result.

3. The child shows signs of regression and acts like a baby or in an immature way for his or her age.

4. The child is extremely stubborn, in order to hide feelings of incompetence, frustration or' helplessness.

5. The child makes excuses ("the coach is stupid") or makes light of events ("this is a dumb sport anyway").

6. The child moves to the fringes of society by cutting or reducing ties with friends, or other people in general.

7. The child is having mood swings, appears sad, weeps and/or has fits of anger, frustration, or periods of silence.

8. The child makes negative comments about himself/herself such as "I never do anything well", "Nobody likes me", "I'm not pretty", "It's my fault. . ."

9. The child is sensitive to praise and criticism.

10. The child is excessively worried about the opinion of others.

11. The child is significantly affected by the negative influence of friends.

12. The child helps too much or not at all in the house.

Suggestions For Helping Young People Develop Self-Esteem

1. Greet each one of the children warmly when they arrive, and make sure that they are happy to be there.

2. Show them your confidence in their ability to learn.

3. Show them respect.

4. Tell them what they do well.

5. Show them you appreciate them as people.

6. Communicate with them in a positive manner.

7. Engage them in activities appropriate for their level of development. Fix realistic objectives and expectations based on the abilities of the participants.

8. Praise the participants sincerely and often, for example, encourage them three or four times before making corrections. Encourage participants to try without always putting the emphasis on results.

9. Avoid elimination games and games which put pressure on participants. Create situations in which participants have a good chance of being successful.

10. Be precise when you praise their efforts or performance.

11. Congratulate them on their special achievements; recognize each participant's progress.

12. Smile, wink or nod to participants to acknowledge their efforts. A "pat on the back" is a great way to encourage participants.

13. Give participants responsibility. Have them participate in decision-making and give everyone the opportunity to be the leader. Alternate the role of captain.

14. Seek the opinion of the participants and encourage them to ask questions.

15. Communicate to them the true joy of participating in sport.

Developing Confidence and Self-Esteem
"Coaching – The Spirit of Sport"

Athlete Selection

1. Deal with each athlete individually.
2. Reinforce the good qualities of your athletes.
3. Provide strategies for improvement.
4. Respect the athlete as an individual person.

Making comments and giving feedback at practice

1. Give simple precise suggestions.
2. Give participants responsibilities.
3. Encourage participants. Be enthusiastic and constructive.
4. Don't make it a chore - have fun!

Before and during practice - Listen to participants

1. Actively seek their input.
2. Respect their opinions. Try to incorporate them in your practices.
3. Show that you are flexible in your point of view.
4. Value the participants' involvement.

Pre-competition communication

1. Take the tension out of competition: have the participants focus on what they are going to do rather than the final result. Keep things in perspective.
2. Be enthusiastic and constructive. Focus on the task rather than the outcome of the competition.
3. Recognize participants' emotional involvement and learn to listen.
4. Remind them what works well.
5. Tell them of your confidence in them.

After winning a competition

1. Always make some comments.
2. Enjoy the victory.
3. Underline what has gone well.
4. Point out what can be improved.
5. Lay the foundations for future victories.

After losing a competition

1. Recognize effort.
2. Underline the strong points.
3. Point out what can be improved.
4. Be sure participants learn something from the experience.
5. Play down the defeat, remind them that there will be other opportunities and that the important thing is to have done their best.

Recognizing the Learner's Preferred Learning Style

You Are Primarily a "Visual" Person – Your General Profile

This means that you are particularly sensitive to the visual aspects of your environment, that you live in the present, that you are aware of what is going on around you, and that you very quickly bring up images of the past in order to make sense of what is happening to you. You like art and beauty, order and disorder. You have a very fine sense of nuances of color and form. You pick up details: you identify your athletes' handwriting. You recognize people easily: their appearance, some aspect of how they look, their location in a particular setting are points of reference that you capture in a flash. You get athletes to stay in the same place so that you will have time to identify them by their place in the room, so much so that when people forget and change places in the room, you may well call them by the wrong name.

You have a good sense of orientation, so you are able to locate where you are on a plan or map, and you don't have to ask the way. You don't always understand why athletes ask you to repeat some instruction for a drill or comment on a practice. "Just open your eyes", you tell them. You believe that a clear explanation or document requires illustrations or diagrams. When there are no visual pieces, you immediately draw something on the board; you believe it is easier or 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.

Particular Aspects You Should Pay 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 summarize the main points of your message. That way you will satisfy their need for words and you will frame how long they can talk; they will appreciate your activities better and you will provide them a meaningful opportunity to contribute to the group's dynamics.

Kinesthetic people often seem to you to be too "slow". Use your creativity to create imaginary journeys for them: they will revel in your images, or 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 providing 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. You excel in this area because you perceive any visually-based strategy as being more effective.

Visual Learners

1. They often do better when you show them rather than tell them.
2. They may have difficulty with oral directions, or appear confused with a great deal of auditory stimuli.
3. They have tendency to watch your face when they are read or spoken to.
4. They like to look at books and pictures.
5. They like things orderly and neat. They often dress in an attractive manner.
6. They can generally find things that are lost and seldom misplace their own things.
7. They often can recall where they saw something some time ago.
8. They notice details. They are good proofreaders; see typing errors, notice if your clothing has a flaw.
9. They can find pages and/or places in a book quite easily.
10. They often draw reasonably well - at least with good balance and symmetry .
11. May use minimal words when responding to questions; may rarely talk in class.

Recommended Teaching Methods

1. Give visual directions and demonstrations as often as possible.
2. Use visual aids such as film, videos, images, overheads, books, magazines, slides, panel boards.
3. Use color-coding systems and highly visual aids.

You Are Primarily an "Auditory" Person – Your General Profile

This means that you are particularly receptive to the auditory aspect of your environment, and that you very 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 and 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 recognize 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 and well ordered. You usually breathe through the middle of the thorax by filling your lungs well, which enables you to maintain a regular rhythm.

Particular Aspects You Should Pay Attention To

The previous aspects can sometimes work against you as well: you take such pleasure explaining that you may occasionally forget that some of your athletes soon "turn off' and are unable to sustain their attention to purely auditory sources of information. From time to time, be sure to provide some visual support to revive their interest and regain their attention. It will also make their task easier when you supplement your explanations with concrete examples that will enable them to create their own internal images. Abstract terms tend to be too much in the realm of sounds alone.

So what about kinesthetic 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.

Auditory Learners

1. They are often referred-to as a "talker", and are seldom quiet. They tell jokes, tall tales, and are full of excuses why something is not done.
2. They follow oral instructions easily.
3. They may have difficulty with written work and copying. They often have rather poor handwriting, drawing and other art work. They have trouble reproducing seen figures and letters, and generally they have poor visual memory.
4. 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.
5. They like musical and rhythmic activities.
6. They tend to memorize easily, and they often know all the words to songs.
7. They may appear physically awkward. They often have a poor perception of space and may get lost in unfamiliar surroundings.
8. They often have poor perception of time and space and often do not keep track of time easily.
9. They often have mixed laterality (left hand - right footed)

Recommended Teaching Methods

1. Teach them to talk through the steps in a task or activity.
2. Encourage them to think out loud, and listen to what they are saying.
3. Utilize tape-recorded instruction for information and/or examination.
4. Use lots of audio equipment in the learning process.
5. Pair the individual with a visual learner.

You Are Primarily a **"Kinesthetic" Person – Your General Profile**

This means that 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 in order 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 or the relationships between people. You have a keen sense of the state of mind of those you are speaking with. You are passionate; your athletes appreciate the way you "rev them up". You are warm and spontaneous. Sometimes, you let yourself get carried away by your emotions; your athletes 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 the attention of your athletes because you express yourself in concrete terms, with a fairly slow delivery. You often call on your emotions and theirs.

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.

Particular Aspects You Should Pay Attention To

You would be even more effective in explaining the essential elements of what is to be learned if you took more frequent pauses in order to re-frame what is being said. Make a plan and put key ideas on the blackboard. Otherwise, your athletes may get the impression that you are changing the subject abruptly. They need to be able to be involved in the process to acquire a more global vision of the course if they are to understand the general meaning of the program.

For primarily visual learners, your many expressions and gestures are a valuable source of information. Anecdotes and a concrete and dynamic approach help them create vivid mental images. You can have them provide a synthesis of what has already been said or done, or 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 to the degree that you may not be capable of keeping pace with the way they interpret information. Have them speak from time to time, so that the rest of the class can benefit from their brightly colored 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 summarize an important explanation, because they often link things together in a subtle way. Don't hesitate to recognize your differences in your conception of knowledge, so learn to rely on their strong points; "What word would you use to describe this?", "How would you classify the various ideas we have heard today?" Thanks to your primarily kinesthetic sense, you practice your profession with great sensitivity. This is one of your great attributes, to teach in a lively, unexpected and sometimes unusual way. You epitomize this picturesque Chinese proverb, "Teaching that only enters the eyes and the ears is like an imaginary meal".

Kinesthetic - Tactual Learners

1. They often are quite literally a "mover", and considered hyperactive.
2. They appear to want to feel and touch everything, rub their hands over objects; they can't keep hands to themselves.
3. They are usually quite well coordinated.
4. They enjoy doing things with their hands. They like to take things apart and to put things together.
5. They may truly enjoy writing things down.
6. They utilize concrete objects as learning aids, especially those that can be manipulated easily.
7. They learn best by doing and exploring the environment.

Recommended Teaching Methods

1. Use movement exploration.
2. Have them tap tempos.
3. Use all the concrete, manipulative devices possible in the teaching/learning mode.
4. Employ role playing where possible.
5. Let them assist you in creating learning aids.

Learning Style Checklist

Discover your preferred style of learning and self-expression.

This checklist assesses the strengths of your of your senses - auditory, visual and kinesthetic. There are ten incomplete sentences and three choices for completing each sentence. You are asked to score the three choices for each sentence as they apply to you.

Use the rating scale of: (3) points for the choice that applies most to you
(2) points for your second choice
(1) point to the answer that is least typical of you

1. When I learn something new, I usually
   a. ( ) want someone to explain it to me.
   b. ( ) want to read about it in a book or magazine.
   c. ( ) want to try it out, take notes or make a model of it.

2. At a party, most of the time I like to
   a. ( ) listen and talk to two or three people at once.
   b. ( ) see how everyone looks and watch the people.
   c. ( ) dance, play games or take part in some activities.

3. If I were helping with a musical show, I would most likely
   a. ( ) write the music, sing the songs or play the accompaniment.
   b. ( ) design the costumes, paint the scenery or work the lighting effects.
   c. ( ) make the costumes, build the sets or take an acting role.

4. When I am angry, my first reaction is to
   a. ( ) tell people off, laugh, joke or talk it over with someone.
   b. ( ) blame myself or someone else, daydream about taking revenge or keep it inside.
   c. ( ) make a fist or tense my muscles, take it out on something else, hit or throw things.

5. A happy event I would like to have is
   a. ( ) hearing thunderous applause for my speech or music.
   b. ( ) photographing the prized picture of a sensational newspaper story.
   c. ( ) achieving the fame of being first in a physical activity such as dancing, or a sports event.

6. I prefer a teacher to
   a. ( ) use the lecture method with informative explanations and discussions.
   b. ( ) write on a chalk board, use visual aids and assign readings.
   c. ( ) require posters, models or in-service practice and some activities in class.

7. I know I talk with
   a. ( ) different tones of voice.
   b. ( ) my eyes and facial expressions.
   c. ( ) my hands and gestures.

8. If I had to remember an event so that I could record it later, I would choose to
   a. ( ) tell it aloud to someone else or hear an audio tape recording or a song about
   b. ( ) see pictures of it or read a description.
   c. ( ) replay it in some practice rehearsal using movements such as dance, play-acting or drill.

9. When cooking something new I like to
   a. ( ) have someone tell me the directions - a friend or television show.
   b. ( ) read the recipe and judge how it looks.
   c. ( ) use many pots and dishes, stir often and taste-test.

10. In my free time, I like to
   a. ( ) listen to the radio, talk on the telephone or attend a musical event.
   b. ( ) go to the movies, watch television or read a magazine or book.
   c. ( ) get some exercise, go for a walk, play games or make things.

Add up all your scores for your (a) choices _____ Auditory

(b) choices _____ Visual

(c) choices _____ Kinaesthetic

The scores range for each style should be from 10 to 30 and together will total 60.

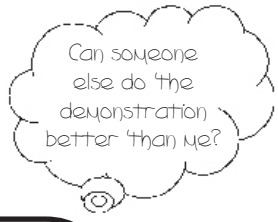
Each of us learns through all three styles. A number of us have a preferred or dominant learning style. If there are four or more points between any of the scores you have a relative strength in that learning area. This means you learn more easily and express yourself more naturally in the area with the larger score.

There are, of course, no right or wrong choices. This checklist simply reveals the style of learning that you depend on and enjoy the most.

THE TEACHING PROCESS

Organization

Includes safety measures, and how the activity starts and finishes
Requires at least 50% motor involvement
Instructor is able to supervise



Explanation/Demonstration

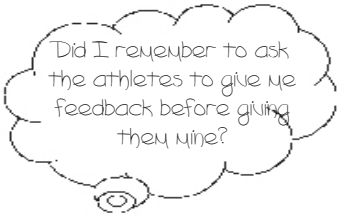
Describe the aim of the exercise
Outline what is to be done and how
Describe points of reference/cues
Identify criteria of successful performance
Touch the different communication channels (visual, kinesthetic, auditory)

Observation

Ensure that the athletes are actively engaged and achieve a good rate of success
To observe, move around without interfering with athletes
Observe both individuals and the group
Verify if success criteria are achieved

Feedback

Identify the cause of failure
Adapt the activity as needed
Help athletes by reassuring them
Explain and demonstrate again if necessary
Recognize successful performance



Effects of the Feedback

Give the athletes time to practice again to check whether they have acted on the feedback

Elements of Teaching

Step 1: Organization

- Always think about how to begin and finish an activity or a drill.
- Always take into account the safety issues of the activity or drill.
- Organize the activity in a way that allows each athlete to remain active during at least 50% of practice time.
- Organize the activity in a way that enables athletes to progress at their own pace.
- Set up the environment in such a way as to allow yourself to move around and see every athlete without interfering.
- Ensure each athlete has the maximum possible amount of practice time (number of repetitions).
- Always plan for the equipment that will be used during the activity or the drill. Prepare them ahead of time and make sure they are available at the time of the activity.

Questions to ask yourself before and after a practice

Did I set up the practice or the activity in a way that:

1. Enabled each of the athletes to be actively engaged for at least 50% of the time?
2. Allowed me to spend more than half my time with individual athletes?
3. Enabled each athlete to progress at his/her own pace, respecting the athlete's starting point?
4. Gave me sufficient time to observe the athletes?

Step 2: Explanation and Demonstration

- Tell the athletes the object of the exercise or drill.
- Always give the athletes some cues or reference points (what he/she should look for or feel while performing). Effective cues are short, clear, simple and not too many (two or three).
- A cue is a precise piece of information that enables the performer to control a movement. It must be observable by the instructor and easily understood by the athlete. There are two types of cues: external and internal.
  - EXTERNAL CUES can be seen or heard by the athlete.
  - INTERNAL CUES are perceived internally by the athlete (kinesthetic sensations).
- Suggest to athletes that, while executing the movement, they should pay attention to or concentrate on (1) something external to their body (e.g., a target); or (2) the expected outcome of their movements, and not too much on how the movement is being performed or on what they feel. In motor learning, this type of instruction is called **external focus of attention**.
- Always show and tell the athlete what successful performance will look and feel like (how will the athlete know that he or she has succeeded?).
- Be sure to use appropriate words, movements, or visuals (if possible) to take into account the preferred learning style of each athlete (visual, kinesthetic, and auditory).

ORGANIZATION OF DEMONSTRATION

Instructor: _____ Observer:_____

The set up of the activity was:

_____ Quick and efficient

_____ Quick but not efficient

_____ Neither quick nor efficient

The athletes began the activity:

_____ Quickly and correctly

_____ Quickly, but not correctly

_____ Correctly, but not quickly

_____ Neither quickly nor correctly

During the activity:

Good use was made of the available equipment:	Yes	No
Good use was made of the available space:	Yes	No
Good use was made of the available time:	Yes	No
Groupings were adequate:	Yes	No
Athletes practiced in safe conditions:	Yes	No

In the practice, the athletes are actively engaged:

_____ Most of the time (50% or more)

_____ Moderately (30–50%)

_____ Insufficiently (30% or less)

Comments:

_____

_____

_____

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Motor Learning: Key Points on Giving Instructions

Recent research in the area of motor learning has focused on the effectiveness of different ways of giving instructions. Among others areas of interest, researchers have tried to determine what athletes should focus on during the execution of a motor task: (1) on the way the movement or skill is performed (internal focus); or (2) on an external element or the anticipated effect of the movement (external focus). The key points from these studies are summarized below.

- **To promote learning, instructions should be given in such a way as to focus the athlete's attention on some external factor and/or the anticipated effect of his/her movement, rather than on the way the movement is executed.**

  Focussing too much on the way to perform a particular movement, e.g., focussing on the position of the elbow and how to make a flick of the wrist at the end of the movement, can be detrimental to motor learning. During the execution of the movement, it seems to be more effective to draw the athlete's attention to some external factor, (e.g., the target to hit, or the expected outcome of the movement like the particular trajectory to impart to a ball) rather than internal elements (e.g., feeling each phase of the movement during its execution). Research on this topic is known as "focus of attention".

  There is ample evidence to suggest that instructions whereby the athlete is asked to focus attention on some element external to his/her body have a positive impact on both short-term performance (i.e. during the practice session) and longer-term performance; this type of instruction therefore appears to promote both learning and retention of skill. In addition, instructions of this type appear to be effective for most sports skills, and whatever the level of the performer. Finally, the positive effects of this type of instructions on both performance and learning do not appear to affect negatively the form of he movements; in other words, the quality of the execution does not appear to suffer.

- **If possible, external focus should be directed towards an element or an anticipated effect that is far away from the performer.**

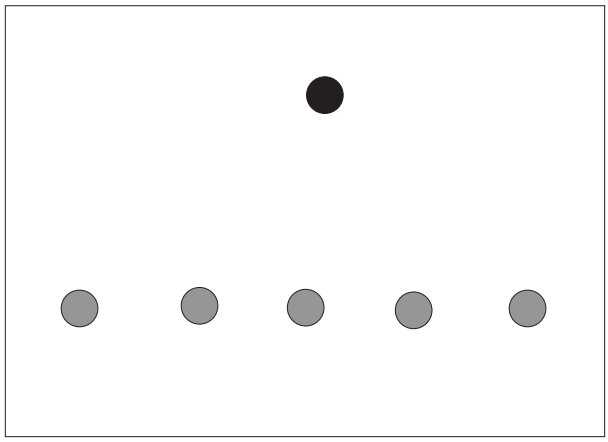
- Current research suggests that the most effective approach requires the learner to focus on an expected outcome situated as far as possible from the athlete's body, but which can nevertheless still be directly linked to the movement itself.

Choosing a Formation

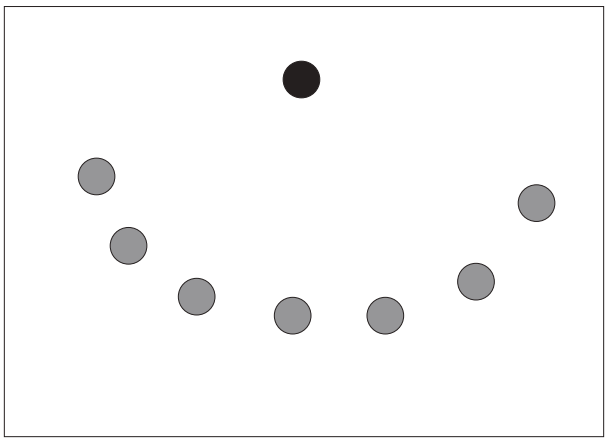
Giving an Explanation or a Demonstration

It is important to choose an effective formation in order to be seen and heard by the athletes. The choice of formation depends on the space available, the kind of message (information, explanation, demonstration) and the number of athletes.

Straight line



Semicircle



Adapting the Basic Formations

These basic formations can be adapted to meet the needs of larger groups, for example:

- Make two rows: the front row kneeling or sitting, and the second row standing.
- Make three rows: front row sitting, the second kneeling, and the third standing.

Choose a Good Vantage Point for the Athletes

It is important to ensure that the athletes have a good vantage point to watch the demonstration. Think of the best vantage points for the athletes in relation to the formation you have chosen **before** you begin the demonstration.

If you need to, turn 90 or 180 degrees and do the demonstration again so that everyone can have several views of the demonstration, and has the opportunity to observe from the best vantage point. However, avoid doing the demonstration too many times as it may take too much time, and the athletes who have already seen it enough may "switch off'.

Control Distractions

The athletes must be arranged with potential distractions behind them, for example:

- Sun in their eyes
- Reflections
- Activity in the street
- Other groups of athletes training
- Spectators

Demonstration

Instructor: _____ Observer: _____

		Demo 1		Demo 2	
1	Equipment was ready for the start of the demonstration	Yes	No	Yes	No
2	Organization of the athletes was appropriate	Yes	No	Yes	No
3	The technique or skill was adequately illustrated	Yes	No	Yes	No
4	Attention of the athletes was directed to an external focus	Yes	No	Yes	No
5	Instructor pointed out what should be avoided	Yes	No	Yes	No
6	Demonstration was repeated from different angles	Yes	No	Yes	No
7	Athlete's were involved in the demonstration in an appropriate way	Yes	No	Yes	No
8	Instructor identified internal and external points of reference	Yes	No	Yes	No
9	Instructor explained the reason for doing the activity/drill	Yes	No	Yes	No
10	Instructor checked that the athletes understood the skill	Yes	No	Yes	No
11	Technical elements of the demonstration were executed correctly	Yes	No	Yes	No
12	Amount of information provided by the instructor was appropriate	Yes	No	Yes	No
13	Instructor emphasized safety aspects when appropriate	Yes	No	Yes	No
14	Instructor's voice was loud enough and projected well enough	Yes	No	Yes	No

Comments:

_____

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_____

Overall assessment:

( ) Excellent performance
( ) Good performance, some adjustments required, but generally well done
( ) One or two serious mistakes, room for improvement, but acceptable
( ) Not acceptable, several serious mistakes

Step 3: Observation

- Ensure that the athletes get involved in the activity quickly (rapid transition).
- Always ensure athletes have a clear understanding of the task at hand, in view of the instructions that were given.
- Always ensure that the activity or drill is appropriate for the skill level of the athletes, and that it is not beyond their current abilities.
- Always ensure that there is a good rate of success among the athletes, i.e. most of the athletes are able to achieve the desired outcome.
- Be actively involved in the supervision of the athletes, so that you get to see ALL the athletes during the activity. Scanning the activity and moving around to watch what is going on from different vantage points enable you to be actively involved.

(**Note:** During archery workshops, find out about the best way of moving around and observing athletes without interfering with them).

- Be sure to watch individual athletes so that you can be aware of the individual differences in performance, and can then provide individualized feedback.
- Find out if the athletes have fun, or if they are not bored or discouraged.

Questions to ask yourself before and after a practice:

Did my supervision enable me to:

1. Keep the athletes actively engaged in the activity?
2. See all the athletes as a group and individually?
3. Observe key reference points and success criteria from different vantage points?
4. Be sure everyone is safe?
5. Evaluate the athletes' degree of success in the execution of the activity or drill?

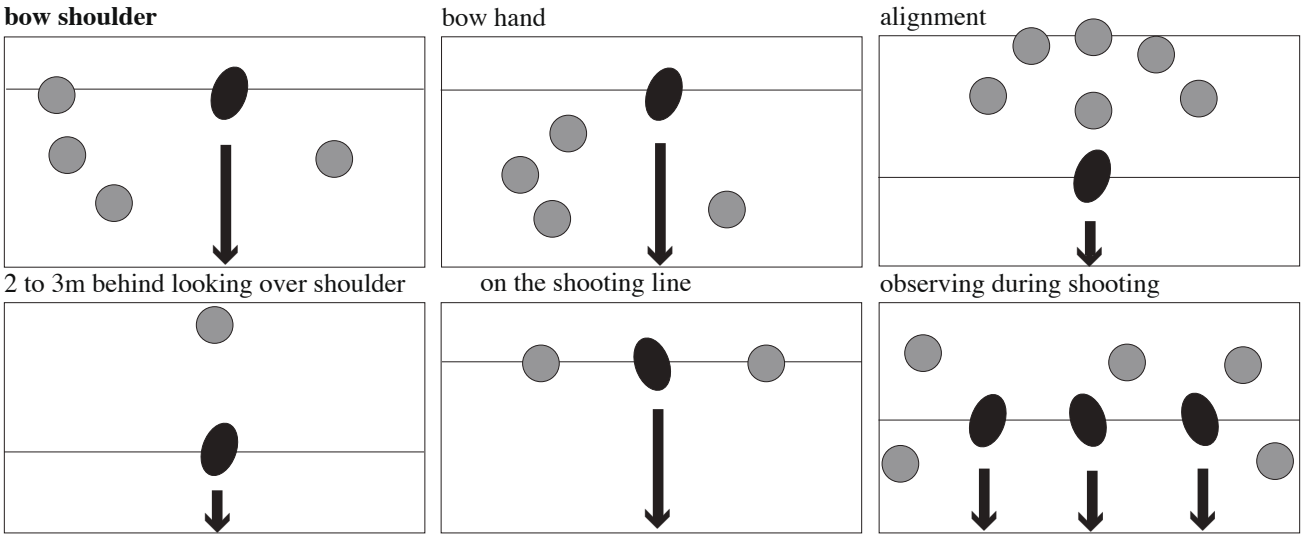
The Challenge Zone

Or Matching the Difficulty of the Activity With the Skill Level of the Participant

While observing the athletes, the instructor should verify that they are appropriately challenged by the task at hand. When the demands of an activity are too high for the participant's ability, he/she may become anxious or discouraged, and therefore may have difficulty learning. On the other hand, when the requirements are too low, the athlete may quickly show signs of boredom or lack of interest. The difficulty level associated with the task must therefore be "optimal," i.e. the participant must feel that he/she has the ability to succeed but that the **activity represents a challenge**. In other words, the athlete will be motivated to learn when challenged at the appropriate level, which implies that there must be a reasonable chance of either success or failure when he/she performs a task.

As a general rule, if the participants' success rate is approximately two times out of three, then the activity represents a suitable challenge.

Choosing a Formation – Observing shooting form



instructor is observing the athlete

Step 4: Feedback

- Timing is everything for giving feedback: the athlete needs to be open to hearing it, and near enough to hear you.
- Draw the athlete's attention to some element external to his/her body or to the anticipated effect of the movement rather than on the way the movement is being done.
- Let the athletes practice without always interrupting them. The more you talk, the less they can practice!
- Repeating the same general comments, (e.g., "That's great!", "Keep going!") is not enough. It's not that it is bad, but effective feedback is more than simply general encouragement.
- To promote acquisition and development of skills, information given must be specific.
- To be useful, feedback must also be accurate. To be accurate, the coach must: (1) really know the skills the athlete is working on; (2) have a clear reference point as far as correct execution is concerned; and (3) be in the right place to observe the athlete's performance.
- In the case of motor skills, a demonstration (i.e. nonverbal feedback or the execution of a very precise movement) is often useful feedback to give to the athlete.
- Feedback given to the whole group is often effective.
- Although feedback is important and contributes to learning, avoid giving feedback too often, or too much at anyone time.
- Remember that it is always the quality and quantity of feedback that determines its effectiveness.

Giving Appropriate Feedback

First step: Success or Failure? Before providing any feedback, the instructor must first identify whether or not the athlete is succeeding in the activity.

Second step: Categories of Intervention Once an evaluation of the athlete's performance is made and the instructor has determined whether or not the athlete is experiencing success, an appropriate type of intervention must then be chosen. Various types of interventions are listed in Table 1. The first type of (inhibiting) is obviously not appropriate, and therefore should not be used. Among the other options, some are more effective when the athlete cannot perform the task successfully, and others when he/she can. These particular aspects are dealt with in the following pages.

Types of Intervention	Behaviors or Actions by the Instructor
A. Inhibiting	1. do nothing 2. shout, rebuke
B. Repeating	3. repeat instructions 4. demonstrate or repeat previous demonstrations
C. Explaining	5. explain how to do it right 6. question the athlete
D. Helping	7. reassure, encourage 8. have the athlete start again
E. Adapting	9. use different equipment or practice areas 10. reduce difficulty level or give more time

Third step: Saying the Right Thing. Thus far, we have seen that the instructor must first determine whether the athlete is succeeding or failing, and then decide what kind of intervention is best in either case. We will now see what each type of intervention sounds like in words.

Types of Feedback

Types	Definitions	Examples
Evaluative	The instructor assesses the quality of the performance; he/she makes some kind assessment or judgement	• That's fine! • Good job! • No, not like that! • Not good enough!
Prescriptive	The instructor tells the athlete how to execute the skill next time	• Shoot it higher! (general) • Aim at the top of the gold! (specific)
Descriptive	The instructor describes to the athlete what he/she has just done	• The set-up was too slow (general) • Your release was active (specific)

When providing feedback to athletes, instructors should aim at the following:

- Positive feedback should be offered more often than negative feedback.
- Specific feedback should be offered more often than general feedback.
- A good balance should be struck between descriptive and prescriptive feedback (note: descriptive feedback that is both specific and positive may influence the athlete's self-esteem in a positive way).

Motor Learning: Key Points on Giving Feedback

Until recently, the vast majority of instructing publications recommended that, to be effective in helping athletes correct mistakes and improve performance, feedback had to be provided:

- As often as possible.
- As soon as possible after the execution of the movement or task.
- In the most precise manner possible.

During recent years, researchers have reexamined some of these recommendations on the grounds that they were based on studies of the short-term improvement of performance rather than on the effects of longer-term learning, which is clearly the ultimate aim of instructing.

While the recommendation regarding the importance of providing specific feedback remains unchanged, the most recent data concerning feedback indicate that:

- **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; as such, it should require some analysis and decision-making by the learner. Feedback must encourage the athlete to be an independent and autonomous learner, and look for solutions to the particular challenges posed by the practice. The longer-term objective is that the athlete becomes able to maintain and modify performance without the instructor's intervention.

- **Very frequent feedback does not promote learning.** A comparison between intermittent feedback (after every two or three repetitions or even less frequently) and frequent feedback (after every repetition or attempt) shows that 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.** Feedback provided while an individual performs a task appears to boost performance in the short-term, but actually degrades learning compared to feedback provided after the execution of the task. (In this case, it is particularly important to understand the difference between performance and learning in order to get things in perspective).

- **The least effective approach: frequent feedback during the execution.** The negative effect of the phenomenon described in the preceding paragraph is made even more striking when feedback is given very often while the learner is practicing: while it may lead to short-term improvement, it also tends to create dependency on this kind of feedback, which can impair longer-term learning.

- **In the short-term, "summary feedback" is not as effective as "instantaneous feedback", but it does lead to superior learning and retention of skills.** Summary feedback is a method of giving feedback after several attempts or repetitions of a task, in such a way as to give (1) an objective view of tendencies observed during the execution of a movement, for example by producing a graph showing how performance varies from one attempt to another; or (2) information about the "average"

performance achieved after several repetitions. 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.

- **To promote learning, feedback should only be given 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, when it falls outside a range of ± 25% of 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:
  1. reduce the frequency at which feedback is provided
  2. promote summary feedback whereby the participant may be encouraged to compare less successful attempts with those that fell within the "acceptable range of performance"
  3. develop a degree of autonomy and ability to engage in self-analysis of performance by the athlete. In this last case, the instructor may ask the athlete to compare his/her self-analysis with the information given by the instructor about correct or incorrect execution of the task.

  Another aspect that has been studied recently is the nature of the feedback given to the learner. Among other things, researchers have sought to determine what participants should be told to focus on during the execution of a motor activity:
  1. on the way the movement is performed (internal focus); or
  2. on some external focus, or on the anticipated effects of the action (external focus)

  Major research findings in this area are summarized on the next page.

- **To promote greater learning, feedback should direct the attention of the learner towards some external focus of attention or on the anticipated effects of the movement rather than on the way the movement is performed.** When a movement is being performed, focussing too much attention on the way it is being executed (for example, thinking about the exact position of the elbow, and the flick of the wrist at the end of the movement) may delay motor learning. During the execution of the movement, it is more effective to draw the athlete's attention to some external element, (e.g., the target to hit, or the expected outcome of the movement like the particular trajectory of the arrow) rather than internal elements (e.g., feeling each phase of the movement during its execution). Research on this topic is known as "focus of attention". There is good evidence to suggest that the type of feedback directed towards an external focus of attention has a positive impact both on the short-term performance (during the session) and the longer-term, so it promotes both learning and retention of skills. Furthermore, feedback directed towards an external focus of attention appears to be effective for most sport skills, whatever the level of the athlete.

  Finally, the effectiveness of this type of feedback does not appear to have any negative effect on the movements themselves; in other words, the quality of execution does not seem to be negatively affected.

- **If possible, external focus should be directed towards an element or an anticipated effect that is far away from the performer.** Current research suggests that the most effective approach requires the learner to focus on an expected outcome situated as far as possible from the athlete's body, but which can nevertheless still be directly linked to the movement itself.

Internal Focus of Attention	External Focus of Attention
Concentrating on... • the force exerted on a certain body part during movements • keeping a specific part of the body in a certain position during movement • paying attention to the arm positions during an archery shot • focussing on feeling the movement during an archery shot	Concentrating on... • the force exerted on an object or implement during movements • keeping a specific object or implement in a certain position during movement • paying attention to the bow after the archery shot • visualizing the trajectory of the arrow and it's landing point during an archery shot

OBSERVATION OF THE INSTRUCTOR'S FEEDBACK

Instructor _____ Number of athletes _____ Length of time of observation _____

Types	Definitions	Examples	
Evaluative	The instructor assesses the quality of the performance, so the instructor makes some kind of assessment or judgment	• No, not like that! • Not good enough!	• That's fine! Smooth shot. • Good job! Your stance was solid.
Prescriptive	The instructor tells the athlete how to execute the skill next time	• Shoot farther! (general) • Adjust for the wind!	• Get your string arm higher! (specific) • Move the sight out 2 clicks.
Descriptive	The instructor describes to the athlete what he/she has just done	• Your set up was inconsistent. (general)	• Your stance was too open. (specific)

Type of Feedback	Occurrence (Check Mark)	Total	# / minute
Positive Evaluative			
Negative Evaluative			
General Prescriptive			
Specific Prescriptive			
General Descriptive			
Specific Descriptive			

Intervention Skills

The most important intervention skills recognized by the majority of researchers are the following:

Planning

1. The content of the session must have some relation to the overall program.
2. The instructor must know his/her stuff.
3. The objectives of the practice must be clearly defined.
4. The key elements of the practice and criteria for success must be clearly defined.
5. Exercises must be varied and progressive.
6. Exercises must be adapted to the level of the athletes.

Organization

1. Ensure there are enough appropriate equipment.
2. Choose the right formation for explanations and demonstrations.
3. Be stimulating and lively (have fun!).
4. Be sure that the practice area is safe throughout the session.

Giving information

1. Explanations must be brief and clear.
2. Explanations must be complete (organization of the group, how the practice will go, the duration of the practice, etc.).
3. The context must be appropriate (quiet, respectful: the learner must be paying attention in order to learn, but must also be open to receiving and assimilating the explanation being given).
4. The instructor must be in the right position during the explanation, i.e. in front of the group; the participants/athletes may be standing or sitting in a semicircle in front of the instructor.
5. The words used must be correct and adapted to meet the needs of the targeted group (don't use words or terminology that only you know).
6. Delivery must be controlled: speak slowly, loud enough and with enthusiasm; ask the participants/athletes if your voice carries well enough.
7. Demonstrations serve above all to create a mental picture of the movement. Obviously, this picture must be as accurate as possible, as it is the basis of all learning. A good demonstration has the following characteristics: the movement is well-executed, the timing is right, the demonstration is carried out in the right place, and everyone can see it.
8. Give clear instructions such as: "Make as many passes as possible in the time given, and keep moving!".
9. Ask questions to check whether your instructions have been understood, for example, "What must you do during this drill?".
10. Check that the participants/athletes have understood the object of the exercise before letting them go back into a game situation.

Managing the group

1. Ensure that the participants are aware of the rules to follow and the code of conduct.
2. Be sure to inform the participants/athletes of the rules, and of the consequences of not following them; the consequences must be reasonable and take into account the age of the participants/athletes, and the nature of the infraction.
3. Watch out for signs of indiscipline, and react quickly and appropriately to this kind of behavior.
4. Apply the rules and impose the appropriate penalty for breaking the rules (which you have already established).
5. Adapt quickly to maintain control of the group at all times.

Observation

1. Pick your spot and move around to see all the participants/athletes. By maintaining good visual and auditory contact, it is possible to know what is really happening in the group. Constant scanning of the group is the basis for sound observation. Visual contact is the primary way of capturing attention. Although it is important to watch, you must also think about what is going on. You must learn to recognize signs of boredom, disagreement, tiredness, so that you can deal with them quickly.
2. You must learn to pick up indications or signs of sound execution - or the lack of it - and intervene quickly to correct the situation when you need to.
3. When you give feedback, remember the following criteria:
   - Specific, not general
   - Positive and constructive, not destructive or negative
   - Focus on behavior that can be improved
   - Clear and informative
   - Sandwich approach: positive comments on what the participant/athlete is doing well, things to work at, encouragement or some other positive aspect

   Note: Although feedback is important, don't overdo it, as it is important to allow participants/athletes to practice and perform without intervention or constant interruption.

Conclusion

The competence of the instructor can be assessed on the basis of the following criteria:

- The ambiance created in the practice session
- The amount of motor activity of the participants/athletes
- The participants/athletes' learning

Creating a Positive Learning Environment

1. **Interact more with the participants/athletes who need it most**
   Feedback from the instructor is intended to inform and encourage athletes who may have limited skills, and who, by definition, find it difficult to execute the skills correctly.

2. **Ensure that participants/athletes are actively involved**
   Too long a time spent organizing the group and the equipment, and, similarly, long periods of inactivity during the practices may lead to loss of interest by the participants/athletes and lead to a lack of discipline.

3. **Adapt the degree of difficulty of the practices to the abilities of the participants/athletes**
   Practices must involve tasks that create a degree of uncertainty in the participants/athletes, i.e. they must have the impression, but not be absolutely certain, that they are able to execute the task correctly. This kind of task presents them with an interesting challenge.

4. **Define what successful performance looks like**
   Without clear objectives to achieve and when they do not know how they are doing, participants/athletes live in a climate of uncertainty and ambiguity which may promote dependency on the instructor, or loss of interest in the activity.

5. **Give specific and constructive feedback**
   Instructors must give specific information that will lead the participants/athletes to think. It is better to avoid sharp criticism, as it is well known that this can have a negative influence on learning and the development of the person.

6. **Do not allow** a **few participants to monopolize attention**
   It is important to recognize that certain participants/athletes condition the instructor to react the way they want, and end up expecting all the instructor's attention. Add to this phenomenon the fact that every instructor likes some participants/athletes more than others, and it is not surprising to discover that other people feel left out and badly treated when this occurs.

7. **Improve the scope of feedback**
   When instructors give feedback to participants/athletes, they often use stereotypical messages, which often become repetitive and little more than habitual statements. Sometimes you need not give any feedback. The quality and credibility of the feedback are more important than the quantity.

Effective Communication

If the instructor is to establish a good working relationship with the participants and other instructors involved in the project (at practice sessions, meetings, and at any other time), he/she must develop good communication skills. This section provides some practical suggestions for improving communication skills.

Personal

1. Know yourself, both as an instructor and as a person.
2. Know your preferred communication style (analytical, dynamic, pleasant, expressive), and choose the appropriate one(s) for your target group.
3. Be aware of the importance of the nonverbal aspects of communication: when you are an instructor, people look at you! Participants and athletes notice your slightest movements and gestures. Nonverbal language represents around 80% of all communication. Your verbal language must not contradict your nonverbal language; rather, they should be complementary. For example, if you say: "Let's take the time we need to do this practice properly", but you are constantly looking at your watch, you are sending two contradictory messages.
4. Know how you react to typical situations you face in sport. For example, do you get stressed during competitions?
5. Create opportunities to listen to and communicate with other people.
6. Pay real attention to and take genuine interest in the person you are speaking to.
7. Accept the fact you will probably have to clarify and repeat whatever you say often during the season. You may have to say the same thing in several different ways and use different words before the message is truly understood and acted upon.
8. Show that you listen actively and ensure you understand the message you are receiving. Active listening suggests that you ask for clarification whenever necessary, and that, on occasions, you may repeat what you have heard to be sure that you have understood the other person, for example, "When you said....., did you mean.....or..... ?" or "If I understand what you said, now you are going to.....".

Ambiance

1. Create a positive ambiance based on confidence, be patient, tolerant, and show empathy towards others.
2. Create a positive environment for communication (appropriate location, absence of noise, discreet, etc.). If it's not possible to spend time with the other person, make an appointment with him/her for another time, for example, after practice.

Interpersonal

1. Respect the differences and particularities of every individual.
2. Be open with other people, right from the beginning of the relationship.
3. Clearly identify expectations in front of participants and athletes.
4. Describe how you meet these expectations.
5. Describe the attitudes and behaviors you expect to see (a code of behavior).
6. Communicate a coherent and relevant message to the members of your target group, in terms that they understand.
7. Don't talk too long to the group (before or after the meeting) or in an individual meeting, especially if it is with a young person; be brief and specific.

Designing a Sport Program

Designing a Sport Program
Table of Contents

Sport Program: Definition and Components

A sport program is a planned and progressive sequencing of activities. The nature (training, competition, etc.), number, frequency, duration, and content of these activities are adapted to the participants' age and sport experience. The goal of the program is to foster the participants' athletic development and sport form over time.

Main Components of a Sport Program

Time Dimension: A program. . .

- Usually has a well-defined beginning and end.
- Is of varying length (ranging from a few weeks to several months).
- Is part of the long-term development of the participants/athletes: their starting point, what they have done before, and what they should be able to do at the end of the program are taken into account.

Events: A program consists of different types of events. . .

- Sports (practices, preparatory competition, regular competition, trials, play-offs, championships, tournaments, tests, etc.).
- Social (suppers, parties, awards ceremonies, distribution of prizes, etc.).
- Administrative (registration, equipment purchase, fund raising, parent meetings, meetings with league/club administrators, etc.).

Intentions, Objectives, and Priorities: A program. . .

- Takes into account the participants, their interests and their particular needs.
- Takes into account the competitive demands of the sport.
- Outlines its purpose and philosophy (why it exists), its focus (what it will emphasize, i.e. participation, development, excellence), the desired outcomes (goals and objectives), and how it will be operated (rules, policies, procedures).
- Prioritizes particular aspects (objectives, events, time devoted to certain activities, etc.) given certain constraints that may apply.
- Makes its intentions, objectives, and priorities public, which helps justify choices and decisions.
- Has intentions, objectives, and priorities that are coherent with the values of the instructor and the organization.

Structure: A program...

- Proposes activities that are organized and planned (level of detail and sophistication may vary).
- Proposes a framework for services to participants.
- Proposes a link and some consistency between its various components (vision and objectives, philosophy, priorities, participants' needs, activities, and events).

Progression: A program is characterized by. . .

- Intentions, objectives, and priorities that may change at various points of the season.
- An evolution in terms of training activities and content, so as to take into account the intentions, objectives, and priorities that apply at a given point in time.

Adjustment and Evaluation: Within a program...

- The participants progress from a given starting point; this progression may occur in different ways: group/team cohesion; technical/tactical mastery; physical condition and tolerance of fatigue; attitudes (work; participants behavior; commitment; discipline); performance, etc.
- The instructor must assess the participants' starting point so as to identify what can realistically be accomplished in the short-, mid- and long-term, and choose the appropriate methods for doing so: such decisions normally require some form of evaluation.
- It must be accepted that adjustments will most likely have to be made en route, even if the initial plan were carefully laid out.

Sport Form - General Considerations

Definition – Sport Form (Sport Readiness)

Sport form can be defined as the level of development of the different athletic abilities at a given time in comparison to what is required to achieve performance goals.

In other words, it is how well the athlete is physically, tactically, and mentally prepared to meet the requirements of competition.

Sport form is therefore a concept that can have a specific meaning given:

1. the sport;
2. the age and gender of the athletes/participants;
3. the level of competition in which they participate.

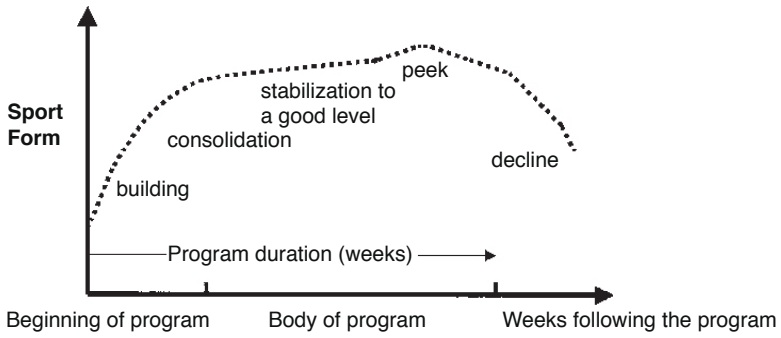
Progression of Sport Form

The first goal of training is to help the athletes/participants develop their sport form and skills. 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 curvilinear pattern during a season or a program. In other words, there is quick improvement in the beginning, a slowing down after a few weeks, and finally a levelling off. Sport form can obviously decrease (that is, go back to a previous level) if training is interrupted for a certain period of time, such as at the end of a program.

Figures 1 and 2 provide a schematic illustration of the general evolution of sport form during both a single season (Figure 1), and in the long term, that is, from one season to the next (Figure 2).

Figure 1 – General pattern according to which sport form progresses during a seasonal sport program of several weeks. Sport form is built gradually and in stages (or phases) of varying duration.



Building Sport Form

There are two objectives in the first development phase of sport form (building), namely:
(1) develop the basic athletic abilities (physical, motor, and technical); and (2) progressively increase the quantity of work that the 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 what will be observed later in the program. This phase is very important because it helps to "build the foundations" of sport form.

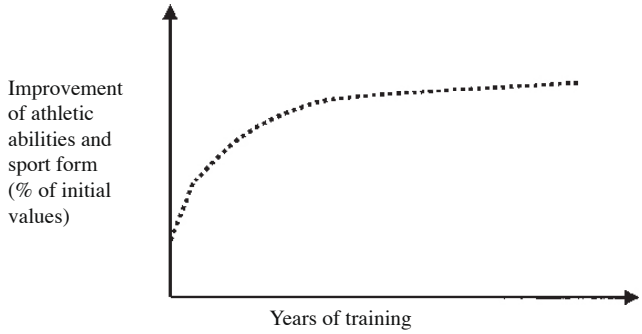
Consolidation and Stabilization of Sport Form

The second and third phases (consolidation, stabilization) are characterized by an increase and a stabilization of sport form. During these phases, the conditions in which athletic abilities are developed become increasingly sport-specific.

Decline in Sport Form

The fourth phase usually occurs in the weeks after the end of the program. It consists of a decline in sport form due to a decrease in the quantity and intensity of the training. This phenomenon is normal and necessary if the athletes are to recover physically and mentally.

Figure 2 – General evolution pattern of long-term athletic abilities and sport form (i.e. over a period of several years)



The evolution of athletic abilities and sport form over several years of training is not linear and not necessarily predictable. Moreover, it can vary from one person to another. For some people, a marked response can be observed to the proposed training stimulus, whereas for others, the improvement rate will be less pronounced despite sustained commitment and work on their part. However, generally speaking, fairly quick improvement in athletic abilities can be observed 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 achieving noticeable gains using a variety of methods.

Subsequently, a progressive levelling-out can be observed in the improvement rate. 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 particular 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. Without passing through these "formative stages", the chances of long-term success are considerably reduced.

Summary of Istvan Balyi's Article

Key Program Elements	OVERVIEW OF THE ATHLETE'S LONG-TERM DEVELOPMENT			
	Community Sport	**Introduction to Competition**	**Competition Development**	**Competition High Performance**
Age Group Italics (early specialization sports	Chronological/biological Boys: 6/10 years Girls: 6/10 years	Biological Boys: 10/14 years Girls: 10/13 years (10-11)	Chronological/biological Boys: 14/18 years Girls: 13/17 years (12-15)	Chronological/biological Men: 18 years + Women: 17 years + (16+)
General Orientation	Have fun in sports	Train to train	Train to compete	Train to compete and win
Objectives	Fun and participation; general development; experiment with new forms of sport activities	General development of athletic abilities and some limited form of sport-specific conditioning; acquisition and consolidation of appropriate technical and tactical elements; first serious competitive experience	Consolidation and/or development of physical, tactical, technical, and mental abilities and skills in order to perform successfully in provincial and national competitions	Maintenance of physical abilities at a high level and improvement of tactical, technical and mental skills in order to reach peak performance in national and international level competitions
Type of Periodisation	not applicable	Single periodisation	Double periodisation	Triple or multiple periodisation; frequent recovery breaks
Length of Program	A few weeks (6 — 12)	20 — 30 weeks	35 — 45 weeks	45 — 50 weeks
Ratio of Practice (Training) to Competition	Very large majority of time devoted to games and activities to develop motor skills; competition and results are not a priority	75% of the time devoted to sports participation should be spent training and 25% to competing (these percentages may vary slightly depending on the sport)	50% of the time devoted to sports participation should be spent developing physical conditioning and tactical and technical skills, and the other 50% in sport-specific preparation for competitions	75% of the time should be devoted to sport-specific preparation and to participation in competitions
Number of Practices per week	Athlete's preferred sport: 1-2 per week; participation in other sports 2-4 times per week	Sport-specific training 3-4 times per week plus participation in other sports	6 - 9 times per week	9-12 times per week

Summary of Istvan Balyi's Article

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Specialization	None; participation in different sports	Participation in complementary sports (similar movements and demands); preferred sport becomes more important	Sport-specific technical, tactical and physical preparation; specialization in a discipline or in a position	Sport-specific technical, tactical and physical preparation
Training Priorities Physical Preparation	Speed, power and endurance acquired through fun and games	General physical conditioning	General development of athletic abilities; individualized sport-specific conditioning	Highly individualized sport-specific physical conditioning; slight improvement sought, if possible
Training Priorities Motor Development	Agility, balance, coordination and speed	Agility, balance, coordination and speed		
Training Priorities Technical Development	Running, jumping and throwing techniques	Progressive acquisition and consolidation of basic sport-specific skills	Advanced technical preparation	Refinement of advanced technical skills, where necessary
Training Priorities Tactical Development	Introduction to the basic rules and ethics of sport	Basic tactical preparation; correct decision-making in frequently encountered competitive situations	Development of national level tactical skills and decision-making abilities	Development of international level tactical skills and decision-making abilities
Training Priorities Mental Skills	Do your best, be persevering	Basic mental skills	Advanced psychological preparation	Advanced psychological preparation; highly individualized approach
Training Means and Methods	Games; fun activities; medicine ball activities; activities with Swiss balls; general resistance training exercises using body weight to improve strength and strength-endurance	Frequent use of general exercises; sport-specific physical conditioning and technical preparation	Frequent use of sport-specific exercises and competition specific exercises	Patterning of every possible aspect of training and performance; individualization of all aspects of training and competitive preparation

Early Specialization Sports

The term “early specialization sport” refers to a sport in which, to be successful, athletes must begin serious and systematic training at a relatively young age, and several years earlier than would be necessary in the majority of other sports. There are only a handful of sports that require early specialization:

- Artistic Gymnastics
- Rhythmic Gymnastics
- Figure Skating
- Diving
- Female Tennis
- Sprint Swimming

Each of the above sports should establish its own athlete development model because a generic model might contain too many over-simplifications, and omit important aspects that contribute to sport-specific athletic development. For these sports, the challenge is to combine the “Fundamentals” and “Train to Train” stages outlined in the previous tables, or to merge them into a single “Train to Train” stage.

With the exception of the above sports, specialization before age 10 is not recommended since it contributes to early burnout, dropout, and premature retirement from training and competition.

Definition of Athletic Abilities — Use in Section 4.4.1

To succeed in his/her sport, the athlete must have and seek to improve certain abilities that support performance.

Category	Athletic Abilities Required in Most Sports
Physical abilities are determined by the rate at which energy and force can by produced by the muscles, and by the range through which the movements can by executed	**Maximum Speed:** 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). **Speed-Endurance:** The ability to sustain efforts at near maximum speed for as long as possible (normally, very intense efforts lasting between 8 and 60 seconds). **Aerobic Stamina:** 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". **Maximum Strength:** The highest level of tension generated by a muscle or muscle group during a maximum contraction, regardless of the duration of the contraction. **Speed-Strength:** The ability to perform a muscle contraction or overcome a resistance as fast as possible (normally, very brief efforts of 1-2 seconds). **Strength-Endurance:** The ability to perform repeated muscle contractions at intensities below maximum strength (normally, 15-30 repetitions, or more). **Flexibility:** The ability to perform movements of large amplitude about a joint without sustaining injury . **Coordination:** The ability to perform movements in the correct order, and with the right timing.
Motor abilities support the controlled execution of movements	**Balance:** 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, and/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 in a dynamic manner. **Agility:** The ability to execute movements or to move rapidly, with precision, and with ease.
Tactical abilities support effective decisions	The ability to analyze a situation and produce a correct response, i.e. one that gives a competitive advantage and/or increases the probability of a good performance.
Mental abilities enable the athlete to be in the proper state of mind to perform successfully	**Goal setting:** The ability to identify clear goals and priorities that will guide future actions and decisions. **Concentration:** The ability to pay attention to what is important in a given situation, and avoid negative influences or distractions.

Training Athletic Abilities

Athletic ability	To improve the athletic ability, the activity must have the following features or characteristics:
Speed	• Movements or actions performed at maximal speed or near maximal speed AND • Movements or actions identical to those in which speed improvement is sought AND • Efforts of short duration, i.e. less than 5 to 8 seconds AND • Long recovery between efforts, i.e. 8 to 10 times longer than the effort itself. **Note 1:** Training no longer effective when intensity or quality of execution decreases. **Note 2:** Total time of all repetitions = 30 seconds to 2 minutes.
Speed endurance	• Movements or actions performed at near maximal speed AND • Movements or actions identical to those in which speed-endurance improvement is sought AND • Efforts comprised between 10 and 60 seconds AND • Recovery between efforts is. 6 to 8 times longer than effort. **Note:** Total time of all repetitions = 2 to 5 minutes.
Aerobic stamina	• Repeated high intensity dynamic efforts performed without interruptions for more than 2 or 3 minutes each OR • High intensity steady-state efforts performed for 10-15 minutes or more OR • Moderate intensity steady-state efforts performed for 30 minutes or more OR • High intensity intermittent efforts of 15 seconds to 2-3 minutes followed by pauses of equal or shorter duration for 20 to 30 minutes or more. **Note:** The more intense the efforts, the greater the training effect on maximum aerobic power.
Maximum strength	**Note:** In many cases, the sport itself does not provide good opportunities to develop this athletic ability. See detailed guidelines.
Speed strength	• Movements or actions that require jumping, bounding, or quick pushing OR • Movements or actions that require accelerating objects as quickly as possible.
Strength endurance	• Repeated muscle contractions that are sustained for several seconds OR • Several sub-maximal muscle contractions performed consecutively at a constant rate.
Flexibility	• Controlled movements of large amplitude OR • Controlled movements in which the muscles are stretched, and where the position is maintained for 20 to 40 seconds. **Note:** No external force should be exerted on the limb or the articulation.
Coordination	• Activities that involve a sequence of actions that must be performed in a given order. **Note:** Improvements more likely to occur if activity is performed when the athlete is not tired.
Balance	• Activities where difficult or unusual positions must be assumed and maintained OR • Activities where "normal" movements are performed in unusual positions OR • Activities where balance is challenged by external factors, or that require an effort to maintain balance.
Tactics	• Situations that are relevant to the competitive experience AND • Situations that involve decision-making in order to gain an advantage AND • Situations that involve some degree of uncertainty OR • Situations where the best option must be selected.

Importance of Physical and Motor Abilities by Sport Family

Sport Family	Physical Abilities							Motor Abilities	
	Speed	Speed Endurance	Aerobic Stamina	Maximum Strength	Speed Strength	Strength Endurance	Flexibility	Coordination	Balance
Combat Sports Judo and Karate Boxing Wrestling	High	Moderate	Moderate	High (relative to body weight)	Very high	Very high	Very high	Very high	Very high
Artistic Sports Figure Skating *#Gymnastics Synchronized Swimming *#Diving	Moderate *High	Moderate #Low	Moderate #Low	High (relative to body weight)	High to very high	High #Low	Very high	Very high	Very high
Single Action Sports Throws #Jumps #Weight lifting *Baseball/Softball	High *Very high	Low to moderate *High	Low	Very high (# relative to body weight)	Very high	Moderate *High (pitcher)	Very high	Very high	Very high
Precision Sports *Curling Shooting #Archery Bowling Golf	Low *Moderate	Low *Moderate	Low	Moderate #High	Low to moderate	Moderate #High	Moderate	High	High
Racket Sports Tennis and Squash Racquetball Badminton Table Tennis	High	Moderate to high	Moderate	Moderate	Very high	High	Very high	Very high	Very high
Team Sports Soccer Ice Hockey Basketball Lacrosse Volleyball	High	High *Moderate	Moderate	Moderate *High	High	Moderate	Moderate	Very high	High to very high
Cyclical Sports **Long Duration** Speed Skating Running Cross Country Skiing Distance Swimming Road Cycling	Moderate	High	Very high	Moderate	Moderate	High	Moderate	Moderate *High	Moderate *High

Importance of Physical and Motor Abilities by Sport Family

Sport Family	Physical Abilities							Motor Abilities	
	Speed	Speed Endurance	Aerobic Stamina	Maximum Strength	Speed Strength	Strength Endurance	Flexibility	Coordination	Balance
Cyclical Sports **Medium Duration** *Speed Skating 1.5-5 km *Speed Skating short track Track Cycling 3-5 km Swimming 400-800 m Rowing Running 800-3000 m	Moderate *High	High to very high	High	Moderate to high	Moderate	High to very high	Moderate	Moderate *High	Moderate *High
Cyclical Sports **Short Duration** *Speed Skating <1 km *Speed Skating short track Track cycling <2 km Swimming 100 m Running 400 m	Very high	Very high	Moderate	High to very high	High to very high	High	Very high	Very high	High *Very high
Alpine Skiing	Moderate to high	High	Moderate	High	Very high	Very high	High	Very high	Very high
Bobsleigh	Very high	Moderate	Low	Very high	Very high	Moderate	High	Very high	Very high
Fencing	Very high	High	Moderate	Moderate	Very high	High	Very high	Very high	Very high
Luge	Very high	Moderate	Low	High	Very high	High	Moderate	High	Very high
Parachuting	Moderate	Moderate	Moderate	Moderate	Moderate	High	Very high	Very high	Moderate
Water Skiing	Moderate to high	Moderate	Moderate	Moderate	High	High	High	Very high	Very high
Yachting	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	High	High

Note: This information is presented as general guidelines only; the importance of a given athletic ability may vary according to the discipline, actual level of performance, selected tactics, etc.

Activities For Developing Speed

- Activities must be dynamic (i.e. 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 (i.e. approximately 5-8 seconds).
- Rest between repetitions has to be long enough to allow for sufficient recovery; this will enable the participant/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 participant/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 due to fatigue. It is a good idea to divide the repetitions into sets (e.g. 2 sets of 5 repetitions each).
- To avoid injury, participants/athletes should be well warmed up.
- Activities aimed at improving speed should be scheduled at the beginning of the main part of the practice session, when participants/athletes are not yet tired.

Activities For Developing Speed-Endurance

Note: the systematic development of speed-endurance is not recommended before puberty.

- Activities used should be dynamic (i.e. 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 it is possible to sustain the effort between 10 to 45-60 seconds without any significant drop in intensity. For short efforts (e.g.: 10-20 sec.), the controlled speed should be close to maximum speed; conversely, if the effort is longer (e.g.: 20 sec. and more), speed will have to decrease.
- Rest between repetitions has to be long enough to allow for sufficient recovery; this will enable the participant/athlete to perform other repetitions at a high speed. Rest intervals can be as many as 5-8 times longer than work periods (e.g. 20 sec. effort followed by 2 min. 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 (ex. 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 sec. with longer active recovery periods at a much lower intensity.

- To avoid injuries, participants/athletes should be well warmed-up before engaging in intense efforts.

- Activities to develop endurance-speed should take place when the participants/athletes are not yet tired.

Activities For Developing Aerobic Stamina

- The effort should be dynamic and it should involve large muscle masses (e.g. 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 participants/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 participant/athlete age.

- The same intensity or speed of execution may not be suitable for every participant/athlete; it is important to recognize that work intensity may have to be individualized.

- The activity or exercise can be continuous (i.e. without any rest periods) or intermittent (alternating periods of work and recovery).

- Fatigue may occur in the case of low to moderate intensity efforts (e.g. 30 minutes of cycling; 20 minutes of running) due to 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" efforts usually allows the participants/athletes to maintain a relatively high intensity without causing too much fatigue.

- The same principles can apply to team sports, where participants/athletes are asked to play nonstop in a limited area for 5 to 10 minutes; in this type of activity, all the participants/athletes must be moving at all times. Instructors should have extra balls, pucks, etc. on hand in order to keep the level of activity high and to minimize recovery periods during the activity when control implement is lost.

Activities For Developing Coordination

- 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 coordination is primarily determined 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 is sufficient).

- The actions or movements can be general in nature, or specific to the sport, depending upon 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 participant/athlete is asked to attempt a more complex sequence of actions. For instance, if the participants/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), more advanced coordination activities should not be attempted.

- 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; coordination 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 which require participants/athletes to perform movements in various directions and/or use their "weaker" side.

- An activity can be made more challenging by (1) increasing the speed of execution, (2) adding new movements, (3) modifying the order in which the movements must be performed, (4) combining various already mastered but performing them in an unusual manner (e.g. dribbling the ball while squatting; running in the snow, sand or water), (5) adding restrictions (e.g. less time; less space; increased accuracy; unstable environment), or (6) adding uncertainty (e.g. performing the action with eyes shut); these variations have to be presented gradually, and only after the basic sequence of actions is mastered.

- It is preferable to repeat the movement sequences more frequently for less time, rather than less frequently for more time; in other words, learning will tend to be more effective if you have two 5 minute motor sequences four times a week rather than if you have one 40 minute practice session once a week.

Activities For Developing Balance

- Although their primary focus is slightly different, some coordination or general motor development activities may also contribute to the development of balance.

- In general, to develop balance it is necessary to create 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), and are asked to maintain it for a specified period of time.

- It is also possible to develop balance by having participants/athletes perform normal movements in unusual conditions, for instance walking backwards, 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); hopping on one foot, on the spot, forward, backward, etc. However, it is important to avoid excessively difficult situations that

could cause falls or injuries.

- The use of large exercise balls (aka stability balls) can also present interesting motor challenges, and can help develop balance. By using such balls, simple everyday activities such as sitting, standing, or trying to maintain a horizontal body position become 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, the participant must lower his or her 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 given the nature of the sport (for instance by putting one hand on the ground), and ensure the weight is evenly distributed on each contact point.

Activities 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 in Instruction Beginners Reference Material.

- 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, and until a slight tension is felt. Once the muscle is slightly stretched and relaxed, the participant/athlete must hold the position for 20 to 40 seconds.

- The participant/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 conducive to performing flexibility exercises because (1) muscles are normally adequately warmed-up at that point, and (2) flexibility does not involve intense effort. While participants/athletes are stretching, the instructor can gather feedback concerning the practice session, and can provide his/her feedback or information as required.

Activities 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 the activity itself: In addition, certain guidelines must be followed in order to avoid injuries, particularly in children and beginners.

In most sports, development of maximum strength is difficult to achieve through the sport or the activity itself. In addition, certain guidelines must be followed in order to avoid injuries, particularly in children and

beginners.

Specific strength development methods, as well as particular safety measures that must be considered and implemented, will be covered in other NCCP workshops. The following considerations are provided for guidance, and are aimed at young participants/athletes getting started in strength training.

- In general, exercises involve localized muscle masses. In most of these exercises, the resistance is provided by the body weight of the participant/athlete or by relatively light weights.

- It is recommended to avoid heavy loads, and to ensure that the participant can 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; participants must end the exercise when the quality of execution starts to deteriorate.

- It is possible to use jumping and/or hopping exercises; the speed of execution, and consequently of muscle contraction, is higher, and therefore these exercises will 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, muscles in front and in back of body segments, and muscles on both right and left sides.

Activities For Developing Tactics

- The activity should imitate competitive or real-play situations at the performance level of participants/athletes.

- Participants/athletes must have a clear understanding of the desired objective for the situation/activity (e.g. quick transition in order to outnumber the opponent; surprise an opponent in order to gain an advantage in a particular situation).

- The situation should involve some degree uncertainty, and should present a number of options for the participants/athletes. Avoid stereotypical and predictable situations wherein the participants/athletes do not have to think or focus.

- Participants/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 participants/athletes have a clear understanding of the intent of the activity, the pace can be somewhat slower.

- Take time to question the participants/athletes about their choices or decision-making process in order to help them discover the various options they had in the situation presented to them; this approach requires the participants/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 take an advantage over the opponent in this situation? Why?
- What can you do to hide your intentions to the opponent as long as possible?
- What can actions can you take to make the opponent uncertain about what you want to do, or about where and when you will do it?

What to Emphasize or to Avoid at Various Ages: General Training Recommendations Based on Growth and Development Guidelines

The table on the following page outlines the athletic abilities that should be emphasized or avoided at various ages for male and female athletes. In this table, the following legend is used:

Females (F) Males (M)

	Training of this quality to be avoided at this age
	Training of this quality can be done at this age, but should not be considered a priority
	Training of this quality can be done with moderation at this age
	Training of this quality is optimal at this age
	Training of this quality should be done in function of the needs of the sport at this age

Important Notes to Instructors:

1. The recommendations contained in the following table represent the opinion of experts in the fields of growth and development and training; as such, they apply to most sports. However, for some sports in which athletes specialize at a very young age, such as gymnastics, some of these recommendations may seem to differ from certain training approaches commonly used. If this is the case, we invite instructors to: (1) exercise judgment both in the interpretation of the present guidelines and in the implementation of sport-specific training methods; and (2) consult with recognized experts where necessary in order to ensure that the training activities performed by the athletes are appropriate, safe, and adapted to their physical maturity.

2. At the same chronological age (i.e. 12 years of age), there can be a significant degree of variability in the physical maturation level of kids. When referring to the guidelines outlined in the following table, it would not be unusual to have situations where some athletes are ahead of, or behind the general training guidelines by 2 or more years.

Training of Athletic Abilities and Participants' Age: Guidelines

Athletic Ability		Age (in years)														
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aerobic Stamina (short efforts 10-15 min)	F									☺	☺	☺	☺			
	M										☺	☺	☺			
Aerobic Stamina (prolonged efforts)	F	☹	☹	☹	☹	☹	☹						☺	☺	☺	
	M	☹	☹	☹	☹	☹	☹	☹					☺	☺	☺	
Speed-Endurance	F	☹	☹	☹	☹	☹										
	M	☹	☹	☹	☹	☹										
Strength-Endurance	F	☹	☹	☹							☺	☺	☺	☺		
	M	☹	☹	☹							☺	☺	☺	☺	☺	
Maximum Strength	F	☹	☹	☹	☹	☹	☹	☹	☹	☹			☺	☺	☺	
	M	☹	☹	☹	☹	☹	☹	☹	☹	☹				☺	☺	
Speed-Strength (power)	F	☹	☹	☹	☹	☹	☹	☹	☹			☺	☺	☺		
	M	☹	☹	☹	☹	☹	☹	☹	☹	☹			☺	☺	☺	
Flexibility	F							☺	☺	☺	☺	☺	☺			
	M								☺	☺	☺	☺	☺	☺	☺	
Speed (efforts of 8 seconds or less)	F									☺	☺	☺	☺			
	M										☺	☺	☺	☺		
Speed (fast cadence of movement)	F	☺	☺	☺	☺	☺	☺	☺								
	M	☺	☺	☺	☺	☺	☺	☺								
Coordination Agility Balance	F	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺					
	M	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺				
Basic Techniques	F			☺	☺	☺	☺	☺	☺							
	M			☺	☺	☺	☺	☺	☺	☺						
More Advanced Techniques	F									☺	☺	☺	☺			
	M										☺	☺				
Tactics	F	☹	☹	☹												
	M	☹	☹	☹												

☹ should be avoided ☺ optimal training age not a priority in moderation as needed by the sport

Sample Programs for Different Sport Families

General Remarks

The following pages provide examples of sport programs intended for different families of sports, and designed for athletes involved in the "Introduction to Competition" context.
Specific examples are proposed for the following sport groupings:

- Team sports
- Individual endurance sports
- Single action/speed and power sports
- Combat sports
- Racket sports
- Technical-artistic sports
- Target-precision sports

Athletic Abilities Considered In Each Example

In each figure, the most important athletic abilities for the sport family are listed vertically. The importance given to the training of each athletic ability for a particular week of the program as well as the training objectives are indicated by a code consisting of lines and colors. This information outlines the desired progression throughout the program; it can also provide some direction as to the best training methods to use in a given week. The athletic abilities considered in the sample programs were previously defined in the "Planning a Practice" module. Some terms specific to a family of sports have been added in some instances, but those are fairly simple and should be easily understood by instructors of these types of sports. Where appropriate, the following abbreviations were also used:

Technical/ Elements

- Basic techniques = Activities related to the sport's fundamental techniques
- Var. basic tech. = Activities related to variations of the sport's basic techniques

Tactical Elements and Decision-Making

- Ind./Team tact. = Individual and team tactics. That is, the acquisition of knowledge linked to the sport's fundamental tactics in terms of intentions, cues to consider, basic plays, and specific roles of the athletes in their execution.
- Game plan = Execution of specific directions during a competition

Motor Abilities

- Motor abilities = Activities related to the athletic abilities of coordination, agility and balance

Physical Condition Elements

- Aerobic cond. = Activities requiring aerobic stamina or maximum aerobic power
- Speed-end. = Activities requiring speed-endurance

Importance Given to the Training of Athletic Abilities

For each week of the program, the importance given to the training of a specific athletic ability is indicated by the thickness of a band:

- Thin band = not very important
- Medium-thickness band = moderately important
- Thick band = very important

Training Objectives

The intention and training objective for a specific athletic ability are indicated using the following colors: black, grey, and light grey.

Depending on the athletic ability the following code was used:

Technical and Tactical Elements:

- Black = introduction and acquisition
- Grey = consolidation
- Light grey = refinement

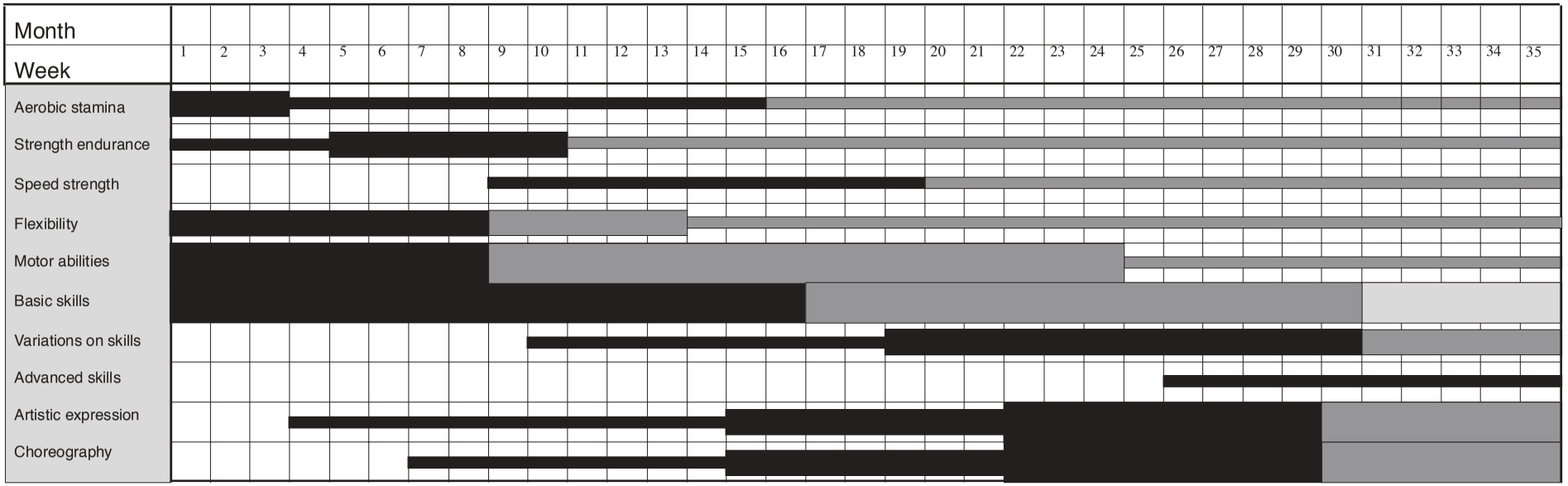
Physical Condition Elements (aerobic stamina, speed, speed-endurance, strength, strength-endurance, speed-strength, flexibility) and Motor Abilities (coordination, balance, agility):

- Black = development
- Grey = maintenance

Examples

1. *A thick black band for "basic techniques" means that activities that contribute to acquiring basic technical elements should be included, and that a large proportion of the available time should be devoted to this type of training.*
2. *A thin, light grey band for "var. bas. tech. It means that activities that contribute to refining variations of basic technical elements should be included, but that only a small proportion of the available time should be devoted to this type of training.*
3. *A thick black band for "aerobic cond." means that activities that contribute to developing aerobic stamina should be included, and that a large proportion of the available time should be devoted to this type of training.*

Example — Introduction to Competition — Artistic Sports

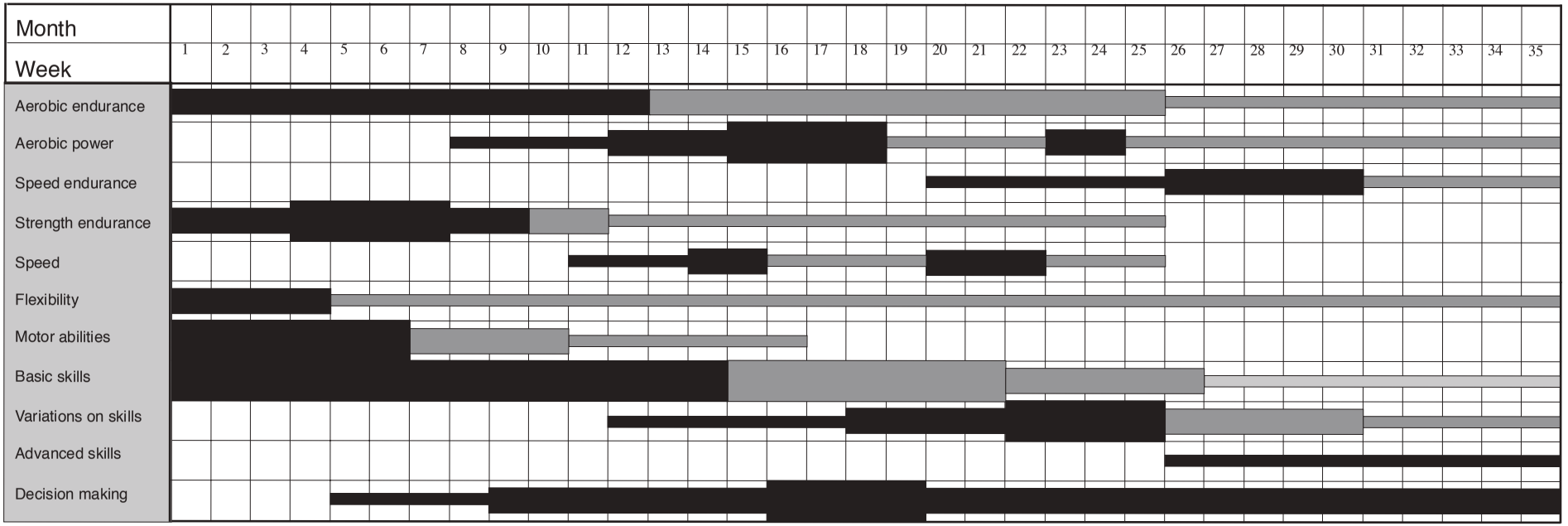


The training emphasis given to a specific athletic ability is shown by the thickness of the band.

The training objective for a specific athletic ability is shown by a color code.

black	dark grey	light grey
Acquisition (technical or tactical elements) or **development** (physical or motor abilities)	**Consolidation** (technical or tactical elements) or **maintenance** (physical or motor abilities)	**Refinement** (technical or tactical elements)

Example — Introduction to Competition — Endurance Sports

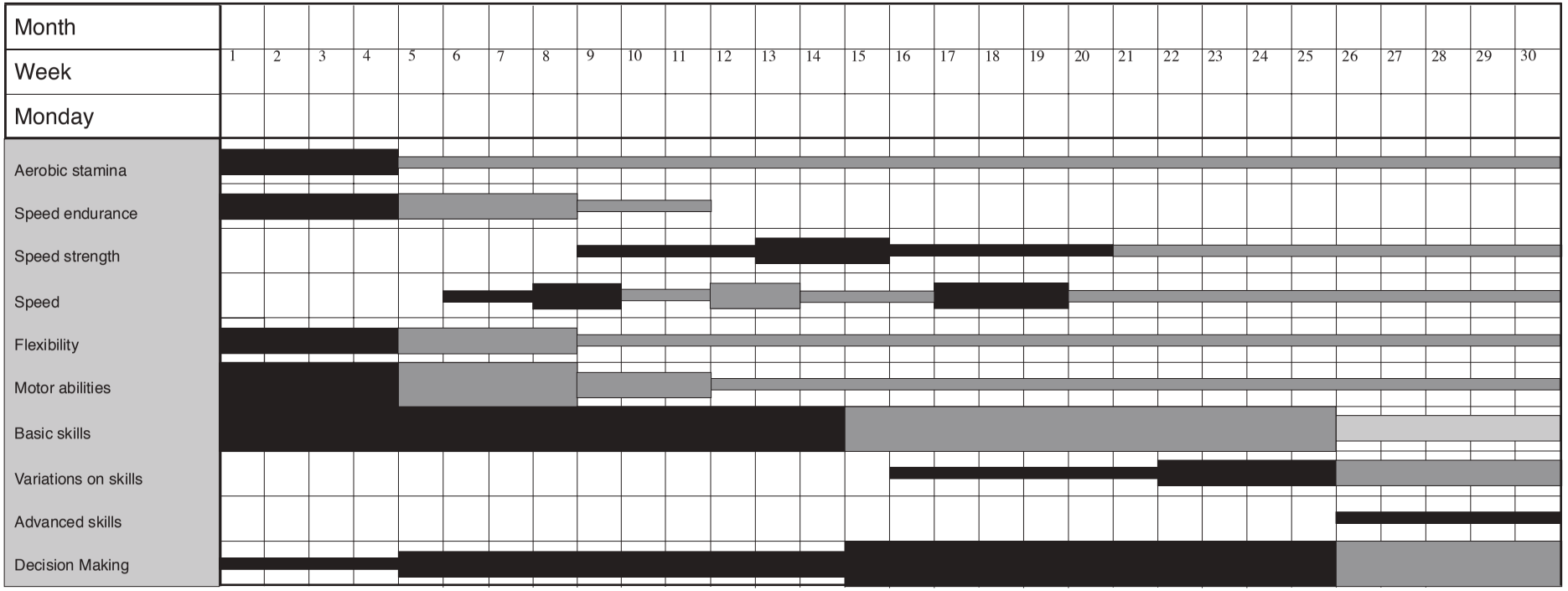


The training emphasis given to a specific athletic ability is shown by the thickness of the band.

The training objective for a specific athletic ability is shown by a color code.

black	dark grey	light grey
Acquisition (technical or tactical elements) or **development** (physical or motor abilities)	**Consolidation** (technical or tactical elements) or **maintenance** (physical or motor abilities)	**Refinement** (technical or tactical elements)

Example — Introduction to Competition — Racket Sports

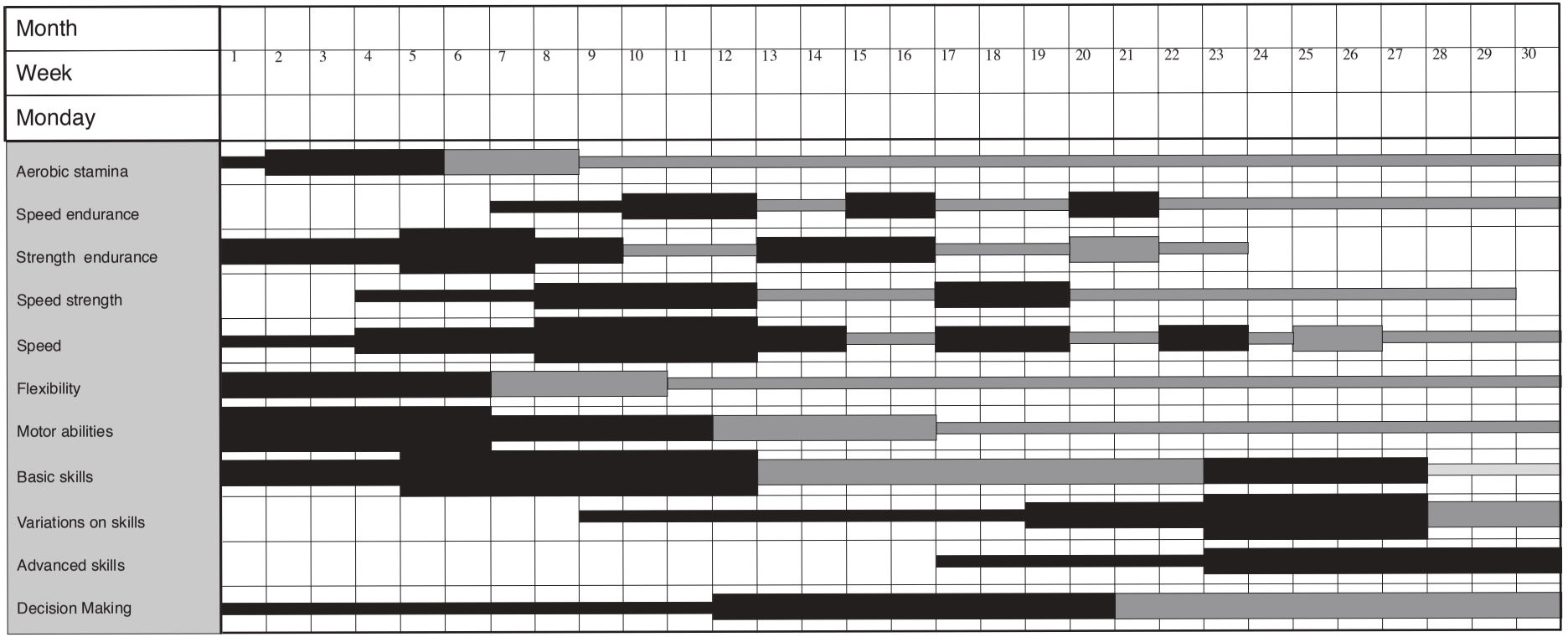


The training emphasis given to a specific athletic ability is shown by the thickness of the band.

The training objective for a specific athletic ability is shown by a color code.

black	dark grey	light grey
Acquisition (technical or tactical elements) or **development** (physical or motor abilities)	**Consolidation** (technical or tactical elements) or **maintenance** (physical or motor abilities)	**Refinement** (technical or tactical elements)

Example — Introduction to Competition — Speed–Power Sports

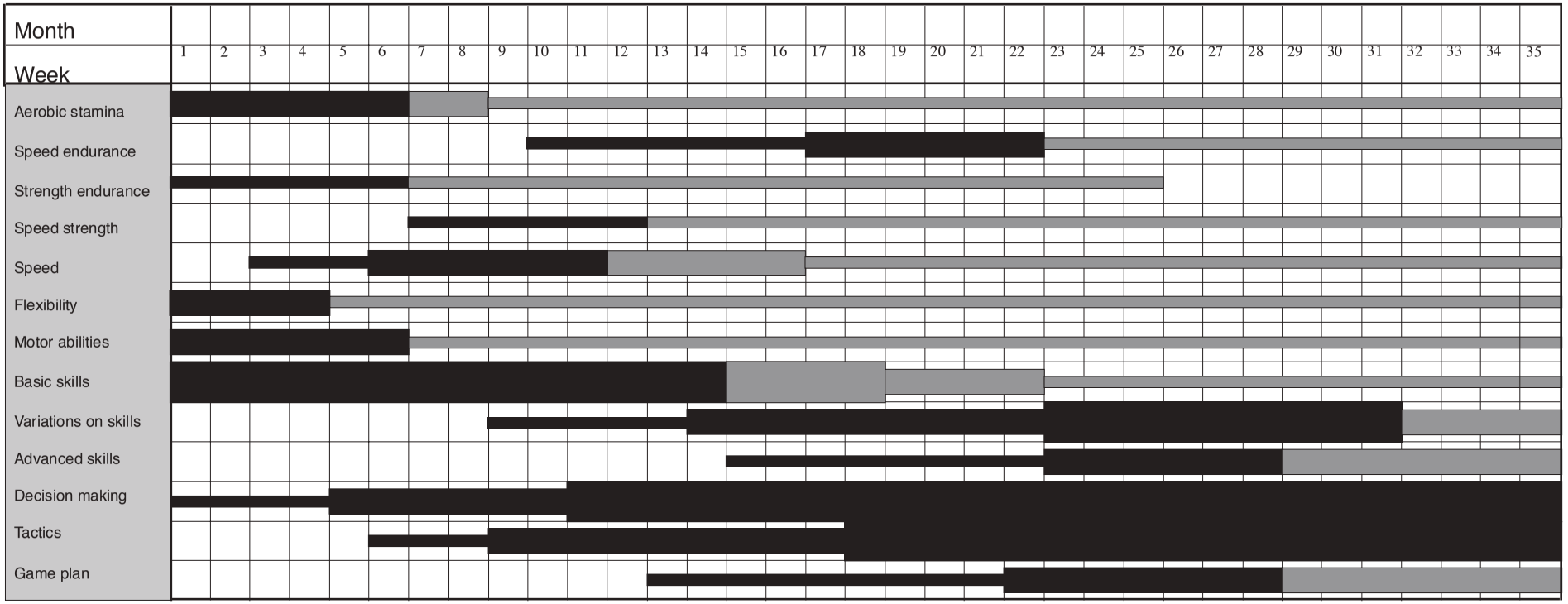


The training emphasis given to a specific athletic ability is shown by the thickness of the band.

The training objective for a specific athletic ability is shown by a color code.

black	dark grey	light grey
Acquisition (technical or tactical elements) or **development** (physical or motor abilities)	**Consolidation** (technical or tactical elements) or **maintenance** (physical or motor abilities)	**Refinement** (technical or tactical elements)

Example — Introduction to Competition — Team Sports

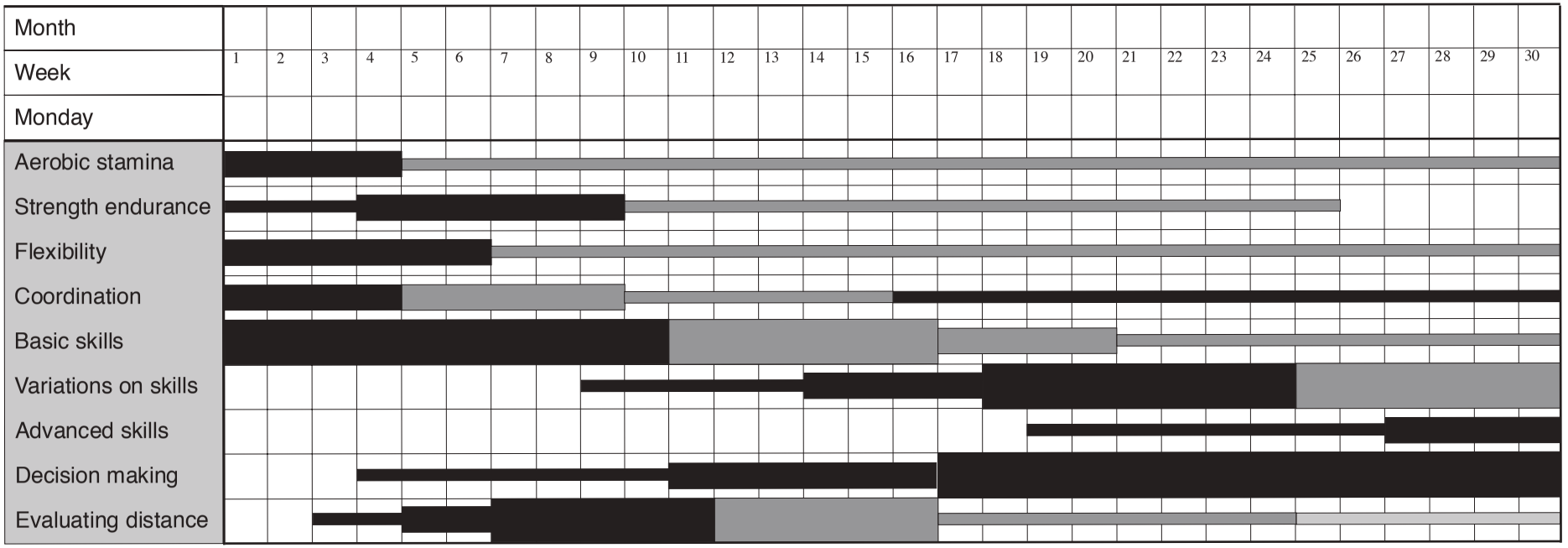


The training emphasis given to a specific athletic ability is shown by the thickness of the band.

The training objective for a specific athletic ability is shown by a color code.

black	dark grey	light grey
Acquisition (technical or tactical elements) or **development** (physical or motor abilities)	**Consolidation** (technical or tactical elements) or **maintenance** (physical or motor abilities)	**Refinement** (technical or tactical elements)

Example — Introduction to Competition — Precision Sports — Archery



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 color code.

black	dark grey	light grey
Acquisition (technical or tactical elements) or **development** (physical or motor abilities)	**Consolidation** (technical or tactical elements) or **maintenance** (physical or motor abilities)	**Refinement** (technical or tactical elements)

Types of Exercises and Their Use in Different Phases of the Program – Use in Section 4.5.5 of the Workbook

	Characteristics	Examples	Mostly used ...
General Exercises	No sport-specific elements; no elements encountered when performing movement in competition Set of exercises borrowed from various forms of physical activity or other sports	• Strength-training exercises for different parts of the body • Running in the woods • Rolling, bounding, etc.	Beginning of the preparation period
Specific Exercises	Some sport-specific elements, or certain parts of movements performed in competition		
for cyclical sports	Movements that recruit the same muscle groups used in the activity	• Strength-training exercises on a bicycle for a cyclist (e.g. using big gear on a hill) • Roller skiing for a cross-country skier	End of the preparation period and first half of competition period
for team, technical-artistic, combat, and racket sports; simple specific exercises	Sport-specific technical movement executed in a way that is consistent with the sport's rules. However, only one predetermined motor response is performed.	• A smash in volleyball where the ball is fed by the instructor • Execution of a throwing technique with a passive partner in judo	End of the preparation period and beginning of competition period
for team, technical-artistic, combat, and racket sports; complex specific exercises or serial skills	Execution of a variety of sport-specific movements in the right order, and at close to competition speed	• Execution of parts of a figure skating routine containing certain elements at the level of difficulty to be used in competition	End of the preparation period and beginning of competition period
Competition Exercises	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, equipment, etc.	• Training at target speeds based on competition intensity • Execution of whole routines at the level of difficulty of competition • Simulation of competition situations • Games, directed games, exhibition games	Second half of the competition period The weeks leading to important competitions

Activity Planning Guidelines for Various Stages of Skill Development
Use in Section 4.5.5 of the Workbook for Sport-Specific Technical and Tactical Elements

Recommended Practice Conditions	Stage of Skill Development			
	Initiation First contact	**Acquisition** Movement patterning	**Consolidation** Correct execution in	**Refinement** Minor improvements
Surrounding environment	Stable and predictable, free of distractions	Stable and predictable, free of distractions	Increased variability and distractions in the environment, but not to the point where movement patterns deteriorate	Competition conditions
Decision-making, or uncertainty of the situations in which athletes are involved	No decision-making or options to choose from	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
Speed of execution	Slow and controlled	At athlete's own pace	Increased, variable, and close to competitive demands	Similar conditions in competition
# of repetitions, or opportunities to execute the movements	As needed, depending on athlete's general motor development	High	High	As many as possible
Risk factor and consequence of error	Completely safe conditions, errors of no consequence	Low risk conditions	Less than or similar to what is encountered in regular competition	Similar to a high level of competition
During training, the emphasis should be on...	Basic stances and positions; getting the idea of what the movements look and feel like	Global execution and general form of the movement	Maintaining the form of movements 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 – Use in Section 4.5.6 of the Workbook

Category ability or element of sport form	Training objectives sought	# of weeks required to obtain a significant improvement if appropriate methods are used at the right frequency	Training frequency suggested to achieve the objective (times/week)	Training time during a session given the objective sought (in minutes)	
				Minimum	Up to:
Technique	Initiation	1-2; variable		30	60
	Acquisition	4-6	3 or +	30	60-90
	Consolidation	3-4	3 or +	20	60-90
	Refinement	Variable; most likely several months, or more	2 or + 2-3 or +	?? most likely at least 20-30	60-90
Tactics	Acquisition	4-6	2	20	45
	Consolidation	Variable; 3-4	2	20	45-60
	Decision-making	?? most likely several	2	??	??
Aerobic endurance	Development	6	2-3	20-30	60-75
	Maintenance	Not applicable	1	20-25	60-75
Aerobic Power	Development	6	2-3	20	55-60
	Maintenance	Not applicable	1	12-15	55-60
Speed	Development	4	2-3	15	45-50
	Maintenance	Not applicable	1	10	45-50
Speed endurance	Development	4	2-3	18-20	45-50
	Maintenance	Not applicable	1		45-50
Maximal strength	Development	It is not recommended to seek a systematic development of this athletic ability in young athletes			
	Maintenance				
Strength endurance	Development	4-5	2	10	30-35
	Maintenance	Not applicable	1	10	30-35
Speed strength	Development	4-5	2	5	12
	Maintenance	Not applicable	1	5	12
Flexibility	Development	3-5	2-3 or +	12-15	50-55
	Maintenance	Not applicable	1	5-8	50-55
Motor Abilities (balance, agility, coordination)	Development	?? most likely several	2-3 or +	?? most likely at least 10-15	?? most likely 20-45
	Maintenance	Not applicable	?? most likely at least one	?? most likely at least 10-15	?? most likely 20-45

Summary Table on Training Methods

Part B of this document contains more detailed guidelines and examples of training methods for developing and maintaining certain athletic abilities. These protocols are based on the general characteristics that activities should have in order to produce a training effect on a given athletic ability. These characteristics are outlined in the Reference Material of the "Planning a Practice" module.

Some of these protocols may not be appropriate for all sports, or may be difficult to implement as such in sports that take place in an environment which is: (1) unpredictable and unstable; or (2) requires efforts that are not easily controllable and quantifiable. For example, the protocols relating to speed or endurance are relatively easy to apply to cyclical sports like running, cycling, cross-country skiing, speed-skating, swimming, etc., but less so in the case of team sports, racket sports, technical/artistic sports or combat sports. However, for these sports, the protocols may still provide a useful point of reference to guide the implementation of sport-specific activities, particularly as far as the work/rest ratios, the number of repetitions, and even the required level of intensity are concerned.

Most scientific studies on training methods were based on research conducted on adult athletes, so the data have been somewhat modified to take into account the fact that the athletes you are instructing will be, for the most part, children or adolescents. Do not hesitate to adjust the number of sets or repetitions of activities if/when the athletes are not capable of respecting the guidelines or if workouts seem too easy.

For sports in which the importance of the athletic ability is "high": Use the highest weekly frequency proposed, and establish a progression that will enable the athlete to complete the maximum amount of work suggested for each session. It may take several weeks of training to achieve this.

For sports in which the importance of the athletic ability is "moderate": Use the lowest weekly frequency proposed as a starting point, and establish a progression that will still enable the athlete to complete the least amount of work suggested for each session. It may still require several weeks of training to achieve this. If there is enough time during the practices, try to do more work.

For sports in which the importance of the athletic ability is "low": It is possible that time restrictions may be such that you are not able to include this type of activity in your program; if this is the case, ensure that the athletes have the opportunity to participate in different forms of sport activity outside your program or during the off-season so that they can still do some work in this area in order to achieve a balanced athletic development.

Athletic Abilities that can be Combined in Training

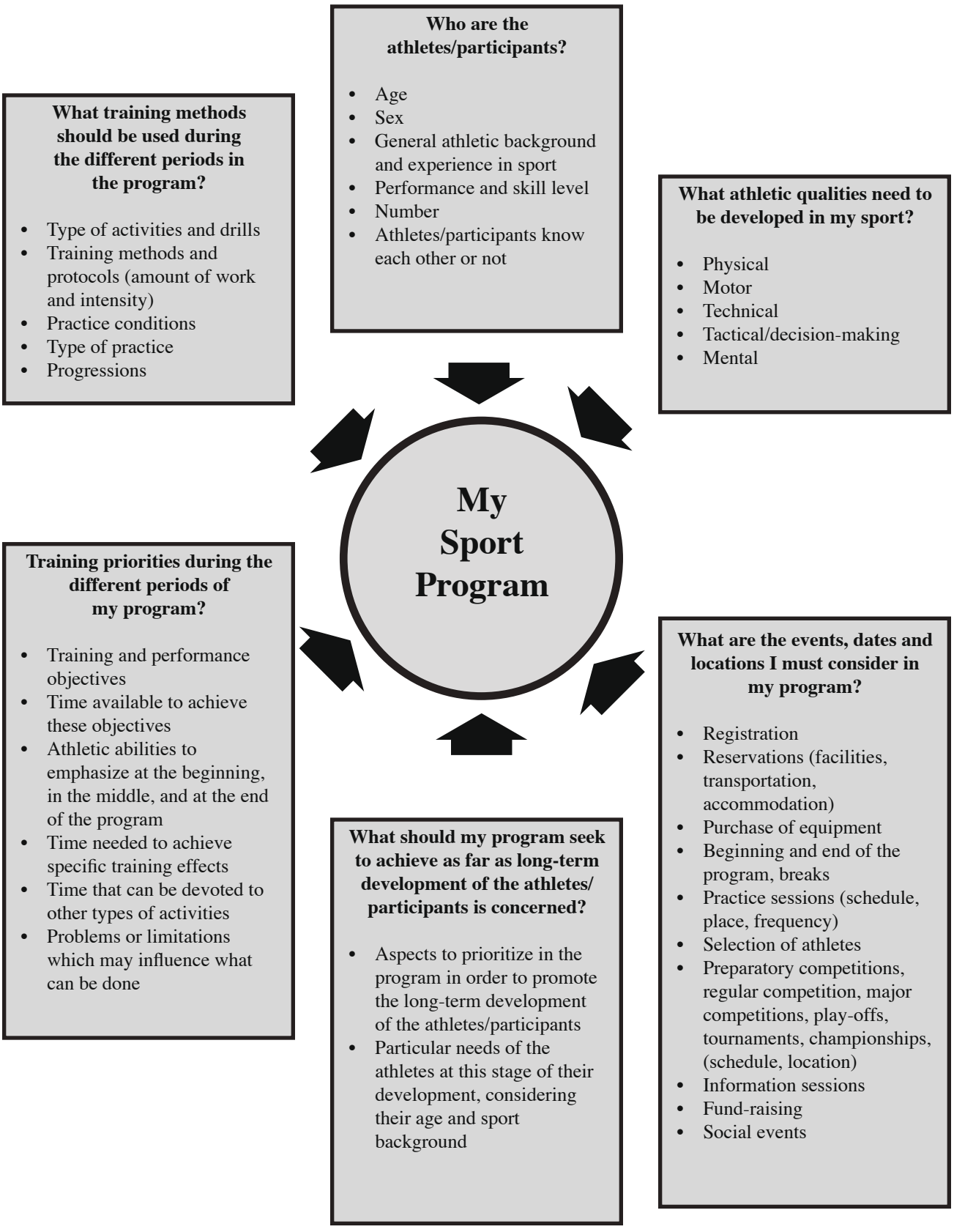
Use in Section 4.5.10 of the Workbook

In some cases, it is not possible to train the various athletic abilities separately because of a lack of time. In other cases, practicing the sport inevitably involves certain technical elements as well as one (or more) physical abilities; for example, swimming several lengths of the pool will enable some aerobic work to be carried out and also provides an opportunity to work on stroke technique. The following table outlines how some athletic abilities can be "combined" for training purposes, given the primary characteristics of the activity.

Athletic abilities that the instructor wants to train in priority	Athletic abilities that can be trained and/or maintained at the same time, providing the characteristics of the activity and the practice conditions are appropriate
Technical Elements	Some tactical elements and decision-making skills; aerobic endurance; aerobic power; speed; speed-endurance; strength-endurance; coordination; agility; balance
Tactical Elements – Decision-Making	Some sport-specific technical elements; speed; speed-endurance; strength-endurance; coordination; agility; balance
Aerobic Endurance* Aerobic Power	Some sport-specific technical elements; coordination; agility
Speed	Some sport-specific technical elements; some tactical and decision-making elements; coordination; agility
Speed-Endurance*	Some specific technical elements; some tactical and decision-making elements; coordination; agility
Strength-Speed*	Some sport-specific technical elements; some tactical and decision-making elements
Strength-Endurance*	Some sport-specific technical elements; some tactical and decision-making elements
Flexibility*	Some phases of technical execution
Coordination	Some sport-specific technical elements; some tactical and decision-making elements; speed; speed-endurance; agility
Agility	Some sport-specific technical elements; some tactical and decision-making elements; speed; speed-endurance; coordination
Balance	Some sport-specific technical elements

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

Major Categories of Questions to Consider When Putting Together a Sport Program



Knowing the general pattern according to which sport form evolves in the short-term allows us to divide a sport program or season into Periods whose main characteristics will:
(1) promote the progressive development of athletic abilities; and (2) prepare the athletes for the major competitions in which they will participate.

Period	Beginning	End
Preparation	First practice of the program	First "official" competition of the program
Competition	First "official" competition of the program	Last competition of the program
Transition	Last competition of the program	Last structured training activity of the program

To describe more precisely the major characteristics of a program, 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)

According to the sport, the phases of the competition period may be completely distinct, or there may be an overlap of regular and important competitions.

The Transition Period is generally not divided into smaller units.

Note: The main characteristics of each Period and Phase of a sport program, and the priorities and objectives of each in terms of training, are covered in a subsequent section of this document.

Types of Sport Programs

There are three main types of sport programs. They can be defined by the number of competition periods that occur every year, namely:
- sport programs based on a single periodisation;
- sport programs based on a double periodisation;
- sport programs based on a multiple periodisation.

As its name indicates, a sport program based on a single periodisation has only one competition period per year. This usually ends with one or a few major events, e.g., a league that has regular games in the fall and winter and playoffs in the spring, or regular competitions followed by a championship at the end of the season. A double periodisation is comprised of two distinct competition periods each year, e.g., a sport that has a "summer season" and a "winter season". Introduction to Competition uses a single periodisation.

Models of Long-Term Athlete Development
Training Requirements of Different Sports

In principle, sports can be classified as either "early specialization" or "late specialization" (Balyi and Hamilton 1999). Early specialization refers to the fact that some sports, such as gymnastics, rhythmic gymnastics, figure skating, diving, and table tennis require early sport-specific specialization in training.

Late specialization sports, such as athletics, combat sports, cycling, racquet sports, rowing, and all team sports require a generalized approach to early training. In these sports, the emphasis of training should be on the development of general, fundamental motor and technical/tactical skills. Reviewing the existing literature helped us to conclude that early specialization sports require a four-stage model, while late specialization sports require a five-stage model:

Early Specialization Model	**Late Specialization Model**
1. Training to Train	1. FUNdamental
2. Training to Compete	2. Training to Train
3. Training to Win	3. Training to Compete
4. Retirement/Retaining	4. Training to Win
	5. Retirement/Retaining

Since only a few sports can be categorized as early specialization sports, this article will focus on late specialization sports. Each early specialization sport should develop a sport-specific model; a generic model would lead to serious oversimplifications. The challenge for early specialization sports is either to combine the FUNdamental and Training to Train stages or to amalgamate them into a single stage, such as the Training to Train stage. For late specialization sports, specialization before age 10 is not recommended since it contributes to early burnout, dropout, and retirement from training and competition (Harsanyi 1985).

One of the most important periods of motor development for children is between the ages of 9 and 12 (Balyi and Hamilton 1995; Rushall 1998; Viru et al. 1998). During this time, children are developmentally ready to acquire the fundamental movement skills that are the cornerstones of all athletic development. These fundamental skills include running, throwing, jumping, hopping, and bounding—the ABC's of athletics. The introduction of the ABC's of athleticism (agility, balance, coordination, speed) during this period will lay the foundation of athletic excellence for later years.

Fundamental movement skills should be practiced and mastered before sport-specific skills are introduced. The development of these skills, using a positive and fun approach, will contribute significantly to future athletic achievements. Participation in a wide range of sports is also encouraged. This emphasis on motor development will produce athletes who have a better trainability for long-term sport-specific development. If the fundamental motor skill training is not developed between the ages of 9 and 12, skills cannot be recaptured at a later time (although carefully planned and implemented remedial programs can contribute to limited success).

THE FIVE-STAGE MODEL OF LATE SPECIALIZATION SPORTS

STAGE I—FUNdamentals™

Both males and females 6 to 10 years old: The FUNdamental stage is well structured and fun! The emphasis is on the overall development of the athlete's physical capacities, fundamental movement skills, and the ABC's of athleticism. Participation in as many sports as possible is encouraged. Speed, power, and endurance are developed using FUN games. Correct running, jumping, and throwing techniques are taught, using the ABC's of athletics.

Strength training during this stage should include exercises using the athlete's own body weight, medicine ball, and Swiss ball exercises. Athletes should be introduced to the simple rules and ethics of sports. No periodisation takes place, but all programs are structured and monitored. Activities revolve around the school year, and during summer and winter holidays multi-sport camps are recommended. If athletes and parents have a preferred sport, participation once or twice per week is recommended, but participation in other sports three or four times per week is essential for future excellence. If the athletes later decide to leave the competitive stream, the skills they have acquired during the FUNdamental stage will still benefit them when they engage in recreational activities, which will enhance their quality of life and health.

STAGE 2—TRAIN TO TRAIN™

Males 10 to 14 years old/females 10 to 13 years old: During the Training to Train stage, young athletes learn how to train and they also learn the basic skills of a specific sport. As well, they are introduced to the basic technical/tactical skills and ancillary capacities including warm-up and cool-down, stretching, hydration and nutrition, recovery and regeneration, mental preparation, taper and peak, integrated pre-competition routines, and post-competition recovery.

During competitions, athletes play to win and to do their best, but the major focus of training is on learning the basics as opposed to competing. Training and competition ratios are optimized because too many competitions waste valuable training time and conversely, not enough competition inhibits the practice of technical skills and learning how to cope with the physical and mental challenges presented during competition.

A 75 per cent training to 25 per cent competition ratio is recommended by experts during the Training to Train stage; however, these percentages vary according to sport and individual specific needs. Athletes undertaking this type of preparation will be better prepared for competition in both the short and long term than athletes who focus solely on winning. During this phase, athletes train in competitive situations daily in the form of practice matches or competitive games and drills.

The Training to Train stage addresses the critical or sensitive periods of physical and skill development. Athletes who miss this stage of training will never reach their full potential, regardless of remedial programs they may participate in. The reason why so many athletes plateau during the later stage of their careers is primarily because of an overemphasis on competition instead of on training during this important period in their athletic development.

STAGE 3—TRAIN TO COMPETE™

Males 14 to 18 years old/females 13 to 17 years old: This phase of development is introduced after the goals and objectives of the Training to Train stage have been achieved. The training to competition and competition-specific training ratio now changes to 50:50. Fifty per cent of training is devoted to the development of technical and tactical skills and fitness improvements, and fifty per cent is devoted to competition-specific training.

During the Training to Compete stage, high intensity individual and sport-specific training is provided to athletes year round. Athletes, who are now proficient at performing both basic and sport-specific skills, learn to perform these skills under a variety of competitive conditions during training. Special emphasis is placed on optimum preparation by modeling training and competition. Fitness programs, recovery programs, psychological preparation, and technical development are now individually tailored to a greater degree. This emphasis on individual preparation addresses each athlete's individual strength and weaknesses.

STAGE 4—TRAINING TO WIN™

Males 18 years and older/females 17 years and older: This is the final stage of athletic preparation. All of the athlete's physical, technical, tactical, mental, and ancillary capacities are now fully established and the focus of training has shifted to the optimization of performance. Athletes are trained to peak for major competitions. Training is characterized by high intensity and relatively high volume. Frequent "prophylactic" breaks help to prevent physical and mental burnouts. Training to competition ratio in this stage is 25:75; the 75 per cent competition ratio includes competition-specific training.

STAGE 5—THE RETIREMENT RETRAINING

This stage refers to the activities performed after an athlete has retired from competition permanently. During this final stage, ex-athletes move into sport-related careers that may include instructing, officiating, sport administration, small business enterprises, masters' competition, and the media.

General Recommendations for Sport Programs for Young Participants/Athletes: Introduction to Competition

Context

- The participants/athletes are most often children or young adolescents.
- Their participation in sport is seasonal.
- Wide range in participants' experience in sport and in their levels of performance.

General Recommendations

- Participants must be encouraged to try various sports activities.
- Emphasis must be put on basic athletic development, and participants must be as actively engaged as possible during practices. Primary training objectives include basic motor abilities (agility, balance, coordination), speed, general physical conditioning, and the acquisition and development of basic technical skills. In some instances, it is possible to do some work in the area of acquisition of more complex techniques.
- Some strength training can be done (avoiding heavy weights), as well as training for the athletic abilities that require significant energy production from the muscles (without, however, putting too much emphasis on the development of "speed-endurance").
- Athletes should not be subjected to a "mechanical" approach to their sport involving high numbers of repetitions in an artificial context.
- As participants are now able to concentrate better, it is possible to focus on more specific and more complex tasks in practices. Instructions can also be more complex.
- Development of tactical and decision-making skills can begin.
- In sports involving late specialization, participants may begin to specialize in a particular discipline or position at around 13-14 years.
- Participation in competition becomes more serious, but there should not be too much pressure on participants; competitive experience must be fun and the level of competition adapted to the athlete's capabilities.
- Time devoted to general training and the development of basic athletic abilities must be greater than time spent doing specialized training and preparing for competition.

Challenges in Developing or Managing Seasonal Sport Programs

Logistical Constraints

Helping your athletes/participants to progress in sport and to develop fully as a person is an essential part of your sport program. This progression will be largely influenced by the length of your program and by the training and competition opportunities that will be available; however, other factors may also come into play and may have a significant impact on the type of program you can put together, for instance the human and financial resources available, access to equipment and facilities, etc.

Developmental Needs and Interests of Participants

Your program must be adapted to the needs and interests of the athletes/participants.
Generally speaking, in a sport program, these athletes/participants:

- Are at a particular point in the long-term development process required by your sport. The time they spend in your program must therefore help them progress toward subsequent stages, taking into account their current level of performance.

- Do not all have the same experience, the same background in sports, or the same performance capability; consequently, you may often have to work with people with specific needs. In addition to activities intended for most of the group, you will undoubtedly have to adapt some activities to particular members of your group.

- Can be at very different stages of physical or cognitive development, and/or display highly variable levels of maturity, even if they are the same chronological age. Once again, needs can vary considerably from one participant to another.

- Do not all have the same objectives or motivation with regard to their involvement. You must take this fact into account and propose varied activities that will keep everyone interested.

Establishing Favorable Conditions For Athletic Development

As far as athletic and skill development are concerned, the main challenges when developing a sport program are 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 athletes.

- Establish realistic objectives for sport form development and competition performance given: the sport's requirements, the participants' age and athletic experience, and the available practice/training time.

- Set up training opportunities that provide an adequate and gradual preparation before competition begins. Indeed, in several sport programs for beginning athletes in Canada, the general preparation phase (GPP) and the specific preparation phase (SPP) are often drastically shortened (even omitted or bypassed). This is a particularly glaring problem in many team sports where athletes begin to compete very early on in the program.

- Sequence training priorities over the length of the program so that there is a logical progression and the athletes reach a suitable level of sport 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 program's main development objectives.

- Recognize the time required to develop various athletic abilities as well as the amount and frequency of training required to make significant improvements.

Common Issues Encountered In Sport Programs	Possible Solutions to Consider
Program or season is too short for the athletes to develop	• Encourage the athletes to participate in sports that have similar requirements and in others that will help them develop other types of skills. • Register the athletes in sport schools or camps so that they can continue to develop and thereby avoid losing too much of their sport form.
Preparation period is too short	• Lengthen the preparation period, i.e. start training earlier before the first regular competitions. • Consider certain competitions at the beginning of the calendar as being a continuation of the preparation period. Consequently, do not attach too much importance to early season results.
Insufficient competition opportunities	• Include competition exercises or simulate competitions in training • Organize friendly or exhibition competitions.
Practices too short	• General warm-up is done before gaining access to the facilities. • Practise motor-ability development (agility, coordination, balance, etc.) or the basic physical conditioning elements (flexibility, endurance, strength) outside of the practices so as to devote as much of the available time as possible to the specific sport activity. • Use all possible means to maximize active engagement during practices. • Create workshops or stations that allow a greater number of athletes to be active at the same time.
Insufficient training and preparation opportunities to enable athletic development in the sport or discipline	• Lengthen the preparation period, i.e. start training earlier before the first regular competitions. • Consider certain competitions at the beginning of the calendar as being a continuation of the preparation period. Consequently, do not attach too much importance to early season results. • Increase training frequency between competitions if possible. • Provide the athletes with programs and activities that can be done individually between practices to maximize the time spent on particularly important elements during practices at which you are present.
Insufficient training opportunities between competitions	• Avoid having practice content being dictated solely by the performance at the last competition or by preparation for the next competition. Rather, make sure that content is in keeping with a long-term view (blocks of weeks, or season). • Provide the athletes with programs and activities that can be done individually between practices to maximize the time spent on particularly important elements during practices at which you are present.
Season too long for athletes of that age; too many competitions in the program; too many "important" competitions in the program	• Talk with the other instructors and administrators in charge of the competition network to adjust the length of the program and the number of competitions. • Consider not taking part in certain competitions when possible. • Increase the number of athletes and rotate participation in competitions. • Give rest to certain athletes by not registering them in some competitions or by withdrawing them; this also gives other athletes the chance to gain competitive experience.

Common Issues Encountered In Sport Programs	Possible Solutions to Consider
Season too long for athletes of that age	• Consider certain competitions at the beginning of the calendar as being a continuation of the preparation period. Consequently, give less importance to early season results (e.g., fewer points for a win before a given date). • Prioritize competitions and choose those that allow athletes to progress towards the next stage of their long-term development process.
Practices too long	• Shorten practice duration and increase frequency of practices. • Incorporate frequent breaks during training and plan for fun games or activities if practice time is restricted to a few very long sessions.
Too many practices; frequency of practices too high	• Alternate hard and easy training days during the week to avoid too much fatigue. • Plan for a day off after 2 or 3 training days. • Plan for a day off or a very easy day the day following a competition if athletes are exhausted. • Avoid planning a hard training session the day before a competition.
Selection dates too early in the program; insufficient preparation opportunities for athletes before selections	• Do not conduct selection camps that result in the elimination or exclusion of athletes. • Delay selection dates. • Create different training groups within the same club or team. • Provide other opportunities later in the season for non-selected athletes.
Selection criteria based on current ability in the sport and not on athletic potential; elimination effect resulting from the selection process	• Evaluate the athletes on their ability to apply those elements seen in practices to competition situations rather than on their performance. • Do not conduct trials that result in the elimination or exclusion of athletes. • Create different training groups within the same club or team. • Provide other opportunities later in the season for non-selected athletes.
Too much emphasis placed on winning or short-term performance to the detriment of the athletes' long-term development	• Evaluate the athletes on their ability to apply those elements seen in practices to competition situations rather than on their performance. • Redefine the program's objectives if too much emphasis seems to be placed on competition results.
Athletes begin to specialize too soon	• Specialization should not be envisaged as long as the basic skills that are essential to the sport have not been mastered.
Shortcomings of many athletes' motor abilities	• Plan for activities intended to train the motor abilities (agility, coordination, balance, etc.) that athletes can practise in their free time. • Use all possible means to maximize active engagement during practices and create activities that call upon the motor abilities.

Types Of Objectives Within A Sport Program

The table below lists certain categories of objectives that an instructor can try to achieve in a sport program. Bear in mind that several objectives can be associated with the same project or activity. For example, athletes can try to improve while having fun, or "experiment" while trying to do their best or to win.

Objectives	Comments
General	
Participate/take part **Gain experience** **Have fun**	• Take part in the event; the performance or result are not important. • Experiment with new things; the performance or result are not important. • Above all, make the experience enjoyable and pleasurable.
Athletic, Physical and Motor Abilities	
Develop/improve **Maintain**	• Try to raise the level of the athletic ability. • When a given athletic ability is considered to be sufficiently developed, maintain it at that level and keeping it from declining.
Technical Elements Specific to the Sport	
Acquire new skills **Correctly perform the skill** **Consolidate the skill** **Increase the success rate in skills execution**	• Learn how to correctly perform new movements and skills. • Try to make sure the movements are well-executed and that their form is correct. • While still maintaining good form in the movement, try to reach a high level of efficiency and/or precision under variable conditions, which are more difficult and unpredictable. • Try to reach a high level of efficiency and/or precision while still maintaining good form in the movement; here, the outcome of the action becomes important.
Tactical Elements Specific to the Sport	
Read a situation and react appropriately **Vary motor responses according to the situation**	• In a given situation, observe the right cues, analyze them, make a decision and carry out the appropriate motor response. • Try to increase the number of possible motor responses when faced with a given situation.
Performance	
Do one's best **Personal best** **Win** **Finish among the "n" first positions**	• Try to do as well as possible, whatever the outcome or result. • Try to do something better than before. • Try to win, to finish in first position. • Try to attain a particular ranking with respect to the other participants in the competition.

Main Characteristics of Periods and Phases of Seasonal Sport Programs for Young Athletes the Usual Objectives of These Periods and Phases, and Effective Instructing Methods

Period	Phase	Objectives and Priorities	Training Methods
Preparation	General preparation phase (GPP) Recommended Length: 6 to 8 weeks or more	• General development of physical, motor and mental athletic abilities. • Acquisition of new technical abilities and skills. • Consolidation of already acquired technical and tactical abilities. • Progressive increase in the quantity of work done during practices. • Improvement of the athletes' weak points. • Development of interpersonal bonds within the group. • Establishment of general objectives related to athletic development.	• Large proportion of general activities and exercises; small proportion of specific and competition activities and exercises. • Training and practice conditions fairly stable and predictable, or controlled by the instructor. • Average intensity lower than that of later phases.
	Specific preparation phase (SPP) Recommended length: 3 to 5 weeks or more	• Progressive development of physical conditioning adapted to the sport. • Specific development of the primary physical, motor, and mental athletic abilities required in the sport. • Improvement of the athletes' weak points. • Consolidation of already acquired technical and tactical abilities. • Acquisition of new tactical abilities and knowledge. • Progressive increase in the quantity of work done during practices. • Progressive increase in activity intensity so as to approach competition level intensity toward the end of this phase.	• Greater proportion of specific or competition exercises, decrease in the proportion of general activities and exercises. • More specific and less predictable training and practice conditions; conditions controlled by the instructor more frequent than random conditions.
	Pre-competition phase (PCP) Recommended length: 2 to 3 weeks or more	• Preparation of athletes for future competitions. • Maintenance of physical, motor, and mental athletic abilities of low or moderate importance in the sport. • Specific development of the primary physical, motor I and mental athletic abilities required in the sport. • Consolidation of already acquired technical and tactical abilities. • Increase in activity intensity so as to be at competition-level intensity toward the end. • Stabilization of the quantity of work done during practices • Identification of more specific performance objectives. • Stress management and emotional control when outcome is important. • Cooperation within the group. • First selection activities (if applicable).	• Large proportion of specific or competition exercises, and small proportion of general activities and exercises. • Specific training and practice conditions. • Conditions controlled by the instructor more frequent than random conditions. • Participation in a few preparatory and "nonofficial" competitions.

Main Characteristics of Periods and Phases of Seasonal Sport Programs for Young Athletes the Usual Objectives of These Periods and Phases, and Effective Instructing Methods

Period	Phase	Objectives and Priorities	Training Methods
Competition	Regular competition phase Length: variable	• Validation and confirmation of learning and progress made by athletes during training. • Achievement of performance goals. • Maintenance of the primary physical, motor, and mental athletic abilities required in the sport. • Consolidation of already acquired technical and tactical abilities; maintenance of recently acquired ones. • Stabilization or decrease of the quantity of work done during practices and maintenance of an intensity similar to that found in competition. • Stress management and emotional control when outcome is important. • Acquisition/implementation of game/combat/race plan. • Cooperation within the group. • Other selection events (if applicable).	• Very large proportion of specific or competition exercises, and very small proportion of general activities and exercises, unless the latter are required to correct certain persistent shortcomings. • Specific training and practice conditions similar to those of competition; conditions controlled by the instructor less frequent than random conditions. • Practice simulation of situations likely to be encountered in major competitions. • Use of specific competition situations or of less important competitions as “difficult practices” or as “tests” in which experiments are tried.
	Major competition phase	• Implementation of game/combat/race plan with the aim of achieving a performance in competition. • Achievement of performance goals when the stakes or competition level are higher. • Stress management and emotional control when outcome is very important. • Recovery from fatigue and stress due to participation in regular and major competitions. • Rather than trying to increase the length of practices, make sure that their frequency is maintained and the intensity remains high. • High success rate when performing actions in training; high cooperation within the group. • Final selections (if applicable).	• Very large proportion of specific exercises. • Random conditions more frequent than conditions controlled by the instructor. • Exercises and activities intended to refine preparation. • Insertion of frequent breaks in practices so as to avoid fatigue and maintain a high degree of intensity.
Transition	Length: variable 2 to 8 weeks	• Recovery and regeneration. • Healing of injuries sustained during the competition period. • Decrease in the length, frequency, and intensity of sport activities.	• Active rest. • Very large proportion of general activities and exercises. • Participation in activities other than organized competitive activities. • Participation in sports with different physical and motor requirements, with or without competition, without stress.

Types of Exercises and Drills and Their Proposed Use
Different Periods and Phases of a Sport Program

Introduction

Training exercises and drills are usually divided into three main categories:

1. General exercises
2. Specific exercises
3. Competition exercises

Each type of exercise or drill has its own characteristics that bring about particular training effects in terms of athletic abilities. The general characteristics of the main exercise categories are described below.

General Exercises

General exercises, or general physical preparation, have no elements that are specific to the sport or movement. They are a series of exercises borrowed from various forms of physical activity or other sports. General exercises serve above all as a general physical preparation for motor abilities. They can also be used when the athlete needs to do active physical or mental recovery, e.g., after a difficult competition or a series of particularly demanding practices.

Examples of general exercises are push-ups, sit-ups, skipping, hopping and bounding, rolls, swimming for gymnasts, badminton for cyclists, and so on.

Specific Exercises

Specific exercises contain elements of the sport as well as certain parts of movements performed in competition. Consequently, the muscle groups used in the sport are recruited so as to reproduce some of the demands of competition. This would include, for example, movements, execution speed, duration of effort, and/or objectives (precision, efficiency, consistency, etc.).

However, specific exercises are not necessarily carried out in conditions that are perfectly identical to those of competition, particularly as concerns the intensity, duration, and environment. For example, a sport-specific movement can be repeated several times at a lower than competition intensity, or by taking breaks that are shorter or longer than those of competition. The movements specific to a specific to a sport can also be performed in an artificial context, e.g., swim in a river rather than in a pool, run in the woods rather than on a track, practise with an object that is heavier or lighter than the one used in competition, carry out certain movements with no opposition or against reduced opposition as compared to competition situations, etc.

By definition, specific exercises contribute directly to the development of the physical conditioning essential to a sport.

In the case of team sports, technical effectiveness and specific physical preparation are closely related; consequently, this type of exercise is important to foster the acquisition of sport-specific skills. For example, vertical jump, which requires muscular power, is important to execute a smash in volleyball; vertical jumps imitating the smash therefore constitute a specific exercise even when there is no ball to hit.

Some specific exercises relevant to team, technical-artistic, combat, and racket sports are briefly described below.

Simple Specific Exercises

In simple exercises, the athlete performs a technical movement in keeping with the rules of the sport. However, the conditions are such that there is only one predetermined motor response to perform.

The exercises usually focus on a particular component of the movement or a precise technical element. Used especially during the introduction or acquisition stages of a new skill, simple specific exercises are used to acquire the mechanics of a movement. The athlete is put in artificial, easy, constant, and predictable conditions. He/she then learns the precise mechanics of the movement. The exercises require executing a large number of repetitions and a sub-maximal physical effort. Simple specific exercises can also contribute to reinforcing or maintaining a technical movement in keeping with competition demands.

Complex Specific Exercises or Serial Skills

Complex specific exercises or serial skills are exercises in which the athletes must successively execute several different movements in the correct order. The athletes know in advance the motor-ability task they must accomplish. When executing the exercises, the athletes try to perform each movement correctly. The purpose of the exercises is to ensure a smooth transition from one movement to another; the sequence of movements must therefore be the same as in competition. The speed of execution can be somewhat lower than that of competition, but it should progressively get closer to competition speed over time. These exercises contribute to the development of variants of basic skills, and foster the consolidation of technical movements.

Competition Exercises

Competition exercises (or simulated competition) are the most specific form of preparation there is for an athlete. They consist in executing movements or tasks in the same conditions as those that will be encountered in competition, and taking into account particular aspects such as rules, equipment used, environmental conditions (surface, lighting, temperature, time of day when the activities are performed, etc.). A cross-country skier who skis 10 km at race speed, volleyball players who make passes that finish with a smash at the net against defenders using unpredictable tactics, a gymnast who executes the elements of a routine in sequence and at competition speed, and a tennis player who practises volleys at the net after an exchange are examples of competition exercises.

Competition exercises lead to complex adaptations because they simultaneously bring into play physical, motor, technical, mental, and decisional elements. For this reason, they are important to the development and maintenance of sport form during the competition period. When the conditions created during training replicate the demands of competition, this type of exercise represents an effective way of preparing and stabilizing sport form for actual competitions. Moreover, this type of exercise can also be used to reinforce technical movements, foster tactical learning, or make very specific modifications to technique. In this case, the exercises can be done at a slightly lower than competition intensity.

Note: *When instructing young athletes, general and specific exercises should be used most of the time, instead of competition exercises. This is particularly true during the first weeks of a program.*

Certain competition exercises for team, technical-artistic, combat, and racket sports are briefly described below.

Simulated Competition Exercises

In this type of exercise, athletes are placed in competition-like conditions and must solve a problem. First of all, the conditions call upon the athletes' perceptual abilities (read and react). Secondly, in certain sports simulated competition exercises bring into play the concept of cooperation and synchronization with other partners against active opposition. In team sports, the conditions created by the instructor for this type of exercise may involve 2, 3, or 4 players who are engaged in a partial phase of the game. The practice usually focuses on running through the team's tactical combinations and tries to develop organization and cooperation among the players. To solve the problems encountered simulated competition exercises, the athletes must: (1) quickly analyze the situation by taking in the relevant information about the intentions (behavior) of the partners and opponents; (2) make a decision about the solutions to the problem; and (3) carry out the appropriate motor response. This last aspect requires the correct speed, all of this in a changing or dynamic situation. The objective of this type of exercise is to develop the athletes' self-reliance during the execution of various competition tasks. In the case of team sports, this type of exercise also fosters important phases of a game. Team members therefore try to:

- Take advantage of the team's strong points.
- Limit the effectiveness of their opponents' strong points.
- Take advantage of their opponents' weak points and shortcoming

Competition Exercises – Modified Game

These are competitive situations such as 2 against 2, 3 against 3, 4 against 4 on a smaller or normal playing field. Regular rules can be used, or the instructor can modify them if necessary (e.g., make at least three passes before shooting).

Competition Exercises - Directed Game

A directed game involves the whole team, with or without opponents, going through a partial phase of a game. The instructor's input is essential if tactical learning is to occur in this type of exercise. Two points are particularly important, namely: (1) the tactics practised must take into account the player' current physical and technical abilities, and be achievable in the immediate future; (2) the instructor must provide specific feedback regarding the aspects that require corrections, in order for the tactics to be acquired and mastered.

Inter-squad games during practices with specific directions being given to certain players in some situations is an example of a directed game. In fact, the game often unfolds along well-defined lines, and the instructor can intervene at any time to make corrections or changes.

Competition Exercises - Exhibition Game

An exhibition game takes place against a real opponent. It is used to verify the athletes' performance capability in terms of technique and tactics. It is also used to evaluate the athletes' attitude in stressful situations, to determine the skill of the competitors, and their ability to apply the game plan.

In team sports, the instructor can take advantage of the situation to experiment with combinations and substitution of players so as not to disrupt the team during major competitions. Exhibition games should fully respect real competition conditions.

Proportion of General, Specific, and Competition Exercises During the Different Phases

The proportion of general, specific, and competition exercises varies from one phase to the next in a sport program. A progression should occur throughout the program's phases to promote the development of sport form.

Recommendations regarding the relative proportions of general, specific, and competition exercises in the different phases of a sport program are outlined in some of the preceding tables and in the section entitled "Progression Parameters",

Applying Training Methods

The following pages contain guidelines and examples of training methods for developing and maintaining certain athletic abilities. These protocols are based on the general characteristics that activities should have to produce a training effect on a given athletic quality. These characteristics are outlined in the Reference Material for the "Planning a Practice" module.

Some of these protocols may not be appropriate for all sports, or may be difficult to implement as such in sports that take place in an environment that: (1) is unpredictable and unstable; or (2) requires efforts that are not easily controllable and quantifiable.

For example, the protocols relating to speed or endurance are relatively easy to apply to cyclical sports like running, cycling, cross-country skiing, speed-skating, swimming, etc., but less so in the case of team sports, racket sports, technical-artistic sports or combat sports. However, for these sports, the protocols may still provide a useful point of reference to guide the implementation of sport-specific activities, particularly as far as the work/rest ratios, the number of repetitions, and even the required level of intensity are concerned.

Most scientific studies on training methods were based on research conducted on adult athletes, so the data have been modified somewhat to take into account the fact that the athletes you are instructing will be, for the most part, children or adolescents. Do not hesitate to adjust the number of sets or repetitions of activities, if/when the athletes are not capable of respecting the guidelines or if workouts seem too easy.

For sports in which the importance of the athletic ability is "high": Use the highest weekly frequency proposed and establish a progression that will enable the athlete to complete the maximum amount of work suggested for each session. It may take several weeks of training to achieve this.

For sports in which the importance of the athletic ability is "moderate": Use the lowest weekly frequency proposed as a starting point, and establish a progression that will still enable the athlete to complete the least amount of work suggested for each session. It may still require several weeks of training to achieve this. If there is enough time during the practices, try to do more work.

For sports in which the importance of the athletic ability is "low": It is possible that time restrictions may be such that you are not able to include this type of activity in your program; if this is the case, ensure that the athletes have the opportunity to participate in different forms of sport activity outside your program or during the off-season so that they can still do some work in this area in order to achieve a balanced athletic development.

Examples of Training Protocols/Methods to Develop and Maintain Physical and Motor Abilities

	Speed	Speed-Endurance (short efforts)
Type of efforts	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)
Model/type of movements	As sport-specific as possible	As sport-specific as possible
Intensity	All out; as fast as possible	All out
Length of a repetition	5 to 8 sec	15 to 20 sec
# of repetitions per set	4 to 5	3 to 5
# of sets	2 to 4	2 or 3
Total number of repetitions	8 to 20	6 to 15
Length of recovery/repetition	60 to 75 sec	1 min 30 sec to 2 min
Type of recovery/repetition	Active, very low intensity	Active, very low intensity
Recovery between sets	Active, low intensity (5 to 6 min)	Active, low intensity (6 min)
Stop before it ...	Athlete can no longer maintain a high speed	Athlete can no longer maintain a high speed
Min-max length of protocol	16 min 40 sec; 46 min 40 sec	19 min 30 sec; 47 min
Significant improvement in...	4 to 6 weeks	4 to 6 weeks
Development	2 to 3 X per week	2 to 3 X per week
Maintenance	1 set, 1 X per week	1 set, 1 X per week
	Aerobic Endurance	**Strength Endurance**
Type of efforts	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets)	Intermittent (repetitions of intense efforts followed by pauses, and grouped in sets); alternate muscle groups involved
Model/type of movements	Specific, or involving the major muscle groups involved in the sport	Tractions, pulling actions, flexions, extensions, etc. using own body weight, free weights, or machines
Intensity	All out; 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 10 times
Length of a repetition	3 to 5 min	3 to 4 sec
# of repetitions per set	2 to 4	10 to 15, or +
# of sets	2 to 3	2 to 3 (per exercise)
# of different exercises		5 to 8
Total number of repetitions	4 to 12	100 to 300 or +
Length of recovery/repetition	Equal to length of effort	Not applicable
Type of recovery/repetition	Active, low intensity	Not applicable
Recovery between sets	Active, low intensity (5 to 10 min)	30 sec to 1 min
Stop before it ...	Intensity decreases too much	Quality of execution decreases; marked fatigue occurs during execution
Min-max length of protocol	28 min; 2 hr 15 min	10 min; 32 min
Significant improvement in...	6 to 8 weeks	4 to 5 weeks
Development	2 to 3 X per week	2 X per week
Maintenance	1 set, 1 X per week	1 set per exercise, 1 X per week

Examples of Training Protocols/Methods to Develop and Maintain Physical and Motor Abilities

	Speed–Strength	Flexibility
Type of efforts	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
Model/type of movements	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 sec during the contraction phase of the muscle group	20 to 40 sec
# of repetitions per set	6 to 8	2 (1 each side)
# of sets per exercise	2 to 3	2 or 4
# of different exercises	2 to 3	6 to 8
Total number of repetitions	24 to 72	24 to 64
Length of recovery/repetition	Not Applicable	Not Applicable
Type of recovery/repetition	Not Applicable	Not Applicable
Recovery between sets	30 sec to 1 min	15 to 30 sec
Stop before it ...	Quality of execution decreases; marked fatigue occurs during execution	Some pain is felt
Min-max length of protocol	5 min; 10 min 30 sec	12 min; 54 min
Significant improvement in...	4 to 5 weeks	3 to 5 weeks
Development	2 X per week	2 to 3 X per week
Maintenance	1 set per exercise, 1 X per week	1 set per exercise, 1 X per week

Motor Athletic Abilities (Balance; Agility; Coordination)

The characteristics of activities that may contribute to the development of motor athletic abilities have been described in the Reference Material of the "Planning a Practice" module. Unfortunately, little information is available on the optimal training frequency and on the minimal amount of time necessary to induce a training response for these abilities. Therefore, if they are important in the sport, they should be incorporated on a regular basis into the program's activities, particularly during the first few weeks.

Appendix and Forms

Appendix and Forms
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Appendix 1 - General Process for Designing a Sport Program:

Determining the General Orientations of the Program

1. Determine the coaching context in which your program will be implemented. To do so, take into account variables such as your sport, the age of your athletes, their training and competition background, and previous performances they have achieved.

2. Taking into consideration the model proposed by Istvan Balyi and notions of growth and development, determine the major orientation that your program should have (FUNdamentals, Train to Train; Train to Compete; Train to Win).

3. Using your sport's athlete development model, identify specific aspects that must be featured within your program from a technical, tactical and mental point of view. (Note: You can obtain this information by contacting your National Sport Federation, the FCA).

4. Using your sport's athlete development model, make a general assessment of your athletes' strengths and weaknesses given their age.

Structure of Your Program

5. Make an inventory of the competitions in which you would like your athletes to complete throughout the season, and determine their relative importance (regular, important, exhibition, tournaments, playoffs, championship, etc.).

6. Make an inventory of the training opportunities available to you and to your athletes (number of practices or training sessions per week, duration of each session, facilities and equipment available).

7. Determine when the first "official competition" will take place. Enter this date in your program planning form; it will represent the beginning of the Competition Period of your program.

8. Determine when the last "official competition" will take place. Enter this date in your program planning form; it will represent the end of the Competition Period and the beginning of the Transition Period of your program.

9. Determine when the first formal training contact with your athletes will take place. Enter this date in your program planning form; it will represent the beginning of the Preparation Period and the end of the Transition Period of your program.

10. Identify the various events that will be featured within your program (training camps, regular competitions, important competitions, tournaments, championships, selections or trials, fund raising activities, social events, etc.) and specify their relative importance. Indicate the date of these events on your program planning form.

Determining the Training Priorities, Objectives, and Methods for a Single Week

11. From the series of sample sport programs provided, choose the one that suits your particular sport; alternatively, use a similar template already produced by your sport.

12. Choose a week of the program.

13. Using the code based on lines of varying thicknesses, identify the most important athletic abilities (maximum of 5) to train in this particular week.

14. Using the color code, identify the training objectives associated with each of the athletic abilities you have selected.

15. Ask your athletes to validate these objectives in order to ensure they match their skills, interests, and motivations; for instance, ask them to complete questionnaires such as the ones proposed in the Reference Document of the Introductory module.

16. For each combination of "athletic ability - objective", identify appropriate types of exercises that could be used during practices (for all athletic abilities) and practice conditions (for sport-specific technical and tactical elements only).

17. For each athletic ability you have identified, and bearing in mind the desired objective, determine the number of training sessions needed per week and the amount of time that must be planned for training during each practice. Note: You may choose to spend more time than the "minimum recommended time" for training a particular athletic ability, however, you should not devote less time than recommended if you really want to achieve the desired training effect.

18. Add up all the training time required. This represents the amount of time you should devote to training in the week you have chosen.

19. To determine if the total time obtained in step #18 is realistic for your training situation, add up the number of practice sessions that you can have during the week, and the length of the main part of each session. This figure represents the actual training time available to train the various athletic abilities in the week that you have chosen.

20. Determine the gap between the time required in the "ideal situation" (step #18) and the actual time available for training in the week that you have chosen (step #19).

21. If the gap in time is significant, consider the following questions when you come to decide which athletic abilities to prioritize:
    - Can the athletes train certain athletic abilities individually, outside your practice sessions, or before or after the sessions?
    - Is it possible to combine the training of certain athletic abilities in your sessions?
    - Which athletic abilities are the most important according to the sample program of your family of sports?

22. Bearing in mind the training time available (step #19) and the reflection you did in steps #20 and #21, layout the training priorities and content in the different practice sessions of the week. Use the "Weekly Planning Worksheet" and, for each session, specify the following information:
    - The athletic abilities to be worked on.
    - The training objectives.
    - The practice conditions and types of activities that are appropriate.
    - The training methods and the time devoted to training each athletic ability.

Once you have this information, you should be able to put together the main part of each of your practice sessions using the process presented in the module "Planning a Practice",

Appendix 2 - Link Between Various Planning Documents and Tools

Istvan Balyi's Long-Term Athlete Development Model

This document provides information about the major orientations that should be given to a sport program in terms of athlete long-term development and training to competition ratio. This information should guide the overall characteristics of the sport or discipline's program.

Sample Programs for Various Sport Families

These provide information about the most important athletic abilities in the sport and on the training priorities and objectives given: (1) the major orientations that the program should have in terms of athlete long-term development; (2) the time of the season; and (3) the delays necessary to induce a training effect on specific athletic abilities.

Summary Worksheet

Enables a link to be made between the following: (1) information contained in the sample programs for various families of sports (athletic abilities to prioritize and training objectives); (2) relevant training methods and protocols; (3) the amount of training that would be necessary to train the athletic abilities on a weekly basis; (4) the training opportunities available to the instructor on a weekly basis. This worksheet is designed to facilitate decision-making regarding the training activities that will be performed during the week.

Weekly Planning Worksheet

This worksheet is designed to distribute the available training time among the week's training sessions or practices. It also allows to specify information pertaining to the characteristics of the training activities within each session as far as types of exercises and practice conditions are concerned.

Practice Planning Worksheet (see "Planning a Practice" module)

This worksheet is designed to outline in a detailed manner the specific activities that will be featured in a practice, as well as their order in the session.

Appendix 3 - Considerations On Selecting Athletes

General Considerations

Most instructors must, at one point or another, make decisions about the selection of athletes. The goal of these decisions can be to identify those who: (1) will be chosen for a team; (2) will take part in a particular competition; (3) will go with the team to a tournament; and/or (4) will have more competitive opportunities.

These decisions are often unavoidable due to restrictions on the number of athletes who can register for certain competitions or be part of a team. Even in cases where each athlete/participant can take part in competitions or the club or team has a policy stating that each athlete can take part, it may happen that the financial resources are insufficient to provide everyone with equal support. In either one of these scenarios, the instructor can be confronted with the harsh reality of having to select some athletes, and not select others.

Possible Negative Impacts Of Selection

Decisions about the selection of athletes inevitably lead to some disappointment among those who were not chosen or among their parents. Indeed, most athletes will have invested considerable effort and energy to be "picked", to say nothing of the financial investments made by their parents and others. When they learn the news, the athletes might feel they have failed. Some will be afraid of their family and friends' reactions, or even be "ashamed of themselves" after this perceived failure, which might negatively affect their self-esteem. Now and then, the athletes or their parents show some frustration; these negative reactions can even encourage them to change sports or drop out of organized sport all together. Selection camps therefore constitute a serious task that an instructor must carry out professionally.

Suggestion: Make the Selection Procedure and Criteria Public

To minimize the negative reactions that can arise after selecting athletes, the process must not be seen as being improvised, vague, or biased from the outset. A good way of accomplishing this is to make sure that all the athletes/participants, their parents, and the club or sport association directors know exactly when and how the "decision" will be made.

Such an approach implies that you describe the selection procedure and criteria that will be used. In other words, you will have to clearly indicate **when** the decision will be made, **who** will make it, **how** it will be made, **how many** athletes will be chosen and on **what criteria** the decisions will be based. Other information, e.g., the place (when necessary), the opportunities available in the future for those who were not picked, and the options for appealing a decision can also be part of the procedure and criteria.

Defining the selection procedure and criteria is often more difficult than it appears at first glance given the stakes involved for the athletes, the resulting consequences and emotions, and the numerous unforeseen situations that can arise. It is therefore useful to talk about this subject with other instructors, experienced directors, and even with the athletes themselves. This will provide you with comments and ideas from people who often have a wide range of experience with the difficulties involved in trials and who have developed effective ways of fairly managing the process. Even if you have a fairly precise idea of how you want to proceed, the viewpoints of other people can help you refine your procedure and criteria and make them clearer and more explicit.

The selection procedure and criteria should preferably be written out and handed out to the athletes, their parents and the club directors well before the date you intend to announce your decision. Moreover, you might consider having the procedure and criteria approved by the athletes, parents, and administrators before making your procedure and criteria public. This will provide you with comments and suggestions and ensure that everyone has understood the implications of what was announced.

Aspects to Consider When Writing up the Selection Procedure and Criteria

When you are writing up the selection procedure and criteria, you should consider the following aspects:

- Do not conduct trials unless you are obliged to do so, and encourage the largest number possible of athletes to take part in the program activities. Do not be afraid to call into question certain well-established practices whose main effect is to discourage young people and reduce their development opportunities. For example, consider forming more than one team or more than one training group when possible, and take on some assistants.

- If you absolutely have to carry out trials, make sure that their timing is well chosen, so as not interfere with the main principles of athletic development. Moreover, avoid selecting athletes very early in the program. The latter is not recommended in programs involving young athletes/participants for the following reasons: (1) an early emphasis placed on specific preparation and program performance is detrimental to a more progressive approach to training which focuses on long-term development; (2) the athletes who have not done any specific training during the off-season, or who have participated in other sports, are often at a disadvantage compared to those who have been involved in sport-specific training all year, and this even when they have high athletic potential. Selecting athletes at the beginning of the program encourages an early specialization, and emphasizes results too early in the season, which is not desirable in the perspective of the long-term development of young athletes.

- The selection criteria must reflect the values and development objectives of the instructor, club, and sport association (e.g. participation, equal opportunities for everyone, performance, progress, effort, attitude, etc.)

- The procedure and criteria must be simply and clearly described and have no “grey zones”. Everyone must unequivocally understand the “how, when, and where” as well as other information dealing with the number of athletes/participants who will be picked and the person or group in charge of decision-making. Complicated phrasing that no one can understand should be avoided.

- Whenever possible, the criteria should include elements, such as specific performance standards, a point system, statistics dealing with important aspects of your sport, results during previously identified competitions, etc. Such an approach will make it possible to avoid situations where athletes feel excluded from the outset and feel they have no chance of being picked because a given person is in charge of the selection process. This type of criteria must also appear to be fair and reasonable to the majority of participants.

- Make sure that your criteria cover the most likely scenarios and possibilities. For instance, what happens if one of the athletes is sick or injured, breaks equipment during one of the trial stages, or cannot be present for an unavoidable reason? Moreover, what constitutes an injury or an unavoidable reason? What happens in the case of a tie or if one of the preliminary trials is not held? What happens if one of the athletes who has systematically dominated has a counter performance? Or if certain athletes who are showing considerable potential are not yet able to perform at the required level, despite the fact that, in the weeks to come, they will undoubtedly surpass others who might be picked at time? "Crossing your fingers" and hoping that this type of situation will not happen is not a good strategy, since experience shows that this kind of dilemma occurs fairly frequently. One of the possible options is to prepare for these possibilities by indicating in the criteria that a certain number of athletes/participants will be picked "at the instructor's discretion". In other words, they will be picked based on your personal evaluation of their current or future aptitudes, their level of commitment, and their attitude. However, you should expect to be asked to justify any choices based on the "instructor's discretion"...

- Make sure that the criteria are identically explained to each athlete, to instructors, parents, and members of the team or club's support personnel. A scenario in which different and incompatible selection approaches are presented separately to different people must absolutely be avoided, since the resulting differences in understanding and expectations may later prove impossible to reconcile and carry out.

- When appropriate, you might indicate that the criteria were developed to identify athletes who have a particular profile or who demonstrate precise performance skills or aptitudes. This can allow you to provide additional explanations as to why such or such criteria are used. In such a case, it could be useful to refer to certain facts or statistics in order to justify the choice of criteria.

- Once the criteria are made public, you will have to stick to what was announced, and this even if the implementation of the procedure and criteria create some surprises as to which athletes are selected. In this way, you will prove your integrity and credibility in other people's eyes. This possibility shows how important it is to seriously think about the procedure and criteria used in selecting athletes.

Managing Selection Announcements
Confidence and Self-Esteem of Non-Selected Athletes

- Once your decision has been made, meet individually and as quickly as possible with each non-selected athlete to tell him/her about your choice. Avoid making public or delayed announcements, or relaying the information to an athlete through a third party.

- You should do the following when you meet with the athlete:
  - Reassert his/her strong points.
  - Praise his/her participation and efforts.
  - Go over the selection criteria and the way you applied them.
  - Avoid comparing the athletes/participants during the discussion.
  - Provide simple, precise and constructive improvement strategies.
  - Take the drama out of the trials. Remind him/her that there will be other opportunities and that the most important thing is not the final result but to have tried one's best.
  - Encourage him/her to continue and persevere. Express your confidence in him/her.
  - Acknowledge his/her emotions, and be ready to listen to them.
  - Respect his/her dignity at all times.
  - Actively seek his/her comments and reactions, and respect his/her viewpoint.
  - Before proceeding with the announcements, find out about the possible alternatives for those who have not been picked so that you can suggest options to them. For instance, provide them with the phone number of another coach who could take them into his/her program.
  - Make sure that he/she learns a positive lesson from the experience. End up on a positive note by praising, once again, his/her participation and effort and reassert his/her strong points.

- Talk with the parents of each non-selected athlete/participant so as to answer their questions.

Appendix 4 – Sample Planning Worksheets

Week no. _____ of the program

1. Athletic ability to prioritize	2. Training objectives	3. Appropriate types of exercises (all athletic abilities) and practice conditions (sport-specific elements only)	4. Protocols and time: number of sessions/ week X time required in each session (respect the recommended minimal time)
1.		( ) General exercises ( ) Specific exercises ( ) Competition exercises **Conditions:**	___ sessions/week X ___ minutes/session ___ hours ___ min
2.		( ) General exercises ( ) Specific exercises ( ) Competition exercises **Conditions:**	___ sessions/week X ___ minutes/session ___ hours ___ min
3.		( ) General exercises ( ) Specific exercises ( ) Competition exercises **Conditions:**	___ sessions/week X ___ minutes/session ___ hours ___ min
4.		( ) General exercises ( ) Specific exercises ( ) Competition exercises **Conditions:**	___ sessions/week X ___ minutes/session ___ hours ___ min
5.		( ) General exercises ( ) Specific exercises ( ) Competition exercises **Conditions:**	___ sessions/week X ___ minutes/session ___ hours ___ min
		Total training hours required during the week (rounded off):	

Number of sessions in the week ____ X length of the main part of each of your sessions

____ hr. ____ min. = _____ hours available for athletic development in the week.

Gap between “hours required for training” and “hours actually available for training” = ____

Questions to help me choose the training priorities given the limitation in my program:

- Can athletes train certain athletic abilities on their own, outside practices I lead?
- What are the most important athletic abilities in my sport?
- Can the training of some athletic abilities be combined during practice?

Weekly Planning Worksheet

Practice Session	Athletic Ability	Objective	Practice Conditions Type of Exercises	Time
One				Total minutes
Two				Total minutes
Three				Total minutes

Worksheet 1: Program Planning Calendar

Season:

Month																													
Monday	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Championship																													
Tournaments																													
Important competit.																													
Regular competition																													
Preparation - comp.																													
Training camps																													
Other activities																													
Period																													
Phase																													
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

Codes for other activities in the training chart:

☐ ☐ ☐ ☐ ☐

Shooting Performance Strategy		
Activity	**Desired Feelings and Appearance**	**Problem and Coping Response**
Stance – alignment, clearance, solid; keep everything simple; center	stand tall and be proud; feel the weight of the legs anchored at the feet	Not comfortable? refocus on centering
Nocking the arrow – rhythm	let the arrow flow smoothly from the quiver to the arrow rest	practice rhythm; be sure cock flight faces out
Draw hand and arm – set the fingers comfortably; start putting some pressure on the string	fingers are soft, relaxed, free of tension	let string roll one quarter turn to set arrow plate pressure
Bow hand and arm – set the hand into the handle comfortably and in correct alignment	feel stable	focus on elbow being firm; check to see that bow is aligned with the hand
Draw – push into the bow from shoulder; keep the bow arm shoulder down; keep the string in alignment with the body; focus on the target	one continuous, consistent movement	focus on pushing from shoulder; focus on alignment of string
Anchor – solid, consistent, comfortable; string alignment with head, eye; string touches chin, nose, mouth with knuckles flat; hold the string with the back and shoulder muscles	draw hand feels relaxed; draw arm muscles feel relaxed; feel strength in back and shoulder	let the arms relax; if it doesn't feel right, let down and start over with the stance; Snap shooting? ... review anchor, solid, consistent
Holding and aiming – rhythm consistency, timing; hold with the rhomboid muscles; breathe in and out; white/black/blue/red - deep breath on gold	feel the stability of stance; feel the strength of back; feel the life of the breathing	focus on your strength; focus on your breathing; if it doesn't feel right, let down and start over with the stance; Last arrow syndrome? ... shoot one arrow at a time
Release – let out a half breath; pull with rhomboids through the clicker; clean and consistent flow; as the arrow is released, let out the rest of your breath during the follow through	visualise the arrow following the life breath just released to the target; feel the arrow go beyond the paper and through the target	Peeking?... focus on your anchor and your follow through; Can't pull through the clicker?... focus on the last quarter inch of the arrow
Follow through – smooth, flowing, comfortable	enjoy the feeling of a good shot	Where should your release hand be after the follow through?
Relax – quiet, focused; clear the mind to begin the next shot	that felt good "There will be no beginning and no ending of this circle of mind/body movements of the shot event." Ed Eliason	keep the rhythm flowing to maintain the circle

Facility Inspection Form

Facility: _____ Date: _____

Inspected by: _____

Item	Adequate	Inadequate	Corrective measures	Observations
Stationary equipment				
room security				
shooting line				
buttresses				
stands				
safety nets				
timing lights				
Team equipment				
target faces				
Individual equipment				
bows				
sights				
stabilizers				
arrows				
quivers				
arm guards				
finger tabs				
First-aid kit with procedures				
Others				

Corrections: add replace modify discard clean repair check

This document, once completed, should be given to the facilities manager, and the coach should keep a copy for his/her files.

Facilities Manager Name: _____ Signature: _____

Name of Coach: _____ Date (dd/mm/yy): _____

Signature of Coach: _____

Analyzing Performance

FORM ANALYSIS — archery 10 steps

Analysis completed by _____ Position _____

Athlete _____ Category _____ Date _____

Age ____ Sex ____ Right / Left Hand

Check (√) relevant items

1. Stance

Foot placement
___ straight stance
___ oblique stance
___ reverse oblique stance
___ feet apart (open)
___ feet together (closed)
___ feet parallel

Weight distribution
___ even
___ weight on toes (%_____)
___ weight on heels (%_____)
___ weight on front foot (%_____)
___ weight on rear foot (%_____)

Lean and sway
___ straight posture
___ leans toward target
___ leans back
___ no sway
___ forward sway
___ backward sway

2. Nocking the arrow

___ directly at target
___ at ground

3. Draw Hand

String fingers/release placed on bow
___ bow pointed directly at target
___ bow pointed at ground
___ bow pointed upwards
___ bow pointed sideways

4. Bow Hand

The archer uses a:
___ low wrist
___ high wrist
___ medium or normal wrist
___ bow sling (type)
_____

Draw started
___ directly at target
___ above target
___ below target
___ bow moving up or down

Pre-draw
___ pointed upwards
___ pointed downwards
___ parallel
___ above shoulders and parallel
___ no pre-draw

5. The Draw

Draw completed with bow pointed:
___ directly at target
___ above target
___ below target
___ bow moving up or down

Use of klicker or draw check aid
___ no klicker
___ smooth draw to klicker
___ stops at klicker

Draw hand action
___ directly to anchor
___ low and raised to anchor
___ one continuous movement
___ draw made with stop
___ past face and forward
___ high and lowers to anchor

6. Anchor

___ centre of face
___ side of chin
___ high anchor
___ floating anchor
___ solid anchor

Anchor aids
___ peep sight
___ kisser button on teeth or lips
___ tab shelf
___ "Can't Pinch" tab
___ anchor to lips
___ anchor to nose

7. Hold and Aim

Bow hand
___ relaxed
___ movement during draw and hold

Bow hand wrist
___ wrist set central on handle
___ back of hand straight
___ back of hand cupped
___ movement
___ outside centre
___ inside centre

Bow hand fingers
___ relaxed and open
___ forced open
___ holding bow lightly
___ thumb relaxed
___ movement
___ gripping bow tightly
___ thumb movement

Head position
___ head maintained initial position
___ head moved after anchor
___ string moved to head
___ head moved to string

String hand
___ hook: deep, middle, finger tips
___ inside centre
___ changes during hold
___ finger pinch
___ hand turned out at bottom
___ release aid
___ % weight on first finger
___ % weight on second finger
___ % weight on third finger

Draw hand and wrist
___ straight to knuckles
___ bent out
___ bent in
___ movement

Bow arm elbow
___ straight
___ turned out
___ rotated down
___ locked
___ broken
___ movement
___ hyper extended

Bow shoulder
___ extended to target
___ pushed up to neck
___ pulled low

String elbow
___ parallel with arrow
___ above arrow
___ below arrow
___ in line with centre of bow
___ outside of centre of bow
___ inside of centre of bow

8. Release

___ active
___ static
___ dropped hand
___ pulled straight back
___ rotated out from face (pluck)
___ moved up
___ release aid (type)
_____

Release actions
___ head movement
___ bow arm dropped
___ eye movement
___ none
___ release aid surprize action
___ release aid trigger effect
___ release aid finger movement

9. Follow Through

Bow arm action after release
___ bow moves right
___ bow moves left
___ bow arm drops
___ bow torque (on axis)
___ body movement right after
___ body position held

10. Relax and Reflect

___ stops sequence
___ used optical check
___ signs of emotion
___ immediately prepares next shot

Notes

_____

_____

_____

_____

_____

_____

_____

Observation Plan

1. Make an observation plan for a coaching session.

   Daily Goal _____

   Skill to be worked on: i.e. stance, release, etc. _____

   _____

2. How will the skill be demonstrated?

   _____

   _____

   _____

3. List a number of ways to observe the skill.

   _____

   _____

   _____

   _____

   Diagram

4. Intervention: Identify a problem that needs correction. _____

   _____

   _____

5. How will you provide feedback to the athlete? (or allow the athlete to give feedback)

   _____

   _____

   _____

   _____

   _____

   _____

Practice Plan

	ATHLETES: **LOCATION:** **EQUIPMENT NEEDED:**	**DATE:** **GOALS:**	**TIME:** **start** **finish**
Introduction			Key messages/safety points
Warm-up	Include general and specific warm-up and stretching exercises		Key messages/safety points Equipment needed
Main part	Pay attention to the order of the activities		Key messages/safety points Equipment needed
Cool down			Key messages/safety points Equipment needed
Conclusion			Key messages/safety points

Emergency Action Plan

TEAM: **DATE:**

EVENT: **LOCATION:**

Responsibilities

Charge Person

1. take control, assess situation, need for ambulance
2. keep area clear of bystanders, athletes
3. don't move injured athlete or equipment
4. decide how to move athlete if not too serious
5. bring in call person if needed
6. stay with injured athlete
7. fill out accident report
8. location of participant medical profiles

Responsibilities

Call Person

1. know location of telephones and how to access them
2. prepare a list of needed phone numbers
3. know directions to facilities
4. be able to provide information to ambulance dispatcher
5. report to charge person

Number Card

Location of Phones

Phone Numbers

Parents
Doctor
Hospital
Police
Fire Department
Ambulance

Description of Location

Directions to Location

Map of Location

Coach Self Evaluation Tool

The purpose of this tool is to assist you in identifying the areas of coaching that you need improve upon. Give yourself an honest rating under each category. Once you have completed the evaluation, total your score and see how you measure up on the Coach Meter below.

(1) Strongly Disagree (2) Disagree (3) Agree (4) Strongly Agree

Organizational Skills

I arrive on time	1 2 3 4
I dress appropriately	1 2 3 4
I always prepare a practice session plan with logical progressions	1 2 3 4
I challenge all athletes	1 2 3 4
I show concern for the health and safety of all of my athletes during practice sessions	1 2 3 4
I set clear boundaries for athletes	1 2 3 4
I have the ability to treat minor injuries and exhibit reasonable conduct when handling accidents or emergencies	1 2 3 4

Instructional Skills

I introduce skills clearly and accurately	1 2 3 4
I demonstrate skills properly and use correct techniques	1 2 3 4
I ensure that the activity is suitable for the age, ability and fitness level of my archers	1 2 3 4
I encourage questions and create a non-threatening practice environment	1 2 3 4
I explain the reason for doing the activity/drill	1 2 3 4
I have the ability to analyze archer's strengths and weaknesses	1 2 3 4

Communication and Interpersonal Skills

I greet each athlete as he/she comes into practice session	1 2 3 4
I am enthusiastic and positive	1 2 3 4

Coach Self Evaluation Tool

I am dedicated to archery and to my athletes	1 2 3 4
I am dedicated to archery and to my athletes	1 2 3 4
I demonstrate a sense of fair play and promote sportsmanship	1 2 3 4
I am patient and tolerant	1 2 3 4
I am honest and fair	1 2 3 4
I am a good role model and set a positive example at all times	1 2 3 4
I have a sense of humor	1 2 3 4
I treat all players equally and enforce club rules consistently	1 2 3 4
I use appropriate verbal and non-verbal communication	1 2 3 4
I find a way to make all the athletes feel good about themselves	1 2 3 4
I know when and when not to use discipline	1 2 3 4

Total _____

Coach Meter:

75 – 100	Excellent, you are a well organized coach and have great communication skills. Keep up the good work and continue your coaching development through further training, education and certification!
50 – 75	Good, you have mastered some of the necessary skills but need to improve certain areas of your coaching expertise. Contact your PSO to find some resources available for your specific needs.
25 – 50	Needs Improvement, you could use some help in some areas of your coaching and would benefit from more interaction with other coaches in your sport and from exploring and accessing the considerable resources at your PSO.
1 – 25	Please contact your provincial archery organization about signing up for the NCCP program to develop your coaching skills and to make you more comfortable and effective in fulfilling your coaching responsibilities. You have what it takes to become a great coach one day!

The Coaches Association of British Columbia developed this self evaluation tool.

Coach Evaluation Tool

This form is to be turned in as part of the instructor's portfolio, and is to be filled in by the administration of the club and by parents/participants. The purpose of this tool is to use it to evaluate volunteer coaches and to identify areas where coaches could improve themselves. We strongly encourage parents to fill these out with their children. Please rate items under each category as follows:

(1) Don't know (2) Strongly Disagree (3) Disagree (4) Agree (5) Strongly Agree

Organizational Skills

The coach dresses neatly and appropriately for the learning environment	0 1 2 3 4
The coach prepares a practice session plan with logical progressions	0 1 2 3 4
The coach challenges all athletes to increase personal skill level	0 1 2 3 4
The coach uses a variety of activities/drills in practice	0 1 2 3 4
The coach shows concern for the health and safety of all athletes during practice sessions	0 1 2 3 4
The coach sets clear boundaries for athlete behavior	0 1 2 3 4
The coach has the ability to treat minor injuries and exhibits reasonable conduct when handling accidents or emergencies (if applicable during this observation session)	0 1 2 3 4

Instructional Skills

The coach introduces and explains skills clearly and accurately	0 1 2 3 4
The coach uses proper techniques when demonstrating a skill	0 1 2 3 4
The coach encourages questions and creates a non-threatening practice environment	0 1 2 3 4
The coach has the ability to analyze archer strengths and weaknesses	0 1 2 3 4
The coach ensures that the activity is suitable for the age, experience, and ability of the participants	0 1 2 3 4

The coach is enthusiastic and positive	0 1 2 3 4
The coach is dedicated to archery and to the athletes' enjoyment of sport	0 1 2 3 4
The coach demonstrates a sense of fair play and promotes sportsmanship	0 1 2 3 4
The coach is patient and tolerant	0 1 2 3 4
The coach is honest and fair	0 1 2 3 4
The coach is a good role model and sets a positive example at all times	0 1 2 3 4
The coach has a sense of humor	0 1 2 3 4
The coach treats all archers equally and fairly	0 1 2 3 4
The coach uses appropriate verbal and non-verbal communication	0 1 2 3 4
The coach finds a way to make all athletes feel good about themselves	0 1 2 3 4
The coach provides both positive and constructive feedback	0 1 2 3 4
The coach knows when and when not to use discipline	0 1 2 3 4

total _____

If a rating of 1 or 2 was indicated in any of the areas listed above, please review this with the coach and try to identify ways to improve each area. This tool was designed to assist coaches in providing the best experience possible for young athletes.

Coach Meter:

90 – 100	Excellent, coaching ability! There's no harm in continuing your coaching education so that you can be up to date with current coaching information.
75 – 90	Good. You have mastered some of the necessary skills but need to improve certain areas of your coaching expertise.
50 – 75	Needs Improvement. You could use some help in some areas of your coaching.
1 – 50	Please contact your provincial archery association about signing up for the NCCP program and developing your coaching skills. You have what it takes to become a great coach one day!

The Coaches Association of British Columbia developed this coach evaluation tool

Analyzing Performance

Referent Model

National Coaching Certification Program

Coaching Association of Canada

Performance

Outcomes
Describes what and why

Key Performance Factors
Describes how the outcome is achieved

Correction

Apply Corrective Strategy
By supporting the Athletes in training or competition

Select Corrective Strategy
- Teaching Interventions
- Activity Modifications
- Competitive Interventions

Detection

EQUIPMENT
ENVIRONMENT
AFFECTIVE
COGNITIVE
PHYSICAL
TACTICAL
ARCHERY FORM

Observation
Where to look?
What to look for?

Detectable Signs
Compare the gap between what is observed and what is inteded.

Analysis of potential causes

Equipment	Environment	Affective	Cognitive	Physical	Tactical	Archery Form
Fit	Weather wind rain cold heat	Fear	Understanding	Strength	Decision making	Phases of movement
Tuning		Motivation	Knowledge	Stamina	Competition plan	Biomechanical principles
Type		Self Efficacy	Concentration	Flexibility	Team match play	
Financial capacity	Surface	Belief	Focus	Fitness		AWAD archers
	Lighting	Interest	Arousal control			
	Altitude	Support network	Cue recognition			
	Pollution		Perception			

Corrective Strategies

Teaching Interventions	Activity or Drill Modifications	Competitive Interventions
• Help or reassure • Explain or ask questions • Simplify -Reduce number of variables to process, or use examples • Use mental skill strategy (i.e. Re-focusing, visualization or goal setting) • Demonstrate or model correct performance • Provide feedback or results	• Adjust equipment • Adjust task demands or repeat • Adjust progression • Adjust timing • Change environment • Adjust work/rest ratios or intensity	• Adjust equipment • Change tactics or game plan • Use mental skill strategy (i.e. Re-focusing, visualization or goal setting) • Provide feedback or results

Performance Phase

Think of a skill or tactic that is commonly used in archery and what the intended performance would look like. For the skill or tactic that you have identified describe an outcome that defines your expectations and identifies an end point that explains why the skill is important.

For example, "The athlete will use back tension in order to have a good shot."
Once you have defined the outcome, consider key performance factors that identify how the outcome is achieved. The key performance factors are the archery technical or tactical elements that describe "optimal" or "effective" execution of the task, skill, or tactic. The number of key indicators and factors will depend on the degree of sophistication expected in detecting the athlete's performance.

Detection Phase

The detection phase requires you to observe the performance, detect critical signs and identify potential causes. You may cycle through these steps several times before making a decision on what to correct. The key question that must be considered is: When does the gap between the observed performance and the intended outcome reach a point that makes a coaching intervention necessary?

The observation will require you to choose several vantage points to best identify the outcome and key performance factors. Different vantage points may reveal different key factors or other potential causes affecting performance. It is important that the observation strategy provides the best picture of the intended or prototype performance.

As you observe the performance you will begin looking for signs or indicators that may explain a gap between the actual performance and what was intended. From a general perspective consider how the athlete engages in the task and the extent to which the outcome is achieved. Even if the outcome is achieved there may be discrepancies in the performance which can assist in achieving optimal form or greater consistency in performance. This process will assist you in prioritizing potential causes that may have the greatest impact performance. When prioritizing the potential causes, consider a hierarchy of causes to filter your perceptions. Ask yourself whether a preliminary cause has a greater impact than technical causes? Often a technical cause may have very little affect on performance if a preliminary cause is not first addressed. As you begin to prioritize the preliminary causes you may wish to re-observe the performance to see whether the identified cause changes your perspective of the detectable signs.

Correction phase

The detection phase will have assisted you in identifying a potential cause that explains gap between the observed performance and the intended outcome. You should consider selecting a corrective strategy that has the greatest effect on identified cause. Corrective strategies may be specific teaching interventions, activity or drill modifications, or competitive interventions. Applying the corrective strategy requires you to consider how you will support the athlete in training or competition contexts. Once the correction is implemented it is important that you once again reflect on intended performance.

Analyze Performance (Referent Model) Archery	Context: Instruction Intermediate	Instructor:

Skill	Outcome	Key Performance Indicators / Factors
Athlete: **Level:** **Skill:**		

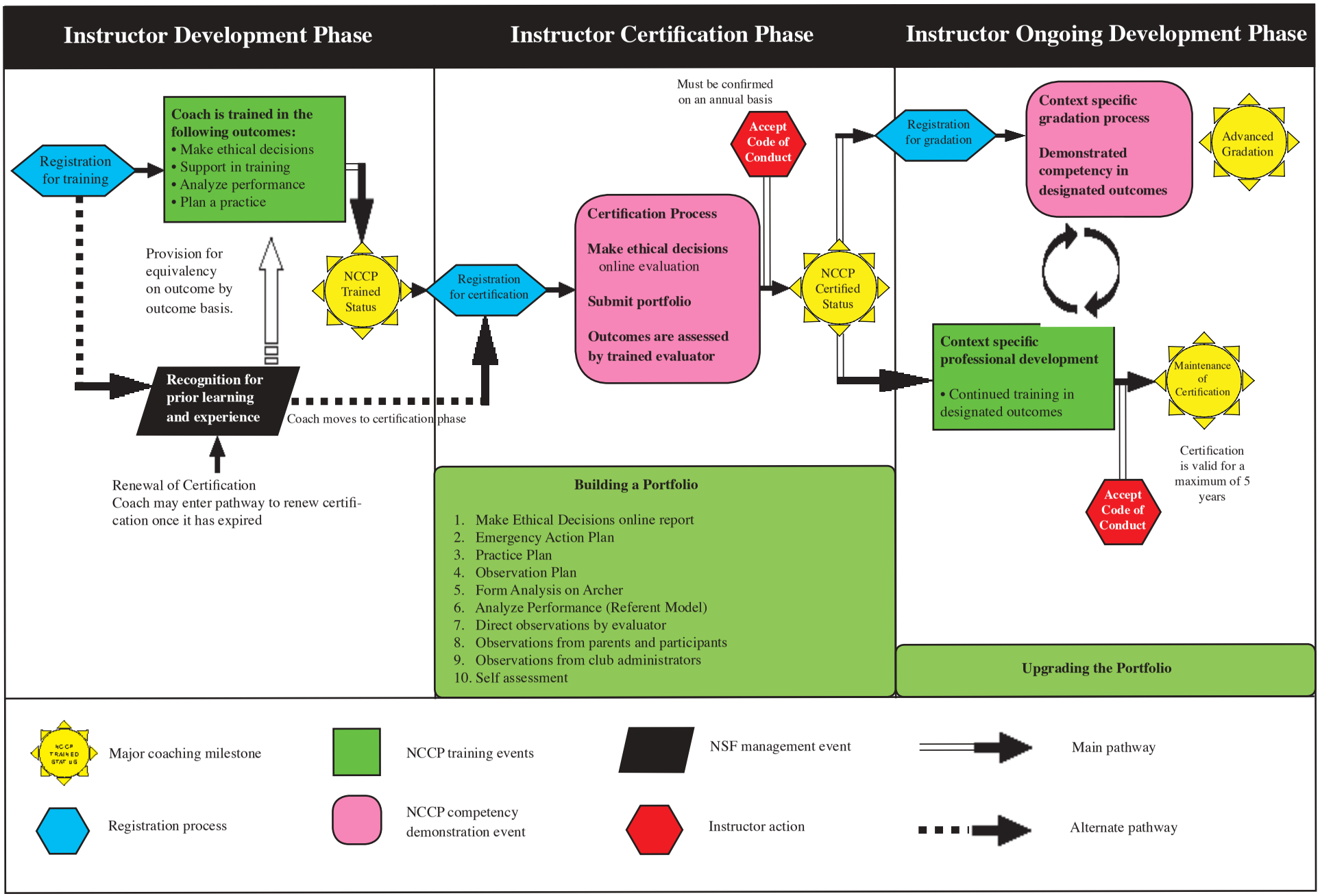
Analysis of Causes	Priority H/M/L	Key Indicators for an Intervention	Interventions to correct performance
Equipment Examines archery equipment that could be a limiting factor on the performance. (include archery equipment, clothing and footwear)			
Environment Examines any environmental factors that could lead to performance deficiencies. (venue, terrain, weather, etc.)			
Affective / Internal Factors Examines internal factors that could be related to the archer's perception of the shooting activity. (fear, motivation, interest, etc.)			
Cognitive / Mental Examines factors that relates to the archer's thoughts that are used to shoot an arrow. (lack of understanding, concentration, confusion, etc.)			
Physical / Motor Examines the physical abilities that could have limiting affects on the activity. (strength, stamina, endurance, flexibility, coordination, balance)			
Tactical Examines decision making issues such as competing in match play or in field, 3D and outdoor target archery.			
Archery Form Examines the execution and/or biomechanics of skill execution and identifies specific performance factors/goals that are required for a good shot.			

Score:	
Evaluator:	Distribution of copies: first copy to instructor candidate, second copy to evaluator, third copy to the FCA

Portfolio		
Document	**Evaluation Procedure**	**Timeline**
1. Make Ethical Decisions	Central on-line evaluation procedure (Instructor Beginners)	12 months
2. Emergency Action Plan	Send to Learning Facilitator/Evaluator	12 months
3. Practice Plan	Send to Learning Facilitator/Evaluator	12 months
4. Observation Plan	Send to Learning Facilitator/Evaluator	12 months
5. Program Plan	Send to Learning Facilitator/Evaluator	12 months
6. Analyze Performance (Referent Model)	Built in conjunction with external on site evaluation	at evaluation
7. Direct observations by LF	Including case study and presentation/demonstration evaluations	at workshop
8. Observations from parents/participants (3)	Send to Learning Facilitator/Evaluator	12 months
9. Observations from club administration (2)	Send to Learning Facilitator/Evaluator	12 months
10. Self Assessment (2)	Send to Learning Facilitator/Evaluator	12 months

The forms for the portfolio are printed in the reference material.

NCCP Instructor Pathway for Instruction Intermediate



Technical Material

Archery Technical Information
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Bow Theory

A bow is no more than a simple device to transfer stored energy to an arrow. The efficiency with which this transfer takes place is probably the most complex part or archery.

The largest amount of stored energy available to the bow is stored in the limb. When the limb is bent by pulling the string, energy is transferred from the archer to the limb. Upon release this energy is transferred to the arrow. Very simply put, that is the theory of the bow

The bow at full draw contains stress energy approximately equivalent to the draw weight felt by the archer. Upon release the energy is transferred to the arrow as kinetic energy. Both are measured in foot pounds and are equal, but for friction, heat, sound and other small losses. The arrow carries this kinetic energy until it hits the target. At that moment the kinetic energy is transferred into heat energy.

During this transfer, the limbs must overcome the weight of the arrow (inertia), it's own weight and the weight of the string. Therefore any increase in weight of the machine or it's parts, directly influences the speed and efficiency of the arrow.

The original straight limbed bow was efficient enough, but most societies sought to refine it. To improve cast the bowyer added deflex, first to the limb, then the handle. This is simply pre-bending of the limbs and/or of the handle away from the direction of draw. This improved the cast, but the greatest problem with the straight limbed (long) bow was it's inherent stack. Stack is a disproportionate weight increase at or near full draw. This means a bow might start off increasing in weight by 1.5# per I" of draw, but increases to 6# per inch at 28". To compensate for this the bowyer tried a radical change to the limbs themselves: the recurve.

The Recurve Bow

The recurve bow was developed in many early civilizations. The technology is simple; the bow's limb bends twice and allows for an easier transfer of the energy to the arrow. The result is a faster arrow for less physical work by the archer. The archer also gains an effectively longer bow with less finger pinch due to the recurve opening. The recurve design allows for a smoother draw because more of the limb is being used. There have been many refinements of this simple invention over the years. In fact it was many years before the technology of the recurve overtook the accuracy of the long bow.

During target archery's resurgence in the early 1900's, the long bow was still the bow of favor due to it's accuracy and forgiveness. It was not until the late 1930's and early 1940's that recurve bows began returning to the archery scene. The rigid recurve was little more than a long bow with curved tips. It overcame stack and had great cast, but was not as easy to shoot. This was mainly because the recurves did not move. Today's working recurve overcomes these problems.

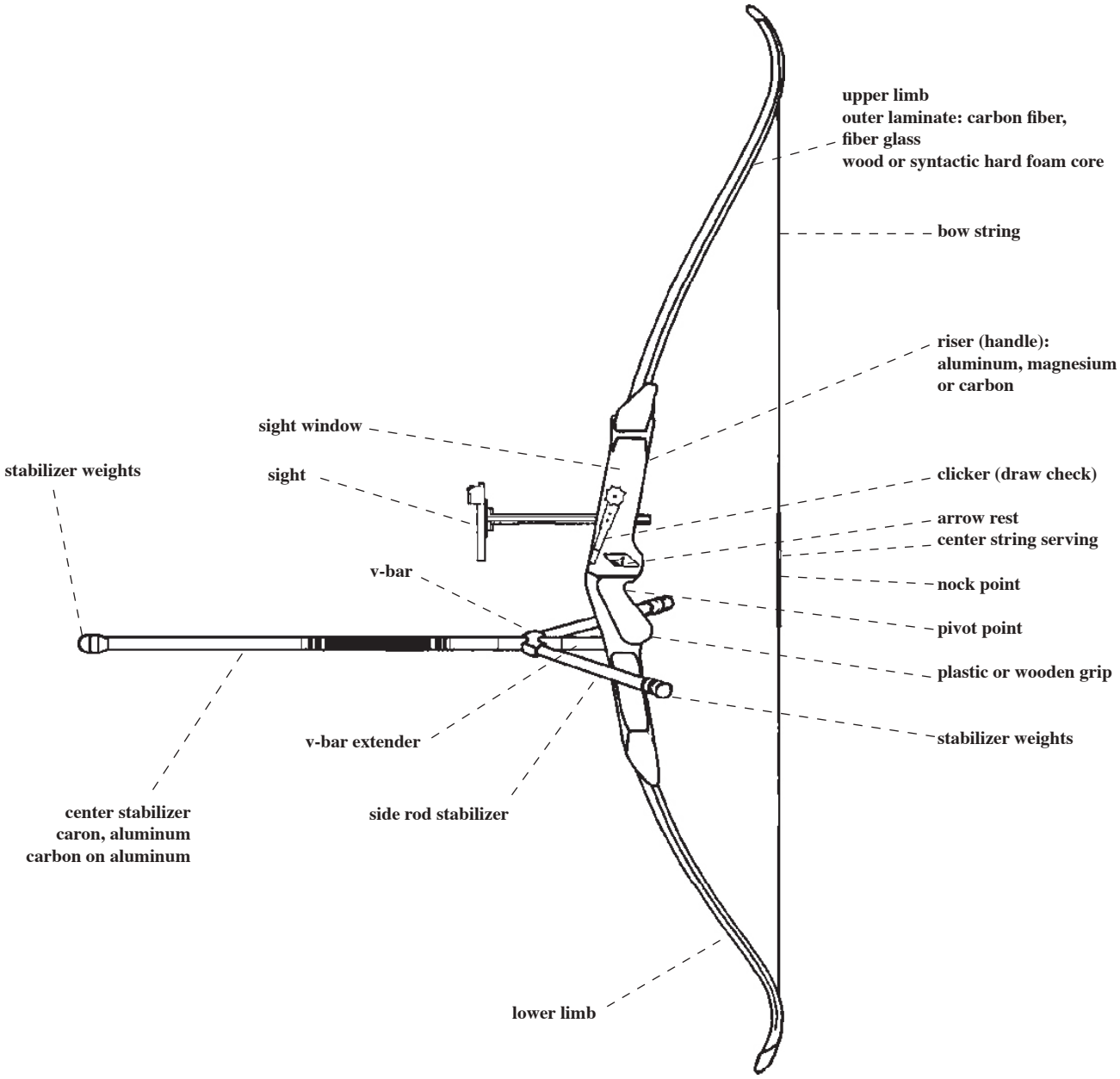
This bow is designed so that the limb, during preliminary draw, starts bending just below the handle then, as draw increases, the recurve portion starts to bend. This gives the effect of two bows working at once. Other subtle innovations have made the recurve bow we know today.

Deflex is the bending of the limbs toward the string before the bow is strung. The deflexed limb is one which is bent from the handle to decrease limb stress and Increase recurve size and efficiency. This provides cast and stability . The handle can also be deflexed by moving the grip forward of the working part of the limb. Deflex in the handle reduces torque and adds stability. Bows with little deflex or reverse deflex are usually very critical.

Overdraw bows have two basic designs: forward handle and an extended arrow rest. Both designs are trying for dramatic increases in speed. This allows for a shorter and much lighter arrow and therefore, much greater speed. Torque is often reduced with the forward handle but accuracy is often lost by lighter arrows. Rules restrict the amount of overdraw.

The Compound Bow

The compound bow is brand new by the pre-Christian standards of the recurve. It has revolutionized the archery world in a short time. The first compound was designed in the late 1930's, remaining relatively obscure until the late 1960's. Since then it has been by far the largest selling bow in all markets.



The compound produces more stored energy simply by employing much heavier limbs in conjunction with eccentric wheels for less hold weight for the archer.

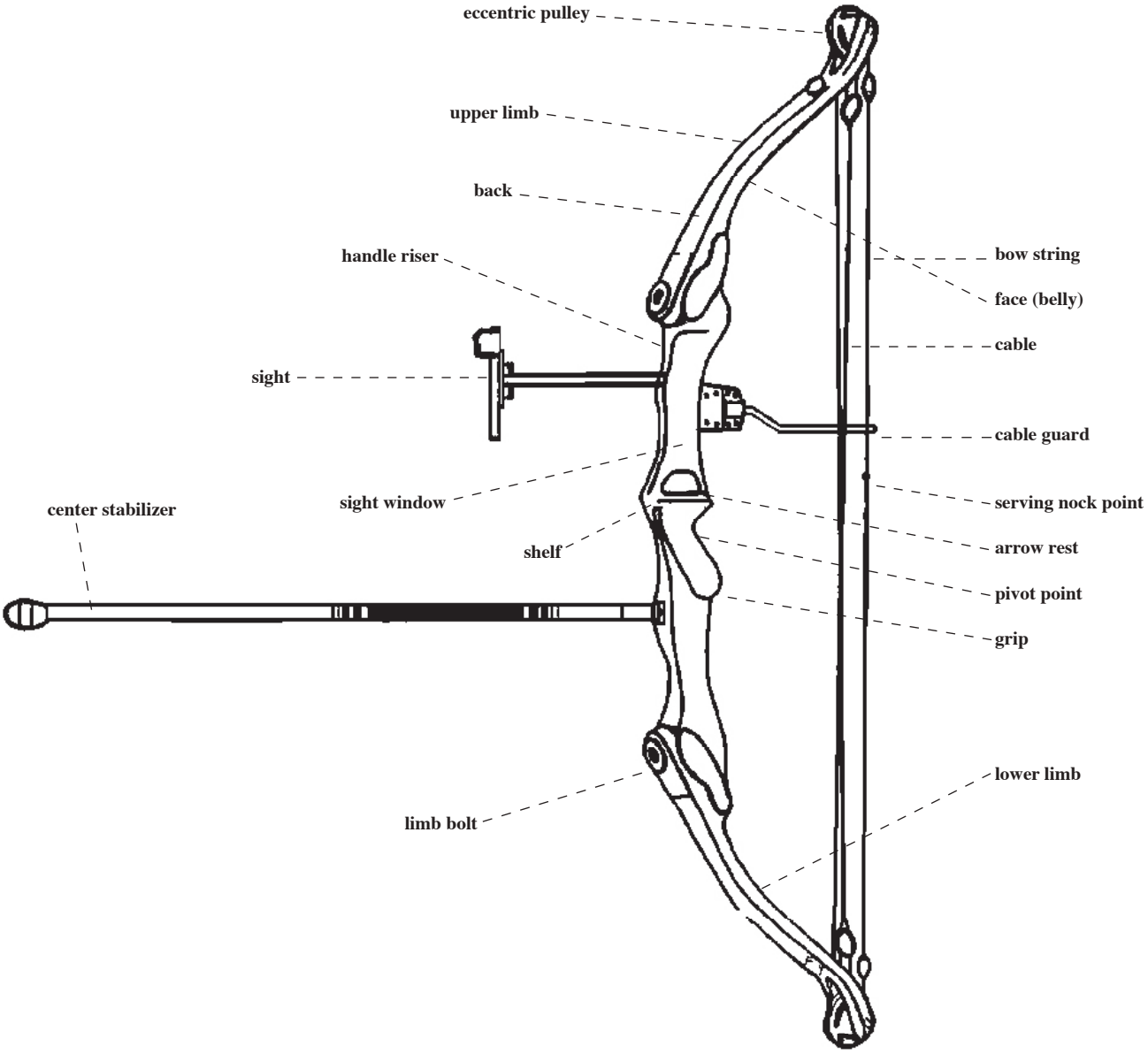
This lower hold weight is also employed in overcoming inertia making a much more efficient bow.

Bow Construction

Bow construction has been continually refined over the past two thousand years. Most bows produced today are made with metal handles and limbs of various laminated materials. While the one piece bow is still used in many beginner applications, the composite bow construction is much more common for our modern archers.

The Handle (Riser)

The handle is usually made of die cast aluminum, magnesium or similar alloys. Most have some degree of deflex and a replaceable grip. All are drilled for at least one stabilizer and a sight mount.



Handle length

Different handle lengths help each archer custom design the bow for individual application. A long sight window will allow for the sight pin set at both the short and long distances to be easily seen without being obscured behind the handle. The long handle, used with shorter limbs, still allows for acceptable cast with minimal stack.

Center shot

One of the greatest advantages of metal handles is that it can be cut past centre in the area of the arrow rest. Wooden handles did not have this luxury because of lack of strength. This prevented the archer from being able to place the arrow on the bow's centre line. This was a desirable, but near impossible feature until the advent of the metal handle. Modern laminating techniques have allowed the bowyer to cut some wooden handles past centre. In fact, most handles are now cut well past center, allowing for much greater tunability. This allows for the string to push the arrow more directly through the centre line of the bow.

The Limb

The limb is the part of the bow in which the energy is stored to be transferred to the arrow. Any limb or a limb of any material will do the job of propelling the arrow, however an archer requires consistency, stabil-

ity and speed. These characteristics are developed by the bowyer through trial and error and modern research.

Length (Recurve)

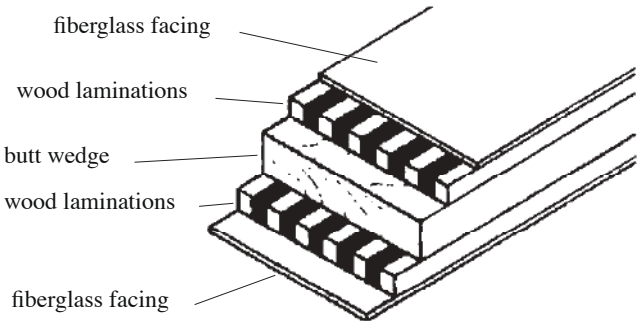
The modern take-down bow comes with a variety of limb lengths. A general rule of thumb is that the longer the limb, the smoother the draw, but this also allows for less cast. Shorter limbs, while giving greater cast, also have more finger pinch.

Length (Compound)

The points made regarding length and the recurve are also basically true for the compound, however the eccentric wheel compensates for some of the angle at full draw. The larger the wheel or cam, the less the finger pinch. Also, due to the extra weight at the limb tip, there can be an increase in speed. Therefore limb length influences speed less in a compound.

Limb Construction

One piece and take-down bow limbs are constructed using the same basic process, except one piece bows must be glued using the handle. The bow limb is constructed by laminating different materials together for better strength, reliability and speed.



Wooden strips or laminations are sandwiched between layers of fiberglass. The thickness of the fiberglass and laminations determine the stiffness of the limb and ultimately the bow's weight. To ensure that inconsistencies in the wood do not cause a weakness in the limb some manufacturers laminate their limbs in two planes. The wood, usually maple, is cut into thin strips about $^1/_8$" thick and 2" wide. These strips are then glued back together to form another block of laminations. This block is then rotated 90 degrees and $^1/_8$" strips are again cut. This produces laminations of wood with strength and resistance to twisting.

This also prevents a situation known as 'wind checking' (minute cracks which appear longitudinally along the edge of maple laminations) from spreading through the piece of wood, rendering the limb useless. This lamination process produces a stronger, faster and more torsion resistant limb with an automatic barrier to prevent wind check cracks from traveling more than $^1/_8$" into the limb.

Some manufacturers are using man made materials to replace wood in laminations. These are made from synthetic foam, which does not have some of the inconsistencies of wood. While slightly more expensive than wood, there is no need for strip laminating. To decrease the weight of the limb while retaining it's stiffness, laminations of carbon or graphite can also be used. This can add some speed to the limb, but increases the cost dramatically.

The laminations are then sanded to precise tolerances and glued over core pieces cut wedge shaped. Fiberglass is glued on each side. The gluing operation takes place in a heat controlled press which has been manufactured in the shape the limb will take. There is no single formula for the type of glue, amount of heat or time in the press. Each manufacturer spends many years in perfecting techniques.

Once the gluing process is complete, the limb is rough sanded and cut to the width required. The hardware required to mount the limb to the handle is then added and the reinforcement strips for the tips are glued in place.

The bowyer then mounts the limbs on a handle to find the centre of the limb tip. This ensures the completed limb will not have an inherent twist. From here a template guides the cutting of the limb's taper to the tip. The string grooves are filed into the tip and the limb is ready for final sanding and tillering.

Tillering

Tillering is a term that has changed a great deal in usage in the last decade. The term used to refer to the work and art of the bowyer when making the bow.

The bowyer had to modify the limbs to establish dynamic balance (permits the arrow to leave the bow without porpoising), though the top-limb was usually longer than the lower and the push of the archer's arm was below the arrow. Today tillering refers to the static relationship of the lower to upper limb denoted by the difference in measurement to the string from the upper and lower ends of the handle riser. The upper measurement is usually greater by between $^1/_8$" and $^3/_8$".

During the tillering and final sanding stages the bowyer must keep weighing the bow throughout the process to ensure the finished weight is correct within his tolerance level. Compounds and recurves are weighed using the same standard; that of the Archery Manufacturers Organization (AMO).

Once the tillering process is complete the bow is fine sanded and finished with a sealing varnish coat. A serial number is recorded to help the bowyer trace any manufacture problems that might occur.

Actual Bow Weight (Recurve)

The marked weight is the weight attained when the bow is drawn 26 $^1/_4$" (measured from the arrow rest to the bowstring). For each inch over or under 26 $^1/_4$", add or subtract 2 pounds.

Note: Bows manufactured prior to 1980 were weighed at 28 inches to the front of the bow. While both methods usually produce the same weight, you should be aware of the reason for slight variations in weight.

Some European and Asian manufacturers have been known to use 26" or other methods. The method of determining the weight is usually written on the bottom limb with the weight.

Compound Equivalent Bow Weight

The marked weight of a compound bow is the greatest weight attained by the bow while being drawn to full draw. Equivalent weight for arrow selection is calculated by adding peak weight to hold weight and dividing by 2.

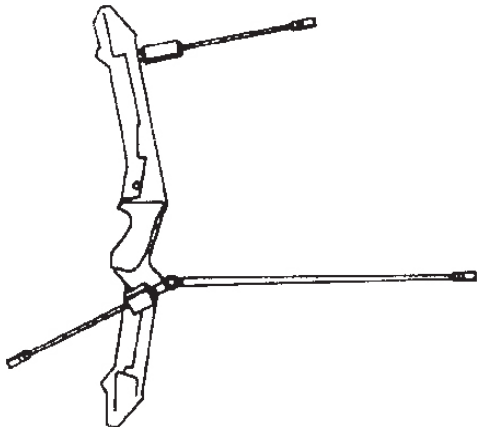
Note: The above weights allow for the use of the same arrow charts for compounds and recurves.

As bows became more sophisticated it became apparent that the more mass in a bow the better it shot. This was because the virtual mass of the bow prevented movement upon release.

With experimentation the archer found that the mass of the handle could be reduced if mass was added in the form of stabilizer rods in varying configurations. Different configurations allow for compensation of different types of torque.

Stabilizer Configurations

There are a myriad of different configurations of stabilizers used in modern archery. In all cases stabilizers are deployed to prevent movement of the bow in any plane until the arrow has passed the bow.



Frontal Stabilization

A slight vertical torque is induced in the bow due to the hand being below the thrust of the bow which is in line with the arrow. There can also be horizontal torque caused when the string slips off the finger tips or the release aid toward the bow shoulder. Stabilizers mounted on the front of the bow restrict these torques due to the inertia of the weight forward. The most popular of these has been the single long rod although twin front rods have also been quite common.

V Bars

V Bars also tend to restrict the horizontal, or left–right, torque of the bow. V Bars can also be adjusted to slow the tendency of the frontal stabilizers to tip the bow forward on release.

Counter Balances

Sometimes the weight out in front of the bow causes a radical swing forward of the bow. To compensate for this shorter stabilizers inside the handle can be added.

Torque Flight Compensators (TFC's)

TFC's are essentially small shock absorbers attached to the base of the stabilizer. They give a dampening effect to the stabilizer and provide a greater degree of stabilization for a shorter rod. Manufactured much like a shock absorber, the TFC also allows for adjustment in the amount of stabilizer movement at full draw and release.

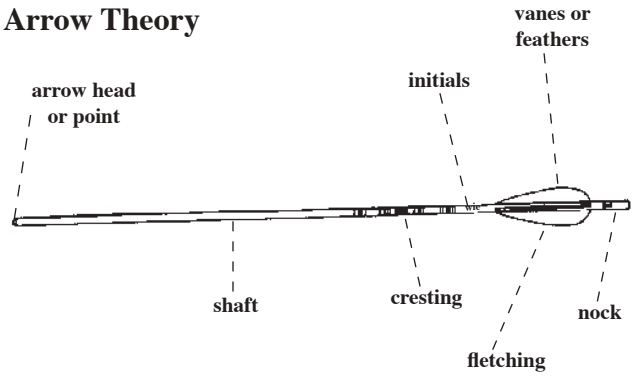
Weight and Length

The amount of weight added to the stabilizer is entirely up to the individual. The farther the weight is from the bow, the more it enhances the length of the rod. In all cases the amount of weight must not be in excess of the ability of the archer to hold it steady for the entire shooting day.

Stabilizer length is usually left to the archer, except in some heavy tackle applications where the official rules restrict the length to 12 inches.

Basically, the shorter the stabilizer, the more weight required for the same torque resistance. The weight should be adjusted to minimize the vibration of the long frontal stabilizer.

Arrow Theory



Spine

The original method of grading arrows was to match them by their amount of bend. The spine (stiffness) of an arrow shaft is the measured deflection in inches, of the shaft when depressed by a 2 lb weight at its centre. To facilitate measurement, the shaft is always supported at two points separated at a distance of one inch less than the arrow length. For example, a 28" arrow is supported on points 27" apart.

Arrow Length

The actual measured length of an archer's arrow is the arrow length. It is measured from the groove in the arrow's nock to the base of the point. To find the correct arrow length for an individual, measure an arrow at full draw. Add $^{3}/_{4}$" from the front of where the arrow contacts the arrow rest.

Draw Length

This is the measurement of how far the archer draws the string measured from the arrow rest to the bow string's nocking point at full draw.

Point of Balance (POB)

The point of balance is the point at which the arrow will balance, usually toward the point of the arrow from it's center. Find the POB by balancing the arrow on a sharp edge.

Front of Centre (FOC)

This is the amount the POB is forward of the actual mid-point of the arrow, expressed as a per cent. Good flight is usually attained when the arrow has an FOC between 6 and 11%.

Archer's Paradox

As the arrow sits on the rest at full draw the point of the arrow is usually slightly to the left of the centre line of the bow. It would seem to the uninitiated, the thrust of the string is straight down that centre line. Therefore it would appear that the arrow should be

deflected far to the left. But if the bow and arrow are properly matched and tuned, the arrow flies straight. This is called "the archer's paradox".

As the right handed archer releases the string it moves suddenly to the left to clear the fingers or release. It also carries the nock end of the arrow to the left. This introduces a small bend in the arrow, concave to the left. At the same time the bow's full draw weight presses on the arrow to move it. The inertia of the arrow, especially the weight of the forward end, resists movement and the bend is increased.

As the arrow moves forward the spine of the arrow tends to correct this bend. Also, the string moves with the nock of the arrow toward the right. The thrust of the bow is also decreasing in force, though increasing in speed.

The arrow moves forward in the bow about 1/4 to 1/3 of it's length during which time the arrow presses against the arrow plate or plunger. At this point the arrow has recovered from the initial bend and starts to bend convex to the left. The convex bend allows much of the arrow to pass the bow without any contact.

At a point when the string has passed brace height by approximately 1 or 2", the nock leaves the string. By then the bend has again started to go concave. This flips the nock end to the left enabling the fletch and nock to pass the bow without touching. This flexing or vibration of the arrow continues in diminishing magnitude for 10 to 15 meters. Proper tuning of the bow keeps this vibration to a minimum.

Fletching

There are many different types of fletching from the most basic feather fletch to plastic, mylar and rubber vanes. All fletches are required to do the same job for the arrow and that is to straighten it out as soon as possible. Arrow fletching beating left and right dampens the vibration of the arrow on it's way to the target. Straight fletch acts as a rudder while spiral or angled fletch causes slight drag until some rotation is achieved. The job of the archer and the coach is to find the best combination of stabilization with the least amount of drag.

In addition to drag by size of fletch, weight is also a very important consideration. Any increase in arrow weight adversely affects bow efficiency and therefore arrow speed and trajectory.

Feathers are the lightest of all fletching materials and produce the best drag due to their rough surface, however they are very susceptible to weather and become very heavy when wet. Today, feathers are used mostly by beginning classes and bow hunting due to their durability and ability to not deflect the arrow when proper clearance cannot be achieved. They are used by some tournament archers indoors, but are seldom used outdoors in any tournament application.

Most tournament archers use plastic, mylar or rubber vanes. These vanes are sometimes heavier than feathers but are weather proof and very durable.

A very important consideration is the height versus the length of the fletch because the greater the total area of fletch, the greater the stabilizing effect.

In practice, a longer, lower profile fletch will clear the bow much better than a shorter high profile fletch. In addition, the more angle at which the fletch is applied, the more drag produced, and therefore the smaller the size required.

Some types of fletch are designed to spin the arrow on the way to the target. While some spin is imparted, the fletch's design provides for more drag than spin and produces excellent results due to its high drag for small size design.

Points

The type, style, size and weight of the point is also a very important consideration. While airflow is not a major consideration, the shape of the point must allow for a clear airflow over the point and shaft. Most new points are of the bullet design, which is most efficient. In addition, this design causes less damage to target buttress and indoor netting.

Arrow point weight is one of the most important factors to be considered when matching arrows to a given bow. The heavier the point the more the arrow bends upon release. This causes the arrow to react like an arrow of less spine.

Arrow Types

Arrows are usually grouped into type by the material used in the shaft's construction. The following are the most common in use today.

Wood – Wood is used only by beginning archers, bow hunters and in traditional archery. It is very seldom used in target competition.

Fiberglass – Fiberglass is constructed of longitudinal fibers bonded into hollow tubes. Although nearly indestructible, this is seldom used in other than beginning applications. Very few manufacturers are continuing this type of shafting.

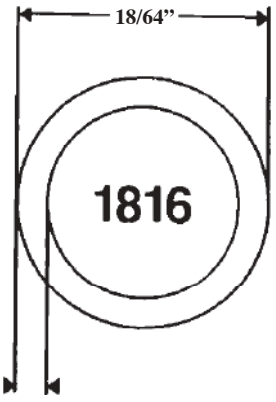
Aluminum – This is one of the most popular type of arrow shafting in use today.

Carbon Graphite – This is widely used by tournament athletes. It is durable and light and almost indestructible.

Size

Aluminum arrows are sized by a four digit number, e.g. 1816. This number corresponds to the shaft's diameter and wall thickness. In our example 18 is the diameter in 64th of an inch and 16 is the thickness in thousands of an inch. So our 1816 is $^{18}/_{64}$" in diameter and the thickness of the wall is $^{16}/_{1000}$" When using an arrow chart to find the correct arrow shaft, the user will find many suggested shafts for a given weight/ draw length combination.

Arrow Size



Experience will help, but basically, the thinner the wall the easier the arrow is to tune and adjust using the different tuning methods. A thin wall is also much more susceptible to bending and denting and therefore not as durable.

When deciding which shaft to purchase, many different factors must be considered. These include: use, i.e. target or field shooting; indoor or outdoor shooting; experienced or inexperienced archer.

The charts are laid out so as to also show weight and spine. Weight is an important consideration for cast. A lighter arrow will naturally fly further. However an untuned arrow, due to its fish tailing, will not travel as far as a heavier arrow tuned to the bow. The spine affects tunability.

Arrow Maintenance

Nocks

As the initial guidance is imparted to the arrow through the nock, it is the most critical part of the arrow. Tests have shown that misalignment of a few thousandths of an inch can cause a miss of about 15 cm at 40 meters. Therefore the nock must be installed absolutely straight. When replacing a nock, first ensure that all debris such as glue, lacquer and pieces of old nocks are removed.

This can be accomplished by dipping the end of the arrow in a solution of acetone or lacquer thinner or carefully rotating the tapered end of the shaft on a fine grit emery paper.

Note: In order to ensure the factory true straightness of the taper remains, if at all possible no abrasives should be used.

Apply a drop of fletching cement to the taper and spread it around with your finger tip. Quickly place the nock on the taper and turn it clockwise until the nock groove is aligned exactly as required. Carefully wipe any excess glue from around the nock and allow to dry. The arrow will be shootable within a few minutes, but for best results, allow up to one half hour.

Nock Straightness

To check for straightness, roll the shaft on a table top or similar flat surface or spin the shaft between your finger tips. If the shaft is fletched, it can be checked by blowing on the fletches and watching the nock as the arrow rotates.

Spinning and blowing for rotation takes some practice so be patient. Nocks should be checked for straightness before each shooting session and as often as possible during tournament shooting.

Nock Removal

Do not cut nocks off with a knife, as cutting may distort the taper. To remove the nock, heat it over a candle or propane torch while holding it with pliers. As the nock melts, pull it off with a twisting motion. Follow the same procedure to remove the remaining pieces.

Cutting

Measurement and cutting of the shaft is best left to qualified individuals such as authorized dealers and experienced coaches. The shaft is very precise and has to be cut with a proper high speed cutter. A tube cutter is not recommended for cutting aluminum shaft. The shaft should be lightly chamfered inside to remove cutting residue before installing points.

Points

When it is necessary to remove points, this must also be done over an open flame. A propane torch on low flame works well. Apply heat initially to the point itself, then sparingly to the shaft. Grip the point with pliers and pull it out. Allow the shaft to cool before handling.

When inserting the new point, place it in the shaft about 5mm, heat the point and apply heat melt (ferrule cement) to the point while rotating slowly. When the ferrule cement becomes liquid, place the point against a solid object and push. The excess cement can be wiped away while hot or easily broken away when cool.

CAUTION: When removing or inserting points using flame, use as little heat as possible on the shaft itself.

Straightening the shaft

Another technique to learn is that of straightening arrows. For the beginning archer, it is well worth it to have the arrows straightened by the Club Pro or the local dealer. However, it is a skill you and the archer will eventually find most useful.

There are many complicated machines available but most arrows can be straightened by hand. Hold the arrow near the nock and place the other end on the thumb and index finger of the other hand. Bring the nock near your eye and extend the other arm away from you gripping the arrow near the point. Rotate the arrow until you can see the bend, then rotate the bend toward the heel of your hand and bend the shaft over it lightly. With a lot of practice most arrows can be brought back to a reasonable degree of shootability.

The archer must learn to spin the arrow to check for straightness. Accuracy is affected by arrow straightness to the degree of proficiency the archer has attained. It is recommended that the archer learn to depend on straight arrows early in the career so that when the accuracy is there, another art doesn't have to be learned.

As with the nock, a bend in the fletch end of the arrow is more critical than one near the point (unless the bend is in the first six or seven inches, as only approximately this amount contacts the pressure point).

Arrow and Bow Tuning

The intent of bow tuning is to achieve arrow flight to the target that is true and provides the best grouping at the target. A well tuned bow is usually very forgiving, but no amount of forgiveness will make up for inconsistencies in form. At all times you must be aware of how well the archer is capable of shooting and if the problem is tuning or form.

There are many tuning methods and all work to some degree for different archers. The method illustrated here is the Bare Shaft Planing Test.

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 centre, that is, the arrow rest must be able to be moved a full range from inside centre to outside centre. 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 centre 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 centre shot. On a recurve bow center can be found by aligning the string to bisect the centre 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 centre of the grip. Using the centre 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 it's limbs between two chairs, the arrow will hang on the bow's centre 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.

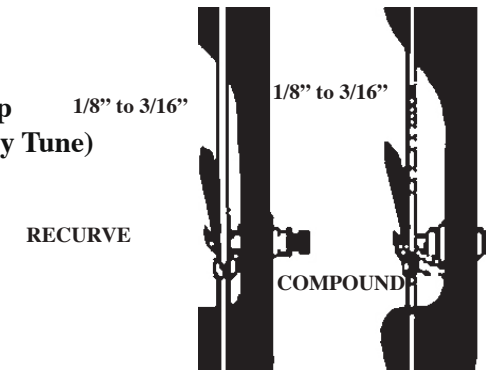
Brace Height

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 it's effect noted.

Basic Set Up (Preliminary Tune)



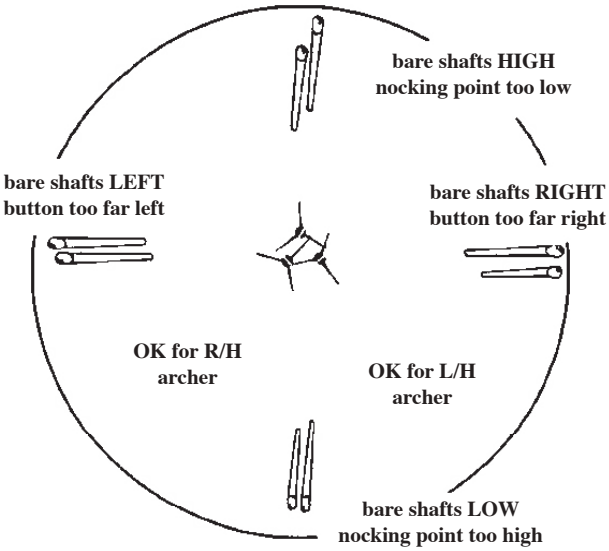
The bow is now ready for fine tuning. The process described above will provide a basic tune for bows shot by beginners to novice. Once basic form is perfected and the archer is capable of grouping, fine tuning can be attempted.

The Bare Shaft Planing Test

The Bare Shaft Planing 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.



Porpoising (Nocklng Point Adjustment)

The up/down (vertical plane) movement of the arrow to the target is called “porpoising” 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 l5cm) 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 porpoising 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 centre 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 $^1/_2$ lb. 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 Planing Test also apply here. If the tear is vertical, adjust the nocking point (porpoising). If it is horizontal, adjust the centre 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 rest to the left in $^1/_{16}$" increments
- checking for adequate clearance past cables and cable guard
- relaxing bow hand to eliminate excessive torque
- increasing peak bow weight
- moving arrow rest 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 it's 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

There are four main types of string material in use today:

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.

Kevlar – a trade marked fiber introduced in the 1970's. It is stronger than Dacron on a strength per unit weight basis and stretches much less than Dacron. Kevlar is highly subject to abrasion, producing strings with a relatively short life.

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 and 3 times more than Kevlar. It is now a very popular string material for tournament archers.

By far the greatest number of strings made today are of Dacron, however many tournament archers are turning to Fast Flight for the increase in speed due to less stretch. Some compound manufacturers are also using Fast Flight strings, and replacement cables are also available for some bows. Fast Flight does produce more speed and lower trajectory than other

string materials and is a string that lasts for as long a time as Dacron.

There is, however, a serious trade off. While the limb is returning to brace height, the normal stretch of other materials produces some cushioning effect.

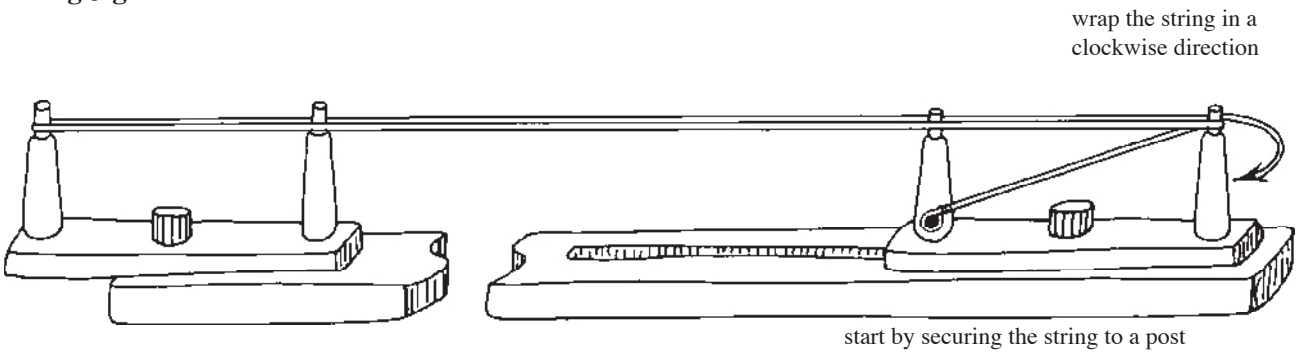
Without this cushion, the strain on the limb tips and other parts is tremendous, especially in the case of high speed bows with light (carbon) arrows. Increased limb breakage has been a definite factor since the introduction of Fast Flight strings.

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.

Bow String Construction

String Jig



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 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.

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.

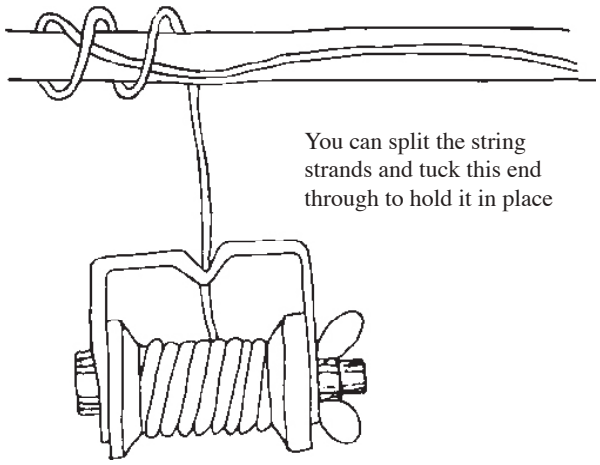
When you have enough strands, secure the string on the post.

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.

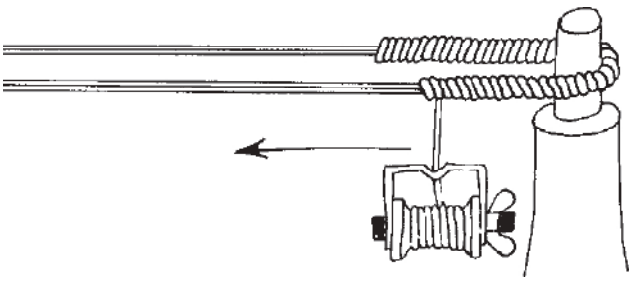
Start spinning the server over the stands; remember to wind in a clockwise direction. Serve about 12cm or 5". This illustration shows how to start the serving.

Keep the serving snug and neat
Serve at least 10 turns to secure serving



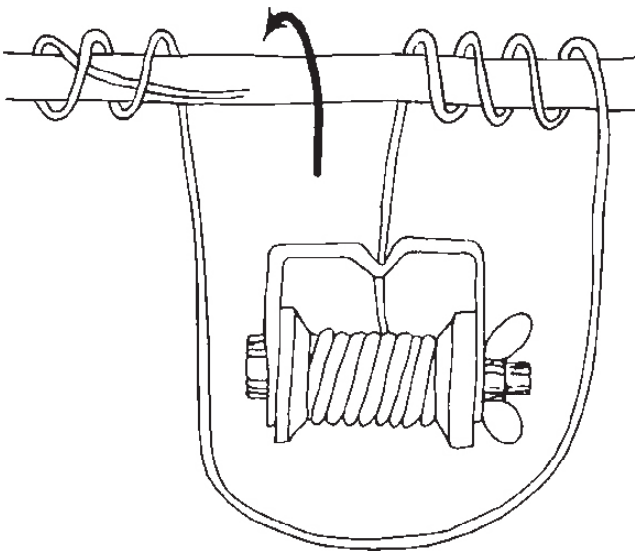
Serve one end at a time. Next, turn the jig back to full length, allowing the serving to overlap slightly.

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 or recurve at the tips. A compound only requires a few inches of serving.

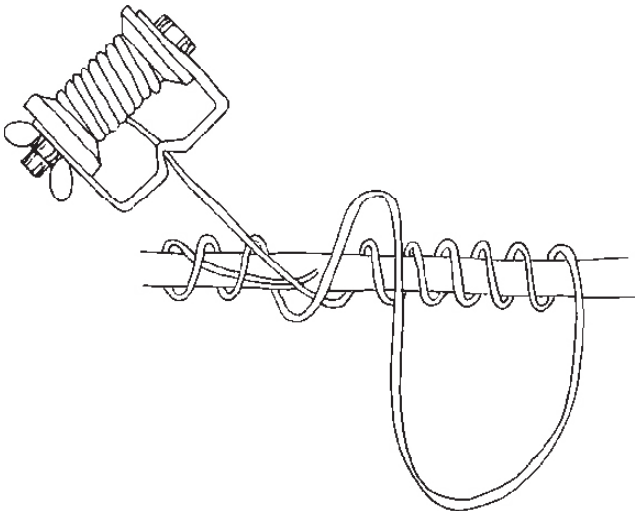


The following diagram shows how to finish the serving. Hold onto the bottom loop with your four fingers to give yourself room to wrap the server back on the string. Serve about 10 wraps to ensure that the serving will remain secure.

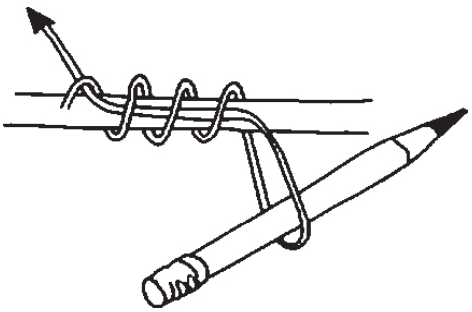
Wind back about 10 turns



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.



Continue serving the other loop following the same procedure.

When making the centre serving, ensure that it is long enough to cover the area required for the bow square. Serving must be tight enough to offer protection, but not so tight as to cause breakage of strands.

Test that the diameter of the serving is large enough for proper arrow nock fit. If the nock is too tight, a smaller diameter serving can be used. If the nock fit is too loose, you can embed a short piece of string material under the serving as you serve the nocking point area.

Peep sights can be served on the string using the same technique as just shown.

Once the string is complete on the jig, it is removed and the bow is strung. Check the brace height immediately. The new string can usually be stretched somewhat by pressing down the recurves. It is important that all measurements be recorded and amended as necessary. After string peeps, nocking point locators, etc., have been added, the string is ready to be shot. All strings should be test shot to ensure they are working as close as possible to that of the original. Dacron strings must be 'shot in' to allow for any stretch. It is also important that the archer check the tune and cast of the new string. The archer should have the same confidence in the spare string as the one being shot.

ARROW FAULTS

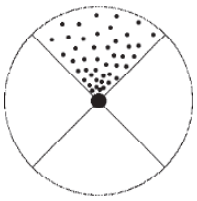
This unit is designed to be used in conjunction with the case studies used in coaching clinics.

In order to raise the score of an archer, one must be able to analyze the arrow patterns on the target and make correct judgements as to what has caused them. One must be aware of recurring misses or the movement of a single arrow out of the group. In some instances, these movements may occur at a particular distance, or as the result of certain weather conditions which have a bearing on the function of the archer or equipment.

When a problem becomes evident, the total form must be analyzed to decide what action should be taken to correct the situation. Correct performance must be reinforced rather than dwelling on incorrect form. Often the area of the body where the symptoms of the errors are noted is not where the cause originates. In order to properly correct problems, one must be able to distinguish between the symptom and the cause of the problem.

ARROW PATTERNS

High Arrows



Causes

- bow is held too low on the grip which stresses the lower limb, building up extra limb stress, lifting the arrow on release
- wrist is broken more than usual, applying pressure lower on bow grip, increasing lower limb stress

Correction

- ensure that bow grip is always consistent and in the same position on bow

Use reference locations as a check.

Cause

- raising the bow hand at the moment of release

Correction
- a good follow through must be maintained. At the moment of release all tension must remain the same as it was before the release.

Cause
- bow arm or shoulder is extended more than normal which increases draw length and may also cause left shots

Correction
- allow the bow arm to seat itself in the shoulder socket. Apply only enough pressure toward the target to keep the bow arm straight.

Cause
- pinching down on the arrow may raise it off the rest or cause a bend in the arrow which, on release, flips the arrow up off the rest. Pulling more with the bottom fingers loads the lower limb.

Correction
- feel an even and consistent pressure on the fingers of the drawing hand during and after the draw
- if elbow of drawing arm is held too high, this could put extra pressure on the bottom finger

Cause
- flicking fingers down on release.
- allowing fingers to open one at a time with the lower one last rather than all at the same time

Correction
- use only the proper back muscles to draw and hold the bow. Ensure that the hand is relaxed. Release should be accomplished by simply relaxing he fingers of the drawing hand

Cause
- lifting the nose off the bow string or tipping the head backwards

Correction
- The anchor must always be consistent and with nose slightly touching the string for recurve archers. The use of a kisser button or peep sight may help.

Cause
- mouth open has the same effect as lowering the anchor if lower jaw is used as anchor point

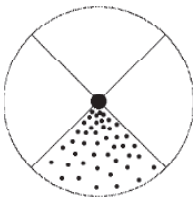
Correction
- Always keep the teeth together.

Cause
- anchor too low or too far back

Correction
- Spend enough time during practice to learn the exact location of the anchor and then maintain that position.

Equipment Concerns
- nocking point moves down from its correct location, causing increase in size of groups and "porpoising" of the arrow in flight
- new string may have a lower brace height or fewer strands
- check for broken strands in an old string
- if the arrow rest is too low, arrows may strike the bow shelf
- arrow rest installed at an angle
- nocks off line on shelf, pointing up at the back

Low Arrows



Cause
- gripping the bow tightly when a loose grip with a sling is normally used

Correction
- Spend more time during practice sessions to work on keeping the fingers of the bow hand are open and relaxed.

Cause
- bow arm bent which shortens the draw length

Correction
- maintain enough tension in the bow arm to hold it straight and pointing towards the target

Cause
- no follow through – collapse on release
- bow arm drops

- drawing hand moves forward on release
- creeping
- dead release

Correction
- All of the above are caused by insufficient back tension during the shot. The archer must be taught how to maintain tension throughout the shot, as well as concentrating and aiming.

Cause
- low elbow of drawing arm

Correction
- Ensure that elbow is in a line with the arrow or slightly higher. It is easier to use the back muscles with a high elbow.

Cause
- tension in knuckles of drawing hand with the hand cupped

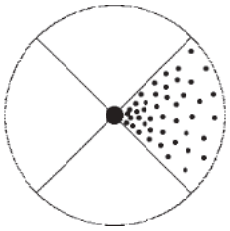
Correction
- The drawing hand must be kept completely flat by relaxing all the muscles of the hand except the tips of the fingers.
- The arm should be straight from the elbow to the second joint of the fingers.

Cause
- inconsistent head position, especially chin too low

Correction
- Head angle should be carefully learned during practice. Use of kisser button may help.

Equipment Concerns
- nocking point has moved up the string
- arrow rest is worn causing arrows to drop off
- new string has a brace height higher than normal
- interference from clothing or arm guard
- rigid or sticky tab or glove
- nocks off line on shaft, pointing down at the back
- hand gripping the bow handle

Right Arrows



Cause
- The bow hand is too far to the left causing clockwise (positive) torque in the bow.

Correction
- Establish reference points on bow hand to accurately position the hand for each shot.

Cause
- canting the top limb to the right

Correction
- Hold the bow vertically. Use the level as a training aid.
- Check to be sure that changes of head angle are not causing bow cant.

Cause
- head angle changing during shooting

Correction
- Check body alignment and head position. Reinforce alignment during practice sessions.

Cause
- plucking or allowing the drawing hand to move away from the face sideways

Correction
- Ensure that tension is maintained in the back at the moment of release.

Cause
- string alignment too far to the left of the bow

Correction
- Move the anchor slightly to the right or turn your head to put string alignment in proper location on the bow.

Cause
- bow arm moves to the right at moment of release

Correction
- Continue concentrating and aim-

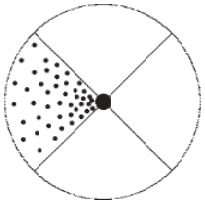
ing during and after the shot.

Cause
- anchor too far to the left on the face

Correction
- The coach and archer must be aware of the correct anchor.
- The archer must have enough reference points to enable him to anchor in exactly the same location each time.
- Practice sessions should be used to work on the anchor. Watch for changes in string alignment.

Equipment Concerns
- nock off line with shaft, pointing right at the back
- worn arrow rest
- arrow spine too soft
- improper cushion plunger adjustment or loose locking screw which will allow plunger to move in
- twisted recurve or limbs out of alignment
- sight mounted at an angle causing right or left shots depending on the distance being shot
- low brace height

Left Arrows



Cause
- bow hand too far to the right of bow grip

Correction
- Establish reference points on the bow hand to accurately position the hand the same for each shot.

Cause
- canting the top limb of the bow to the left

Correction
- Hold bow vertically. Use the level as a training aid. Be aware of changes of the head angle that could cause bow canting.

Cause
- head angle changing during shooting

Correction
Check body alignment and head position. Reinforce this during practice sessions.

Cause
- anchor is further to the right than normal

Correction
- The coach and archer must be aware of the correct anchor.
- The archer must have enough reference points to enable him to anchor in exactly the same location each time.
- Practice sessions should be used to work on the anchor.
- Watch for changes in string alignment.

Cause
- string alignment too far to the right

Correction
- Move the anchor to the left or turn head slightly to put the string alignment in proper location on bow.

Cause
- leaning body backward

Correction
- Stand up straight. Imagine the head as being pushed up to the ceiling.

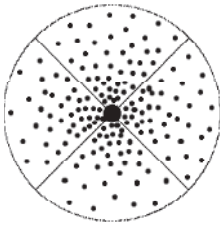
Cause
- string striking bow arm or clothing

Correction
- Ensure that the shoulder is down and the back elbow is turned under.
- Wear tight clothing or use a chest protector.
- Use a more open stance to get better clearance.
- Bow hand may be too far to right on handle.

Equipment Concerns
- nock off line with shaft, pointing left at the back
- arrows falling off worn arrow rest
- arrow spine too stiff
- cushion plunger improperly adjusted or loose locking screw which will allow plunger to move out
- recurve twisted or limbs out of alignment

- sight mounted at an angle causes left or right arrows, depending on the distance being shot

Arrows Scattered



When the error is inconsistent and several types of faults are made, there will be a scattered pattern on the target. This usually indicates that the archer needs more basic instruction because he/she lacks uniformity in his/her sequence. A poorly tuned bow will often produce a scattered pattern on the target. Usually, this condition is also accompanied by poor form, but can be the result of several factors incorrectly adjusted causing the equipment to be overly sensitive, magnifying the smallest error on the part of the archer. The equipment should be completely retuned and should not be used in the present condition.

Technique Analysis

Stance (step one)

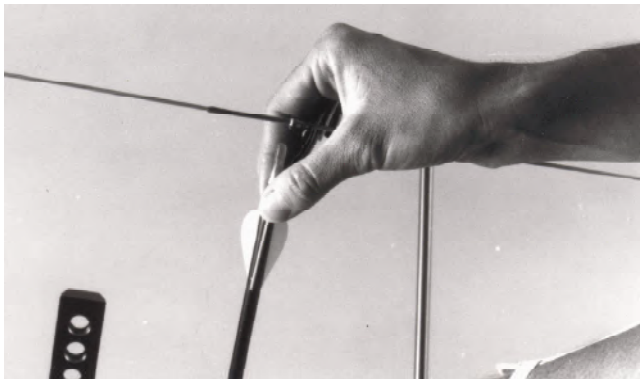
Once the archer has the basic stance, clearance or other problems may manifest themselves. Consider the following:

Regular Stance: This offers the best alignment of the shoulders, but has the lease 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.

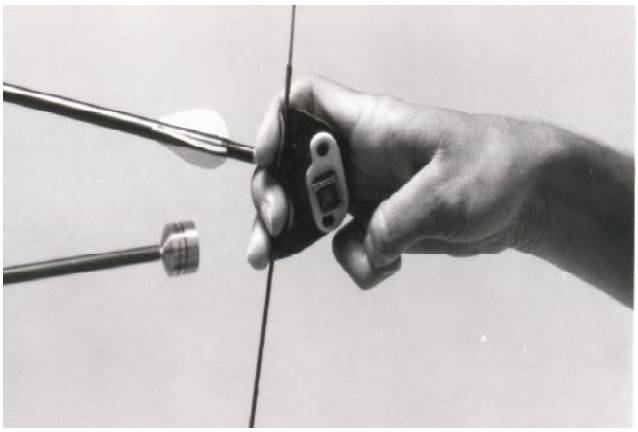
Nocking the Arrow (step two)



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.

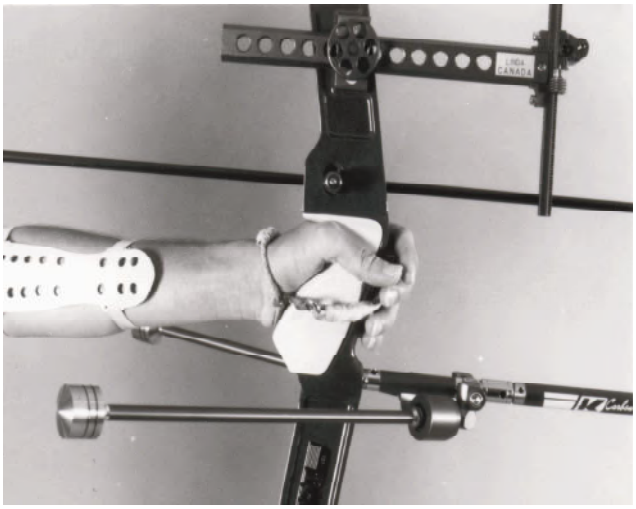
With a deeper hook, it is important to take more of the weight on the middle finger. This allows for less forearm strain and easier clearance of the other two fingers.

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 contact 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 it's 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 be aware 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 bowhunter 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.

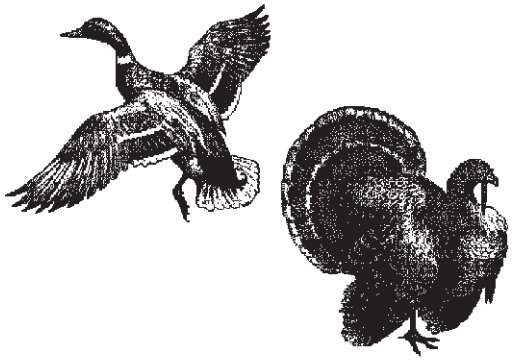
Follow Through (step nine)

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.

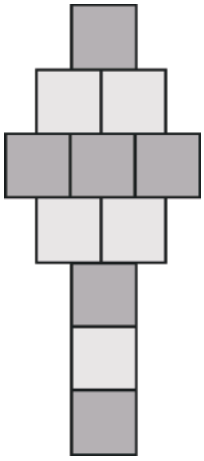
ARCHERY GAMES



HOPSCOTCH

Equipment: butts - bows - arrows - hopscotch drawings
Aim of the game: align 3 arrows in a diagonal, horizontal or vertical lines
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: 3 arrows per archer, the number of ends depends on your free time

Rules: different types of hopscotch alignments



BIRD SHOOT

Equipment: butts - bows - arrows - target face with bird or figurine drawing (any little piece of cardboard will do) 2 x 4 or 4 x 8cm.
Aim of the game: hit the bird or the figure before the others (traditional archery game).
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: X times-one
Rules: All players are lined up.
During each end:

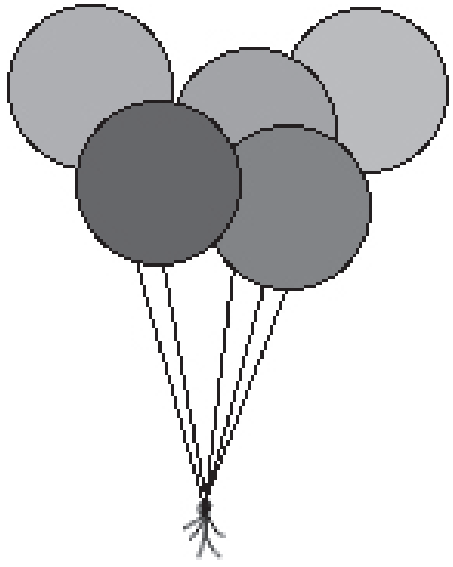
- The 1st arrow is shot from left to right.
- The 2nd arrow is shot from right to left
- The 3rd arrow is shot from left to right, etc... until the bird or the figurine is hit.

BALLOONS

Equipment: butts - bows - arrows - target face with drawing of balloons of different colors and sizes
Aim of the game: hit the balloons which are worth more points depending on color and size
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: 3 arrows per archer.
Number of ends depends on your free time

Scoring:	Yellow balloon:	10
	Red balloon:	8
	Blue balloon:	6
	Green balloon:	4
	Purple balloon:	2

- Depending on archer ability, it is possible to make the game more interesting by varying the diameter of the balloons.



501 POINTS

Equipment: butts - bows - arrows - dart target
Target description: The target face is divided into sectors each having a number from 1 to 20:
zone 1: doubles zone 2: singles
zone 3: triples zone 4: centre (25 points)
zone 5: double centre (50 points)

Aim of the game: bring the score down to 0 before your opponent, each team starting off with 501 points.
Shooting distance: variable, depending on archer ability
Number of players: individuals
teams of 2 - Teams of 3
Number of arrows:
individuals = 6 arrows
teams of 2 = 3 arrows
teams of 3 = 2 arrows each
Number of sets: individuals = 3
teams = 5 sets

Rules: The game must start and end with doubles

GOLF

Equipment: butts - bows - arrows - target face with golf drawing
Aim of the game: Complete a round on the golf target face or, in succession, shoot an arrow in each "hole" numbered from 1 to 12.
Shooting distance: variable, depending on archer ability
Number of players: individuals - teams of 2 or 3
Number of arrows:
individuals = 3 arrows
teams of 2 = 3 arrows
teams of 3 = 3 arrows

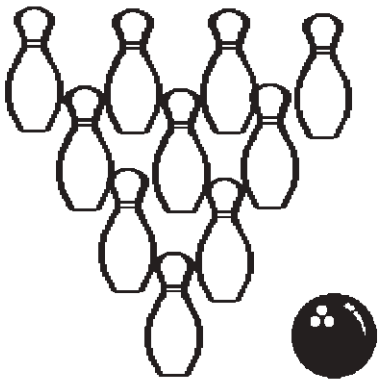
Rules: Scoring is based the zone of impact: rough, fairway, bunker. With your home-made target face, scoring is as follows:

- Hole #1 is the first target:
  first shot = 100 pts
  second shot = 50 pts
  third shot = 10 pts
- Each player or each team can only shoot 3 arrows at the same hole, and must go on to the next hole if the target has not been hit after the three shots.
- If the target is hit with the first arrow, the other two arrows are not shot.

BOWLING

Equipment: butts - bows - arrows - bowling target face
Aim of the game: simulate a bowling game
Shooting distance: variable, depending on player ability
Number of arrows: a maximum of 2 per end
Number of ends: as many as are necessary to fill a real bowling score sheet = 10 (minimum)

Rules: The archer shoots an arrow. If the player gets 10, a strike is scored and no other arrow needs to be shot. If the players gets something other than 10, then a second arrow is shot in hopes of getting a spare. If the score still does not total 10, the higher score of either arrow is written down.



THE LINE RACE

Equipment: butts - bows - arrows - target face with numbers drawn on it
Aim of the game: be the first one to go through the row of numbers
Shooting distance: variable, depending on archer ability
Number of players: individuals - pairs
Number of arrows: 3 arrows each

Rules: Each archer goes through the row from smallest to highest number.
- They can not shoot at the next number until they hit the preceding one.
- If they hit an occupied section, they must start all over again.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

WORD GAME

Equipment: butts - bows - arrows - target face with big letters drawn on it
Aim of the game: reconstruct a word drawn randomly before the match
Shooting distance: variable, depending on archer ability
Number of players: teams of 3 or 4
Number of arrows: teams of 3 = 4 arrows each
Teams of 4 = 2 arrows each
Rules: Each player is free to shoot at any given letter providing it can be found in the drawn word. The first team to hit all the letters in the word wins.

A	B	C	D	E
F	G	H	I	J
K	L	M	N	O
P	Q	R	S	T
U	V	W	X	Y

SOCCER

Equipment: butts - bows - arrows - 80cm target face
Aim of the game: Start before the opponent and score as many points as possible.
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: 3 arrows
Number of ends = 6

Rules: You can only score points after having shot your arrows in the bull's-eye; this counts as a "touchdown".
A touchdown = 10 points.
- The player continues to score during the next round as long as he/she stays in control of the "football".
- Control is lost once the opponent embeds an arrow in the bull's-eye.
- You must then try to embed an arrow in the bull's-eye to prevent your opponent from scoring and to give yourself a chance to eventually score.
- The winner has the highest point total.

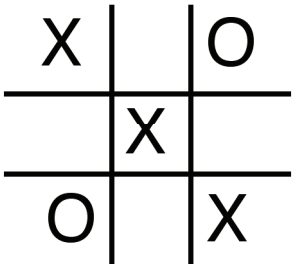
X'S AND O'S

Equipment: butts - bows - arrows - target face with X and O drawing
Aim of the game: Align 3 arrows either horizontally, vertically or diagonally and prevent the opponent from doing the same.
Shooting distance: variable, depending on archer ability
Number of players: individuals - teams of 2 or 3
Number of arrows: individuals = 6 arrows each
teams of 2 = 3 arrows each
teams of 3 = 2 arrows each
Number of sets: individuals = 3 teams = 5

Rules: After each end, 4 results are possible:

A 2 alignments of 3 arrows = 100pts
B 1 alignment of 3 arrows = 50pts
C 1 alignment of 2 arrows = 10pts
D no alignment = .50pts

With C or D results, the archers take back their unaligned arrows.



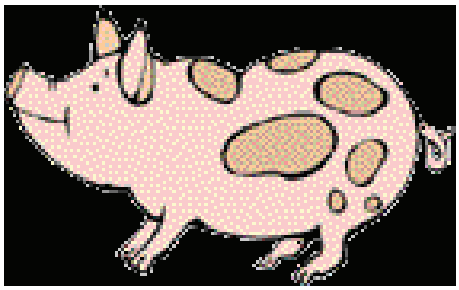
THE "YOU ARE BACON" GAME

Equipment: butts - bows - arrows - target face with drawing of pig
Aim of the game: make as many points as possible or hit each part of the pig
Shooting distance: variable, depending on archer ability
Number or players: individuals - teams of 2
Number or arrows: 3 arrows each
Number of ends: 6

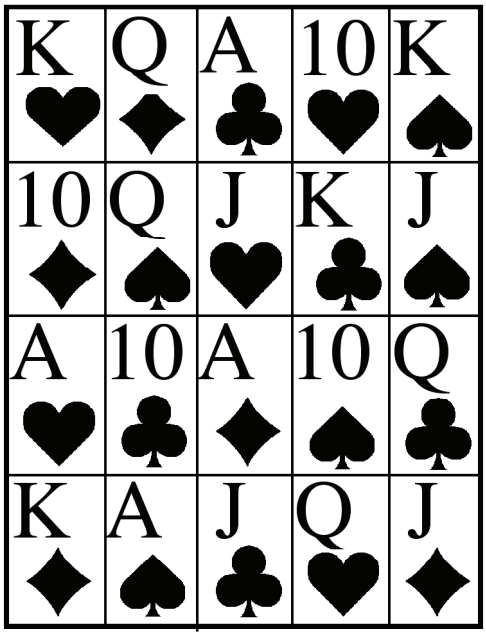
Rules: Scoring:

Tail	= 12	Nose	= 11
Groin	= 10	Forelegs	= 9 & 8
Hind legs	= 7 & 6	Ears	= 5
Head	= 4	Shoulder	= 3
Thigh	= 2	Body	= 1

- If all pig body parts are hit, 25 extra points are awarded.



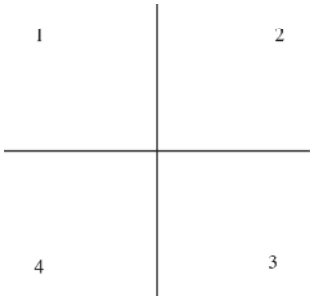
POKER



THE LAND GAME

Equipment: butts - bows - arrows - 80cm target face
Aim of the game: score as many points as possible
Shooting distance: variable, depending on archer ability
Number of players: individuals (4 = 1 per land) or 4 teams of 2
Number of arrows: individuals: 3 arrows each
teams: 4 arrows each
Number of ends: 6
Rules: Divide the target face into 4 lands.

- Each player or team must shoot in their assigned lands.
- The points are tabulated from 10 to 1.
- If an arrow is embedded in an opponent's land, it is added to the opponent's point total.
- Variation: Points may be subtracted if arrows are embedded in an opponent's land.



LONG DISTANCE SHOOTING

Equipment: butts - bows - flu flu blunt arrows - flag
Aim of the game: shoot as far as possible, aiming for the flag
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: individuals = 6 arrows each
Number of ends = variable

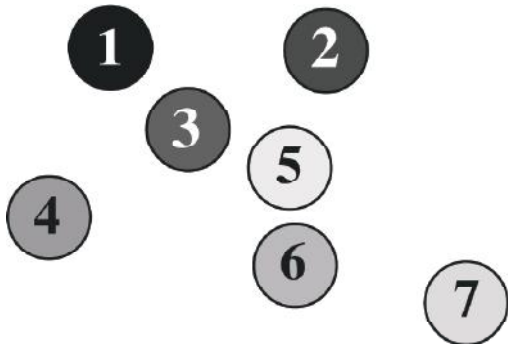
Rules: An open treeless field, approximately 50 meters wide and at least 300 meters in length, is required.

- Each archer shoots 6 arrows, only the one travelling the furthest distance counts.
  Each best arrow is worth 5 points.

POOL

Equipment: butts - bows - arrows - target face with drawing (the balls are numbered)
Aim of the game: Hit the balls and get their face value; the more points the better.
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: individuals = 3 arrows each
Number of ends = 5
Rules: Maximize your point total by hitting the balls with the highest face value. You can hit the same ball several times.

- Variation: After hitting a ball, double your score by hitting one of the pockets (black dot) with your next arrow.



DICE GAME

Equipment: butts - bows - arrows - 80cm target face - 1 die
Aim of the game: score the prescribed number of points
Shooting distance: variable, depending on archer ability
Number of players: individuals
Number of arrows: 1 arrow each
Number of ends = 10

Rules: Throw the die. Based on its outcome, we must get the prescribed score:
1-2-3-4-5. If you roll a 6, roll again.

- Each target color is worth:

Yellow:	5 pts
Red:	4 pts
Blue:	3 pts
Black:	2 pts
White:	1 pt

- Each time the result conforms to the roll of the die, 1 point is added.

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