National Coaching Certification Program

Coaching Association of Canada

Competition Coaching Introduction
Learning to Train (On-Snow)
Cross-Country Skiing

REFERENCE MATERIAL

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Learning to Train (On-Snow)
Cross-Country Skiing

REFERENCE MATERIAL

CROSS COUNTRY
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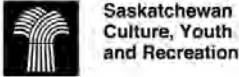
Good ski technique habits should be further developed through repeated practice and the use of games that reinforce the technique being taught. All basic cross-country ski skills should be refined by the end of the Learning to Train stage of athlete development.

Prepared under the authority of
Cross Country Canada's
Coach and Athlete Development Committee

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 and Training

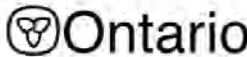|		
ALBERTA SPORT, RECREATION PARKS & WILDLIFE FOUNDATION	BRITISH COLUMBIA	*Sport* MANITOBA
Newfoundland Labrador	New Nouveau Brunswick CANADA — Culture and Sport Secretariat / Secrétariat à la Culture et au Sport	
SPORT NORTH FEDERATION	NOVA SCOTIA Health Promotion and Protection	Nunavut
Ontario	Prince Edward Island — Community and Cultural Affairs Sport & Recreation	
Sports-Québec	Saskatchewan Culture, Youth and Recreation	Yukon Community Services Sport and Recreation Branch

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IG *Investors Group*

ATHLETE & COACH DEVELOPMENT PROGRESSION

Athlete Age	LTAD Stage	NCCP Context
23 +/- males 23 +/- females	Training to Win (T2W)	Competition Coaching: High Performance (CCHP)
20 - 23 +/- males 19 - 23 +/- females	Training to Compete (T2C)	Competition Coaching: Development (CCD – T2C)
16 - 20 +/- males 15 - 19 +/- females	Learning to Compete (L2C)	Competition Coaching: Development (CCD – L2C)
12 - 16 males 11 - 15 females	Training to Train (T2T)	Competition Coaching: Introduction (CCI – T2T)
9 - 12 males 8 - 11 females	Learning to Train (L2T)	Competition Coaching: Introduction (CCI – L2T)
6 - 9 males 6 - 8 females	FUNdamentals	Community Coaching (CC)
0 - 6	Active Start	Community Coaching: Introduction (ICC)

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RESOURCE LIBRARY

The purpose of the NCCP Reference Material is to provide you with a resource "library" to assist you in the ongoing development of your coaching skills.

The content of this document is intended to complement the information provided in your NCCP Community Coaching and Learning to Train (Dryland) materials, and is directed primarily at supporting you in your role as a coach working with children in the Learning to Train stage of athlete development.

The Collection, Use and Disclosure of Personal Information

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The following section complements the information provided in section 8 of your NCCP Introduction to Community Coaching Reference Material and section 1 of your NCCP Community Coaching Reference Material.

1.1   Athlete Recruitment

Note: Sections 1.1.1 and 1.1.2 provide generic information on the subject of athlete recruitment. The details provided may be more or less applicable to the sport of cross-country skiing. They are intended to offer ideas and insights that can be adapted as and when applicable to the cross-country skiing scenario.

1.1.1   Recruitment Strategies

Have a Game Plan

The great baseball philosopher Yogi Berra once said, "You got to be careful if you don't know where you're going because you might not get there." In his inimitable style, he was probably trying to say that in order to get where you're going, you have to know where you're going. This is very much the case with recruitment and the efforts directed at bringing new participants into your sport.

Recruitment, as in any marketing effort, is a step-by-step process that requires careful planning in order to receive optimal use of resources and achieve the best results. An organization, for example, that produces an expensive recruitment brochure or video, without giving any thought to audience or messaging, may be missing opportunities or spending far more time, effort and money than is necessary. You wouldn't go into a championship final without a game plan - don't go into a recruitment drive without a communications strategy.

Define Your Objectives

At the end of the day, what do you want to achieve with your recruitment strategy? How are you going to use this strategy? How many athletes and what quality of athletes?

Know your objectives in order to keep your recruitment efforts on track and to evaluate whether the strategy succeeds in meeting these objectives.

Define Your Audience

Who do you want to attract to your sport? People with the potential skills to participate in your sport are your primary audience. However, secondary audiences such as coaches, parents, schools and community groups should also be considered. The key is to define an audience that is relevant - that is, one that would respond to your messages - while being fairly inclusive so that you don't miss any opportunities.

Do Your Research

Attracting athletes to a sport is no different than attracting buyers to a product. To be successful in recruiting athletes, you need to "sell" your sport. Recruitment efforts should therefore outline the benefits. Think about what there is about your sport that is appealing to an athlete. What can you offer athletes?

As well as looking at how you would like your sport to be perceived, look at how your sport is currently perceived by the general public and if these perceptions (whether accurate or mistaken) will be an obstacle in your recruitment strategy.

This preliminary research will help you define your messages and audience. For example, if your sport has a reputation as being an aggressive sport and you want aggressive athletes, your messaging should reflect this. On the other hand, if your sport has a reputation for being an aggressive sport and you want to refute this perception, your messaging should downplay the aggressive nature of your sport and promote other attributes.

Food for Thought: If you anticipate some negative response to your recruitment efforts, be prepared with reliable, objective facts and figures to refute negative attitudes about your sport. This need not be a "visible" part of your recruitment communications – that is, if you decide to produce a brochure, highlighting in it the "drug-free" aspects of your program may only invite negativism which may not have materialized without this reference. However, information (key messages and responses) about "Drugs in Sport" is useful to have in your back pocket, should it become an issue during recruitment efforts or at any time if it becomes an issue in the media.

Define Your Messages

Now that you are clear about your recruitment objectives, audience and what your sport has to offer, it's time to define your specific messaging. This is information you want to get across in all communications, whether visual or verbal. "Messages" can be factual - ''the Bunnyrabbit Program at the X Cross-Country Ski Club can accept more participants; phone 555-2222 to enroll your child" - or implied – a video showing kids having fun, verbal endorsement from a sport role model, etc.

Messages (and all recruitment communications) should invite the audience to respond both literally and emotionally. After your recruitment effort – through written material, videos or face-

to-face contact - potential recruits should see themselves involved in your sport, and will also have the information they need to respond.

Messages/communications materials can be tailored according to the target audience's information needs. An example of a matrix of audience/messages is below:

Audience	Their Information Needs (Messages)
Parents/Children/ Coaches	✓ Great sport to be involved in ✓ How to get involved, etc
Media/Public	✓ Promotes healthy lifestyles ✓ Provides healthy alternatives for children and teens ✓ Athletes are good role models ✓ Sport teaches important life lessons
Schools, Universities, Colleges	✓ Great sport for your athletes/coaches ✓ Sport can help build student morale ✓ Sport can generate revenue ✓ Provides healthy alternatives for students ✓ Promotes healthy communities ✓ Athletes are good role models ✓ Sport teaches import lessons outside the classroom

Food for Thought: "Sell your messages to yourself." Make sure that your messages are consistent and clear, and that "messagers" (i.e. coaches and other spokespersons) are clear on the messages. This is vital - first, you want to be sure that everyone understands the game plan, and second, you want to be sure that everyone is on the same page of the play book.

Know Your Limitations

Recruitment takes time, effort and, in some cases, money. Decide in advance what your resources are, and how you will use them to achieve your recruiting objectives. Prioritize your efforts and keep a running "inventory" of your progress. Game plans need to be flexible when challenges arise (e.g. budget, other time commitments).

Coordinate With Other Communications Efforts

Marketing (i.e. recruiting) can be expensive if it is "ad hoc" and developed in isolation of other considerations. Check with other people in your organization to see if joint marketing opportunities exist. For example, if someone in your organization is trying to find corporate sponsors, see what communications materials are being developed and if a similar piece for recruitment can be developed at the same time. Or, if someone in your organization is meeting

with a school official to discuss shared use agreements, see if there is an opportunity to expand this meeting to include a discussion with the appropriate school official to discuss school-based programs and other recruitment possibilities.

1.1.2   Developing Your Recruitment Game Plan

Show Them, Tell Them, Sell Them…

Recruitment need not be a big budget item. In fact, many of the most successful recruitment practices will not cost a dime. What follows is a "menu" of activities which you could consider in your recruitment efforts. Again, when choosing and implementing activities, bear in mind the use and appropriateness of messages, audience, timing, budget and other resources.

Timing Is Everything

Recruiting is a year-long activity. However, to get the most bang from your communications buck, you should plan to schedule most of your efforts around times that make sense to your training/ competition schedule and which can take advantage of other opportunities (see below).

For obvious reasons, you will want to focus a lot of recruitment energy in the weeks or months leading up to your "training camp" or "pre-season." However, take advantage of other events during the year where you can piggyback on the exposure already achieved:

❏ **Your Sport's Championships**. If your athlete/team reaches the championships, this is the time to promote your sport to potential recruits. People like to be associated with winners.

❏ **Your Athletes' Winning Streaks**. Don't rest on your laurels. If your athlete or team is in the news (positively), take this opportunity to recruit.

❏ **Major Sporting Events**. It is not a coincidence that following the Canadian team's success at the 1996 Summer Olympics, many rowing clubs starting printing off their program brochures. In Victoria, British Columbia, the post-Olympic "rowing high" brought media exposure and hundreds of recruits to the city's rowing clubs. Likewise, a hockey club may want to promote

itself during the Stanley Cup playoffs, or during the NHL pre-season, when hockey interest is at its zenith.

❏ "**Captive" Audience Events.** Check your local school, university or community calendar to see if there are any events or periods where your sport could promote itself to prospective recruits. Look for Career or Sport Days at schools (see personal contact activities for more ideas).

In all of the above examples, inject the "personal touch" into your efforts by highlighting your athletes and/or involving a local personality or high performance athlete.

Personal Contact

Personal contact is critical. Nothing attracts attention and generates emotional responses like the "sound and fury" of your sport. Invite prospective recruits (and/or their parents) to watch your athletes in action and/or participate in one of your practices. Or bring the action to them. Offer to have one of your coaches do a demonstration or make a presentation about your sport at your local

elementary school. If possible, have some of your athletes take part.
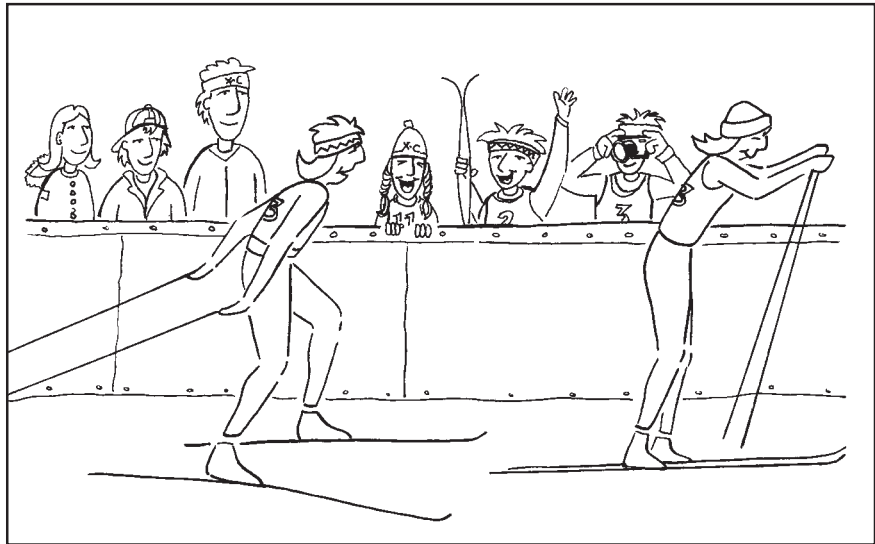
"Personal" exposure to your sport is particularly useful if your sport does not receive much coverage from mainstream media or if it requires specific equipment or facilities not usually available in schools or fitness centres. If the appropriate facilities are not available, improvise by teaching the skills of your sport using similar equipment, such as roller skis for cross-country skiing, or a trampoline for diving.

Look outside of the "converted." Recruiting athletes from another sport – particularly a similar sport to cross-country skiing – such as running, cycling or swimming – may be a productive avenue to pursue.

Other activities could include:

❏ **Mini Camps**. Hold sessions to teach sport skills to boys and girls in your community. Offer sessions at times and locations which will attract the most participation, e.g. after school, during spring break when working parents may be receptive to an activity for their children. Use other events, such as the Olympics, as themes for mini-camps. Throw in other events such as barbecues, kayaking, etc. to make it fun.

❏ **Outreach Programs**. Work with local Boys and Girls Clubs, Big Brothers and Sisters and other community groups. Not only will this provide recruitment opportunities, but your sport organization will build a reputation as being responsible "corporate citizens" (which may also come in handy when your organization is looking for corporate sponsorship). Use messaging that incites an emotional response from parents, community leaders and athletes - e.g. "Join a Team, Not a Gang."

❏ **Introductory Sessions/Classes at Local Recreation Centres.** Offering a beginner's course or session at the "Y" or other fitness/recreation centre may attract recruits to your sport, or identify a "diamond in the rough" - someone with athletic skills appropriate for your sport.

❏ **Novice Events**. Add a novice event or "Corporate Challenge" to your major competitions to encourage people to try your sport (bike races, triathlons, etc.). Hold introductory clinics before and follow-up clinics after the events to generate interest and teach new skills.

Make the most of opportunities. Your sport organization may have coaches-in-training or athlete role-models-in-training who could use recruitment opportunities to further their own objectives. For example, a level three coach could teach a phys ed class for her/his practicum, while giving your sport important exposure to potential recruits.

Ambassadors of Sport

Delivering messages "straight from the horse's mouth" is another successful way of recruitment. Encourage your athletes, particularly ones with leadership skills and success in athletics, to become spokespersons and role models for your organization. These people should be participating in your mini-camps, practice sessions, etc. and if they have the appropriate skills, should be encouraged to speak about your sport (and the benefits of sport in general) at awards dinners, recognition ceremonies, graduations, to the media, etc. Other ideas:

❏ **Create Excitement!** Have your athletes wear their (clean) team jerseys to school and events.

❏ **Mentor**. Have your athletes invite a friend to participate in a practice session.

❏ **Hold Social Events**. Hold fund-raisers, dances, social events, car washes, etc. that promote your team or athletes. Position your sport as a "social" activity - an avenue for making friends, being part of a team, etc. Promote your athletes or team as an important part of the community - get them involved in other causes (charity fund-raisers, runs, etc.).

Create "Celebrity" Partnerships

If your sport has a professional or semi-professional team (university, college, junior league), club or individual, get them involved with your recruitment activities. Even if your sport doesn't have an affiliate team or club, find one with similar characteristics (e.g. triathlon may find a track and field, swimming or cycling celebrity).

Cultivate a relationship with the professional team or celebrity (generally through the team's public relations department). Ask for free tickets for your athletes (and get your athletes to attend

these games together, wearing team jerseys), hold "dream camps" for potential recruits (similar to what the National Baseball Association in the U.S. does) or for invitations to attend training sessions etc. Invite celebrities to your workouts or pre-season training camps, and invite the media to cover these sessions. In short, build mentorship opportunities for your athletes.

This partnership will:

❏ help in your recruitment efforts, as affiliation with celebrities is positive exposure (particularly if the media picks up on this activity – i.e. free advertising);

❏ provide your athletes and the community with positive role models;

❏ provide your athletes with "expert" advice; and

❏ show a progression from your community organization to the professional ranks (which is particularly relevant to career-minded athletes).

In order to generate these opportunities, convince the public relations department/athlete/team that this exposure:

❏ reflects well on their organization, as they are seen as "good corporate citizens";

❏ generates excitement about their organization, which may translate into increased ticket sales; and

❏ can be a good scouting opportunity.

Look at "celebrity" partnerships as opportunities to meet other objectives. For example, you could get local businesses to sponsor these events, or you can use these opportunities to help raise money for your club or to help pay expenses to maintain these partnerships. As well, these partnerships can enhance athlete development efforts - the expertise you receive from a professional athlete may translate into better performance from your athletes and thus, better opportunities for recruitment.

Media Relations

Develop a relationship with your local sport reporters/announcers: give them feature article ideas about your athletes; provide them with updates on your team's progress, etc. There's a lot of competition for media attention, so give the media a story they will want to tell. At the same time you need to be selective about contacting them. Don't hound them, but offer solid opportunities for articles that will attract reader/listener/viewer interest and response.

Recruit outwards. If some of your athletes are from communities near you, commission a writer (a journalism student at your local university or college may do this for free) to do features on them to send to their home town media (i.e. "Home Town Kid Does Well"). Show their community that their decision to join your organization was a good one.

Posters, News Releases, Brochures

These are the big-ticket items and the ones you should consider if your budget permits. Work with the people in your organization who do marketing or public relations to coordinate promotion material.

Things to keep in mind while designing communications material:

❏ Keep it simple and focus on key messages.

❏ Invite reader/audience to respond (e.g. include contact number for more information, invite them to a practice/training camp).

❏ Make it visual - show big, clear, professional photos of athletes in action, having fun. A sign of a good poster, for example, is one clear image. Hang a draft of your poster on a wall 20 feet away and see what jumps out at you. If it's a bunch of small type and small photos, try again. If it's one positive, inviting image that attracts your attention, you've got a winner.

❏ Exude professionalism - spend a little more on the design. You don't need a full-colour glossy brochure, but a hand-typed piece of paper (like the ones with rip-off phone numbers at laundromats) doesn't project an image of a professional organization.

Be a Peacock!

Show others that your team/organization is proud of its accomplishment. If you have a club house, display your trophies, photos and other souvenirs in a visible place.

Keep the Troops Happy!

Word of mouth is the best recruitment method. If your athletes enjoy the sport and feel that they are progressing well, chances are they will want their friends and family involved. Encourage them to be ambassadors for your sport. Make new recruits welcome. Develop "novice" competitions/ events to make them feel comfortable with competition and new skills.

Evaluate

Look also to other organizations. Learn from others - take their success and adapt their practices to a model which works well for your organization.

1.2   Team Building

Cross-country skiing is an individual sport that is practised in a team environment. A good team environment is essential – firstly, because it is one of the motivating factors that draws athletes into and then keeps them in sport, and secondly, because being part of a team where individuals demonstrate mutual respect and trust for each other will enhance the athletes' self image and confidence.

To assist you in developing a successful program, a list of standard team building principles and practices has been provided below. Note: although this list focuses on the needs of athletes in the L2T stage of development, it can be adapted to meet the needs of other age groups as well.

❏ Treat all skiers equally; having favorites would be like bringing a virus into your team.

❏ Tell each athlete something positive at every practice session; if you miss them at practice, call them when you get home.

❏ Require all individuals involved with your program – athletes, support coaches and parents - to respect each other.

❏ Arrange for social time following practice sessions.

❏ Practise together as a team as much as possible.

❏ Keep your team in touch year-round.

❏ Build overnight trips to competitions into your seasonal plan.

❏ Schedule social activities (e.g. fundraising/car wash, pizza/hot chocolate at a home following practice) and developmental activities with a strong social component (e.g. team hike and campout) into your seasonal plan. Refer to sections 6 and 3.1.2 of the NCCP L2T (Dryland) Reference Material for more information.

❏ Coordinate out-of-town trips, hikes, etc. so that the athletes travel together.

❏ Provide a number of camp opportunities annually as part of your program - club camps, regional camps, camps during the off-season, camps at Xmas, etc.

❏ Provide club/team clothing - racing suits, warm ups, coats, vests, toques, T-shirts, ball caps, etc.

❏ Enlist the help of parents to undertake special team building initiatives - for example, developing a DVD featuring each team member in some way, and handing out a copy to each athlete and coach at the end of the season.

❏ Incorporate specific team building exercises such as those described in the section on Physical Challenges (i.e. The Rock) into your plan for the season.

> A team is a group of individuals with common goals working together to achieve those goals.

1.2.1   Communication

Communication can be defined simply as the "timely transmission and receipt of information". Information is relayed through two main channels - verbal and non-verbal. This can be further divided into three sub-groups - physical action, written/spoken words and visual image. These communication methods are used by each of us daily.

❏ **Verbal Communication**

This form of communication is fundamental to the exchange of ideas between people. It is highly effective and economical and it works well in both one-to-one and small group situations. Moreover it allows athletes the opportunity to paraphrase, bridge, clarify and restate the information on the spot.

However, as a rule of thumb, the effectiveness of verbal communication decreases as the size of the group increases. In this situation you may choose to apply non-verbal techniques to ensure an effective exchange of information occurs.

❏ **Non-Verbal Communication**

Non-verbal communication can take many forms and may occur in a number of mediums. Since our definition of verbal communication is the exchange of ideas expressed orally, then all other forms fall into the category of non-verbal communication.

The forms of non-verbal communication are as varied as one's imagination. Common examples include video cassettes, newsletters, correspondence, overheads, magazines, pamphlets and so on.

Non-verbal communication techniques are as important as verbal techniques, each form having its advantages when utilized in the appropriate application.

The application of both verbal and non-verbal communication strategies can be planned ahead and facilitated.

Ongoing communication is necessary not only between you and your athletes, but also you and their parents/guardians. Conventional methods for ongoing communication with both are small group meetings and newsletters. This continues to be an effective way of distributing information and receiving feedback.

Some suggestions for utilizing communications to help build a successful program are provided below:

❏ **Newsletters (electronic or hard copy)**

The newsletter is a standard communication tool. A newsletter can provide your athletes and their parents with need-to-know information in an easy to read format. It does not need

to be a professionally laid out document – the objective is simply to relay need-to-know information in a manner that is both timely and easy to produce. This is a perfect task for a mom or dad who would like to help out but who doesn't feel comfortable on skis.

Information that could be included in a newsletter:

✓ Scheduling information, details about upcoming sessions, notification of changes, etc.

✓ Upcoming special events: ski tournaments, club functions, skill assessments, etc.

✓ Progress report for the program as a whole – e.g. how the team is progressing according to the set objectives.

✓ Sponsorship information: recognition of the contributions of program sponsors (the club, local ski shop, etc).

✓ Profiles of a volunteer coach or other helper (e.g. the person who takes care of refreshments after practice; the club groomers, etc.). Name a "Volunteer of the Month" to profile a volunteer for recognition.

✓ Athlete information: upcoming birthdays, other special information about team members that should be shared, etc.

✓ Requests for volunteers for any tasks requiring additional help.

❏ **Communications Among Program Leaders**

Good communication among the program leaders is imperative in order to achieve the following important objectives:

✓ **Convey Information.** Much of the program information can be distributed on paper, either at meetings or one on one. Regular meetings can be scheduled, perhaps before or after the on-snow sessions (when everyone is at the ski area anyway).

✓ **Encourage a Good Atmosphere**. The individuals leading the program should support one another continuously with encouragement, praise and other forms of positive reinforcement. This will carry over into communications with the athletes and is crucial if your program is to be successful. This type of communication (ongoing positive support) is best given on a one to one or small group basis.

The program leadership should make a concerted effort to:

✓ Ensure that each volunteer receives a warm greeting at each session.

✓ Ensure that each of the coaches receives a positive personal comment each session.

✓ Recognize extraordinary service by individual volunteers.

✓ Regularly recognize individual coaches (or the coaches as a group) before the parents and athletes.

✓ Never be critical of the program or its volunteers in public.

❏ **Post-Season Communication**

Information should be made available, perhaps through a final team newsletter containing

pertinent information such as:

✓ the closing activities - dates, times, locations, agenda for the closing/wrap-up event of the season (activities, banquet, award ceremony, and/or evaluation);

✓ a year-end report – the successes and failures of the past season and anticipated modifications to the program for next year;

✓ a thank you – to volunteers, sponsors, the association and others who contributed to the program during the past season; and

✓ registration for next season.

In addition you might choose to use this opportunity to hold a post-season face-to-face meeting with the parents of your athletes to obtain feedback from them. The purpose of the session would be to find out what they thought about the past year's program and to get some guidance to help you with your planning for next season. A word of warning, however – an evaluation session needs to be designed carefully to bring out both the strengths and weaknesses of the program, and should evaluate the "program" rather than the people delivering it. Don't allow the opportunity to be used as a gripe session for unsatisfied parents. Keep it focused on the athletes and their accomplishments and how they might accomplish more and/or enjoy it more.

In Summary:

❏ Communication is the key to a successful program.

❏ Program leadership depends upon communication.

❏ All modes of communication should be used, and all channels kept open.

❏ The vast majority of communication should be of a positive nature in order to keep the program upbeat.

❏ Communication is a two-way street - sending AND receiving.

❏ A message is only effective if both parties understand it.

❏ Keep working at communicating more effectively!!

1.2.2   Concept and Importance of Team Building

As athletes progress from the FUNdamentals stage of athlete development to the Learning to Train stage, there is a transition from coaching a group (FUNdamentals) to coaching a team (Learning to Train). It is important to understand the differences and considerations for both so that you can adapt your coaching to properly manage this transition.

The following section provides information on the concept of team building. This information is generic in nature but can be adapted for team building of children, teen and adult groups. The concepts outlined in this section will be a helpful tool for team development for the various types

of teams you will interact with as a coach. The latter include but are not limited to athlete teams, coaching teams, programming teams and parent support teams. Comprehensive understanding of these concepts and good facilitation will aid in the development of an effective and healthy team environment.

Understanding Teams versus Organizations and Groups

❏ **Organization**

✓ Relatively large and impersonal.

✓ Little inter-member interaction and reciprocal influence.

❏ **Group**

✓ Small and may impact members' feelings and self-image.

✓ Important psychological needs (e.g. social contact) are better satisfied.

✓ Members can contribute to goal accomplishment by working independently.

✓ Members play a variety of roles.

❏ **Team**

✓ Small, with members having a stronger sense of identification.

✓ Greater task interdependence.

✓ Members have more differentiated and specialized roles.

✓ Members often play a single or primary role.

Importance of Team Building

❏ A **sense of purpose** exists. Members have issues and topics that are of mutual interest. Members of the team work together to achieve a common goal.

❏ **Benefits** accrue from team membership. Teams provide a range of benefits for the organization and the individuals, over and above getting a task done.

❏ **Increased creativity** results. Individual ideas spark off one another, and the process of working in a team seems to generate more and more possibilities. The key to leading and understanding teams is that teams actually let you release creativity.

❏ **Coordination** is facilitated. Team members all play a part in getting the whole job done, instead of seeing their own little process as being the start and finish of it all.

❏ **Personal support** is provided. Good teams operate rather like an extended family whose members trust, like, help and care about each other.

❏ **Induction** occurs naturally. Team members help newcomers find their place in the team.

❏ Teams encourage a sense of **ownership**, the act of passing over to people the responsibility for their own decisions and their own actions.

1.2.3   Team Player Styles

There are four team-player styles: contributor, collaborator, communicator and challenger. Each style is briefly described below:

Contributor

❏   Freely shares all relevant information and opinions with other team members.

❏   Helps the team use its time and resources.

❏   Pushes the team to set high standards and to achieve top-level results, and insists on high-quality outputs.

❏   Completes all team assignments and other relevant work necessary for the completion of team tasks.

❏   Accepts responsibility for all actions as a team member.

❏   Completes all work in his/her regular job area and all other tasks not related to the team.

❏   Provides the team with clear, concise and useful presentations at team meetings.

❏   Provides technical training for other team members and serves as a mentor for new team members.

❏   Has a clear set of priorities.

Collaborator

❏   Helps the team to establish long-term goals and clarify its current objective or tasks.

❏   Helps the team see how its work fits into that of the organization as a whole.

❏   Regularly reminds the team of the need to revisit its goals and action plans.

❏   Encourages the team to establish plans with milestones and appropriate task assignments.

❏   Pitches in to help other team members who need assistance.

❏   Works hard to achieve team goals and to complete current tasks, even though he/she may not agree with them.

❏   Does not gossip about other team members or share negative comments about the team process with non-members.

❏   Flexible and open to new ideas or data that may alter team goals.

❏   Often works outside his/her defined role to help the team achieve its goals.

❏   Willing to share the limelight with other team members.

Communicator

❏ Resolves process problems such as conflict among team members or lack of involvement by some members.

❏ Listens attentively, and without judgment, to all viewpoints.

❏ Helps the team to relax and have fun by joking, laughing and discussing personal interests.

❏ Acknowledges and praises other team members for their efforts.

❏ Communicates enthusiasm and a sense of urgency about the team's work.

❏ Periodically summarizes the status of a discussion or proposes a possible consensus.

❏ Encourages other team members to participate in team discussions and decisions.

❏ Helps people on the team get to know each other and to know what skills and resources each can contribute.

❏ Gives feedback to other team members – feedback that is descriptive, specific and intended to be helpful.

❏ Receives feedback from other team members without becoming defensive.

❏ Reminds the team to take time periodically to assess team effectiveness and plan for improvement.

Challenger

❏ Candidly shares views about the work of the team.

❏ Inclined to disagree openly with the leadership of the team.

❏ Often raises questions about the team's goals.

❏ Pushes the team to set high ethical standards for work.

❏ Speaks out, even when views are contrary to those of a vast majority of the team.

❏ Asks "why" and "how" and other relevant questions about presentations at team meetings.

❏ Sometimes is accused of not being a team player because he/she differs from conventional wisdom.

❏ Challenges the team to take well-conceived risks.

❏ Honest in reporting team progress and stating progress facing the team.

❏ Willing to blow the whistle on illegal and unethical activities of the team.

❏ Will back off when views are not accepted and will support a legitimate team consensus.

1.2.4   Factors Affecting a Team

Once a team is formed and functioning, there will be numerous factors that will continue to affect it and its members. These include both internal and external factors. These factors continue to affect the team in positive and negative ways.

Team Motivation

Motivation is a key component in ensuring team success once the team is performing. Motivation can be defined as "the force that moves people to do something" (Hayat 2001).

There are two main types of motivation, one intrinsic (occurring within oneself) and the other extrinsic (due to outside factors; like a "reward and fine" policy). The table below shows some intrinsic and extrinsic factors to bear in mind to ensure that the whole team remains motivated:

Intrinsic Factors	Extrinsic Factors
✓ Interesting/challenging assignments ✓ Responsibility ✓ Achievement ✓ Recognition ✓ Advancement ✓ Appreciation	✓ Physical work environment (e.g. temperature, comfort, noise level, safety) ✓ Context in which work is done (e.g. salary, benefits, time pressure, status)

Team Members' Roles

Members of a team take on different roles at different times and stages. This is important to note as a team leader, in order to recognize the strengths and weaknesses of team members and to resolve conflict. For example, if there is more than one member of a team playing the same role on the same assignment and at the same time, there is potential for conflict.

The following are ten common roles:

❑ Coordinator.

❑ Monitor/evaluator.

❑ Energy source.

❑ Disrupter.

❑ Implementer.

❑ Completer/finisher.

❑ Resource investigator.

❑ Specialist.

❏ Shaper.

❏ "Recognitioner".

1.2.5   Ten Ingredients for a Successful Team

❏ **Clarity in team goals.** A team works best if everyone understands its purpose and goals. If there is any confusion or disagreement, the team needs to work on resolving these issues.

❏ **Clear vision.** As a youth group, all team members should be in agreement over the group's mission and have a clear vision. If the mission is too large, it will need to be reduced to a more manageable size.

❏ **A plan.** A plan helps the team identify what type of advice, assistance, training and other inputs and materials it may need. It also gives the team a schedule and an identification of "milestones" (such as a planned youth event). A flow chart could be a useful planning tool.

❏ **Clearly defined roles.** The team will operate most efficiently if it taps everyone's strengths, as discussed above, and makes sure that everyone knows her/his tasks and responsibilities.

❏ **Clear communication.** The team will be stronger if there are productive discussions, and everyone is kept informed.

❏ **Beneficial team behaviour.** Teams should encourage all members to use skills and practices that make discussions and meetings more beneficial.

❏ **Well-defined decision-making procedures.** A team should always be aware of how it reaches decisions, and ensures that there is consensus.

❏ **Participation.** Since each team member has a stake in the group's achievements, everyone should participate in discussions and decision-making.

❏ **Ground rules.** These should be established early and followed. Occasionally, ground rules should be reviewed and revised.

❏ **Awareness of the group process.** Ideally, all team members should be aware of the group process – how the team works together.

❏ **Use of the scientific approach in team work.** Good data should be used for problem solving and decision-making. Arguments not based in fact often arise, and the use of correct data could help resolve these conflicts.

Some Factors to Remember When Building a Team

Reasons, resources, roles, rules, relationships, reassessment.

1.2.6   Individual Skills for Effective Team Building

❏ **Written Communication.** Communicates easily on paper with speed and clarity. Presents ideas concisely and in a structured way. Uses appropriate language and style.

❑ **Oral Communication.** Speaks to others with ease and clarity. Expresses ideas well and presents arguments in a logical manner. Gives information and explanations that are clear and easily understood. Listens actively to others.

❑ **Leadership.** Shows skill in directing group activities. Has natural authority and gains the respect of others. Is capable of building an effective team. Involves all team members and gives advice and help when required.

❑ **Team Membership.** Fits in well as a peer and as a subordinate. Understands own role and the role of others within the team. Shares information and seeks help and advice when necessary. Offers suggestions and listens to the ideas of others.

❑ **Planning and Organizing Skills.** Can make plans and forecasts. Can define objectives and allocate the necessary resources. Sets realistic targets and decides priorities. Devises systems and monitors progress. Makes good use of his/her time.

❑ **Decision-Making.** Evaluates alternative lines of action and makes appropriate decisions. Identifies degrees of urgency for decisions. Responds to situations quickly and demonstrates flexibility.

❑ **Motivation.** Shows energy and enthusiasm. Works hard and is ambitious. Is able to advance the work with little detailed supervision. Sets own targets and is determined to achieve them.

❑ **Personal Strength.** Is self-confident and understands own strengths and weaknesses. Is realistic and willing to learn from past failures and successes. Is reliable, honest and conscientious. Can cope with pressure and control emotions.

❑ **Analytical Reasoning Skills.** Can quickly and accurately comprehend verbal and numerical information. Is able to analyse arguments objectively and to reach logical conclusions. Can present well-reasoned and persuasive arguments.

1.2.7   Factors That Facilitate Teamwork and Cooperation

❑ **Task Structure**

✓ Members have good knowledge of tasks.

✓ There is a consistent and clear link of tasks with the team's mission.

✓ Members have a meaningful piece of work, sufficient autonomy to perform it and access to knowledge of its results.

❑ **Group Boundaries**

✓ The membership of the team is appropriate for the task to be performed.

✓ Members have collective knowledge and skills to perform the work.

✓ Members have sufficient maturity and interpersonal skills to be able to work together and resolve conflicts.

✓ Members may have differing perspectives and experiences but can communicate with and relate to one another.

❏ **Norms**

✓ Members share an appropriate set of norms working as a team.

✓ It is necessary to regularly scan and review prevailing norms to ensure that they support overall objectives.

✓ It is necessary to ensure that conflicting norms do not confuse team members.

❏ **Authority**

✓ There is firm authority that is also flexible in enabling the team members to make their best efforts.

✓ There is competent team leadership that allows the group to comply when conditions demand it (such as in emergencies).

✓ The team leader is able to establish a climate for team members to feel empowered to provide expert assistance when appropriate.

✓ Team members feel comfortable in questioning the leader on decisions that have no clear right answers.

Facilitating Factors	Hindering Factors
✓ Clear mission and performance standards. Every team member knows what the team is trying to achieve and how well he/she has to perform in order to achieve it. ✓ Members share common values, beliefs or goals. ✓ Low levels of task or lateral independence. High levels of communication between parties.	✓ Members compete for scarce resources and/or rewards. ✓ Members are under high levels of stress and face uncertain or incompatible demands (e.g. role ambiguity and role conflict). ✓ Leader's action is inconsistent with organizational vision and goals.

1.2.8 Organizational Shells

As shown in Figure 1.1, a "team" is the smallest unit within an organizational environment. Team members may come from different groups, sections or divisions and are tapped because of their recognized expertise in achieving a specific, well-defined and time-bound task. The team's task has the imprimatur, or official support, of the organization. Team members are guided by certain organizational norms. An organization belongs to a larger structural or environmental group or setting. For instance, a village-level agricultural credit organization (i.e. sport club) may be a member of a federation or a coalition of agriculture-based organizations at a higher territorial level (i.e. Provincial/Territorial or National Sport Organization).

Figure 1.1: Environment
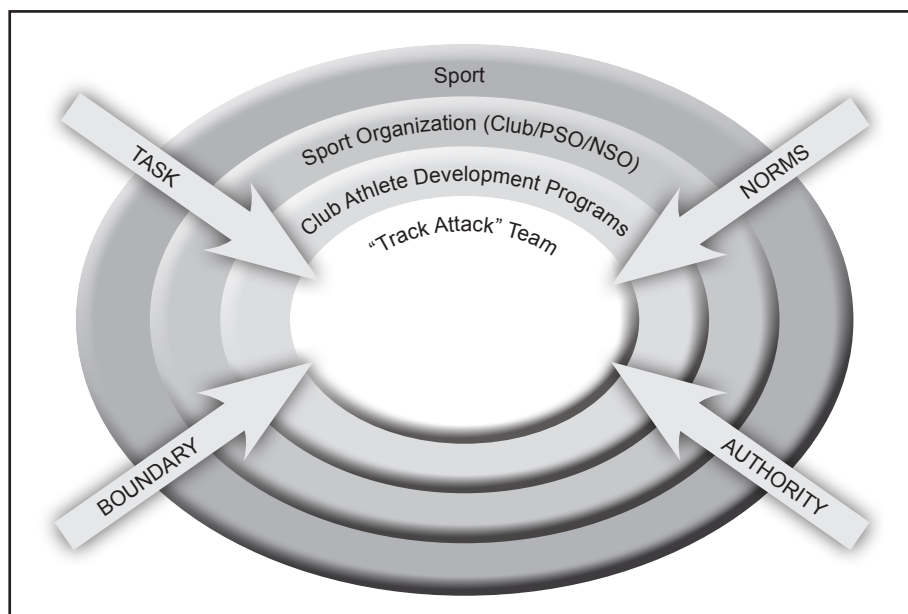
1.2.9   Team Building Using Physical Challenges

Nations are built upon the concept of teamwork – the kind of teamwork that promotes cooperation and cohesiveness over competition, teamwork in which everyone contributes a part to make a stronger whole. Each "team" in our society, whether it is a sales force, a manufacturing group, a sports team, or a family, must work together for a society to flourish and operate smoothly.

When an organization has a goal, the members mobilize, enthusiasm builds and excitement grows as the group moves toward success. Every member on a successful team wants to play a part, because each is concerned with the outcome of the group's efforts. Sometimes a team falls short of its goal, indeed a team might break down if its members do not know how to organize, interact and plan for progress. But the excitement, the enthusiasm and the concern for the group's progress will have helped them learn about accomplishing goals. Even if a group falls short of its target, each participant wins by learning more about becoming a team member. Individuals achieve simply by experiencing the process of team building.

Sport lends itself particularly well to developing cooperative learning. Although sport is primarily concerned with physical fitness and skills, it is also about social, psychological and personal development.

Team building is a concept. Physical challenges can be used to teach it.

When a team cooperates on physical challenges, all members need to believe their teammates are listening to their ideas. Naturally, some ideas will work, some will be rejected and some will need to be tested.

When athletes work together on a challenge, they learn to disagree, to speculate, to take turns and to diminish tensions. The physical challenges offer athletes exactly these experiences.

Teaching athletes to be parts of a team and to be good citizens will enhance their self-concepts and will involve them in success.

A successful experience in team building doesn't just mean scoring a touchdown or kicking a goal. A successful experience might be contributing an idea and being listened to. We all feel good about ourselves when we can influence the direction of a group. All students and athletes need an opportunity to establish relationships so they feel part of a group. Experiencing success should permeate physical education and sports. Sometimes only a talented few gain the success experience of recognition for their accomplishments, but everyone involved in team building will attain this reward.

Lastly, one of the important success experiences all athletes have a right to achieve is fun. Athletes should have fun through play, and look forward to coming back for more fun.

Challenge #1 – The Rock

Following is an example of an introductory team building challenge called "The Rock".

"The Rock" challenge appears simple, but it requires the group to balance for a specific amount of time on an object (the rock). The object you use as the rock determines the difficulty of this challenge.

All group members must balance on the rock (or be off the floor) for a slow count of five. The group needs to find a way to help each other maintain balance; that could mean group members will experience close encounters with one another.

The challenge is mastered when the entire group is on the rock (or off the floor) for a slow count of five. The coach must see the task completed and is the person who counts to five. You'll need a rock (an old tire or sturdy box) and several mats to place under the rock. The size of the tire (rock) used in this challenge can make a significant difference in difficulty. So use smaller rocks for smaller-sized groups. A larger group (such as ten group members) may need a larger rock. This task does not require much room. Place the rock in the center of the mats. Most groups first believe the task is easy. But success does not always come quickly. Because this task requires athletes to hold on to one another closely, some athletes will debate if death is more desirable than touching someone else, while others will love the close encounter.

There are four simple rules:

❏ All group members must be off the floor and on the rock.

❏ All group members do not have to be touching the rock as long as they are off the floor.

❏ Once you have been on the rock, touching the floor for even an instant means the group must start over with no one on the rock.

❏ No last names or put-downs may be used.

Please note that the mat is considered part of the floor. Once a group member gets off the floor or mat, that person should not step down onto the floor or else a sacrifice occurs.

Most groups step onto the rock, hold on to one another tightly, start counting to five and fall over. After a few such failures, the group learns it must plan to step onto the rock and hold onto others while maintaining balance.

One method is to hold on to someone directly across from you on the rock. As more group members get onto the rock, balancing becomes more difficult. Some groups try to have everyone put one foot on the rock and then all add the second foot on the count of three. Some group members may try to stand in the middle of the rock and have others surround them. Or a group may try to lie horizontally on the rock and on top of one another.

Whatever method they use as a solution, it will reinforce group behavior and athletes will find satisfaction when the group works well together.

Challenge #2 - Newspaper Shelter

Following is an example of a team building challenge that allows for team interaction while exploring communication skills, cooperation, planning and having fun.

❏   Team Size: 8-12 athletes.

❏   Materials: Newspapers and masking tape.

❏   Instructions: The group is told that they are stuck in the desert or on a deserted island. They have to build a structure that is free standing and will protect the entire group from the sun. They have 20 minutes to plan how they are going to build the structure. After the 20 minutes they have 20 minutes to build the structure, but they cannot talk during the building phase.

❏   Processing Questions:

✓   What worked during the process? What hindered the process?

✓   How did you plan your structure?

✓   What roles emerged during the process? Was there a leader?

✓   Did everyone have an active role?

✓   How did it feel to not be able to talk during the building phase?

✓   Did you work as a team? How do you know?

✓   What did you learn about yourself and your organization during this exercise?

❏   Coach Notes: Take care to not set this exercise up as a competition between teams. They will probably assume it is, but one interesting question you can ask is why the teams did not work together to build the shelter.

Challenge #3 – Limited Senses

Following is an example of a team building exercise that explores the dynamics of communication, problem solving and leadership.

❏   Team Size: 8+ athletes.

❏ Time: 30 minutes.

❏ Props: One blindfold for each athlete.

❏ Objective: For the athletes to line up in numerical order without talking.

❏ Instructions: Create a clear space in a large area with adequate safety procedures. Ask several coaches/parents to act as buffers. Give each athlete a number and instruct him/her not to share it with anyone. Do not give the athletes consecutive numbers – leave a few out. For example you might give out the numbers 1, 2, 3, 5, 8, 9, 10, 14, 17 and 18. Note, however, that you must have a number 1 and the number that represents the number of participants in the activity. Blindfold each athlete and instruct the group not to talk. The goal is for the athletes to put themselves in numeric order without seeing or talking. Ask for questions and then say "ready, set, go!"

❏ Coach Notes: Frustration will result when participants use various methods to communicate – e.g. foot stomping, tapping, etc. - without finding the missing numbers. You will see some participants give up. After some time, tell the group that there are some missing numbers. You will see leadership emerge, and watch how fast they get it together.

Challenge #4 – Welded Ankle

Following is an example of a team building challenge that explores communication, leadership and cooperation.

❏ Activity: A no-prop, no-sweat initiative that works as well indoors or out, with both small and large groups.

❏ Team Size: 10+ athletes.

❏ Time: Varies, depending upon group size. For a group of ten, allow 20 minutes to one-half hour.

❏ Props: None.

❏ Instructions: Mark off beginning and end lines for the space across which the group must travel. Brightly colored rope, cones, flags, upturned coffee cups, etc. will work. Have the group assemble behind the start line and explain that the group must travel over the end line while maintaining continuous contact with their feet. If anyone in the group loses contact with his/her partner's foot, the entire group must start over.

❏ Coach Notes:

✓ While any configuration that satisfies the requirement is allowable, most groups find that they do best with a single line, shoulder-to-shoulder formation. If they want to try another set-up, by all means encourage the group to be creative.

✓ Variation: Ask several individuals to be "coaches" who stand off from the group and provide verbal assistance. How do they go about providing their advice? How is it received?

1.3   Creating the Right Image

For your program to be successful, it is essential that your local community is aware of and has a positive image of the sport of cross-country skiing, and that your club and its programs are well regarded.

To better understand this aspect of sport management and the contribution you, as a coach, can make towards creating an image of cross-country skiing that will attract children to the sport, and thereby your Track Attack program, you are encouraged to complete the following exercise with the other program leaders you work with as a preliminary step to developing a recruitment strategy for your program.

Image Assessment

The items listed in the image assessment below are commonly-used vehicles for promoting sport. This exercise will allow you to reflect on how effective the sport of cross-country skiing is at reaching into your community and help you identify areas for improvement.

❏   Check the box that most appropriately describes the level of impact (Low, Medium, High).

❏   Complete the assessment with the target age range in mind (i.e. the Learning to Train stage of development).

❏   Discuss a public relations strategy for your own program area.

A positive image of cross-country skiing is successfully conveyed through …	Low	Medium	High
Posters			
TV coverage			
Videos/DVDs			
Magazines			
Provincial/national newspapers			
Local newspapers			
Radio			
Internet			
Trading cards			
Club or team uniforms			

Other ski-related clothing			
Regular clothing (e.g. t-shirts, ball caps)			
Bumper stickers			
Recognition at school (e.g. announcements)			
Success of local/team athletes at high profile events (e.g. Canada Games)			
Hosting of high level events/competitions			
Club/team special events/activities			
Word of mouth			
Other			

1.4   Retention

Understanding why children participate in sport is not a simple matter. One of the difficulties is that children have many reasons for getting involved, and some of their reasons change from day to day. To encourage children to stay involved in sport, parents and coaches must understand these reasons.

In general, children participate in sport in order to have fun, improve skills, belong to a group, be successful, gain recognition, get fit and find excitement. Conversely, they drop out of sport because of other interests, boredom, lack of success, too much pressure, loss of interest, friends leaving or because it ceases to be fun.

Dr. Terry Orlick, professor of sport psychology at the University of Ottawa, says children play sport because it makes them feel good. They need to feel wanted, valued and joyful. But if he or she is suddenly benched or pulled from the lineup because the team needs to win, a child might feel incompetent and rejected. Children don't join a team to sit around and do nothing. Sport is not enjoyable for children if they don't get much opportunity to play. Studies have shown that children would rather play for a losing team than be members of a winning team and sit on the sidelines. If they're not playing, they'll lose interest very quickly.

A study conducted by Dr. Martha Ewing and Dr. Vern Seefeldt of the Institute for the Study of Youth Sports at Michigan State University asked 26,000 students aged 10 to 18 years about their reasons for participating in sport, why they quit and how they feel about winning. The study found that "fun" is the pivotal reason for being in sport - and lack of fun is a leading reason for dropping out. In fact, both boys and girls say that making practices more fun is the most important change they would make in a sport they dropped.

> "It is interesting to note that even top athletes quit their very lucrative careers when sport is no longer fun."
>
> Source: Straight Talk About Children and Sport

1.4.1   Coaching Children to Embrace a "Love of the Game"

Coaches occupy multiple roles in children's lives as sport participants. Coaches must be excellent instructors so that youth learn and improve skills, increase knowledge of strategies and tactics and achieve their goals. Coaches can also inspire children to maintain motivation for participating in sport and, in so doing, allow them opportunities to accrue such benefits as positive self-esteem, enjoyable experiences, long-lasting friendships and a positive attitude toward the value of lifetime physical activity. In short, coaches can ensure that youth want to continue their sport involvement - that is, participate for intrinsic reasons rather than participate for primarily external reasons such as feeling obligated to others to continue. How can coaches maximize their positive impact on youths' motivation in sport?

Figure 1.2 The Ingredients of Motivation
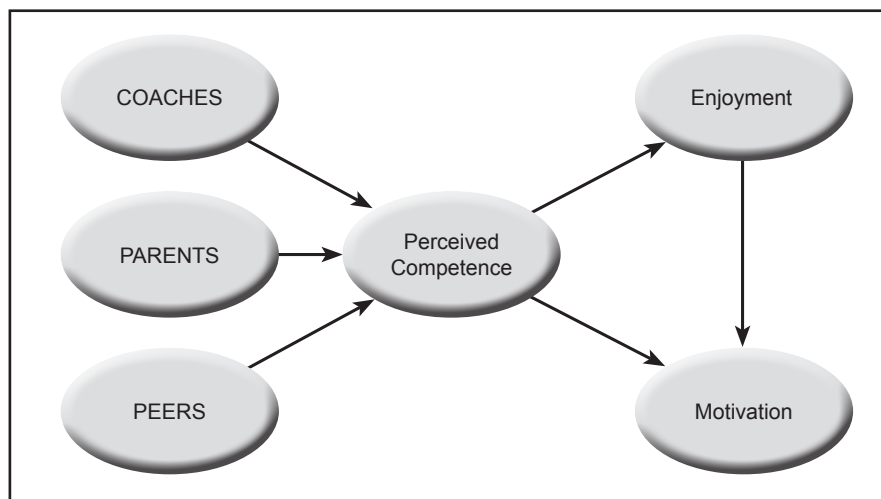
Ingredients of Children's Motivation in Sport

Children participate in sport for multiple reasons, the most prominent among them being *developing physical competence* (learning and improving skills), *attaining social acceptance and approval* (being with and making friends, interacting with parents and coaches), and *enjoying one's experiences* (having fun, doing something interesting). Coaches can maintain and promote greater motivation by engaging in behaviors and structuring practices to meet these motivational needs. The three main reasons children participate in sport means that coaches should be mindful of enhancing players' perceptions of competence, ensuring positive social influence and keeping practices and games fun and enjoyable. These three ingredients of motivation - perceived competence, social support and enjoyment - are necessary for sustaining children's "love of the game."

We can depict all the ingredients of motivation in the diagram shown in Figure 1.2. This visual shows that coaches, parents and peers (teammates, close friends) directly influence children's perceived competence or beliefs about their ability in sport. Perceptions of competence, in turn, influence feelings of enjoyment and motivation in the form of intrinsic/extrinsic reasons, effort exerted and persistence following mistakes. If we hone in on coaches as the source of social influence, we can identify specific coaching behaviors and principles that will maximize the probability that perceived competence, enjoyment and motivation will thrive.

Provide Optimal Challenges

Coaches can satisfy athletes' need for developing and demonstrating physical competence by carefully matching the difficulty of skills or activities with the child's capabilities. Think of optimal challenges as ones that *match the activity to the child, and not the child to the activity*. In short, optimal challenges are those that are at the cutting edge of a child's potential. Goals that are too easy are boring and simplistic; goals that are too difficult are likely to invoke anxiety and fear of failure. Coaches can ensure optimal challenges by setting hard but realistic goals for all participants, outlining developmental skill progressions that allow children to systematically

achieve goals, and modifying facilities, equipment or activities to optimize task difficulty relative to the child's skill level.

Maximize Social Support

Acceptance and approval by adults and peers strongly influence children's perceptions of competence, enjoyment and motivation. Coaches can make an impact on these elements in several ways.

First, they can provide *frequent and contingent informational feedback* on how to improve skills. The term *contingent* means specific to or directly related to level of performance. For example, a baseball coach might praise a player for executing correct technique in hitting a ball to the opposite field, and then follow-up with information on how to get out of the batter's box and up the line to first base more quickly.

In response to a skill error, focusing on information for improving on the next attempt, rather than punishing the error, is a contingent and effective means of motivating players to sustain their effort. The literature clearly shows that frequent, contingent instruction by the coach to enhance sport skills and strategies sends a message to players that they have the ability to improve, and this is a motivating factor.

A second means of coaches providing social support is through *contingency and quality of praise and criticism*. Contingent praise might be our baseball coach reinforcing a player for making the correct decision in response to a fielder's choice, while contingent criticism might be *constructively questioning* a player for committing a mental error on a play he/she has mastered many times before.

This latter behavior should suggest to the athlete that the coach believes he/she has the ability to do better. This brings us to the term *quality of praise and criticism*. Quality refers to the appropriateness of the feedback. Is it too much or too little? For what level of performance or task difficulty is it given? The general rule for ensuring quality or appropriate feedback is:

❏   don't give excessive praise;

❏   don't give praise for mediocre performance; and

❏   don't give praise for success at easy tasks that everybody can do.

Make Sure Sport Experiences Are Fun

Fun does not have to solely mean pizza or McDonald's after the game. Enjoyment can be part of the fabric of practices and competitions. Children and adolescents experience fun when there are opportunities for high levels of action, personal involvement in the action and affirming friendships.

Activities during practice could be structured to maximize action by eliminating waiting in line, ensuring sufficient equipment and keeping things moving with short but intense and varied activities. Children also enjoy having some input to their experiences. Although coaches certainly make up the practice plan and orchestrate the pace and content of activities, children can be

part of the decision-making process such as choosing warm-up drills or an activity at the end of practice. Providing some opportunity for autonomy translates to greater fun and enjoyment

Create a Mastery Motivational Climate

The motivational climate refers to how the learning environment is structured, what behaviors are valued and how individuals are evaluated. A **mastery motivational climate** is one in which success and valued behaviors are defined in self-referenced terms such as learning, effort and improvement, and mistakes are viewed as part of the learning process.

By contrast, a **performance motivational climate** is one that emphasizes norm-referenced definitions of success such as comparison to teammates' performances and game outcome. The sport environment is one that contains some mixture of both mastery and performance climates.

The key is for coaches to recognize, praise and emphasize athletes' personal improvements because such actions are under athletes' control and thus more motivating than emphasizing peer comparisons. The acronym TARGET identifies elements of a mastery motivational climate, and also reinforces some of our earlier coaching concepts. TARGET includes:

❏ **T**ask (optimal challenges vs. standardized goals).

❏ **A**uthority (player choice vs. coach-directed only).

❏ **R**ecognition (reinforcing effort and improvement, not only outcome).

❏ **G**rouping (cooperative teamwork vs. competitive orientation).

❏ **E**valuation (assessing improvement vs. normative criteria).

❏ **T**ime (adequate time for learning and improvement).

Help Children Help Themselves

Coaches can also motivate athletes by teaching them self-regulated learning strategies. These allow children to depend on themselves, not only adults, to monitor and evaluate their skill improvement and performance. Self-regulated learning consists of *self-observation*, *self-judgment* and *self-reinforcement*. These processes refer to monitoring one's behaviors to assess progression toward skills, comparing one's current performance with desired goals and reacting positively or negatively concerning progress toward goal achievement.

Strategies such as goal setting, reframing negative to positive self-talk and encouraging adoption of effort attributions for performance setbacks allow children a constructive means of:

❏ evaluating their progress and readjusting their sights;

❏ maintaining a positive mental attitude rather than getting down on themselves; and

❏ seeking out alternative strategies as a means of problem solving rather than ascribing skill errors to factors outside of their control.

Take-Home Messages

Coaching to embrace a "love of the game" means understanding that multiple reasons underlie children's participation patterns. The major reasons children play sports are to develop and demonstrate physical competence, experience positive social interactions with adults and peers and have fun and enjoyable times. These three reasons form the ingredients of intrinsic motivation - one that is synonymous with an inherent desire to continue involvement.

To maximize motivation, coaches can positively affect children's sport experiences by providing optimal challenges, maximizing social support, ensuring enjoyable activities, creating a mastery motivational climate and helping children help themselves. Each of these principles can be easily customized with sport-specific examples, and applied during practices and competitive events to maintain, sustain and enhance children's "love of the game."

1.4.2   Why Do Teens Drop Out?

Organizations that offer both children and teens a variety of learning activities (for example, 4-H or Scouts) usually have more than half their participation from children in the nine to 11 year age range. Typically, individuals join as children and participate throughout their elementary school years. Then, as they proceed towards adolescence and high school, their involvement declines dramatically. Organizations and their professionals and volunteers will inevitably question what is wrong with their program and what they might be doing to send their participants elsewhere. However, a close at early adolescence will reveal that individuals leaving these types of programs often do so because it is a natural part of their developmental (growing up) process – not because of a programming glitch.

Children and Preadolescents

For children, entering preschool and then elementary school are early steps into the wider world. Organized programs provide the next approved step as parents begin to expose their children to group experiences. At this stage, children make few decisions themselves and their parents decide which and how many of these out-of-school experiences their children will have.

These organized programs provide an opportunity for children and preadolescents to meet their needs and pursue their emerging interests. At this point, youngsters are beginning to step beyond the home and into the community. Making friends, being with their peers and being part of an organized group are very important to them.

Adolescents

Adolescents, on the other hand, are usually quite comfortable in the community away from home. They are now mature enough to have a say in decisions about what they want to do and what they don't want to do. Typically they will explore and experiment with new interests as well as refine and expand ongoing interests. Further, they may wish to pursue interests and activities of their own and not their parents' choosing. In addition to this there are many more activities for them to choose from - some of which they can access themselves as secondary schools usually

offer a variety of programs including sports that don't require the kind of parental support that children's activities do.

At this point teens will begin to develop some independence from their family. Choosing new activities and dropping others pursued since childhood are one way of doing this. They may even drop activities they like and still enjoy just so they can make some choices themselves. In addition, part-time jobs that offer revenue, and thereby increased independence will become increasingly available. Once they have a part-time job they will find that they have to make decisions about how to spend or divide their non-school time. There will no longer be enough time to pursue multiple interests and do all the things they used to do. Then, too, not all teens enjoy groups. There are some who would rather pursue interests on their own.

Teens that do choose to participate in organized programs often do so for the following reasons:

❏ The guidance and support provided by the program leaders. The teen likes the adult or what the adults are providing. The adults who are successful in working with them will generally encourage creativity and support them in their efforts; provide guidance while giving a major role in democratic decision making; and genuinely like this age group and are comfortable working with them.

❏ The organization's activities are fun, challenging and exciting, or simply different from the experiences they have participated in as children.

❏ They like being part of a group.

In summary, a major portion of teen dropout from organized programs and activities can be viewed as developmentally appropriate and normative. This in no way denies the value of programming for those individuals who want and need the group experiences provided by organizations. It does mean, however, that organizations and programmers may need to adjust their expectations with respect to teen participation.

1.5 CCC Athlete Development Grid

LTAD STAGE	COACH LEVEL	FACILITIES	TECHNIQUE	PHYSIOLOGY, STRENGTH, FLEXIBILITY	MENTAL SKILLS	COMPETITION	OTHER
"Learning to Train" stage of athlete development. Boys 9 – 12 Girls 8 - 11	NCCP Competition Coaching Introduction (CCI) – Learning to Train Minimum 58 hours training.	Varied terrain, including challenging technical trails. Groomed tracks for skating and classic techniques. Lit trail system. Day lodge in stadium area.	Window of optimal trainability for motor-coordination. Introduce dryland ski techniques – ski walking and ski striding. The focus on snow is balance, agility and rhythm. Good technique habits are developed through repeated practice. Use games that reinforce technique being taught. All basic cross-country ski skills (classic and skating) should be refined before the end of this stage. Encourage unstructured play time on snow.	Utilize games to develop skills, speed, power and aerobic fitness. Window of optimal trainability for flexibility. Basic dynamic and static flexibility training with an emphasis on proper technique. Develop strength using medicine balls, Swiss balls, exercises that incorporate the child's own body weight. Include basic core strength exercises. Use ski-related hopping and bounding exercises for developing leg strength and movement skills. Include speed exercises in the practice sessions by using specific activities that focus on agility, quickness and change of direction. Aerobic fitness is increasingly important. Include general aerobic activities 3-4x/wk.	Develop an awareness of the importance of practising basic mental skills. Introduce pre-race preparation. Introduce tactical skills. Introduce the mental skills of constructive self-talk, imagery and confident behaviour. Introduce basic stress management. Introduce basic goal setting.	Racing Rocks! ✓ Ski Tournaments ✓ Double Cross ✓ Team Sprints Midget Championships. Club, regional (and Provincial/Territorial Cup races when held within region). 5-10 competitive experiences per season. Race distances: start with 1.0 km and progress to a maximum of 3 km. 5-10 min. max.). Sprints: 200m. Generally begin after Xmas. Introduce ancillary capacities. Competitive focus should be on personal improvement. Basic rules are learned.	Narrow the focus to three sports. Ensure appropriate ski equipment. Good nutrition; continued education on re-hydration Emphasize group interaction, team building and social activities. Group sessions begin Sept. 15. 1.25 to 1.5 hrs. 3x /wk during fall and ski season. Maximum 70 sessions including competitions and special activities (includes winter safety and ski care education). Ensure "adventure-based" activities are built into season plan. Make good use of snow season.

Important note for all age groups re: race distances. Early season races should only be raced a few times towards the end of the season. When establishing a race distance or deciding which race skiers will enter, take into account: the ability and fitness of the skiers; the difficulty of terrain; the elevation (altitude) of the race site; and whether the skiers are in the first or second year of their age class. The objective is to have skiers race at high speed with good technique, rather than struggle to finish the distance.

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SECTION 2 – EQUIPMENT SELECTION AND SKI PREPARATION

This section on equipment selection and ski preparation complements the information provided in section 3 of your Introduction to Community Coaching Reference Material and section 7 of your Community Coaching Reference Material.

2.1   Equipment Selection for L2T Athletes

During the L2T stage of development, a child should have two sets of equipment – one for skating technique and one for classic. Dual-purpose skis are not recommended.

Skis

❏ Classic skis should reach just below the skier's wrist when the arm is raised above the shoulder, and the camber should be suitable for classic skiing. A basic test can be performed to find out if the camber is suitable. With the skis on a flat floor or table top, when the skier is standing on one ski, the ski base should fully contact the floor or table surface beneath the foot. When the skier is standing on both skis at the same time (i.e. weight equally distributed), it should be possible to slide a piece of paper between the ski and surface in the area beneath the foot (i.e. the wax pocket). If the paper slides in this way, the camber is appropriate. Note: The camber of the ski is much more important than the length. Some ski companies don't use height as a criteria for ski selection because the more important factors to consider are weight and technique.

❏ Skating skis should be 3-10 cm above the head of the skier. Before purchasing new equipment, skiers/parents should confirm - by consulting a coach or by checking the F.I.S. Rules and Regulations (on the F.I.S. website) - the current competition rules pertaining to the height of skis.

❏ Skating skis require a camber that is suitable for skating (i.e. the camber needs to be sufficiently stiff). Skating skis for children often have too soft a camber. When the skier is standing on one ski on a flat surface, it should be easy to pull a piece of paper out from under the foot with a gentle tug.

❏ If skis are not of the correct length and/or camber, skiers will have difficulty mastering the technique benchmarks that have been established for this stage of development.

Poles

❏ As a starting point, classic poles should reach to the top of the under arm of the skier when the poles are standing on the floor - to the point where the poles are uncomfortable. Poles used for skating should be the same height as the chin. These are good reference points and skiers can adjust from there.

❏ There is no advantage to using poles that are too long. Conversely, poles that are too long can hinder technique and cause unnecessary fatigue.

❏ If poles are too long or too short, the skier will have difficulty mastering the technical skills necessary to become competent in the sport.

❏ Poles must have adjustable straps. The strap should be adjusted so that the pole can fit firmly against the hand at the point where the forefinger and thumb are joined.

❏ When straps are properly adjusted, the pole grip should reach above the point where the hand grips it.

❏ When the pole is released in the follow-through motion, the skier should still have control of it.

❏ Skiers should use sport specific (i.e. cross-country ski) gloves or mitts.

Boots/Bindings

❏ Boots should be comfortable. A constrictive ski boot doesn't allow for proper circulation. On the other hand, boots that are too large can lead to blisters and provide less control on the hills.

❏ It is recommended that skiers use classic boots for classic technique and skating boots for skating technique. However, a good quality, pursuit-style combination boot is also an option.

❏ Skating boots must provide firm ankle support.

❏ In addition to the annual club ski swap, a boot exchange program within your club can help reduce the cost of purchasing boots during the rapid growth years.

❏ Good quality boots are worth the investment.

Coaching Tip: Parents are unlikely to have the information they need to ensure their children have appropriate ski equipment for developing good technique. In addition, parents probably won't know how to prepare their children's skis (1) for a practice session, or (2) to take with them to a competition (i.e. cleaned and ready for the coaches to work with).

As a result, it is important to hold parent meetings each year before the ski season begins in order to explain what is needed.

2.2   Base Preparation

Terms Used to Describe the Construction of Skis

❏ **Base.** This refers to the material used in the manufacture of the base of the ski. There are variations in bases; some are harder, softer, more porous and less porous. It is preferable to have a P-Tex base, rather than a cheaper substitute that doesn't hold wax as well.

❏ **Metal Scraping**. Metal scraping describes the removal of base material (i.e. P-Tex) with a hand-held sharp metal scraper. At one time this was done to new skis in order to create a smooth and flat surface. However, most skis being marketed today do not require this preparation; they are ready to wax right off the rack. Metal scraping is now used primarily in the repair of skis that have been damaged or, in some cases, to recondition the ski base. Because metal scraping has potential to damage the ski base if done incorrectly, it is a task that should only be performed by an experienced skier or coach.

❏ **Structuring.** This describes the process used to alter the surface texture/finish to allow the ski to glide better on the snow surface.

❏ **Grinding.** Grinding is a process that uses a machine to renew the base of a ski by removing a thin layer of base material. It has two purposes: to make the base flat; and to press or cut a particular structure into it.

❏ **Rilling.** Rilling tools press or cut parallel groves into the base of a ski to create structure to improve ski base performance (generally by helping to reduce suction).

❏ **Tractor.** A "tractor" is a hand structuring tool that creates a pattern similar to a grinding machine. Unlike some of the rillers and grinding machines, tractor-type structuring tools will press the structure into the base, making it possible to remove it easily with hot glide waxing techniques.

Structure

Structure is an important aspect of the preparation of a cross-country ski for racing. When we speak of structure, we are referring to specific patterns placed on the ski base to enhance its glide properties. The structure on a ski base is as important as the wax, and like wax, it must be done properly in order to be effective.

When base structuring takes place, patterns are pressed or cut into the base of the ski. The purpose of these patterns is to help break up the suction that occurs between the ski base and the snow. In dry, cold conditions it will decrease the surface contact area and thus reduce friction between the ski and the snow. In warmer, wetter snow it helps remove excess water from the base.

Structure may account for as much as 20% of the performance of a ski.

Structuring can be done either with a grinding machine or manually; however the structure from grinding is more precise.

Grinding

Cross-country skis are ground on grinding machines that are designed specifically for that purpose. Some points to note:

❏   An infinite number of patterns that can be created.

❏   Grinding patterns can be reproduced.

❏   The finish on a properly ground ski is very clean – no burning, hairs, etc.

❏   A ground ski may be faster than factory-prepared skis. However, many racing skis are now being produced with very good factory grinds.

Hand Structure

If a grinding machine is not available, a ski can be tuned by hand. Hand tuning does not offer as many possibilities as grinding, but it can prepare a very good ski. The following tools are required:

❏   A sturdy jig.

❏   Tools for sharpening scrapers.

❏   A sanding pad.

❏   Rilling tools.

❏   Steel scrapers.

❏   FIbertex.

❏   A tractor.

❏   Brushes.

The first step is to get the work area set up. Ensure that your scrapers are sharp, your brushes are clean, there is good lighting, etc.

❏   Place the ski in your jig; clean off all the old wax.

❏   Make a couple of passes with a steel scraper; hold the ski up to the light to inspect it.

❏   Proceed to flatten the base. Check the ski frequently; hold it up to a light and look for shadows on the base. When the base is flat you will have uniform light along the length of it.

❏   Usually you can flatten the ski with a scraper, but sometimes it is necessary to use a sanding block/paper.

❏   Once the ski is flat, take a sharp scraper and make one or two continuous passes along the entire ski base.

❏ Wipe the ski with fibertex.

❏ You are now ready to consider structures.

❏ With hand structure, there is a progression of options you can choose. These range from a very smooth ski (e.g. a basic metal scraped ski) through to a coarse ski (as much as 3mm rills). The structure you decide to use should be based on testing and/or experience.

❏ A useful tool for hand structure is a "tractor". This tool gives a pattern to grinding. If more structure is needed, you can make more passes. A tractor can be used with rilling tools.

Tips

❏ Practise on old skis first!

❏ If the ski track is soft, cold and dry, a metal scraped ski will work well.

❏ Begin by using two to three different structures and getting to know them and their application well.

❏ Keep track of which structures have worked well in different conditions.

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2.3   Ski Preparation and Competitions

2.3.1   Tool Box

As you gain experience as a coach, your needs will change and your tool box will grow accordingly. In most situations, the club should assume responsibility for the specialized tools and tools and waxes needed for competitions.

Possible Ancillary Equipment for Your Club Tool Box

Metal scraper, thin, sharp	Plastic scrapers
Groove scraper	File(s)
Carborundum stone and/or diamond file	Putty knife
Paint brush	Can for wax removal
Groove plane	Iron
Tractor	Rilling tools – iron
Heat gun	Natural cork
Brushes – many	Synthetic Cork(s)
Straight edge	Nails
Rope	Gas mask
Dust filter	Power drill
Power brush	

Waxing Journal

Coaches are encouraged to keep a journal of their waxing experiences from the time they begin coaching. To do this effectively you will require waterproof forms that include a place to record the date, location, technique, air temperature and snow temperature of each waxing situation experienced.

2.3.2   Setting Up Shop

Setting up a work area is an important aspect of providing waxing support at a competition and one that often requires some improvising on the part of the waxing support team. In order to do fast, efficient and effective work, the support team needs a work area that lends itself to this.

Following are some key considerations to keep in mind:

❑   **Lighting.** When you are working on a ski you need to be able to inspect your work on a regular basis. Moreover, the final inspection of the ski is crucial. To do this the lighting must be good enough for you to see the base of the ski and make a proper assessment. Often you will find that you require portable lights, because the existing lights will not be adequate.

❏ **Power Source.** Irons, heat guns, power drills, extra lights and similar equipment can require more power than a single circuit can supply. When you are setting up your work area, try to spread the load over two or more circuits. In addition, make sure you have access to the main breaker or fuse box, both on the days leading up to and the day of the competition.

❏ **Benches.** Your work benches should be solid and secured to the building. In a temporary situation this can be done with duct tape, nails and bracing, etc. The ski forms that you use should be stiff, and the vices on the forms should be strong enough to hold the skis securely (adjustable forms are preferable). The ski should "fit" the form.

❏ **Equipment Storage**. All unnecessary equipment should be stored out of the way. Those working in the ski preparation area shouldn't have to climb over anything in order to move around. At the same time, the work area should be set up so that everyone can access the supplies they need without disrupting the others in the room.

❏ **Ski Storage**

✓ All too often, skis are piled in a corner or placed against a wall, only to come crashing down when something bumps against them. This is not going to go over well with your support team, who by then may have spent hours working on the skis to get the bases up to racing condition. One way to avoid this is to use portable racks that can be secured to the wall. They offer an easy way to keep the skis out of the way, safe and organized.

✓ It is advisable to have a system of racking so that, when you are preparing a large number of skis, you don't miss anything. It can be stressful for everyone involved if one of the support team takes down a pair of race skis 15 minutes prior to start time and discovers they haven't even been glide-waxed yet.

❏ **Ventilation.** The fumes created when applying glide wax to skis are harmful – all fumes, not just those from fluorocarbon powders. If at all possible, arrange to have the work area well-ventilated. If that is not possible, then all of the support team working in the area should wear an appropriate mask. IF THE WORK AREA IS SMOKEY, KEEP THE ATHLETES OUT!

❏ **Temperature Control.** The work area should be warm when you are glide-waxing the skis. This is an ideal environment for the ski to absorb wax, although it will be hot for the support team that is working there.

❏ **Layout.** It is important to lay out the work area so that members of the support team can work effectively without interfering with each other.

✓ Position the ski racks so that those who need to can reach them from their work benches.

✓ Secure the power cords so that they do not become people traps.

✓ Have enough tools for each work station so that, with the exception of a few special tools, they don't need to be passed around.

✓ If power brushes are being used, position that station so that the dust from them doesn't fall on finished skis.

✓ Have shelves to keep the wax supplies off the benches.

✓ Set up the area so that it is possible to keep it clean.

2.4   Snow and Weather Terminology

The following section outlines the standard snow and weather terminology used for cross-country ski competitions.

Type of Snow	Description
New snow	Snow which retains much of its original crystalline form and has been packed, but not tilled.
Fine-grained snow	Old snow which has been packed and tilled, but has not been subject to overworking or thawing and freezing.
Coarse-grained snow	Old snow which has been extensively worked and has been subject to cycles of thawing and freezing.
Man-made snow	Snow containing a significant percentage of recently man-made snow. This snow will change over time to resemble fine or coarse-grained snow.

Snow Conditions

❏ Packed.

❏ Loose grained.

❏ Re-frozen.

❏ Icy.

❏ Dirty.

Water Content

❏ Dry - cannot form a snowball easily.

❏ Moist – can form a snowball easily.

❏ Wet - can squeeze water out of snowball.

❏ Slush – can obtain water out of a snowball without squeezing.

Trail Density (for competitive skiing)

❏ Low

✓ Racing basket leaves significant impression.

✓ Sides of track break away easily.

❏ Medium

   ✓ Skating technique leaves significant impression.

   ✓ Screwdriver penetrates easily.

❏ High

   ✓ Skating technique leaves shallow marks.

   ✓ Screwdriver has to be forced into snow.

❏ Frozen

   ✓ Icy – cannot penetrate with screwdriver.

Standard Meteorologicial Terms

Precipitation	Cloud Cover	Wind
Light snow	Clear	Calm
Moderate snow	Partly cloudy	Light
Heavy snow	Cloudy	Moderate
Very light rain	Overcast	Strong
Light rain		
Moderate rain		
Heavy rain		
Freezing rain		

Precipitation, wind and humidity can be quantified using the units provided in the chart below.

Units	
Snow depth	cm
Rain	mm
Humidity	%
Wind Speed	Km/h

2.5   Snow Physics

To better understand the various snow conditions that skiers need to prepare for, it is worthwhile taking a look at snow physics from a groomer's perspective.

Snow Physics for Groomers

Knowledge of how snow reacts to changes in temperature and temperature gradients will allow you to better understand what happens when you groom trails in different conditions. It will help you to:

❏ pack the snow to achieve suitable density for a variety of different users;

❏ provide the same track conditions for all skiers in a competitive event; and

❏ extend your skiing season by working the snow the right amount.

The Three States of Water

If you want to fully understand the changes that take place when you groom and pack ski trails, read the following section which explains the basic physical concepts governing the three states of water: gas, liquid and solid (vapour, water and ice).

❏ **Water Vapour.** Think of water vapour as individual molecules of water dashing around the atmosphere in a state of rapid but random motion. Each molecule consists of one blob of Oxygen with two "eyes" of Hydrogen attached.

✓ **Dew Point.** Imagine a large number of molecules of water vapour floating along quite happily in their own cubic centimetre or so of air space. As they are propelled by the prevailing winds landward over the ocean, more molecules freed by evaporation rise up to join them. Eventually they reach land and are swept upwards over high ground. As they rise, the air expands and the molecules slow down, their kinetic energy reduced. The more the air expands, the cooler the molecules become and the closer together they huddle, until at a certain temperature known as the Dew Point they condense into water droplets. When this occurs, the air is said to be "saturated". It contains as many free molecules as it possibly can at that particular temperature. The lower the temperature, the fewer molecules the air can hold before condensation takes place.

❏ **Water.** Water is formed of molecules sliding over each other but held together at the same time in a loose liquid form by the attraction of one molecule to another. Because water molecules form strong bonds, a very large amount of energy is required to convert water to vapour. In fact, the evaporation of water requires approximately 540 calories to change one gram of water to vapour without a change of temperature. This is known as the Latent Heat of Vaporization. Conversely, condensation releases the equivalent amount of heat to the atmosphere.

✓ **Super-Cooled Water.** If water vapour molecules encounter a temperature below freezing before they condense, the clouds that form will be composed of minute droplets which remain in the liquid state below the freezing point. The purer the water, the more the

droplets can be cooled. But there is a lower temperature limit; at -40°C water droplets freeze instantly.

✓ **Vapour Pressure.** Some molecules attain enough speed to break away from the surface of water. The higher the temperature, the more active the molecules and the greater the evaporation. Many of the molecules that break free remain in the form of an atmosphere of free-moving molecules hovering over the surface of the water. A concentration of these molecules is called "vapour pressure". As the temperature falls, the vapour pressure becomes lower.

❏ **Ice.** Ice is a state of matter where the molecules are firmly joined and their movement is restricted to vibrations. However, just as in the case of water molecules, the molecules are able to break away from the surface of the ice and form an atmosphere of vapour.

✓ **Vapour Pressure over Water and Ice.** For a given temperature below freezing, the vapour pressure over water is greater than the vapour pressure over ice. This is because the molecules are able to escape more readily from the water than from the ice. This concept and the concept of supersaturation are most important in the formation of ice crystals, both in the atmosphere and on the ground.

✓ **Condensation.** Condensation happens when a large number of molecules join together to form a water droplet. If there is no foreign surface on which to condense, the molecules can only come together by accidental collisions which may require a high degree of supersaturation, especially in the case of slower moving molecules at lower temperatures. If a sufficient number of molecules get together, then the droplet will continue to grow rather than evaporate away. In the atmosphere, this is achieved by the presence of foreign particles such as dust and salts called "condensation nuclei", which provide a surface on which water molecules can begin to condense.

✓ **Supersaturation.** Consider a glass of iced water. If the humidity is high enough, it will soon become coated on the outside with condensed water droplets. Like the molecules around the cold glass, high flying molecules in the atmosphere need some surface on which they can begin to condense. In the absence of such a surface, in the very clean air conditions at higher altitudes, it is possible for many more molecules to crowd together before condensation occurs. This higher moisture content is called supersaturation.

✓ **Sublimation.** Sublimation is the ability of water molecules to change from ice to vapour and back again without passing through the water stage. A warm dry wind blowing over an ice surface will carry off water molecules, and because the vapour pressure over the ice is momentarily lower more molecules will be encouraged to break away from the surface thus hastening evaporation.

✓ **Saturation with Respect to Ice.** If the atmosphere over a particle of ice contains the same concentration of water vapour as that given off by the ice, it is said to be "saturated with respect to ice". If the vapour concentration in the air is higher than the vapour pressure over the ice, it is said to be "supersaturated with respect to ice". Some molecules condense onto the ice surface.

Heat Gain and Loss in the Snow Layer

❑ **Temperature Gradient.** The temperature gradient is the difference in temperature between two snow layers or between a snow layer and the ground, expressed in terms of degrees Celsius per metre of depth. For example, consider one metre of snow lying on a ground surface the temperature of which is 0°C. If the air temperature drops to -20°C, there is a difference of 20°C in one metre of snow depth or 20°C/m. Because the temperature gradient influences the movement of water molecules within the snowpack, it has a significant effect on changes in snow structure within the snowpack.

The physical processes that cause changes at and beneath the surface of the snow are driven by temperature gradient or the lack thereof and by transfer of heat to the snowpack.

For the purpose of grooming, the interfaces that most concern us are:

✓ The ground and the snow surface.

✓ The air just above the snow surface and the snow surface.

✓ The snow surface and the snow 1-2 cm below the snow surface.

Factors that affect the above interfaces are:

✓ **Incoming Ultra-Violet Radiation (i.e. Sunlight).** This will heat up the snow and cause melting within the top few centimetres of the snowpack. The amount of warming depends upon the albedo (reflectivity) of the snow, the amount of impurities (dirt) mixed with the snow and the granular structure of the surface layers. Machine groomed snow is not highly reflective and therefore a large percentage of the incoming solar radiation is absorbed, which may create a significant temperature gradient within the top 2-3 cm or may allow melting of the surface layers.

✓ **Outgoing Infra-Red Radiation.** This cools the snow surface. In clear conditions, in midwinter, outgoing infra-red radiation may cool the snow surface at the same time as incoming radiation warms the snow beneath the surface, creating or enhancing a significant temperature gradient. During a clear, cold night, a crystalline deposit of surface hoar may form on the snow surface.

✓ **Rain.** Rain transfers heat directly to the snow. It may remain as liquid water in the snowpack.

✓ **Wind.** A warm moist wind results in heat being transferred to the snowpack. A dry wind, while causing the snow to evaporate at a high rate, transfers little heat into the snowpack.

Metamorphism

❑ **The Process of Rounding.** Snow begins to change as soon as it reaches the ground (or at higher temperatures, in the air before it reaches the ground). The rate at which it changes depends upon the temperature. Close to 0°C, the change is rapid. Below about -20°C, there is little discernable change from day to day.

When outside temperatures are moderate or when the snowpack is deep, the temperature gradients within the snowpack will be small. Snow will then change by a process known as "rounding". The natural process of minimizing surface area breaks down the intricate

crystalline snow structure of the ice crystals into smaller, more rounded ice grains. At the same time, because of the reduction in volume of the snow particles, the snowpack consolidates and settles. When snow is first deposited, it is light and fluffy, the crystal branches interlocking to form a cohesive mass. The snow during this period is stable and will remain plastered on steep slopes and rock bands. After a period of time, water molecules are transferred by vapour movement from the extremities to the body of the crystal. The destruction of the interlocking branches results in a critical period during which the snow becomes unstable. Eventually, the ice grains lose all sign of their previous crystalline structure and become more and more rounded. The larger ice grains grow at the expense of the smaller particles, resulting in a uniformity of size within each snow layer.

❏ **How Snow Gains Strength and Density**. You've probably noticed that soft, new snow, when packed, will harden overnight. Necks form between the ice grains forced into contact with each other. The process where snow gains strength by the joining of ice grains is called "sintering".

Figure 2.1: Sintering
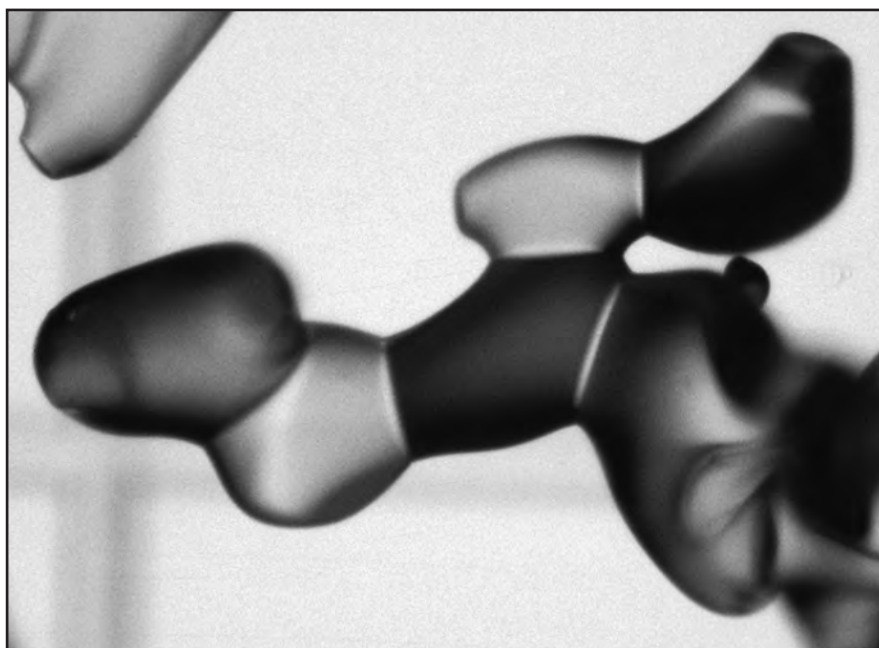
In the case of the ski trail, the snow crystals or ice grains are forced close together by the mechanical compaction of your grooming equipment. Because vapour pressure is higher over a convex surface than over a concave surface, water molecules move from the air above the convexities to the air above the concavities. More molecules sublime from the ice surface to replace those lost above the convexities. At the same time, the air above the concavities becomes supersaturated and molecules are deposited on the surface. On re-warming, the necks between the ice grains will be reduced, weakening or destroying the bond between grains.

Figure 2.2
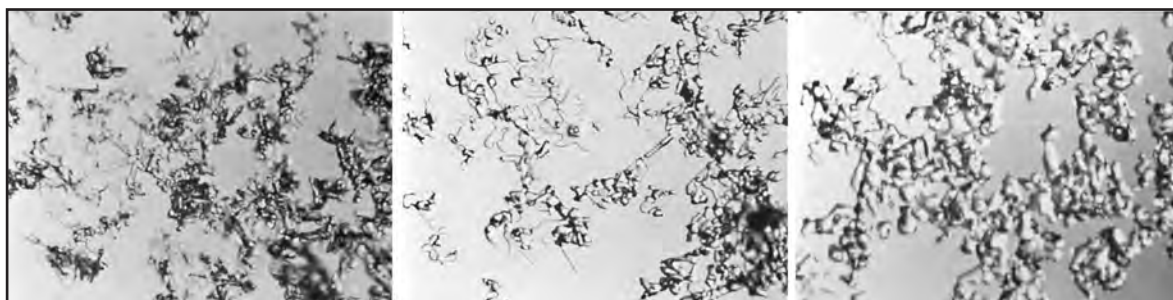
Newly fallen snow (left image), starts to loose its crystalline form as rounding of the ice crystals takes place (centre image). The ice crystals take on a rounded form (right image) becoming ice grains. Sintering occurs and the snow pack settles and strengthens.

❑ **Importance of Density.** If your trails are to stand up to their intended use, you should pay attention to the density of the groomed snowpack. The following table of densities gives typical snow densities and indicates suitable densities for various levels of use. Kilograms/cubic metre (Kg/m3) is the usual measure of density.

✓ New snow   150 - 200 Kg/m3

✓ Wind-packed snow   250 - 300 Kg/m3

✓ Packed with snowmobile alone   300 - 350 Kg/m3

✓ Support required for racing basket   > 350 Kg/m3

✓ Recreational trails - moderate use   450 Kg/m3

✓ Racing trails   500 Kg/m3 or >

✓ World Cup and higher events   540 - 560 Kg/m3

✓ Dog sled races   560 Kg/m3 or >

❑ **Recrystallization Due to Cold.** Crystal growth is the result of a relatively large temperature difference between two layers within the snowpack. For instance, the loose, sugar-snow, found in shallow, early-season snowpacks in some snow climates is the result of large temperature differences between the ground surface and the snow surface. In other cases, layers of loose snow grains may be found in the upper layers of buried crusts formed by a high temperature gradient between the warmer crust and the colder snow above.

Depth hoar forms when vapour, due to a large temperature gradient, recrystallizes on the bottom of ice grains.

Growth occurs because of an upward movement of water molecules within the pore spaces in the snowpack. The rounded ice grains formed at more moderate temperatures begin to take on a more angular form as water molecules move from the top of a grain and are deposited on the bottom of the grain above. This process is called recrystallization.

Figure 2.3: Depth Hoar
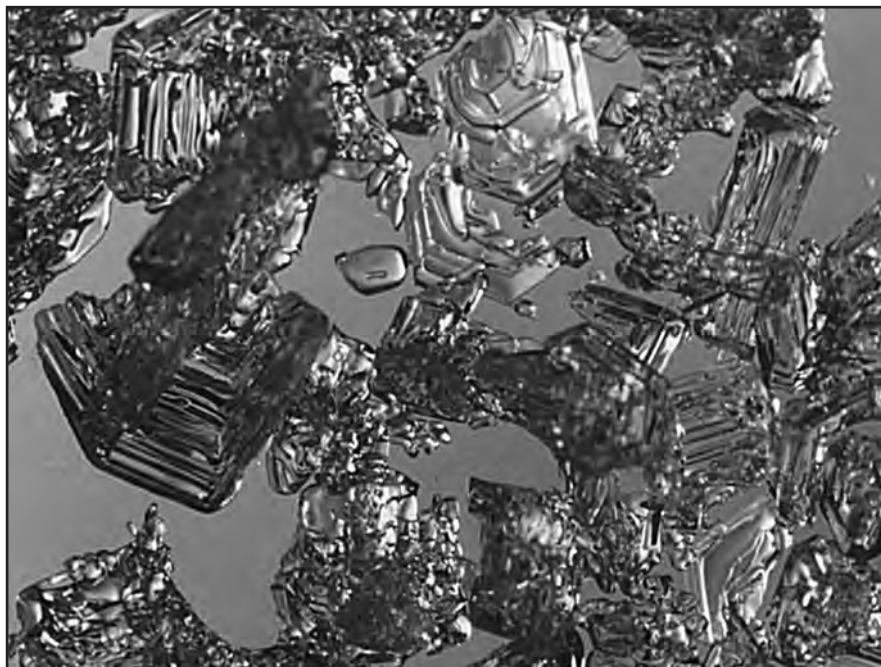
Recrystallization due to large temperature gradients is prevalent in colder climates early in the winter, when the snowpack is both shallow and unconsolidated. Extreme growth occurs when temperatures are very cold, below -20°C.

In denser snow, where smaller pore spaces allow little space for the growth of individual crystals, large temperature gradients result in faceted grains. In very dense snow, with small pore spaces, faceting may not occur.

Grain shape classification recognizes several stages of the recrystallization process. The two main ones are faceted grains and cup-shaped crystals (depth hoar). For practical purposes we will limit the discussion here to faceted crystals. You should not encounter depth hoar in your trail system unless you have neglected your grooming.

❏ **Faceted Grains**. The formation of faceted grains marks the beginning of crystal growth, which is characterized by the development of angular grains with flat crystal faces or facets, just like the faces on a cut diamond. As long as there is sufficient temperature difference between individual grains in the snowpack, crystal growth due to the temperature gradient will successfully compete with the tendency for rounding. If the size of the initial ice grains is large enough and the pore spaces big enough, the process of crystal growth will continue and large cup crystals with well-developed stepped surfaces will form. These large crystals are called depth hoar.

In cold weather, some faceting occurs in the lower layers of almost all shallow snowpacks. How much the process will weaken the snowpack depends upon the temperature, the temperature gradient and the density of the snow. As temperature gradients moderate as a result of further snowfall or warmer temperatures, the process of rounding will prevail and

the snowpack will be strengthened due to sintering. However, if cold conditions continue, and the snow is not too dense, depth hoar will form, substantially weakening the base of the snowpack.

❏ **Hoarfrost**. Hoarfrost is a bright, sparkling crystalline growth of crystals which can be found on, above or in some cases below the snow surface. It is formed in much the same way as snow crystals, and could be considered the snow equivalent of dew. What happens is that daytime radiation allows the air above the snow surface to hold a substantial amount of water vapour. On a cold clear night when the snow surface is cooled by loss of heat to the atmosphere, the air becomes supersaturated with respect to the ice, and water vapour condenses on the snowpack to form a crisp, crystalline coating that will slow down a skier's skis. In cold northern climates, this sandpaper-like frosting can form in a matter of hours, and will persist in cold, clear conditions unless skied off. In competitive skiing, this is one of the primary purposes of forerunners.

Figure 2.4: Faceted Grains
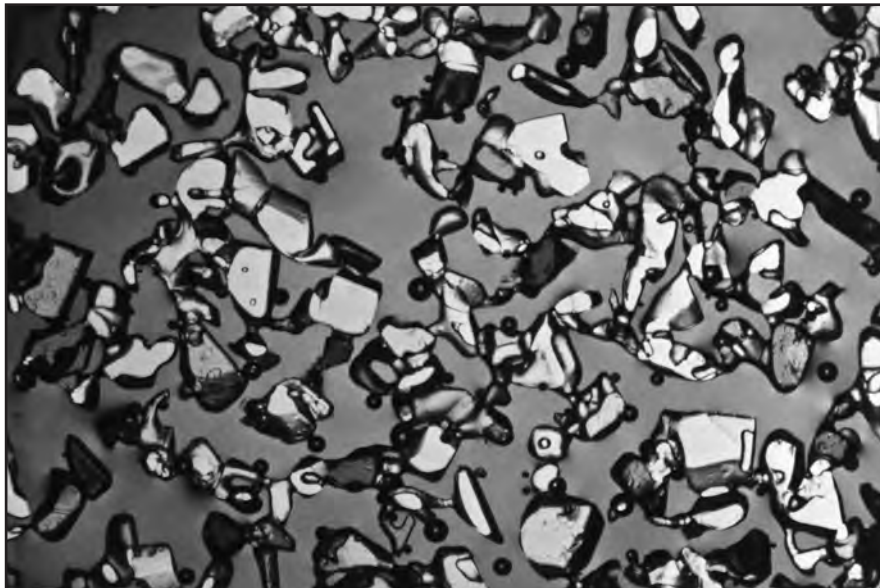
❏ **The Melt-Freeze Process**. When the sun is sufficiently strong to melt the top layers of the snowpack during the day, and when night-time temperatures fall below 0°C, cycles of freezing and thawing will occur. In this process, called "melt-freeze metamorphism", smaller grains will melt before larger ones, and so during the course of a number of melt-freeze cycles larger grains will grow at the expense of smaller ones. The meltwater wetting the surface of these larger grains eventually re-freezes and firmly cements the grains together. MF-grains have a tendency to freeze together in clusters, leaving large pore spaces unless some packing is done.

Figure 2.5: Clusters of Melt-Freeze Grains
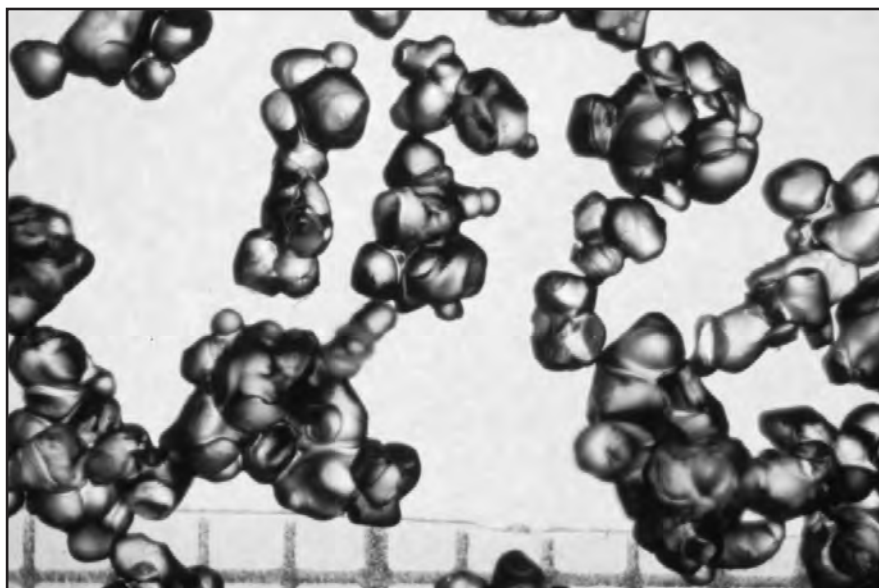
Types of Snow

❏ **Falling or Newly Fallen Snow**

✓ **In Cold Conditions (-1°C and Lower).** Low density snow, highly crystalline, possibly interlocking crystals, matting, building up on trees, etc. This type of snow will be hard to pack if you allow it to get too deep. Such snow packs well in 4-6" layers at temperatures close to 0°C. It is more difficult to pack as the temperature decreases.

✓ **In Warmer Conditions (0°C and Above).** Wet heavy snow, with little remaining crystalline form. If accompanied by wind, this type of snow is plastered on trees, signs, buildings, etc. It packs easily into a hard, dense layer at temperatures close to freezing. It may turn to slush at higher temperatures.

❏ **Partially Settled Snow (Fresh Powder)**. This type of snow has begun the rounding process and, if left alone, will settle and strengthen naturally over a period of time as pore spaces are reduced and sintering takes place. Mechanical disturbance such as blading, tilling or packing will reduce the air spaces by pushing the ice grains closer together, allowing better sintering. The snow, now "machine-groomed powder, becomes both denser and stronger.

❏ **Settled Snow**. Grain size becomes smaller and more uniform. Pore space decreases, sintering increases and density increases. The ability of the snow to recrystallize due to large temperature gradients, and hence loosen-up, is reduced due to smaller pore spaces. In continental snow climates (Alberta and the Rockies, Saskatchewan, Manitoba, Yukon, NWT), a well-packed trail system will not have recrystallization problems. Pack early and well.

❑ **Dry Granular Snow**. There are three possibilities:

✓ **Faceted Surface Grains.** This is unlikely at low elevations (i.e. most cross-country ski areas).

✓ **Faceted Grains (In Bottom of Snowpack).** This is common in continental snow climates, but will not be a problem if trails are well packed.

✓ **Re-Frozen Melt-Freeze Grains.** These are enlarged grains produced by several cycles of melting and freezing. This may be a loose surface layer, but more likely will be frozen clusters that will break up as temperature rises and skier traffic increases. When partial melting has occurred (free water content <8%), it is known as "corn snow". Excessive grooming will tend to loosen and enlarge these grains.

Surface layers of refrozen melt-freeze grains can be reconstituted in two ways:

✓ Mix with fresh snow; either new snowfall or old dry snow from layers beneath the granular layer.

✓ Using a gyro-groomer to mill the snow. This reduces the size of the particles, allowing densification and sintering to take place.

If melt-freeze cycles continue, the snow will eventually become sloppier when unfrozen and icier after freezing and renovation will be needed. There is little you can do at this stage to alter the physical characteristics of the snow grains. Tilling will help to dry out the snow by exposing more surface area to evaporation. Wind will speed up this process.

❑ **Corn Snow**. This snow consists of frozen, loose melt-freeze grains. See "Re-Frozen Melt-Freeze Grains" above.

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LEAVING THEM IN OUR TRACKS

This section on the theory of developing technique complements the information provided in section 4 of the NCCP Community Coaching Reference Material and section 5 of this Reference Material, and is directed primarily at supporting you in your role as a coach working with children in the Learning to Train (L2T) stage of development.

3.1   Overview

Objectives for the L2T stage of athlete development are:

❑   to further develop fundamental movement skills and general overall sport skills (otherwise a significant opportunity is lost, compromising the ability of the young athlete to reach full potential);

❑   to further develop good ski technique habits through repeated practice and the use of games that reinforce the technique being taught; and

❑   to refine all basic cross-country ski skills by the end of this stage.

Cross-Country Skiing – A Sport for Life

Technique is influenced by a multitude of factors that include an athlete's level of skill and conditioning, as well as terrain, equipment, wax and weather conditions. Moreover, as athletes develop, their technique evolves. As they grow and become stronger they need to adjust their technique to their new capabilities.

The intent of Section 3 is to present some of the theory that underpins cross-country technique. It is important that coaches possess a clear and common understanding of this theory to support the instruction and refinement of cross-country ski technique as explained in detail in Sections 4 (Skating) and 8 (Classic and Downhill).

Fundamental Concepts and Terminology

Although at a basic level cross-country skiing is easy to learn, competent instruction and a significant amount of practice are required in order for skiers to reach an advanced level of technique. The reality – not always acknowledged – is that cross-country skiing is extremely technical.

The technical doctrine for cross-country skiing incorporates several concepts and terms that recur throughout the explanations of the various techniques as presented in Sections 4 and 8. The most important of these are defined below:

❑   **Body Positioning.** Body positioning refers to how the various parts of the body are held in order to allow a skier to execute cross-country ski techniques effectively. The basic overall body position that serves as a start point for most cross-country ski techniques is known as

the general athletic stance (see detailed description below). The specific body positioning for each individual ski technique is described in section 4 (for skating techniques) and section 8 (for classic and downhill techniques).

❏ **General Athletic Stance.** The general athletic stance is an overall "good" body position for athletic endeavour. It is the starting position for learning or practising most cross-country ski techniques. Its principal features are also present in many ski techniques in motion. The general athletic stance includes the following:

✓ **Feet.** The athlete's weight should be over the balls of the feet. The feet should be approximately shoulder width apart. If the weight is too far forward, it will be difficult to produce a forceful kick. If the weight is too far back, it will be difficult to apply force quickly enough to be forceful and will also impede forward momentum as the centre of mass will be back.

✓ **Ankles.** Ankles should be "supple" and should exhibit good flexion. The degree of bend in the ankles is crucial in directing force application in such a way that the skier is propelled forward and down the trail rather than up into the air. The degree of ankle bend will be largely dependent on the terrain. Steeper terrain will require a greater amount of ankle flexion. Also, the degree of ankle flexion will be dictated by the amount of force an athlete will need or want to apply.

✓ **Knees.** In order to keep the weight positioned over the feet so force can be transferred to the ski, the knee angle must work in conjunction with the ankle angle. The knees must be supple and "relaxed". A common problem is for a skier to struggle to get proper ankle flexion. What then tends to happen is the skier has a knee angle that is much greater than the ankle angle, which places the skier's weight behind the feet. The weight being back leads to a plethora of problems like poor weight transfer, poor ability to glide as increased load is placed on the quadriceps, and a diminished force-producing moment.

✓ **Hips.** The hips should be "high and forward", and tilted posterior (like your tail is tucked between your legs). "High" means that the knees are only slightly flexed and the legs, therefore, are relatively extended, placing the hips in a higher position than would be the case if the knee angle was greater. "Forward" means that the hips are over the balls of the feet, so that the weight is evenly distributed over the front part of both feet. While skiing, having the hips too far forward or back results in inefficient propulsion and weight shift.

✓ **Core/Back.** In the general athletic stance, the core should be in a naturally rounded position, effectively mimicking a "soft C". The depth of the C will be dependent on terrain, with most skiers adopting a shallower C with the increasing steepness of terrain. This position will assist in maintaining hips over the feet, relax the lower back and help position muscles of the core in force-producing movements.

✓ **Arms/Shoulders.** The shoulders are released. The arms should hang free and loose beside the body. The pendulum action of the arms from this position should be smooth, easy and relaxed.

❏ **Balance.** Balance is a critical underlying component of all techniques. Balance is the state of equilibrium or "being steady". A skier is balanced when his/her centre of gravity is aligned over the base of support. The smaller the base of support, the more difficult it is to maintain

balance. As cross-country ski techniques frequently require the skier to balance on a small base of support - most often a single ski that is in motion over less than level terrain - maintaining good balance is indeed a challenge. Good balance is an essential precondition to proper weight shift and long glide, two of the key characteristics of good technique. Therefore, correct body positioning over the weighted (i.e. gliding) ski (or skis, in Double Poling and part of One-Step Double Poling) is extremely important. For more information, see the text on "Principle #1 – Stability" at section 3.2.2.

❏ **Weight Shift.** Weight shift is the transfer of full body weight from one balanced body position to another. Consistent with the concept of balance, the body position that results from a full weight shift is characterized by alignment of hips and knee directly over the ball of the foot of the weighted (gliding) ski or skis. Weight shift is a dynamic action that contributes to forward momentum. It is accomplished and assisted by the specific body movements/motions of a particular technique.

❏ **Glide.** Glide is the forward movement of a skier on a weighted ski or skis, caused by the force created by body movements/motions and weight shift. Better - or better controlled - weight shift and good balance over the gliding ski or skis serve to enhance the glide action.

❏ **Body Movements and/or Motions.** Body movements or motions are the biomechanical actions required to execute a technique (e.g. poling, kicking, upper body compression, etc.). They may be commonly described as skills.

❏ **Timing.** Timing is the inter-relationship, in sequencing and time, between the specific body movements/motions required to perform a technique properly.

❏ **Rhythm**

✓ Rhythm means that the right things (body positioning and body movements/motions of a particular technique) happen at the right times (timing). Good rhythm cannot be achieved without good balance.

✓ The importance of rhythm as a critical component of good cross-country technique cannot be too strongly emphasized. Athletes with good rhythm will pick up the other components of technique quickly, but athletes who lack rhythm will have difficulty developing a smooth and efficient technique no matter how perfectly they execute the individual movements.

✓ It is essential for young athletes to develop good balance and a sound feel for the rhythm of a technique. These skills are the foundation on which ski technique is developed and should have been an important focus during the FUNdamentals stage of development. By the time athletes have reached the L2T stage, they should be able to build on these basic skills and learn to ski with greater efficiency.

❏ **Tempo.** Within the rhythm of a particular technique, tempo is the pace at which a technique is executed. Generally the basic rhythm of the technique remains the same when tempo is increased or reduced. Tempo may be increased to generate greater speed, particularly in situations such as sprint competitions or the end of races. Tempo is also affected by terrain – e.g. tempo must increase in order to maintain a Diagonal Stride on a medium to steep incline.

❏ **Good Technique**

✓ A technique model creates a standard towards which all athletes strive. In the sport of cross-country skiing this model is generally based on the technique of high-level international athletes competing in various snow conditions, with graduated benchmarks that are appropriate for the progressive stages of athlete development.

✓ Good technique requires the athlete to use body positioning and body movements/ motions that are within certain ranges. In other words, there is no precise position or movement that can be categorized as the only one that will result in good technique. For each skill there is a small range which will result in the athlete having equally effective technique. Very often this range will be determined by morphology differences between skiers (length of body segments, total height, etc.).

✓ However, there is little latitude for deviation in respect of the rhythm of a technique. Rhythm is a characteristic signature of a technique that is fundamental to its proper execution.

✓ When teaching technique, it is normally better to work on the components of a skill and improve them individually before integrating them into the overall technique with its underlying, characteristic rhythm.

❏ **Efficiency**

✓ Efficient cross-country skiers perform a particular technique by executing a series of movements that are sequential, organized in a definite order and united in a whole. Further to this, in order to achieve maximum efficiency, skiers need to execute these movements with the essential timing and balance that will permit them to achieve a fluid rhythm and flow in their skiing.

✓ Research on energy use in cross-country skiing indicates that highly skilled athletes transfer potential and kinetic energy between body parts much more efficiently than less skilled athletes. Efficient technique means there is little wasted energy and effort. Therefore, athletes need to minimize extraneous movements and maintain a "quiet" body positioning in order to move down the track in the direction of travel as efficiently as possible.

✓ The ability to ski with a "quiet" body position is significantly dependent on the balance, coordination, strength and flexibility of the athlete. For this reason the NCCP Community Coaching Workshop emphasized the development of both balance and coordination skills on skis, and the NCCP CCI-L2T (Dryland) Workshop introduced core strength development (i.e. the abdominal and back muscles in the lower torso). Core strength stabilizes the body, which improves balance and allows athletes to use their power more effectively.

❏ **Individual Style.** Individual style is the result of the adaptations each athlete makes to the basic body movements in a technique. This occurs because of his/her unique body dimensions, muscular capabilities and/or beliefs about technique. In this regard, cross-country skiing is like many other sports, in that even among elite practitioners there are visible differences in how the basic components and principles of technique are executed to achieve efficiency and success (e.g. differences in the swing of a professional golfer or a

major league baseball player). However, the common denominator amongst sports is that all of the components of technique must be present and all principles observed in order to produce a successful result. A coach's challenge is to focus athletes' attention on the proper integration of components and principles into technique, while recognizing that the resulting technique will not always look the same. Efforts to have all athletes ski in an identical fashion would be impractical and potentially counter-productive.

❑ **Aerobic Fitness.** There is a strong relationship between athletes' ability to maintain good technique during a competition, their aerobic fitness and their personal performance. Good technique allows athletes to conserve energy, which in turn allows them to continue longer at the same speed than a less skilled athlete. A higher level of aerobic fitness will allow the athlete to maintain good technique longer. Therefore the combination of good technique and fitness is important in order to achieve the best performance.

❑ **Force.** Force is a pull or a push causing motion. Force is optimized by the use of the proper rhythm (body positioning plus body movements plus timing) for a specific technique. It can be increased by increasing a skier's strength and flexibility (refer back to section 4 of the NCCP Community Coaching Reference Material for further information on strength and flexibility).

❑ **Power.** Power is generated by force, which is dependent on body positioning, body movements, timing, strength and flexibility. The generation of power is further enhanced by a skier's tempo, and the ability to sustain it is determined by aerobic fitness.

❑ **Velocity.** In bio-mechanical terminology, velocity is the measure of how fast a body (e.g. a skier) is moving. Velocity is the result of good technique - appropriate for the prevailing track and terrain conditions - being correctly executed in the individual style of a particular athlete. More force and higher tempo normally result in increased velocity.

❑ **Speed.** In bio-mechanical terminology, speed is the measure of how quickly a body movement or motion is executed. Speed of movement is a contributing factor in force production. While the distinction between velocity and speed is interesting from an academic perspective, it is unlikely that the accurate use of this terminology will gain much traction in popular usage within the cross-country skiing community. Accordingly, coaches should be prepared to see the two terms used interchangeably, even within doctrinal publications.

❑ **Pre-Loading.** In skating and classic techniques, pre-loading is the action of quickly extending the "push" leg just before flexing the leg to load it for the push (i.e. kick) phase of the technique. Pre-loading serves to optimize the rebound effect of the elastic property of both the thigh muscles and the camber of the ski. For Diagonal Striding in classic technique, pre-loading is also required to compress the ski camber to a state that will allow for the grip wax to contact and adhere to the snow. The pre-loading action is similar that of a diver jumping up on the springboard before diving, an action that "charges" the springboard with as much energy as possible; the springboard then returns the energy to the diver, thus propelling the diver higher up in the air. Execution of the whole pre-loading sequence must be well-timed and swift in order to preserve the transfer of elastic energy throughout the propulsion phase.

Coaching Tip: Balance is vital and rhythm is more important than technical finesse.

3.1.1   Acquisition of Skills

In order to become technically competent, athletes need to spend time on skis in addition to the structured skill development sessions offered by their club. The more they practice, the sooner they will develop a good skill level!

When recommending additional practice time to the parents of young athletes, however, it is important for coaches to explain that spending time on skis for the purpose of improving technique (repeated practice) is not the same as skiing long distances – the emphasis needs to be on quality rather than quantity. This is often misunderstood, resulting in children skiing kilometre after kilometre, while reinforcing poor technique habits. The latter situation occurs when a skier is unable to retain correct technique because he/she is tired. The repetition of incorrect or sloppy technique for long periods of time is exactly what you wish to avoid. Repetition can ingrain a bad habit as well as a good one, and undoing a bad habit is a difficult and time-wasting process.

The following are some points on the acquisition of skills that may be useful in explaining the distinction between repeated practice and simply skiing long distances.

❏ In order for athletes to retain new skills they must ski more than once a week; to significantly improve their skills they must spend time on skis several times a week.

❏ Individuals improve their performance and attain an expert level not as an automatic consequence of more experience with an activity, but rather through structured learning and effortful adaptation.

❏ The effects of extended and deliberate practice are more far-reaching than is commonly believed. Performers can acquire skills that circumvent the basic limits on working memory capacity and sequential processing. Deliberate practice can also lead to anatomical changes resulting from adaptations to intense physical activity. The study of expert performance has important implications for our understanding of the structure and limits of human adaptation and optimal learning.

❏ If skiers have practised their sport incorrectly, they are unable to change and adapt (later), and then they cannot move on to further improve technique execution. It is essential that they are taught the right methods from the beginning and that these methods are accurately replicated and reinforced in practice.

❏ Practice doesn't make perfect – practice makes permanent. Only perfect practice makes perfect permanently.

3.2   Biomechanics

3.2.1   Skill Phases

In general, skiing skills can be broken into four phases:

❏ **Preliminary Movements.** These are the movements that an athlete undertakes when getting ready to perform a skill.

❏ **Force Producing Movements.** These are movements that an athlete executes to produce force for the purpose of propulsion This is the most significant phase in the execution of a skill.

❏ **Critical Instant.** This is the point that determines the effectiveness of a skill. Ideally, the athlete has applied the right amount of force, in the right direction and at the right time - at the critical instant! At this point an athlete cannot do anything to alter the skill's effectiveness – any changes must be made prior to this.

❏ **Follow-Through.** This refers to the body movements that occur after the critical instant In cyclical skills the follow-through is part of the preliminary movement of the next cycle of the technique. Follow-through actions may also provide useful information about the critical instant and force producing phases.

3.2.2   Laws of Nature

There are five biomechanical principles that are particularly relevant to the analysis of cross-country ski skills. By referring to these principles you will be better able to analyse technique and make accurate observations about what changes are necessary to improve performance.

Principle #1: Stability

Stability refers to a state in which an object (e.g. a skier) is steady or in balance (i.e. in equilibrium). It also refers to the capacity of an object to return to equilibrium or to its original position after having been displaced. Recognition of the two interpretations of "stability" is critical to understanding the mechanics of cross-country ski technique. In essence, while it is important to achieve a state of balance in certain phases of ski technique, a skier can - and should - also be stable when moving between positions of balance (or stability). The ability to remain stable – whether in balance or not – is a matter of control, with control being exercised through properly executed technique.

The following bullets summarize important underlying concepts or definitions relevant to stability:

❏ The **centre of gravity** is the imaginary point at which the mass of the athlete or object may be thought of as being concentrated. See Figure 3.1. The lower the centre of gravity, the more stable an athlete will be.

Figure 3.1
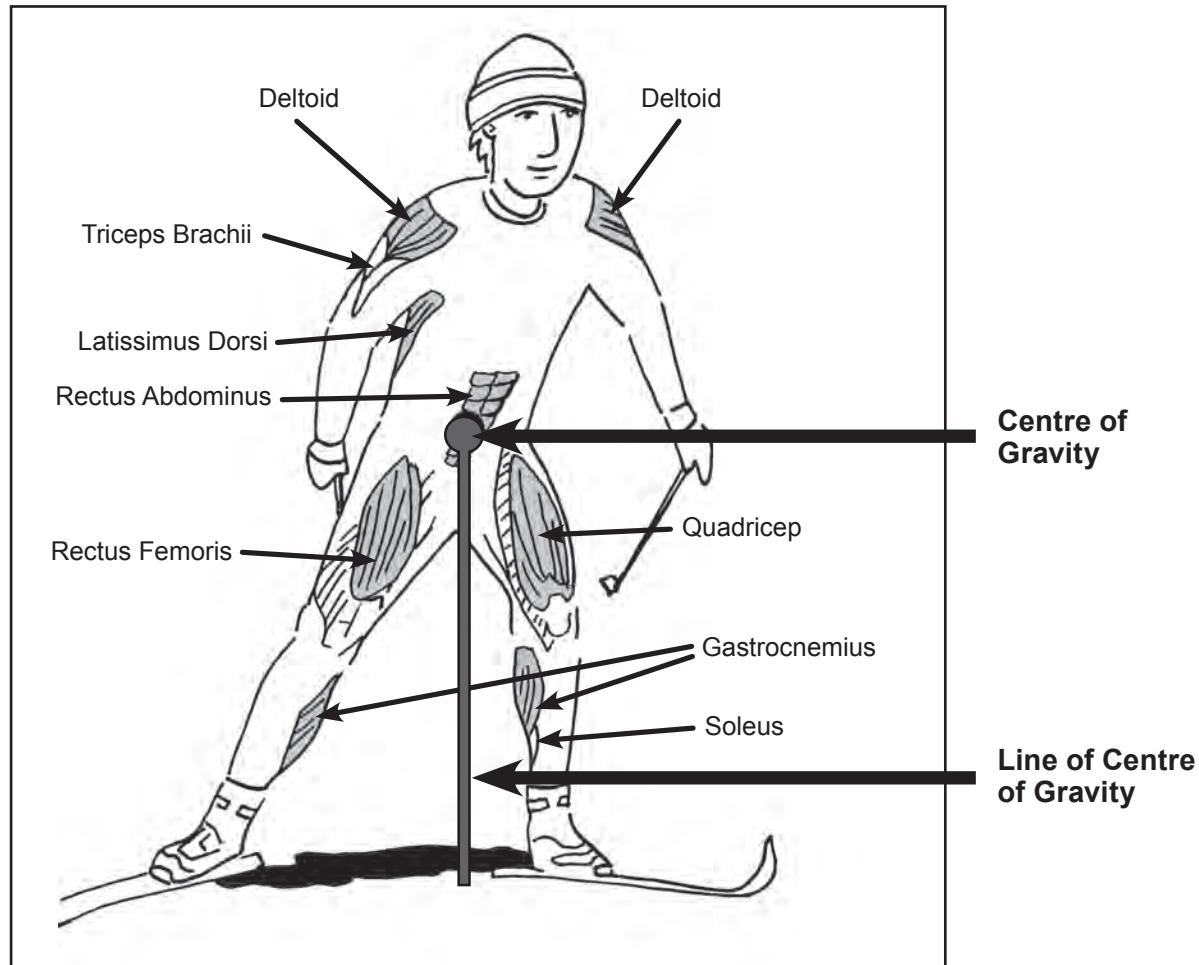
❑ The **base of support** is the area bounded by the supporting limbs (in cross-country skiing, the legs). See Figure 3.2. The larger the base of support, the easier it is for an athlete to be stable and the more margin for error there is in establishing and maintaining stability.

❑ The **line of gravity** is an imaginary line passing straight down through the centre of gravity to the ground.

❑ The centre of gravity must be within the base of support for the athlete to be balanced. In other words, the line of gravity must fall within the base. If an athlete's centre of gravity moves outside of the base of support, or if it deviates sufficiently to one side or other of the line of gravity, balance will be lost. However, loss of balance is not necessarily undesirable, nor does it imply that stability will be lost as well. It is often necessary and/or desirable to "lose balance" in order to initiate weight shift and create momentum. Provided that the loss of balance occurs in a controlled manner and results in a return to a balanced position at the end of a movement, stability is retained.

Figure 3.2

Deltoid

Deltoid

Triceps Brachii

Latissimus Dorsi

Rectus Abdominus

Rectus Femoris

Quadricep

Gastrocnemius

Soleus

Line of Centre of Gravity

Base of Support
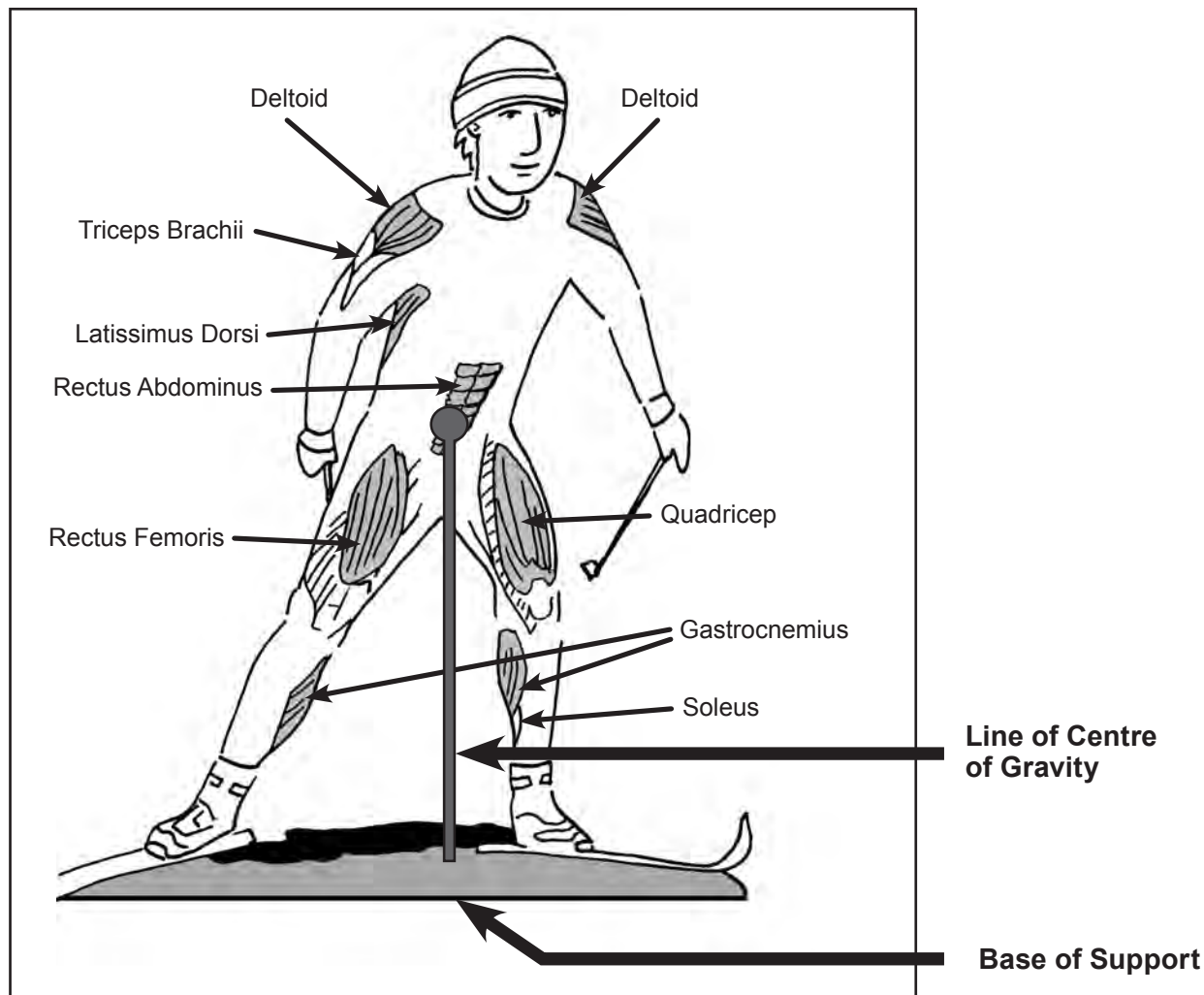
In the sport of cross-country skiing, the relevance of the Principle of Stability is pervasive:

❏ In executing most cross-country skiing skills, skiers must both move and try to maintain their stability. By moving the centre of gravity within the base of support or even outside of it, skiers voluntarily create a state of disequilibrium to initiate weight shift and facilitate movement. Good ski techniques comprise the controls that ensure that stability is not lost (i.e. equilibrium/balance is re-established at the completion of a movement).

❏ For example, when skiers swing their hands forward and step up the hill onto a new gliding ski in the Offset technique, they are clearly in a provoked state of disequilibrium. Until the new gliding ski is on the snow and weight has been shifted onto it they are falling forward and to one side because their centre of gravity is outside the base of support (i.e. the pushing ski). This position of temporary instability facilitates the shift of weight to the side they are leaning toward. Provided that their movements are controlled and result in a balanced position over the new gliding ski – albeit only briefly – the skiers will have remained stable throughout the action and forward movement will have been enhanced.

❏ The Principle of Stability is particularly important in cross-country skiing because the base of support is more often than not a single narrow ski that is travelling over terrain that is constantly varying. Skiers must be able to balance on this narrow and shifting base. But equally they must be comfortable in the "off-balance" state that exists between positions of balance, because technique dictates that a balanced position on a single ski will be held only briefly before a transition to the other ski must be initiated. The dual challenges of balancing on a narrow base of support and constantly managing disequilibrium/imbalance between balanced positions place a huge premium on sound technique. For this reason, cross-country skiing is a highly technical sport.

❏ In skating techniques, athletes who lack good balance and/or good technique will not be able to control their weight shift and will often spread their feet apart to widen the base of support. The tendency – caused by a skier's instability - to adopt a wide stance must be resisted and overcome. This requires the development of good technique through knowledgeable coaching and properly executed practice.

❏ Skiers who lack stability in downhills will often broaden their base of support by spreading their skis wider apart. For downhills, all skiers should also bend their knees and flex at the waist to improve stability by lowering their centre of gravity. Aerodynamics will be improved at the same time.

Principle #2: Use All of the Joints

The production of maximum force requires the use of all the joints that can be used. In the sport of cross-country skiing, skiers rarely, if ever, apply maximal force, but want to utilize all the appropriate joints in order to maximize technique effectiveness (see Figure 3.3).

❏ A **force** is a push or pull that causes motion. It is usually measured in Newtons (N).

❏ **Velocity (or Speed)** is the measure of how fast a body is moving. Velocity is usually measured in metres per second (m/s).

❏ **Acceleration** refers to the rate of change of velocity and is a measure of how consistent velocity is. Acceleration is usually measured in metres per second per second (m/s^2).

❏ The more joints an athlete uses in a movement, the more muscles he/she can contract and the more force he/she can exert. For example, when executing the poling action in a Diagonal Stride movement, the athlete should engage several joints sequentially:

✓ The action should be initiated at the hip joint with a slight crunching action of the upper body using the core muscles.

✓ The pole is then pushed backward by the shoulder muscles.

✓ The pole is pulled back using the elbow joint, engaging the triceps muscle.

✓ And the wrist joint completes the action with a final thrust to the rear.

Figure 3.3
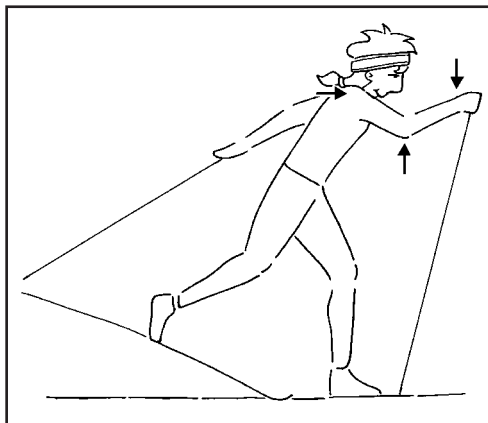
Principle #3: Use the Joints in Order

The production of maximum velocity requires the use of the joints in order - from largest to smallest. Leaving out one joint will reduce the force of the action.

❏ Most cross-country ski skills require a large amount of force and the development of large velocities in the limb segments. As a result, Principles #2 and Principle #3 are both important to this sport.

Figure 3.4
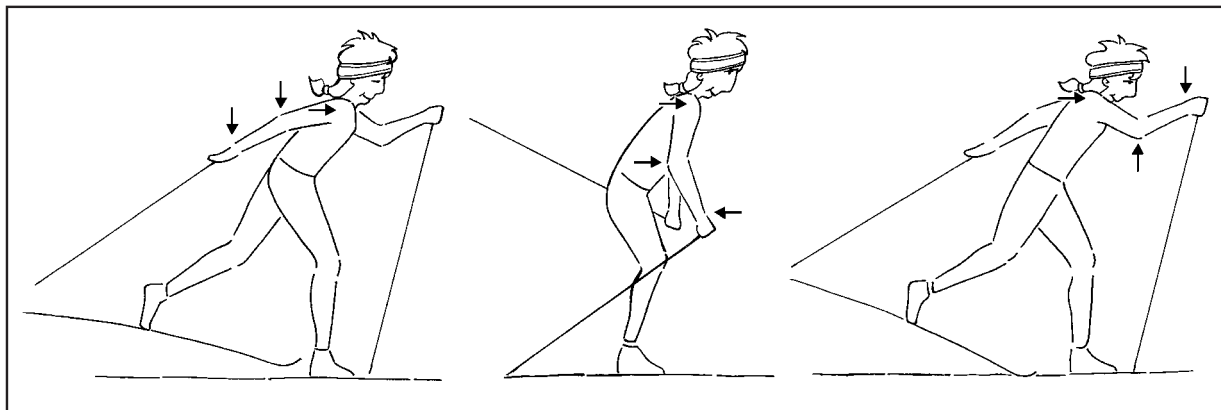
Principle #4: Increased Impulse Equals Increased Velocity

An "impulse" is made up of (1) the force applied, and (2) the length of time the force is applied. The longer and more powerfully the force is applied, the more velocity increases.

❏ Cross-country skiers can increase the length of time that a force is applied, and therefore the impulse, by applying the force through a greater **range of motion** in their joints. In general, the fastest cross-country skiers have longer stride lengths (greater impulse), but similar stride rates, to less skilled skiers.

❏ **Joint range of motion** refers to the amount of movement at a joint. This is measured in degrees (^{O}).

❏ Cross-country skiers need to improve/maintain their **flexibility** through routine stretching in order to maximize the potential range of motion in their joints (e.g. hips, knees, ankles).

❏ Cross-country skiers can improve the amount of force they can produce in their joints through strength training and general aerobic conditioning. This in turn will increase their velocity.

Principle #5: Movement Usually Occurs in the Opposite Direction to the Applied Force

This principle is related to Newton's Third Law of Motion, which states that every action has an equal and opposite reaction.

❏ In cross-country skiing, however, movement down a ski trail is not this simple because snow is slippery. For example, when executing classic technique it would be ideal if an athlete could push back with the foot the same as when running. Instead, because snow is slippery (even with good wax), it is necessary for the athlete to push down into the snow as well as back down the track.

❏ In addition, some forces operate in directions opposite to the force of movement. In cross-country skiing, air resistance and snow friction are important factors that need to be minimized in order to maximize speed. For example:

✓ athletes can minimize the effect of air resistance by drafting behind another athlete, or by tucking on the downhill sections of a course; and

✓ wax technicians can prepare skis to reduce the natural friction of the skis on the snow.

3.3   Observation Planning and Preparation

> The following section on Observation Planning and Preparation complements the information on Observation, Intervention and Feedback provided in sections 5.4.3, 5.4.4 and 5.4.5 of this Reference Material.

3.3.1   Observation Planning

An observation plan outlines when, where and how you should position yourself to observe your athletes when teaching technique. A good plan is essential for detecting and correcting skills effectively.

To develop an observation plan you need to:

❏ Pull out the appropriate technique checklist for a particular session and determine the key elements you intend to observe.

❏ Select your scanning strategies.

❏ Select your observation position.

❏ Decide on the number of observations.

Key Elements

The key elements for both the skating and classic techniques are outlined in the Technique Checklists provided in section 3.4. When choosing which ones to use, keep in mind that they should support the main goals for that session.

> Coaching Tip: To execute an effective observation, the coach must be knowledgeable about both the phases of the skill in question *and* the key elements.

Scanning Strategies

Scanning strategies are designed to help you observe the key elements, decide which parts of the body to focus on, and determine whether or not you need to observe several key elements at the same time.

Tips to help you develop an appropriate scanning strategy:

❏ Begin by scanning the overall technique. This will give you the general picture of an athlete's performance. Then focus on the key elements.

❏ The points on which you focus will affect what you see. For example, if you try to get a general impression of the whole, you will probably NOT get a clear impression of how any particular body part is moving, and vice versa.

Coaching Tip: For technique sessions, encourage your athletes to wear clothing that makes it easier to observe the joint positions – i.e. they should not wear bulky clothing.

Observation Position

Your observation position, or the place from which you watch a skill, is one of the key components of sound observation. The best position for viewing will vary from skill to skill and from key element to key element.

Tips to help you select an effective observation position:

❏ Position yourself at a right angle to the plane of the athlete's motion. This is the best vantage point for most skill observation.

❏ Move around - different viewpoints can tell you different things.

❏ In order to observe overall technique, observe several repetitions of a technique, and overcome problems associated with the speed as the athletes move across your field of vision: position yourself at a distance.

❏ In order to focus on the individual phases of a skill: position yourself quite close to the athletes.

❏ If orientation is important, choose settings with horizontal or vertical reference lines.

❏ To help block out distractions, set the session up away from large, busy areas, and then position yourself so that they are behind you.

Number of Observations

The exact number of observations depends on the skill in question. Ideally, you should observe the athlete as many times as it takes to get the information you need to communicate what he/she needs to improve on.

3.3.2   Teaching and Observation Formations

When teaching on-snow sessions to athletes in the L2T stage of development and younger, it is important to keep the athletes active so that they stay warm and attentive. For this reason having your athletes line up and complete a skill one at a time is usually less than ideal. The preferred approach is to utilize ski playgrounds or small loops where athletes can be continuously active and you can take them aside one at a time to work on their technique.

There are occasions, however, when a group approach to teaching on-snow sessions is appropriate. Following are some examples of formations and grids that can be useful for teaching skills in those situations. One of the benefits of using formations is that it increases your control over those being taught by restricting their movements to a specific area.

Coaching Tip: A coach must develop the ability to distinguish the individual style of an athlete from good/poor technique.

Figure 3.5

Teaching Formations
Front - Back View

For Coach's Demonstration

Teaching Formations
Front - Back View

Coach

For Athletes' Practice

Figure 3.6

Teaching Formations

Uphill / Downhill Skills

Fall Line

For Coach's Demonstration

Teaching Formations

Uphill / Downhill Skills

Fall Line

For Athletes' Practice

Figure 3.7

Teaching Formations
Teaching Grid for Level Terrain

Teaching Track   **Practice Tracks**

For Coach's Demonstration

Teaching Formations
Teaching Grid for Level Terrain

For Athletes' Practice

3.3.3   Effective Use of Video

A digital camcorder (video camera) is an essential tool for analysing an athlete's technique precisely and explaining the desired action clearly. It can significantly improve the effectiveness of your teaching. A video camera can be used to:

❏ subjectively analyse a skier's technique; subjective analysis can be carried out by making general visual assessments;

❏ objectively analyse a skier's technique; objective evaluations can be made by creating some background reference markers and counting the number of video frames covered between the markers or measuring skier body angles with respect to the markers;

❏ visually point out where improvement is needed and where improvements have been achieved;

❏ present role models with excellent technique;

❏ present a split screen sequence in which skilled and novice skiers ski side by side during the various phases of a technique (the skilled skier could range from an international level athlete to a young role model from the same age range as the observing skier); and

❏ create a technique record tape for individual skiers to show their improvement over a period of time.

Tips for Successful Video Recording

A video camera can be a powerful tool if it is used effectively. With a little practice, you should be able to produce clear and informative images for both yourself and your athletes. Following are some tips to get you started:

❏ Decide prior to the session what the objectives are, what technique you would like to analyse and where you will position yourself (or your assistant coach if an assistant is doing the camera work).

❏ Before you leave home, inventory the equipment to ensure you have packed everything you will need. Make sure all the tapes have been labelled so that you/your assistant don't tape over valuable footage.

❏ Give your athletes clear instructions as to what you want them to do when you are filming them, including when and where you want them to start and stop skiing.

❏ Keep in mind that you are recording both video and audio when the camera is on "record" mode. It is best to not talk at all while the video camera is on.

❏ If filming from the side, select an open area where you can move well back from the ski tracks. This will give you the longest sequence of frames (without angles that distort the image) as the skiers pass by. Use the zoom lens to create a large skier image on the screen.

❏ Organize the session to minimize the amount of time the athletes will be waiting in a line up.

❏ If the objective of the session is to give athletes on-the-spot feedback on their performance, you can keep the group skiing (and practising what they just learned) in a continuous loop while this is taking place. The athletes can be pulled aside for one-on-one feedback as needed. Ensure the athletes leave enough space between each other to allow you to film them individually.

❏ If the objective is to hold an indoor video session at some later point in time, you may choose to use a tracked/packed area that is approximately 40 metres in length. If you have a group of six athletes, you would position three at one end of the ski track(s) (to your left), and three at the other end of the ski track(s) (to your right). Next place one ski pole beside the track - 10 metres in from the athletes on your left, and a second ski pole 10 metres before the athletes on your right. The first athlete to ski past you can be from either side. When that athlete is three quarters of the way down the track (passing the ski pole farthest from their starting point), the second skier (from the opposite end of the track) should be passing the same ski pole, but going in the opposite direction. The camera should follow the athlete that is between the two ski poles. With this arrangement the camera follows whichever athlete is between the two markers (ski poles) and the camera action is continuous. If you are filming classic technique, it is best (but not necessary) to have two parallel tracks.

❏ If filming from the front, make sure there are no angles and that the image fills the screen. Adjust the zoom lens as the skier moves towards you.

❏ If possible, arrange your position so that the sun is behind your back when you are filming.

❏ When filming technique, you should ask your athletes to remove their bulky warm-ups (weather permitting) and ski in their ski suits. Bulky clothes cover up subtle movements and hide the angles being analysed.

❏ At times it may be useful to have your athletes ski at close to race pace, so that you can analyse their technique when they are skiing at a higher speed.

Coaching Tip: For athletes in the L2T stage of development, it is preferable to use a video camera in on-snow situations where the athletes have the opportunity to practise a technique immediately after seeing themselves on camera, and where interaction with the coach is one-on-one, and not in front of their peers.

Conducting Effective Indoor Video Sessions

Reviewing technique on video in an indoor setting can be very useful if the session is managed well. On the other hand it, if it is not managed carefully, it has the potential to create issues with some of your athletes. Following are some suggestions to help you conduct successful indoor sessions:

❏ Create a positive, low-stress environment.

❏ You may wish to begin each session using pre-selected footage of a high-level athlete or other good role model performing the same technique, or (depending on how much time you have to prepare for the session) a split screen sequence in which the skilled skier and the athlete in question ski side by side during the various phases of a technique.

❏ One option is to preview the tape ahead of time, make a list of the order in which you would like to see the athletes (pin it on the door), and jot down some notes about the things you would like each of them to work on. Start with two athletes in the room, and as one finishes and leaves the room they are asked to send in the next one. The athletes in the group that are not in the room can be working on something else while they are waiting their turn. This approach works well in camp situations.

❏ In the above situation, the video footage of the athlete receiving the feedback should first be reviewed at normal speed, and then at slow speed.

❏ Another option is to have sessions with one to five athletes. If there are more than two athletes present, you may wish to begin by viewing the entire tape at normal speed, allowing them to observe the whole group.

❏ Allow the athletes to participate in the process. Encourage involvement by asking him/her questions such as: "What do you think you are doing correctly? What do you think you are doing better than last time you skied or saw yourself ski? What do you think you can do to improve your technique the next time you ski?"

❏ Focus on constructive feedback – what the athlete should work on to improve his/her technique - not on what is being done wrong.

❏ End individual feedback with a positive statement of what you liked most or what they have improved on most since the last session.

❏ Praise in public, critique in private, and always keep in mind that some athletes are more sensitive than others.

❏ Whenever possible, go directly back onto the snow and work on the necessary corrections. The sooner the feedback can be acted upon the better.

Video Equipment Care

Following are some tips for trouble-free usage of your video camera:

❏ Check the manufacturer's instructions for details on the proper operation and maintenance of the equipment.

❏ Ensure the batteries are stored, drained and recharged, according to the manufacturer's directions.

❏ Keep batteries warm to extend battery life.

❑ Always bring extra batteries to a video session.

❑ When bringing a video camera indoors, give it time to warm to room temperature. Moving it from the cold outside air into a warm room too quickly might result in condensation which could potentially cause damage.

❑ When borrowing/renting video equipment, ensure the batteries are fully charged, all the necessary connecting wires are included, a tape is included, and the unit is in good working order.

❑ Do not drop or otherwise jar the camera.

❑ If connections do not fit together easily, don't force them. You may be attaching them incorrectly.

❑ Keep the lens cap on when the camera is not in use.

In camp situations, one person may be assigned the responsibility of managing all the video equipment, including recharging the batteries.

3.4   Skill Criteria and Checklists

The "Targets" and related skill criteria for CCC's Track Attack program are provided below. To assist you in managing the skill evaluation and awards aspects of the program, sample Skill Checklists and a Progress Report Chart have been included at the end of this section. These checklists are intended to serve as examples only. It is strongly recommended that you develop your own system for tracking the progress of your athletes.
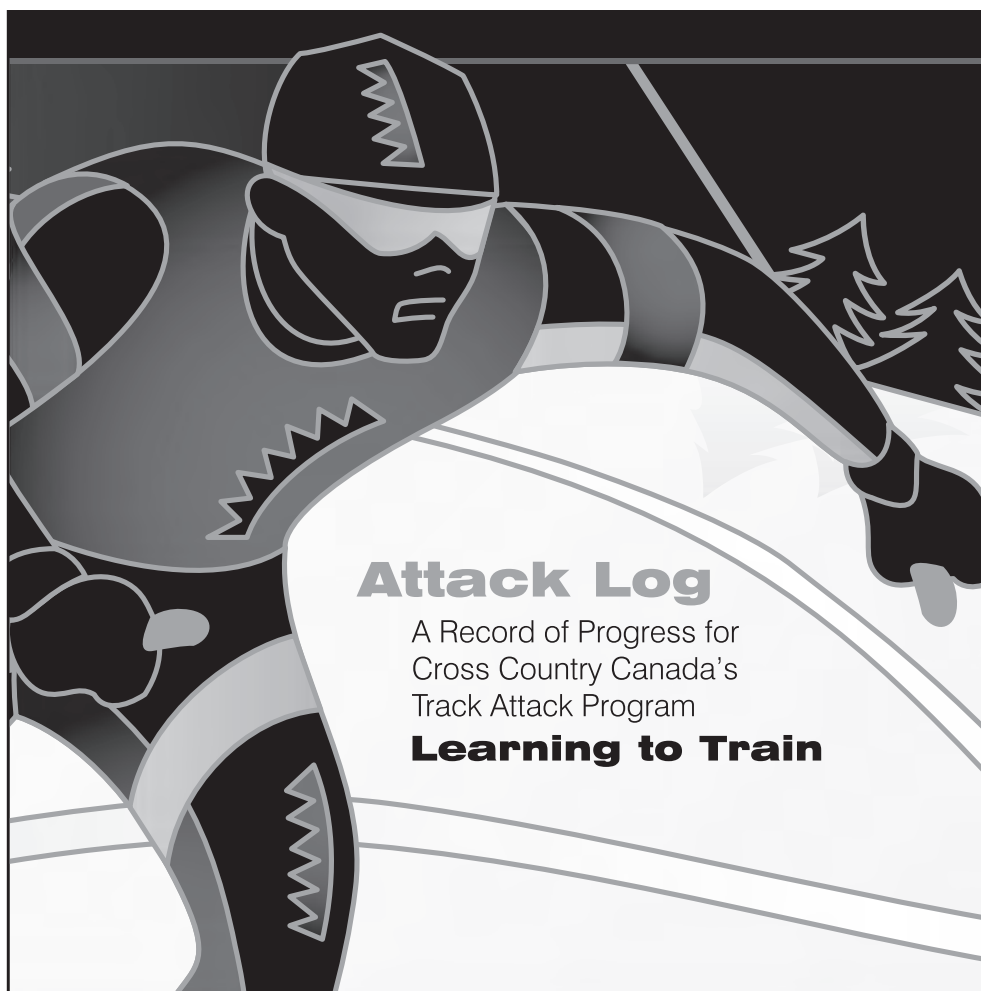
3.4.1   Track Attack Skill Criteria

The following skill criteria are from the "Attack Log" – CCC's Track Attack Program booklet that was published in 2006. Technique evolves continuously, and for updates on the three technique criteria in this series you should refer to sections 4 and 8 of this Reference Material.

Target #1: Diagonal Stride Technique

This technique should be practised and assessed on flat or gradually rising terrain with set tracks. In recreational skiing, Diagonal Stride is used when skiing in these types of situations. In competitive skiing, Diagonal Stride is most frequently used on uphill segments of the course; Double Poling and One-Step Double Poling are used on flat terrain.

Below is a sequential checklist of the steps for performing the Diagonal Stride technique. These steps represent the skills an athlete must demonstrate in order to achieve Target #1.

❏ There is a clear and equal push off with each leg combined with a distinct weight transfer from ski to ski.

❏ There is a consistent and confident glide on each ski.

❏ The forward movement of the arm and backwards movement of the same side leg are synchronized.

❏ When viewed from the side, the recovery foot lands beside or in front of (not behind) the gliding foot 100% of the time.

❏ When the legs pass together there is good ankle and knee bend so the hips are aligned over the balls of the feet.

❏ The rear leg is fully extended at the end of the leg push.

❏ There is a distinct forward upper body lean, which aligns with the extended leg at the end of the leg push.

❏ Hips rise at the end of the glide phase.

❏ At pole plant the hands are close to shoulder height, and elbows are slightly bent.

❏ Each pole tip is planted beside the opposite side of the ski boot.

❏ The poling action is powerful and consistent; the arms extend past the hips.

❏ The pole grip is released briefly in the latter stage of each poling action; the pole thrust is completed through pressure on the pole strap.

Target #2: Double Poling Technique

In recreational skiing, Double Poling is used for variety and maintaining speed on flat terrain, and for speed and efficiency on gradual downhills. In competitive skiing it is used in similar terrain, but for the purpose of generating speed and power.

Below is a sequential checklist of the steps for performing the Double Poling technique. These steps represent the skills the athlete must demonstrate in order to achieve Track Attack Target #2.

❑   Hands reach forward to initiate pole plant; hips are forward.

❑   When the poles are planted, the hips are over the balls of the feet; the hands are forward at shoulder level; the elbows are slightly bent but held fairly rigid.

❑   Poles are held at a small angle to the snow, pointing backwards. Pole tips are behind the pole handles when they are planted.

❑   The upper body flexes at the waist just after poles are planted to provide initial propulsion from the powerful abdominal muscles.

❑   As the upper body moves to a horizontal position, the arms start to extend; the arms follow through with a strong extension to the back.

❑   Immediately following the pole plant, the skier is clearly pushing on the poles with the upper body weight.

❑   The upper body movement is completed by extending the arms to the rear. The progression is upper body, then shoulders, then elbows. The elbows should not collapse in the initial phase of the pole motion.

❑   Knees should be slightly bent and flexible through all phases of the movement.

❑   After completing the push, the arms and upper body are recovered forward at the same time to initiate another poling action.

Target #3: One Skate Technique

The One Skate technique requires a poling action (arm push) with each leg push. This technique should be practised and assessed on a packed, gentle downhill slope. For recreational skiing, One Skate is used on flat or gentle downhill terrain to maintain speed. In competitive skiing, One Skate is a powerful, dynamic technique used to accelerate on flats and gradual uphills. It is the fastest technique in many situations and is used extensively by racers.

Below is a sequential checklist of the steps for performing the One Skate technique. These steps represent the skills an athlete must demonstrate in order to achieve Target #3.

❑   Begin as if Double Poling.

❑   The skier's weight is placed on the right ski (the gliding ski), while the left ski (the recovering ski) is lifted and angled a bit to the side.

❑   The left foot (with the recovering ski) is brought close to the right foot (on the gliding ski) prior to the beginning of the next thrust.

❏ The skier's right hip and shoulder are over the gliding ski at the time the leg push is initiated.

❏ The poles are planted with the tips slightly ahead of the binding and a complete Double Poling action is initiated.

❏ As the skier pushes/pulls down with the upper body and arms, he/she pushes on the right ski (which now becomes the thrusting ski) and transfers weight onto the left ski.

❏ Knees and ankles bend in a pre-loading action before pushing off.

❏ The thrusting leg pushes down and to the side, not back, and as the ski is pushed off it remains parallel to the snow.

❏ The leg thrust begins with the hip and continues through the knee and ankle.

❏ The completion of the poling extension is synchronized with completing the weight transfer to the left ski.

❏ As the skier shifts onto the left ski (now the gliding ski), the arms along with the right ski are recovered and the sequence is repeated using the opposite arms and legs.

❏ The glide on the left and right skis is consistent.

❏ The skier maintains a forward body position throughout the technique, with the hips over the balls of the feet.

Target #4: Ski Tournament

A Ski Tournament is a one-day extravaganza of special activities. It includes an individual sprint race and traditional relay as well as games. The objective of the event is to encourage participation, teamwork and good technique.

A traditional relay format has teams of three or four persons. The first skiers from each team start at the same time, and then hand off to the next skier at the end of the first leg. This continues until each member of the team has completed the prescribed course.

An individual sprint race begins with a time trial to rank the skiers. Following that are the "elimination heats" which usually have four skiers each. The two fastest skiers from each heat move forward to the next round. The remaining skiers in that heat may move to a consolation round at the discretion of the organizers.

Below is a list of the steps that are required in order to achieve Target #4.

❏ The athlete participated in and successfully completed a relay.

❏ The athlete called "track" when he/she wished to pass another skier, and if a skier behind called "track" he/she moved to the side at the first request.

❏ The athlete executed a correct relay exchange with the other member(s) of the team.

❏ The athlete participated in and successfully completed a sprint race.

❏ The athlete arrived at the start(s) on time.

❏ The athlete cheered for their team-mates and the other competitors.

❏ The athlete participated in all the Tournament activities in order to earn the maximum number of points for his/her team.

❏ The athlete behaved in a fair manner towards the other skiers at all times.

❏ The athlete thanked one of the Tournament volunteers for hosting the event.

Target #5: Midget Championships

The objectives of the Midget Championships are to:

❏ bring young skiers together for a weekend of cross-country ski competition and fun;

❏ encourage achievement through team effort; and

❏ encourage good ski technique.

This is a special competitive activity for skiers in the Learning to Train and Training to Train stages of athlete development. If a province or territory does not offer this event, participation in either the Arctic Winter Games or a Provincial/Territorial Winter Games can be substituted.

Below is a list of the steps that an athlete is required to complete order to achieve Target #5.

❏ The athlete participated in a Midget Championships event.

❏ The athlete prepared a list of everything they would need and packed for the trip themselves, including their ski equipment.

❏ The athlete brought their skis to the event cleaned and prepared the way their coach asked them to.

❏ Each night the athlete made sure that his/her clothes and equipment were ready for the next morning.

❏ Together with the coach the athlete developed a general plan for pre and post race activities.

❏ The athlete found out in advance what the procedure would be for picking up his/her bib on time.

❏ The athlete learned that competitors must follow the marked course from start to finish and must pass all controllers, and that a competitor who departs from the designated course must return to the point of departure before continuing.

❏ The athlete drank replacement fluid and ate snacks within an hour of finishing the race.

❏ The athlete made sportsmanship a personal goal for this event, and achieved his/her expectations in this area.

❏ The athlete remembered to take all personal belongings with him/her on leaving the venue following the day's activities.

❏ The athlete thanked an event volunteer for hosting the event.

Target #6: Provincial/Territorial Championships

A Provincial/Territorial Championship is the premier provincial/territorial competition hosted by CCC Divisions each year. These age-class events are held in accordance with CCC Rules and Regulations. If a province or territory does not offer this event, participation in either the Arctic Winter Games or a Provincial/Territorial Winter Games can be substituted.

Below is a list of the steps that an athlete is required to complete in order to achieve Target #6.

❏ The athlete participated in and successfully completed a provincial/territorial championship.

❏ The athlete inspected the course with his/her team-mates and/or coach the day before the race.

❏ The athlete practised the difficult sections until comfortable skiing them at race pace.

❏ Prior to attending the athlete found out what foods would be appropriate the morning of a competition, and when would be the best time for them to eat.

❏ Each competition day the athlete ate an appropriate breakfast that was high in carbohydrates. The athlete kept a record of what he/she ate and when, so as over a period of time to learn what works best.

❏ The athlete completed a pre-race warm-up, as discussed with the coach.

❏ The athlete learned that once skiers enter a zone where the corridors are marked they must remain in their chosen corridor unless they are overtaking another competitor.

❏ The athlete learned that if an athlete withdraws from a competition due to an accident or any other reason it must be reported to the officials at the finish line, and the bib must be returned to the race organizers.

❏ When the athlete finished racing, he/she changed out of their wet clothing as soon as possible and went for an easy ski (warm down) with some ski-friends.

❏ The athlete warmed-down at a slow pace.

❏ The athlete thanked a race volunteer for hosting the event.

Target #7: Backcountry Adventure

An overnight backcountry excursion could be for a weekend (one or two nights), or longer. It might be a ski to a lake in the vicinity of your home community, a ski to a chain of backwoods cabins that your club (or a neighbouring club) has established for this purpose, a true backcountry tour into the mountains, or a similar activity.

Below is a list of the steps an athlete is required to complete in order to achieve Target #7.

❏ The athlete participated in and successfully completed an overnight backcountry trip.

❏ The athlete completed a session on winter safety specific to the requirements of this trip.

❏ The athlete learned what type of ski equipment would be needed, assembled the appropriate equipment and packed for the trip without assistance.

❏ The athlete learned what type of clothing would be needed, assembled the appropriate clothing and packed for the trip without assistance.

❏ With the rest of the group, the athlete helped plan the route on a map in advance of the trip, and used the map to follow the path while on the trip.

❏ With the rest of the group, they participated in planning the meals, assembling the supplies and packing for the trip.

❏ The athlete did not litter and packed out what he/she packed in.

❏ The athlete learned to use the tools/equipment required for this particular trip (i.e. compass, avalanche transceiver, probe).

❏ The athlete shared in the workload and completed assigned tasks as a member of the team.

❏ The athlete stayed with the group at all times to reduce the possibility of getting lost.

Target #8: Snow Camp

In order to meet the criteria for this target, the Snow Camp must be a minimum of one weekend in length (a minimum of one overnight) and be held at a location where the skiers can stay together for the duration of the activity. The camp leader must be a qualified coach - minimum

NCCP CCI "in training" (or equivalent). Ideally the camp will include skiers from more than one club.

Below is a list of the steps an athlete is required to complete in order to achieve Target #8.

❏ The athlete participated in a snow camp.

❏ The athlete packed for the camp without assistance, including ski equipment.

❏ The athlete learned why flexibility exercises are important, and improved his/her skills.

❏ The athlete learned about what to eat/drink and when to eat/drink on race days.

❏ The athlete improved his/her skating and classic technique, including downhill skills.

❏ The athlete learned about ski preparation and ski care.

❏ The athlete prepared his/her own skis for the duration of the camp.

❏ The athlete completed the assigned tasks.

❏ The athlete learned about the routine to follow when taking part in a competition - inspecting the course, picking up race bib, warming up, warming down (and other recovery steps).

❏ The athlete enjoyed being with ski friends.

❏ The athlete remembered to take all personal belongings with him / her when leaving camp, and unpacking without assistance on returning home.

Target #9: Ski Orienteering

Ski Orienteering is a winter endurance sport that is similar to the orienteering disciplines practised during the summer season. Ski Orienteering requires good physical and mental fitness. A ski-orienteering participant needs good skiing and map reading skills – and the ability to combine the two.

The ski trails are prepared to different standards. Throughout the event the participant has to make decisions about which route is the fastest between the control points. The route choice is made on the basis of the quality of the ski tracks, gradient and distance, all of which can be read from the map.

Below is a list of the steps that an athlete is required to complete in order to achieve Target #9.

❏ The athlete participated in and successfully completed a ski orienteering activity.

❏ The athlete learned how to use a compass.

❏ The athlete learned how to read a map.

❏ The athlete learned how to find control points using the map and compass.

❏ The athlete brought his/her water bottle and appropriate snacks.

❏ The athlete evaluated different routes between checkpoints. Some were well-groomed but long, while others were not groomed but short. Some were hilly and some were flat.

❏ The athlete skied with a partner to reduce the possibility of getting lost.

Target #10: Practice Sessions

In order to meet the criteria for this target, the program for the season must conform to the CCC Long Term Athlete Development Model for the "Learning to Train" stage of athlete development (minimum # practice sessions: 10 years of age: 50 sessions; 11 years: 55 sessions; 12 years: 60 sessions - 90% attendance required)

Below is a list of the steps that an athlete is required to complete in order to achieve target #10.

❏ The athlete completed one full season of practice sessions/special activities.

❏ The athlete's cross-country ski season began in mid-September and ended mid-March.

❏ The athlete completed a minimum of 16 pre-ski season practice sessions/special activities.

❏ The athlete attended a minimum of one off-season camp (hiking, canoeing, etc).

❏ The athlete attended a minimum of one on-snow camp (overnight).

❏ The athlete attended a minimum of two activities with the club at large.

❏ The athlete attended a minimum of three competitions.

❏ The athlete attended a practice session on ski preparation and ski care.

Target #11: Glide Wax Application

When heating of either fluorocarbon or non-fluorocarbon glide waxes is required, the process must be conducted in a well-ventilated area. Excessive heating of the products must be avoided. The application temperature should be less than 115 degrees Celsius. Reliable respiratory protection in the form of a canister mask for organic vapours and dusts must be used by persons within the application area. Coach and/or parental supervision is essential. The recommended minimum age is 12.

Below is a checklist of the steps the athlete needs to follow when applying glide wax.

❏ Securely fasten the ski in a ski form.

❏ Clean the ski by using wax remover and a sharp, plastic scraper.

❏ When the ski is clean, begin glide waxing.

❏ Heat the iron. It should be hot enough to melt the wax without burning it (producing smoke).

❏ Lay a thin bead of glide wax on both sides of the groove on the glide zone. If you are preparing a classic ski, do this in the glide zone only, not in the grip zone.

❏ Melt the beads of wax with one or two passes of the iron from tip to tail. Use long, continuous strokes (no pausing).

❏ Scrape the groove and the sidewalls of the ski with a round groove scraper before it cools.

❏ Let the ski cool.

❏ Scrape the ski with a plastic scraper until all visible wax is removed.

❏ Brush with a nylon brush in order to remove any excessive glider from the base.

Target #12: Roller Skiing

Roller skiing is a sport-specific off-season (dryland) activity that helps to prepare a skier for the winter season. As such, it forms an important component of a complete seasonal plan for cross-country skiing.

It takes practice for skiers to achieve a high level of competency. There are progressive steps that skiers should follow when they first learn to roller ski, in order to ensure their safety and long-term success with this activity. Roller skiing is a good way to reinforce good technique habits. It is also a good way to acquire bad habits – so pay close attention to technique execution.

Below is a list of the steps that an athlete is required to complete in order to achieve Target #12.

❏ The athlete roller skied a minimum of ten times, in group sessions, under the supervision of a qualified coach.

❏ The athlete roller skied on a smooth, paved flat road with minimal traffic.

❏ The athlete learned about roller ski safety and how to take care of equipment.

❏ The athlete wore a helmet and reflective vest when roller skiing.

❏ The athlete did not wear an iPod when roller skiing.

❏ The athlete practised and mastered turning and stopping.

❏ The athlete practised and mastered the basic roller ski speed control techniques.

❏   The athlete can double pole with hips forward on pole plant.

❏   The athlete can balance and glide with his/her full weight on one ski.

Target #13: Team Sprints

A Team Sprint is a two-person sprint relay. The first skiers on each team start together and race the course, then hand off to their team-mates, who then ski the course. The second skiers then hand off to the first skiers who ski the course again. And so on. According to the rules of competition, each skier will complete three legs before the race is over (note that race organizers may chose to modify the rules when hosting races for younger skiers).

Below is a list of the steps that an athlete is required to complete in order to achieve Target #13.

❏   The athlete participated in and successfully completed a Team Sprint competition.

❏   Together with his/her coach the athlete set specific objectives (performance goals) in advance of the activity, such as making an effective handover in the exchange zone or doing an effective warm up prior to the start of the race.

❏   With his/her team-mate, the athlete practised Team Sprints ahead of time, including a rehearsal of the start procedures.

❏   The athlete followed the pre-race plan that his/her club coaches prepared for race day, including arriving at the race site at the pre-arranged time, checking in with the team on arrival, picking up his/her skis to test the wax, reporting back to the coaches if there were problems with the wax, and doing a warm-up.

❏   The athlete prepared appropriate snacks and a replenishing drink to take on race day.

❏   The athlete executed correct relay exchanges with the other member of his/her team.

❏   Together with his/her team-mate and coach, the athlete analysed the race so as to have a better understanding of how to do a Team Sprint the next time.

❏   The athlete thanked a race volunteer for hosting the event.

Target #14: Double Cross

Cross-country skiing is much more than a walk in the park on skinny skis! Since the introduction of skating, higher technology equipment and new race formats such as sprinting, pursuits and mass starts, cross-country skiing has picked up speed and grown in excitement. The evolution continues, with athletes now performing feats on cross-country skis that are more closely

associated with freestyle skiing and snowboarding. At the leading edge of this trend is "Xtreme X-Country". In its elite competitive form, it takes place on high speed roller-coaster courses and resembles snowboard cross. At a more basic level, it involves learning to ski through jumps and bumps in your ski club's own "Ski Playground". Regardless of the level at which it is performed, Xtreme X-Country emphasizes basic athletic skills such as balance, agility, strength and the ability to adapt basic sport skills to an unusual setting. To keep in step with this new dimension of cross-country skiing, Cross Country Canada has developed the "Double Cross" program, designed to enable young skiers to experience the fun and excitement of applying their cross-country skills to challenging terrain in an environment of adventure and intra-group competition.

Below is a list of the steps that an athlete is required to complete in order to achieve Target #14.

❏ The athlete participated in and successfully completed a Double Cross activity that featured competing in pairs or groups of four on a course that demanded fast turns, jumps and shifts in technique.

❏ The athlete inspected the course in advance with the coach and decided what kinds of technique would be appropriate at various points.

❏ The athlete warmed up carefully, through skiing and stretching activities.

❏ The athlete participated as a member of a team and encouraged his/her team-mate(s).

❏ The athlete had a radically good time.

❏ The athlete thanked a volunteer organizer for hosting the event.

Target #15: Off-Season Camp

In order to meet the criteria for this target, the camp must be an adventure-based activity. Ideally the camp would be held in a special location such as a national or provincial park, or on a glacier. For example, in Alberta the camp might be a hiking camp on the Skyline Trail near Jasper; if it were in British Columbia, it might be a hiking camp on the West Coast Trail on Vancouver Island; if it were held in Ontario, it might be a canoe trip in Algonquin Park.

The camp must be a minimum of one weekend in length (minimum two nights). The camp leader must be a qualified coach – minimum NCCP CCI "in training" (or equivalent).

Below is a list of the steps that an athlete is required to complete in order to achieve Target #15.

❏ The athlete participated in an off-season camp.

❏ The athlete packed for the camp, including any specialized equipment needed.

❏ The athlete learned how to find "zone 1", and how to apply this information.

❏ The athlete learned about the equipment needed for off-season, ski-related activities – roller skis, water bottle & belt, ski poles.

❏ The athlete practised "core" strength exercises.

❏ The athlete practised some ski-specific strength exercises.

❏ The athlete learned about the nutritional needs of an endurance athlete.

❏ The athlete learned about re-hydration and why to drink lots of water.

❏ The athlete practised ski walking and some skating simulation exercises.

❏ The athlete assisted in the preparation of camp meals.

❏ The athlete shared in camp duties and completed assigned tasks.

❏ The athlete remembered to take all personal belongings on leaving the camp, and unpacked without assistance on returning home.

Coaching Tip: If you are the coach in charge of your club Track Attack Program, your responsibilities will include checking off the appropriate box in an athlete's Attack Log when he/she have successfully completed a step. Once the athlete has completed all the steps required to reach a target, you can arrange or him/her to receive the associated incentive card.

3.4.2 Track Attack Skill Checklists

Sample Checklist: Target # 12 - Roller Skiing

Athlete Name	Completed 10 sessions	Roller skied in appropriate locations	Roller ski safety & equipment care	Helmet and reflective vest worn	Did not wear iPods or similar electronic devices	Mastered turning and stopping	Mastered speed control techniques	Double Poling	Balance and glide	General Comments

Sample Checklist: Target # 15 - Off-Season Camp

Athlete Name	Participated in off-season camp	Packed for camp	Learned how to find "zone 1" and how to apply it	Learned about off-season equipment for xc skiers	Practiced core strength exercises	Practiced ski-specific strength exercises	Leaned about nutritional needs of endurance athletes	Learned about rehydration	Practiced ski walking and skating simulation exercises	Assisted in preparation of camp meals	Completed camp tasks	Took personal belongings home and unpacked	General Comments

Checklist:

Athlete Name	General Comments									

3.4.3   Track Attack Progress Report

Athlete Name: _____

Date Athlete Started Track Attack Program: _____

Date of Progress Report: _____

TARGETS	COMPLETED	DATE
Technique		
#1 The Athlete's Edge - Diagonal Stride Technique		
#2 The Athlete's Edge - Double Pole Technique		
#3 The Athlete's Edge - One Skate Technique		
Comments/suggestions:		
Attendance at Competitive Events		
#4 Racing Rocks! - Ski Tournament		
#5 Racing Rocks! - Midget Championships (or equivalent)		
#6 Racing Rocks! - Provincial/Territorial Championships		
Comments/suggestions:		
Participation in Another Dimension of Skiing		
#7 Off-track Fun – Backcountry Adventure		
#8 Off-track Fun – Snow Camp		

#9 Off-track Fun – Ski Orienteering		

Comments/suggestions:

Training		
#10 Fast Track to Success – Practice Sessions		
#11 Fast Track to Success – Ski Preparation (glide wax application)		
#12 Fast Track to Success – Roller Skiing		

Comments/suggestions:

Something Different		
#13 Outside the Box – Team Sprints		
#14 Outside the Box – Xtreme X-Country (Double Cross)		
#15 Outside the Box – Off-season Camp		

Comments/suggestions:

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SECTION 4 – TECHNIQUE DEVELOPMENT - SKATING

> This section on teaching skating technique complements the information provided in sections 4 and 9 of the NCCP Community Coaching Reference Material, and is directed primarily at supporting you in your role as a coach working with children in the Learning to Train (L2T) stage of development.

4.1   Teaching Skating Technique

General Considerations for Teaching Technique (Both Skating and Classic)

One of the most important goals of the L2T stage of development is for athletes to refine all of the cross-country skiing techniques, becoming proficient in each of them. Following are some key considerations for coaches to keep in mind to help athletes achieve this.

❏ It is essential to have a good understanding of the elements of proper technique in order to teach and evaluate technique effectively.

❏ It is essential to have frequent, regular and properly structured opportunities to teach technique to your athletes.

❏ Skiing fast must not be the initial objective. Coaches should focus on teaching proper body positioning, body movements and timing – which, when executed correctly and together, produce rhythm. They should ensure that their athletes have acquired the characteristic rhythm of a technique before emphasizing the generation of power and speed.

❏ In order to truly perfect technique, athletes must develop an accurate kinaesthetic sense – an instinctive feeling for what is efficient – so that they are able to continuously and reflexively adapt their movements to be optimal, even when fatigued or in the pressure of competition. Developing this acute kinaesthetic sense is best achieved by exposing athletes to a variety of stimuli. The following approaches to learning and training are applicable to this process:

✓ Techniques should be practised on a variety of snow and track conditions. Once the mechanics of technique have been learned in a teaching situation, athletes should be required to practise in wet and mild conditions, on hard tracks and in soft powder snow so that they can learn how to adjust their technique to the different situations. Moreover, skiing in less than ideal conditions (e.g. on tracks that weren't set following a light snowfall) will help them develop balance and agility.

✓ As well as practising technique in a variety of snow and track conditions, athletes should practise technique on different types of ski trails. For example, modern ski trails and competition courses are often built like "super highways", but skiing on less manicured trails that twist and turn is important in order for athletes to improve their agility on skis and learn to change techniques reflexively as the trail requires.

✓ Participating in year-round activities that require relevant technical abilities (balance, coordination, rhythm, etc.) will also contribute to the development of the desired kinaesthetic sense.

❑ Athletes should do some of their technique practice without their poles. This will help them refine their balance skills and the timing of their leg actions and weight shift. This is especially important early in the season, when athletes first get on snow. However, skiing without poles also serves to remind athletes of some of the underlying fundamentals of sound technique and should therefore be included in practices periodically throughout the season.

❑ The balance and agility drills provided in the Community Coaching Reference Material (section 4) should be a part of every practice session.

❑ Most athletes require frequent and consistent feedback on their performance in order to ensure technique improvement occurs. To assist with this, coaches are strongly encouraged to use video cameras to provide on-snow analysis and feedback (section 3.3) and to develop good observation, intervention and feedback skills to maximize teaching effectiveness (section 5.4).

❑ It is important for athletes to see examples of good technique put into practice so they can create a mental picture of what they are aiming to achieve. To this end coaches should work on upgrading their own technique, as they are important role models for their athletes.

❑ When competing, athletes need to use the techniques that will give them optimal speed in the given terrain and snow conditions. Fitness obviously affects when and where a specific technique is used, but adapting the technique to the terrain is very important as well. Competitive skiers must therefore learn to analyse both the course profile and the prevailing snow and track conditions in order to determine how to best ski the trail. In addition they need to learn how to maintain momentum when switching from one technique to another. Choosing the best technique for a given situation means using the one that is optimal for a certain speed.

Characteristics of the "Best" Skiers

❑ The "big three" characteristics are the following:

    ✓ Good balance.

    ✓ Good weight shift.

    ✓ Good rhythm (i.e. correct body positioning, body movements and timing).

❑ Other important characteristics are as follows:

    ✓ Good forward movement – "gains lots of ground".

    ✓ Generates and maintains momentum – "keeps the wheels turning".

    ✓ Good at creating force in the direction of travel – not up, down or sideways.

    ✓ Good at changing technique to match terrain, snow and track conditions.

    ✓ Good physical condition.

    ✓ Good kinaesthetic feel.

Key Considerations Specific to Teaching Skating Technique

❏ The Teaching Points provided later in this section outline the key elements that make up each skating technique. It is recommended that coaches analyse the skating technique skills of the athletes in their group at the beginning of the season and, based on this evaluation, develop an individualized "skating technique plan" for each. These plans will be useful in determining the focus of the technique sessions for the whole group, as well as in guiding your advice to individual athletes throughout the season.

❏ All the skating techniques have common features. Small differences in timing and body movements – and through them the generation of power - make the different skating techniques suitable to different terrain and snow conditions.

❏ Emphasize the importance of spending equal time initiating pole plants on the left and right sides when using the Offset and Two Skate techniques. This will prevent potential muscle imbalances from developing and will allow the muscles on one side of an athlete's body (e.g. arms, shoulders, abdomen) to rest while he/she is working on the other side. It will also ensure that athletes can adapt their technique smoothly to the constantly changing profile of the trail, thus optimizing efficiency.

4.2   Skating Techniques

This section provides comprehensive descriptions and teaching methodologies for the several skating techniques that are essential for a cross-country skier: Offset, One Skate, Two Skate and Free Skate. Some general information is also provided on Diagonal Skate, but this technique is not treated in depth as it is seldom used in a racing context.

For the purpose of better understanding the roles and relationships between the various skating techniques, the techniques are equated to "gears" (analogous to gears in a vehicle). This is illustrated in Figure 4.1.

Figure 4.1: Skating Technique "Gears"
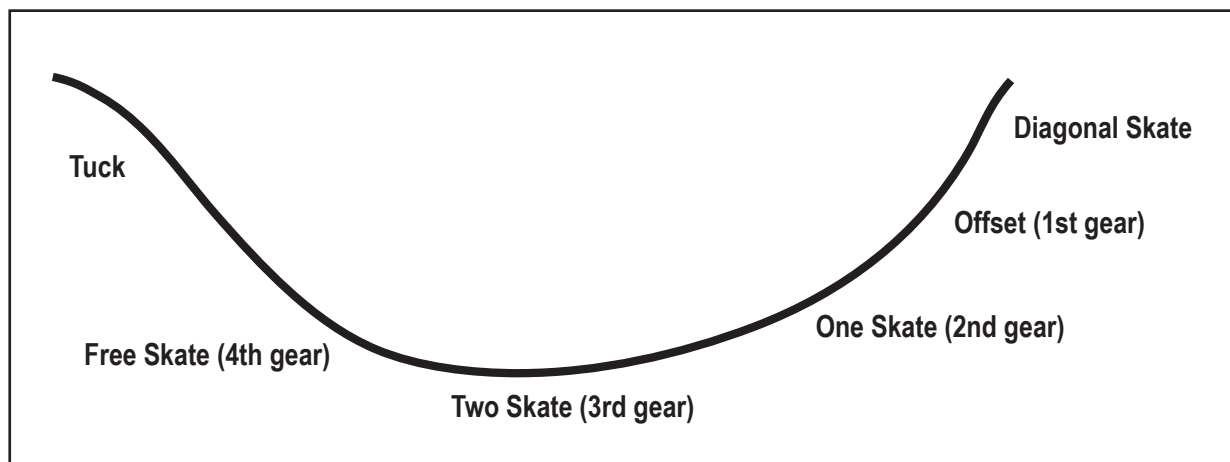
The gear analogy gives an indication of the relative speed of a skier when using them. Thus, skating techniques are described as follows:

❑ **Diagonal Skate** – a sub-gear (or "Granny gear", in a cycling context).

  ✓ Diagonal Skate is a useful technique for recreational skiers, as an energy-efficient means to climb steeper hills.

  ✓ In a racing context in which ski trails are properly designed, a competent and fit skier should not need to resort to using Diagonal Skate to climb hills. While this approach is correct in principle, practicality dictates that there are situations where Diagonal Skate will still be used. Such situations include use by younger skiers where fitness may not permit a hill to be climbed using Offset, as well as use by more proficient skiers when faced by a particularly steep grade on a race course that does not meet homologation standards. Ultimately, when the situation dictates (i.e. continuing to execute Offset technique correctly is impossible), it is better to maintain forward and upward momentum with Diagonal Skate than to resort to walking or a Herringbone-type shuffle.

  ✓ Apart from the racing scenario, many or most skiers will find the Diagonal Skate to be of value when training. When training in the lower zones/intensities, skiers should attempt to use Offset technique for hill-climbing to the extent possible. However, they

will sometimes find it expedient to climb steeper sections of the course using Diagonal Skate in order to keep their heart rates within the specified parameters for the zone in which the training is taking place.

✓ As noted previously, this manual will not provide details on the Diagonal Skate, as it is not a technique that warrants critical analysis beyond that provided in the Community Coaching Reference Material. Nevertheless, coaches should ensure that when Diagonal Skate is being used by their athletes, the technique is being executed correctly, observing the essential fundamentals of good skate skiing – e.g. good weight shift, forward hips, step up the hill.

❏ **Offset** – 1st gear. See section 4.2.1.

❏ **One Skate** – 2nd gear. See section 4.2.2.

❏ **Two Skate** – 3rd gear. See section 4.2.3.

❏ **Free Skate** – 4th gear. See section 4.2.4.

The material provided in the following sections will provide you with comprehensive information on the various skating techniques, together with recommendations on how to teach them. Skating Technique Checklists are summarized in section 4.2.5.

The technique descriptions in this manual are appropriate for distance races and for recreational skiing. Note that experienced ski racers may make minor modifications to skating techniques for sprint competitions in order to be more dynamic and explosive. These modifications can be executed for relatively short distances and/or races of short duration only.

Ski technique and our understanding of it are constantly evolving – sometimes quickly. This material articulates the most current doctrine and will be updated periodically as changes occur.

4.2.1 Offset Technique (1st Gear)

Purpose

This technique is used primarily to ascend hills (i.e. for climbing). Depending on the track conditions, Offset may be used in situations that range from slight uphills to very steep uphills. As they develop, skiers with good technique and power will be able to use One Skate and Two Skate techniques more on uphills, thus reducing the amount of Offset (1st gear) used.

Mechanics

The Offset technique is relatively easy to learn at a basic level. The reason for this is that it places fewer initial demands on a skier's balance. This is because: 1) the body positioning and movements of the technique involve a weight shift from side to side and forward that amounts to "falling up the hill" (which can be accomplished even in an off-balance body position); and 2) the shorter glide that is generated in the uphill conditions in which Offset is used requires the skier to spend less time balanced on each ski.

Figure 4.2 - Complete Cycle of Offset Technique (lead side is left)

Figure 4.2.1

Figure 4.2.2

Figure 4.2.3

Figure 4.2.4

Figure 4.2.5

That being said, Offset is also one of the more difficult techniques to master, due to the nuances implicit in it, and good balance is ultimately a key to executing the technique well. Coaches must strive to have their athletes become particularly proficient and efficient in this technique, as hill-climbing frequently determines the outcome of a competition.

Offset (1st gear) involves skating alternately on each leg, utilizing a slightly staggered Double Pole-type motion on every second skate. The poling side is referred to as the lead side. The photo sequence at Figure 4.2 depicts a complete cycle of Offset technique with the skier's left side leading.

The detailed mechanics of the technique are described below; the text focuses on right side leading:

❏ When the skier Offsets to the right (i.e. the lead side), the skier begins by pushing to the side and back off the left ski (see Figure 4.3), stepping up the hill with the right ski and subsequently executing a Double-Pole-type action. Note that the stepping action must not be exaggerated, as this will cause the skier's hip (and centre of gravity) to be left behind. The aim is to project the hip and weight forward and up the slope, not simply to extend the foot forward. In practice, "stepping up the hill" should feel more like "falling up the hill" if the skier's hip and weight are appropriately positioned.

Figure 4.3

Figure 4.4

❏ In the poling motion, the right hand is placed slightly forward of the head and at a more vertical angle than the left pole (i.e. the "offset" positioning that gives the technique its name). See Figure 4.4. Conversely, the left ski and hand lead when the skier is Offsetting to the left.

❏ As the poling motion of Offset takes place on every second stride and the poles are not aligned with one another on planting, the technique is distinctly asymmetrical in appearance. Nevertheless, whether Offsetting to the right or left, force is applied smoothly and equally through both legs. The overall force applied in Offset comes relatively equally from the upper body (core muscle contraction and poling) and the pushing leg.

❏ The critical timing in Offset is in the sequencing of planting poles and placing skis. The essence is a "three point-one point" sequence. To initiate Offset, the two poles and the ski on the lead side (i.e. three points) come in contact with the snow **at the same time**. See Figure 4.5. The non-lead side ski (i.e. one point) is placed on the snow by itself as the Offset cycle is completed.

Figure 4.5

❏ In the poling action, both pole baskets are planted close to the ski bindings.

❏ Ideally (to the degree the slope permits) skis are placed flat on the snow so that gliding is optimized; they are then edged as gliding ends, the leg begins its extension and the kick takes place.

❏ The combination of the pole thrust and the lead side ski pushing moves the body up the hill and over to the non-lead side ski. See Figure 4.6.

Figure 4.6

❏ As soon as the skier's weight is shifted onto the non-lead side, the arms begin to swing back up and forward as the skier begins the push back onto the lead side. This begins the next cycle, with the skier again shifting weight to the lead side as the poles and lead side ski contact the snow simultaneously.

❏ There is a complete weight shift from ski to ski. The whole body works together to shift the skier's weight from ski to ski and up the track, with very little time spent gliding inactively. The skier must keep the weight shifting from one ski to the other continuously to ensure that forward momentum is being maintained. If there is a pause in the technique, the skier will slow down and lose momentum.

❏ The upper body is dynamic, with a relatively shallow compression during the poling action. The upper body remains somewhat flexed forward as the weight is shifted over to the non-lead ski and then extends as the arms quickly recover and the leg pushes off to the side to prepare the body to repeat the cycle.

❏ As the slope of the hill increases, so should the tempo, in order to prevent loss of momentum as glide decreases. The slope of the hill will also dictate how wide a stance the athlete will take while performing the Offset technique - the steeper the hill, the wider the stance. A skier's feet should be under the hips at the time of the ski and pole planting, which will result in the skier "falling" up the hill versus "stepping" up the hill (which would have a tendency to leave the hips behind and impede upward momentum).

❏ The direction of the fall line on a hill should generally dictate which side of the body becomes the lead side. The lead side should be on the uphill side of the trail.

Body Positioning

❏ **Hips.** The positioning and motion of the hips are of vital importance, as the shifting of weight is directly tied to them:

  ✓ The hips must be moved over the lead side ski at the time the ski is placed on the snow, so that the skier steps onto a ski that is gliding as it hits the snow. Throughout this action the hips should remain forward and high. In a "high" hip position, the body weight is supported by the femur bone in a nearly vertical position (allowing the skeletal structure rather than muscles to support the weight). If the hips are behind and low, an effective and properly timed weight shift cannot take place. While it is important to focus on hip positioning over the lead ski, it is equally important to think in terms of placing the lead ski under the hips.

  ✓ The hips are oriented generally down the trail, rather than swinging to face the direction in which the ski is travelling. The hips, however, are not locked or blocked in a single forward orientation.

  ✓ A good indicator of proper hip positioning is for the skier to feel weight distribution evenly on the whole of the lead-side foot.

❏ **Core.** The core muscles must be engaged to allow this muscle group to support the overall body position and action, as well as to assist in the generation of power through the poling motion. This takes the form of shallow crunches as the poling action is executed. The back and upper body will be slightly rounded during the Offset motion. Note that too much bend at the waist during Offset (jackknifing at the waist) pushes the hips back and doesn't allow for the use of the ankles.

❑ **Ankles and Knees**

✓ A pronounced bend at the ankles and knees during Offset is critical for the skier to be able to generate force, with the degree of flex constantly changing throughout the technique. See Figure 4.7. The flex at the ankles and knees also contributes to balance, allows the skier to maintain more constant speed and prevents loss of momentum. The flex in these joints becomes more pronounced as the slope increases.

Figure 4.7

✓ It is important that the skier thinks about driving the knees forward up the hill, which will also keep the speed more constant.

✓ Ideally the lead side knee tracks directly over the foot, as this is important for balance and effective gliding. Some athletes will find this more difficult; this is generally because of poor leg strength and/or body positioning.

❑ **Arms and Shoulders**

✓ The movement of the arms and shoulders should be smooth and have good rhythm.

✓ Despite the offset (or staggered) positioning at pole plant, the poling action remains as close as possible to that of Double Poling. The elbow on the lead side should be bent (90 degrees or less), with the hands just forward of the head at pole plant. The other hand will be slightly lower at pole plant. The lead side pole is planted at a more vertical angle than the opposite pole. Figure 4.7 above illustrates correct arm positioning at pole plant.

✓ The follow-through of the arms and hands is short and generally stops just past the hips, with the actual amount of follow-through being determined by such factors as the skier's tempo and the length of glide being produced. This permits momentum to be maintained and allows the quick return of the arms to their initial position.

✓ The shoulders should be level, rather than one being raised and one lower.

❑ **Feet.** The skier's weight is centered across the whole foot, with slightly more than half of the weight forward on the ball of the foot. The skier's weight will shift toward the forefoot as the ski is set down and then to the whole foot as the push phase of the skate is initiated. The

push progresses from the whole foot to the inside of the foot, with final extension coming from the ball of the foot. If the weight is too far forward onto the toes it will cause the front of the ski to plow into the snow. If the weight is too far back, it will force the skier's hips back, causing the quadriceps to be used more and preventing the skier from "falling" up the hill.

Progression

Athletes will generally be predisposed to Offset to either the right or the left. Coaches should allow individuals to favour the "natural" lead side when teaching the technique. However, skiers must learn to Offset to both sides with confidence and competence, so practice drills must be designed from an early stage to ensure that this occurs. This will allow skiers to develop a balanced muscular structure, will reduce fatigue by enabling both sides of the body to be used equally and will decrease the possibility of overuse injuries. It will also enable skiers to adjust their technique in accordance with which side of the track is uphill, thus optimizing the technique's effectiveness.

Teaching Points

Offset technique should be taught on a gradual uphill on packed trail. In the description below, the skier is Offsetting to the right. The skier starts in a static position.

❏ The skier begins with skis in a "V' shape and is in the general athletic stance. The arms are at the side; the poles are planted slightly forward of the bindings. The lower leg (knee to ankle) segment and the trunk (shoulder to hip) should be parallel (inclined forward on the same plane).

❏ The skier pushes off the left ski, stepping forward up the hill with the right (lead) leg (see Figure 4.8); at the same time the poles are brought forward and planted again (see Figure 4.9):

Figure 4.8   Figure 4.9

✓ The left leg push off (kick) is from an edged ski. The push is primarily to the side but inevitably incorporates also a backward component. The push begins at the hips and progresses through the large muscle groups and lower leg joints (knee and ankle). The final push is from the ball of the foot.

✓ The poles and right ski touch the snow at the same time – a three point contact.

✓ A full weight shift occurs through the action of stepping (falling) forward.

✓ The right ski lands flat (to the degree possible, depending on the steepness of the hill) and should be in motion (gliding) forward as it lands. See Figure 4.10.

Figure 4.10

✓ On landing, the right shoulder and hip should be aligned over the right foot, in a balanced position. See Figure 4.10 above. The knee is directly over the foot and is driven up the hill.

✓ The poles are planted in an "offset" position. The right pole is planted with the tip beside the right binding and the hand slightly ahead of the head. The left pole tip is also planted close to the binding, except that the arm will be lower at pole plant and the hand will be slightly more forward.

❏ With the pole plant, the skier initiates a Double Pole-type action.

✓ The right (lead) ski is continuing to glide as the Double Pole action takes place.

✓ The upper body flex (contraction) is shallow, with the actual degree of flex depending on the slope of the hill.

✓ Arm action is similar to the Double Pole in Classic Technique, but the hands finish just past the hips. The amount of follow through is dependent on the skier's speed, but recovery must be initiated quickly enough to initiate the next cycle of the technique without a loss of momentum.

❏ As glide diminishes, the right ski is edged and the skier pushes off onto the left ski. See Figure 4.11.

Figure 4.11

✓ During the leg push motion, the skier initiates and completes weight transfer onto the left ski.

✓ The right leg push off is the same as for the left leg.

✓ The ski and foot action on the left side on landing are the same as for the right side.

❑ The skier balances briefly with the left hip and shoulder aligned over the left ski. See Figure 4.12. The ski is then edged and the skier pushes off the left leg and steps and shifts the weight onto the right ski, to start the cycle again.

Figure 4.12

If you are coaching children in the L2T stage of development, this information will go hand-in-hand with the Skating Technique Checklists (section 4.2.1) and Track Attack Skill Criteria and corresponding Track Attack Skill Checklists (section 3.4).

Common Errors and Solutions – Offset Technique	
Errors	**Solutions**
Incomplete weight shift. The skier rides a "centre line" between the two skis, rather than committing the weight fully to each side. This increases fatigue, as the body's weight is supported by muscle rather than bone, and limits momentum.	✓ The skier's knee and hips should be aligned over the foot. ✓ Balance drills must be emphasized and practised. The skier will not execute a complete weight shift if unable to assume a balanced position on landing on the gliding ski.
Hips too far back. A very common mistake is having the hips behind the feet, causing the skier to "sit back", which impedes forward momentum. This results from poor balance and weight shift.	✓ Encourage the skier to maintain the general athletic stance for skating and the forward hip position over the lead ski (thinking about "falling up the hill" and "driving the knee and hip up the hill"). ✓ Encourage the skier to complete a full and positive weight shift on each side. ✓ Keep hips oriented down the track.
The upper body is too rigid. This prevents the skier from involving the core muscles in the technique.	✓ Encourage the skier to replicate the "crunching" action of the normal Double Pole, but with less compression.
The lead shoulder is dropped. Some athletes do not push equally with the poles, which causes a drop of the shoulder on the lead side and interferes with proper weight transfer.	✓ Ensure the athlete poles equally with both arms and keeps their shoulders in the same horizontal plane. ✓ Check the position of the baskets at the pole plant. They should be close to the binding.
Loss of momentum. The skier needs to transfer weight from ski to ski without a loss of ski glide and momentum. Skis should not grind to a halt in each glide phase of Offset.	✓ The skier should maintain the "three point-one point" sequence in a smooth thythm; the steeper the hill, the quicker the tempo. ✓ The skier should as much as possible step onto a gliding ski. ✓ Encourage the skier to maintain the general athletic stance for skating and the forward hip position over the lead ski (thinking about "falling up the hill" and "driving the knee and hip up the hill"). ✓ Again, stress the need for a full weight shift.

4.2.2   One Skate Technique (2nd Gear)

Purpose

One Skate, or 2nd gear, is the technique used on flat, gentle downhill or gentle uphill terrain. The skier's technical ability, fitness and strength will dictate the particular terrain in which One Skate will be used. The firmness and speed of the track, as well as the evenness of the terrain, will determine where a transition to another technique becomes necessary.

One Skate (2nd gear) is used when Offset (1st gear) becomes inefficient (i.e. the skier is moving too quickly to continue using Offset). In competitive skiing, the One Skate technique is usually used to accelerate (for instance, at the finish of a race) or to maintain a high speed in situations that permit this powerful technique to be used effectively and efficiently. Good force application, weight shift and balance are essential if the skier is to perform this technique effectively.

Mechanics

One Skate (2nd gear) is the most powerful skating technique. Unlike Offset, it is a symmetrical technique, involving a Double Pole-type motion for every skate push. A complete cycle of the technique involves two Double Poles and two skate pushes – a Double Pole for each skate. Arm and leg actions are the same on both sides of the body, with the upper and lower body working together effectively. The skis track forward in a narrow "V". A complete cycle of One Skate is illustrated at Figure 4.13.

The One Skate technique is more challenging to learn than Offset, as it places greater demands on a skier's balance. The skier must balance on the gliding ski during each leg push, and must be able to hold that position comfortably in order to obtain the maximum efficiency from the technique.

Figure 4.13 – Complete Cycle of One Skate Technique

Figure 4.13.1   Figure 4.13.2

Figure 4.13.3

Figure 4.13.4

Figure 4.13.5

Figure 4.13.6

Figure 4.13.7

Figure 4.13.8

The salient points of the mechanics of One Skate are as follows:

❏ The skier starts the movement in the general athletic stance for skating, fully in balance on the glide ski with a bent ankle. The hips and knee are over the foot, with a forward leaning trunk and with the arms at the side, poles trailing behind. The other foot is unweighted, in a recovery position.

❏ With the skier remaining balanced on the glide ski, the arms swing forward into a Double Pole position; the upper body rises on a fairly straight leg and is "loaded" for the first Double Pole. See Figure 4.14.

Figure 4.14   Figure 4.15

❏ The Double Pole motion is initiated, with poles being planted and upper body compression taking place. See Figure 4.15. At the same time the leg flexes then pushes explosively. The skier skates onto the new glide ski with a full weight shift.

❏ The skier begins to move over onto the new glide ski just before the arms reach the level of the hips. See Figure 4.16. The Double Pole motion and the skating push are complete as the new gliding ski hits the snow and the skier's weight shift to that ski is completed. While the skier is gliding, the arms and trunk recover to the starting high position to initiate another Double Pole and skate that will take the skier back onto the first glide ski and finish the full One Skate cycle. See Figure 4.17.

Figure 4.16   Figure 4.17

❏ The Double Poling push initiated by the upper body must be energetic and powerful, and the amount of trunk compression will vary depending on terrain. The skate push with the legs is also dynamic and the bend at the ankle is pronounced. The skier forcefully extends at the hip, knee and ankle of the pushing leg to create a quick push off and weight transfer forward and sideways to glide on the new ski.

❏ The timing of the arm, body and leg movements is one of the most important features of the One Skate technique. The key to timing is in the planting of the poles (two points) when the legs are closest together and just **before** stepping onto the new gliding ski (one point). See Figure 4.18.

Figure 4.18

❏ Precise transfer of the skier's weight from the glide ski over to the new glide ski is also a key component of effective One Skate technique.

❏ It is critical that the upper body crunch and pole thrust be initiated together.

❏ Balance is critical in this technique, as the skier must be totally committed to and balanced over a single gliding ski. When the poles and pushing ski are being recovered, the skier has

only the gliding ski in contact with the snow. The skier's weight – centred in the hips – is carried over the gliding ski foot, allowing the skier's weight to be borne by bones rather than muscle. See Figure 4.19. The hips are not blocked, but remain oriented generally down the track.

Figure 4.19

❏ Although the Double Pole motion is powerful, the majority of the force in One Skate comes from the leg muscles; this technique permits a strong kick that produces more force than the "falling" push permitted in the Offset technique.

Body Positioning

❏ **Hips.** The positioning and motion of the hips are of vital importance, as the shifting of weight is directly tied to them:

✓ The hips are in a "high" position just prior to the beginning of the Double Pole, the body weight being supported by the femur bone in a nearly vertical position (allowing the skeletal structure rather than muscles to support the weight). See Figure 4.14 above.

✓ As the Double Pole begins, the weight shift is initiated, the leg compresses and the hips are lowered slightly in order to load the leg and permit power to be generated when the leg extends. See Figure 4.15 above.

✓ The shifting of the hips (and body weight) over to the new glide ski occurs throughout the Double Pole motion and the extension of the kicking leg, all to be completed simultaneously. Throughout this action the hips should remain forward over the foot. If the hips are behind and low, an effective and properly timed weight shift cannot take place.

✓ The hips are oriented generally down the trail, rather than swinging to face the direction in which the ski is travelling. The hips, however, are not locked or blocked in a single forward orientation.

✓ A good indicator of proper hip positioning is for the skier to feel weight distribution evenly on the entire gliding foot.

❑ **Core.** The core muscles must be engaged to allow this muscle group to support the overall body position and action, as well as to assist in the generation of force through the poling motion. This takes the form of shallow crunches as the poling motion is executed. The back and upper body will be slightly rounded during the One Skate motion. See Figure 4.20 below. Note that too much bend at the waist (jackknifing at the waist) pushes the hips back and doesn't allow for the use of the ankles.

Figure 4.20

❑ **Ankles and Knees**

✓ A pronounced bend at the ankles and knees during One Skate is critical for the skier to be able to generate force, with the degree of flex constantly changing throughout the technique. See Figure 4.20. The flex at the ankles and knees also contributes to balance, allows the skier to maintain more constant speed and prevents loss of momentum.

✓ It is important that the skier thinks about driving the knees forward, while still maintaining a high and forward hip position.

✓ The gliding side knee tracks directly over the foot, as this is important for balance and effective gliding. See Figure 4.21. Some athletes will find this more difficult; this is generally because of poor leg strength and/or body positioning.

Figure 4.21

❑ **Arms and Shoulders**

✓ The movement of the arms and shoulders should be smooth and rhythmic.

✓ The arm positioning throughout the motion is very similar to that in Double Poling in Classic technique.

✓ At the time of pole plant, the elbows are the lowest point in the arm position. They are positioned neither out like wings nor in tight to the body; the precise positioning is difficult to state, but some amount of outward orientation is necessary to engage the lats (the latisimus dorsi). See Figure 4.22.

Figure 4.22

✓ The follow-through of the arms and hands is short and stops just past the hips. This permits momentum to be maintained and allows the quick return of the arms to their initial position.

✓ The rapid and timely recovery of the arms is critical to the timing of this technique.

❑ **Feet.** On the gliding ski the skier's weight is centered across the whole foot, with slightly more than half of the weight forward on the ball of the foot. In the kicking phase, the push progresses from the whole foot to the inside of the foot, with final extension coming from the ball of the foot. If the weight is too far forward onto the toes it will cause the front of the ski to plow into the snow. If the weight is too far back, it will force the skier's hips back, causing the quadriceps to be used more and compromising balance.

Progression

Teaching should take place on flat or slightly uphill terrain. Start with the general athletic stance for skating. Practise the One Skate without poles, but with the arm and trunk executing the Double Poling motion. Emphasize timing, good balance and weight shift. Downplay glide length and speed until the skier has learned the proper rhythm (body positioning, body movements and timing) of the technique.

Teaching Points

The One Skate technique requires a shallow Double Pole-type motion with each leg push. This

technique should be practised and assessed on easy terrain (flat or slightly uphill to start) and packed snow.

Practising in an uphill setting may seem counter-intuitive. However, it serves to make balance easier by removing the additional challenges of extra speed and glide that exist in a downhill scenario. In addition, the reduced glide implicit in an uphill setting requires the skier to execute the technique in a slightly faster tempo in order to maintain forward momentum, thus necessitating more frequent pole plants which serve to offset balance difficulties.

In the following illustration, the first stride in the One Skate cycle is to the left, and the skier begins in a static position.

❏ The skier is in the general athletic stance for skating, with the skis in a narrow "V' shape (ski tips are about 50 cm apart). The trunk is fairly upright, the arms at the side of the body with the poles trailing behind. The skier is balanced on the right ski (i.e. the glide ski) and the left ski (i.e. the recovery ski) is unweighted.

❏ The skier then loads the right side of the body in preparation for the first Double Pole and leg push:

✓ The arms are swung forward into the Double Pole position (though the poles are not planted immediately). See Figure 4.23 below.

✓ The weight is shifted onto the right ski, with the hips sitting forward and high over the right foot but oriented down the track.

✓ The left ski is raised slightly off the snow (as it would be in recovery after the completion of the previous kick). See Figure 4.24 below.

Figure 4.23   Figure 4.24

❏ The skier executes a coordinated Double Pole motion and push off from the right ski:

Figure 4.25   Figure 4.26

✓ Importantly, pole plant (two point contact) occurs just briefly before the left ski is placed on the snow (one point contact). See Figure 4.25.

✓ The poles are planted slightly ahead of the binding and a strong Double Pole action incorporating simultaneous upper body compression (crunch) and pole push are executed. The follow-through of the arms is short (just past the hips is enough) and is synchronized with the completion of the weight transfer to the left ski.

✓ At the same time, the skier flexes the right leg and then extends and pushes off the right ski. See Figure 4.26. The right leg push off (kick) is from an edged ski. The push is primarily to the side, but inevitably incorporates also a backward component as the leg is behind the body. It begins at the hips and progresses through the large muscle groups and lower leg joints (knee and ankle). The final phase of the push is from the ball of the foot. The tip and tail of the ski leave the snow at the same time (if the binding is mounted in the correct position on the ski).

✓ As the Double Pole takes place, the weight shift is initiated and the right leg is extended simultaneously. As the weight shift takes place, the left ski is placed on the snow. See Figure 4.27. The ski is pointed forward down the trail as much as the skier's speed and the gradient of the track permit. A narrower "V" is faster than a wider one, as more terrain will be covered with each stride.

Figure 4.27

❏ The skier completes the poling motion, then loads the left side and completes an identical Double Pole and push sequence on that side:

✓ Recovery of the arms after the completion of the Double Pole must be rapid in order to position the arms forward to key the timing of the next side of the cycle.

✓ The glide on the left and right skis is the same.

❏ During the recovery of each leg, the foot passes underneath the hip of that side (feet come fairly close together).

If you are coaching children in the L2T stage of development, this information will go hand-in-hand with the Skating Technique Checklists (section 4.2.1) and Track Attack Skill Criteria and corresponding Track Attack Skill Checklists (section 3.4).

Common Errors and Solutions – One Skate	
Errors	**Solutions**
Employing Offset timing with One Skate. The skier uses a 3-point plant to initiate the technique, which leads to weight shift occurring too soon and a weakened poling action.	✓ Ensure that the skier fully loads the gliding side, with a high body position. ✓ Ensure pole plant occurs while the recovery ski is still in the air (the "two point-one point" sequence). This permits the ski to be launched onto the snow with the full power of the Double Pole and leg push behind it. ✓ Practise skiing without poles to develop a feel for the rhythm of the technique.
Late kick. The leg push is back, rather than to the side and the body weight remains back.	✓ Encourage the skier to bring hips forward over the gliding foot. ✓ Encourage the skier to push to the side - off the full foot - in the skating action. ✓ Keep hips oriented down the track.
The upper body is too rigid. This prevents the skier from involving the core muscles in the technique.	✓ Encourage the skier to replicate the "crunching" action of the normal Double Pole, but with less compression.

Poor balance.	✓ Good balance starts with proper body positioning, incorporating flexed hips, knees and ankles.
	✓ The skier must learn the rhythm of One Skate (body position, body movements and timing) before balance problems can be mastered. De-emphasize speed and length of glide until the proper rhythm is achieved. To help get the feel for rhythm, the skier should practise skiing utilizing relatively short rhythmic strides with a very shallow Double Pole and rapid arm recovery. Skating without poles can also be helpful, as the correct arm recovery timing may be easier to learn without the encumbrance of poles.
	✓ With rhythm solved, the emphasis can turn to maintaining balance during a longer glide. Drills that incorporate "lingering" over the glide ski should be introduced.
	✓ Avoid practising on downhill segments of trail until balance is reasonable. However, practising on downhill stretches will eventually be essential, as the skier must have the balance necessary to ride a long glide and derive full speed and efficiency from the One Skate technique.
	✓ Balance can also be practised in the off-season, using exercises and roller skis.
Too much side to side movement.	✓ Ski tips are kept fairly close together in this technique, as force is directed down the track. Encourage the skier to keep the head and trunk facing mainly down the track, while ensuring good weight transfer. The same-side shoulder hip and knee should align over the ski during the first part of the gliding action.

4.2.3   Two Skate Technique (3rd Gear)

Purpose

Two Skate, or 3rd gear, is the technique used when the slope of the track varies from flat to slightly downhill and the skier has already generated speed. It is a technique that is commonly used when the skier is interested in maintaining speed as opposed to accelerating. The skier's technical ability, fitness and strength will dictate exactly in which terrain it will be used. The firmness and speed of the track and the evenness of the terrain will dictate where a transition to another technique is necessary.

Mechanics

The Two Skate (3rd gear) is different from the One Skate (2nd gear) in that it is asymmetrical. A complete cycle of the technique requires one Double Pole-type motion with every second leg push. A complete cycle of Two Skate technique is depicted on the next page in Figure 4.28.

Two Skate is a powerful skating technique. However, as the upper body is applying force in only one phase of a cycle, it is not generally as powerful as One Skate. Nevertheless, Two Skate is a particularly efficient technique, and proficient skiers can use the weight shifts inherent in it to sustain and occasionally exceed the speeds generated in One Skate, though with less effort.

As with One Skate, the upper and lower bodies must work closely together and rhythm is critical. The skis track forward in to a narrow "V".

For some skiers the Two Skate technique is more challenging to learn than the One Skate. This is because it challenges the skier's balance – for while a significant glide is required on each ski, the balance-assisting planting of poles occurs only once in each cycle.

However, once skiers have a feel for the rhythm of Two Skate, they find that the strong weight shift in the recovery to the non-poling side results in good forward momentum that serves to reduce balance problems. Females typically find the Two Skate a comfortable technique, both because it requires less force from the upper body and because they possess a slightly lower centre of gravity that contributes to good balance.

The salient points of the mechanics of Two Skate are as follows:

❏   When using Two Skate, the method of propulsion on the poling side is identical to that of One Skate. The upper body and lower body work together to transfer weight to each gliding ski.

❏   Timing is the same as for One Skate, with poles being planted when the legs are closest together and slightly before the recovery ski is placed on the snow.

Figure 4.28 – Complete Cycle of Two Skate Technique

Figure 4.28.1

Figure 4.28.2

Figure 4.28.3

Figure 4.28.4

Figure 4.28.5

Figure 4.28.6

❏ In Two Skate the skier assumes a high position for the initiation of the Double Pole on the poling side, (see Figure 4.29) and body compression results in a slight lowering of the body by the end of the poling motion.

Figure 4.29   Figure 4.30

❏ The return to the poling side is accomplished from the lower position with a skating push aided by the momentum of the arms swinging up, forward and over to the poling side. See Figure 4.30. The synchronization of this dynamic forward arm swing and skate push is integral to the effectiveness of the Two Skate technique. The arm recovery from follow-through to new pole plant must be uninterrupted; any pause mid-recovery serves to compromise rhythm and forward momentum.

❏ There should be good rhythm as the skier moves from the Double Pole motion to the skate push. Precise transfer of the skier's weight from the glide ski over to the new glide ski is also a key component of effective Two Skate technique. Two Skate is the skating technique where smooth rhythm is essential; one should have a feeling akin to ballroom dancing - smooth and rhythmic, fast and snappy.

❏ Even more so than in One Skate, the majority of power comes from the legs. Force is generated by the legs equally on each side. It is important to maintain power down the track even during the swing from the non-poling side to the poling side.

Body Positioning

Note: Body positioning for Two Skate is in most respects the same as for One Skate. Accordingly, the following text, with some exceptions, is the same as for One Skate and refers to the same Figures that were used to illustrate One Skate technique.

❏ **Hips.** The positioning and motion of the hips are of vital importance, as the shifting of weight is directly tied to them:

✓ The hips are in a "high" position just prior to the beginning of the Double Pole, the body weight being supported by the femur bone in a nearly vertical position (allowing the skeletal structure rather than muscles to support the weight). Refer back to Figure 4.14.

✓ As the Double Pole begins, the weight shift is initiated, the leg compresses and the hips are lowered slightly in order to load the leg and permit power to be generated when the leg extends. Refer back to Figure 4.15.

✓ The shifting of the hips (and body weight) over to the new glide ski occurs throughout the Double Pole motion and the extension of the kicking leg, all to be completed simultaneously. Throughout this action the hips should remain forward over the foot. If the hips are behind and low, an effective and properly timed weight shift cannot take place.

✓ The hips are oriented generally down the trail on both sides, rather than swinging to face the direction in which the ski is travelling. The hips, however, are not locked or blocked in a single forward orientation.

✓ A good indicator of proper hip positioning is for the skier to feel weight distribution evenly on the entire gliding foot.

❑ **Core.** The core muscles must be engaged to allow this muscle group to support the overall body position and movement, as well as to assist in the generation of power through the poling motion. This takes the form of shallow upper body crunches as the poling motion is executed. The back and upper body will be slightly rounded. Refer back to Figure 4.20. Note that too much bend at the waist (jackknifing at the waist) pushes the hips back and doesn't allow for the use of the ankles.

❑ **Ankles and Knees**

✓ A pronounced bend at the ankles and knees during Two Skate is critical for the skier to be able to produce force, with the degree of flex constantly changing throughout the technique. Refer back to Figure 4.20. The flex at the ankles and knees also contributes to balance, allows the skier to maintain more constant speed and prevents loss of momentum.

✓ It is important that the skier thinks about driving the knees forward, while still maintaining a high and forward hip position.

✓ The gliding side knee tracks directly over the foot, as this is important for balance and effective gliding. Refer back to Figure 4.21. Some athletes will find this more difficult; this is generally because of poor leg strength and/or body positioning.

❑ **Arms and Shoulders**

✓ The movement of the arms and shoulders should be smooth and rhythmic.

✓ The arm positioning throughout the Double Pole-type motion is very similar to that in Double Poling in Classic technique.

✓ At pole plant, the elbows are the lowest point in the arm position. They are positioned neither out like wings nor in tight to the body; the precise positioning is difficult to state, but some amount of outward orientation is necessary to engage the lats (the latisimus dorsi). Refer back to Figure 4.22.

✓ The follow-through of the arms and hands is longer than in One Skate.

✓ The rapid and timely recovery of the arms is critical to the timing of this technique. An uninterrupted and properly timed swing forward and upward of the arms reinforces

weight shift and contributes significantly to momentum. This is a distinctive feature of the Two Skate technique.

❏ **Feet.** When weight is shifted to the Double Pole side, the weight initially moves to the forward part of the foot. In the leg push phase, the push progresses from the whole foot to the inside of the foot, with final extension coming from the ball of the foot. On the gliding ski the skier's weight is centered across the whole foot, with slightly more than half of the weight forward on the ball of the foot. Generally, if the weight is too far forward onto the toes it will cause the front of the ski to plow into the snow. If the weight is too far back, it will force the skier's hips back, causing the quadriceps to be used more and compromising balance.

Progression

Introduce on an even or slightly uphill track. Start by reviewing the power phase of the Double Pole action while balancing on one foot. Emphasize the rhythm and symmetry of each of the leg pushes. Point out the difference between the "high" position of the trunk prior to the Double Pole on the poling side and the compressed body position that results after poling. The skier should practise and become proficient with the Two Skate on both sides of the body.

Teaching Points

The Two Skate technique requires a shallow Double Pole-type motion with each second leg push. This technique should be practised and assessed on easy terrain (flat or slightly uphill to start) and packed snow.

For the example below, the right side is the poling side, and the skier starts in a static position.

❏ The skier is in the general athletic stance for skating, with the skis in a narrow "V' shape (ski tips are about 50 cm apart). The trunk is fairly upright, the arms at the side of the body with the poles trailing behind. The skier is balanced on the left ski (the glide ski) and the right ski (the recovery ski) is unweighted.

❏ The skier then loads the right (poling) side of the body in preparation for the Double Pole and leg push. See Figure 4.31.

Figure 4.31

✓ The arms swing forward into the Double Pole position (though the poles are not planted immediately).

✓ The skier pushes off the left foot and steps onto the right foot (the new glide foot). With the push, the weight is shifted onto the right ski, with the hips sitting forward and high over the right foot but oriented down the track.

✓ At the completion of the leg push, the left ski is raised slightly off the snow (as it would be in recovery after the completion of the previous kick). The tip and tail of the ski leave the snow at the same time (if the binding is mounted in the correct position on the ski).

❏ The skier executes a coordinated Double Pole-type motion on the right side and pushes off from the right ski, stepping forward onto the left ski (the new gliding ski). See Figure 4.32.

Figure 4.32

✓ Importantly, pole plant (two point contact) occurs just briefly before the left ski is placed on the snow (one point contact).

✓ The poles are planted slightly ahead of the binding and a strong Double Pole motion incorporating simultaneous upper body compression (crunch) and pole push are executed. The follow through of the arms should be longer than for One Skate and is synchronized with completing the weight transfer to the left ski.

✓ At the same time, the skier flexes the right leg and then extends and pushes off the right ski. The right leg push off (kick) is from an edged ski. The push is primarily to the side but inevitably incorporates also a backward component. It begins at the hips and progresses through the large muscle groups and lower leg joints (knee and ankle). The final phase of the push is from the ball of the foot. The tip and tail of the ski leave the snow at the same time.

✓ As the Double Pole takes place and the right leg is extended, the left ski is placed on the snow with the weight shift being initiated simultaneously. The ski is pointed forward down the trail as much as the skier's speed and the gradient of the track permit. A narrower "V" is faster than a wider one, as more terrain will be covered with each stride.

❏ As the skier completes the Double Poling motion, the left leg is loaded in preparation for the push back to the right (poling) side. See Figure 4.33.

Figure 4.33

✓ The positioning of hips and knee over the left ski are the same as for the right ski. The skier must be fully committed to and balanced on this ski when gliding (a single point of contact).

✓ Recovery of the arms back to the right side after the completion of the Double Pole must be uninterrupted so that the smooth and rhythmic nature of the technique is maintained and in order to position the arms forward to key the timing of the next cycle.

✓ The glide on the left and right skis should be consistent.

❏ During the recovery of each leg, the foot passes underneath the hip of that side (feet come fairly close together)

If you are coaching children in the L2T stage of development, this information will go hand-in-hand with the Skating Technique Checklists (section 4.2.1) and Track Attack Skill Criteria and corresponding Track Attack Skill Checklists (section 3.4).

Common Errors and Solutions – Two Skate	
Most of the errors highlighted in the previous skating techniques also apply to the Two Skate technique.	
Errors	**Solutions**
Lazy leg push. The skier does not flex the leg joints sufficiently, especially when skiing at lower speeds.	✓ Encourage a good bend at the ankle and snappy leg action. ✓ Skiing with Two Skate movements without poles creates an effective and snappy leg action as the "lazy leg" has to activate in order for the technique to become successful.
Timing. Often novices will have difficulty combining the arm and leg action fluidly.	✓ Have the skier practise by mimicking the proper sequencing of actions without skis on. ✓ Rehearse the technique in a static situation. Have the skier stand on a stationary glide ski and initiate the Double Pole motion, while flexing and extending the push leg. Finish the Double Pole with the weight transfer to the new glide ski. Once that is achieved, have the skier complete the entire Two Skate action at slow speed and then full speed. ✓ Emphasize the planting of the poles BEFORE the new glide ski is placed on the snow.
Hips too far back. A very common mistake for skiers is having their hips behind the feet causing them to "sit back". This is often the cause of a late kick as well.	✓ Emphasize the use of the general athletic stance as the baseline for body positioning. ✓ Emphasize feeling the weight on the ball of the foot. ✓ Hips and knee must be positioned over the foot on the glide ski.
The upper body is too rigid. This prevents the skier from involving the core muscles in the technique.	✓ Encourage the skier to replicate the "crunching" action of the normal Double Pole, but with less compression.

Poor balance. The weight is shifted too early to the non-poling side. In addition, the skier's weight shift is incomplete and the body positioning over the glide ski is incorrect. The latter error is particularly problematic on the non-poling side, where the skier's weight must be balanced on a single point of contact (the gliding ski) without the assistance of an accompanying pole plant.	✓ Emphasize the timing of the movement onto the ski on the non-gliding side. As the Double Pole takes place and the right leg is extended, the left ski is placed on the snow with the weight shift being initiated simultaneously. ✓ The positioning of hips and knee over the ski on the non-poling side is the same as for the poling side. The skier must be fully committed to and balanced on this ski when gliding (a single point of contact).
Relaxing on the non-poling side. Skiers tend to use the non-poling side for a break. This is particularly marked in a tendency for the hands to pause briefly behind the hips during recovery. This action not only reduces the skier's momentum but also does not enable the arms or leg to work together in shifting weight back to the poling side.	✓ Emphasize an uninterrupted and smooth swing forward of the arms during recovery. ✓ Emphasize having a strong leg push from both sides.

4.2.4   Free Skate Technique (4th Gear)

Purpose

Free Skate, or 4th gear, is the technique used when Two Skate, or 3rd gear, can no longer be sustained due to higher speed. This technique is used on downhills and flats.

The Free Skate involves alternate leg pushes with no pole action. At high speeds such as on downhill slopes or very fast level tracks the Free Skate is a very efficient way to maintain momentum.

Mechanics

The key body movements and positioning related to the skier's leg push and weight shift are similar to those of Two Skate. The unique features of Free Skate are the arm movement and the tuck position of the upper body.

A complete cycle of Free Skate (being executed on roller skis) is depicted in Figure 4.34. The salient points of the mechanics of the technique are as follows:

❏ As the push phase begins, the skier is balanced on a single supporting/gliding ski, in a high tuck position and with the arms swinging past the side of the body. The push leg from the previous cycle is in the air in recovery.

Figure 4.34 – Complete Cycle of Free Skate Technique

Figure 4.34.1

Figure 4.34.2

Figure 4.34.3

Figure 4.34.4

Figure 4.34.5

Figure 4.34.6

❏ The skier pre-loads the support leg, then flexes it at the hip, knee and ankle to load the leg muscles for the leg push. The function of the supporting/gliding leg changes to pushing.

❏ The skier then extends the push leg at the hip, knees and ankles, pushing off quickly to the side. As this occurs, the skier swings the recovery foot past the pushing foot, places the ski on the snow and drives the leg forward down the track.

❏ The body weight is transferred from the pushing foot to the new glide leg as the push is completed.

❏ In the glide phase, the skier's weight is balanced over the gliding ski, with the shoulder, hip and knee on the glide leg side being aligned over the ski.

❏ As glide begins to diminish, the skier loads the gliding leg again and repeats the push phase movements on the other side of the body. Both leg pushes are equal.

❏ The arms swing alternately forward and down the track without planting the poles and are used for maintaining rhythm and momentum. The arms swing opposite to the legs, as in Diagonal Stride in classic technique. For instance, with the left leg gliding, the right arm is extended forward, forearm over the gliding ski, while the left forearm is extended to the rear. The arms pass close to the body during the arm movements.

Another variation of Free Skate is to keep the hands together in front of the body, as in a Tuck Position. See Figure 4.35. As the skier transfers his/her weight from ski to ski, the hands also move to be on top of the ski. This technique is frequently used when skiing at a high speed.

Figure 4.35

Body Positioning

❏ **Core.** The core muscles must be engaged to allow this muscle group to support the overall body position and action, as well as to assist in the generation of power through the legs. The back and upper body will be slightly rounded, based on the skier's ability to maintain the varying degrees of tuck.

❏ **Ankles and Knees**

✓ A pronounced bend at the ankles and the knees is critical to allow the skier to use all of his/her power and to maintain a balanced body position.

✓ Skiers should focus on driving the knee forward down the track in order to optimize forward speed.

✓ A good bend at the ankles and knees is also a way to lower the base of support and the centre of gravity in order to have a more effective tucking position.

✓ The gliding side knee tracks directly over the foot, as this is important for balance and effective gliding.

❏ **Hips**

✓ It is crucial that the hips be directly over the feet. A good indicator of proper hip positioning is for the skier to feel weight distribution evenly on the entire gliding foot.

✓ The hips are oriented generally down the trail, rather than swinging to face the direction in which the ski is travelling. The hips, however, are not locked or blocked in a single forward orientation.

❏ **Arms and Shoulders.** The movement of the arms and shoulders should be smooth and have good rhythm. The arms should be bent at the elbows and swing from side to side helping the skier to shift the weight from ski to ski and forward (or stay together in a Tuck Position if the speed is very high). The Free Skate provides an opportunity for the arms to be relaxed.

❏ **Feet.** The skier's weight is centered across the whole foot, with slightly more than half of the weight forward on the ball of the foot. The skier's weight will shift toward the forefoot as the ski is set down and will quickly shift back across the whole foot for the majority of the push phase of the skate. If the weight is too far forward onto the toes it will cause the front of the ski to plow into the snow.

Figure 4.36 illustrates the critical positioning of body weight over the gliding foot during the glide phase of Free Skate, together with correct arm positioning.

Figure 4.36
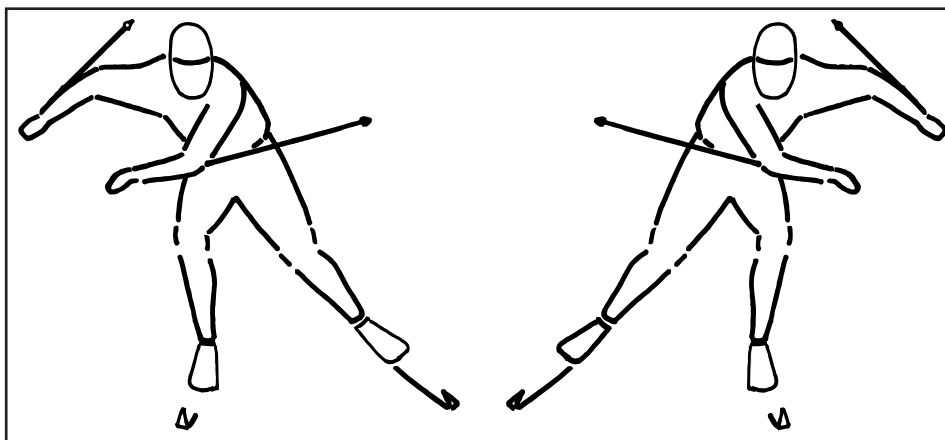
Progression

Start with the general skating drills, emphasizing proper body positioning, good balance and weight shift. Practise at lower speed and with no poles. Once a skier is proficient at skating without poles on flat terrain, skiers can progress to Free Skating on gentle downhills and then higher speed downhills. The latter is the most challenging because of the longer glide on each ski which comes with skiing downhill and the related challenges of balancing on a single point of contact.

Teaching Points

The Free Skate involves alternate leg pushes with no pole thrust. At high speeds such as on downhill slopes or very fast level tracks, the Free Skate is an efficient technique for maintaining momentum. This technique should be practised and assessed on a gentle downhill slope first.

❏ The skier is in the general athletic stance for skating, with the skis positioned in a "V" shape.

❏ The upper body is inclined slightly forward and compressed, with arms at the skier's side and the poles pointing backwards.

❏ The skier bends the left knee and ankle, pushing off with the left leg and transferring the weight onto the right ski.

❏ The right shoulder, hip and knee are aligned over the right ski. As the glide ski slows, the skier flexes the right knee and ankle and pushes off the right ski and shifts the weight to the left ski.

❏ The skier's left shoulder, hip and knee then align over the left ski.

❏ The push and the glide on the left and right skis are consistent:.

❏   During the recovery of each leg, the feet pass underneath the hip of that side (feet come fairly close together).

❏ The skier swings the arms in front of the body (rotation movement).

❏ Poles are held with the tips pointing backwards, not touching the snow.

❏   For evaluation purposes, there should be an obvious and complete weight transfer from ski to ski (the skier glides on one ski and then the other).

If you are coaching children in the L2T stage of development, this information will go hand-in-hand with the Skating Technique Checklists (section 4.2.1) and Track Attack Skill Criteria and corresponding Track Attack Skill Checklists (section 3.4).

Common Errors and Solutions – Free Skate	
Errors	**Solutions**
Lack of balance. As with all of the skating techniques, the skier must be able to properly balance on the glide leg and have a quick weight transfer.	✓ A useful drill is to encourage the skier to line up the shoulder, hip, knee and ankle over the glide ski. Work on balancing on one ski while standing still, and then progress to balancing on one ski while moving with a long glide on each ski. This can be done on slight downhills with one ski on solely to focus on balance. Then progress to having the second ski on and maintaining the same balance. ✓ Practise skating without poles for extended periods of time to work on balance.
Incomplete weight transfer. This is usually due to a lack of balance. Review the FUNdamantal skills and early parts of the progression.	✓ The touch-your-knees drill (see section 4.3) is a good method of improving weight transfer. ✓ Another method of promoting good weight transfer is to put small obstacles on the trail in front of the skier. A small cone or other object could be placed in front of the skier in an alternating fashion so the skier must lift alternate skis over the object. As the skier glides on the left foot, he/she steps over an object on the right side with the right ski. The skier then has to step over an object on the left side while gliding on the right side. ✓ Skiing in softer snow will also require better weight transfer as the skier will catch an edge if he/she doesn't fully transfer the weight.

Twisting. In the skating stride there should be minimal twisting of the upper body. The upper body, the hips and shoulders should remain quite horizontal with the snow and the trunk remains reasonably centered, facing down the track.	✓ The amount of twisting that occurs can be observed and monitored with the use of a ski pole. The ski pole can be held by the skier on their lower back. The skier should be able to keep the pole in a fairly horizontal position while completing a skating action. ✓ Holding a pole on the belly button and nose perpendicular to the skis can also help in providing feedback as to what the upper body is doing. The pole should be travelling in a upright fashion from side to side, and tilting of the pole one way or the other will indicate an improper weight transfer, shoulder drop, hip twist etc.
Lazy leg push. The skier does not flex the leg joints sufficiently, especially when skiing at lower speeds.	✓ Encourage a good bend at the ankle and snappy leg action. ✓ There should be equal leg push with both legs.
Hips too far back. A very common mistake is having the hips behind the feet, causing the skier to "sit back", which works against the generation of forward momentum. This is often the cause of a late kick as well.	✓ Emphasize the use of the general athletic stance as the baseline for body positioning. ✓ Emphasize feeling the weight on the ball of the foot. ✓ Hips and knee must be positioned over the foot on the glide ski.

4.2.5   Skating Technique Checklists

To simplify the detection and correction of technique errors when you are out on the snow, a series of checklists has been developed.

Common Checkpoints

The following checkpoints are common to all skating techniques:

❏ **Overall**

   ✓ All techniques originate with the general athletic stance, modified for the specific technique being learned.

   ✓ Weight shifts fully from ski to ski.

   ✓ The skier is balanced on the gliding ski.

   ✓ Power is generated equally from both sides of the body.

✓ Motion of arms and legs is snappy and forceful.

✓ Hips and upper body stay generally oriented down the track.

❑ **Lower Body**

✓ The skier drives knee and hip forward allowing body to be vertically aligned over ski.

✓ The leg pushes to the side and slightly back.

✓ The gliding ski is flat for as long as possible before edging for push off.

✓ Pushes come from flexed hip, knee and ankle.

✓ Hips are forward over the glide foot.

❑ **Upper Body**

✓ Poles are planted close to skis.

✓ The skier reaches high and forward with bent arms (elbows down and pointing slightly outwards).

✓ Shoulders are parallel to the ground.

✓ Compression occurs during the Double Pole-type motion.

✓ There is a slight forward body lean from the ankles.

Specific Checkpoints

The following checkpoints list the characteristics that are unique to each skating technique:

❑ **Offset**

✓ Timing is keyed by a three-point landing (two poles are planted and new gliding ski touches snow at the same time).

✓ There is a Double Pole-type motion on the lead side, with staggered pole placement.

✓ The skier "falls" up the hill on the lead side, stepping onto a moving ski.

✓ Knee and hip are driven up the hill, and are aligned over the ski on both sides.

✓ The centre of gravity is constantly moving; there is no "lingering over glide ski" as in One Skate and Two Skate.

✓ The ankle, knee and hip joints are flexed as required by terrain.

✓ The skier executes a maximum leg push on each side, as with the other techniques.

✓ Leg push off (kick) is from an edged ski.

✓ At the completion of the leg push, the ski is raised slightly off the snow. The tip and tail of the ski leave the snow at the same time.

✓ Power comes relatively equally from the upper body and the pushing (kicking) leg.

✓ The upper body is dynamic, with a relatively shallow compression during the poling action.

✓ The follow-through of the arms and hands is short, and generally stops at or just past the hips (depending on slope of trail and skier speed).

✓ The upper body remains somewhat flexed forward, with back and upper body slightly rounded.

✓ Tempo increases as the slope of the hill increases.

✓ The slope of the hill dictates how wide a stance the athlete will take.

❏ **One Skate**

✓ The skier executes a shallow Double Pole-type motion with each leg push.

✓ Arm and leg movements are the same on both sides of the body,

✓ The timing of the arm, body and leg movements is one of the most important features; the skier plants the poles (two points) when the legs are closest and just **before** stepping onto the new gliding ski (one point).

✓ The skier assumes a "high" position for the initiation of each Double Pole – hips are high, legs relatively straight, upper body is erect with slight forward lean.

✓ The upper body crunch and pole thrust are initiated together.

✓ Core muscles are engaged in the form of shallow upper body crunch.

✓ The skier begins to move over onto the new glide ski just before the arms reach the level of the hips.

✓ The Double Pole action and the skating push are complete as the new gliding ski hits the snow and the skier's weight shift to that ski is completed.

✓ While the skier is gliding, the arms and trunk recover to the starting high position to initiate another Double Pole and skate.

✓ The Double Poling push initiated by the upper-body is energetic and powerful; the amount of trunk compression depends on terrain.

✓ The arm positioning throughout the poling motion is very similar to that in Double Poling in Classic technique.

✓ The follow-through of the arms and hands is short and stops just past the hips.

✓ Recovery of the arms after the completion of the Double Pole is rapid in order to position the arms forward to key the timing of the next side of the cycle.

✓ The recovery ski is raised only slightly off the snow.

✓ During the recovery of each leg, the foot passes underneath the hip of that side (feet come fairly close together).

✓ When placed on the snow, the gliding ski is pointed forward down the trail as much as the skier's speed and the gradient of the track permit.

❏ **Two Skate**

✓ The skier executes a shallow Double Pole-type motion with each second leg push.

✓ Timing is the same as for One Skate, with poles being planted slightly before the recovery ski is placed on the snow.

✓ The technique is smooth and very rhythmic – akin to ballroom dancing.

✓ The method of propulsion on the poling side is identical to that of One Skate.

✓ The skier assumes a "high" position for the initiation of the Double Pole on the poling side – hips are high, legs relatively straight, upper body is erect with slight forward lean.

✓ As the Double Pole begins, the leg compresses and the hips are lowered slightly in order to load the leg and permit power to be generated as the leg extends.

✓ Core muscles are engaged in the form of shallow upper body crunches as the poling action is executed.

✓ Body compression results in a slight lowering of the body by the end of the poling motion.

✓ The return to the poling side is accomplished from the lower position with a skating push aided by the momentum of the arms swinging up, forward and over to the poling side.

✓ The arm recovery from follow-through to new pole plant is uninterrupted.

✓ The arm positioning throughout the Double Pole-type motion is very similar to that in Double Poling in Classic technique.

✓ The follow-through of the arms and hands is longer than in One Skate – past the hips or further, depending on speed, glide length and the skier's tempo.

✓ At the completion of the leg push, the left ski is raised slightly off the snow; the tip and tail of the ski leave the snow at the same time (if the binding is mounted in the correct position on the ski).

✓ During the recovery of each leg, the foot passes underneath the hip of that side (feet come fairly close together).

✓ The glide on the left and right skis is consistent.

❏ **Free Skate**

✓ The skier remains low with pronounced flexion at knees and ankles.

✓ Upper body remains low similar to the Tuck Position.

✓ The skier maintains good balance and makes a complete weight shift from ski to ski.

✓ The arms swing from side to side (or are in front of face depending on speed).

4.3   Skating Technique Drills

The purpose of skating drills is to reinforce components of good skating technique. It is essential that all drills involve actions and timing that are actually used in skating. Drills involving different timing of a technique should be avoided.

❏ **Tin Soldier.** The skiers are in a stationary position on skis. Their tips are spread apart about shoulder width. Skiers rock from ski to ski like a Tin Soldier but generally keep their skis on the snow. The skiers should next be encouraged to lift one ski off the snow as they move their weight onto the other ski. They can be encouraged to balance for a few seconds on each ski. As they rock back and forth they should be encouraged to remain quite upright and gradually move their skis forward a little to start the skating action.

Care should be taken to ensure they are in a Forward Lean position with good ankle and knee flexion, so that the hips are over the feet. If they are in this forward leaning position, gliding will naturally occur. Once the basic positioning is good, encourage the skiers to maximize their glide on each ski.

❏ **Touch-Your-Knees.** This is a good drill to get skiers to improve their timing when free skating. Skiers practise skating, and when they are gliding on their left ski they touch their right hand to their left knee and vice versa when gliding on the other side.

❏ **Skating With a Partner.** Pair the skiers up with a more experienced skater. The skiers stand one next to the other, holding on to the opposite ends of the same ski pole (or other type of pole). The pole should be held firmly about their waist and held horizontally. The experienced skier should start skating slowly with the other skier working on copying the balance and rhythm of the more experienced skier.

❏ **No Twisting drill.** For this drill, poles are used as a guide to see if the skiers are twisting their upper body or dropping one or both of their shoulders. The skiers skate without poles (in a ready position) with the poles held either on their lower back or on the front of their shoulders. The skiers should be able to skate while keeping the poles horizontal. A small degree of movement in the poles is acceptable (five degrees). This drill reinforces the proper upper body position during skating in order to maximize the power generated from the poling actions. After the skiers have mastered this drill on flat terrain, they can progress to practising it on an uphill.

❏ **Abdominal Crunch Drill.** This drill will teach the proper application of force, the role of the core and the importance of the body falling forward from the ankles. From the high starting position (hands high, hips lined up over the feet), the skiers fall onto their poles with a strong abdominal crunch to initiate the force. At the same time, the skiers initiate a leg kick. The "falling" motion combined with the synchronicity of the arm and leg pushes will produce optimal power. This drill should focus on the initiation of the movement, not on the follow through.

❏ **One Pole Two Skate.** Use only one pole on the poling side using the Two Skate technique. By dropping one pole, the skiers must initiate a very forceful push phase with the leg on the poleless side in order for an effective weight shift back to the initial side. This drill also helps skiers develop better fluidity, as the leg on the poleless side has to work more effectively with the upper body.

4.4   Games for Teaching Skating Technique

❏ **Push Your Partner.** Skiers face each other, each holding one end of a pair of poles. One skier pushes the other skier along a packed surface using the poles while the second skier provides a little resistance. This exercise will force the pushing skier to lean their body forward to provide an appropriate push.

When the skiers are able to do the basic skating movement, there are some aspects of the technique that should be reinforced: 1) Skiers should glide on a flat ski. The ski is only edged as the skiers prepare for a push off. 2) Skiers should push at an angle to the side with their ski, not back. 3) During the recovery phase of each leg, the feet pass underneath the hip of that side.

❏ **Longest Glide.** Hold a longest glide contest and see which skier can skate a set distance, (e.g. ten metres) with the fewest skate pushes and without using poles. As the game progresses, have the skiers try to reduce the number of skate pushes they take to ski the same distance.

❏ **Dribbling.** Slowly dribble a soccer ball down the track alternating small kicks forward with each foot. Once some basic skating skill has been developed, a group game of soccer or frisbee on skis can help the skiers develop their balance and confidence in skating without the skiers worrying about technique details.

❏ **Passing a Ball.** Have two or more skiers skating in a line and have them pass a ball from skier to skier. This helps them change their focus away from the details of the technique and necessitates wider ranges of dynamic balance. This can also be done on a slight downhill.

❏ **Figure Eight**. Once the skiers become relatively advanced, have them skate a figure of eight around two ski poles planted in the snow.

❏ **Fox and Rabbit Chase.** This game is played within a square. The square should be as big as the skills of the skiers allow. Markers are required to establish the boundaries. One skier is a fox, and one is the "chase" rabbit. The other skiers are also rabbits, but they are hidden in the forest (the forest is made of ski poles set up in an area within the square). If the chase rabbit becomes tired, he/she may at any time tag one of the other rabbits hiding in the trees, and that rabbit will become the chase rabbit. If the fox catches the chase rabbit, the two exchange roles so that the rabbit becomes the fox. If you have enough skiers, you can have two foxes and two chase rabbits. The coach may or may not choose to have the skiers use poles depending on the space available to play the game.

❏ **Dodge Ball.** For this game, you require a soft, air-filled ball (e.g. volleyball). Divide the group into two teams, the "Ins" and the "Outs". The "Outs" form a large circle within which the "Ins" can move freely. The size of the perimeter of the circle is determined by the throwing ability of the participants. The ball is handed to one of the "Outs" to begin the game. The object is for the "Outs" to knock the "Ins" out of the circle. No hits are allowed above the shoulder. If the ball does not make it back to the outside edge of the circle, an "Out" may enter the circle to retrieve it, but cannot throw until back in position. Each "In" that is hit by the ball has to leave the circle. Once the "Ins" have been removed from the circle, the "Ins" and "Outs" exchange roles. The coach may choose to time each group to see which one can eliminate the other the fastest. No poles.

❏ **Schmerltz Rugger.** A schmerltz is a tube sock with a tennis ball dropped in the toe and a knot tied in the sock. Two goal lines and a field goal ring (about two metres in diameter) are created. A touchdown (six points) is scored by carrying the schmerltz across the opposition's goal line; a field goal (three points) is scored by throwing the schmerltz into the circle. The idea is to pass the schmerltz. If a skier is tagged while holding it, the tagging team gets a free throw. Each team should have a goalie to protect the circle. If the schmerltz is being carried for too long by the skiers, use the three stride rule (three strides and pass). No poles. See Figure 4.37.

Figure 4.37
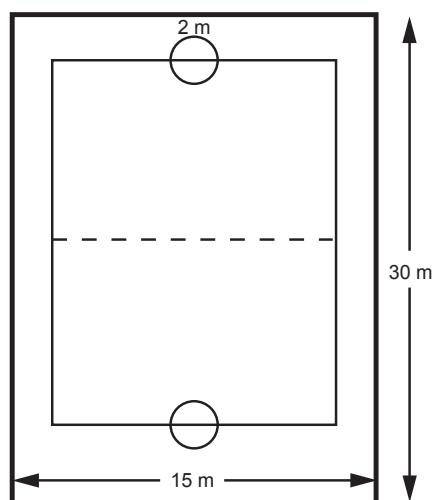
❏ **Frostbite Tag.** This game is played within a six metre ski pole circle. One person is "It", and another is "Hot Spot". When "It" tags skiers, they must remain frozen with their hand touching the tagged part of their body. They remain frozen until "Hot Spot" touches them on the frozen spot. Change "It" and "Hot Spot" frequently. Also, you can have more than one "It". This works well when the "girls" are on one side and the "boys" are on the other side. No poles.

❏ **Chain Tag.** The skiers play this game within a marked circle. One skier is "It". When "It" tags another skier they hold hands, and try and tag other skiers. Each skier that is tagged joins the chain by holding hands with the skier at the end of the chain. The game continues until every skier is part of the chain. A variation is to have two "Its" forming chains, and the chain with the most skiers at the end is the winner. No poles.

❏ **Relays**

✓ **Soccer Relay.** Each team has a balloon and a turn-around pole. The skier must kick his/her balloon to the pole, around it and back. The first team finished is the winner. Keep the distance short. Make sure you have many extra balloons.

✓ **Ball Relay.** Skiers hold a ball in front of them and ski to a turn-around point. They return holding the ball behind their backs and tag the next team member. Keep the distances short and the teams small so that skiers are not inactive for very long periods of time.

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Photo Credit, Wood D., 2008.

Technique Illustration, Niemi A., 2008.

5.1   Introduction

This section on Teaching and Learning complements the information provided in section 7 of the Introduction to Community Coaching Reference Material and section 6 of the Community Coaching Reference Material.

The teaching process is broken down into five main phases:

❏   designing learning activities;

❏   setting up the activities;

❏   delivering the activities;

❏   assessing the learning; and

❏   adjusting and re-tooling.

The first phase (designing learning activities) is when you plan your training and practice sessions; this is the starting point for your teaching. More information on this subject is provided in section 10 of your CCI-L2T (Dryland) Reference Material.

The present section focuses 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 section that the best technical knowledge or planning skills may turn out to be ineffective if certain principles of effective teaching are not respected. This section 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 tools to help you improve your teaching skills.

Although it is not realistic to expect you to improve your teaching abilities significantly in one day of training, it is possible to provide you with some concrete means to continue developing your teaching skills on your own. This will be done through the self-monitoring process shown below in Figure 5.1.

Figure 5.1
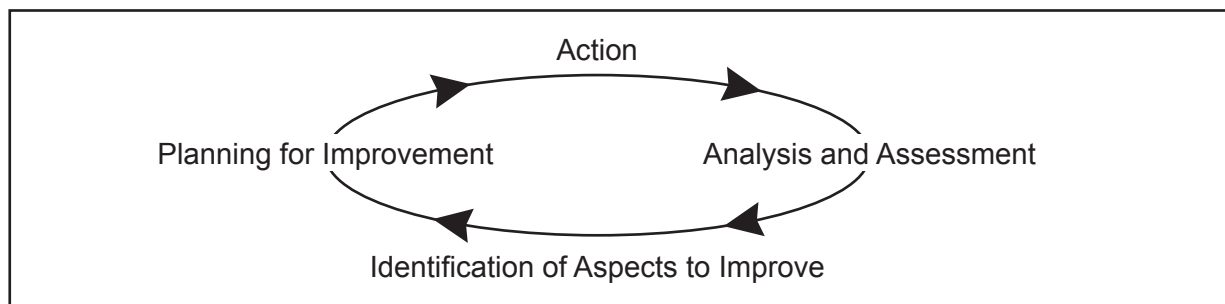
This section enables you to get involved in each step of this process by: (1) showing you how to use some tools designed to assess teaching effectiveness; (2) providing you with the opportunity to use some of these tools; and (3) showing you how to analyze data to identify specific aspects of your teaching you may wish to work on to be more effective.

5.1.1   Key Factors to Consider in Assessing the Effectiveness of Teaching

Safety

Type of practice and conditions in which activities take place during practice

Weather

Site and practice area

Equipment

Athletes' level of fatigue

Athletes' behaviour

Organization

Promotes maximum practice time

Reflects proven sport-specific procedures

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

Coach freed up to supervise activities better

Promotes individual attention to 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)

Athlete

Quantity and quality of motor involvement

Learning styles

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

Includes some criteria to enable athletes to evaluate their own performance as they practise

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 athletes' skill level

Diversify feedback

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

Non-verbal feedback is consistent with verbal feedback

Is correct from a technical point of view

Is consistent with success criteria identified for the task

Is formulated clearly and in a manner that draws the athlete's attention to the right things

Is provided at the right time and with the right frequency

5.2   Defining Learning

5.2.1   Performance versus Learning

One of the principal preoccupations of coaches is how to maximize learning, even when only limited time is available. To achieve this goal, it is important to be familiar with some basic concepts related to how people learn skills and how effective coaches teach sport activities:

❏ Motor performance is the observable behaviour of the athlete when he or she is executing a task; it can be assessed using very precise criteria, e.g. the number of times the athlete throws and hits the target.

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

❏ Performance observed during a practice session is not necessarily a good indication of learning by the athlete. Establishing whether learning has taken place requires reassessing performance at a future date. Additional assessments make it possible to verify skill retention, i.e. whether the skill can be executed repeatedly and consistently.

❏ If the coach does not appreciate the distinction between performance and learning, there is a risk of incorrectly interpreting the extent of the athlete's progress and the athlete's ability to execute a particular task consistently and independently.

❏ When performance assessments are done, it is important to establish a distinction between performance in practice and performance when it is most important - in competition.

Dimensions of Learning

Learning has three distinct dimensions: affective, cognitive and motor.

Figure 5.2
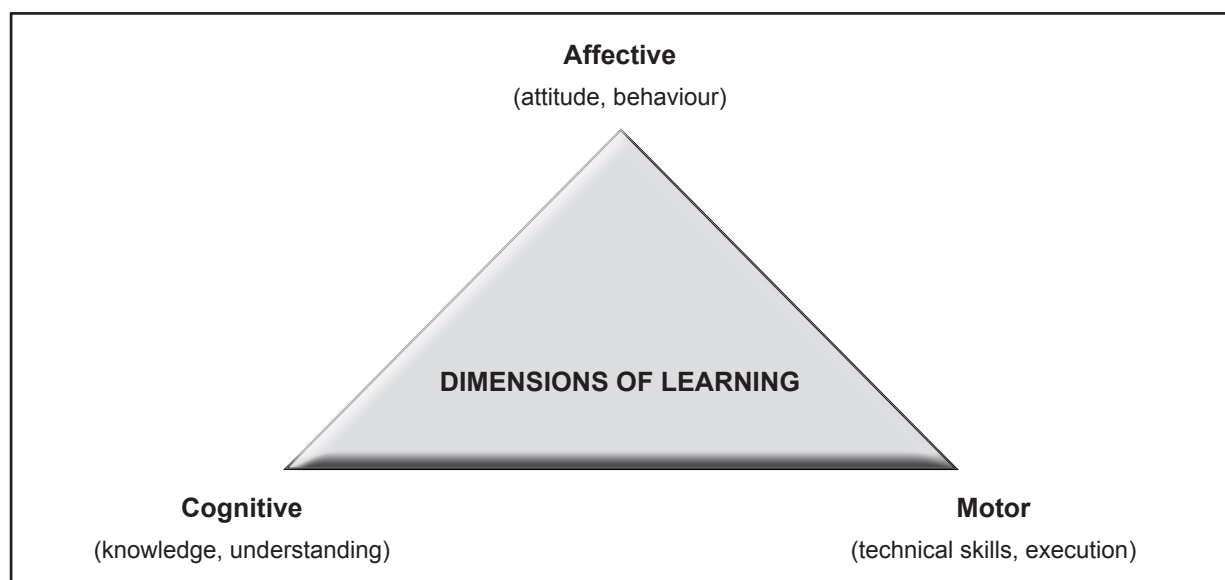
❏ **The affective dimension** - concerns learning from the point of view of attitudes, values and ethical behaviour. This dimension is closely linked to the self-esteem of athletes. Later on, we will consider how to recognize a lack of self-esteem in the athlete.

❏ **The cognitive dimension** - concerns learning from the perspective of the acquisition of knowledge, whether it be technical, tactical or strategic knowledge. This dimension is as much about what the athlete knows (or does not know) as it is about what the athlete understands (or does not understand).

❏ **The motor dimension** - concerns learning from the perspective of the execution of skills, techniques or any other form of motor performance.

Rate of Improvement Over Time

❏ When an athlete begins to practise, there is a rapid improvement in the ability to carry out a task or perform a particular movement, but the rate of improvement is much slower later on.

❏ Learning happens in stages, and the rate of improvement varies from stage to stage.

❏ The quantity and quality of practice, i.e. the time and the number of repetitions, are the most important factors that lead to motor performance improvements and skill learning.

Figure 5.3
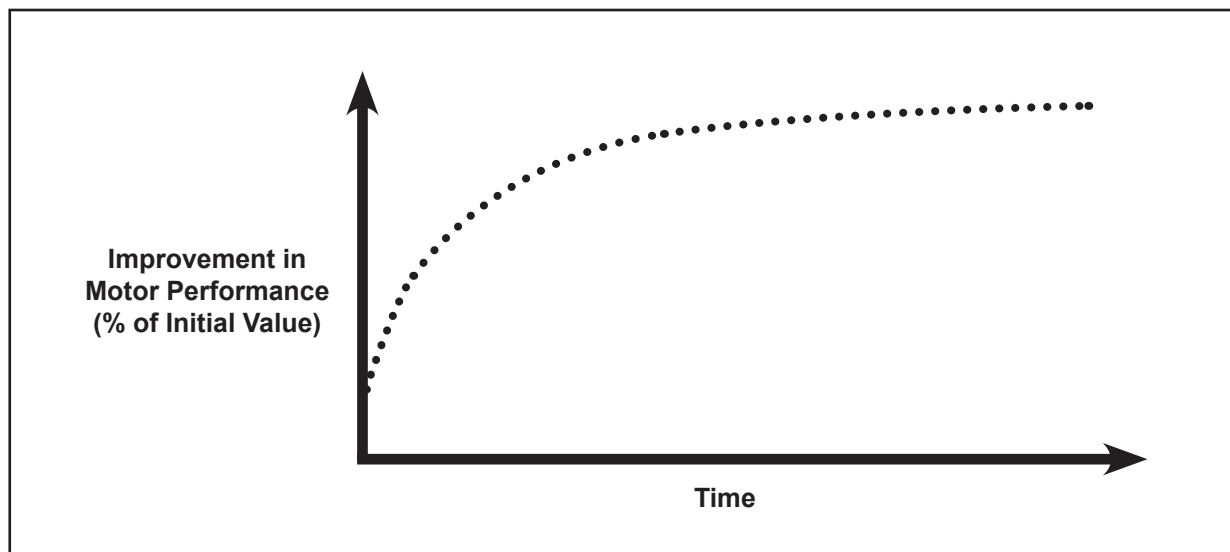
Effects of Different Types of Practice on Motor Learning

Different types of practice can be used to teach skills, and their effect on learning and performance can vary.

Practices that emphasize repeating the same task many times under the same conditions (behavioural training) usually lead to a rapid improvement in performance; however, this improvement may not be stable or maintained over time.

Practices that require some form of problem solving by the athlete (decision training) may not produce improved motor performance as quickly early on, but may lead to superior learning and retention of skills, as well as superior transfer of skill to the competitive environment.

Figure 5.4

Performance and Type of Practice
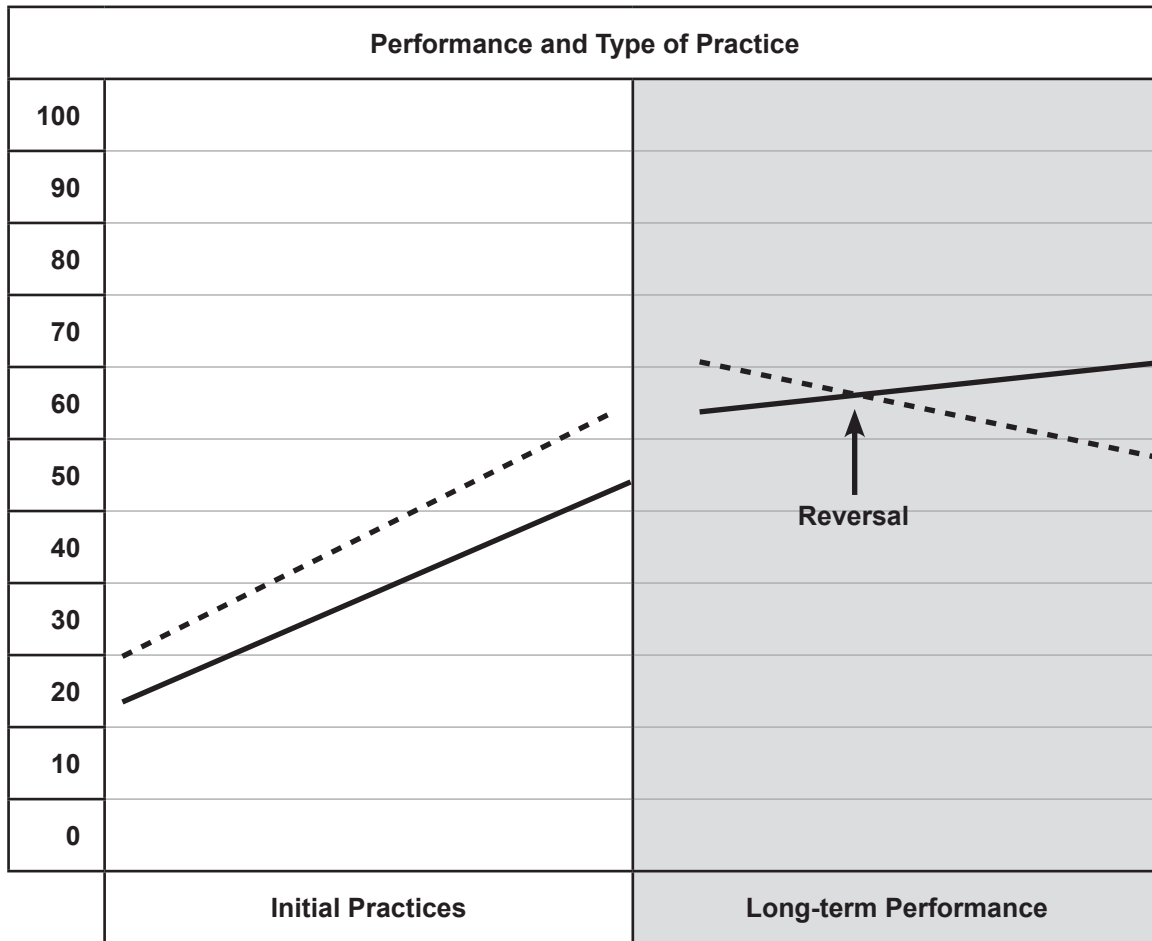
- - - - **Behavioural Training**

——— **Decision Training**

5.3   Maximizing Learning

5.3.1   My Preferred Learning Style - Questionnaire

The following questionnaire is designed to help you discover your preferred learning style. To a large extent, your preferred learning style is linked to the sensory channel (hearing, seeing, feeling) you use the most to learn. In the 21 situations described in the following pages, circle the option (A, B or C) that best describes your personal experience.

When you've answered all the questions, read the analysis and interpretation of your answers in sections 5.3.2 and 5.3.3 below.

What Happens When:

1. **You are preparing a technical learning sequence for the next month:**
    A.   You make lots of gestures with your hands while you think.
    B.   You draw up a diagram to help you clarify a few key ideas.
    C.   You prepare a detailed plan of the content of the coaching sessions.

2. **You are getting ready to read over the material for the course you are taking:**
    A.   You are taken aback by the pile of paper.
    B.   You feel tired even before you begin.
    C.   You regret waiting until now to get to the work.

3. **You are off to practice:**
    A.   You are delighted to see that the sky is clear.
    B.   You are delighted to hear the birds singing.
    C.   You yawn and wish you could stay in bed.

4. **You go into the coffee shop and the first thing you notice is:**
    A.   The sounds of conversations.
    B.   Your colleague's beautiful smile.
    C.   The smell of coffee.

5. **You go to get some colleagues who are supposed to be participating in a meeting:**
    A.   You see that they are chatting and do not hear that the meeting is about to start.
    B.   You hurry them along so that they get into the room as quickly as possible.
    C.   You see that they are not ready to go into the meeting.

6. **You walk into a room to begin a presentation:**
    A.   You hope the heating will be switched on soon; it's cold in the room.
    B.   You notice the walls are painted an ugly colour.
    C.   You are upset by the athletes who continue chatting.

7. **You walk into a room to start a presentation:**
   - A. The whispering is intriguing.
   - B. You notice that two difficult athletes are sitting next to each other.
   - C. You are not sure whether to sit down or walk back and forth.

8. **An athlete comes to see you to ask you a question:**
   - A. The fact that he/she is looking anxious is not a surprise.
   - B. You wonder what is behind his/her approach.
   - C. You are amused that he/she is coming to see you.

9. **You are writing an important article for your athletes:**
   - A. Your hand will go to sleep if you go on any longer.
   - B. You try to figure out if your handwriting is legible.
   - C. You really like how ball point pens roll on the paper.

10. **Your athletes don't understand an explanation:**
    - A. You immediately think about how to explain it another way.
    - B. You are surprised at the number of puzzled faces in front of you.
    - C. You are not pleased; you don't like this kind of situation.

11. **Two athletes challenge the coach, and you notice:**
    - A. That it makes everyone uncomfortable.
    - B. That they speak without asking permission.
    - C. That they look very angry.

12. **Some athletes ask to discuss a problem that everyone in the organization is talking about:**
    - A. You think their request is out of line.
    - B. You are touched by their request.
    - C. You note that the other people present agree with the request.

13. **The athletes are surprised when you announce the next special activity:**
    - A. Even though it has been in the schedule for a long time.
    - B. Even though they know what to do anyway.
    - C. Even though you had repeated it several times.

14. **You are off to a competition:**
    - A. You notice your new shoes are very comfortable.
    - B. You are delighted to see the smiling faces of the people who are hosting you.
    - C. You perform a head count several times to be sure everyone is there.

15. You are summoned to your boss's office:

    A.   You have decided to stand firm on this issue.

    B.   You wonder whether this is a good omen.

    C.   You re-read the secretary's note to see if you can find an explanation.

16. A meeting is just about to start:

    A.   You notice person X isn't there.

    B.   You work out how long the meeting will last by figuring on ten minutes per agenda item.

    C.   You notice you have chosen a more comfortable seat than last time.

17. You approach the parents of some athletes with whom you have arranged a meeting:

    A.   You notice that they have a slight regional accent.

    B.   You extend your hand to them spontaneously.

    C.   Just a moment! You thought they were older than this.

18. A supervisor walks into your work area:

    A.   You find he/she has a pleasant voice.

    B.   You find him/her pleasant.

    C.   You have a dry throat.

19. In the cafeteria, you are swallowing the last few mouthfuls of your meal:

    A.   You have enjoyed the meal.

    B.   The conversation around you isn't loud. So much the better!

    C.   You find the colour of the dishes brighter than usual.

20. Some athletes come and go during your presentation:

    A.   You look at your notes several times to find where you were because they distracted you.

    B.   You are put off by the coming and going.

    C.   You are inwardly furious.

21. Once the day is over, you go home and you:

    A.   Congratulate yourself for the successful moments of the day.

    B.   Think back over the good moments of the day.

    C.   Enjoy sitting down after a day on your feet.

5.3.2   Interpretation Table

The table below shows what kind of learning each answer in the questionnaire represents. For example, choosing the answer B for the first question indicates a visual learning style.

For each situation that was described in the questionaire, circle the letter that corresponds to your answer. For every time you answered A, give yourself one point; give yourself two points for every time you answered B and three points for every time you answered C. Then add up the total points in each column. The column with the highest total represents your primary learning style.

Situation	Visual	Auditory	Kinesthetic
1	B	C	A
2	A	C	B
3	A	B	C
4	B	A	C
5	C	A	B
6	B	C	A
7	B	A	C
8	A	B	C
9	B	C	A
10	B	A	C
11	C	B	A
12	C	A	B
13	A	C	B
14	B	C	A
15	C	B	A
16	A	B	C
17	C	A	B
18	B	A	C
19	C	B	A
20	A	C	B
21	B	A	C
Total			

5.3.3   Recognizing Preferred Learning Styles

You Are Primarily a Visual Learner

❏ **Your General Profile**

✓ This means 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 to make sense of what is happening to you. You are affected by art and beauty, order and disorder. You have a very fine sense of nuances of colour and form. You pick up details: 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 direction, 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 feedback and drill instructions during a practice. "Just open your eyes", you tell them. You believe that a clear explanation or document requires illustrations, diagrams. When there are no visual pieces, you immediately draw something on the board: you believe it is easier, clearer than any verbal explanation.

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

❏ **Aspects to Which You Should Pay Particular Attention**

✓ You have to learn how to enter the world of auditory learners. 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. Better still: 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 with 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… They will experience multiple sensations that they will find overwhelming. Begin your explanations by saying: "Imagine yourself walking…visiting…touching…" Any action verb will do, provided you cause them to be mentally active in the course of their reflection. Ask them what they feel when they create these images. If you are able to keep them in contact with their own feelings, they will become more creative and be more interested in your activities. They remind everyone (and yourself) that you are a person and you are also capable of

experiencing sensations, feelings, 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.

You Are Primarily an Auditory Learner

❏ **Your General Profile**

✓ This means that you are particularly receptive to the auditory aspect of your environment and that you readily call up sounds and words heard in the past to help you make sense of what is happening to you.

✓ You are sensitive to the harmony of sounds, the meaning of words, the rhythm of things. You have a fine sense of the various ranges of tonality: the bass and treble are very familiar to you. You 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, to tell stories. You like to sing or, at the very least, you appreciate the musicality of what you say or hear.

✓ You like to listen to people, discuss or play with ideas. Your athletes like your careful elocution: you take pleasure in talking. Your voice is melodious, well ordered. You usually breathe through the middle of the thorax by filling your lungs well, which enables you to maintain a regular rhythm.

❏ **Aspects to Which You Should Pay Particular Attention**

✓ 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 keep paying 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 learners? Words alone will always be an empty vessel for them, unless you can also appeal to their need for physical sensation. Choose the words that complement their preferred sense.

You Are Primarily a Kinesthetic Learner

❏ **Your General Profile**

✓ This means that among the many forms of information that you receive at any given moment, you are particularly sensitive to those that you feel. From time to time, you pause to check your feelings. This is your way of relating to what is going on around you.

✓ You are aware of the ambiance, the relationships between people. You have a keen sense of the state of mind of those with whom you are speaking. 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.

❑ **Aspects to Which You Should Pay Particular Attention**

✓ You would be even more effective if you took more frequent pauses to reframe what is being said - for example, by jotting down key ideas on a blackboard to summarize the essential elements of what is to be learned. 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 or a concrete and dynamic approach will help them create vivid mental images. You can have them synthesize what has already been said or done or describe how this fits into the larger picture: they will be very good at this exercise. However the rhythm of your presentation may seem too slow to them: mental pictures are created very quickly in their minds, so much so that you may not be capable of keeping pace with the way they interpret information. Have your athletes speak from time to time, so that the rest of the group can benefit from their brightly coloured examples and images.

✓ Athletes who are primarily auditory may become frustrated: they like structured practices and well planned activities that are described in precise, well-thought-out terms. Have them comment on a technique or summarize an important explanation, because they often link things 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've heard today?" Thanks to your primarily kinesthetic sense, you practise your profession with great sensitivity. This is one of your great attributes: to teach in a lively, unexpected and sometimes unusual way. You epitomize this picturesque Chinese proverb: *"Teaching that only enters the eyes and ears is like an imaginary meal".*

Visual Learners

General Observations

❑ They often do better when you show them rather than tell them. They may have difficulty

understanding oral directions.

❏ They may have difficulty with oral directions or appear confused with a great deal of auditory stimuli.

❏ They have a tendency to watch your face when you read or speak to them.

❏ They like to look at books and pictures.

❏ They like things orderly and neat. They often dress in an attractive manner.

❏ They can generally find things that are lost and seldom misplace their own things.

❏ They can often recall where they saw something some time ago.

❏ They notice details. They are good proofreaders, see typing errors and notice if your clothing has a flaw.

❏ They can find pages or places in a book quite easily.

❏ They often draw reasonably well — at least with good balance and symmetry.

❏ They may use few words when responding to questions; they may rarely talk in class.

Recommended Teaching Methods

❏ Give visual directions and demonstrations as often as possible.

❏ Use visual aids such as film, videos, images, overheads, books, magazines, slides, panel boards, etc.

❏ Use colour-coding systems and visual aids.

Auditory Learners

General Observations

❏ They are often referred to as talkers and are seldom quiet. They tell jokes and tall tales and are full of excuses for why something isn't done.

❏ They follow oral instructions easily.

❏ They may have difficulty with written work and copying. They often have rather poor handwriting and may draw badly. They have trouble reproducing figures and letters they have seen, and they generally have poor visual memory.

❏ They remember spoken words or ideas quite well. They may answer better when questions are explained to them verbally compared to when they must read them.

❏ They like musical and rhythmic activities.

❏ They tend to memorize easily, and they often know all the words to songs.

❏ They may appear physically awkward. They often have a poor perception of space and may get lost in unfamiliar surroundings.

❏ They often have poor perception of time and space and often do not keep track of time easily.

❏ They often have mixed laterality (left hand – right footed).

Recommended Teaching Methods

❏ Teach them to talk through the steps in a task or activity.

❏ Encourage them to think out loud, and listen to what they are saying.

❏ Use tape-recorded instructions.

❏ Use lots of audio equipment in the learning process.

❏ Pair the individual with a visual learner.

Kinesthetic Learners

General Observations

❏ They move around a lot and are considered hyperactive.

❏ They seem to want to feel and touch everything.

❏ They are usually quite well co-ordinated.

❏ They enjoy working with their hands. They like to take things apart and to put things together.

❏ They may truly enjoy writing things down.

❏ They use concrete objects as learning aids, especially ones that can be manipulated easily.

❏ They learn best by doing and exploring the environment.

Recommended Teaching Methods

❏ Use movement exploration.

❏ Have them tap tempos.

❏ Use all the concrete, manipulative devices possible in the teaching/learning mode.

❏ Employ role playing where possible.

❏ Let them help you create learning aids.

5.4   The Teaching Process

#1
Organization and Set-up

Includes safety measures, and how the activity starts and finishes

Requires at least 50% motor involvement

Coach is able to supervise

Can someone else do the demonstration better than me?

#2
Explanations and Demonstrations

Describe the aim of the exercise

Outline what is to be done and how

Describe points of reference/cues

Identify criteria of successful performance

Take the different learning styles into account

#3
Observation

Ensure that the athletes are actively engaged and achieve a good rate of success

Move around without interfering with athletes

Observe both individuals and the group

Verify if the criteria for success are achieved

Did I give athletes enough time to practise before stopping them to give feedback?

Did I remember to ask athletes to give me feedback before giving them mine?

#4
Intervention and 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

#5
Effects of the Feedback

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

5.4.1   Organization and Set-Up

❏ Always think about how to start 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 so that you can move around and see every athlete without interfering.

❏ Ensure each athlete has the maximum possible amount of practice time (number of repetitions).

❏ Always plan what equipment to use during the activity or the drill, prepare it ahead of time and make sure it is available at the time of the activity.

Self-Assessment Tool for Coaches:

Ask Yourself These Questions Before and After the Practice
Did I set up the practice or the activity in a way that: ❏ Enabled each of the athletes to be actively engaged for at least 50% of the time?   ❏ Allowed me to spend more than half my time with individual athletes?   ❏ Enabled each athlete to progress at his or her own pace, respecting the athlete's starting point?   ❏ Gave me sufficient time to observe the athletes?

5.4.2   Explanations and Demonstrations

❏ Tell athletes the object of the exercise or drill.

❏ Always give athletes some cues or reference points (what they should look for or feel while performing). Effective cues are short, clear, simple and few (two or three).

❏ A **cue** is a precise piece of information that enables the performer to comprehend and control a movement. It must be observable by the coach and easily understood by the athlete. There are two types of cues: external and internal.

✓ An **external cue** can be seen or identified by the athlete. It generally relates to the desired outcome of a movement or sequence of movements, providing the context for the movement(s) (also known as internal cues – see next bullet below). It also serves to explain to the athlete why a component of technique is being performed in a specified way.

✓ An **internal cue** is perceived or felt internally by the athlete (kinesthetic sensations). It generally equates to an input (or inputs) required to generate a desired outcome or result. It is meaningful primarily within the context of the intended outcome (or external cue).

❏ Suggest to athletes that *while executing the movement or movements (i.e. with internal cues) as instructed, it is essential they always be conscious of the desired outcome or purpose (i.e. perceived through an external cue)*. The external cue will often be expressed relative to something external to the athlete's body. For instance, in shooting a basketball, the external cue would relate to the basket; in cross-country skiing, external cues might be expressed in terms of distance covered or slopes climbed while skiing. 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, auditory, kinesthetic).

Self-Assessment Tool for Coaches:

Ask Yourself These Questions During and After the Practice
Did my explanations and demonstrations enable me to:
❏ Create a clear picture of what I wanted to see happen and how?
❏ Describe the logistical and organizational aspects of the drill/activity?
❏ Emphasize the most important aspects (reference points, external focus)?
❏ Pass on information on the "why" of things (e.g. the reasons why a movement should be done in a particular way)?
❏ Respect the athletes' individual learning styles?
❏ Check for understanding?

Key Points on Giving Instructions

Recent research in motor learning has focused on the effectiveness of different ways of giving instructions. Among other 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).

❏ To promote learning, instructions should be given in a way that focuses the athlete's attention on some external factor or on the anticipated effect of his or her movement, rather than on the way the movement is executed.

❏ Focusing too much on how to perform a particular movement, e.g. focusing on how to position the elbow or flick 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 pay attention to some external factor (e.g. the target to hit) or to the expected outcome of the movement (like the particular trajectory of a ball) rather than to internal elements (e.g. feeling each phase of the movement during its execution). This topic is known as "focus of attention".

❏ There is ample evidence that instructions asking the athlete to focus on some element external to his or 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 all performers. Finally, the positive effects of this type of instruction on both performance and learning do not appear to negatively affect the *form* of the movements; in other words, the quality of the execution does not appear to suffer.

❏ If possible, external focus should be directed toward an element, an anticipated effect or an outcome that is far from the performer's body.

❏ 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 that can still be directly linked to the movement itself.

Choosing a Formation for Explanations or Demonstrations

It is important to choose a formation that allows athletes to see and hear you. The choice of formation depends on the space available, the kind of message (e.g. information, explanation, demonstration), the number of athletes and whether the athletes are on a soccer field or on snow with skis on. The diagrams below show common "dryland" formations.
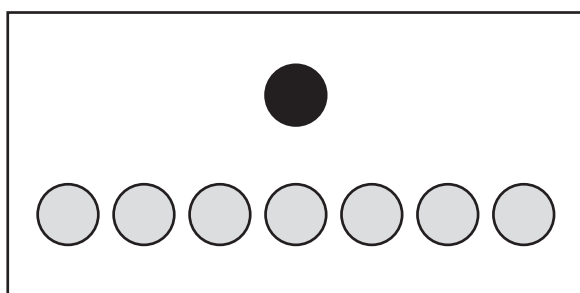
Straight Line   **Two Lines**
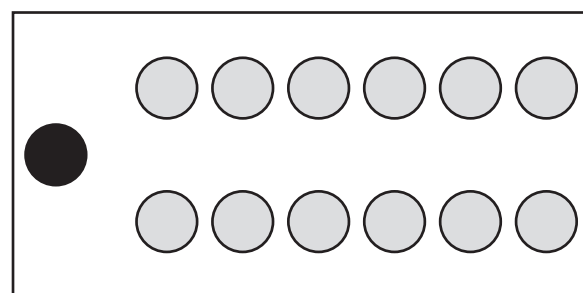
Semi-Circle
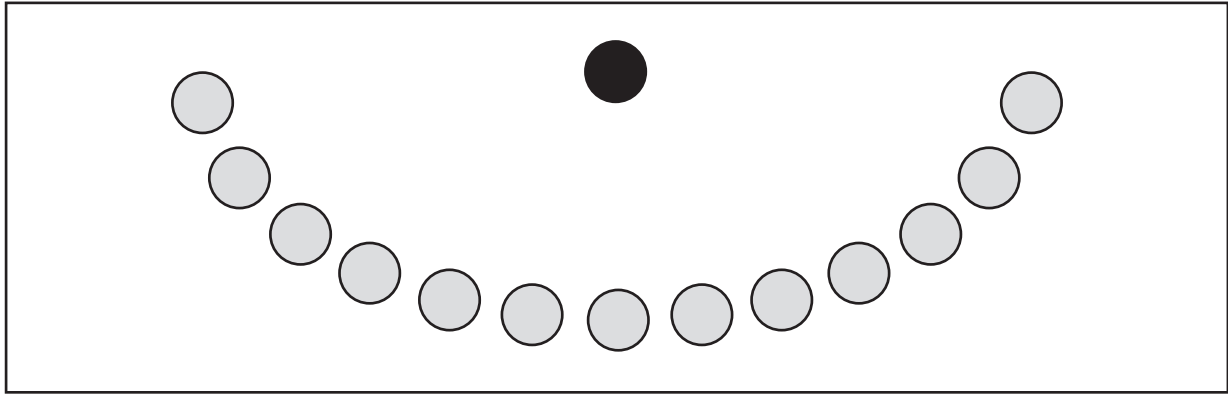
U-Formation
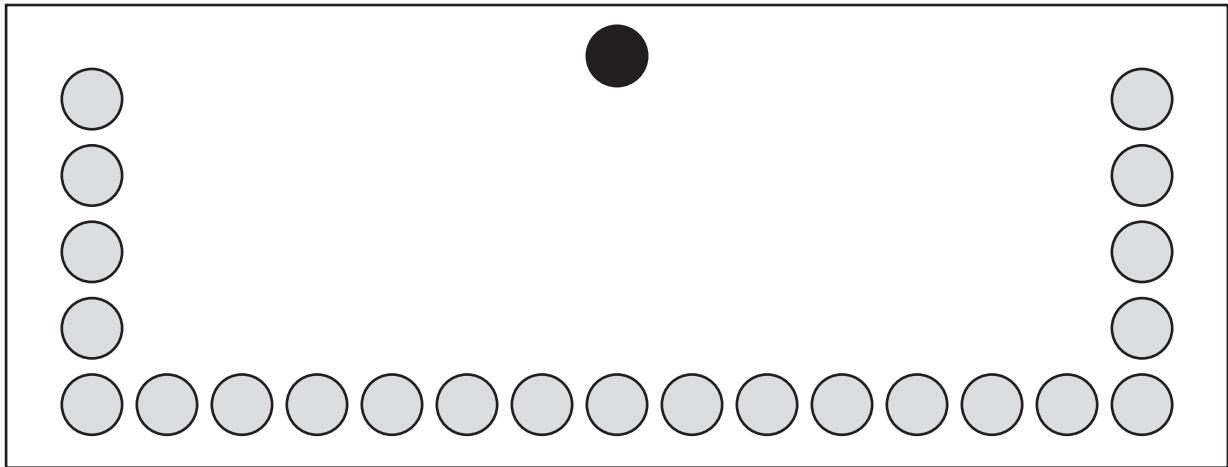
Adapting the Basic Formations

❑ These basic formations need to be adapted to the situation. For examples of teaching and observation formations for on-snow sessions, refer to section 3 of this Reference Material.

❑ Formations can also be adapted to meet the needs of larger groups, for example:

✓ Make two rows: the front row kneeling or sitting, the second row standing.

✓ Make three rows: front row sitting, second row kneeling and third row standing.

Control Distractions

❑ Athletes must be arranged with potential distractions behind them, for example:

✓ Sun in their eyes.

✓ Reflections.

✓ Other groups of athletes training.

✓ Spectators.

Choose a Good Vantage Point for the Athletes

❏ It is important to ensure that athletes have a good vantage point for watching the demonstration. Think of the best vantage points for 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 can 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".

Explanations and Demonstrations Assessment Grid (sample)

Coach: _____ 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	Demonstration gave a good general idea of the technique or movement	Yes	No	Yes	No
4	Demonstration directed athletes' attention to an external focus (target, outcome, expected effect)	Yes	No	Yes	No
5	Coach pointed out what not to do (negative example)	Yes	No	Yes	No
6	Demonstration was repeated from different angles	Yes	No	Yes	No
7	Athletes were involved in the demonstration in an appropriate way	Yes	No	Yes	No
8	Coach identified internal and external points of reference	Yes	No	Yes	No
9	Coach explained the reason for doing the activity/drill (link with previous practices, etc.)	Yes	No	Yes	No
10	Coach checked that the athletes had a good understanding of what needs to be done	Yes	No	Yes	No
11	Technical elements of the demonstration were executed correctly	Yes	No	Yes	No
12	Amount of information provided by the coach was appropriate (clear, short, accurate)	Yes	No	Yes	No
13	Coach used vocabulary respecting the three learning styles	Yes	No	Yes	No
14	Coach emphasized safety aspects when appropriate	Yes	No	Yes	No
15	Coach's voice was loud enough and projected well enough	Yes	No	Yes	No

Comments:

_____

_____

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

Explanations and Demonstrations Assessment Grid (working copy)

Coach: _____ 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	Demonstration gave a good general idea of the technique or movement	Yes	No	Yes	No
4	Demonstration directed athletes' attention to an external focus (target, outcome, expected effect)	Yes	No	Yes	No
5	Coach pointed out what not to do (negative example)	Yes	No	Yes	No
6	Demonstration was repeated from different angles	Yes	No	Yes	No
7	Athletes were involved in the demonstration in an appropriate way	Yes	No	Yes	No
8	Coach identified internal and external points of reference	Yes	No	Yes	No
9	Coach explained the reason for doing the activity/drill (link with previous practices, etc.)	Yes	No	Yes	No
10	Coach checked that the athletes had a good understanding of what needs to be done	Yes	No	Yes	No
11	Technical elements of the demonstration were executed correctly	Yes	No	Yes	No
12	Amount of information provided by the coach was appropriate (clear, short, accurate)	Yes	No	Yes	No
13	Coach used vocabulary respecting the three learning styles	Yes	No	Yes	No
14	Coach emphasized safety aspects when appropriate	Yes	No	Yes	No
15	Coach's voice was loud enough and projected well enough	Yes	No	Yes	No

Comments:

_____

_____

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

5.4.3   Observation

❏   Ensure that athletes get involved in the activity quickly (rapid transition).

❏   Always ensure athletes understand the instructions you provide.

❏   Always ensure that the activity or drill is appropriate for athletes' skill level.

❏   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.

❏   Actively supervise athletes so you see ALL the athletes during the activity. Scanning the activity and moving around to watch what is going on from different vantage points will enable you to be actively involved. (Note: During sport-specific workshops, find out what is 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 individual differences in performance and provide individualized feedback.

❏   Find out if the athletes have fun, or if they are bored or discouraged.

Self-Assessment Tool for Coaches:

Ask Yourself These Questions During and After the Practice
Did my observation enable me to: ❏   Keep athletes actively engaged in the activity? ❏   See all athletes as a group and individually? ❏   Observe key reference points and success criteria from different vantage points? ❏   Be sure everyone is safe? ❏   Evaluate athletes' degree of success in the execution of the activity or drill?

5.4.4   Intervention and Feedback

In this section, we will present several steps to enable the coach to give appropriate feedback.

❏   **First Step: Success or Failure?** Before providing any feedback, you must first determine whether the athlete is succeeding in the activity.

❏   **Second Step: Types of Intervention.** Once you have determined whether the athlete is experiencing success, you need to choose an appropriate type of intervention. Various types of intervention are listed in the table below. The first type (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 are more appropriate when he/she can. These particular aspects are dealt with in the following pages.

Five Types of Intervention

Type of Intervention	Behaviours or Actions by the Coach
A. Inhibiting	Do nothing. Shout, rebuke.
B. Repeating	Repeat instructions. Demonstrate or repeat previous demonstration.
C. Explaining	Explain how to do it right (verbal or reference point). Question the athlete.
D. Helping	Reassure, encourage. Have the athlete start again.
E. Adapting	Use different equipment in practice areas. Reduce difficulty level or give more time.

Intervention Skills

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

❏ **Planning**

    ✓ The content of the session must have some relation to the overall program.

    ✓ The coach must know his/her stuff.

    ✓ The objectives of the practice must be clearly defined.

    ✓ The key elements of the practice and criteria for success must be clearly defined.

    ✓ Exercises must be varied and progressive.

    ✓ Exercises must be adapted to the level of the athletes.

❏ **Organization and Set-up**

    ✓ Ensure there is enough appropriate equipment.

    ✓ Choose the right formation for explanations and demonstrations.

    ✓ Be stimulating and lively (have fun!).

    ✓ Be sure that the practice area is safe throughout the session.

❏ **Explanations and Demonstrations**

    ✓ Explanations must be brief and clear.

✓ Explanations must be complete (organization of the group, how the practice will go, the duration of the practice, etc.).

✓ 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).

✓ The coach must be in the right position during the explanation.

✓ 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).

✓ Delivery must be controlled: speak slowly, loud enough and with enthusiasm; ask athletes if your voice carries well enough.

✓ 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.

✓ Give clear instructions such as: "Make as many passes as possible in the time given, and keep moving!"

✓ Ask questions to check whether your instructions have been understood, for example, "What must you do during this drill?"

✓ Check that athletes understand the purpose of the exercise before they try it again.

❏ **Managing the Group**

✓ Ensure that athletes are aware of the rules to follow and the code of conduct.

✓ Be sure to inform athletes of the rules and of the consequences of not following them; the consequences must be reasonable and must take into account the age of athletes, as well as the nature of the infraction.

✓ Watch out for signs of undisciplined behaviour and react quickly and appropriately to such behaviour.

✓ Apply the rules and impose the appropriate penalty for breaking the rules (that you have already established).

✓ Adapt quickly to maintain control of the group at all times.

❏ **Observation**

✓ Pick your spot and move around to see all 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 and tiredness so that you can deal with them quickly.

✓ 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 give feedback, remember the following criteria:

- Specific, not general.

- Positive and constructive, not destructive or negative.

- Focus on behaviour that can be improved.

- Clear and informative.

- Formulated so that the athlete's focus of attention is on an external element in addition to the technical elements being practiced.

- Feedback is given in a summary fashion after several repetitions rather than after each repetition.

- Sandwich approach: positive comments on what the athlete is doing well, things to work on, encouragement or some other positive aspect.

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

❑ **Conclusion**

✓ The competence of the coach can be assessed on the basis of the following:

- The environment created in the practice session is positive.

- The amount of athletes' motor activity is high (50% or more).

- Athletes' learning.

Intervention When the Athlete is Not Experiencing Success

Column 1	Column 2	Column 3
Athlete's Behaviour	**Probable Cause**	**Appropriate Intervention**

Failure

Affective

- Cannot meet the demands of the task (clearly upset or gives up practising) → **Affective**
  - Fear → Help (reassure) or Adapt (slower progression)
  - Unmotivated → Explain (question) then Help (start again) Adapt

Cognitive

- Does something different, or achieves a different outcome → **Cognitive**
  - Not understanding → Explain (question) then Repeat
  - Ability not yet acquired → Explain (question) then Adapt

Motor

- Nearly gets it right, but not quite → **Motor**
  - Too demanding → Explain (question) or Adapt (use different equipment)
  - Too complex → Adapt (take more time, simplify)

Intervention When the Athlete is Succeeding

```
  ┌─────────────┐              ◇
  │             │        Does the coach        Yes    ┌──────────────────┐
  │ Successful  │ ──────▶ need to check skill ──────▶ │ Have the athlete │
  │             │        acquisition?                 │ outline reasons  │
  └─────────────┘              ◇                       │ for success      │
                               │                       │ (identify        │
                               │ No                    │ reference points)│
                               ▼                       └──────────────────┘
                      ┌──────────────────┐                      │
                      │                  │                      │ or
                      │                  │                      ▼
                      │ Next activity or │            ┌──────────────────┐
                      │ level of         │            │ Have the athlete │
                      │ progression      │            │ repeat the       │
                      │                  │            │ performance      │
                      └──────────────────┘            │ several times    │
                                                      └──────────────────┘
                                                               │
                                                               │ or
                                                               ▼
                                                      ┌──────────────────┐
                                                      │ Do a more        │
                                                      │ difficult task   │
                                                      └──────────────────┘
```

5.4.5   Observation of the Coach's Feedback (sample)

Coach: _____

Number of athletes:_____ Length of time coach under observation:_____

Type of Feedback	Definitions	Examples	
Evaluative	The coach assesses the quality of the performance, so the coach makes some kind of assessment or judgement	That's fine! Good job!	No, not like that! Not good enough!
Prescriptive	The coach tells the athlete how to execute the skill next time	Throw it higher! (general) Kick further!	Get your arm higher! (specific)
Descriptive	The coach describes to the athlete what he or she has just done	The build-up was too slow (general)	Your legs were really extended (specific)

Type of Feedback	Occurrence (Checkmark)	Total	# Minute
Positive Evaluative			
Negative Evaluative			
General Prescriptive			
Specific Prescriptive			
General Descriptive			
Specific Descriptive			

Observation of the Coach's Feedback (working copy)

Coach: _____

Number of athletes: _____ Length of time coach under observation: _____

Type of Feedback	Definitions	Examples	
Evaluative	The coach assesses the quality of the performance, so the coach makes some kind of assessment or judgement	That's fine! Good job!	No, not like that! Not good enough!
Prescriptive	The coach tells the athlete how to execute the skill next time	Throw it higher! (general) Kick further!	Get your arm higher! (specific)
Descriptive	The coach describes to the athlete what he or she has just done	The build-up was too slow (general)	Your legs were really extended (specific)

Type of Feedback	Occurrence (Checkmark)	Total	# Minute
Positive Evaluative			
Negative Evaluative			
General Prescriptive			
Specific Prescriptive			
General Descriptive			
Specific Descriptive			

Key Points on Giving Feedback

Until recently, the vast majority of coaching publications recommended providing feedback:

❏ 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, however, researchers have re-examined some of these recommendations on the grounds that they were based on studies of short-term improvement in performance, not longer term learning. Longer term learning is the ultimate aim of coaching.

While the recommendation regarding providing precise feedback remains unchanged, the most recent research on feedback indicates 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; it should therefore require some analysis and decision-making by the learner. Feedback must encourage the athlete to be an independent and autonomous learner and to look for solutions to the particular challenges posed by the practice. The longer term objective is for the athlete to be able to maintain and modify performance without the coach'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 athlete 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 to get things in perspective.)

❏ **The least effective approach: frequent feedback during execution.** The negative effect of the phenomenon described in the preceding paragraph is even more evident when feedback is given very often while the learner is practising. This may lead to short-term improvement, but 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 involves giving feedback after several attempts at or repetitions of a task in a way that gives: (1) an objective view of tendencies observed during execution of a movement; or (2) information about the average performance achieved after several repetitions. 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 be given only when the difference between the athlete's performance and the desired result requires it.** Bandwidth feedback refers to the practice of providing feedback only when performance is outside an acceptable range of correctness, for instance if performance is more than 25% worse than the acceptable target result. The target result can be either the form of the movement or the precision of the execution. Motor learning research indicates that using a relatively large bandwidth is beneficial for learning. This tends to: (1) reduce the frequency with which feedback is provided; (2) promote summary feedback, which may encourage the athlete to compare less successful attempts with those that fell within the acceptable range of performance; and (3) develop a degree of autonomy in the athlete, as well as the ability to analyze his or her performance. In this last case, the coach may ask the athlete to compare his or her self-analysis with the coach's information about correct or incorrect execution of the task.

Another aspect of feedback that has been studied recently is the nature of feedback. Among other things, researchers have sought to determine what athletes should be told to concentrate on during the execution of a motor activity. This topic is known as "focus of attention". As explained earlier in section 5.4.2, there are two types of focal points (with corresponding cues): (1) the way the movement is performed (internal focus); and (2) the desired outcome(s) of the action (involving an external focus). Major research findings in this area may be summarized as follows:

❏ **To promote greater learning, feedback must include directing the attention of the learner to some external focus of attention or to the expected effects of the movement.** When a movement is being performed, focusing exclusively 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. When the details of a movement are taught, they must be placed in the context of the desired outcome. Then during the execution of the movement, it is important to draw the athlete's attention to some external element (e.g. the generation of glide and of speed down the track) or to the expected outcome of the movement (e.g. the maintenance of momentum) rather than solely to internal elements (e.g. feeling each phase of the movement during its execution). There is good evidence to suggest that feedback directed toward an external focus of attention has a positive impact on both short-term performance (during the session) and longer term performance, so it promotes both learning and retention of skills. Furthermore, feedback directed toward 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 toward 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 that can still be directly linked to the movement itself.

Examples of Situations that Refer to an Internal Focus of Attention	Examples of Situations That Refer to an External Focus of Attention
Concentrating on …	**Concentrating on …**
❏ Foot location and kick timing during the kick phase of Diagonal Stride	❏ The force exerted on the snow during the kick phase of Diagonal Stride
❏ Not bobbing the head or rocking shoulders from side to side	❏ Maintaining a "quiet" body position, while still executing a positive weight shift
❏ Focussing on knee angle and leg extension	❏ Focusing on the length of the glide and the desired direction of travel
❏ Paying attention to the arm's position and hand action during the diagonal stride	❏ Paying attention to the pendulum-like action of an arm movement in diagonal stride

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6.1   Putting It All Together

The assessment tools on the following pages are for use during and after the workshop. They cover the key aspects of how to create conditions favourable for learning:

❏ Organization and set-up

❏ Explanations and demonstrations

❏ Observation, intervention and feedback

You will use one or more of the assessment tools yourself in Step #6 - Teaching and Learning – Part 2, and you will see how other coaches use the other tools. This will give you a broader perspective on teaching and some new ideas for your own coaching.

Once the workshop is over, you can use the tools to keep improving your effectiveness as a teacher.

Learning Tips for You - the Coach:

❏ Coaches, like athletes, must practise and get feedback to improve!

❏ To improve, it is important to obtain objective data and feedback on key aspects of teaching.

❏ Instruments designed to evaluate the effectiveness of your interventions provide objective information that may identify specific areas of the teaching process needing improvement.

❏ These instruments are useful because they provide specific rather than general feedback on your teaching skills.

6.1.1   Coach Evaluation Tool for Observers: Organization and Set-up

Coach:	Observer:
The set-up for 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 practised in safe conditions	Yes ( ) No ( )
During the practice, the athletes were actively engaged:	50 % of the time 30-50% of the time 30 % or less of the time

For additional information on organizing and setting up a practice session refer to section 5.4.1.

6.1.2   Coach Evaluation Tool for Observers: Active Engagement Time

Coach: _____ Observer: _____

Start of observation: _____ End: _____ Total time: _____

Code for analyzing use of time: O = organization   E = explanation   P = practice

(min) 1	2	3	4	5	6	7	8	9	10

(min) 11	12	13	14	15	16	17	18	19	20

(min) 21	22	23	24	25	26	27	28	29	30

(min) 31	32	33	34	35	36	37	38	39	40

	Total Time	**% of Time**
Observation		
Organization		
Explanation		
Practice Time		

For additional information refer to sections 5.4.3 and 5.4.4 of this Reference Material.

6.1.3   Learning Styles Questionnaire for Athletes

Instructions: Check all the boxes that correspond to your normal behaviours. Complete all three series of questions.

<table>
<tr><td align="center">Series 1</td></tr>
</table>

❏   When I have nothing else to do in the evening, I like to watch television.

❏   I need visual images to help me remember names.

❏   I like to read books and magazines.

❏   I prefer to get written instructions from my professor rather than verbal ones.

❏   I write down what I have to do.

❏   When I cook, I stick closely to the recipe.

❏   I have no difficulty putting together models or toys as long as I have written instructions.

❏   Scrabble is my favourite game.

❏   My outward appearance is important to me.

❏   I like to go to museums and exhibitions.

❏   I keep a journal and I keep a written record of what I have done.

❏   I often look at the photos and works of art used in advertisements.

❏   I review for my exams by making a summary of the essential points.

❏   I find my way easily in a new place provided I have a map.

❏   I like my bedroom to be very neat and tidy.

❏   I go to see at least two films a month.

❏   I don't think much of people who are badly dressed.

❏   I like to watch people.

❏   I always get the scratches touched up and fix the broken parts on my bike.

❏   I think fresh flowers really brighten up a house or office.

Total for Series 1: _____

Series 2

❏ In the evening, when I have nothing else to do, I like to listen to music.

❏ When I need to remember someone's name, I repeat it over and over again.

❏ I like long conversations.

❏ I prefer my professor to explain something to me verbally rather than in writing.

❏ I like listening to conversations and interviews on the radio and television.

❏ I make up rhymes to help me remember things.

❏ I listen well.

❏ I prefer to keep up with the news by listening to the radio, rather than by reading about it.

❏ I talk to myself a lot.

❏ I prefer to listen to a description of a piece of equipment rather than read the directions.

❏ I don't like it when my bicycle makes strange noises (clicking, grinding, etc.).

❏ I learn a lot about a person by listening to his or her voice.

❏ I buy lots of CDs, videocassettes and DVDs.

❏ I review for my exams by reading my notes out loud or by discussing with other people.

❏ I would prefer to make an oral presentation to a class rather than write an essay on the topic.

❏ I like to go to music concerts.

❏ Sometimes, people say I talk too much.

❏ When I am in a place I don't know, I like to stop at a gas station to ask the way.

❏ I talk to my cat or dog.

❏ I solve a math problem by saying it out loud.

Total for Series 2: _____

Series 3

❏ I like physical education classes.

❏ I can recognize things by touch when my eyes are covered.

❏ I always follow the beat when I hear music.

❏ I like to live outdoors.

❏ I am well coordinated.

❏ I tend to lose weight easily.

❏ I buy clothes that feel good to touch.

❏ I like to pet animals.

❏ I physically touch people I am talking with.

❏ I learned touch-typing quickly when I was learning to type on my computer.

❏ People picked me up and touched me a lot when I was a child.

❏ I prefer to participate in a sport rather than watch it.

❏ I like to take a warm bath at the end of the day.

❏ I love massages.

❏ I am a good dancer.

❏ I am a member of a gym or health club.

❏ I like to get up and stretch a lot.

❏ I can tell a lot about a person by the way he or she shakes my hand.

❏ My body gets tight at the end of a hard day.

❏ I like crafts and manual labour, and I like to build things.

Total for Series 3: _____

Total for Series 1 (visual)   = _____

Total for Series 2 (auditory)   = _____

Total for Series 3 (kinesthetic)   = _____

For additional information on learning styles refer to section 5.3.

6.1.4   Preferred Learning Style Checklist for Athletes

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

Instructions

There are ten incomplete sentences and three choices for completing each sentence. Score the three choices for each sentence as they apply to you. Score (three) points for the choice that applies to you, score (two) for your second choice and (one) point for the answer that is least typical of you.

The Checklist

❑ **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.

❑ **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.

❑ **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.

❑ **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 or hit or throw things.

❑ **A happy event I would like to experience 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, acting, surfing or a sports event.

❏ **I prefer a teacher to...**

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

❏ **I know I talk with...**

      a. (   ) different tones of voice.
      b. (   ) my eyes and facial expressions.
      c. (   ) my hands and gestures.

❏ **If I had to remember an event so that I could record it later, I would choose to...**

      a. (   ) tell it to someone else or hear a tape recording or song about it.
      b. (   ) see pictures of it or read a description.
      c. (   ) replay it in some practice rehearsal using movements such as dance, play-acting or drills.

❏ **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.

❏ **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 the scores for your (a) choices _____ Auditory

Add up all the scores for your (b) choices _____ Visual

Add up all the scores for your (c) choices _____ Kinesthetic

Look over your scores for each style. The range should be from 10 to 30, and together they will total 60.

For additional information on preferred learning styles refer to section 5.3.

6.1.5 Vocabulary Tables

For additional information on preferred learning styles refer to section 5.3.3.

The following pages contain lists of words preferred by people with different learning styles. You can use the information in these lists to find suggestions for the most appropriate words or phrases to use with each type of learner.

Vocabulary for the Visual Learner

Verbs

notice	look at	look at	show
shine	clarify	distinguish	visualize
light up	lighten	hide	catch sight of
imagine	discern	illustrate	mark out
paint	depict	observe	appear
seem	discover	expose	scan
inspect	fix	glow	sparkle
blaze	illuminate	dazzle	

Adjectives

remarkable	dark	luminous	somber
brilliant	light	blurred	vague
clear	lucid	imaginative	clairvoyant
picturesque	cloudy	spectacular	coloured
deep	far-sighted	hazy	outlined
loud	obscure	obvious	distinct
expressive	limpid		

Adverbs

brilliantly	expressively	distinctly	vaguely
clearly	lucidly		

Nouns

remark	perspective	look	objective
burst	clarity	graph	illusion
snapshot	sharpness	point of view	imagination
clairvoyance	screen	cloud	spectacle
painting	observation	forecast	image
aspect	view	panorama	discovery

Expressions

see life through rose-coloured glasses	take your bearings
take stock of	before your very eyes
open your eyes wide	scattered to the four winds
look furtively	face-to-face
see someone in their true colours	without a shadow of a doubt
take a close look	to the naked eye
only have eyes for	be blindingly obvious

Vocabulary for the Auditory Learner

Verbs

hear	speak	say	listen
express	harmonize	question	shout
relate	moan	sound	put into dialogue
yell	ask	cry out	burst out
amplify	mention	recount	ask about
alarm	inform	discuss	articulate
announce	declare	compose	narrate

Adjectives

harmonious	melodious	musical	discordant
solemn	oral	loud	calm
orchestrated	high-pitched	vocal	audible
talkative	dissonant	deafening	amplified
deaf	strident	piercing	nasal
shrill	muffled	hollow	

Adverbs

harmoniously	noisily	of course	in harmony
solemnly	orally	loudly	deafeningly

Nouns

harmony	dialogue	(in) tune	(out of) tune
click	question	cry	groan
listening	sound	request	shout
roar	din	word	speech
tone	discussion	voice	announcement
declaration	tonality	amplification	burst

Expressions

play a wrong note	lend an ear
whispering	have somebody's ear
hear voices	be in tune
ring true	sound false
turn a deaf ear	experience the whole gamut
echo	different version
sharp cry	put the accent
get through to	be all ears
have an earful of	bawl out
out loud	talk through your hat
burst your eardrums	overhear

Vocabulary for the Kinesthetic Learner

Verbs

soften	sensitize	touch	firm up
soothe	warm up	move	solidify
feel	cool down	shock	weigh down
relax	contact	shake	hit
break	irritate	press	carry
seize	grab	flatter	boost

Adjectives

soft	relaxed	concrete	firm
sensitive	insensitive	tender	solid
gentle	warm	cold	heavy
light	tepid	shocking	touching
trying	ticklish	agitated	striking
brittle	irritable	pressing	moving

Adverbs

softly	in contact with	concretely	firmly
sensitively	insensitively	tenderly	solidly
gently	warmly	coldly	heavily

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Nouns

softness	feeling	contact	firmness
sensitivity	insensitivity	tenderness	solidity
gentleness	warmth	coldness	heaviness
lightness	mildness	shock	test
contact	agitation	blow	breakage
irritation	pressure	movement	emotion

Expressions

have good sense	have your feet on the ground
be open-handed	take to heart
pretty as a picture	have a good nose
put your finger on	make an impression
come to blows	be fed up
get on your nerves	fuel your arguments
get caught up in	cry your eyes out
be a stickler for principles	get on your high horse
come out of your shell	stand on your own two feet
be as meek as a lamb	
look as if butter wouldn't melt in your mouth	

6.2 Teaching and Learning: Self-Assessment

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

6.2.1 Self-Assessment Sheet

The aim of this self-assessment is to rate your ability to use effective teaching methods to optimize athletes' learning. For each statement presented below, circle the number that best represents whether you achieve the statement (Never, Sometimes, Often, Always).

I make my teaching as effective as possible by…	Never	Some-times	Often	Always
Having a practice plan to follow	1	2	3	4
Ensuring that my practices achieve the goals identified in my practice plan	1	2	3	4
Having an introduction and a conclusion in each practice	1	2	3	4
Providing suitable warm-up and cool-down activities	1	2	3	4
Making sure that the main segment of a practice includes activities that help athletes learn	1	2	3	4
Ensuring that equipment is available and ready to use	1	2	3	4
Using space and equipment effectively to enhance activity	1	2	3	4
Providing breaks for recovery and hydration	1	2	3	4
Greeting my athletes as they arrive at practice	1	2	3	4

Choosing activities that contribute to the development of skills, tactics or athletic abilities	1	2	3	4
Making the best use of practice time and making sure that athletes are active most of the time	1	2	3	4
Sequencing practice activities so they enhance learning or specific training effects	1	2	3	4
Modifying practice activities as required to deal with context-specific circumstances or logistics (e.g. weather, timing, resources, etc.)	1	2	3	4
Adapting practice activities as required to challenge athletes appropriately	1	2	3	4
Adjusting practices as required after observing athlete's performance	1	2	3	4
I encourage athletes' learning by…	**Never**	**Some-times**	**Often**	**Always**
Creating opportunities to interact with all athletes	1	2	3	4
Ensuring athletes are positioned appropriately to see and hear demonstrations	1	2	3	4
Having 1 to 3 key learning points in my explanations	1	2	3	4
Explaining key factors or teaching points and making sure athletes understand those factors or points	1	2	3	4
Choosing key teaching points that are appropriate for the athlete's age and stage of athletic development	1	2	3	4
Constructively reinforcing athletes' efforts and correcting performance	1	2	3	4

Providing feedback and instructions that clearly identifiy what and how to improve	1	2	3	4
Providing feedback that is positive, specific and directed toward both the group and individuals	1	2	3	4
Establishing appropriate expectations for athlete behavior and reinforcing these expectations when appropriate	1	2	3	4
Modelling and promoting a positive image of the sport to athletes and other stakeholders	1	2	3	4
Speaking respectfully to athletes	1	2	3	4
Maintaining a positive outlook and acknowledging athletes' needs and thoughts	1	2	3	4
Explaining things clearly and concisely and providing opportunities for athletes to ask questions	1	2	3	4
Modelling desired performance myself or having other athletes do so	1	2	3	4
Knowing when to promote critical thinking by withholding feedback from the athlete	1	2	3	4
Asking questions to facilitate awareness and promote critical thinking	1	2	3	4
Getting athletes to focus on external cues or on the expected effects of a movement rather than focus on internal cues or internal aspects of the movement	1	2	3	4
Integrating decision-making into each practice and teaching athletes basic decision-making	1	2	3	4

Integrating mental-preparation strategies into practices	1	2	3	4
Using a variety of interventions to reach as many learning styles as possible (auditory, visual, kinesthetic)	1	2	3	4
Emphasizing independent thinking and problem-solving	1	2	3	4
Encouraging calculated risks in accordance with the NCCP Code of Ethics	1	2	3	4

DATE:_____

REFERENCES

Coaching Association of Canada, *Teaching and Learning*, Version 1.1, 2007.

This section on Athlete Support complements the information provided in section 8 of your NCCP Introduction to Community Coaching Reference Material, section 8 of your Community Coaching Reference Material and section 6 of your Learning to Train (Dryland) Reference Material.

7.1   Team Management

As athletes grow their needs change. For program leaders this means more factors to consider and more responsibilities. A program that includes hikes, camps, travel to competitions in other communities and overnight trips also requires a support group of helpers, risk management guidelines, rules, disciplinary policies and some serious planning.

As a coach, you play a critical role in meeting your athletes' needs, not just in the structure and organization of the program but also in creating a healthy team environment. Whatever the goals of your team, the best outcomes will occur if the team works well together.

Effective team management is therefore an essential component of a successful sport program.

The best results can be obtained if all team members display the following four characteristics: loyalty, commitment, punctuality and respect. Long after the results are forgotten, athletes will remember what it was like to be part of a "real team".

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Team Support

The task of coaching athletes is big enough without the coach having to undertake all the other tasks that go with providing a comprehensive and meaningful program. In order to provide the best possible support for your athletes, you will require both a program specific support group and an effective coordination strategy with the other program areas in your club (e.g. grooming and tracksetting, marketing, public relations, fundraising and other athlete development programs). For more information on developing a successful team, refer to section 8 of the NCCP Introduction to Community Coaching Reference Material, section 1.2 of the Learning to Train (Dryland) Reference Material and section 1.2 of this document.

Team Policies and Procedures

A good team environment evolves through common activities, team identification and both formal and informal rules, including rules for behaviour. Your club may already have in place all the policies and procedures you require. If not, it is important for you to develop your own. As a minimum, basic risk management policies should be in place before your program gets underway. The following highlights some key points with respect to this aspect of team management:

❏ Establish standards of behaviour, team rules and risk management policies (e.g. roller skiing policy) in writing. With respect to developing team rules and a code of behaviour, you may wish to include input from your athletes.

❏ Establish policies and procedures for implementing the above (e.g. penalties for infractions and procedures for applying disciplinary action).

❏ Check the Cross Country Canada website for the Club Directory, and search the club websites for examples of existing cross-country ski club policies.

❏ Check the "Centre for Sport and the Law" website or a similar source for advice on how to develop your policies.

❏ Ensure that your athletes (and their parents) are aware of the team policies, team rules and the behaviour that is expected of them.

❏ Inform the athletes of the consequences of non-compliance.

❏ Watch for non-compliance and react quickly and appropriately when it does occur.

❏ Apply the rules and impose the appropriate penalty for breaking the rules.

❏ Adapt quickly in order to maintain control of the group at all times.

7.1.1 Example Club Policy: Code of Conduct

Bear Claw Cross-Country Ski Club Code of Conduct

This Code of Conduct has been developed to ensure the safety and well-being of all Club members and to provide guidelines for the Club, coaches, athletes and parents involved in the Club's activities.

Members of the Bear Claw Cross-Country Ski Club participate in training, local races and travelling to out-of-town training events and competitions. Club members represent:

❏ themselves as individuals;

❏ the Club;

❏ the sport of cross-country skiing; and,

❏ the community.

Expected Behaviours

❏ Athletes, coaches, parents and chaperones will demonstrate respect for fellow team members, coaches, parents, officials, chaperones, members of the public and the coaches and athletes of other teams.

❏ Club members will display courtesy and appreciation for the efforts of other people.

❏ Coaches, parents and chaperones will respect the dignity of the athletes in their care, recognizing the inherent power imbalance in the relationship so as not to abuse it.

❏ Athletes will direct unresolved complaints about others to their coaches, chaperones or parents for assistance.

Inappropriate Behaviours

The Club considers the following behaviours to be unacceptable:

❏ Violation of the Criminal Code.

❏ Failure to comply with stated rules or curfews set by coaches and/or chaperones.

❏ Underage use of alcohol or tobacco, or the use of drugs other then those prescribed by a physician.

❏ Bullying of fellow Club members or members of other teams. For the purposes of this Code of Conduct, bullying is defined as physically, mentally or emotionally abusing another person for personal satisfaction and to feel a sense of empowerment over another. It can be in a direct form, such as teasing or taunting, or an indirect form such as spreading rumours.

❏ Other behaviours considered as inappropriate by the Club or its coaches and/or chaperone.

Disciplinary Panel

Athletes, coaches, parents and chaperones who demonstrate a lack of respect for others, or who behave inappropriately, will attend a discussion with a disciplinary panel.

The disciplinary panel will be comprised of a coach, a Club executive member (who is not the parent of the athlete) and another member of the Club who is of the age of majority.

The athlete, coach, parent or chaperone whose behaviour is under examination may attend the discussion with a personal representative.

One of the Club coaches will notify the parents of athletes involved in one of these situations.

The decisions of the disciplinary panel may include consequences such as, but not limited to, the following:

❏ Suspension from practice sessions, team competitions or coaching support.

❏ Discussion with parents/guardians about immediately returning the athlete home at the expense of the parents/guardians or, in the case of coaches, parents or chaperones, at the expense of the coach, parent or chaperone.

❏ Dismissal from the Club.

Specific Guidelines Related to Club Trips and Travelling

Club members who participate in Club trips will communicate closely with their coaches and/or the trip organizers in order to be well-informed, personally organized and self-reliant. They will also adhere to the following rules when living, training or competing away from home:

❏ Attend all team meetings or negotiate alternatives with the coach.

❏ Respect others' needs and requests for privacy, rest and sleep.

❏ Check with coaches or chaperones when leaving the location of the group. Athletes 12 years of age and younger will not leave the accommodation or competition area unless accompanied by a chaperone, coach or designated older athlete. Athletes 13 to 18 years of age, inclusive must travel in groups of two or more.

If athletes are billeted, they will be able to phone their coaches or chaperones at any time. All concerns or problems regarding accommodation arrangements, including billets, must be discussed as soon as possible with a coach or chaperone.

Agreement

I have read and understand the above and I agree to respect the Bear Claw Cross-Country Ski Club Code of Conduct.

Athlete Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____

Coach Signature: _____ Date: _____

7.1.2   Example Club Policy: Travel

Bear Claw Cross-Country Ski Club Travel Policy

Competition Calendar and Expression of Interest

❏ Each fall, the Club Head Coach will recommend to the Board of Directors (BOD), for their approval, a list of the competitions the Club should attend that season. Only BOD-approved competitions will be eligible for financial support from the Club.

❏ A Travel Grant Application Form listing the trips eligible for financial support, estimated costs, athlete eligibility requirements and any other relevant information will be handed out at the parent/athlete fall information session.

❏ The Travel Grant Application Form will include a deadline for applications plus the option of indicating an expression of interest or a commitment. This will allow the Club to begin making travel arrangements for the approved competitions. However, an athlete's indication of an expression of interest does not mean that he/she will be obligated to make the trip.

Eligibility for Competitions Other Than the National Championships

❏ Members of Junior (13 to 18 years of age) and Senior (19 years of age and older) racing teams will be eligible to attend and receive travel support to the Provincial Cup Series and the Provincial Winter Games.

❏ Members of the Track Attack and Jackrabbit programs will be eligible for travel support to one Ski Tournament, one Provincial Cup, the Provincial Midget Championships and the Provincial Winter Games.

Eligibility for Canadian Cross-Country Ski Championships

❏ Athletes meeting one or more of the following criteria will be eligible to receive travel support from the Club to attend the National Championships:

✓ Member of the Provincial Ski Team or Provincial Development Squad.

✓ Member of a National Ski Team program.

✓ Member of a National Training Centre program.

✓ Recommended by the Club Head Coach and approved by the BOD.

Travel Booking

❏ As soon as the deadline for confirmation has passed and athletes traveling are confirmed (or signed up early), travel bookings will be made. At that time, a deposit of the total cost of transportation (e.g. plane fare, bus) will be required and will be due within two weeks.

❏ If an athlete does not travel, his/her deposit will be retained for any fees that were not recoverable. Usually a credit to the airline will be issued. However, for example, Air Canada charges $145.00 to change tickets.

Final Payment

❏ After the trip, the actual costs will be quickly calculated and a final invoice will be issued within one week. This invoice will reflect the TOTAL cost of the trip with no Club support. Payment is due IN FULL within two weeks of the date of the invoice.

Club Support for Club Trips to Competitions

❏ Refer to the Bear Claw Cross-Country Ski Club Fundraising Policy for details about fundraising and travel support requirements.

❏ Disbursements for travel support to BOD-approved events based on an athlete's "fundraising credits" will be made either in March or when the athlete has accumulated the number of fundraising credits necessary for "full" support.

❏ For every trip after an athlete has credit for "full" support, the full amount will NOT be required after the trip, but only the difference between the amount already paid as a deposit and the total owing based on the Club's contribution of up to 50%.

❏ For all BOD-approved events, including those events to which there is no formal Club support for travel, with the approval of the Head Coach athletes may use frequent flier or similar programs for their flights to and from an event. When doing so, the athlete (or their parent/guardian) will be completely responsible for ground transportation to the Club team's place of accommodation. Athletes under 18 must be accompanied by an adult or have booked their travel to coincide with the itinerary of an adult Club member. In these situations, the Club will reimburse athletes 50% of their allotted support for the recognized cost of an equivalent airfare (i.e. the lowest cost airfare for a Club member going to the same competition). For example, an athlete who has acquired the maximum level of support of 50% through fundraising would be reimbursed 50% of 50% (i.e. 25%) of the recognized cost of that airfare. Reimbursement for a $600 equivalent airfare would be $150.

Coaching Support for Club Trips to Competitions

❏ The coach-to-athlete ratio for travel for athletes 18 years of age and younger is 1:5.

❏ The coach-to-athlete ratio for travel for senior athletes (19 years of age and older) is 1:7.

❏ Designated "Parent Helpers" may also be utilized at the discretion of the Head Coach.

❏ The cost of all travel, accommodations and food for the coaches will be shared by the athletes. Coaches will be provided a $30/day food allowance. In the case of designated Parent Helpers, the Helpers will be responsible for their own travel costs, but not for vehicle rental or accommodation, as they are often needed for driving.

❏ The Head Coach has the discretion to add extra coaches or designate Parent Helpers above the coach-to-athlete ratio minimums for trips where more supervision or support is needed.

Other

❏ Athletes must sign a current Bear Claw Cross-Country Ski Club Code of Conduct before traveling with the Club.

❏ In advance of a Club trip, a Trip Notice (information sheet) will be distributed. The notice will include the location, hotel phone number, races dates/times/distances, what to bring, etc.

❏ If there are any changes in the status of an athlete's travel plans, the Travel Committee must be advised immediately.

❏ If an athlete cannot pay the trip fee, the Travel Committee must be advised immediately.

Travel Committee

Members of the Travel Committee for the current year are:

❏ James White (xxx-xxxx) - Chair.

❏ Dennis Black (xxx-xxxx).

❏ Amy Brown (xxx-xxxx).

7.1.3 Example Club Policy: Fundraising

Bear Claw Cross-Country Ski Club Fundraising Policy

General

Bear Claw Cross-Country Ski Club offers a number of programs for athletes of all ages. Much of the support provided to these programs is only possible through Club fundraising activities. Without these fundraising efforts, Bear Claw Cross-Country Ski Club would not be able to provide quality coaching support, waxing support for various races, training equipment and other benefits for its members. Accordingly, all Club members are encouraged to support Club fundraising. Fundraising activities include such things as "product" sales (e.g. chocolate bars, raffle tickets, perogies) and volunteer activities (such as trail runs).

Fundraising Credits for Travel Support

No minimum number of fundraising credits is required in order for a Club program member to seek and receive travel support.

Only events that are on the Club Board of Directors' list of approved events for a given competitive season will be eligible for travel support during the same competitive season. "Full" travel support for a Club program member attending an approved event is defined as up to 50% of the allowable expenses incurred for travel. In order for a Club member to obtain "full" travel support, he/she will be required to earn a total of ten fundraising credits during the corresponding competitive season.

Several options are available to Club program members in order to achieve their required fundraising credits. These fundraising options currently include:

❏ Bingos - one credit for each bingo worked. There is typically one bingo per month at the Bear Claw Community Bingo site.

❏ Firewood - one credit for each three-hour wood cutting/splitting/selling session worked.

❏ Ski Lessons - one credit for every two hours of Club-sanctioned instruction provided.

❏ Coaching - credits will be given for coaching as per the Club's Coaching Support Policy.

Based on the number of fundraising credits accumulated by a Club program member during a competitive season, travel costs (i.e. accommodations, transportation and meals) will be reimbursed on a pro-rated basis as determined annually by the Board of Directors, up to the "full" support limit of 50%. For example, a full 50% reimbursement may be received if all ten fundraising credits are earned. Families with three or more participants need to complete up to 10 fundraising credits per program member in order that each family member, individually, may be eligible to receive travel support.

Contacts

Contact persons for fundraising activities for the current year are as follows:

❏   Bingos – Tom Brown (xxx-xxxx).

❏   Firewood – Tim Green (xxx-xxxx).

❏   Product Sales – Tracy White (xxx-xxxx).

❏   Ski Lessons – Mary Black (xxx-xxxx).

7.1.4   Example Club Policy: Screening

Bear Claw Cross-Country Ski Club Screening Policy

Preamble

The Bear Claw Cross-Country Ski Club (BCCCSC) offers programs for athletes of all ages and promotes skill development, enjoyment, competition and ethical conduct amongst its members. In order to be successful in its efforts, it is vital that the Club can provide a safe and secure environment for its membership. The purpose of this screening policy is to support that secure environment by ensuring, to the extent possible, that BCCCSC volunteers and paid personnel who may work with vulnerable persons are subjected to a process of "screening" to ensure the safety of participants.

It is well-established in common law that organizations providing programs and services to vulnerable persons have an obligation to take reasonable steps to ensure their safety and well-being. While there was previously some debate about whether or not there was a legal duty to "screen", today there is widespread agreement that such a duty exists. In other words, screening has become an element of risk management, and the organization that doesn't carry out some form of screening is likely failing to meet the reasonable standard of care that the law, and the community, expects of them.

The intent of this policy and the associated requirements is not to cast doubt on the quality and conduct of volunteers and paid staff engaged by the BCCCSC. The focus of the policy is on the positions that create risk, because of the demands and exposure of the position to vulnerable participants.

Definitions

❏   **Junior Athletes.** All BCCCSC members or participants in programs or activities run or sponsored by BCCCSC who have not yet passed their 19th birthday.

❏   **Police Records Check.** The process of securing information from the police about individuals, as well as to describe the form or report in which information is provided. It may include a check of national or local and regional police records. At the end of the process, a report is

issued. The report may simply identify whether or not someone has a criminal record, or it may provide details of actual offences.

❏ **Position of Trust.** A position of trust identifies a situation in which someone is placed in a position of authority over another person in an ongoing relationship. A position of trust implies that someone has some degree of power over another and that the relationship is unequal. Individuals in positions of trust may be family members, friends, caregivers, volunteers, or employees. A position of trust identifies a situation which may be considered risky because of the demands of the position.

❏ **Screening.** Screening is a series of initiatives and protective mechanisms which, when utilized, minimize the potential for abuse or injury. These mechanisms include:

✓ the requirement to submit a formal application form to BCCCSC by individuals seeking to serve in a "position of trust" on a volunteer or paid basis;

✓ the use of interviews by a member or members of BCCCSC's Board of Directors of individuals seeking to serve in a "position of trust" on a volunteer or paid basis;

✓ the use of reference checks for such positions;

✓ the use of Police Record Checks or other background checks by BCCCSC; and,

✓ the use of risk management or risk mitigation measures aimed at reducing the risks inherent in certain relationships.

❏ **Vulnerable Person.** Volunteer Canada uses this term to denote individuals who have difficulty protecting themselves and are therefore at greater risk of harm. People may be vulnerable because of age, disability or handicap, or circumstances. Vulnerability may be a temporary or a permanent condition.

This is purposely a broad definition, one that can include children, teens, senior citizens, people with physical, developmental, social, emotional, or other disabilities, as well as people who are victims of crime or harm.

"Vulnerable person" will also include people who have been victims of crime or accident, or are otherwise left with little defense against those who would harm them.

With respect to BCCCSC activities, "vulnerable persons" are generally junior athletes 18 years of age or younger. There may, however, be cases where the BCCCSC's membership or Club activities include participants who are vulnerable through some physical or developmental disability.

General Policy Regarding Screening

❏ Given the normal range of activities in which the BCCCSC engages, particularly its focus on the participation of children and teens and the development of high performance athletes, the situations that pose risk are those which involve the interaction of adults (e.g., paid or volunteer coaches, assistant coaches, designated parent helpers, responsible adults) with these athletes.

❏ In order to provide a safe and secure environment for its members and to serve to reduce or eliminate risk, the BCCCSC has adopted the following measures as best practices:

✓ For all levels of junior athlete instructional or training activities, including Bunnyrabbit, Jackrabbit and Track Attack, every training or lesson group is accompanied by at least two coaches; or a coach and at least one other designated, responsible adult.

✓ All junior athlete instructional and training activities are based on a published schedule or, in the case of sessions arranged via the "snow phone" or e-mail, by a broadcast schedule/itinerary, with known and predictable locations, destinations and return times.

✓ For "local" activities or events involving overnight stays, to which junior athletes travel via personal/parental vehicles and/or highway coach, and stay in the company of paid or volunteer coaches, assistant coaches, designated parent helpers or junior athletes' parents, the designated lead coach for the event will be supported by a sufficient number of adults, including both male and female adults where junior athletes of both genders are involved. In any case, all such overnight stays will be supervised/accompanied by at least two adults. Examples of this type of club activity or event currently include dryland and on-snow Club training camps, out-of-town competitions where the majority of Club members, coaches, designated parent helpers and junior athletes' parents travel to the races by a Club-hired highway coach.

✓ For all overnight trips involving junior athletes, at least one adult of each gender will be included in the team management group (coaches, assistant coaches, apprentice coaches, designated parent helpers) where the athletes are of both genders; where the junior athletes are all of the same gender, then at least one of the team management group will be of that gender (where this is impossible in the case of small teams, arrangements will be made with other teams attending the same event to share such supervisory roles).

✓ Coaches (or other team management group members) will avoid to the extent possible being alone in the same room with an individual junior athlete when in lodging facilities and, in all such cases, the door of the room will be kept open.

❏ These measures can considerably mitigate risk in what otherwise might be low-to-medium risk situations. There is, however, a considerable difference between a short-duration, limited-intensity activity such as a typical SDP or junior athlete dryland/on-snow training session, and the far longer and more intense relationships that are normal in junior athlete racing environments. The BCCCSC takes the position that the cut-off above which a position should be considered "high-risk" is when that position may be responsible for leading or accompanying a group of junior athletes on an overnight "away" trip to a camp or competition.

❏ Characteristics of "high-risk" positions are those where the incumbents:

✓ are frequently alone with an athlete who has not yet passed his/her 19th birthday, or with other vulnerable participants, such as people with certain disabilities;

✓ are in a position of significant power over junior athletes or other participants; and

✓ travel out-of-town, away from the supervision of parents/guardians of junior athletes.

❏ It follows that the positions of head coach, coach, assistant coach, apprentice coach and designated parent helper, all of whom are likely to travel with junior athletes on overnight "away" trips, should be considered as high-risk positions. Similarly, persons who may serve in any of these positions, but do not travel with junior athletes on "away" trips, may also be required to fulfill the screening procedures listed below, particularly where such roles are seen as "permanent" (e.g., season-long) appointments, rather than occasional assignments.

Specific Application of Screening Policy

With respect to Club-delivered activities and those attended by the BCCCSC's junior athletes under the direct supervision of the Club's coach(es), the BCCCSC has adopted the following policies:

❏ All coaches (i.e. head coach, coach, assistant coach, apprentice coach), designated parent helpers and SDP program leaders (Bunnyrabbit, Jackrabbit, and Track Attack), whether paid or unpaid, will be subject to the following screening requirements:

    ✓ submission of a written application;

    ✓ an interview and reference checks by a member (or members) of the Board of Directors (where applicants are not well known to a member (or members) of the Board of Directors); and

    ✓ provision of a completed Police Records Check.

❏ Those Club coaches (i.e. head coach, coach, assistant coach, apprentice coach) and designated parent helpers, whether paid or unpaid, who are most likely to be supervising the Club's junior athletes during "away" camps or competitions involving travel by aircraft (i.e. Provincial/Territorial Cup races, Provincial/Territorial Winter Games, Provincial/Territorial Midget Championships) will be required to have a current (i.e. less than three years old) Police Records Check on file with the Club.

7.2 Planning Your Competition Schedule

Competitions are an integral part of a progressive club athlete development system. To assist you in developing a stage-appropriate competition plan for your program, the following table (section 7.2.1) has been provided. This exercise builds on what you learned in Step 6 in the L2T (Dryland) workshop by looking at the competition schedule in more detail.

7.2.1 Developing a Competition Plan for Your Team (working copy)

Age Range: _____11_____ # Boys: _____4_____ # Girls: _____5_____

Month	December				January					February				March				
Day = Monday	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31
Low-Key Mid-week Club "Fun" Races (e.g. Chocolate Series)																		
Club Time Trials																		
RR - Ski Tournaments																		
RR - Double Cross																		
RR - Team Sprints																		
Club Races (e.g. Club Champs; Club Costume Relays**)**																		
Regional Cups																		
Provincial/Territorial Midget Champs																		
Provincial/Arctic Winter Games																		
Provincial/Territorial Cups/Champs																		
Others																		

Example Competition Plan for the L2T Stage of Development

Age Range: _____11_____   # Boys: _____4_____   # Girls: _____5_____

Month	December				January					February				March				
Day = Monday	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31
Low-Key Mid-week Club "Fun" Races (e.g. Chocolate Series)	X				X					X			X					
Club Time Trials																		
RR - Ski Tournaments							X											
RR - Double Cross									X									
RR - Team Sprints																		
Club Races (e.g. Club Champs; Club Costume Relays**)**																X		
Regional Cups		X																
Provincial/Territorial Midget Champs											X							
Provincial/Arctic Winter Games															X			
Provincial/Territorial Cups/Champs																		
Others																		

Competitions with a strong "team" component

Notes:

❏ The circles indicate the two major competitions of the season – two or three days of activities each, plus travel.

❏ The two "Racing Rocks (RR)" activities will each be one day events and held either locally or within the region (not more than two hours from home).

❏ The Regional Cup race will be a one day event held 2.5 hours from home.

❏ All other races will be held locally. Only the Club Race (year-end Club Championships) will be a full day event – the others will be low-key evening activities.

❏ The Ski Tournament and Midget Championships both include sprint races that are not more than 100 metres in length.

❏ The Club Championships, Provincial Winter Games, Midget Championships and Ski Tournament all include traditional relay events.

❏ Example "Low-Key Club Fun Race":

The Chocolate Series. This is a fun, low cost event that meets the competitive and non-competitive needs of young and old and requires little preparation or volunteer effort. The cost to enter is a Loonie. Formats can vary, and different formats can have their own name – such as Chocolate Chase, Chocolate Moose or Chocolate Sprint. The Sprint race requires one volunteer; the other events require only a large display clock. The clock provides the count-down and start and the skiers record their own times which they can read off the display clock when they cross the line. The reward at the end is a chocolate bar. Another variation is the Chocolate Find – an orienteering event that takes skiers out onto the club trail system.

7.2.2   Competition Model

Optimal competition calendar planning at all stages is critical to athlete development. At certain stages, development of physical capacities takes precedence over competition, and at other stages the ability to compete becomes the focus. Competition schedules should therefore be selected by the coach and athlete based on the athletes' developmental needs.

A long-term athlete development plan means a system of training and competition that is optimized for the abilities of athletes during the various developmental stages. The following factors should be considered when planning:

❏ Optimal training-to-competition ratios should be the objective for all stages of athlete development.

❏ At the L2T stage, an insufficient number of competitions (inappropriate training-to-competition ratio) will result in a lack of sport skills to build on in later stages.

❏ At all stages, the appropriate level of competition is critical to the technical, tactical and mental development of the athlete.

❏ The length and level of the competitive season should be aligned with the changing needs of the developing athlete in the LTAD progression.

❏ Early season races should be at the shorter end of the range. The maximum distance should only be used one or two times towards the end of the season.

❏ When deciding which races your athletes should enter, take into account the following:

✓ The format (i.e. mass start, relay, team sprint, interval start, pursuit, individual sprint).

✓ The ability and fitness of the skier.

✓ The difficulty of terrain (course profile).

✓ The elevation (altitude) of the race site.

✓ Where the athlete is in his/her age grouping – first year, second year etc.

❏ At the end of the L2T stage, girls can begin to develop their maximal oxygen consumption rate (VO2max) though racing, as they are entering a Window of Optimal Trainability (WOT)

for this performance factor. Race distances that are optimal for this stage - in order to develop VO2max - are in the range of 1.5 to 3 kms (5 - 10 minutes).

❏ Due to the longer period of pre-adolescent growth for boys (as compared to girls), it is not optimal for boys at the L2T stage to be introduced to VO2max development. Therefore most race distances for this stage should exceed three kms, so that the athletes are optimizing the WOT for aerobic capacity that corresponds to the growth phase they are in.

❏ Types of competitions that are suitable for the L2T stage of development:

    ✓ Racing Rocks! (Ski Tournaments; Double Cross; Team Sprints).

    ✓ Club Races (Club Championships; Club Costume Relays; Club "Chocolate" Relays, etc.).

    ✓ Regional Cup Races, Provincial/Territorial Midget Championships, Arctic/Provincial Winter Games, Provincial/Territorial Championships. Refer to section 3.2.1 of the NCCP L2T (Dryland) Reference Material for an overview of what a three year program of L2T stage-appropriate competitions might look like.

❏ Competitions that provide recognition and rewards for athletes for each year of birth (in the L2T stage).

❏ Windows of Optimal Trainability (WOT).

Figure 7.1: Pacific Sport Windows of Optimal Trainability (adapted from Balyi and Way, 2005)

Competition Model Chart

Stage/ Gender	Age	Major Goals for Stage of Development	Recommended Race Times and Distances	Other Considerations	Major Factors to Avoid
FUNdamentals Boys	(5)-6-7-8	• FUN • Skill development • Speed 1 (≤ 5 sec.)	5 to 10 min (0.5 to 1.5 km) **Total** = 4 - 6 races/ season	• Adapt race distances to race "time" guidelines for the age grouping • Include some "legs only" events • Use varied terrain; include some unconventional settings (i.e. obstacle courses; terrain parks) • Include a variety of race formats (i.e. relays; mass starts); creative elements (i.e. costumes; changes of equipment) (mostly club and regional races) • Ideally the race experience should be half a day (mostly club and regional races) • As much as possible, limit travel to races • Introduce competition in a team environment whenever possible • Begin racing after Christmas • Athletes 5-(6) years old (Active Start) should receive participation awards such as a ribbon • Athletes (6)-8 (FUNdamentals): acknowledge achievements/results for each YOB (medals, ribbons, etc.); recognition awards for all participants is encouraged	• Anaerobic (capacity and power) efforts • Terrain extremes (i.e. long or steep hills; all flat)
FUNdamentals Girls	(5)-6-7-8	• FUN • Skill development • Speed (1 ≤ 5 sec.)	5 to 10 min (0.5 to 1.5 km) **Total** = 4 - 6 races/ season	• Adapt race distances to race "time" guidelines for the age grouping • Include some "legs only" events • Use varied terrain; include some unconventional settings (i.e. obstacle courses; terrain parks) • Include a variety of race formats (i.e. relays; mass starts); creative elements (i.e. costumes; changes of equipment) (mostly club and regional races) • Ideally the race experience should be half a day (mostly club and regional races) • As much as possible, limit travel to races	• Anaerobic (capacity and power) efforts • Terrain extremes (i.e. long or steep hills; all flat)

				• Anaerobic (capacity and power) efforts • Terrain extremes (i.e. long or steep hills; all flat)
L2T Boys	9-10-11-(12)	• Fun • Skill development • Introduce strength using body weight • Athlete can race at high speed with good technique	**Distance:** 5 to 20 min (1 - 3 km) **Sprints:** 100m or ≤ 20 sec. (at the end of this stage) **Total** = 6 – 8 races/ season	• Focus on "fun" events that emphasize team effort and skills (i.e. Ski Tournaments) • Adapt race distances to the "time" guidelines for the age grouping • Include a variety of race formats (i.e. relays; mass starts); creative elements (i.e. costumes; changes of equipment) • Use varied terrain; include some unconventional settings (i.e. obstacle courses; terrain parks) • Include some Double Poling and "legs only" events (at shorter distances) • Emphasize the importance of skill development through recognition and rewards • Use slightly declining slope for sprint races to develop speed and balance • Ideally the race experience should be half a day, with only 1-2 key events being one day. Club, Regional Cup and Provincial/Territorial Cup races (when held within region) • As much as possible, limit long distance travel to races • Competitive focus should be on personal improvement, and in a team environment • Basic rules are learned • Generally begin racing after Christmas • Acknowledge achievements/results for each YOB (medals, ribbons, etc.)

Additional notes (upper section):

• Introduce competition in a team environment whenever possible
• Begin racing after Christmas
• Athletes 5-(6) years old (Active Start) should receive participation awards such as a ribbon
• Athletes (6)-8 (FUNdamentals): acknowledge achievements/results for each YOB (medals, ribbons, etc.); recognition awards for all participants is encouraged

Stage/ Gender	Age	Major Goals for Stage of Development	Recommended Race Times and Distances	Other Considerations	Major Factors to Avoid
L2T Girls	(8)-9-10-(11)	• FUN • Skill development • Introduce strength using body weight • Athlete can race at high speed with good technique	**Distance:** 5 - 20 min (1 - 3 km) **Sprints:** 100m or ≤ 20 sec. (at the end of this stage) **Total = 6 - 8 races**	• Focus on "fun" events that emphasize team effort and skills (i.e. Ski Tournaments) • Adapt race distances to the "time" guidelines for the age grouping • Include a variety of race formats (i.e. relays; mass starts); creative elements (i.e. costumes; changes of equipment) • Use varied terrain; include some unconventional settings (i.e. obstacle courses; terrain parks) • Include some Double Poling and "legs only" events (at shorter distances) • Emphasize the importance of skill development through recognition and rewards • Use slightly declining slope for sprint races to develop speed and balance • Ideally the race experience should be half a day, with only 1-2 key events being one day. Club, Regional Cup and Provincial/Territorial Cup races (when held within region) • As much as possible, limit long distance travel to races • Competitive focus should be on personal improvement, and in a team environment • Basic rules are learned • Generally begin racing after Christmas • Acknowledge achievements/results for each YOB (medals, ribbons, etc.)	• Anaerobic (capacity and power) efforts • Terrain extremes (i.e. long or steep hills; all flat)

Stage/ Gender	Age	Major Goals for Stage of Development	Recommended Race Times and Distances	Other Considerations	Major Factors to Avoid
T2T – 1 Boys	(12)-13-(14)	• FUN • Skill development • Aerobic capacity • Speed 2 (≤ 20 sec.) • Strength using body weight • Develop tactics: tracking, sprints, etc. • Athletes compete to win and do their best, but the major training focus is on refining technique skills • Athletes train in competitive situations several times a week (practice matches, competitive drills and games)	**Sprints:** 100m or ≤ 20 sec. **Distance:** (3 - 7.5 km) 2 races @ 3 km 5 races @ 5 km 1-2 races @ 7.5 km mass start at end of season **Total**: 2 Sprint + 8 Distance = 10 races	• Adapt race distances to the "time" guidelines for the age grouping • Use all the official race formats • Continue to include a few "fun" events that emphasize team effort and skills • Use slightly declining slope for sprint races to develop speed and balance • Emphasize personal improvement and personal best • Begin racing mid-December • Compete in Regional Cup and Provincial/Territorial Cup Series, Provincial/Territorial Games, Easter/Western Canadian Championships • Begin to narrow the competitive focus to two sports • Acknowledge achievements/results for each YOB (medals, ribbons, etc.)	• Anaerobic (capacity and power) efforts • Terrain extremes (i.e. long or steep hills; all flat)

Stage/ Gender	Age	Major Goals for Stage of Development	Recommended Race Times and Distances	Other Considerations	Major Factors to Avoid
T2T – 1 Girls	(11)–12- (13)	• FUN • Skill development • Aerobic capacity • Maximal aerobic power • Speed 2 (≤ 20 sec.) • Strength using body weight • Develop tactics: tracking, sprints, etc. • Athletes compete to win and do their best, but the major training focus is on refining technique skills • Athletes train in competitive situations several times a week (practice matches, competitive drills and games)	**Sprints:** 100m or ≤ 20 sec. **Distance:** (1.5 - 7.5 km) 5 races @ 1.5-3 km 2 races @ 5 km 1-2 races @ 7.5 km mass start at end of season **Total:** 2 Sprint + 8 Distance = 10 races	• Adapt race distances to the "time" guidelines for the age grouping • Use all the official race formats • Continue to include a few "fun" events that emphasize team effort and skills • Use slightly declining slope for sprint races to develop speed and balance • Emphasize personal improvement and personal best • Begin racing mid-December • Compete in Regional Cup and Provincial/Territorial Cup Series, Provincial/Territorial Games, Easter/Western Canadian Championships • Begin to narrow the competitive focus to two sports • Acknowledge achievements/results for each YOB (medals, ribbons, etc.)	• Terrain extremes (i.e. long or steep hills; all flat)

Notes:

☐ Age is defined as "the age of a child as of the December 31st that is part of the current ski season".

☐ "T2T – 1" refers to the first part of the Training to Train stage of athlete development.

☐ The guidelines above refer to competitions that are held on snow.

7.3   Preparing for a Competition

Ideally your club will determine its competition schedule long before the season begins – i.e. which races the club will be hosting (big or small), which out-of-town events the (whole) club team will attend and which events the club plans to send a specific group of athletes to, such as a Provincial/Territorial Midget Championships. This kind of early planning allows program leaders the opportunity to inform athletes, parents, coaches and other helpers of the dates and approximate costs well in advance, and is essential for optimal participation and support.

7.3.1   Planning Ahead

Planning considerations for a successful trip would include the following:

❏ Informing all involved, at the start of the season, of the dates, type of event and approximate cost.

❏ Recruiting your support team and providing them with some information as to what their duties will be – preferably in writing. Refer to section 7.4 for more information.

❏ Developing a budget.

❏ Preparing your athletes for the types of events in which they will be competing. For example, if the competition includes a traditional relay, then you may wish to practise relay exchanges, teach how to "read" relay bibs and discuss the rules that pertain specifically to relays.

❏ Acquiring and becoming familiar with the Race Notice.

❏ Arranging for accommodations, a place to wax and store ski equipment at the hotel, meals that the team will be coordinating, transportation to and from your home community and the community hosting the event, etc.

❏ Preparing a trip notice with the information that parents need - accommodations, key phone numbers, a what-to-bring list for their child/athlete, transportation arrangements, departure/ return times, plans for meals, etc.

❏ Ensuring waivers, trip payments and/or race entry fees are collected in a timely manner.

❏ Registering the athletes (correct names, correct categories and any other required information) prior to the deadline. Confirm at that time whether or not the race organizers received your registrations, regardless of the method you used to register. If you have the option of checking the final race registration list before you leave home, do so. Check it carefully and report any errors right away.

❏ Risk management: waivers, team rules, disciplinary policies and procedures, etc. Also, keep in mind that athletes in this age group require more support and supervision than older athletes do, and organizers need to plan for coach/parent support accordingly.

❏ A carefully planned rooming list.

❏ Trip evaluation forms.

❏ Developing a "to-bring" list for your team - e.g. waxing equipment (tools, wax table, etc.), waxes, waxing tent, team communication system (i.e. team radios), etc. Refer to section 2 for more detailed information.

❏ Keeping records of the above to help you plan better next time.

❏ Ensuring coach, athlete and parent "Code of Conduct" documents are read and understood before leaving for camps or out-of-town competitions.

❏ Ensuring the athletes' ski equipment is race-ready prior to attending a competition.

Coach's Competition Planning Sheet #1 (working copy)

Identify the <u>principal</u> tasks you, as a coach, are responsible for prior to, during and after a competition.

Event: _____ **Date:** _____

The Day Before:

1. _____

2. _____

3. _____

4. _____

5. _____

Pre-Race (the morning of):

1. _____

2. _____

3. _____

4. _____

5. _____

During the Race:

1. _____

2. _____

3. _____

4. _____

5. _____

Post-Race:

1. _____

2. _____

3. _____

4. _____

5. _____

7.3.2　Coach's Competition Planning Sheet #1

Identify the <u>principal</u> tasks you, as a coach, are responsible for prior to, during and after a competition.

Event: _____ **Date:** _____

The Day Before:

1. _____

2. _____

3. _____

4. _____

5. _____

Pre-Race (the morning of):

1. _____

2. _____

3. _____

4. _____

5. _____

During the Race:

1. _____

2. _____

3. _____

4. _____

5. _____

Post-Race:

1. _____

2. _____

3. _____

4. _____

5. _____

7.3.3   Athlete's Personal Race Plan

The objective of a personal race plan is to give an athlete purpose and direction, reduce tensions and prepare him/her for a competition.

The following outline has been provided as a possible handout for athletes who are interested in learning more about how to prepare for a competition. Some of your athletes may be ready for this information – others may not be interested until they are older.

Why Warm-Up?

An appropriate warm-up routine prepares you physically and mentally to execute a race to the best of your ability. It will gradually prepare you for skiing full out by getting your body's energy systems and muscles up to prime operating temperature. Points to note:

❏   your warm-up should include some hard work, but not hard enough for fatigue to set in;

❏   the timing of your warm-up is critical because you should be well warmed up for your race, but you don't want to lose the effect of the warm-up prior to the start; and

❏   your warm-up routine is part of your pre-race plan and should be monitored and improved from race to race.

Why Warm-Down?

An appropriate warm-down routine should relax tight muscles, help remove waste products from your muscles, help you recover quickly if you have another race later that day or the following day, and reduce your chances of getting sick. Point to note:

❏   if the weather is particularly cold, or if there are other indications that hypothermia could be a possibility, then it is important for you do your warm-down with another skier.

Preparing for a Race

For you, the athlete, the planning and implementation of a personal race strategy is an important component of your preparation for a competition. Each competition should be considered a learning experience - something to look forward to and an exciting challenge on the way to self-improvement! Here are some points to consider.

Pre-Race - The Day Before

The day before the competition, your main objective is to have your planning and preparations in good order so that your race day can run as smoothly as possible.

❏   When you arrive at the venue you will want to inspect your competition course, either by yourself or with team-mates that will be racing the same course. Depending on your familiarity with the site and conditions, your coach may wish to ski it with you. While checking the course, you should ski over the difficult downhill sections once or twice at race pace until

you establish a comfort level; unless the course conditions change significantly overnight, this may be the only time you will ski the course prior to the competition.

❏ At some point during the course inspection, or shortly after it is completed, you should discuss your race strategy (tactics) with your coach. Tactical decisions depend on the race format, your strengths and abilities as an athlete, the course conditions, your start position and the course distance/profile.

❏ Discuss a suitable warm-up routine with your coach. This will depend on your age, your physical fitness and the race format. For T2T and older athletes, a short "interval" should be included. At some point in time you will need to discuss and develop this procedure with your coach. Together you will learn through trial and error what works best for you.

❏ Discuss a suitable warm-down routine with your coach.

❏ The detailed club/team plan for race day (prepared by the coaches and understood by everyone on the team) is an essential part of your preparations, as is your personal race plan, and they need to be in harmony with each other in order for everything to fall into place the following day. Develop the habit of putting your plan in writing. The purpose of all this pre-race planning is to ensure that the morning of the race will be calm and well organized so that you can focus entirely on your preparations for your competition. Following the competition, you and your coach should review your personal plan and look for ways to improve it for next time.

❏ Ensure that you understand what the procedure will be for picking up your bib.

Pre-Race - The Morning of the Race

The morning of the competition your main objectives should be: (1) to be physically ready; (2) to be mentally ready; (3) to have all your equipment in good working order; and (4) to have your skis prepared properly.

❏ Follow the pre-race plan you developed the day before.

❏ Try a slow wake up run (10-15 minutes) soon after you get up in the morning. This may or may not work for you, but at some point you will need to test it out and see if it is the right thing or not.

❏ Eat appropriately. What you choose is a matter of individual preference, but keep in mind that the food you eat in the last few hours before a competition should be high in carbohydrate and low in fibre. You will need to experiment to learn what works best for you. Don't eat anything you are not used to on the morning of the race.

❏ Experiment to find out the best time for you to eat before a competition. This could be one to four hours before your start. Three important considerations to keep in mind are:

✓ don't eat a full breakfast later than three hours before start time;

✓ if you are eating just one or two hours before your start, use food in a liquid form to ensure rapid absorption; and

✓   don't eat so long before the race that you feel hungry before you start.

❏ Your coaches will give you specific instructions on when you are to arrive at the venue. Generally this will be 1.5 hours before your start time in a classic race and 1 hour before your start time in a free technique race.

❏ When you arrive, go to your team headquarters and check in with the coaches. Find out how the skis are being processed on that particular day, and when you should pick up your warm-up skis. If you are waxing your own warm-up skis, find out the recommended wax and prepare them.

❏ The timing of your warm-up is critical because you want to be well warmed-up for your event but you don't want to lose the effect prior to the start.

❏ This final pre-race period should be planned to the minute. Your warm-up routine should take your full attention and your entire focus should now be on preparing for your competition. From this point, there should be no time for anything but carrying out the plan.

❏ Follow the warm-up routine you planned with your coach the day before.

❏ You should do your warm-up routine alone so that you can be focussed on the upcoming race. Generally you would ski for about 20 minutes. You would extend this somewhat in very cold temperatures.

❏ Ensure that your warm-up is done correctly. This will become increasingly important as you get older. Senior athletes following a proper warm-up routine should be physically prepared for their event so that they are able to ski at the appropriate pace right from the start. Typically a good warm up increases the core temperature, uses muscles and techniques at the intensity level required during the event and sets the appropriate arousal level without your being fatigued at the start. If you are sweating when you finish a warm-up, you should change your toque and gloves before the start.

❏ In very cold weather, the "feeling" from the warm-up should be the same. What changes as the temperature drops is how the warm-up is done to get and maintain this "feeling". Often on a cold day you will be tempted to cut your warm-up short because you will be afraid of becoming cold. Instead, the warm-up should be long enough and intense enough for you to break into a sweat. To maintain this warmed up state, you need to minimize the amount of time you are in damp or wet clothing. In these conditions a well prepared athlete will put on dry gloves/mitts, underwear, hat (and perhaps socks) after the warm-up and before the start.

❏ Your warm-up routine should end about ten minutes prior to your start. Return to your team headquarters for your race skis. Test the wax out briefly before going to ski marking. Check that everything is in perfect order. This includes a final equipment check.

❏ Proceed through ski marking. This should take place approximately five minutes before the start.

❏ Once you are in the holding area you should do some dynamic exercises. You may also wish to jog or ski. It is important for you to keep warm and loose.

❏   It is important to concentrate on the start of the race. By keeping your focus on the start and the race process, you should be able to control anxiety effectively.

❏   You should enter the start gate relaxed and sweating lightly; your heart rate should be above its resting values.

❏   Your warm-up routine is an essential part of your pre-race plan. Evaluate it and improve on it from race to race.

Post-Race

The main objective of the period immediately following the competition is to ensure a good recovery.

❏   One of your team coaches should be at the finish line to meet you. If you would like him/her to have your recovery drink, snack or something else you need immediately following your race, plan for this ahead of time.

❏   Change your toque, gloves and other wet clothing as soon as you have completed your event and before you do your warm-down.

❏   You should begin your warm-down routine as soon as possible.

❏   Go for an easy ski (approximately 10 to 20 minutes). If the weather is particularly cold or if there is any other indication that hypothermia could be a possibility, then it is important for you do your warm-down with another skier.

❏   For the best recovery, warm down at low zone one (approximate heart rate of 120).

❏   Note: you should not stretch for at least three hours following the end of your event.

❏   Within 15 minutes of the race, consume some high carbohydrate sport drink with protein and begin snacking on foods that will quickly replace the depleted fuel and nutrients from your system. The recovery drink should be at room temperature.

❏   The replacement of fluid is a high priority during the first hour after a competition; snacking should continue over a three to four hour period.

❏   Snacks should be selected from foods that are high on the glycemic index (the measure of how quickly foods are converted into fuel the body can use is called the "glycemic index"). This would include bagels, oatmeal, etc.

To better prepare for future competitions, you and your coach should analyze your race and determine whether you achieved the goals you had set. It is from this evaluation that you can develop a better strategy for next time.

7.3.4   Athlete's Pre-Race Planning Sheet (example #1)

Athlete Name: _____

Check List:

- ❏ Skis
- ❏ Poles
- ❏ Gloves
- ❏ Recovery Drink
- ❏ Boots
- ❏ Clothing Change
- ❏ Toque
- ❏ Extra Food

Time Before Race Start	Activity	Notes
180 min		
150 min		
120 min		
100 min		
80 min	Pick up warm-up skis	Warm-up skis are waxed
60 min	Test warm-up skis	Give feedback on wax to coaches
40 min	Pick up race skis	Race skis should be prepared (target)
35 min		
30 min		
25 min		
20 min		

15 min		
14 min		
13 min		
12 min		
11 min		
10 min	Check in at ski marking	
9 min		
8 min		
7 min		
6 min		
5 min		
4 min		
3 min		
2 min		
1 min		
Start		

Athlete's Pre-Race Planning Sheet (example #2)

Name: _____

Goals (organization, warm-up, technique, etc.)

1) _____

2) _____

Plan - Evening Before Race

❏ Good supper

❏ Team meeting

❏ Wax skis

❏ Talk to my coach and finalize my personal plan for race day

❏ Pack equipment and clothing

❏ Go to bed early at _____

Plan - Race Day:

❏ Get up at _____

❏ Eat a healthy breakfast

❏ Leave for the race site at _____

❏ Go to team headquarters and check in with the coaches when I arrive at the venue

❏ Test my skis as per instructions from the coaches

❏ Check if I need to change my clothing, go to the bathroom or have a snack

❏ Ski my warm-up routine as discussed with my coach

❏ Arrive at the start area ten minutes before my start time

❏ Start at _____

❏ Ski hard, but with the focus on good technique

❏ Behave fairly towards other competitors

❏ Feel proud of myself

❏ Replace fluid and begin snacking within 15 minutes of the finish of my race

❏ Change clothes as necessary before doing my warm-down

❏ Ski ten minutes in a slow, easy warm-down with my ski-friends

❏ Cheer for my team mates and other competitors

❏ Talk about my race to my coach

❏ Pack up my personal belongings

❏ Thank one of the race volunteers for hosting the event

7.3.5   Athlete's Warm-Up Plan (example)

My start time is: __11:22____. I will start my warm-up routine at: _10:45_____

Time	Activity	Comments
10:45	Skiing	15 minutes of "Endurance" skiing
11:00	Skiing	2-3 minutes of "Intensity" skiing
11:03	Skiing	4-5 short sprints at 5 seconds each
11:04	Skiing	4 minutes "Easy" skiing
11:08	Changing clothes	Change to dry clothing if needed (i.e. top, toque, gloves, socks); add additional clothing (i.e. overcoat) - depending on temperature - to wear up until my start
11:12	Ski marking	Get my skis marked at the ski marking station; ten minutes prior to start
11:13	Holding area	Skiing back and forth and or doing a few dynamic exercises according to the plan I worked out with my coach
11: 18	Removing unnecessary clothing	Remove warm-ups four minutes before my start; if the weather is cold, keep my jacket around my shoulders until just prior to my start
11:22	Starting my race	Follow my race strategy as discussed with my coach

Notes:

❏   I can only retain the benefit of my warm-up routine for a maximum of ten minutes.

❏   Prior to the start I can keep warm by moving and wearing clothing suitable for the weather/ temperature.

7.3.6   Athlete's Warm-Down Plan (example)

Time	Activity	Comments
	Meet up with team coach in finish area	Pick up my recovery drink and snack as soon as I finish my race; begin drinking and eating within 15 minutes
	Pick up my clothes	Pick up my clothing from the coach and/or the station where the race officials have put them
	Change my clothes	Change out of my wet clothing
	Start warm-down	As soon as possible
	Ski	10 to 20 minutes easy "Easy" skiing
	Leave for home/hotel	Pack up and take all of my personal belongings with me when I leave

Notes:

❏ The reason I warm-down in Zone 1 is to get the best recovery.

❏ I should consume some high carbohydrate sport drink with protein within 15 minutes of the finish of my race. The drink should be at room temperature.

❏ I should begin snacking on foods that will quickly replace the depleted fuel and nutrients from my system within 15 minutes of the finish of my race. My snacks should be selected from foods that are high on the glycemic index (bagels, muffins, oatmeal, etc.).

❏ The replacement of fluid is a high priority during the first hour after my race; snacking should continue over a three to four hour period.

❏ I should not stretch for at least three hours following my event.

7.3.7   Athlete's Race Evaluation Form

1. Discuss my race goals with my coach and write them below:

    _____

    _____

    _____

    _____

    _____

    _____

    _____

2. Compete in my race.

3. At the finish line, briefly discuss my race with my coach (i.e. "Two Stars and a Wish").

4. Follow my race warm down plan.

5. Later in the day meet with my coach (and possibly my team mates as well) to review the race. Discuss:

    a.) my Two Stars and a Wish" for the race I just completed;

    b.) whether or not I achieved my race goals (why? why not?);

    c.) what I might want to change next time;

    d.) my overall thoughts and feelings about my race; and

    e.) feedback from my coach.

6. Record one key point I would like to remember for next time:

    _____

    _____

    _____

    _____

    _____

    _____

    _____

7.3.8   Coach's Competition Planning Sheet #2

For each race day, coaches should have a detailed, written plan with timelines. Your plan should include: transportation to and from the race site; moving equipment to and from the race site; wax testing; preparing the skis; picking up and handing out bibs; meals; some one-on-one time with your athletes; athlete support up to the start line, during the race and after the race (including recovery drinks, dry clothing and snacks); debriefing with the athletes, etc.

Date: _____

Time	Task	Who

Coach's Competition Planning Sheet #2 (working copy)

For each race day, coaches should have a detailed, written plan with timelines. Your plan should include: transportation to and from the race site; moving equipment to and from the race site; wax testing; preparing the skis; picking up and handing out bibs; meals; some one-on-one time with your athletes; athlete support up to the start line, during the race and after the race (including recovery drinks, dry clothing and snacks); debriefing with the athletes, etc.

Date: _____

Time	Task	Who

7.4   Providing Support at a Competition

There are a number of things a coach and his/her support team must attend to before, during and after a competition to ensure that the athletes have a positive and motivating experience. Some of the tasks are administrative in nature, such as accommodations, transportation between the hotel and race site, picking up race bibs, etc. Others are technical, physical and psychological.

The objective of this section is to give you an overview of what is required for an overnight trip to a competition in another community. Note that the list that follows is just a starting point. You need to develop your own detailed list of tasks in order to provide your athletes with a good environment in which to compete.

7.4.1   Race Support Checklist

❏ Upon arrival at your accommodations, confirm the details that were arranged ahead of time.

❏ Post the rooming list on a bulletin board or the door to your room so that members of the team know where they are staying and how to find each other. This is a good place to post other team messages as well.

❏ Once the team is settled in, drive to the race site and check it out.

❏ Arrange for the athletes to ski the courses they will be competing on the following day; arrange for coaching support as needed.

❏ Find out where you would like to set up your waxing station, where the washrooms are, where the race headquarters are, what will be available for an indoor common area, what food will be available on site, suitable locations for giving splits (if needed) and where to do your ski testing.

❏ If you don't already have copies of the start list from off of the internet, find out where they are and pick some up.

❏ Return to your accommodations and prepare for dinner.

❏ Hold a "support team" meeting to discuss plans for the remainder of the evening and the following day. Possible items to cover include:

✓ curfew and follow up;

✓ wax testing: where, who, when;

✓ preparing the skis: where, who, when (both that evening and the next day); refer to section 2.3 for more detailed information;

✓ logistics and the transportation schedule to the site: where, who, when;

✓ splits: where, who, when;

✓ bibs: where, who, when;

✓ start area: when, who;

✓ finish area: when, who;

✓ recovery drink: where, who, when;

✓ back up plans for common problems, such as an athlete leaving his/her ski boots back at the hotel; and

✓ other business as required.

❑ Prepare for and hold a team meeting. This is an information meeting for all the coaches and athletes on your team. Attendance must be compulsory in order to reduce those problems that inevitably occur when some of the team are relying on second-hand information. Everyone should be asked to bring a writing pad and pen in order to record key information. If possible, use a room that is well lit and comfortable. The points covered should include:

✓ relevant points about the stadium area, including the start and finish areas;

✓ possible areas for warm-up and warm-down;

✓ a review of the race courses and race distances for each applicable category;

✓ start times for each applicable category;

✓ distribution of race bibs;

✓ the weather forecast and the implications as to what the athletes should wear and bring with them to the race site;

✓ the waxing plan for that evening, for warm-up skis and/or race skis;

✓ the waxing plan for the next day for race skis;

✓ key points from your "support team" meeting; and

✓ the race day schedule – when and how do the race skis get to the competition site, when and from where does the team leave for the competition site, when does it return to the hotel, when is the next team meeting, etc.

Team meetings should be short and to the point. Specific and individual questions should be addressed one-on-one after the meeting is over.

❑ Discuss personal (individual) race plans with your athletes, including warm-up and warm-down routines.

❑ Ensure your athletes have completed a pre-race plan for the next day.

❑ Complete the team's detailed plan for the next day.

❑ Prepare skis.

❑ On race day, carry out the Team's race day plan.

❑ If time permits, stand along the competition course at critical points and provide verbal encouragement and technique tips as your athletes pass by.

❑ One of your support team should be checking the results board periodically throughout the event to make sure there are no errors with the timing; if there are, the race officials should be notified so that they can make the necessary corrections.

❏ Talk to each of your athletes after the race.

❏ Thank the race officials for putting on the race.

❏ Pack up and return to your accommodations.

❏ Debrief with your support team.

Coaching Tip: On race day your main objective is to ensure that your athletes: are physically and mentally ready, have their skis waxed properly, and have their equipment in good working order.

7.5   Parents and Competition

Parents play a pivotal role in determining whether or not their child has a positive learning experience when he/she takes part in a competition. It is therefore worthwhile for you and the other coaches in your club to develop a strategy for introducing new parents to some guidelines for successful sport parenting. The following tools have been provided to assist you.

Ten Commandments for Sport Parents

1.   Do not impose your ambitions on your child.

2.   Be supportive, no matter what.

3.   Encourage fair play.

4.   Only have positive things to say at a competition.

5.   Acknowledge your child's fears.

6.   Do not criticize officials.

7.   Respect your child's coach.

8.   Be loyal and supportive of the team.

9.   Encourage your child to have goals other than winning.

10.   Do not expect your child to become an Olympian.

7.5.1   How To Be a Successful Sport Parent

If parents want their children to come out of their sport experience as winners (feeling good about themselves and having a healthy attitude towards sport), they need to help! Parents are a vital and important part of the coach-athlete-parent team. If they do their job correctly and play their position well, then their children will learn the sport faster, perform better, really have fun and have their self-esteem enhanced as a result. Their sport experience will serve as a positive model for them to follow as they approach other challenges and obstacles throughout life. If parents "drop the ball" or run the wrong way with it, their children will stop learning, will experience performance difficulties and blocks, and will begin to really hate the sport. And that's the good news! Further, parents' relationships with their children will probably suffer significantly. As a result, children will come out of this experience burdened with feelings of failure, inadequacy and low self-esteem - feelings that will generalize to other areas in their lives. Children and their coaches need parents ON the team. They can't win – in every meaning of the word - otherwise!

The following is a list of useful facts, guidelines and strategies for parents to use to become more skilled in the "children and sport" game. Remember, no one wins unless everyone wins. Parents are needed on the team!

❏ **Stress process (skill acquisition, mastery and having fun), not outcome.** When athletes choke under pressure and perform far below their potential, a very common cause of this is a focus on the outcome of the performance, i.e. win/lose, instead of the process. In any peak performance, the athlete is totally oblivious to the outcome and instead is completely absorbed in the here and now of the actual performance. An outcome focus will almost always distract and tighten up the athlete, thereby insuring a bad performance. Furthermore, focusing on the outcome, which is completely out of the athlete's control, will raise his/her anxiety to a performance inhibiting level. So, if parents truly want their children to win, they should help get their focus away from how important the contest is and onto the task at hand. Supportive parents de-emphasize winning and instead stress learning the skills and playing the game.

❏ **Avoid comparisons and respect developmental differences.** Supportive parents do not use other athletes that their child competes against to compare and thus evaluate their own child's progress. Comparisons are useless, inaccurate and potentially destructive. Each child matures differently, and the process of comparison ignores the significant distorting effects of developmental differences. For example, two 12-year-old boys may only have their age in common! One may physically have the build and perform like a 16 year old, while the other, a late developer, may have the physical size and attributes of a nine year old. Performance comparisons can prematurely turn off otherwise talented athletes on their sport. The only value of comparisons is in teaching. If a child demonstrates proper technique, that child can be used comparatively – but as a model only!

❏ **When defined the right way, competition in sport is both good and healthy and teaches children a variety of important life skills**. The word "compete" comes from the Latin words "com" and "petere", which mean together and seeking respectively. The true definition of competition is a seeking TOGETHER, where the opponent is a partner, not the enemy! The better the opponent performs, the more chance an athlete has of having a peak performance. Sport is about learning to deal with challenges and obstacles. Without a worthy opponent and without any challenges, sport is not as much fun. The greater the challenge, the better the opportunity athletes have to go beyond their limits. World records are consistently broken and set at the Olympics because the best athletes in the world are "seeking together" and challenging each other to enhanced performance. Children should never be taught to view their opponents as the "bad guys", the enemy or someone to be hated and "destroyed". Parents must never model this attitude!! Instead, they should talk to and make friends with the parents of their children's opponents. Root for great performances and good plays – not just for the winner!

❏ **Children should be encouraged to compete against themselves**. The ultimate goal of the sport experience is to challenge oneself and continually improve. At this age, judging improvement by winning and losing is both an unfair and inaccurate measure. Winning in sports is about doing the best YOU can do, an issue that is separate from the outcome or the performance of one's opponents. Children should be encouraged to compete against their own potential, i.e. "the Peter and Patty Potential". That is, the boys should focus on

beating "Peter" (competing against themselves) while the girls challenge "Patty." When children have this focus and compete to better themselves instead of beating someone else, they will be more relaxed, have more fun and therefore perform better.

❏ **Success and failure should not be defined in terms of winning and losing**. As a corollary to the point above, one of the main purposes of a child's sport experience is skill acquisition and mastery. When a child or team performs to his/her potential and loses, it is unacceptable for a parent to focus on the outcome and be critical. On the contrary, if a child or team tries their very best and loses, the parent should encourage them to feel successful! Similarly, when a child or team performs far below their potential but wins, they should not be encouraged to think they were successful. Parents should help their children make the important distinction between success and failure and winning and losing. Remember, if parents define success and failure in terms of winning and losing, they are playing a losing game with their children!

❏ **Help make sport fun for your child**. It is a time proven principle of peak performance that the more fun athletes are having, the more they will learn and the better they will perform. Fun must be present for peak performance to happen at every level of sport participant, from children to world-class competitors! When children stop having fun and begin to dread practice or competition, it's time for parents to become concerned! When the sport or game becomes too serious, athletes have a tendency to burn out and become susceptible to repetitive performance problems. An easy rule of thumb for a parent is: *if your child is not enjoying what he/she is doing or loving the heck out of it – investigate!* What is going on that is preventing him/her from having fun? Is it the coaching? The pressure? Is it YOU??! Parents should keep in mind that being in a highly competitive program does not mean that there isn't room for fun. Children who continue to play after the fun is gone will soon become a drop-out statistic.

❏ **Be supportive, do not mix the roles of coach and parent!** A parent's role on the parent-coach-athlete team is as a Support player with a capital S!! Parents need to be their children's best fan. Unconditionally!!! They should leave the coaching and instruction to the coaches. Rather, they should provide encouragement, support, empathy, transportation, money, help with fund-raisers, etc., but……they shouldn't coach if that is not their designated (agreed by the coach) role! Most parents who get into trouble with their children do so because they forget the important role that parents play. Coaching can interfere with the parents' important roles as supporters and fans. The last thing children need or want to hear from their parents after a disappointing performance or loss is what they did technically or strategically wrong. Parents should keep their role as a parent separate from that of coach, and if they are in the position where they are coaching their own children, they should be diligent about maintaining this separation of roles. In the start area, on the course, or during the post-race debriefing, they should say "'now I'm talking to you as a coach". At home, they should say, "'now I'm talking to you as a parent". The rule is: parents shouldn't parent when they coach, and shouldn't coach at home when they're supposed to be parenting.

❏ **Remember the importance of self-esteem in all of your interactions with your child-athlete.** Athletes of all ages and levels perform in direct relationship to how they feel about themselves. When children are in an athletic environment that boosts their self-esteem,

they will learn faster, enjoy themselves more and perform better under competitive pressure. One thing all children want, and never stop wanting, is to be loved and accepted and to have their parents feel good about what they do. This is how self-esteem is established. If parents' interactions with their children make them feel good about themselves, they will, in turn, learn to treat themselves the same way. This does not mean that parents should incongruently compliment their children for a great effort after they just performed miserably. In this situation, being empathetic and sensitive to their feelings is what is called for. Self-esteem makes the world go round. If parents help their children feel good about themselves they will give them a gift that will last a lifetime. They should never interact with them in a way that assaults their self-esteem by degrading, embarrassing or humiliating them. If parents continually put children down or minimize their accomplishments, not only will the children learn to do this to themselves throughout their life, but they will also repeat this mistake with their own children!

❏ **Give your child the gift of failure**. If parents really want their children to be as happy and successful as possible in everything that they do, they should teach them how to fail! The most successful people in and out of sports do two things differently than everyone else. First, they are more willing to take risks - and therefore fail more frequently. Second, they use their failures in a positive way as a source of motivation and feedback to improve. Our society is generally negative and teaches us that failure is bad, a cause for humiliation and embarrassment, and something to be avoided at all costs. Fear of failure or humiliation causes one to be tentative and non-active. In fact, most performance blocks and poor performances are a direct result of athletes being preoccupied with failing or messing up. No one learns to walk without falling enough times that they learn how. Each time that you fall your body gets valuable information on how to do it better. You can't be successful or have peak performances if you are concerned with losing or failing. If parents teach their children how to view setbacks, mistakes and risk-taking positively, they will give them the key to a lifetime of success. Failure is the perfect steppingstone to success.

❏ **Challenge – don't threaten**. Many parents directly or indirectly use guilt and threats as a way to "motivate" their children to perform better. Performance studies clearly indicate that while threats may provide short-term results, the long-term costs in terms of psychological health and performance are devastating. Using fear as a motivator is probably one of the worst dynamics that parents can set up with their children. Threats take the fun out of performance and directly lead to children performing terribly. Implicit in a threat, (do this or else!) is a parents' own anxiety that they do not believe their children are capable. Communicating this lack of belief, even indirectly, is further devastating to the children's performance. A challenge does not entail loss or negative consequences should the athlete fail. Further, implicit in a challenge is the empowering belief, "I think that you can do it".

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SECTION 8 – TECHNIQUE DEVELOPMENT - CLASSIC

This section on teaching classic and downhill technique complements the information provided in section 4 of the Community Coaching Reference Material, and is directed primarily at supporting you in your role as a coach working with children in the Learning to Train (L2T) stage of development.

8.1   Teaching Classic and Downhill Technique

Note: In order to understand and apply effectively the material in this section, coaches should have a sound working knowledge of the information presented earlier in section 3.1 regarding key concepts and terminology and section 3.2.1 regarding the Laws of Nature. In addition, the material entitled *"General Considerations for Teaching Technique"* (from section 4 of this manual) is reprinted below for your convenience.

General Considerations for Teaching Technique (Both Skating and Classic)

One of the most important goals of the L2T stage of development is for athletes to refine all of the cross-country skiing techniques, becoming proficient in each of them. Following are some key considerations for coaches to keep in mind to help athletes achieve this.

❏ It is essential to have a good understanding of the elements of proper technique in order to teach and evaluate technique effectively.

❏ It is essential to have frequent, regular and properly structured opportunities to teach technique to your athletes.

❏ Skiing fast must not be the initial objective. Focus first on teaching proper body positioning, body movements and timing – which, when executed correctly and together, produce rhythm. Ensure that your athletes have acquired the characteristic rhythm of a technique before emphasizing the generation of power and speed.

❏ In order to truly perfect technique, athletes must develop an accurate kinaesthetic sense – an instinctive feeling for what is efficient – so that they are able to continuously and reflexively adapt their movements to be optimal, even when fatigued or in the pressure of competition. Developing this acute kinaesthetic sense is best achieved by exposing athletes to a variety of stimuli. The following approaches to learning and training are applicable to this process:

✓ Techniques should be practised on a variety of snow and track conditions. Once the mechanics of technique have been learned in a teaching situation, athletes should be required to practise in wet and mild conditions, on hard tracks and in soft powder snow so that they can learn how to adjust their technique to the different situations. Moreover, skiing in less than ideal conditions (e.g. on tracks that weren't set following a light snowfall) will help them develop balance and agility.

✓ As well as practising technique in a variety of snow and track conditions, athletes should practise technique on different types of ski trails. For example, modern ski trails and competition courses are often built like "super highways", but skiing on less manicured

trails that twist and turn is important in order for athletes to improve their agility on skis and learn to change techniques reflexively as the trail requires.

✓ Participating in year-round activities that require relevant technical abilities (balance, coordination, rhythm, etc.) will also help to develop the desired kinaesthetic sense.

❏ Athletes should do some of their technique practice without poles. This will help them refine their balance skills and the timing of their leg actions and weight shift. This is especially important early in the season, when athletes first get on snow. However, skiing without poles also serves to remind athletes of some of the underlying fundamentals of sound technique and should therefore be included in practices periodically throughout the season.

❏ The balance and agility drills provided in the Community Coaching Reference Material (section 4) should be a part of every practice session.

❏ Most athletes require frequent and consistent feedback on their performance in order to ensure technique improvement occurs. To assist with this, coaches are strongly encouraged to use video cameras to provide on-snow analysis and feedback (section 3.3) and to develop good observation, intervention and feedback skills to maximize teaching effectiveness (section 5.4). In the latter context, it is extremely advantageous for coaches to periodically ski behind each of their athletes for several kilometres of mixed trail conditions, as this will permit them to provide immediate feedback on technique beyond the relatively constrained view that is available on a training grid, from a fixed camera point or from a split station during a competition.

❏ It is important for athletes to see examples of good technique, so they can create a mental picture of what they are aiming to achieve. To this end coaches should work on upgrading their own technique, as they are key role models for their athletes.

❏ When competing, athletes need to use the techniques that will give them optimal speed in the given terrain and snow conditions. Fitness obviously affects when and where a specific technique is used, but adapting the technique to the terrain is very important as well. Competitive skiers must therefore learn to analyse both the course profile and the prevailing snow and track conditions in order to determine how to best ski the trail. In addition they need to learn how to maintain momentum when switching from one technique to another. Choosing the best technique for a given situation means using the one that is optimal for a certain speed.

Characteristics of the "Best" Skiers

❏ The "big three" characteristics are the following:

✓ Good balance.

✓ Good weight shift.

✓ Good rhythm (i.e. correct body positioning, body movements and timing).

❏ Other important characteristics are as follows:

✓ Good forward movement – "gains lots of ground".

✓ Generates and maintains momentum – "keeps the wheels turning".

✓ Good at creating force in the direction of travel – not up, down or sideways.

✓ Good at changing technique to match terrain, snow and track conditions.

✓ Good physical condition.

✓ Good kinaesthetic feel.

Key Considerations Specific to Teaching Classic Technique

❏ The Teaching Points provided later in this section outline the key elements that make up each classic technique. It is recommended that coaches analyse the classic technique skills of the athletes in their group at the beginning of the season and, based on this evaluation, develop an individualized "classic technique plan" for each. These plans will be useful in determining the focus of the technique sessions for the whole group as well as in guiding your advice to individual athletes throughout the season.

❏ The learning curve for classic techniques is different than for skating techniques. At a basic level, classic techniques are easier to execute than skating techniques. However, they are also more difficult to execute well, in that there are many nuances to the essential body positions and movements that are required, particularly for Diagonal Stride. Somewhat simplistically, executing classic techniques correctly invariably requires finesse, while in skating a skier who is physically strong may be able to compensate for technique deficiencies. Overall, the process of refining – let alone perfecting – classic techniques is typically longer than for skating techniques, so coaches and skiers must be prepared to be patient.

❏ Classic techniques are further complicated by the additional variables of wax effectiveness and weather dependency. It is difficult and frustrating for a skier to learn good classic technique if his/her wax is not working well. Therefore, it is important for both coaches and athletes to become competent in waxing for the full spectrum of conditions. At the same time, regardless of the effort put into wax selection, there will inevitably be days when wax performance will be less than perfect – and occasionally downright bad. Athletes must accept that such days are part of skiing and learn to persevere, recognizing that good technique will enable them to get the best results possible in difficult conditions.

❏ There is a particular premium on good weight shift and balance in classic skiing, in that classic technique is executed in a narrow track and thus within the constraints of a relatively narrow base of support. Good weight shift is essential for sustaining forward momentum, establishing the body position needed for good balance and facilitating good wax performance at critical points in several classic techniques. Good balance is essential for enabling a skier to glide on a single ski in a variety of different snow and track conditions. Frequent practice without poles is an effective way for skiers to improve their capabilities in these key components of technique.
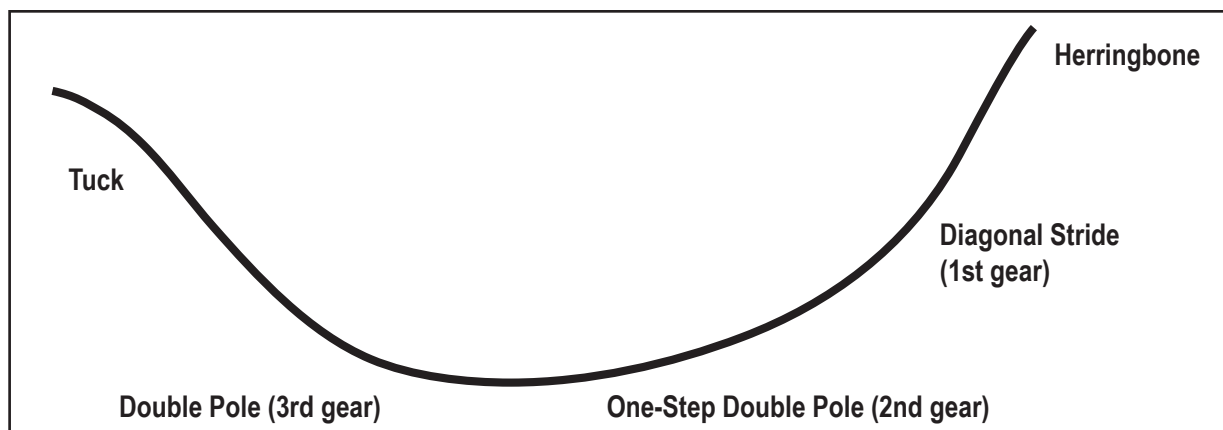
8.2   Classic Techniques

This section presents detailed information on the classic techniques as follows: Diagonal Stride, One-Step Double Pole and Double Pole. Some general information is also provided on Herringbone, but this technique is not treated in the same depth as other techniques since it has much in common with Diagonal Stride as regards body movements and positioning.

In this section, classic techniques are equated to "gears" (analogous to gears in a vehicle) which give an indication of the relative speed of a skier when using each of the techniques. This is illustrated in Figure 8.1.

Figure 8.1: Classic Technique "Gears"

The gear analogy gives an indication of the relative speed of a skier when using them. Thus, classic techniques are described as follows:

❏ **Herringbone** – a sub-gear (as with the Diagonal Skate technique in the skating context). When the slope of a hill becomes very steep, there may be a point where the skier cannot ascend further using Diagonal Stride as the wax will no longer grip. At this point the skier will resort to the Herringbone technique to maintain forward movement up the hill. In the Herringbone, the skier angles the skis out to the side in a "V" in order to maintain grip, but the upper body movements and weight shift are the same as for Diagonal Stride.

✓ Herringbone is an essential technique for recreational skiers, as an energy-efficient means to climb steeper hills.

✓ In a racing context in which ski trails are properly designed, a competent and fit skier with properly waxed skis may not need to resort to using Herringbone to climb hills. While this approach is correct in principle, practicality dictates that there are situations where Herringbone will still be used. This will certainly be the case when grip waxes fail to work due to difficult conditions or a poor wax selection decision. In addition, Herringbone may be used more frequently by younger skiers whose fitness or technique ability may not permit a relatively steep hill to be climbed using Diagonal Stride. As well, more proficient skiers may need to use Herringbone when faced by a particularly steep grade on a race

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course. Ultimately, when the situation dictates (i.e. continuing to climb while executing Diagonal Stride technique correctly is impossible), Herringbone must be used.

✓ Apart from the racing scenarios described above, many or most skiers will continue to find the Herringbone to be of value when training. When training in the lower zones/intensities, skiers should attempt to use Diagonal Stride technique for hill-climbing to the extent possible. However, they will sometimes find it expedient to climb steeper sections of the course using Herringbone in order to keep their heart rate within the specified parameters for the zone in which the training is taking place.

✓ As noted previously, this manual will not cover Herringbone in depth. Nevertheless, coaches should ensure that when Herringbone is being used by their athletes, the technique is being executed correctly. On steeper slopes, well-executed Herringbone technique is only marginally slower than Diagonal Stride; poorly executed Herringbone is simply walking up a steep hill without back-slipping. Points to emphasize for good Herringbone technique include the following:

• The weight is transferred dynamically from ski to ski, maintaining a high tempo and good rhythm. See Figure 8.2.

• The hips must remain high and forward. See Figure 8.3. A forward hip position serves to facilitate forward momentum and helps make the wax work by keeping the skier's weight over the wax pocket. However, excessive forward body lean takes the weight off the skis and leads to back-slip.

Figure 8.2   Figure 8.3

• The "V" placement of the skis should be as narrow as possible. As the hill gets steeper, the "V" becomes wider.

• The skier should land on a flat ski to the extent possible, in order to permit the wax to work, but may need to edge the ski to apply pressure on the inner edge of the skis on particularly steep slopes and difficult snow conditions. In principle, it is preferable to improve traction by widening the "V" than by edging the skis.

• The poling action is rapid and close to the body. The pole is used both for push and to prevent back-slip.

❏ **Diagonal Stride** – 1st gear (see section 8.2.1).

❏ **One-Step Double Pole** – 2nd gear (see section 8.2.3).

❏ **Double Pole** – 3rd gear (see section 8.2.2).

The material provided in the following sections will provide you with comprehensive information on the various classic techniques, together with recommendations on how to teach them. Classic Technique Checklists are summarized in section 8.2.4.

The technique descriptions in this manual are appropriate for distance races and for recreational skiing. Note that experienced ski racers may make minor modifications to classic techniques for sprint competitions in order to be more dynamic and explosive. These modifications can be executed for relatively short distances and/or races of short duration only.

Ski technique and our understanding of it are constantly evolving – sometimes quickly. This material articulates the most current doctrine and will be updated periodically as changes occur.

8.2.1   Diagonal Stride (1st Gear)

Purpose

The Diagonal Stride, or 1st gear, is the classic technique that is used as follows:

❏   in a racing context – on most uphills; and

❏   in a recreational context – on flat terrain and gradual uphills.

The technical ability, fitness and strength of the skier will dictate the actual terrain in which Diagonal Stride will be used. The firmness and speed of the track and the evenness of the terrain will determine where a transition to another technique becomes necessary.

For both racers and recreational skiers, the Diagonal Stride is used on uphill sections of a ski trail with the exception of very steep uphills. As the slope gets steeper and glide shortens or ceases, the execution of the Diagonal Stride must be modified to improve its effectiveness in these circumstances. When the hill becomes too steep to be climbed using Diagonal Stride, the skier must switch to Herringbone to obtain better traction and maintain forward momentum (Herringbone technique was discussed briefly in section 8.2).

Mechanics

The Diagonal Stride technique comprises the same rhythmic arm and leg movements used in walking and running. This basic striding action is such that diagonally opposite arms and legs move forward and backward at the same time.

The Diagonal Stride is composed of a number of interconnected body movements, the synergistic effect of which far exceeds the effect of the individual components. To achieve this effect, the skier must not only move through certain body positions but also move continuously, smoothly and powerfully through the stride cycle.

A complete cycle of Diagonal Stride is depicted at Figure 8.4.

Figure 8.4: Complete Cycle of Diagonal Stride Technique

To successfully teach this technique, the coach must understand the stride cycle and the phases within it. A complete Diagonal Stride cycle consists of two identical but opposite stride sequences:

❏ the right leg stride sequence – comprised of:

   ✓ a left leg push and consequent glide action of the right leg; and

   ✓ a supporting pull/push with the left pole.

❏ the left leg stride sequence – comprised of:

   ✓ a right leg push and consequent glide action of the left leg; and

   ✓ a supporting pull/push with the right pole.

The major component of the power generated in the Diagonal Stride comes from the leg movements in each stride sequence. The supporting poling action integral to each stride sequence adds additional power and provides linkage/continuity between stride sequences. **The essence of Diagonal Stride is to fluidly and rhythmically integrate the propulsion derived from the cyclical leg-arm-leg-arm action – the entire cycle being supported and enhanced by a dynamic weight shift and precise body positioning, movements and timing.**

A complete and properly timed weight shift from one ski to another is even more important in classic technique than in skating. In addition to contributing to forward momentum, it is necessary for effective wax performance at critical points in the technique.

As the skier is at all times supported by only a single leg, good balance – derived in large part from correct body positioning – is a critical element of the technique. Proper weight shift and good balance go hand-in-hand; one cannot occur without the other.

For the purposes of analysing and describing the technique, a stride sequence of Diagonal Stride (i.e. half of a cycle) can be viewed as consisting of three phases: the leg push phase; the unassisted glide phase; and the pole-assisted glide phase. The following description is of a right leg stride sequence:

❏ **The Leg Push Phase.** The first phase, featuring the left leg push, begins when the skier's right leg (i.e. the recovery leg) is moving forward and about to pass beside the gliding/supporting leg (this may be viewed as the Ready Position for Diagonal Stride). The phase finishes just as the pushing foot leaves the snow. The majority of propulsive force in the Diagonal Stride technique – as much as 80% – is generated in this phase. Figures 8.5.1 and 8.5.2 depict the start and finish of the leg push phase.

Figure 8.5.1

Figure 8.5.2

✓ At the start of the phase, the skier has most of his/her weight forward on the pushing foot (i.e. the old gliding/supporting ski). There is a good bend at the ankle, with the hip lined up over the front of the foot, and the upper body is inclined forward. The hip, knee and ankle joints are angled similarly (see Figure 8.5.1). The weight-forward, flexed position is a powerful starting position that helps to ensure efficient movement down the track.

✓ As the recovery (right) leg is swung forcefully forward and the new gliding ski is placed on the snow, the left leg push begins and continues until the pushing foot leaves the snow. The leg push must follow biomechanical principles laid out in section 3.2. To be effective, the hip, knee and ankle joints should contribute to the leg push in that order, constituting a sequential but very rapid and explosive movement. The hip muscles work first, then the thigh muscles start straightening the knee midway through the hip action and the calf muscles begin extending the ankle shortly thereafter.

✓ The angles at the hip, knee and ankle joints should open up (i.e. the leg should straighten) as much as possible before the pushing leg leaves the snow. The leg push should be thought of as a pushing action on the snow and backwards with the ball of the foot. The leg push should be executed quickly and effectively so that power is transferred quickly to the snow, the wax pocket of the pushing ski is compressed (allowing the grip wax to work) and a resulting glide is created.

✓ Weight transfer occurs progressively throughout this phase. Initially the majority of weight is on the pushing (left) leg. The skier's upper body begins to shift diagonally across the track toward the right side as the recovery leg swings forward. The weight shift becomes more dominant as the new gliding/supporting ski touches the snow forward of the pushing foot and is completed as the pushing foot and majority of the ski leave the snow.

✓ During this phase, the skier's hips rotate slightly. The left hip opens to the rear at the end of the leg push to facilitate the follow-through of the pushing leg. The right hip wraps forward slightly as the weight shift is completed, to permit the skier to be positioned with weight balanced over the gliding/supporting ski.

✓ At the beginning of this phase, the poling arm is in mid-thrust, with the poling hand yet to pass the leg. During the phase, the hand continues the pull/push to the rear, passing close to the leg. The pole thrust ends shortly after the hand passes the leg. The hand relaxes, with force on the pole towards the end of the phase being maintained largely through hand pressure on the pole strap.

✓ Concurrently, the pole on the push leg side is in mid-recovery, with the poling hand already well forward past the leg as the phase begins. The pole is inclined well to the rear and the arm is slightly flexed at the elbow. The recovery is not fully completed during this phase.

✓ At the end of the leg-push phase, the forward lean of the upper body and the full extension of the push leg are such that a straight line is formed from the skier's shoulder to the toe just as the pushing foot leaves the snow.

❏ **The Unassisted Glide Phase**. The second phase of the Diagonal Stride is called the unassisted glide phase. It begins when the pushing (left) leg leaves the snow (Figure 8.6.1) and ends with the pole plant of the same side pole (Figure 8.6.2). No propulsive force is generated in this phase. The objectives of the phase are to maintain a good balanced gliding position and position the body for the pole thrust which occurs in the next phase.

Figure 8.6.1   Figure 8.6.2

✓ To maintain the gliding action, the skier keeps his/her weight entirely on the gliding/supporting foot (i.e. the right foot), with the weight distributed comfortably across the

whole foot. The gliding leg continues to straighten as the skier's body moves up and over the gliding foot, though it does not reach a fully straight and locked position. The right hip remains wrapped slightly forward to facilitate proper body positioning over the gliding/supporting ski.

✓ During this phase the pushing leg completes its follow-through to the rear. The skier's hip on the pushing side remains somewhat open to facilitate the follow-through.

✓ During this phase, the pole on the push side completes its recovery motion and is planted in preparation for the pole thrust. As the pole is positioned for pole plant, the pole tip is swung forward until the pole angle is slightly less than vertical. The moderate elbow flex of the recovery motion increases noticeably, with the elbow flared very slightly to the side, putting the arm in a position to generate force effectively when the pole thrust begins. The pole tip is planted beside the track and opposite the toe of the gliding foot. Figure 8.7 depicts the skier's body position at the moment of pole plant.

Figure 8.7

✓ Concurrently, the pole on the opposite side leaves the snow and completes its follow-through to the rear. The follow through of the arm is relatively short (depending on skier velocity and glide length). The hand is relaxed with fingers extended, maintaining control over the pole through pressure on the pole strap.

❏ **The Pole-Assisted Glide Phase.** The final phase is the pole-assisted glide phase. It begins at the planting of the pole at the end of the unassisted glide phase (Figure 8.8.1) and ends with the return to the Ready Position where the legs pass one another (Figure 8.8.3). This phase serves to position the body correctly for the next leg push. In addition, the poling action within the phase provides propulsion that helps to maintain the velocity and forward momentum created by the leg push, thus lengthening the glide on each ski.

Figure 8.8.1

Figure 8.8.2

Figure 8.8.3

✓ At pole plant, the hand is directly forward of the shoulder, at or slightly below shoulder height. To permit the reach needed for proper arm positioning, the shoulder wraps forward slightly, rather than remaining blocked in a position perpendicular to the direction of travel. The shaft of the pole is inclined slightly to the rear – i.e. the pole grip is slightly ahead of the tip. As the pole is planted, the flex at the elbow increases, with the angle created by the upper arm and forearm decreasing to as little as 90 degrees. The actual degree of flex varies dependent on the skier's velocity and the pitch of the slope being climbed; a greater flex generates more force and is suited to steeper slopes.

✓ In the poling action, the arm joints are used in sequence – shoulder, elbow and wrist. The poling action is initiated with the engagement – in very rapid sequence – of the shoulder, back and core muscles, pulling down and back on the pole. Once engaged, these muscle groups work together in a fluid and forceful motion. The movement continues with the increase in angular speed of the elbow extension as the hand passes below the elbow and continues to move to the rear. The poling action that starts as a pull ends in a push to the rear as the hand passes the hip, the latter action occurring in the leg push phase of the next stride sequence.

✓ Concurrently, the right arm begins the recovery motion. The arm recovery action is similar in nature to the pendulum action of leg recovery. The hand grip on the pole tightens, with control now being asserted largely through the thumb and forefinger. The hand and elbow pass close to skier's body. The hand is well forward of the body by the time the legs pass beside one another. Arm movement should be forward down the track rather than arcing up or swinging across the body. An arcing action can tend to cause the skier to "bob" with the upper body up into the air. Swinging the hand across the body can lead to an improper arm position on pole plant and potentially a misdirected pole thrust that undermines balance.

✓ The trailing left leg (i.e. the one used for the leg push phase) is swung forward naturally, as a pendulum from the hip. This is a forceful movement using the hip, then knee and finally the foot. Note that there is a strong relationship between the leg follow-through from the push and the pendulum action of the recovery leg swinging forward. If the follow-through has not been sufficient there will be limited scope to generate force in the pendulum.

✓ The weight shift that started in the push-off phase culminates dynamically in the hip and leg action that drive the recovery leg forward to become the new gliding/supporting leg. The core muscles are actively engaged throughout this movement.

✓ As the recovery leg passes the original pushing foot, the hips return to a position perpendicular to the direction of travel.

✓ At the same time as the trailing leg moves forward there is a rapid straightening (though not to a locked position) and subsequent compressing action of the glide leg. This action, called preload, can be seen in Figures 8.8.2 and 8.8.3. It is this preloading that allows a powerful leg push to take place. Straightening followed by rapid compressing (preloading) stretches the muscles (their tendons and connective tissue) used in the leg push action of the next cycle. This action is akin to loading a spring - the leg muscles can produce a more powerful push if they are slightly flexed immediately before the leg push.

✓ This phase completes the stride sequence and half of an overall cycle.

The opposite stride sequence (in this case, a left stride) is then executed, with no discernible break between the two sequences. Key points in the left stride sequence are shown in Figure 8.9.

Figure 8.9.1   Figure 8.9.2

Figure 8.9.3

As the steepness of the hill increases, the skier's glide decreases to the point where there is very little to no glide at all and forward momentum is lost, necessitating modifications to the Diagonal Stride technique. To maintain forward momentum, the skier must increase stride rate. Essentially the skier starts "ski striding" on his/her skis (see section 9 of your NCCP L2T (Dryland) Reference Material). The detailed modifications are described below:

❏ **Modifications of Leg Actions for Steep Uphills**

✓ In the pole-assisted glide phase, the glide leg straightens less, but it is essential that the skier keeps the hips as high and forward as possible.

✓ The follow through of the leg is short and the leg moves forward energetically.

✓ The foot of the returning leg is pushed in front of the knee when it contacts the snow. This moves the ski farther up the hill. The ski lands on the snow forcefully and the grip of the wax in the next leg push improves as a result. The skier must remember to keep the hips high and forward.

✓ There is more bend in the knee and ankle in the legs together position.

✓ The proportion of the skier's overall propulsive force being generated by the legs increases.

❏ **Modifications of Upper Body Actions for Steep Uphills**

✓ As the hill gets steeper, the skier stands more upright, to keep the weight over the pushing foot.

✓ The arm doesn't come very far forward when the poles are planted, and there is more elbow bend than in the normal Diagonal Stride.

✓ The follow through of the poling action is shortened.

Body Positioning

❏ **Core.** The core muscles must be engaged to allow the back and upper body to be slightly rounded throughout the Diagonal Stride motion, but not to the point where the upper body is

stiff. The skier's trunk will be more upright as the hill gets steeper. Note that too much bend at the waist at any point in the cycle (jackknifing at the waist) pushes the hips back, making it difficult to produce a strong push from the legs and frequently resulting in back-slipping and loss of kick.

❏ **Ankles and Knees**

✓ A pronounced bend at the ankles and knees as the legs pass together is critical to optimize the skier's power (this is one of the most important technical aspects of the Diagonal Stride). See Figure 8.10. More bend in these joints is required with increasing ski resistance associated with steep uphills or slow snow.

Figure 8.10   Figure 8.11

✓ The gliding/supporting leg is relatively straight (though not locked) during the glide phases, which reduces the leg muscle effort to hold the gliding position.

❏ **Hips**

✓ It is crucial that the hips be high and forward right over the ball of the foot when the leg push is initiated. The hip position moves to the rear somewhat as the push takes place, returning to a high position during preload and the most forward position for leg push.

✓ A good indicator of proper body positioning is for the skier to feel the weight distribution – centred in the upper body – across the forefoot during the pole-assisted glide phase.

✓ The hip orientation changes through the three phases of each movement sequence. As the leg push phase begins, the hips are squared to the direction of travel. As the push leg extends, the hip on that side opens slightly to permit a full extension and follow through. See Figure 8.11 above. At the same time, on the opposite side of the body, as the recovery leg swings through and lands, the same side hip wraps forward to permit the skier's weight to align fully over the glide foot.

❏ **Arms and Shoulder**

✓ The movement of the arms and shoulders should be smooth and have good rhythm.

✓ The arm travels straight forward and back.

✓ The arm bend at the elbow on pole plant will increase as the hill gets steeper.

✓ Because of the relatively low speed during the Diagonal Stride, the follow-through of the arms and hands is short and stops just past the hips. This allows the quick return of the arms to their initial position.

✓ The shoulders remain generally perpendicular to the direction of travel, though there is a slight wrapping forward on the poling side as the arm reaches to adopt the pole plant position.

❏ **Feet.** For the Diagonal Stride to be most effective, the skier's centre of gravity must be over the forefoot during most of the cycle of the technique. This will happen naturally if the skier's overall body position – particularly the alignment of the hips – is well forward. This position allows for a quick and powerful leg push.

Progression

Once the basic sequence of actions in Diagonal Stride can be accomplished, the skier must develop the ability to glide on one ski at a time and perform proper weight shift. This involves pushing off the snow with one foot and moving the upper body over the other ski in a forward gliding position. Mastery of this aspect of technique takes an abundance of time, patience and good coaching. Once the skier has achieved good weight shift and a good alternating extension action in the arms and legs, he/she should work on improving force production and glide by improving the individual components of the Diagonal Stride.

The following progression describes in more detail how the fundamental components should be reviewed and strengthened. Initial instruction for the first two stages of progression listed below should take place on a flat or gently rising track-set trail or teaching grid:

❏ Teach and practise the various components of Diagonal Stride without poles. The aim is for skiers to learn the correct body movements, weight shift and timing (i.e. developing the essential rhythm of Diagonal Stride) and improving balance on one ski.

✓ Without poles, skiers should walk on their skis, swinging the arms naturally – emphasize weight shift with each step, with a slight side-to-side motion being evident. The focus at this stage is entirely on weight shift.

✓ Next skiers should increase the speed at which the recovery leg is brought forward, which will generate a small glide. Emphasize that weight shift must continue to be present. Again, arms are swung naturally forward and back in the poling motion.

✓ With weight shift satisfactory, move on to a refinement of body position. In particular, emphasize keeping the hips forward and swinging the recovery foot past the gliding foot before it touches the snow.

❏ Teach and practise the same components with the skier using poles. The aim is to introduce poles into the technique while maintaining and ultimately improving upon the correct body movements, weight shift and timing already learned. Emphasize that the poling action is intended to generate force, not to compensate for poor balance.

❏ Once skiers are comfortable with the basic movements and rhythm of the technique, and they can execute proper weight shift and achieve a balanced position on the gliding ski, move on to refining the technique components that are critical for optimal force generation.

    ✓ Work on the pronounced bend at the ankles and knees in the legs-together position.

    ✓ Work on fast arm recovery, which contributes to down-the-trail momentum (a slow recovery does not contribute).

    ✓ Work on a quick preloading action of the gliding leg in the legs-together position and an immediate, powerful leg push.

    ✓ Ensure a proper pole plant, and powerful pole motion.

    ✓ Work on proper glide leg position during the pole-assisted glide. A 90 degree angle between the shins and the snow is desired.

    ✓ Work on recovering the push leg forward powerfully, leading with the hip, knee and foot (in that order).

❏ Polish the whole technique as each component is incorporated, thereby producing a smooth technique that is more effective overall.

Note that the fluidity and effective power transfer between body positions is as important as the actual body positions!

Teaching Points

This technique should be practised and assessed on flat or gradually rising terrain with set tracks. In recreational skiing, Diagonal Stride is used when skiing in these types of situations. In competitive skiing, Diagonal Stride is most frequently used on uphill segments of the course; Double Poling and One-Step Double Poling are used on flat terrain.

The following are the most important teaching points applicable to Diagonal Stride.

❏ There is a clear and equal push off with each leg, combined with a distinct weight transfer from ski to ski.

❏ There is a consistent and confident glide on each ski.

❏ The forward movement of the arm and backwards movement of the same side leg are synchronized.

❏ When viewed from the side, the recovery foot lands beside or in front of (not behind) the gliding foot 100% of the time.

❏ When the legs pass together there is good ankle and knee bend so the hips are aligned over the balls of the feet.

❏ The rear leg is extended at the end of the leg push.

❏ There is a forward upper body lean, which aligns with the extended leg at the end of the leg push.

❑ Hips rise at the end of the glide phase.

❑ At pole plant the elbows are flexed to permit a strong arm pull to be generated. They should bend further as the slope increases.

❑ Each pole tip is planted beside the toe of the opposite side ski boot.

❑ The poling action is powerful. The hands extend just past the hips.

❑ The pole grip is released briefly in the latter stage of each poling action; the pole thrust is completed through pressure on the pole strap.

Figure 8.12 below isolates four of the critical instants in the Diagonal Stride cycle, emphasizing the fluid and explosive nature of the technique.

Figure 8.12

Common Errors and Solutions – Diagonal Stride

The Diagonal Stride is a series of interconnected actions. As a result, technique problems in one part of the stride can be caused by another part of the stride. Before trying to correct problems in a skier's Diagonal Stride technique, ensure that he/she is moving through the correct body positions (preliminary movements) as described in the mechanics section. The following is a description of some common errors and how to correct them

Errors	Solutions
Poor weight shift. The skier is unable to fully commit the weight to the gliding ski.	✓ Return to the basic drill of shifting from one ski to the other while standing still. Then introduce forward movement, first without poles and then with poles.
	✓ The key to an effective weight transfer is in the positioning of the hips. As the weight is shifted to the right leg, the right hip wraps forward of the left hip, so that the weight is aligned through the hip and down the leg directly over the right foot.
	✓ Next execute the basic shifting movement on a gradual uphill; then the same action on a gradual downhill.
Poor balance. Often Diagonal Stride problems are the result of poor balance. Balance is of two types: side-to-side; and forward-backward.	✓ Diagonal Stride without poles can be a very useful method of improving balance and the athlete's overall technique. Athletes should be encouraged to do some of this type of skiing in gradually rising terrain to improve their balance and leg push.
	✓ Striding down hill while maintaining long glides is a very good way to increase stride length and confidence while gliding on one ski.
	✓ Skiing at night, with low visibility, can be helpful as it requires a skier to focus more fully because they can't anticipate terrain or track variations.

Uncoordinated stride. If the skier's balance is quite good, the problem is likely a failure to replicate the correct timing and rhythm of the technique.	✓ Return to the basic general athletic stance without poles. Have the skier walk naturally on skis and then gradually accelerate and decelerate in turn. Stress the maintenance of a relaxed body. Then re-introduce poles. ✓ Depending on progress with the above exercises, you can have the athlete: • ski using the arms only in a Diagonal Stride on a slight downhill; and • ski quickly and powerfully uphill.
Short strides (bobbing). The leg push propels the skier more upwards, rather than forward over the glide ski and down the track.	✓ Verify that the skier's ankles are bent enough as the legs pass together. Straight legs will push the skier up, not forward. ✓ Practice the scooter exercises (from Community Coaching manual) and work on getting up and over the glide ski. It can also be useful to encourage more of a forward upper body lean if the skier is quite upright. ✓ Encourage the athlete to swing the arms more "forward" rather than up, which should draw the athlete more on to the toes and bring the hips forward causing the body to drive forward rather than up.
Sitting Back. The key to an effective Diagonal Stride is to quickly push the body weight forward on to the glide ski so the skier is only on one weighted ski at a time. Skiers that are sitting back do not get good weight transfer. Often this can be seen from the side when the recovering ski contacts the snow behind the glide foot and a slapping noise is heard. The underlying problem is poor weight transfer.	✓ Start the skier in the general athletic stance. Tilt the body forward until the skier needs to step forward to stay upright. A good drill to complement this is to have the skier lean forward with hands supported by a coach standing in front of him/her. While retaining the leaning supported position, have the skier extend one leg behind in a follow-through position. The coach can then remove the supporting hands and the skier will automatically bring the extended leg forward to a stable position forward of the opposite foot. This accurately replicates the correct body positioning for the push-off phase of the Diagonal Stride.

	✓ Emphasizing a good bend at the ankles and knees and the weight on the ball of the feet as the legs pass together will help the skier feel his/her weight forward. The skier should also feel the weight across the whole foot (not on the heels) during the gliding phase. The scooter exercises can help with this.
	✓ The hip on the gliding side must wrap forward and the hip and knee should line up over the front of the foot in the glide phase.
	✓ The skier's hips should not rise and fall dramatically; however, there is some up and down action as preloading occurs.
	✓ Instruct skiers to look at a point three metres down the track.
	✓ Try to review the problem with video.
	✓ Exaggerate the movements by skiing "big". Bigger kicks and increased drive of the returning leg will force the athlete on to the front of their stride.
Back-slipping going up a hill (not attributable to poor wax). Often skiers will start losing some of their grip while going up a hill. There are two major causes for this: 1) the skier might be sitting back (see solution above); and/ or 2) the skier "leans into the hill" with too much flexion in the trunk**.**	✓ A good coaching cue for helping a skier that is leaning too far forward is to ask the skier to look up to the top of the hill and straighten up the upper body a bit every time a back-slip occurs. In this way the skier can determine how much lean is appropriate for different grades of hills.
Incomplete push-off. Many skiers do not quickly extend their hip, knee and ankle joints prior to the ski leaving the snow.	✓ Verify that the weight shift is complete and properly timed.
	✓ Verify that the skier's ankles and knees are bent enough and the skier's weight is on the ball of the feet as the legs pass one another.
	✓ Have the skier practise full extension on dryland. Have the athlete practise hopping as far as possible on one foot to get full extension. Practise next at full speed and then on snow.

Ineffective shoulder use in poling. A common poling error is ineffective use of the powerful shoulder muscles, leading to loss of glide during the pole-assisted glide phase of Diagonal Stride.

✓ The ski team handshake is a fun exercise that promotes good balance in a position similar to the pole plant and also trains the forward movement of the shoulder complex that is important for good, powerful poling. Two skiers stand facing each other, about two arm-lengths apart. Each skier should be on the left leg with the right leg relaxed backwards in a counter-balancing position. Both skiers can then lean forward about 45 degrees. The skiers grasp hands and alternate gently pulling each other slightly forward. The person being pulled relaxes his/her shoulder so that it moves forward.

✓ Figure 8.13: Ski Team Handshake
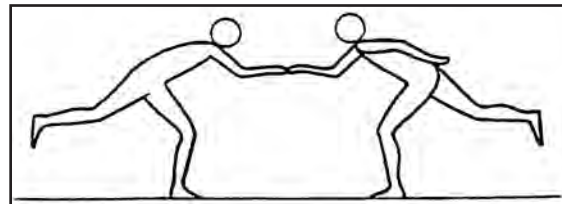
Poor pole plant positioning. The skier plants the pole across the front of the body. For example, on pole plant the right pole grip is near the skier's left shoulder and the tip is under the right shoulder. Such pole plant often occurs when skiers compensate for poor forward movement of the shoulder at the beginning of the pole plant. It can twist the body noticeably from side to side.

Figure 8.14: Poor Pole Plant Positioning
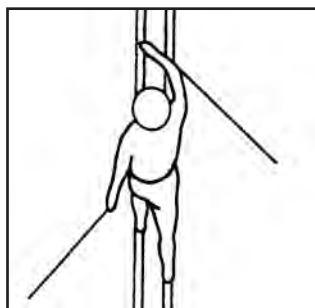
✓ Check the athlete's pole length to ensure a proper length pole is being used.

✓ Practise the correct pendulum-like arm movement without poles. Progress to executing the movement with poles held halfway down the shaft and kept parallel to the ground. Any tendency of the arms to cross-over will be very evident.

✓ Progress from stationary to slow-motion to full-speed poling.

8.2.2   Double Pole (3rd Gear)

Note: Although Double Pole equates to 3rd gear, it is discussed before the One-Step Double Pole (i.e. 2nd Gear) because the technique is integral to One-Step Double Pole. In terms of teaching progression, coaches should work on Double Pole before One-Step Double Pole.

Purpose

As is implied by its designation as 3rd gear, Double Pole is used in conditions where the skier's velocity is high. Generally it is used on flat, gradual downhill and gradual uphill terrain. When executed by a fit and competent skier, Double Pole is the fastest and most powerful technique. The skier's technical ability, fitness and strength will dictate the actual terrain where this technique will be used. The firmness and speed of the track, as well as the evenness of the terrain, will determine when a transition to another technique becomes necessary.

Of the several classic techniques, Double Pole has evolved most significantly in recent years. Indeed, in sprint races at the elite level, strong skiers may use it throughout the race (other than on downhills) – on skis with no kick wax – in order to achieve the highest skier velocities possible. Coaches need to be able to distinguish between the basic Double Pole and the more aggressive Double Pole which has evolved for competitive purposes. Both are technically correct. The particular circumstances and application by a particular skier will determine which is appropriate.

Mechanics

A complete cycle of an aggressive Double Pole technique is illustrated at figure 8.15.

Figure 8.15: Complete Cycle of Double Pole Technique

For the purposes of analysing and describing the technique, a cycle of the Double Pole can be viewed as comprising two phases: the propulsion phase; and the free glide phase. Note that this is in some respects an artificial delineation. Successive cycles are uninterrupted, with the movements of one flowing seamlessly into the other.

❑ **Propulsion Phase.** The propulsion phase begins with the movement of pole plant and finishes at the end of the pole push. The aim of the propulsion phase is to transfer the force

produced by the back, upper body, abdominal and arm muscles into an increase in the forward velocity of the gliding skis. This phase is depicted in Figure 8.16.

Figure 8.16.1

Figure 8.16.2

Figure 8.16.3

Figure 8.16.4

✓ Upper body position at the time of pole plant is high and relaxed, and is forward to the point where the body would fall forward if the poles are not planted. The shoulders, hips and knees are all forward of the ankle. To obtain the desired upper body position, the ankle must be well flexed. In aggressive Double Poling, the skier's heels will leave the ski in the lead-up to pole plant (i.e. in the preceding free glide/recovery phase) to support the high and forward body position.

✓ The arms reach in front of the body. The elbows are pointing down and slightly outwards and the forearms are angled upward sharply. This arm position brings the latisimus dorsi and upper back muscles into play.

✓ The poles are planted in front of the bindings (or at the binding when glide speeds are lower or the position of the upper body is not as far forward).

✓ At pole plant, the shafts are nearly vertical, with grips slightly ahead of pole tips. Skier velocity will quickly put the pole at a rearward angle by the time the pull begins.

✓ The hips, knees and ankles are slightly flexed at the time of pole plant.

✓ From the relaxed position before pole plant, the pole is driven downward rapidly and forcefully. This is done with a quick, powerful contraction of the abdominal muscles, in conjunction with the use of the upper body's weight compressing from its high, forward pole plant position. The pulling down action is similar to "hanging on the poles".

✓ The torso compression ends before the torso is horizontal to the ground.

✓ The arm joints are used in sequence – shoulder, elbow and wrist. Early in the pull down and push back arm movement the elbow is more noticeably flexed, with the angle between upper arm and forearm decreasing to as little as 90 degrees. The arms straighten through the elbow and wrist at the end of the Double Pole motion. The thrust ends with hands pushing on the pole strap.

✓ Power generation peaks early in the propulsion phase and ends as the hands pass the thighs. The rest of the arm motion in this phase is largely follow-through.

❏ **The Free Glide (or Recovery) Phase.** The free glide phase starts when the poles leave the snow and ends with the pole plant. See Figure 8.17. The skier's aim in this phase is to recover the body dynamically and smoothly into a high pole plant position.

Figure 8.17.1

Figure 8.17.2

Figure 8.17.3

✓ The recovery phase is not passive. Rather, with the shoulders leading the arms the skier brings the arms forward directly for the initiation of the next pole plant.

✓ The shoulders remain relaxed (i.e. not raised) during this movement; the back remains slightly rounded (i.e. no arching or hyperextension of the back).

✓ As the recovery begins, the weight is evenly distributed across the full foot of both feet. As the trunk rises and the arms swing forward, the hips shift forward and the weight shifts to the balls of the feet. When the arms reach their highest position, ready for pole plant, the skier's trunk, hips and knees are all forward of the ankle, with the ankles flexed to accommodate this position. For aggressive Double Poling, the heels will lift off the ski.

✓ The return of the arms and the lifting of the trunk must be synchronized.

Body Positioning

❏ **Core**

✓ The core muscles must be engaged. This allows the back and upper body to be slightly rounded throughout the Double Pole motion, though not to the point where the upper body is stiff. It also permits the core muscles to contribute to force production as the skier pulls down on the poles in the propulsion phase.

✓ The bend at the waist at the end of the poling motion must be slightly less than horizontal. This will keep the hips from falling too far back and will permit a rapid return to the high position for the propulsion phase. Rapid recovery is necessary to maintain the correct timing and rhythm of the technique. Stopping the downward movement of the upper body before the horizontal position also conserves energy, in that the trunk must travel a shorter distance to return to the high position.

❏ **Ankles and Knees**

✓ A good bend at the ankles is necessary at pole plant to allow the skier's trunk to be high and forward. Also, the more bend in the ankles, the more forward the skier's body position can be, thus enhancing force generation. More bend in these joints is required with increasing ski resistance associated with steep uphills or slow snow.

✓ In aggressive Double Pole sequences, as the upper body rises in preparation for pole plant the ankle flexion will be so great and the body positioned so far forward that the heel of the boot lifts off the ski. See Figures 8.18.1 and 8.18.2.

Figure 8.18.1

Figure 8.18.2

✓ Note that heel lift is not essential to a properly executed Double Pole technique; rather it is particular to a powerful version of the technique used in competitive scenarios. However, without the heel lift a skier will not be able to get the body mass as high and forward of the ankles, and poling power will be limited accordingly.

✓ There is only a shallow flex in the knees at pole plant. Knee flexion increases slightly as the poling action takes place.

❏ **Hips.** It is crucial that the hips be high and forward right over the balls of the feet at pole plant. See Figure 8.18.2 above. The hip position moves slightly rearward as the poling action progresses, but this must not be over-accentuated.

❏ **Arms and Shoulder**

✓ The movement of the arms and shoulders must be smooth and rhythmic.

✓ At pole plant, the arms are high and forward and the elbows are moderately flexed, pointing slightly outwards (see Figure 8.19.1). The arm flex at the elbow will be greater when the resistance from terrain and/or snow conditions is higher.

✓ As the poling action begins, the elbow flexion increases to facilitate a strong pull and push (see Figure 8.19.2).
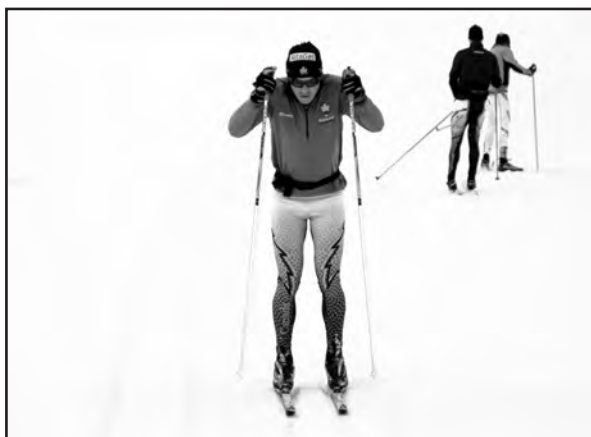
Figure 8.19.1   Figure 8.19.2
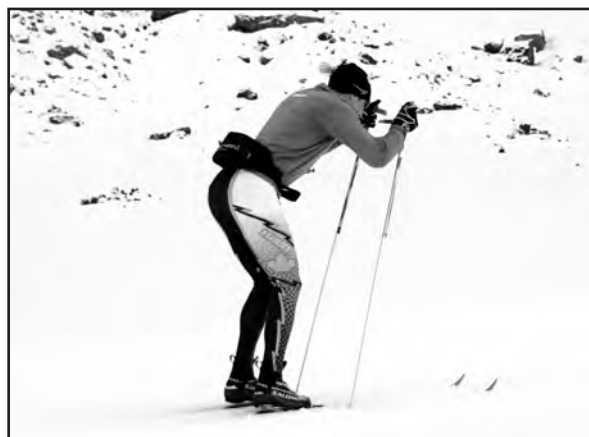
✓ The follow-through of the arms and hands is somewhat dependent on terrain (i.e. the amount of glide being generated), but in general is limited, to allow for the hips to remain high during the whole cycle. This also allows the quick return of the arms to their initial position.

❏ **Feet**

✓ A skier's weight is spread across the whole foot during the Double Pole, except for at pole plant when the skier's weight is on the balls of the feet.

✓ As noted above under "Ankles and Knees", in some cases the heels will be lifted off the skis to facilitate an optimal poling action.

✓ Some skiers attempt to facilitate a forward position of the upper body and a good arm reach by unweighting one foot and allow it to slide slightly to the rear, to be recovered beside the gliding foot just before pole plant. This should be discouraged, as it actually serves to bring the hip back with the trailing foot – which is counterproductive to the aim of keeping the centre of gravity forward.

Progression

There are two areas that need to be focused on while teaching the Double Pole: 1) refining the technique to maximize the amount of power produced in the propulsion phase; and 2) minimizing the slowing of the skis in the free glide phase so that the athlete is thinking about maintaining speed.

The following progression is for use over several weeks of technical practice and is the optimal sequence for working on the individual components of the Double Pole:

❑ Perfect the upper body, arm and knee/ankle positions at pole plant.

❑ Achieve peak force production early in the propulsion phase, through simultaneous engagement of core, shoulder and arm muscles.

❑ Work on a quick, smooth and direct return of the hands/poles from the end of push to the next pole plant.

Teaching Points

For recreational skiing, Double Pole is used on flat terrain for variety and maintaining speed, and on gradual downhills for speed and efficiency. In competitive skiing, Double Pole is used in similar situations when it is able to generate more speed and power than One-Step Double Pole.
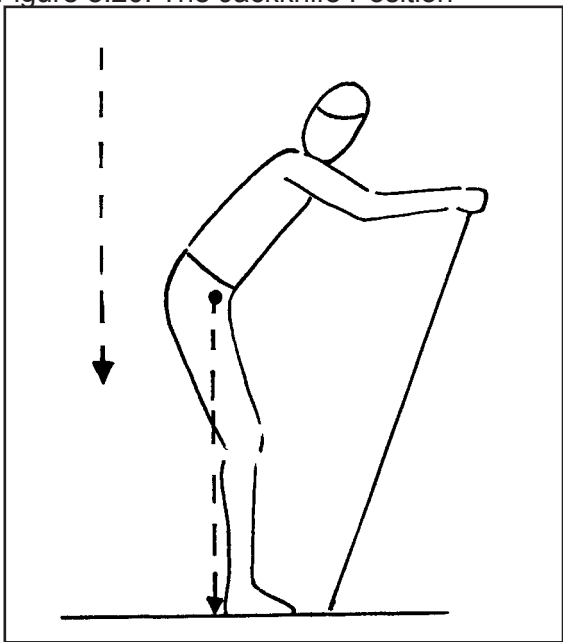
This technique should be practised and assessed on a gentle uphill or flat terrain. The skier begins in a static position.

❑ The skier is in the general athletic stance.

❑ Hands reach forward to initiate pole plant; hips are forward.

❑ When the poles are planted, the hips are over the balls of the feet; the hands are forward and high (at shoulder level); the elbows are pointed downwards and slightly out. The arm bend at the elbow will be greater when the resistance is higher.

❑ The upper body flexes at the waist just after poles are planted to provide initial propulsion. Immediately following the pole plant, the skier is clearly pulling on the poles with the upper body weight. This coincides with the engagement of back, shoulder, core and arm muscles.

❑ The flex at the elbow increases in the initial phase of the pole motion, but the elbow joint does not collapse.

❑ The upper body movement is completed by extending the arms to the rear. The progression is sequential from larger joint/limb and muscle groups to smaller, ending with extension of the wrist. At the end of the pole thrust the hand is pushing on the ski pole strap.
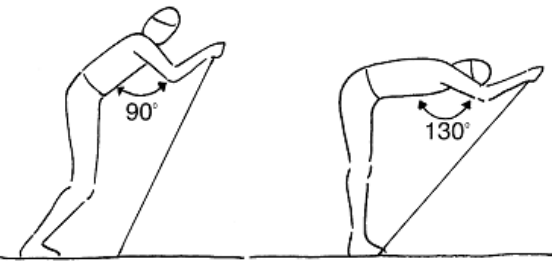
❏   Knees should be slightly bent and flexible through all phases of the movement.

❏   The follow-through of the arms and hands is not excessive, to allow for the hips to remain high during the whole cycle. This also allows the quick return of the arms to their initial position.

❏   Similarly, the trunk position does not reach the horizontal level.

❏   After completing the push, the arms and upper body are recovered directly forward at the same time to initiate another poling action. The shoulders lead the arms in recovery.

Common Errors and Solutions – Double Pole	
Errors	**Solutions**
Jackknife position. In this position, the skier cannot use the body weight to enhance the power of the poling action. The body weight is over the heels instead of the toes Figure 8.20: The Jackknife Position 	✓ Have the skier assume the correct pole plant position, using the poles to prevent falling forward. Ask the skier to think about and feel the correct position. Have him/her rock gently slightly backward and forward to feel the differences in weighting on the poles at other positions. ✓ Stress that the poles should support the skier. ✓ Have the skier make sure to have the hips over the toes before beginning each pole plant. ✓ Have the skier go up on tip-toes when first learning the technique, to get the feel of the action ✓ Make sure the skier does not sit down too much at the end of the pole plant. This will cause a lag in the timing of the action and the hips will not be able to go forward enough. ✓ Ensure the poles are not too short.
Excess flexion of the trunk. Some skiers will flex the upper body to the horizontal position and beyond. This error forces the skier to waste time and energy to return to a high pole plant position.	✓ Ask the skier to finish the arm/hand thrust sooner in the propulsion phase. ✓ Emphasize a high and forward position at pole plant. ✓ Have the skier look at least five metres down the track throughout the stride.

Head ducking. The skier is unable to gain power from the action of the abdominal muscles. Figure 8.21: Head Ducking (figure: skier positions showing 90° and 130° angles)	✓ Emphasize that the shoulder must be the first arm joint to be used in the upper body in the propulsion phase.
Sitting Double Pole. This error is similar to jackknifing, except that skier sits down through excessive flexing of the knees. In this case the flexion in the knees counteracts the contraction from the abdominal muscles and trunk. This results in a weak pole thrust.	✓ Ensure high and forward body position at pole plant. ✓ Ask the skier to Double Pole with locked knees to get the feel of not bending at the knees.

8.2.3   One-Step Double Pole (2nd Gear)

Purpose

One-Step Double Pole, or 2nd gear, is the technique used when the skier's velocity is too great for an effective Diagonal Stride and too slow for ordinary Double Pole.

It is a powerful technique that incorporates both a strong leg push and a strong poling action. It is particularly useful for creating velocity and momentum. However, on fast sections of the course, transition to Double Pole will normally be desirable. Once sufficient velocity is attained, Double Pole is more efficient, and will potentially generate more velocity. There are two reasons for this:

❏ The poling motion in Double Pole produces more force than in One-Step Double Pole.

❏ A higher tempo of poling can be achieved in Double Pole. This is because the force is being applied by relatively short body segments – the arms and trunk – that can be recovered quickly. In contrast, the One-Step Double Pole technique also engages the leg segments. While containing large and strong muscle groups that allow a forceful leg push, these limbs are also long and heavy and cannot be recovered as quickly as the arms.

The One-Step Double Pole technique is usually used on the flat or gentle uphills, depending on the resistance of the snow. However, the skier's technical ability, fitness and strength are all factors that will influence the actual terrain in which this technique will be used. The firmness

and speed of the track, as well as the evenness of the terrain, will determine when a transition to another technique becomes necessary.

Mechanics

The primary sources of power in One-Step Double Pole are the leg push and the poling motion. Both are critical to the technique, with the relative force generated by each varying with the circumstance and the strength/proficiency of the skier:

❏ In many situations (e.g. snow and terrain conditions) and for many skiers, the leg push will be dominant. The leg push occurs at a moment in the technique cycle where the skier's glide is diminishing. As such, it serves to break inertia, accelerate the skier and re-establish forward momentum. In this scenario, the poling motion helps maintain the velocity and glide created by the leg push. Most recreational skiers are likely to perform One-Step Double Pole in this manner. In addition, executing the technique in this manner is common in competitive skiing in certain types of terrain or at particular stages of a race. For instance, it might be appropriate on long gradual uphills where the efficiency of Double Pole begins to decline. Equally, it might be appropriate after a prolonged stretch of Double Poling, as it re-engages the large leg muscles and provides some relief to the muscle groups involved in the Double Pole motion.

❏ In other situations, particularly in elite racing and/or sprint competitions, the greater part of power is generated by an aggressive poling motion. In this scenario, the leg push provides supplementary power to prolong glide, but also serves the critical function of situating the skier's body in the optimal position to execute an explosive Double-Pole-type motion. If a forceful and dominant Double Pole is intended, efforts to generate power from the leg push should not be allowed to compromise the poling action; accordingly, the leg push and arm return phases may be of shorter duration than might otherwise be the case.

Coaches must be careful not to over-simplify what is actually a fairly complex technique. Although the One-Step Double Pole is often described as a technique that combines the leg push and stride of Diagonal Stride with the poling motion of Double Pole, there are, in fact, important differences that make the two power-generating components of One-Step Double Pole unique unto themselves. Notably, the application of bio-mechanical principles is such that, in combining a strong leg push with a strong poling motion, the poling motion cannot be as powerful as it is in Double Pole, a technique designed to optimize the motion. Nevertheless, combining a leg push with a sub-optimal Double Pole-type motion results in a technique that is very powerful in its own right and which has particular utility in some situations.

A complete cycle of aggressively executed One-Step Double Pole is depicted in Figure 8.22.

Figure 8.22: Complete Cycle of One-Step Double Pole Technique

For the purposes of analysing and describing the technique, a cycle of One-Step Double Pole can be viewed as comprising four phases: the leg push phase; the free glide phase; the pole-assisted glide phase; and the arm return phase. Key body positions mark the start and finish of each phase.

In principle, successive cycles of One-Step Double Pole should alternate pushing legs. However, it is possible for successive cycles to use the same leg. Factors that govern this include the manner in which the trail bends or banks, as well as the skier's comfort level (strength and/or balance) on a particular leg.

The mechanics of the four phases of a One-Step Double Pole cycle are described below:

❏ **The Leg Push Phase.** The first phase is the leg push phase, which starts with a leg push and stride similar to that of the Diagonal Stride (refer to section 8.2.1 for detail on the leg push mechanics of Diagonal Stride). The leg push phase ends when the pushing foot leaves the snow. The aim in this phase is to achieve a powerful leg push that propels the body down the track, while at the same time initiating upper body movements to prepare for the poling motion. The leg push phase is depicted in Figure 8.23.

  ✓ At the beginning of this phase, the skier is in the Ready Position - i.e. the general athletic stance for this technique. The weight is balanced evenly on two gliding skis, and the hands are just swinging past the thighs in recovery from the previous cycle.

  ✓ Note that, in practice, there is no distinction between the leg push phase and the preceding arm return phase. It is important to understand that the arm return and accompanying body re-positioning lead directly into the pre-load that initiates the leg push.

Figure 8.23.1

Figure 8.23.2

Figure 8.23.2

✓ As the leg push phase begins, the pushing foot is weighted and there is a quick pre-load of the push leg. The ensuing leg push is forceful and snappy. As the push occurs, the hips lower and move to the rear slightly, as in the Diagonal Stride.

✓ The leg push may be enhanced by sliding the pushing foot forward slightly before the pre-load (as is the case with the right foot in Figure 8.23.1). However, this is a technical enhancement that tends to be used by competent skiers in a competitive context. It is not essential to the basic technique.

✓ As the leg push occurs, the opposite ski strides forward in the track and the arms swing up and forward to prepare for pole plant. Timing is critical. The stride leg and both arms must be advanced simultaneously and explosively; and at the same time the push leg must be driven forcefully down onto the track and slightly back.

✓ A dynamic weight shift is a key component of this phase. At the end of the preceding arm return phase the skier's weight is distributed on two skis. In the leg push phase, the weight is shifted first to the pushing foot for the leg push, and then quickly to the striding foot as the push ends. The weight shift to the pushing foot contributes to both the force

of the push and the performance of the grip wax that gives the ski purchase on the snow. The weight shift to the striding foot is completed as the pushing foot leaves the snow, with the striding leg becoming the gliding/supporting leg for the next phase. The latter weight shift contributes to forward momentum and allows the skier to adopt a balanced body position over the gliding/supporting ski.

✓ The push occurs primarily below the hips, not behind them. Its duration varies with the slope of the trail and the glide being generated (i.e. longer on flats and gradual downhills; shorter on gradual uphills). A particularly strong and protracted leg push can be accommodated within the essential timing of the technique, but this will likely necessitate a somewhat slower skiing tempo (i.e. fewer cycles in a given period of time) due to the time needed to recover the push leg and re-position the hips forward. If poorly executed, this may lead to poor weight shift and/or the hips may be in a sub-optimal position for the next poling motion.

✓ The concurrent and vigorous swing forward of the arms to the Double Pole position contributes to the down-the-track momentum created by the leg push and weight shift.

❏ **The Free Glide Phase.** The next phase is the fleeting free glide phase. It begins at the end of the leg push and ends with pole plant. See Figure 8.24. In this phase, the skier tries to maintain the ski's glide while getting the arms, hips and upper body into a good position for a strong poling action.

Figure 8.24

✓ Between the end of leg push and pole plant, the push leg continues to travel backwards in follow-through, the body moves forward over the supporting/gliding foot and the hips and trunk rise slowly.

✓ A high and forward upper body position and good arm reach are consistent with the strong leg push and stride executed in the leg push phase. The forward body and arm position serves to counter-balance the push leg in its follow-through and recovery, while the foot of the striding leg provides a relatively forward base on which to balance. Both of these are distinct differences from the Double Pole technique.

✓ In general, it is easier to have a forward lean in the torso in One-Step Double Pole than in Double Pole. This lean must not be permitted to be too pronounced.

✓ At the same time, getting the hips forward is more of a challenge in One-Step Double Pole, as they move to the rear as the leg push occurs. During the free glide phase, the skier must recover the hips forward as far as possible to prepare for the poling motion. However, a hip position that is forward over the ball of the foot – as in Double Pole – will not typically be possible. On balance, the position of hips and torso in Double Pole will be better than in One-Step Double Pole for generating force from the poling motion.

✓ As noted in the previous phase, the time required to recover the push leg and re-position the hips must not be allowed to impair the timing of the technique, but may of necessity affect the tempo at which the technique can be correctly executed.

✓ As the hips are being re-positioned following the leg push, the gliding/supporting leg straightens somewhat, until the knee is only slightly flexed, in order to provide a stable gliding platform that does not unduly stress the leg muscles. Proper body positioning over the gliding ski is critical for balance. The upper body will be over the forefoot, while the hips will generally be over or behind the ankle (unlike the Double Pole position).

✓ The arm position adopted during this phase is as for the Double Pole. Forward arm extension must not be excessive, as this can lead to too much forward lean and inhibit the repositioning of the hips for a good Double Pole position.

✓ From a position about 5-10 cm off the ground, the poles are lowered forcefully (through arm and trunk movements) in preparation for pole plant.

✓ The follow-through of the push leg ends and the push leg starts to return forward as the poles descend to the snow for the pole-assisted glide phase.

❏ **The Pole-Assisted Glide Phase.** The third phase is the pole-assisted glide phase. It begins at pole plant, continues through a Double Pole-type motion and ends when the poles leave the snow. See Figure 8.25. The skier's goal in this phase is a powerful arm push.

Figure 8.25.1   Figure 8.25.2   Figure 8.25.3

✓ To obtain an effective poling thrust, the body weight must be high and forward. While the hips won't be as far forward as in Double Pole, it is important that they be as far forward as possible, and that the upper body be over the poles when the pole thrust begins.

✓ Relative to Double Pole, the poles are more vertical on pole plant and the tips are planted well in front of the ski binding of the gliding ski (rather than beside the ski bindings as in Double Pole). This is because in One-Step Double Pole there is typically more forward lean in the torso. The latter facts imply an overall lower body position at the time of poling when compared to Double Pole alone. The poles are planted straighter and further ahead of the bindings to ensure a long enough arm push to generate the required power. At the same time, the hips move forward slightly as the push leg is recovered and the poling motion is initiated, allowing the skier to adopt a more efficient Double Poling position for the remainder of the poling motion.

✓ The trunk initiates the poling motion from its high and forward position, with the mechanics of the poling motion conforming in many respects to those of the Double Pole technique. The poling motion from pole plant until the pole tips leave the snow is completed in this phase.

✓ There are several other divergences from the Double Pole technique, the net result of which must of necessity be a less powerful pole thrust:

• The salient difference between One-Step Double Pole and Double Pole at this point is that the skier initiates the poling action while gliding on one leg, with the other leg still in recovery. Good balance, underpinned by proper body positioning, is key enabling a strong poling motion to be executed.

• Although the skier's weight (centre of gravity) is centred on the forefoot of the gliding/striding leg, the hips are actually behind this point.

• The skier is unable to rise on the balls of the feet as in aggressive Double Poling.

• The finishing trunk position is not as low as in Double Pole, due to the need to return promptly to a good position for initiating the next leg push.

✓ The push/recovery leg completes its return forward to land beside the glide foot shortly after the poling action begins.

✓ The skier's weight is fully over the gliding ski as the poling motion begins, and is redistributed to both skis mid-way through the poling motion as both feet are together again.

❏ **The Arm Return Phase.** Arm return is the final phase of One-Step Double Pole. See Figure 8.26. It begins at the end of pole push and finishes with a seamless flow into the beginning of the next leg push phase. In this phase, the skier tries to minimize the decrease in ski glide and to get into the correct body position for an effective leg push.

Figure 8.26.1   Figure 8.26.2

Figure 8.26.3

✓ The shoulders lead the arms in recovery and, relative to the Double Pole, the upper body rises more quickly from its compression (to facilitate body positioning for the pre-load, leg push and stride that occur at the beginning of the next cycle).

✓ As in Double Pole, arm recovery is uninterrupted and direct from the follow-through position to the high position needed for the next Double Pole action, though the hands only reach the hips (i.e. the Ready Position) in this phase (the remaining swing forward being part of the next leg push phase).

✓ The duration of this phase depends on the skier's velocity and length of glide. When performed on flat or downhill terrain, the arm follow-through after the pole thrust will likely be longer, and the speed of arm recovery must be adjusted accordingly so as not to compromise the timing of the next cycle.

Body Positioning

❏ **Core**

✓ The core muscles must be engaged to allow the back and upper body to be slightly

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rounded throughout the One-Step Double Pole motion, but not to the point where the upper body is stiff. Note that any tendency to arch or hyperextend the back as poles are swung forward is incorrect and should be discouraged.

✓ With a strong leg push and follow-through, a more pronounced forward lean should naturally occur to maintain balance.

✓ The bend at the waist during the Double Pole motion will be less than in normal Double Pole, to permit the upper body to rise quickly to the Ready Position for the next leg push phase. See Figure 8.27.

Figure 8.27.1   Figure 8.27.2

Figure 8.27.3

❏ **Ankles and Knees**

✓ The knee and ankle are slightly flexed during the free glide phase, with the leg providing a stable base on which to balance. See Figure 8.24. Excessive flexion will cause undue fatigue in the leg muscles.

✓ More flexion will be required during the leg push phase if a strong and protracted push occurs.

✓ The knees and ankles stay slightly flexed during the poling motion.

❏ **Hips.** In principle, the hips should be as far forward as possible at critical force-producing instants, but the movements of the technique impose some constraints.

✓ The hips assume a more rearward position relative to the gliding ski, and are slightly lowered as the leg push occurs and the striding/gliding ski is pushed forward. See Figures 8.23 and 8.24.

✓ The hips rotate slightly at leg push, opening on the push leg side to facilitate the push and follow-through, and positioning the opposite hip over the striding/gliding ski for effective balance.

✓ The hips are recovered up and as far forward as possible during the free glide phase.

✓ At the time of pole plant, the hips are typically over the rear of the foot, noticeably different from the hip position in Double Pole. See Figure 8.25.1.

❏ **Arms and Shoulders.** The movement of the arms and shoulders should be smooth and rhythmic. The arm bend at the elbow will increase as the hill gets steeper (about 90 degrees). Because of the speed achieved during the One-Step Double Pole, the follow-through of the arms and hands is fairly short to allow for the hips to remain as high as possible during the whole cycle. This allows the quick return of the arms to their initial position.

❏ **Feet.** A skier's weight is mostly on the forefoot during the One-Step Double Pole. The only exception to this is at the end of the poling motion, where the skier's weight is centred across the whole foot. If the weight is too far back it will force the skier's hips to the rear and make it difficult to have a quick and powerful leg push.

Progression

The skier should first be able to execute the Diagonal Stride and Double Pole techniques correctly, as the main components of these techniques are combined in One-Step Double Pole.

The following is the optimal progression for learning One-Step Double Pole technique:

❏ Work on a strong simultaneous leg push and stride.

❏ Ensure that there is a correct and complete weight shift in the leg push movement – with the weight shifting from the push foot to the striding foot as the leg push ends.

❏ Ensure that the force created in the push phase propels the skier down the track, not upward.

❏ Work on acquiring good pole plant position, with trunk and hips high and forward as much as possible.

❏ Emphasize good poling mechanics (as in Double Pole).

❏ Emphasize smooth movements in the arm return phase to maximize glide.

Teaching Points

This technique should be practised and assessed on a gentle uphill or flat terrain. The skier begins in a static position or is gliding slowly on two skis.

❏ As the cycle begins, the skier is in the Ready Position (the general athletic stance), with body weight on the both skis. Arms and poles are behind the body, as in the follow-through to the poling motion.

❏ The skier weights one ski (the push ski), pre-loads that leg and starts to swing the arms forward from their trailing position.

❏ The skier then pushes with the push foot, strides with the other foot and reaches forward with the arms to the Double Pole initiation position. These movements occur simultaneously. Weight is shifted from the push foot to the striding foot by the end of the push.

❏ The leg push mechanics are as for the leg push phase of Diagonal Stride.

❏ The skier's hips and trunk rise during leg push follow-through, with the hips recovering forward as much as possible to assume a high and forward position for the pole plant. A good bend at the ankles will facilitate this.

❏ The skier then initiates a powerful Double Pole-type motion, while the recovering pushing foot completes its return to a position beside the gliding foot shortly after the poling motion begins.

❏ The body and arm mechanics of the poling motion are as for Double Pole.

❏ The amount of bend at the waist at the end of the pole push is less than a normal Double Pole.

❏ The skier glides on both skis without sitting back excessively, and then begins the cycle again, with (normally) the opposite leg doing the pushing.

❏ Arm recovery from the follow-through position to the high hands forward position is direct and uninterrupted.

Figure 8.28 below provides another illustration of correctly executed One-Step Double Pole, with less aggressive body movements and body positioning than in the example at Figure 8.22.

Figure 8.28

Common Errors and Solutions – One-Step Double Pole	
Many of the errors that occur in One-Step Double Pole also occur in Double Pole and Diagonal Stride. Therefore, this section discusses only problems unique to One-Step Double Pole.	
Errors	**Solutions**
Timing. As this is most frequent error for those learning the technique, it should have been overcome by the L2T stage. Still, many skiers may be losing power by poorly timed arm and leg movements.	✓ Emphasize the simultaneous projection of both arms and the stride leg forward of the body. Practise this on dry land; from the Ready Position take a sharp step forward while swinging the arms up and forward at the same time. ✓ Practise adopting the post-push position with arms extended forward and one leg behind.
Balance. The glide is too short, and the recovery foot returns to the track too quickly, often with a slap.	✓ The skier may not have fully shifted weight to the gliding ski and assumed the correct body position to establish balance. ✓ Practise standing in the extended leg position – with hip over the gliding/ supporting foot, with knee very slightly flexed. Then practise gliding in this position.
Too much forward lean. The skier has excessive forward lean at the waist and/ or keeps the hips back. Therefore, the skier gets little forward thrust from the trunk.	✓ The skier may be misdirecting the force of the leg push to the rear, and may be over-emphasizing leg follow-through. Both serve to create more pronounced upper body lean, particularly if combined with the arms stretching too far in front. Have the skier focus on a leg push that is snappier and with reduced follow-through. ✓ Have the skier practise correct forward lean, with well flexed ankle and hips and trunk high. Try this as a static drill and then at slow and normal skiing speeds. ✓ Have the skier look at a point farther down the track at the beginning of leg push.

Too upright. The skier is too upright in the upper body, which constrains leg push and results in too much force being directed upward.	✓ Have the skier practise correct forward lean, as a static drill first and then at slow and normal skiing speeds. ✓ Have the skier look at a point on the track closer to him/her at the beginning of leg push.
Ineffective leg push. As a result of this common error, the skier does not get maximum benefit from technique; propulsion is poor and the preparation for poling is ineffective.	✓ To emphasize the correct beginning-of-leg-push position and a powerful pushing action, have the skier stand in the correct Ready Position and then push quickly and powerfully off one foot, as in the Diagonal Stride technique. Ensure that the push leg is weighted for push-off, with the body weight then transferring dynamically to the striding foot. ✓ Ensure that the leg push is snappy, with good preload. ✓ Ensure that the arms and push leg finish the drill in the position shown in Figure 8.29.

Figure 8.29: Push Leg Drill
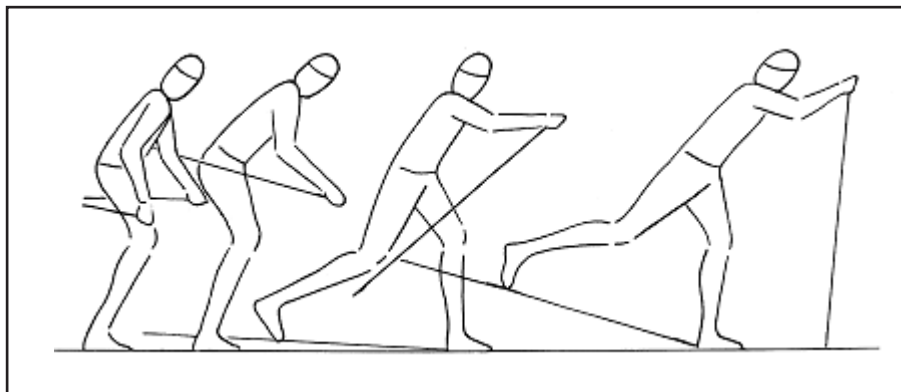
Repeatedly using the same push leg. This error may make the pushing and glide support muscles excessively tired.	✓ Learn early to produce a powerful leg push action in both legs. ✓ Practise gliding on each leg.

8.2.4   Classic Technique Checklists

To simplify the detection and correction of technique errors when you are out on the snow, a series of checklists has been developed.

Common Checkpoints

The following checkpoints are common to all classic techniques (with notable exceptions for Double Pole technique, in which there is no leg push):

❏   **Overall**

✓   All techniques originate with the general athletic stance, modified for the specific technique being learned.

✓   Weight shifts fully from ski to ski (not applicable in Double Pole).

✓   The skier is balanced on the gliding ski, in Diagonal Stride and One-Step Double Pole.

✓   Motion of arms and legs is snappy and forceful.

❏   **Lower Body**

✓   Good angle is maintained at the ankle to permit forward upper body position and correct alignment of hips over the foot at the critical instant of leg and arm push.

✓   Leg push is preceded by a pre-load of the gliding leg before it initiates the push.

✓   Leg pushes down, into the snow, and slightly back.

✓   Leg push is executed quickly and effectively so that power is transferred quickly to the snow and a resulting glide is created.

✓   Hip, knee and ankle joints contribute to the leg push in that order, constituting a sequential but very rapid and explosive movement.

✓   Hips should rotate slightly to allow body weight to be balanced over the gliding ski.

✓   Hips are high and forward over the glide foot (or feet).

❏   **Upper Body**

✓   Poles are planted close to skis.

✓   Skier reaches high and forward with bent arms; the amount of elbow bend and the elbow orientation (i.e. tight to the body or pointing slightly outward) vary with the particular classic technique being executed, the phase of the technique and the pitch of the slope being climbed.

✓   The shoulders are parallel to the ground.

✓   The shoulder, back, core and arm muscles are engaged in poling action.

✓   The back is slightly rounded (no hyper-extension).

✓   There is a distinct, but not excessive, forward body lean (achieved through flex in ankles).

Diagonal Stride

❏   **Most Important**

✓   The skier commits weight fully to the gliding/supporting ski in the glide phases.

✓   The recovery foot is unweighted until placed on the snow ahead of the other foot (with ankle pushed ahead of knee as upward slope increases).

✓   The middle of hips is over toes at initiation of leg push, and further ahead as slope of hill increases.

✓   Forward body lean comes from a flexed ankle.

✓   Hips rotate slightly during leg push, without twisting the upper body.

✓   There is a pre-load and explosive leg push (knee and ankle are momentarily straightened and flexed to load the leg, followed by the forceful extension of the leg push).

❏   **Very Important**

✓   There is complete extension of the leg and arm at the end of their respective pushes.

✓   There is a straight line through the upper body and leg as the push leg leaves the snow.

✓   The gliding/supporting leg straightens (without the knee locking) during the glide phases.

✓   The recovery leg is swung forcefully forward in a pendulum motion.

✓   The arm action is generally straight forward and back, hinging as a pendulum from the shoulder.

✓   Arm push ends shortly after hands pass legs, with natural follow-through continuing.

✓   The shoulder reaches forward on pole plant, hands at or below shoulder height.

❏   **Important**

✓   The pole is generally planted opposite the glide foot; as the slope increases, the pole plants a bit farther back.

✓   The flex in the elbow joint increases as the poling action commences.

✓   At pole release, the skier extends the wrist/hand, with pressure exclusively on the pole strap.

Double Pole

❏   **Most Important**

✓   The hips, upper body and arms are well forward and high to load the poles on pole plant.

✓   The forward body position originates in well flexed ankles.

✓   The skier "falls forward" and "hangs on poles".

✓   The skier pulls down on the poles, engaging the back, shoulder, core and arm muscles.

❏ **Very Important**

✓ Elbows are moderately flexed on pole plant, with the degree of flex increasing with the amount of force being applied.

✓ The elbow flexion increases as the poling action begins.

✓ Legs are slightly flexed on pole plant, with flex increasing noticeably – but not excessively – during the poling action.

✓ If the skier rises on the balls of feet, motion should be forward, not up.

✓ Arm recovery forward (not up) is aggressive, with shoulders leading.

❏ **Important**

✓ Upper body compression ends before the horizontal position.

✓ The upper body stays down until the arms are finished.

✓ The poles are planted in front of the bindings (or at the binding when glide speeds are lower or body position not as far forward).

✓ At pole plant, the shafts are nearly vertical, with grips slightly ahead of pole tips.

One-Step Double Pole

❏ **Most Important**

✓ The leg push, stride and arm reach forward occur simultaneously, and are all snappy/ forceful.

✓ As the leg push is initiated, the push leg is fully weighted, with weight shifting dynamically to the striding leg as the push ends.

✓ The skier is balanced on one fully weighted gliding ski – weight centred over the forefoot – during the free glide phase and as the poling motion is initiated.

✓ The poling action is as for Double Pole in several respects:

  • The upper body and arms are well forward and high to load the poles for pole plant.

  • The hips are high and forward, to the extent possible (though they will not be as far forward as in Double Pole).

  • The skier "falls forward" and "hangs on poles".

  • The skier pulls down on the poles, engaging the back, shoulder, core and arm muscles.

❏ **Very Important**

✓ There is a pre-load of the push leg before the push.

✓ Elbows are moderately flexed on pole plant, with the degree of flex increasing with the amount of force being applied.

✓ The elbow flexion increases as the poling action begins.

✓ Legs are slightly flexed on pole plant, with flex increasing noticeably – but not excessively – during the poling action.

✓ Arm recovery forward (not up) is uninterrupted, with shoulders leading.

❏ **Important**

✓ Upper body compression ends well before the horizontal position (i.e. there is less compression than in Double Pole).

✓ Relative to the Double Pole, the upper body rises more quickly from its compression (to enable the body to be positioned for the pre-load, leg push and stride that occur at the beginning of the next cycle).

✓ The poles are planted well in front of the binding of the gliding ski.

✓ At pole plant, the shafts are nearly vertical, with grips slightly ahead of pole tips.

8.3   Downhill Techniques

Downhill techniques are used to control downhill speed and make necessary changes in direction, while at the same time enabling the skier to maintain as much velocity as possible. The particular downhill technique used by a skier is mainly determined by the snow/trail conditions and the skier's level of ability.

General Considerations for Teaching Downhill Technique

Work on downhill technique can be a fun addition to a practice. Dual slalom practice or race courses, and other variations of bumps and dips, can provide hours of fun while teaching athletes the balance, skills and confidence necessary for good downhill technique. A useful axiom to remember is "terrain teaches". Often an hour of fun downhill practice on a slope, without comments from the coach, can teach as much as an hour of instruction.

While practice is important, there are also some techniques the athlete must become comfortable with prior to being able to perform the advanced skills effectively. A guest appearance by a local alpine instructor, or a day of alpine skiing and instruction at a local area, may also be a wise investment.

For teaching downhill technique, the practice hill should be obstruction free and have a long, gradual runout. There should be steep and gradual slopes and the surface should be smooth and well packed. As the skier's skill increases, he/she may practise on more challenging terrain, but the snow should still be well packed. Skis should be waxed for good glide, and the binding-ski and boot-binding fittings should be snug.

When teaching all downhill techniques, it is important to remember the information provided in section 3.2.2. (Laws of Nature) regarding the stabilizing effect of lowering the centre of gravity. While athletes may initially feel more in control in a relatively upright position, with coaching and practice they will learn that a lower body position is actually more stable (as well as being more aerodynamic and therefore faster).

Types of Downhill Techniques

In general, downhill techniques can be divided into two categories:

❏ **Techniques for Descending and/or Accelerating Through Downhills and Downhill Turns**. These techniques are used when the trail and snow conditions and/or skier's level of ability are such that a downhill can be skied aggressively without the need to reduce or control speed. Techniques in this category are the following:

  ✓ **Straight Running**. Where a downhill is track-set (whether in classic or skating competitions) and the conditions and skier competence are permissive, the skier will stay in the track (or move into it, in skate skiing) and "ride the track" by a combination of changes to body and ski positioning. In dealing with the centrifugal forces exerted on the skier while attempting to "ride the rails" through a turn, the skier retains a tuck position and moves the hips and knees to the inside of the turn. The skis are somewhat edged inwards in the track as the skier travels through the arc of the turn.

✓ **Ready Position**. See section 8.3.1 below.

✓ **Tuck Position**. See section 8.3.2 below.

✓ **Step Turn**. This is a technique used to permit a skier to negotiate a downhill corner without braking. It involves a succession of rapid steps in the direction of the turn. When executed aggressively, each step involves a push from the outside ski, with the skier thus using the turn for acceleration. Skiers will normally enter the Step Turn situation in the Ready Position or Tuck Position. See section 8.3.3 below for detail.

❏ **Techniques for Braking/Controlling Speed in Downhills and Downhill Turns.** These techniques are used when the steepness of the descent, the condition of the track, the degree of corner in the downhill and/or the skier's level of ability are such that the skier must reduce or control speed in order to negotiate the descent safely or without losing control. The techniques in this category represent a spectrum in which optimal control is at one end and conservation of speed is at the other. These techniques are as follows:

✓ **Side Slipping**. This technique is used for descending particularly steep or icy stretches of trail when the skier is unable to control speed using other techniques. . Side Slipping is primarily used in a recreational skiing context, where the conservation of skier velocity is not an objective. Its only relevance in a competitive skiing context is in the application of the Side Slipping movements as an integral component of the Parallel Turn. Side Slipping is described in detail in Section 4 of the Community Coaching Reference Material.

✓ **Snowplow and Snowplow Turn**. These techniques are used for braking and controlling speed and direction on downhills where the steepness of the hill and/or the skier's level of competence and confidence do not permit the use of one of the techniques in the "descending and accelerating" category described earlier. These techniques are widely used in recreational skiing. They have some application in competitive skiing, depending on the trail profile and the level of a skier's ability. In addition, the Snowplow and Snowplow Turn can form part of the evolution of the Parallel Turn. These techniques are described in detail in Section 4 of the Community Coaching Reference Material.

✓ **Parallel Turn**. This is the fastest technique for negotiating bends on steep downhills, and is commonly used by competent skiers in a competitive context when the trail profile and/or snow conditions do not permit the use of one of the techniques in the "descending and accelerating" category described earlier. See section 8.3.4 below.

Note that a skier may need to use more than one technique to descend a particular hill or section of trail, and that the types of technique needed for a particular descent may vary widely over time in accordance with the prevailing snow and track conditions. Therefore, a skier must attempt to become proficient in all techniques and be prepared to use the range of techniques flexibly as conditions warrant.

8.3.1   Ready Position

Purpose

The Ready Position is a transitional downhill technique that is used when the trail is uneven or when quick changes of direction are necessary. It is a position which can be adopted quickly and from which a skier can move easily to another downhill technique as the track requires.

Mechanics

The skier's feet are slightly farther apart (shoulder width) than in the other tucks. The skier assumes a relaxed crouch. The hands are down in front and slightly out to the sides to help maintain balance. The torso is inclined forward, but not so far as to be parallel to the snow. The weight is distributed evenly across the skier's feet. See Figure 8.30 below.

Figure 8.30

8.3.2   Tuck Position

Purpose

The Tuck Position is used in order to descend a hill as quickly as possible. It is used in both skating and classic skiing (in the latter, trails are normally groomed so as to permit a skier to descend steeper hills outside of the track).

Elite skiers use the Tucking technique often. Two factors influence how low the Tuck is maintained: the skier's fatigue and the desired speed. In general, the lower the skier's crouch, the less air resistance there is and the faster he/she can go. However, when a skier is in a deep crouch, the leg muscles are usually contracted and there is little blood flow to and from them. As a result, muscles may cramp, causing performance to deteriorate.

Gaining time on a downhill section calls for no extra physical effort or energy consumption if the skier's technique is good. Furthermore, good and poor tucks take about the same effort.

Mechanics

Tucking is commonly used for maximum speed in elite competition, as it produces less drag than standing upright when descending a hill.

❏ The back should be parallel to the snow, the elbows held close together and in front of the knees, and the hands in front of the chin. For a low Tuck, there must be considerable flex in the hips, knees and ankles. A low Tuck is illustrated in Figure 8.31.

Figure 8.31

❏ Adopting a higher Tuck by not bending as much at knees and hips permits better blood flow to the legs and easier breathing. The high Tuck position is also used when preparing for a turn. Skiers often adopt positions between the low and high Tuck that vary with their fatigue. Two views of a high Tuck are illustrated in Figure 8.32.

Figure 8.32.1   Figure 8.32.2

❏ The skier should concentrate on the trail ahead and plan how to ski it as quickly as possible. His/her feet are normally about track width apart, the weight should be evenly balanced over both feet with the weight centered across the whole foot.

❏ To improve aerodynamics (minimizing wind resistance) and improve balance, the hands should always be forward of the hips and are usually held in front of the skier's face. Elbows can at times rest on the knees.

8.3.4   Step Turn

Purpose

The skier uses the Step Turn when he/she is skiing fast and wishes to maintain that speed while making changes in direction. It is also the best turn to be used in classic races as there is minimal loss of wax compared to a Parallel Turn.

Mechanics

This technique involves taking a series of incremental steps in the direction of travel around a corner while gliding forward. Figure 8.33 below illustrates a Step Turn in a Tuck position. The size of each step will depend on many factors, including the skier's velocity and the prevailing track/snow conditions.

❏ As the skier approaches a turn, his/her weight is evenly distributed on both skis. The skier adopts the Ready Position or a Tuck position (depending on the skier's speed and competence, the gradient of the hill, the trail surface, etc.). The skier lifts the inside ski, putting all the body weight on the outside ski which is edged. The skier then explosively extends the outside leg and transfers the weight to the inside ski in the new direction.

❏ As the skier lifts the inside ski and points it in the new direction, the skier's upper body and hips change orientation to face the new direction of travel. Thus, when the push takes place, the shift of weight to the inside ski is facilitated by correct body positioning over the inside ski.

❏ The skier's weight returns to the outside ski in preparation for the next step.

❏ The skier continues to take steps to the inside of the turn until the change of direction is completed and the track straightens out. At high speed, the steps must be rapid. It is important to emphasize quick and complete weight shift from ski to ski.

❏ In this technique the poles are held as in the Ready Position or Tuck, and are used only for balance.

Progression

❏ For beginners, start on relatively flat terrain. Skiers should step through a series of figure 8s to get the feel of changing direction to both sides.

❏ Then ski down a slight grade, lifting each ski in turn.

❏ Ski down a slight grade, making one Step Turn until performance is good, then add several steps in the same direction.

Figure 8.33 – Step Turn in Tuck Position

Figure 8.33.1

Figure 8.33.2

Figure 8.33.3

Figure 8.33.4

Figure 8.33.5

Figure 8.33.6

❏   Repeat the above three progressions in the other direction.

❏   On a steeper hill, practise the third and fourth progression.

❏   Take several steps in one direction, followed by several steps in the opposite direction.

❏   Practise maintaining a Tuck while performing the step turn.

❏   Practise Step Turns on a modified slalom course at ever greater speeds.

Common Errors and Solutions – Step Turn	
Errors	**Solutions**
Incomplete weight transfer. This may cause the skier to catch an inside edge when skiing on soft snow. It also causes the skier to become unbalanced and to lose momentum.	✓ Have the skier practise balancing on one ski. ✓ Work on Star Turn or Step Turn techniques in loose, deep snow.
Too big a step. The skier's step takes him/her beyond the base of support resulting in an unstable position. The effects are the same as if the weight transfer had been incomplete.	✓ Emphasize taking small steps. ✓ Set up two lines between which a skier must do a given number of Step Turns as he/she goes down a hill.

8.3.4   Parallel Turn

Purpose

The Parallel Turn is the most effective high-speed turn when turning space is limited and the turn must be done very quickly. The technique is also used when snow conditions are such that the skier cannot do a Step Turn around a corner, for example on an icy course. A Parallel Turn will slow the skier down relative to a Step Turn, as the sliding action causes the skier to lose speed. There also can be a significant loss of grip wax with this technique, particularly in icy conditions.

Mechanics

The Parallel Turn should not be confused with the technique of the same name used in Alpine skiing. Rather it is a cross-country skiing technique that has evolved from the relatively traditional descending techniques known as the basic Christie, the stem Christie and the parallel Christie. In practice, it is a technique that can be entered from any one of Straight Running, the Ready Position and the Tuck, and which may contain elements of the Snowplow, Snowplow Turn and Side Slipping, depending on the demands of the trail and snow conditions and the skier's level of ability:

❏ Prior to attempting the Parallel Turn, the skier should be comfortable at Side Slipping and the Snowplow Turn, covered in the FUNdamentals stage (see section 4 of the Community Coaching Reference Material).

❏ **Parallel Turn from Snowplow Entry**. This turn is essentially a combination of a narrow Snowplow Turn and Side Slipping. See Figure 8.34. To teach the technique, have the skier ski down the slope in a narrow Snowplow position and begin a Snowplow Turn. The mechanics of the technique are as follows:

✓ The skier enters the turn in a narrow Snowplow position. See Figure 8.34.1.

✓ The skier initiates the turn by turning the hips and upper body into the turn.

✓ The skier keeps the knees flexed, weights the downhill ski briefly (if traversing the slope), then transfers the weight sharply onto the outside ski to carve through the turn (with the outside ski becoming the new downhill ski as the skier exits the turn). See Figure 8.34.2.

✓ The inside ski tracks parallel to the outside ski from the mid-point of the turn. See Figure 8.34.3.

✓ The weight shift, an accompanying angling of the knees and ankles into the hill during the turn and the edging of the inside of both skis through the latter part of the turn permit slipping and turning as in Figure 8.34.4.

✓ The poles are carried as for the Ready Position throughout.

Figure 8.34 – Parallel Turn from Snowplow Entry

Figure 8.34.1

Figure 8.34.2

Figure 8.34.3

Figure 8.34.4

❏ **High Speed Parallel Turn**. Once a skier is comfortable initiating the Parallel Turn from the Snowplow position, he/she is ready to carry out the turn from a Tuck position. In appearance and practice, this is a turn that is similar to the turns executed by an Alpine skier in a Downhill type of race. An Alpine skier attempts to carve through turns to the degree possible, thus conserving speed, but some tighter or icier turns require more edging of the skis and a degree of skidding/slipping in order to complete the turn (though the aim remains to minimize this and the resulting loss of speed). A Parallel Turn from a Tuck entry is illustrated in Figure 8.35. Mechanics of the technique are as follows:

✓ Approaching the Parallel Turn, the skier is likely in the Ready Position or the downhill Tuck Position, with the weight well centred across the feet.

✓ Upon the initiation of the turn, the skier shifts weight predominantly to the outside ski, with the weight returning to be more evenly balanced on both skis in the later portion of the turn. The skis remain parallel to each other entering the turn and they remain parallel throughout the turn. The skier edges the skis strongly by angling the knees into the hill.

✓ The skier should keep the hands well forward during the turn and the body facing down the hill. The skier should practise the turns at a fairly high speed on a gentle slope that is smooth and well packed. In soft conditions, the skier should be able to edge into the snow when making the turn. However, in harder conditions this will not be possible and some skidding or slipping will occur.

Figure 8.35 – Parallel Turn from Tuck Entry

Figure 8.35.1

Figure 8.35.2

Figure 8.35.3

Figure 8.35.4

Progression

❏ Use flat, easy, open slopes that are well packed and slightly convex. Turn in one direction only.

❏ Do as above, but turn in the other direction.

❏ Turn in one direction and immediately turn the other way.

❏   Practise on a section of hill where the Parallel Turn would be used during competition.

❏   Practise on steeper hills.

Common Errors and Solutions – Parallel Turn	
Errors	**Solutions**
Weight too far back. This reduces the turning ability of the skis and can send the skier off balance more easily.	✓ Have the skier keep the weight predominantly on the outside ski through the turn, with the body positioned forward over the feet.

8.4   Classic and Downhill Technique Drills

8.4.1   Diagonal Stride Drills

❏ **Scooters - A**. For this progression, a set track is preferred, on flat or even slightly downhill terrain. The skier should have good grip from the wax, but not too sticky! The skier does not use poles. The skier removes the right ski and stands on the left ski, in the right hand track. The skier then pushes down the track using the right foot, and is encouraged to push up over the left ski and to glide for a period between push offs. During the glide the skier should be encouraged to get the upper body up and over the glide ski with the gliding knee and hips lining up over the front part of the foot. This is the same position as used in the Forward Lean exercise in the FUNdamental skills. Once the skier has become proficient at this, he/she should try the same activity with the ski on the right foot (in the left hand track) and pushing off the left foot.

The skier begins the leg push with a short quick flex at the knee and ankle followed by extension of these joints. The skier should be encouraged to push off using the full foot, starting with pressure from the whole foot and finishing off with a powerful push from the front of the foot and the toes.

The next step would be to encourage a longer glide between each push. Mark off a section of track and see if the skier can reduce the number of strides needed to complete the section. You can also see who in your group can take the longest glide.

❏ **Pairs Scooters - B.** This can be a fun partner exercise. A pair of skiers with one ski each stands beside each other in a set track. The left hand skier only has a ski on the right foot, which is in the left track, and the right hand skier has a ski on the left foot, which is in the right hand track. They both hold onto one half of a ski pole which is held in front of them in a horizontal position. The skiers then work together, scootering down the track. By skiing together, the skiers minimize unnecessary side to side motion, and a more capable skier can help the less skilled skier develop more appropriate timing and weight transfer.

❏ **Diagonal No Poles.** The skier practises the complete Diagonal Stride without poles. The skier should work on a good weight transfer with a long glide and should be swinging the arms, so the forward arm movement and the backward leg extension end at the same time. As with the above exercises, this generally can be more easily accomplished on a flat or very slightly ascending section of track. This activity can also be done with a partner and sharing one pole. This can be quite helpful for a beginning skier when paired up with a more advanced skier.

As the skier becomes more comfortable on the glide ski, the hips and knee should line up over the toes of the glide ski, and the next leg push should be initiated by a quick bending and then a powerfully extension of the hip and then knee. Practising quite extensively without poles is a very good way of developing the proper balance and timing required in the Diagonal Stride. A useful exercise for more skilled skiers is to practise (in a good track) with their eyes closed. This causes the skier to focus more intently on how to push off with the foot and leg and how to balance on the other ski.

❏ **Diagonal Stride, Hands behind Back.** The skier practises legs only Diagonal Stride with the hands behind the back, thus permitting focus on the leg action in the stride. This can also be done with a pole held behind the back at the elbows, or resting on the shoulder. The pole should generally remain in a fairly horizontal position.

❏ **Diagonal Stride Holding Poles in the Middle.** To get the skier used to holding poles, he/she can start by holding the poles mid-way down the shaft in a very loose grip, between the thumb and index finger. The skier should be encouraged to have a very relaxed grip on the poles and swing the arms naturally, similar to when skiing with no poles.

❏ **Connected Diagonal Stride**. This is another activity for partners. It that can be done with a more skilled skier leading a less skilled skier. Partners ski slowly, one behind the other, with the front skier holding the handle of a ski pole in the right hand and the other skier holding the tip. They also share a ski pole in their left hands. This is another activity that can help a less skilled skier develop a good rhythm for the technique.

❏ **Table Drill**. The following drill (see Figure 8.36 below) can be practised during dryland training to help skiers get used to the correct legs together position. With legs together, the skier stands relaxed about a half-metre in front of a table or wall. The skier bends at the ankle, knee and hip so that the weight starts to go onto the toes and the heels begin to rise off the ground. The skier touches the table or wall with the hands for light support. The skier transfers all the weight onto the right foot; the left foot touches the ground only lightly.

Figure 8.36: Table Drill
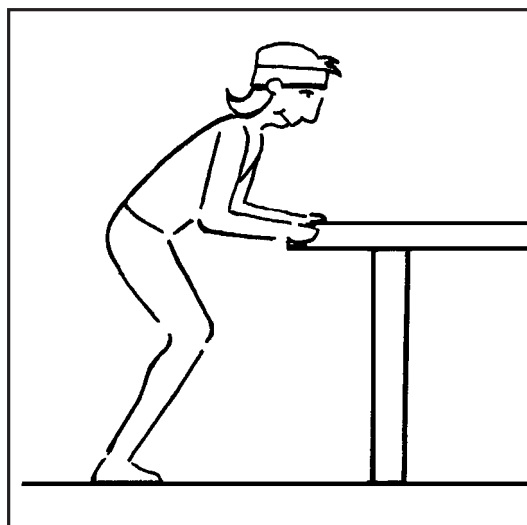
8.4.2   Overall Downhill Drills

The following drills can be useful for improving the skier's overall downhill skills:

❏ Have races on slalom courses.

❏ Play follow-the-leader games on downhill terrain.

❏ Have a competition on a bumpy track.

❏ Have a race up and back down a hill.

8.4.3   Tucking Drills

❏ Practise Tucks on dryland and on flat terrain.

❏ Hold some speed trials, having skiers use the same pair of skis and try different Tuck positions.

❏ Practise on alpine slopes.

❏ Practise on hills that the skier will race on. Find the quickest way down and the best and quickest way to make it through the rough spots.

8.4.4   Step Turn Drills

❏ **Balance Drills on One Leg**

✓ **The Stork Stance.** Skiers practise standing on one leg while remaining balanced. They are allowed to extend their hands sideways to steady themselves. Alternate legs.

✓ **Rubber Leg.** Skiers first stand tall on one leg/ski, and then relax it, letting it slump into a flexed position at the ankle and knee. Alternate legs.

✓ **One-Legged Pops.** Skiers pop/spring off one leg, which is bent, and then land on it. Alternate legs.

✓ **Back Leg Lifts.** Skiers extend one leg/ski rearward and off the snow while bending forward at the waist. They then move the same leg/ski forward, without weighting it, and return their upper body to an upright position. Repeat with the opposite leg.

✓ **Poison Peanut Butter.** Skiers lift one ski and then the other off the snow so that the "poison peanut butter" (i.e. the snow) doesn't stick to their skis. The coach encourages the skiers to keep moving by saying "quick, don't let the peanut butter stick!"

✓ **Stepping Movements.** These movements are the basis of the Side Step and Star Turn. They follow on from the "Poison Peanut Butter" exercise above. This exercise should be introduced on packed snow, but it can also be practised in deeper snow when the skiers are ready for the challenge. Another option is to set several ski tracks parallel to each other. To begin, have the ski poles lying on each side of the skiers, parallel to their skis. The skiers step over the poles going first in one direction, and then the other. As the skiers gain competence, several poles can be lined up for them to step over, or they can be placed farther apart to require a longer step. The skiers can also try to jump over the poles with both feet.

❏ **Practise in Soft, Deep, Loose Snow.** This emphasizes weight shift and lifting the skis.

❏ **Practise on Slalom Course.** High speeds are not necessary and course poles should be fairly far apart. Start off easily so that everyone can accomplish the technique; then move the gates closer together. Several formats are possible: dual starts; races against the clock; and skiing with and without poles.

REFERENCES

Cross Country Canada, *NCCP Level 2 Technical Manual – Cross-Country Skiing*, 1995.

Cross Country Canada, *NCCP Level 3 Technical Manual – Cross-Country Skiing*, 1998

US Ski Team, USSA Sports Performance Series (CD-ROM), *Cross-Country Technique Fundamentals.*

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LEAVING THEM IN OUR TRACKS

> This section complements the information provided in section 11 of your Learning to Train (Dryland) Reference Material and is directed at supporting you in your role as a coach working with children in the Learning to Train stage of development.

9.1   CCI Certification Process

The NCCP is a competency-based program. This program trains coaches, and then permits trained coaches to become certified. Certification is based on demonstrating abilities to "do" certain things that are deemed important for meeting the needs of the athletes who are being coached, thereby creating an environment that will both optimize athletic development and encourage individuals to make a life-time commitment to sport and physical activity.

The Learning to Train (L2T) stage of athlete development is a very important period for developing physical literacy and refining ski skills, as children who do not develop their fundamental motor skills by 12 years of age are unlikely to reach their full potential. Moreover, the L2T and Training to Train (T2T) stages constitute important stages of athletic preparation. It is therefore essential for the children you are coaching that you continue to improve your skills and stay current.

In the new NCCP system a coach is described as:

In Training - when the coach has completed some of the required training for a context.

Trained - when the coach has completed all required training for a context.

Certified - when the coach has completed all evaluation requirements for a context.

❏ The CCI L2T (Dryland) and L2T (On-Snow) workshops provide you with the basic training you require in order to coach children in the L2T stage of growth and development.

❏ When you have completed the two CCI L2T workshops you will be designated a "CCI coach in training".

❏ The CCI T2T (Dryland) and T2T (On-Snow) workshops provide you with the basic training you require in order to coach children in the T2T stage of growth and development.

❏ When you have completed the two CCI T2T workshops you will be designated a "trained CCI coach".

❏ When you have successfully completed the four CCI workshops (refer to section 9.3) and the required tasks and evaluations - including "Making Ethical Decisions (MED)" - relating to the CCI context, you will be CCI certified.

❏ CCI certification is a prerequisite for entry into the next step in the NCCP progression (i.e. attendance at the first Competition Coaching: Development (CCD) workshop).

❏ Once you have achieved a particular status in the CCI certification progression (i.e. "CCI coach in training", "trained CCI coach" and "certified CCI coach"), it will be recorded on the Coaching Association of Canada (CAC) database as part of your coaching record.

❏ Your certification status will be valid for a period of five years, and can be extended by completing designated development activities, such as coaching seminars, practical assignments and additional coaching workshops.

❏ Your certification status can be revoked if you contravene the CCC Coaches Code of Conduct or NCCP Code of Ethics.

A complete explanation of the CCI certification process and the forms used in this process are available on the Cross Country Canada website. In addition the following chart identifies the key outcomes and evaluation components which comprise CCI certification:

Outcomes	Evaluation Components
1. The coach makes ethical decisions.	**Ethics Evaluation**. The coach successfully completes the Coaching Association of Canada's CCI "Making Ethical Decisions (MED)" online evaluation.
2. The coach provides appropriate support to athletes.	**Risk Management.** The coach demonstrates appropriate risk management practices during a practice session (dryland or on-snow). **L2T Practice Session**. The coach successfully organizes a safe, effective practice session for athletes in the L2T stage of development (on-snow). **T2T Practice Session**. The coach demonstrates the ability to organize a safe, effective practice session for athletes in the T2T stage of development (dryland). **Interventions**. The coach demonstrates an effective intervention that promotes learning. **Planning a Practice**. The coach prepares an appropriate practice plan and submits it to the Facilitator.
3. The coach analyzes ski technique.	**Detects Technique Deficiencies**. The coach correctly identifies aspects of intermediate techniques that require improvement. **Corrects Technique.** The coach correctly prescribes changes that will result in improvement.

4. The coach provides appropriate support to athletes.	**Skill Development Camps.** The coach successfully organizes and leads an overnight interclub (i.e. regional) camp for athletes in the FUNdamentals and/or L2T stages of development.
	Training Camps. The coach successfully completes a P/TCE assignment at a Provincial/Territorial Team Camp.
5. The coach supports the competitive experience.	**Competitions - 1.** The coach successfully leads a club team to a Regional Cup race, Midget Championships or a similar age-appropriate competition for athletes in the L2T stage of development.
	Competitions - 2. The coach successfully leads a club team to a nationally sanctioned competition (CPL or CSL) such as a Provincial/Territorial Cup.
	Ski Preparation. The coach demonstrates the ability to provide appropriate waxing support for his/her athletes at a club or regional level competition.
6. The coach designs a sport program for athletes in the L2T and/or T2T stages.	**Sport Program**. The coach prepares an appropriate sport program and submits it to the Facilitator.
	CCI-L2T Certification Test. The coach successfully completes a knowledge test demonstrating his/her understanding of the key coaching concepts covered in the CCI-L2T program.
	CCI-T2T Certification Test. The coach successfully completes a knowledge test demonstrating his/her understanding of the key coaching concepts covered in the CCI-T2T program.
7. The coach has personal technical competence.	**Technique Evaluation**. The coach demonstrates an intermediate level of technical skill in each of the ski techniques covered in the CCI-T2T (On-Snow) workshop.
	Note: Coaches with a significant reason for being unable to complete the technical skill requirements have an opportunity to apply for an exemption.
8. The coach has general coaching experience.	**L2T Coaching Experience**. The coach completes 40 hours of coaching in one season (dryland and on-snow combined), working with athletes at the L2T or T2T stage of development, and receives satisfactory reviews from the parents and athletes.
	T2T Coaching Experience. The coach completes 60 hours of coaching in one season (dryland and on-snow mixed), working with athletes at the L2T or T2T stage of development, and receives satisfactory reviews from the parents and athletes.

Your Certification Checklist

❏ **CCI-L2T (Dryland) Workshop**

✓ Complete the workshop.

❏ **CCI-L2T (On-Snow) Workshop**

✓ Complete the workshop.

✓ Personal technique competence assessed.

✓ Technique analysis (intermediate level) skills assessed.

✓ Complete CCI-L2T Certification Test and submit to Facilitator.

❏ **Before Participating in the T2T (Dryland) Workshop**

✓ Complete 40 hours of coaching in one season.

✓ Lead a club team at a Regional Cup, Midget Championships or a similar age-appropriate competition for children in the L2T stage of development.

✓ Organize and lead a skill development camp.

✓ Submit NCCP CCI-L2T Experience Form (evidence of 40 hrs of coaching etc.) to Facilitator.

❏ **CCI-T2T (Dryland) Workshop**

✓ Complete the workshop.

❏ **Before Participating in the T2T (On-Snow) Workshop**

✓ Develop and submit a written sport program for athletes in the L2T and/or T2T stage of development.

✓ Develop and submit a written practice plan for both dryland and on-snow practices.

❏ **CCI-T2T (On-Snow) Workshop**

✓ Complete the workshop.

✓ Personal technique competence evaluated.

✓ Technique analysis (intermediate level) skills evaluated.

✓ Complete CCI-T2T Certification Test and submit to Facilitator.

❏ **Prior to Completing the CCI Context**

✓ Lead an on-snow practice session for L2T athletes and be evaluated.

✓ Lead a club team at a nationally sanctioned competition (CPL or CSL) competition such as a Provincial/Territorial Cup.

✓ Support a Provincial/Territorial team at a training camp (P/TCE Assignment).

✓ Lead a dryland practice session for T2T athletes and be evaluated.

✓ Submit NCCP CCI-T2T Experience Form (evidence of 60 hrs of coaching etc.) to Facilitator.

✓ Complete the Coaching Association of Canada's CCI "Making Ethical Decisions (MED)" online evaluation.

✓ Ski preparation skills evaluated.

✓ Participants who have not completed their other certification steps by the end of the CCI-T2T workshop will have an opportunity to complete the process by :

  • submitting their NCCP CCI-T2T Experience Form to their Division Office; and/or

  • submitting outstanding written assignments to a Facilitator for review; and/or

  • arranging an evaluation opportunity for technique competence and/or technique analysis with a qualified Evaluator. This process must be completed within 12 months of the date the T2T (On-Snow) workshop was attended.

✓ The cost of a post-workshop evaluation for technique competence and/or technique analysis (if required) is the responsibility of the club or individual.

9.2   CCI Coach Flowchart

NCCP Competition Coaching Introduction (CCI) Certified

MED Online Evaluation
Formal Observation of T2T Coaching Practice (Dryland)
Formal Observation of T2T Coaching Practice (On-Snow)
T2T Experience Form Approved

- ✓ Ski Preparation Skills Evaluated
- ✓ Complete P/TCE Camp Assignment
- ✓ Lead Club Team at CPL/CSL Competition
- ✓ Risk Management Practices Evaluated
- ✓ Intervention Skills Evaluated

Trained CCI Coach --

Training to Train
Males Age 9 - 12
Females Age 8 - 11

Training to Train (On-Snow) Workshop
16 hours

- ✓ Technique Competence Evaluated
- ✓ Ski Technique Analysis Evaluated
- ✓ T2T Certification Test
- ✓ Complete 60 hours T2T Coaching Experience

Training to Train (Dryland) Workshop
16 hours

- ✓ Develop L2T/T2T Seasonal Program
- ✓ Develop Practice Plans for Dryland and On-Snow Practices

CCI Coach "in Training"--

Learning to Train
Males Age 12 - 16
Females Age 11 - 15

Learning to Train (On-Snow) Workshop
16 hours

- ✓ Lead Club Team at Regional Cup or Similar Competition
- ✓ Organize/lead Skill Development Camp
- ✓ Complete L2T Certification Test
- ✓ Complete L2T Experience Form
- ✓ Complete 40 hours L2T Coaching Experience

Learning to Train (Dryland) Workshop
16 hours

Prerequisite.....

NCCP Community Coach (CC) Certified

9.3   Evaluation Form

CCI Learning to Train (On-Snow) Workshop
Cross-Country Skiing

Date of Workshop: _____   Location: _____

Facilitator's Name: _____

Please fill in this form and hand it in to the Facilitator before you leave. Your comments are important to the ongoing development of the National Coaching Certification Program.

Please answer the following:

The workshop gave me new ideas about how to recruit children to cross-country skiing.

1	*2*	*3*	*4*	*5*

Strongly disagree   *Strongly agree*

The workshop provided me with new tools to assist me in creating a good team environment for my athletes.

1	*2*	*3*	*4*	*5*

Strongly disagree   *Strongly agree*

I developed an overall understanding of the different learning styles and the implications this has on teaching.

1	*2*	*3*	*4*	*5*

Strongly disagree   *Strongly agree*

I developed a better understanding of how to help the parents of my athletes acquire appropriate ski equipment for the level of program their child is in.

1	*2*	*3*	*4*	*5*

Strongly disagree   *Strongly agree*

I have an improved understanding of the key considerations for the organization and set up of an effective learning environment.

1	*2*	*3*	*4*	*5*

Strongly disagree   *Strongly agree*

I have increased confidence in my ability to effectively analyze and improve my athletes' skating technique.

1	2	3	4	5

Strongly disagree   *Strongly agree*

I have increased confidence in my ability to effectively analyze and improve my athletes' downhill technique.

1	2	3	4	5

Strongly disagree   *Strongly agree*

I have increased confidence in my ability to effectively analyze and improve my athletes' classic technique.

1	2	3	4	5

Strongly disagree   *Strongly agree*

The workshop provided me with a better understanding of ski bases and how to prepare them to meet the needs of athletes in the L2T stage of development.

1	2	3	4	5

Strongly disagree   *Strongly agree*

I understand better how to prepare for and support my athletes at a competition.

1	2	3	4	5

Strongly disagree   *Strongly agree*

During this workshop I had several opportunities to exchange with and learn from other coaches.

1	2	3	4	5

Strongly disagree   *Strongly agree*

I found the Workbook and Reference Material to be relevant to my coaching needs.

1	2	3	4	5

Strongly disagree   *Strongly agree*

I would recommend this workshop to other coaches I know.

1	2	3	4	5

Strongly disagree   *Strongly agree*

Please answer the following questions:

What sections of the workshop did you find particularly useful?

_____

_____

_____

_____

_____

_____

_____

Would there be anything you would like to see added to this workshop? If so, what would it be?

_____

_____

_____

_____

_____

_____

_____

Are there any additional comments or suggestions you wish to add?

_____

_____

_____

_____

_____

_____

_____

_____

Thank you for your feedback, and best wishes in your coaching.

9.4   CCI Learning to Train Certification Test

Date of Workshop: _____   Location: _____

Facilitator's Name: _____

Coach's Name: _____

The following is your "CCI Learning to Train Certification Test". Please answer T (true), or F (false), to each of these statements:

1)   If you give parents information pertaining to athlete development,   T   F
     they are more likely to interfere with your coaching, so it is
     recommended that you restrict your communications to
     administrative information only.

2)   Fundamental movement and fundamental sport skills permit a child   T   F
     to move confidently and with control in a wide range of physical
     activity and sport situations.

3)   Physical literacy should be developed after the adolescent growth   T   F
     spurt ends.

4)   Developmental age refers to the number of years and days elapsed   T   F
     since birth.

5)   "Windows of trainability" are periods of sensitivity to particular   T   F
     emphases of training.

6)   A sport program is a planned and progressive sequencing of   T   F
     activities. The nature, number, frequency, duration and content of
     these activities are adapted to the athletes' stage of development,
     skill level and sport experience.

7)   During the L2T stage, athletes should be encouraged to take an   T   F
     increasingly systematic approach towards the development of their
     own fitness. The objective is to establish habits that will lay the
     groundwork for a healthy, active lifestyle.

8)   A good flexibility program will shorten the length of the muscles,   T   F
     prepare the muscles for intense work and help in recovery.

9)   For girls, the first speed training window occurs between six and   T   F
     eight years of age.

10) Stretching is easy, but when it is done incorrectly or at the wrong time it can do more harm than good.   T   F

11) All basic technique skills, both classic and skating, should be refined by the end of the L2T stage of development.   T   F

12) Core strength development (abdominal wall and lower back) is important for children participating in any activities or sports beginning at the L2T stage of development.   T   F

13) Skill development camps should not be introduced to children until after the L2T stage of development.   T   F

14) Carbohydrate consumption should be avoided before, during and after long training sessions and competitions.   T   F

15) It is not beneficial to wear eyewear with UV protection during the winter months.   T   F

16) Athletes should be introduced to roller skiing during the L2T stage of development for the purpose of building their upper body strength.   T   F

17) Ski walking is a dryland technique that is used to imitate the on-snow Uphill Diagonal Stride technique (without the glide).   T   F

18) Athletes in the L2T stage of development should rely solely on their coach to prepare their skis both for practices and competitions.   T   F

19) A good understanding and facilitation of team building concepts will aid in the development of an effective and healthy team environment.   T   F

20) Even though each athlete has a preferred learning style it is best to gear your coaching to the style that represents the majority of the group.   T   F

21) One of the most important goals of the L2T stage of development is for athletes to master all basic ski techniques and become equally proficient in each of them.   T   F

22) Athletes should only practise technique in ideal snow and weather conditions.   T   F

23) The "gear" analogy for techniques gives an indication of the relative speed of the skier using them.   T   F

9.5   NCCP CCI-L2T Experience Form

CC #: _____ LAST NAME: _____

FIRST NAME: _____ STREET: _____

CITY: _____ PROV.:_____

PC: _____ PH: _____ BIRTHDAY (d/m/y): _____

MALE or FEMALE   ENGLISH or FRENCH   EMAIL: _____

1. Complete one season of coaching experience (a minimum of 40 hours including preparation time; dryland and on-snow mixed) working with athletes at the L2T stage of development.

    Beginning date: _____ Ending date: _____

    Receive a satisfactory evaluation from a club leader (i.e. Club Head Coach, SDP Programmer) who has gathered comments from skiers and parents involved with the program).

2. Organize and lead an overnight, interclub skill development camp (dryland or on-snow) for athletes in the L2T/FUNdamentals stages of development.

    Date, name and location of camp: _____

    _____

3. Lead a club team to a Regional Cup, Midget Championship or similar age-appropriate competition for athletes in the L2T/FUNdamentals stages of development. Provide appropriate waxing support for your athletes and receive a satisfactory evaluation from a NCCP Evaluator.

    Date, location and signature of evaluator: _____

    _____

4. Lead a safe, appropriately structured and appropriately organized on-snow practice session for athletes in the L2T stage of development, and receive a satisfactory evaluation from a NCCP Evaluator.

    Date, location and signature of evaluator: _____

    _____

Please sign the following statement and have it verified by a leader from your ski club (Head Coach, SDP Programmer, Club Executive):

I,_____ have completed the NCCP CCI-L2T experience requirements for cross-country skiing.

_____   _____
DATE   Signature of Applicant

I verify that _____ has completed the NCCP CCI-L2T
experience requirements for cross-country skiing.

_____   _____
DATE   Signature of Club Official

Please forward to your Division Office

9.6   NCCP CCI-T2T Experience Form

CC #: _____ LAST NAME: _____

FIRST NAME: _____ STREET: _____

CITY: _____ PROV.: _____

PC: _____ PH: _____ BIRTHDAY (d/m/y): _____

MALE or FEMALE   ENGLISH or FRENCH   EMAIL: _____

1. Complete one season of coaching experience (a minimum of 60 hours including preparation time, dryland and on-snow mixed) working with athletes at the T2T stage of development.

    Beginning date: _____ Ending date: _____

    Receive a satisfactory evaluation from a club leader (i.e. Club Head Coach) who has gathered comments from skiers and parents involved with the program.

2. Assist a provincial/territorial team at a training camp and receive a satisfactory evaluation from the Head Coach (P/TCE Assignment).

    Date, name and location of camp: _____

    _____

3. Lead a club team at a nationally sanctioned (classic technique) competition such as a Provincial/Territorial Cup race, and receive a satisfactory evaluation from your club head coach or a NCCP Evaluator.

    Date, location and signature of evaluator: _____

    _____

4. Lead a safe, appropriately structured and appropriately organized dryland practice session for athletes in the T2T stage of development, and receive a satisfactory evaluation from a NCCP Evaluator.

    Date, location and signature of evaluator: _____

    _____

Please sign the following statement and have it verified by a leader from your ski club (Head Coach, SDP Programmer, Club Executive):

I,_____ have completed the NCCP CCI-T2T experience requirements for cross-country skiing.

_____   _____
DATE   Signature of Applicant

I verify that _____ has completed the NCCP CCI-T2T experience requirements for cross-country skiing.

_____   _____
DATE   Signature of Club Official

Please forward to your Division Office

APPENDIX A – COACHING ATHLETES WITH A DISABILITY

Dear Coach,

The Coaching Association of Canada is pleased to offer you an interactive website that enables you to check your accreditation online. Go to www.coach.ca where you can:

- track your progress through the NCCP;

- update your coaching profile;

- print out copies of your coaching card or a transcript of your coaching courses;

- visit the Coaching Tips and Tools section;

- and so much more!

Coaching
Association
of Canada

National
Coaching
Certification
Program