ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 6

EO M426.02E – SKI ALONG A ROUTE

Total Time:	270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Organize all cross-country ski equipment into three groups—skis, boots, and poles. Within each group organize the equipment by size / height.

Photocopy one Cross-Country Ski Equipment Sizing Information Form located at Attachment A and cut it into four separate forms.

Assistant instructors will be required for this lesson.

PRE-LESSON ASSIGNMENT

Distribute to the cadet the Cross-Country Ski Equipment Sizing Information Form located at Attachment A to cadets when they arrive at the expedition centre on the Friday evening. Cadets must complete the form prior to the commencement of this EO.

Cadets must arrive wearing appropriate cold weather clothing. They must have the socks on that they will be wearing during the expedition, to ensure proper fit of ski boots.

APPROACH

An interactive lecture was chosen for TP 1 to introduce and give the cadet direction on types of snow and how they can affect a cross-country skier.

A demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate the procedures for fitting personal cross-country ski equipment and executing classic cross-country ski techniques while providing an opportunity for the cadet to practice the skill.

INTRODUCTION

REVIEW

Nil.

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OBJECTIVES

By the end of this lesson the cadet shall have classic cross-country skied along a route, during an expedition.

IMPORTANCE

It is important for cadets to classic cross-country ski along a route, as it is a mode of travel used during winter expedition training. Cadets are required to work as a member of a team to travel a significant distance during the expedition. Performing classic cross-country ski techniques assists them in keeping up with their team.

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Teaching point 1 **Discuss types of snow.**

Time: 10 min Method: Interactive Lecture



The purpose of this TP is to introduce the cadets to the different types of snow they may encounter when cross-country skiing.

If snowshoeing was chosen as a mode of travel and was instructed prior to this EO, types of snow have already been discussed. If that is the case, conduct a quick review bringing attention to how the different types of snow can affect the slide and grip of skis.

Point out examples of different types of snow that exist in the surrounding environment.

Being aware of what type of snow or ice one is travelling on increases awareness of how skis perform in different conditions.

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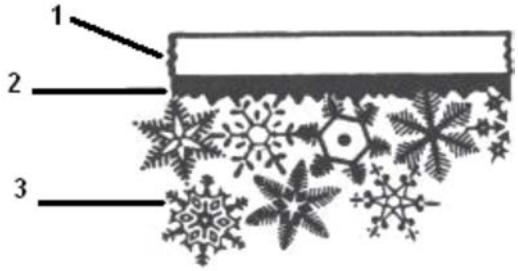
TYPES OF SNOW

Skis do not slide on the snow; they slide on a thin layer of moisture (2) that is between the snow (3) and the ski surface (1). The thin layer of moisture is created by the pressure of the ski upon the snow and by the friction caused by the motion of the skis across the snow. Heat created by the pressure and the friction melts some of the snow.



Note. From Complete Cross-Country Skiing and Ski Touring (2nd ed.), (p. 164), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 1 Relationship Between Snow, Moisture and the Cross-Country Ski

Skis also have to grip the snow to allow the skier to push and move forward while going uphill or on flat terrain. This grip is influenced by the type of snow crystals (flakes).

New snow crystals (flakes), with their numerous points and arms, dig into the uneven surface of the waxed ski when there is weight pushing down on them.



Note. From Complete Cross-Country Skiing and Ski Touring (2nd ed.) (p. 164), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 2 New Snow Crystals (Flakes)

Old snow crystals (flakes), 24–36 hours old, begin to wear away, making them smoother and less able to grip into the ski. Once snow crystals (flakes) begin to melt, or melt and then re-freeze, the points and arms become virtually non-existent, severely affecting how the skis slide on and grip the snow.

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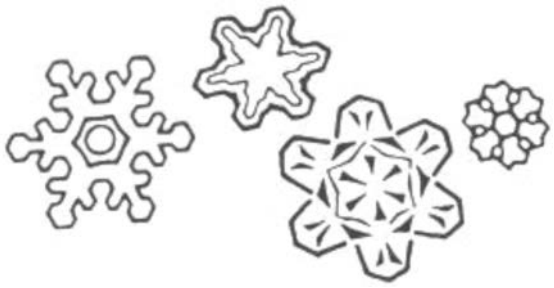

Note. From Complete Cross-Country Skiing and Ski Touring (2nd ed.) (p. 166), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 3 Old Snow Crystals (Flakes)

The action of skis both sliding and gripping the snow is made possible by wax. Wax selection is influenced by:

- the moisture content in the snow,
- the temperature of the air,
- the shape of the snow crystals (flakes), and
- the age / type of snow.

In new snow, the layer of wax should be smooth and thin. In older snow, the layer of wax should be sticky and thick.

Being able to identify different types of snow is very important for cross-country skiers. The type of snow dictates the type / level of wax required for optimum skiing.



Cadets are not required to wax their own skis. This will be completed by an experienced staff member. They should, however, be able to tell the staff member what type of snow they will be skiing on.

New fallen snow. Very loose and light. The snowflakes still have multiple points / arms. If new snow is dry, it is feathery; if damp, it quickly consolidates into a stage of settled snow.

Powder snow. New, untouched freshly fallen soft snow. It can give the feeling of floating in a weightless environment. Powder snow can be packed in thick layers that form a natural pillow. Powder snow has a low moisture content, as almost 97 percent of it is air. Powder snow compacts easily.

Wind-packed snow. Snow blown from one direction, compacted by the force of the wind. Wind-packed snow is created by the pressure exerted by wind, causing a form of cold-heat hardening. In some areas the snow surface is strong enough to hold the weight of a person on skis.

Sun crust snow. Snow that has had the upper layer melt and then refreeze. Usually on top of powder snow, sun crust snow is stronger than the powder snow below it due to the refreezing. This snow can be dangerous as the crust may give away causing the skier to lose their grip.

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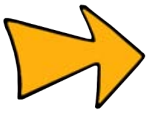
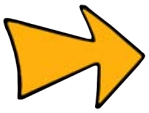


Sun crust snow is not very stable on a slope and can be dangerous when weighted. The snow will give way causing a fall or a slide.

Corn snow. After thawing, corn snow occurs. The structure of the snow is very grainy at this point. Corn snow usually occurs in the spring, and can be strong enough to carry weight but it also can indicate the presence of rotten snow, which is very dangerous. Corn snow is produced during the cycle of melting and refreezing in the accumulated snow.



A layer of snow that has been sun crusted will become corn snow.

Rotten snow. Caused by repeated melting and freezing and is found mostly on the south side of hills, or in lower levels of snow. Water will seep to the lower layers and will not freeze because it is insulated from the weather by the covering snow layer. Rotten snow can resemble very small icicles, or candle ice. This snow is dangerous. Sudden drops may exists and holes develop under the surface of the snow. Falling and injury are highly possible.

Slush snow. When the air temperature becomes warmer than the freezing point, the snow begins to melt and the water content becomes high. Slush snow absorbs water from melting snow. Slush snow is recognizable by depressions in the snow with darker or bluish snow areas. These areas show holes in the ice or an accumulation of water on the surface of the ice. Skiing on this type of snow is not advisable.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What do skis slide on?

Q2. What do new snow crystals (flakes) look like?

Q3. What type of snow has the lowest moisture content?

ANTICIPATED ANSWERS:

A1. Skis slide on the thin layer of moisture that is between the snow and the ski surface.

A2. New snow crystals (flakes) have many points and arms.

A3. Powder snow has the lowest moisture content.

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Teaching point 2 **Explain, demonstrate and have the cadets select and fit cross-country ski equipment.**

Time: 30 min Method: Demonstration and Performance



For this TP it is recommended that instruction take the following format:

(1) Introduce the parts and characteristics of cross-country skis.

(2) Demonstrate selection and sizing of cross country ski equipment.

(3) Have assistant instructors issue the cadets cross-country ski equipment, using the sizing information recorded on the cadet's Cross-Country Ski Equipment Sizing Information Form. Have the cadets form a line to receive the items in the following order:

a. cross-country skis,

b. ski boots, and

c. ski poles.

(4) Monitor the cadets and check sizing as they practice the steps to fitting cross-country ski equipment.

(5) Conduct equipment exchanges as required.

(6) Label each cadet's cross-country ski equipment with gear or masking tape.

Note: Assistant instructors will be required to distribute cross-country ski equipment and monitor the cadets' performance.



Cadets have no option in the type of skis / bindings / boots that are used. Type will depend on expedition centre stores.

Cross-country skiing is a fun and challenging sport with origins dating back hundreds of years. Norwegian and Scandinavian immigrants brought the sport of cross-country skiing to North America in the late 1800s. While it was initially used as a mode of transportation for hunters, miners, and mail carriers, it has progressed into a winter sport that can be enjoyed by all ages and all fitness levels.

Cross-country skiing can be grouped into three categories:

- ski touring,
- track skiing, and
- backcountry skiing.



Ski touring. The broadest and most versatile category of cross-country skiing. Ski touring does not require groomed trails—skiers can walk out their 'backdoor' and enjoy nature in a park, through a forest, or along a country road.

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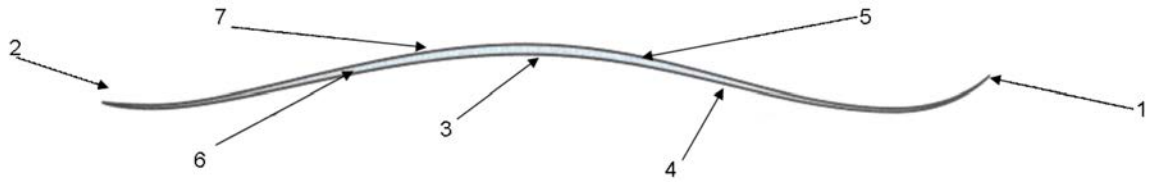
SELECT CLASSIC CROSS-COUNTRY SKIS

Cross-country skiing is a sport that can be conducted with little or no training, which is what makes it so popular. It is critical that skiers have properly fitted equipment. Properly fitted equipment increases overall skiing efficiency, staves off injuries and increases personal enjoyment.

Parts of a Ski

1. **Tip.** The front of the ski.
2. **Tail.** The back of the ski.
3. **Waist.** The middle of the ski.
4. **Ski base.** The underside of the ski.
5. **Topsheet.** The upper surface of the ski.
6. **Sidewalls.** The sides of the ski.
7. **Edge.** Where the sidewall meets the ski base.

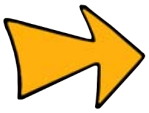


Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 59), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 4 Parts of a Ski

Characteristics of Cross-Country Skis

1. **Camber.** The arch of a ski from tip to tail as it lies ski base down on a flat surface. Camber allows a ski to be thin and light but still support the skier's weight. Camber of a ski can be manipulated to control where and how much pressure is applied to the snow along the length of the ski.



Camber can be explained by thinking about an arched bridge versus a flat bridge. The weight and pressure of an arched bridge is transferred from the middle of each span to the support piers—allowing for lighter materials to be used and the space below the arch not requiring much support. To carry the same amount of weight, a flat bridge needs to be constructed from stronger materials and supported by piers along its entire length.

2. **Width.** The width of a ski depends on the type of snow the individual is skiing on. The softer the snow, the wider the ski should be. Likewise, if skiing on machine-groomed, hard-packed trails, a narrower ski is recommended.

3. **Length.** Classic cross-country skis are typically longer than skating skis. This is because skating skis are usually used on machine-groomed, hard-packed trails and do not require the ski to float to the surface of deep snow.

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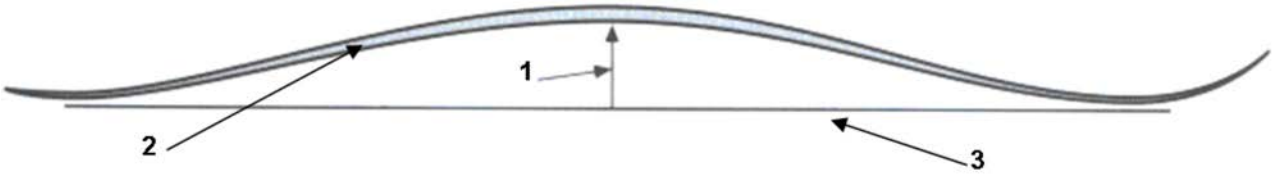

Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 59), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 5 Characteristics of Skis

Selecting Skis

The chart below is a rough guide to follow when selecting a ski length. When selecting a ski length, it is always recommended that the manufacturer's sizing chart be consulted.

Ski Length	Carrying Capacity
168 cm	90–130 lbs
168, 178 cm	130–150 lbs
178, 188 cm	150–180 lbs
188 cm	180–220 lbs

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The most common types of bindings used when cross-country skiing are:

- three-pin (75 mm), and
- system.

Three-pin bindings. Three-pin bindings work with boot soles and are shaped like a duckbill at the toe. The three pins at the front of the binding fit into three holes in the toe of the boot. A bar called a bail levers down from the upturned sides of the binding to clamp the toe of the boot sole to the ski and is held in place by a catch at the front. The duckbill that mates with the binding is 75 mm wide.

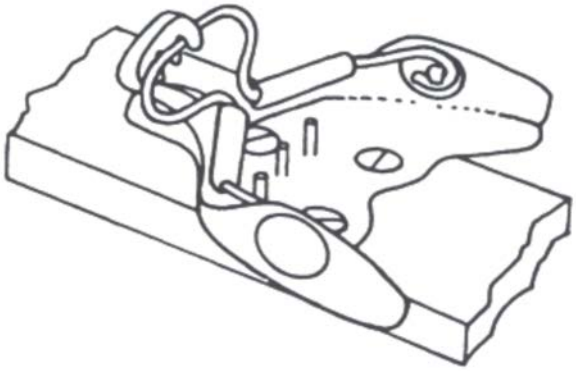

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Figure 6 Three-Pin Binding

System bindings. There are two types of system bindings—Salomon Nordic System (SNS) and New Nordic Norm (NNN). They are not interchangeable. In both models, the ski boots have a deep channel in the sole and a bar beneath the toe that clips into the binding. A wide ridge mounted on the ski extends to the rear from the point where the bar mates with the binding. This ridge fits into the channel in the boot to provide side-to-side control.



Note. From Back Country Ski Bindings by In My View…Things as I see Them, 2009. Retrieved May 1, 2009, from http://1.bp.blogspot.com/_UFDhrGObeFc/SWWjkvg_8KI/AAAAAAAAArM/qmVXzDiE1ek/s400/nnnBCbindings.jpg

Figure 7 NNN System Binding

SELECT SKI BOOTS

Skis are guided and controlled through the boots, so it is important that they fit well. Boots are made from a variety of materials from all leather, to modelled plastic to a combination of materials. Lighter boots provide more freedom but offer less support. Heavier boots provide more support but usually restrict movement and are harder to fit. Boots that are too tight / loose may cause the skier incredible discomfort—resulting in blisters, frost bite, a twisted ankle, etc.

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Figure 8 Three-Pin Binding Boots



Note. From Back Country Ski Bindings by In My View… Things as I see Them, 2009. Retrieved May 1, 2009, from http://1.bp.blogspot.com/_UFDhrGObeFc/SWWjkvg_8KI/AAAAAAAAArM/qmVXzDiE1ek/s400/nnnBCbindings.jpg

Figure 9 NNN Binding Boots

To check the fit of boots, slide the foot as far forward as it will go when standing up. With the toes just touching the front of the boot, there should be just enough room to slide the forefinger behind the heel.

SELECT SKI POLES

Ski poles are an integral part of cross-country skiing. Most techniques in cross-country skiing require the skier to not only use their skis, but their arms (poles) as well. Ski poles help the skier maintain balance while climbing inclines, when going downhill and when going forward.



Telescopic poles allow for adjustments for all sizes of skiers.

Parts of a Ski Pole

Ski poles have a variety of parts, they are:

1. **Basket.** Keeps the shaft of the ski pole from becoming fully submersed in the snow.
2. **Tip.** Allows the pole to dig into snow, ice and dirt so the skier gets a strong push.
3. **Shaft.** Is the main part of the pole—should be made from a strong material so it does not bend under pressure.
4. **Handle.** The handle is ergonomically designed for the comfort the skier.
5. **Strap.** Ensures that the pole moves with the skier.

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Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 73), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 10 Parts of a Ski Pole

Characteristics of Ski Poles

A good ski pole should have the following characteristics:

- a medium-sized basket (the deeper the snow, the larger the basket should be),
- an adjustable strap,
- a weight distribution that concentrates the weight near the handle, and
- minimal bend when pressure is placed on it.

Sizing Ski Poles

Sizing ski poles to fit a cross-country skier requires the skier to stand up straight and hold the pole close to the body. The pole, when held upright, should come to a height in-between the top of the chest and the armpit.

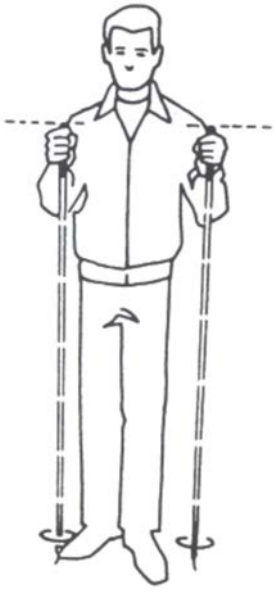

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Figure 11 Sizing Ski Poles

FIT CROSS-COUNTRY SKI EQUIPMENT

The following process should be used to fit cross-country ski equipment:

1. Put on ski boots.
2. Adjust poles to proper size.

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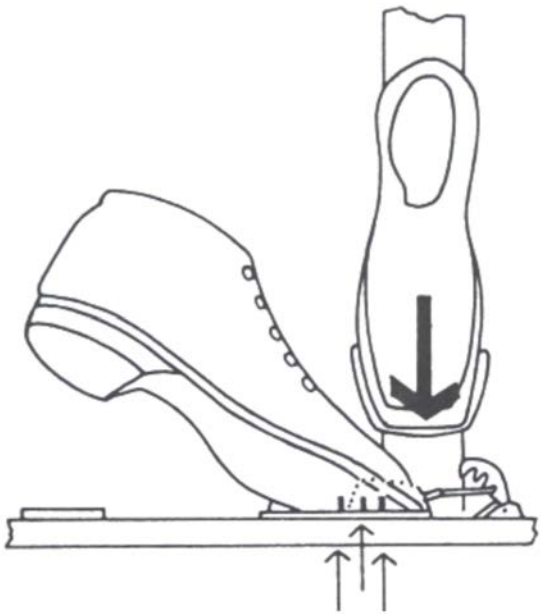
3. Find a flat spot where the snow is firm.
4. Place the skis on the snow side by side (about 30 cm [1 foot] apart).
5. Place poles into the snow, within reach, one on each side of the skis.
6. Identify the type of binding being used (three-pin or system).



Tell cadets what bindings are being used.

7. Attach the ski boot to the ski with:
   a. a three-pin binding by:
      (1) opening the bail (the bar that levers down from the upturned sides of the binding to clamp the toe of the boot sole to the ski);
      (2) brushing the snow off the bottom of the right (left) ski boot and the right (left) ski binding;
      (3) sliding the square toe of the boot into the toe piece of the binding beneath the open bail;
      (4) pressing down with the ball of the foot to push the three pins of the binding into the ski boot (ensure that the pins are aligned before pressing down);
      (5) closing the bail by pushing down and clamping it to the plate; and
      (6) completing the process again for the other ski; and



Note. From Complete Cross-Country Skiing and Ski Touring (2nd ed.) (p. 36), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 12 Attaching a Ski Boot to a Three-Pin Binding

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There is a left and a right ski when using three-pin bindings. The part of the binding which flares out is always on the outside.

b. a system binding by:

(1) pulling up on the toe piece to open the binding;

Some system bindings are automatic and do not require the binding to be opened. If the toe piece does not pull up, then it is automatic.

(2) brushing the snow off the bottom of the right (left) ski boot and the right (left) ski binding;

(3) placing the bar located on the bottom of the toe piece of the ski boot into the slot on the binding;

(4) pushing down with the ball of the foot to force the bar into the slot;

(5) closing the toe piece if manual bindings are being used or listening for the click of the binding locking if automatic bindings are being used; and

(6) completing the process again for the other ski.

8. Grasp the ski poles by moving each hand up the shaft of the pole and into the strap from the bottom so that the thumb rests over the strap.



Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 41), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 13 Grasping the Ski Pole

CONFIRMATION OF TEACHING POINT 2

The cadets' fitting of cross-country ski equipment will serve as the confirmation of this TP.

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Teaching point 3 **Explain, demonstrate and have the cadets practice classic cross-country ski techniques along a route.**

Time: 220 min Method: Demonstration and Performance



The purpose of this TP is to provide cadets instruction on cross-country ski techniques and once a level of proficiency has been established in each skill, for the cadets to travel a designated route for 6–10 km.

For this skill TP it is recommended that instruction take the following format:

(1) Explain and demonstrate each skill while the cadets observe.

(2) Explain and demonstrate the steps to complete each skill while the cadets observe. Monitor the cadets as they practice each step.

(3) Monitor the cadets' performance as they practice each skill.

Assistant instructors will be required to monitor the cadets' performance.



The ideal area for learning cross-country ski techniques is relatively flat, with a gentle hill in close proximity. It is better to have packed snow, rather than deep snow or ice.

CROSS-COUNTRY SKI TECHNIQUES

Cross-country skiing is a sport that requires very little skill. Anybody can put on a pair of skis and play in the snow. Understanding stroke mechanics and techniques will, however, make skiing more efficient and enjoyable.



Having the correct body position when cross-country skiing is very important. When in the proper cross-country ski position, the skier is in a relaxed half-sitting position. The feet are flat, knees slightly bent, the head should be up, and the poles lightly grasped.

Falling Down

No matter how good a cross-country skier a person is, there is always a chance that they will fall down. It is not the falling that is difficult when cross-country skiing. Getting up after the fall is what most people struggle with.

If a skier feels like they have lost their balance / they are going to fall:

1. Check the area for rocks or tree stumps to avoid, if possible.
2. Sit down to one side or the other of the skis.
3. Keep legs below the rest of the body.
4. Dig the skis into the snow to stop any forward momentum.

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It is dangerous for a skier to fall forward onto their knees. This could injure the skier's knees / ankles. As well, when falling forward, a person generally sticks their arms out to break the fall—this could result in an injury.

To get up after a fall:

1. Roll onto their back and stick their limbs, skis and poles into the air to untangle them.
2. Place skis below the body.
3. Keep legs extended.
4. Slide hips towards the tips of the skis (if on a hill stop just beside the skis, if on flat ground place chest on skis).
5. Come to one knee (plant poles to assist with coming to one knee).
6. Stand up.

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Step 1



Step 2



Step 3



Step 4



Step 5



Step 6

Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (pp. 36–37), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 14 Steps to Getting Up After Falling Down

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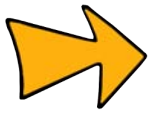
Stopping

For their own safety and for the safety of those around them, it is extremely important that cross-country skiers are able to slow down and stop themselves on flat ground and on hills. The principles for both are the same and require the skier have constant control of their body and their skis. A cross-country ski glides most effectively when it is flat on the ski base. A ski begins to loose forward momentum as soon as it is tipped to either edge. Therefore to stop, the skier must tip the ski to the edge—this is called edging.



Edging can be done when the skis are parallel or when they are in a wedge position—tips together, tails spread apart to form an 'A'.



The wedge position is also sometimes referred to as the snowplow position. Some may be more familiar with this term as it is also used in downhill skiing.

There are two types of wedging:

- the half wedge, and
- the full wedge.

To slow down / stop using the half wedge:

1. Decide which ski they are going to move into the half wedge position.
2. Keep one ski parallel.
3. Move into the half wedge position by:
   a. bringing the knees together;
   b. keeping the tips of the skis together; and
   c. moving the tail of the desired ski outward by pushing the heel out and the toes inward.
4. Angle the inside edge of the wedged ski into the snow by rolling the ankle inward (the more the edge is angled into the snow, the faster the skier will slow down / stop).

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Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 50), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 15 Half Wedge

To slow down / stop using the full wedge:

1. Sink into a crouch.

2. Bring the knees together and point them toward the tips of the skis.

3. Keep the tips of the skis together (but not touching).

4. Move the tails of the skis outward by pushing the heels outward and the toes inward.

5. Angle the inside edges of the wedged skis into the snow by rolling the ankles inwards (the more the edge is angled into the snow, the faster the skier will slow down / stop).

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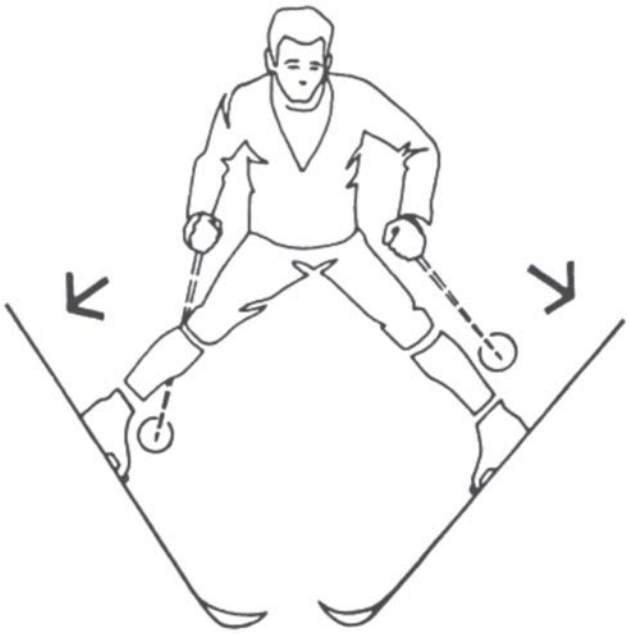

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Figure 16 Full Wedge

Changing Direction

Whenever on cross-country skis there is always a requirement for the skier to change direction of travel. It is a fairly simple process that requires practice in order to perfect it.



For new cross-country skiers, it is recommended that they stop before attempting to change direction. Once they become more proficient, they may employ these skills while moving.

Changing direction can be carried out by picking up the tip, the tail or the entire ski, one at a time, and moving it toward the new direction of travel—then repeating the process with the other ski. Depending on the degree of the turn, the skier may need to complete this process a number of times before reaching the desired direction.

To change direction:

1. Assume the half-sitting position.

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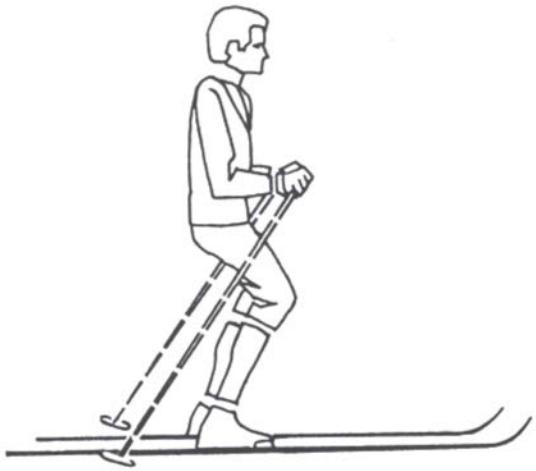

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Figure 17 Half Sitting Position

2. Move the left (right) ski forward until left (right) boot toe is just ahead of the right (left) boot toe.
3. Lift the tip of the left (right) ski about 30 cm (1 foot) off the ground.
4. Move the lifted ski slightly to the left (right), about an arc of 30 degrees.
5. Place the left (right) ski on the ground and transfer the weight to it.
6. Bring the right ski around, in the same manner, to meet the left ski.
7. Repeat Steps 2–6 until facing the desired direction.



Note. From Complete Cross-Country Skiing and Ski Touring (2nd ed.), (pp. 42–43), by W. J. Lederer J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 18 19 Changing Direction



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Figure 18 20 Ski Tracks When Changing Direction

Figure 18

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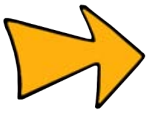

To pick up the tip of the ski, the skier has to:

(1) lift their toes so they come up to the top of the ski boot;

(2) flex their foot up to their shin; and

(3) lift their knee toward their chest.

To pick up the tail of the ski, the skier has to:

(1) curl their toes down against the sole of their ski boot;

(2) bring their heel to their butt; and

(3) keep their knees close together.



Moving forward when cross-country skiing requires the skier to incorporate balance, glide, grip, rhythm, and poling.

Balance. To maintain balance, skiers have to constantly adjust their centre of gravity with their hips and upper body centred over their skis as they glide.

Glide. Moving the body forward from the ankles puts the body in motion and allows the skier to 'keep up' with their feet and glide more with each stride.

Grip. Glide can not occur without good grip. Cross-country skis have a grip zone centred beneath the ball of the foot in the middle of the ski. This grip zone makes the ski stick to the snow when pressure is applied by the skiers foot during the push of each stride.

Rhythm. Skiers must develop a slow and steady rhythm to their stride, moving effortlessly from one ski to the next. For some, this is a difficult concept, but can be developed with practice.

Poling

There are two different poling techniques that a cross-country skier can use, to include:

- **Diagonal poling.** Uses the pole opposite of the gliding ski to create additional forward motion of the skier. The skier plants and pushes with only one pole at a time; and
- **Double poling.** Simultaneously uses both poles to propel the skis and skier forward. Used to go down gentle slopes in order to gain speed and on flats when the skier is not using the diagonal stride.

The following poling principles should be considered:

- Poles can not push forward unless they are angled to the rear.
- The skier gets a stronger push when their arms are bent rather than straight.
- Pushing the pole back rather than down converts more of the skiers energy into forward motion at the end of a stroke.
- The skier should use their body weight, not just their arms—pull with their core, to move forward.
- The skier should concentrate on pushing with their poles rather than bringing them forward.

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To diagonal pole:

1. Assume the half-sitting position.
2. Move the left ski so that it is forward of the right ski.
3. Lean forward.
4. Transfer the weight to the left ski.
5. Plant the right pole just ahead of the left ski boot (to the right of the path that the right ski will take) with the handle ahead of the basket.
6. Simultaneously push off with the left ski and push the right pole back (ensure that core strength is used, not just the arms).
7. Recover by lifting the left pole.
8. Repeat the process with the other pole.



Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 146), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 21 Diagonal Poling / Diagonal Stride

To double pole:

1. Assume the half-sitting position.
2. Keep the elbows close into the body.
3. Round the back;
4. Lean forward.
5. Plant the poles just ahead of the ski boots (handles should be ahead of the baskets).
6. Contract the stomach muscles.

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7. Push forward and extend the arms back.
8. Stand up.
9. Allow the arms and poles to swing forward.
10. Prepare for the next pole plant.



Note. From Cross-Country Skiing: Building Skills for Fun and Fitness (p. 43), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Figure 22 Double Poling

Executing the Diagonal Stride

When cross-country skiing, the most frequently used way to move forward is by executing the diagonal stride. It is called the diagonal stride because the right leg and the left pole (and vice versa) work together to move the skier forward. The diagonal stride technique makes for greater forward thrust and easy balance.



The body movement when executing the diagonal stride is the same as marching.

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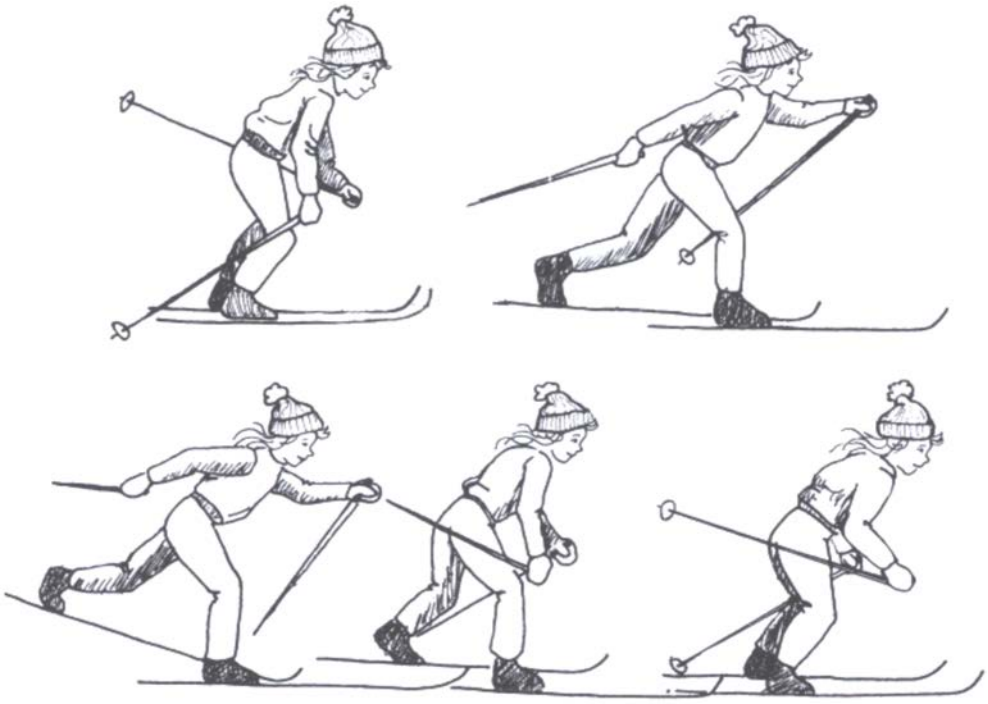

Note. From Ski Games: A Fun-Filled Approach to Teaching Nordic and Alpine Skiing (p. 92), by L. Gullion, 1990, Champaign, IL: Leisure Press. Copyright 1990 by Laurie Gullion.

Figure 23 Diagonal Stride Technique

The steps to execute the diagonal stride are the same as those to diagonal pole.

Ascending Hills

The biggest factor that affects a skier's ability to traverse up a hill is grip. Grip comes from the skier staying over their feet and pushing their skies straight down into the snow. There are two different techniques that can be used to ascend hills:

Herringbone. A technique used to climb straight up a hill on the inside edges of the skis with the tips farther apart than the tails. A skier using the herringbone technique to ascend a hill leaves an imprint that resembles the skeleton of a fish.

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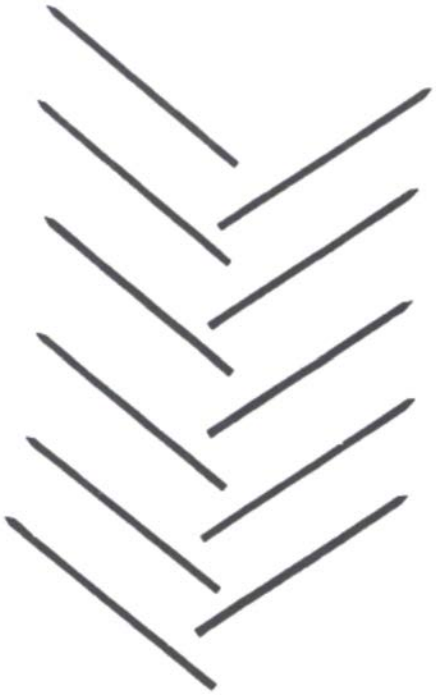

Note. From Complete Cross-Country Skiing and Ski Touring (2nd ed.), (p. 90), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 24 Herringbone Tracks

To use the herringbone technique to ascend a hill:

1. Place skis into a 'V' formation (the tails should be close together).
2. Turn the legs out.
3. Transfer the weight onto the left (right) foot.
4. Lift up the right (left) ski and move it forward.
5. Plant the left (right) pole behind the left (right) ski.
6. Repeat until reaching the top of the hill.

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Figure 25 Herringbone Technique



On steep hills, the skier has to dig in the edges of their skis to maintain grip and position.

Side step. Is a technique where the skier places their skis horizontal to the hill and moves upward using short side steps. A skier uses the side step when a hill gets too steep, the snow becomes too deep, or the herringbone becomes too tiring.

To use the side step technique to ascend a hill:

1. Place the skis horizontal to the hill to be ascended.
2. Keep the body upright and centred over the skis.
3. Move the torso sideways and up the hill.
4. Plant the pole ahead of them.
5. Lift and move the ski up.
6. Dig the edge of the ski into the snow.
7. Repeat until the top of the hill is reached.

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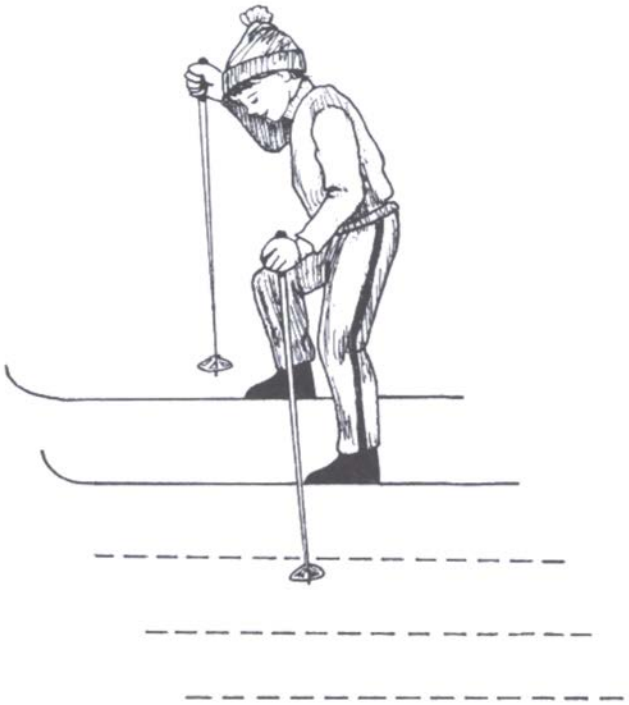

Note. From Ski Games: A Fun-Filled Approach to Teaching Nordic and Alpine Skiing (p. 100), by L. Gullion, 1990, Champaign, IL: Leisure Press. Copyright 1990 by Laurie Gullion.

Figure 26 Side Step Technique

Descend a Hill

The most important factors to descending a hill safely are balance and control. A skier should never just turn their skis downhill and go—the descent must always be controlled. In other words, the skier must always be ready to slow down or stop.

When descending a hill:

1. Adopt the half-sitting position.
2. Keep the head up and look forward.
3. Move the skis so that they are just under shoulder width apart.
4. Ensure the feet are flat on the skis.
5. Look down the slope to make sure there are no obstacles.
6. Drop the hands to thigh level.
7. Hold the pole shafts toward the back, keeping the baskets off the snow.
8. Glide down the hill.
9. Slow down / stop by executing a full wedge.

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ACTIVITY

Time: 120 min

OBJECTIVE

The objective of this activity is to have the cadets, in teams of no more than six, ski along a route with an expedition field pack to practice cross-country ski techniques.

RESOURCES

- Personal expedition equipment,
- Personal cross-country ski equipment,
- Group cross-country ski equipment, and
- Water carrier (one per cadet).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing to include an explanation of:
    a. the objectives and importance of the activity,
    b. the resources that may be required to perform the activity, and
    c. any safety guidelines that must be followed while performing the activity.
2. Have the cadets retrieve their cross-country ski equipment and expedition field packs.
3. Have the cadets, in teams of no more than six, cross-country ski with an expedition field pack, following the designated route for a distance of 6–10 km during an expedition to practice:
    a. falling;
    b. stopping using:
        (1) the half wedge, and
        (2) the full wedge;
    c. changing direction;
    d. poling by:
        (1) diagonal poling, and
        (2) double poling;
    e. executing the diagonal stride;

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f. ascending hills by:

(1) employing the herringbone technique; and

(2) employing the side stepping technique; and

g. descending hills.

4. Upon arrival at the end point, have the cadets remove, clean and inspect their cross-country ski equipment for damage and then store / return all equipment.

5. Conduct a debriefing by asking the cadets:

a. how they felt about the activity;

b. how they felt their team worked together;

c. what portion of the activity challenged them the most;

d. how their teammates assisted them when they were challenged;

e. if there are any specific examples of when their team bonded;

f. how the team made decisions;

g. whether or not all team members ideas / suggestions were considered; and

h. what they would do as a leader of this type of activity to ensure their subordinates enjoyed the experience.

SAFETY

- The Team Instructor(s) (TI) must be in sight or sound of the team at all times.
- In areas of complex / technical terrain, TI(s) will demonstrate requisite skills as required.
- Teams will travel separately on the same trail.
- There will be a minimum of 500 m between teams at all times.
- Cadets must travel in single file at all times.
- Cadets must have at least 1 L of water.
- Water resupply points will be located along the route.
- Meals will be provided at a predetermined location(s) and detailed in the route instructions.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in cross-country skiing along a route will serve as the confirmation of this lesson.

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CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 426 PC.

CLOSING STATEMENT

Skiing is a fun and challenging mode of travel that can be used during winter expeditions. Being aware of the different types and characteristics of snow and ice helps ensure the safety of all expedition participants. Possessing the ability to execute classic cross-country ski techniques makes the experience more enjoyable and the expedition more efficient.

INSTRUCTOR NOTES / REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M426.02a (Paddle a Canoe), EO M426.02b (Ride a Mountain Bike), EO M426.02c (Hike Along a Route), EO M426.02d (Snowshoe Along a Route) and EO M426.02e (Ski Along a Route) to incorporate into the expedition training.

This EO has been allocated nine periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Upon arrival at the expedition centre, cadets will be divided into teams. Cadets will be given an opportunity to navigate and lead peers. These teams will remain the same for the duration of the weekend.

Total distance for the cross-country ski route may be adjusted depending on trail availability and skill level of participants.

IAW A-CR-CCP-930/AG-001, *Cadet Program Interim Activity Safety Direction*:

1. the following personal cross-country ski equipment is required when cross-country skiing:
    a. ski boots,
    b. skis,
    c. poles,
    d. appropriate cold-weather clothing, and
    e. a whistle;
2. the following group cross-country ski equipment is required when cross-country skiing:
    a. topographical / trail map of area as required,
    b. compass,
    c. first aid kit,
    d. communication device (eg, cellular phone or hand-held radio),

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e. GPS receiver, and

f. cold weather emergency kit appropriate to the activity; and

3. weather must be continuously assessed. If the temperature falls below -20°C (with the wind-chill factor calculated in), cadets must be brought inside.

REFERENCES

C2-004 ISBN 1-896713-00-9 Tawrell, P. (1996). *Camping and wilderness survival*: The ultimate outdoors book. Green Valley, ON: Author.

C2-237 ISBN 978-0-89886-862-3 Hindman, S. (2005). *Cross-country skiing: Building skills for fun and fitness*. Seattle, WA: The Mountaineers Books.

C2-247 ISBN 978-0-393-08734-5 Lederer, W. J., & Wilson, J. P. (1970). *Complete cross-country skiing and ski touring*. (2nd ed.). Toronto, ON: George J. McLeod Ltd.

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