NORTHERN WARFARE TRAINING CENTER SKI MANUAL

SECTION II. INTRODUCTION

Motivator: In Cold Regions snow cover becomes a decisive factor in any type of operation. The side that can move over the snow with efficiency will usually outperform the side that can't or stubbornly refuses to adapt to a new condition. The ski has proven itself to be a exceptionally useful mode of transportation to those who have dedicated the time necessary to be PROFICIENT. To not be proficient in the use of the ski is the same as not having any flotation at all.

Terminal Learning Objective

ACTION	Move over snow on skis
CONDITION	In a snow covered field environment, given a pair of military skis with bindings, ski poles and vapor barrier boots (or other appropriate ski equipment as prescribed by unit), rucksack (with a minimum load of sleeping bag, sleeping pad, extra pair of socks, extra pair of mitten inserts and wax kit, additional packing list items may be prescribed by unit), Extended Cold Weather Clothing System (ECWCS), ballistic helmet, fighting load carrier, weapon and a 5 kilometer snow-covered course with varied terrain. Fighting load carrier, weapon, rucksack and helmet may be grounded during training but will be donned during the 10 kilometer movement.
STANDARD	Complete a 10 kilometer ski movement. Meet all critical performance measures IAW the Individual Student Assessment Plan (ISAP).

Safety Requirements: Daily Risk Assessment conducted. Medical personnel must be on site during all ski training events. OIC/NCOIC must have medical evacuation plan ready for Soldiers injured during ski training.

Risk Assessment: Medium. May be upgraded based upon weather/terrain conditions.

Environmental Considerations: Refer to MSDS sheets for specifics on waxes, ski base cleaners in use in the NWTC ski room. Ensure that manufacturer recommendations are adhered to when using these products.

Evaluation: You will be evaluated on your ability to complete a 10K ski biathlon, provided you attain a level of proficiency that will allow you to safely complete this exercise. Students that do not attain a sufficient proficiency on skis will complete this exercise on snowshoes. This will be at the discretion of your squad instructor. Students with prior skiing experience may not test out. The reason for this is that all students must understand the logical progression of a ski training program as conducted by the military. Students that fail WILL NOT have the opportunity to re-test.

Instructional Lead-In: During this period of instruction you will learn the nomenclature, maintenance and fitting of your skis. Once your skis are fitted you will learn the techniques to move over snow covered terrain.

SECTION III. PRESENTATION

Enabling Learning Objective A:
Ski Lesson 1: Introduction and Fundamentals

ACTION	Prepare Skis and Skiers for travel over snow
CONDITION	In an appropriate maintenance facility (for preparation, fitting and maintenance of skis) and on flat snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier properly fit skis, ski bindings. Soldier waxed skis for current conditions. Soldier stretched prior to ski training. Soldier demonstrated proper athletic stance, proper use of ski poles, proper controlled falls and recovery from falls, walking and shuffling on skis and step and kick turns on skis.

Learning Step/Activity 1 – Describe skis and bindings and describe the military ski and NATO 120 binding.

a. There are many skis on the commercial market today. Classic cross-country, skate cross-country, backcountry wax less, backcountry waxable, Nordic, alpine, Telemark, fat skis, skinny skis, and twin tipped skis and the list goes on. Don't forget about boots, poles and bindings. Selection of a single pair of skis for military purposes can be a daunting task. Because the purpose of military skiing is to move troops cross country in snow covered terrain, the ski should provide flotation for Soldiers carrying heavy loads, allow them to move cross country over unbroken trail and have metal edges to allow them to make turns to control speed on downhill sections. There are no skis, ski poles or bindings in the Army inventory; the policy is that units with the need for skis can obtain them through contract purchase.

b. Parts of a ski:

(1) Tip. In your ski tips there is a hole that can be used to drag skis or improvise a litter.

(2) Shovel. Upturned portion of the ski that provides flotation on snow by keeping it on the surface of the snow.

(3) Waist. This is the middle third of the ski. The narrowest part of the ski.

(4) Tail. Back of the ski. The groove cut into the tail on some skis is for climbing skins.

(5) Base. Plastic bottom of the ski. This is the running surface.

(6) Edges. Metal rails on the sides of the ski. They are used to grip the snow in a turn.

(7) Side cut. Difference in width at the shovel, waist, and tail. It is not used in all skis. Cross-country skis will have little or no side cut, whereas Alpine skis can have very dramatic side cut. More side cut means easier turning.

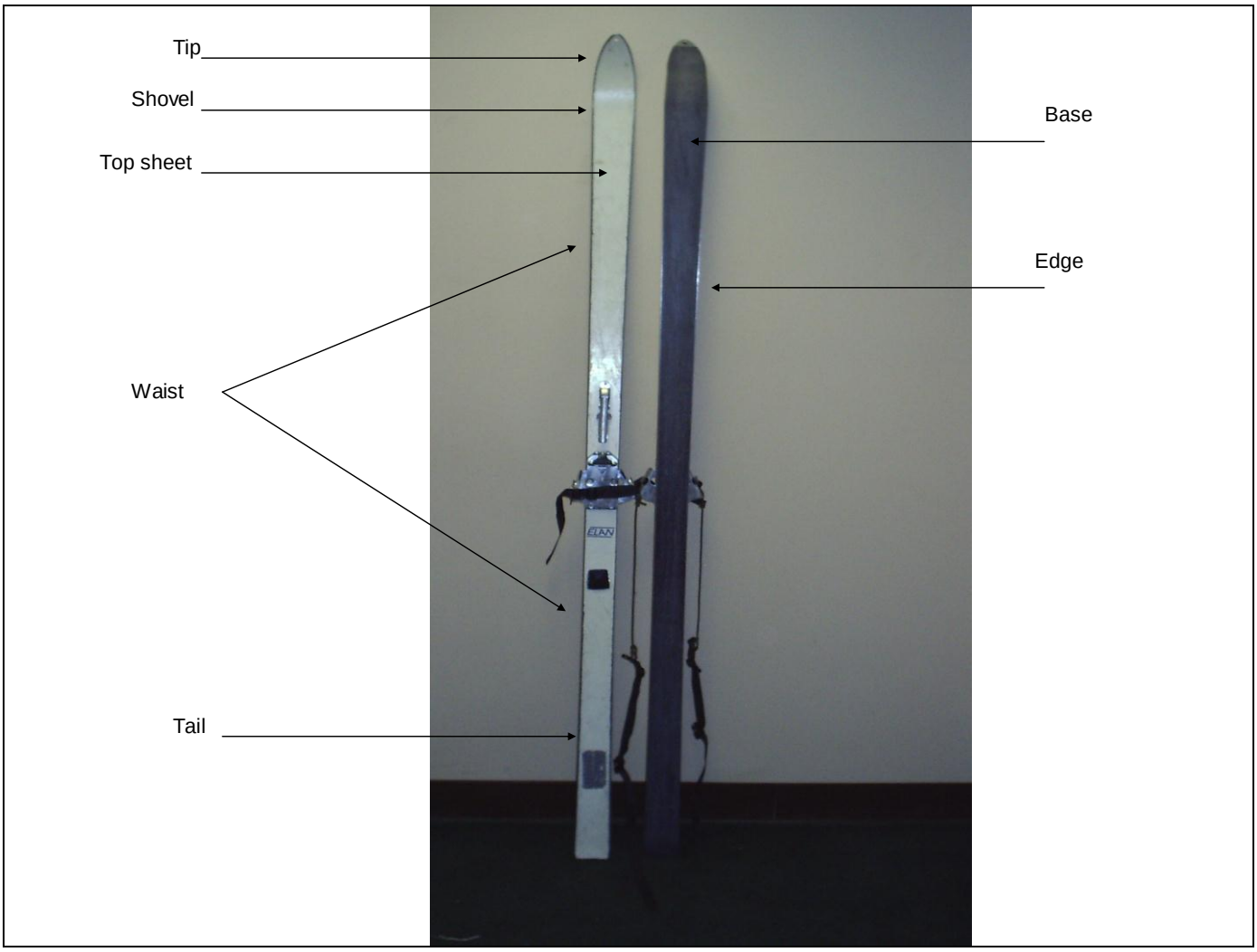
(8) Camber. The bow or concave arch in the middle of the ski. The amount of camber will determine the use of the ski. A single camber ski is best suited for downhill skiing, but will perform as a cross-country ski. Double camber skis are suited for groomed trail cross-country use only and are only marginally effective for downhill use. The only true double camber skis are classic cross country racing skis which are not appropriate for the backcountry.

- A camber and a half (also known as Nordic camber), creates an arched and stiff section in the center of the ski. This forms a center wax "pocket". A soft wax is applied to this area of the ski. This forms an area that will grip the snow, thus giving you traction and allowing you to kick to move yourself forward. Nordic and cross-country skis often have a groove down the center base of the ski. This groove allows the skier to track in a straight line.

- Single camber skis, (also known as alpine camber), distribute the weight more evenly over the entire running surface of the ski. It also allows a rebound effect from turn to turn. When flexed (that is when you are standing on them), alpine cambered skis should flatten out so the entire base contacts the snow. The military has generally selected a ski with single camber to a camber and a half.

(9) Top sheet. Top portion of ski that covers the core. Painted white for camouflage.

(10) Core. Wood or plastic guts of the ski. Gives the ski its load bearing capacity.



Military Ski w/ NATO 120 binding

c. Parts of the NATO 120 Binding.

1. Front throw- locks or un-locks the cable. Covers the Binding Tension Adjuster

2. Binding Tension Adjuster- provides fine tuning adjustment to the cable length.

3. Wing Nut and Locking Plate-locks or un-locks the Adjustable Side Plates.

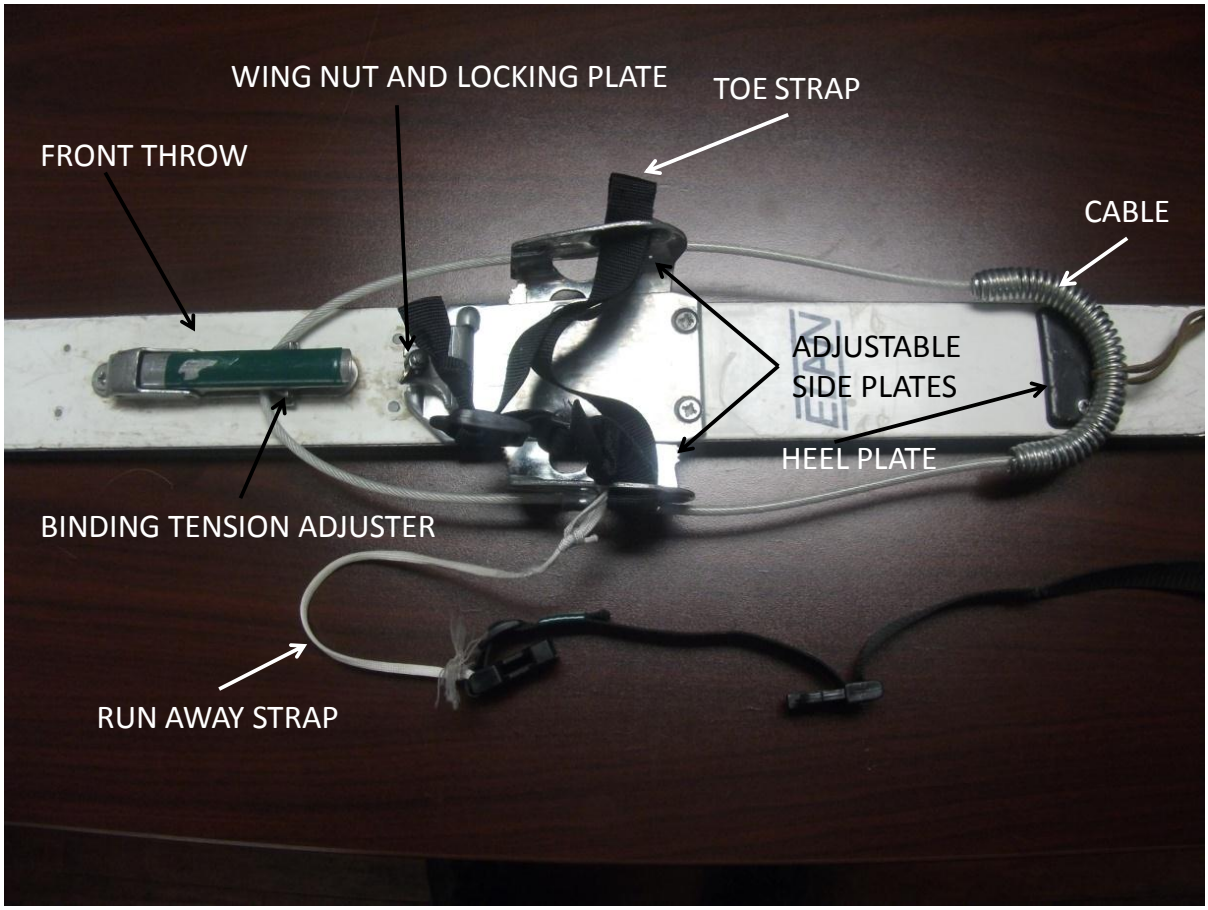
4. Toe Strap- Holds the toe of the boot in the binding.

5. Adjustable Side Plates- holds the boot in the binding, provides torsion to allow the ski to turn.

6. Cable- holds the boot in the binding, provides fore and aft stability to allow the ski to be slid forward.

7. Heel Plate- keeps the heel on the same level as the toe plate of the binding.

8. Run Away Strap- keeps the ski attached to the skier in the event of a release to prevent loss.



NATO 120 Binding

Learning Step/Activity 2 – Issue the appropriate ski to Soldiers.

a. Military skis come in sizes, 180 to 200 cm. Soldiers who weigh less than 165 lbs use 180 cm and over 160lbs use 190cm. Soldiers 200lbs or more use 200cm skis.

Learning Step/Activity 3 – Issue the appropriate ski poles to Soldiers.

a. Ski poles are adjustable.

(1) For downhill skiing, you should have a 90° angle at your elbow when holding the ski pole.

(2) For cross-country, lengthen poles to approximately the center of the upper arm.

ADJUSTABLE POLE FOR MOSTLY CROSS COUNTRY

ADJUSTABLE POLE FOR MOSTLY DOWNHILL

Learning Step/Activity 4 – Maintain skis.

a. Cleaning- The first thing in ski maintenance is to clean any wax and dirt off of the base. This can be accomplished by using a special wax cleaner made for skis or a citrus based general purpose cleaner.

WARNING: DO NOT USE SOLVENTS AS THEY CAN DESTROY THE SKI BASE.

Apply the cleaner liberally to the ski base and allow to soak for a few minutes. A stiff bristle brush (not wire) can be scrubbed on the base, then using a ski wax scraper remove the old wax. When using a scraper ensure that it rides on the edges so that it does not gouge the base of the ski. Once this is done there may still be wax remaining. To remove it simply reapply the cleaner and using a green scratch pad or equivalent item, rub wax off of the base and dry with a clean paper towel. If any wax remains in a gouge in the ski base then remove it carefully with the corner of a scraper or a fingernail.

b. Once the base is clean, inspect the metal edges. Rust can be removed by rubbing with a green scratch pad. Burrs are removed with a simple fine textured whet stone, fine toothed mill bastard file or a ski edge tuner. Pass the tool over the burr just enough to smooth it.

Note: It is not necessary to sharpen edges after every use. This removes too much material and can damage a ski beyond repair. Once a year is more than adequate for the Military Skier.

If it becomes necessary to sharpen edges the preferred tool is a ski edge file fixed at 90 degrees. These can be purchased at a ski shop for around $20. The design is fool proof and 3-4 passes is usually enough to restore a good edge. The next best is a fine toothed mill bastard file.

Note: A file is a directional tool. Sawing back and forth can ruin the file and the ski edge.

First either clamp the ski in ski vises on a bench or have a buddy hold the ski firmly side wall up. While applying light pressure to the file, pass it over the metal edge of the ski 2-3 times maintaining a 90 degree angle. Look for the metal to shine. Repeat over the entire length of the ski overlapping the area filed. The tips and tails do not need to be sharpened. Measure about 6" from the ends and either leave it as is or just de-burr them.

c. Next inspect the bases for gouges. Scratches are OK as long as the base material is not breached or they are large. If any of the core or base of the metal edges is visible the ski must be repaired. First ensure all wax and dirt is removed from the gouge. Next light a P-Tex repair candle and allow it to drip onto a flame proof surface a couple of times to establish flow. There will be a noticeable amount of soot at the base of the flame. Rotate the candle and this soot will temporarily displace allowing clean P-Tex to be applied to the repair.

Warning: Flaming P-Tex will stick to skin resulting in a burn.

Move the candle to the area to be repaired and allow the P-Tex to drip onto the gouge and fill it in. Allow the P-Tex to cool enough to touch. Take a scraper and applying moderate pressure scrape the repair until it is smooth with the base. Be patient, a large gouge may require several applications.

d. Inspect all metal for rust. Remove rust with a green scratch pad, steel wool or very light sand paper.

e. Inspect binding cable for excessive fraying. Exposure of the wire is OK as long as it does not begin cutting the boot. Replace as necessary.

f. Ensure the adjustable side plates stay locked into the teeth of the toe plate. If they slide out check the locking plate. Sometimes the locking plate can become bent so much that it no longer performs the camming action required to fully engage the teeth. Simply un lock the plate and rotate to an upright position and hit it with a hammer until it straightens out but not so much the wingnut won't engage.

g. Inspect the overall condition of the ski. Fill any gouges in the top sheet or side walls with two-part epoxy. Repaint the top sheet if needed. Repairs beyond what is described here are best left to a knowledgeable ski technician.

h. The ski pole requires less maintenance than the ski. Simply repaint when necessary. Replace ski pole baskets when they are damaged. Make sure that the wrist leashes are there and that they are serviceable.

Learning Step/Activity 5 – Fit the NATO 120 binding to the Vapor Barrier Boot (or other issued boot as required).

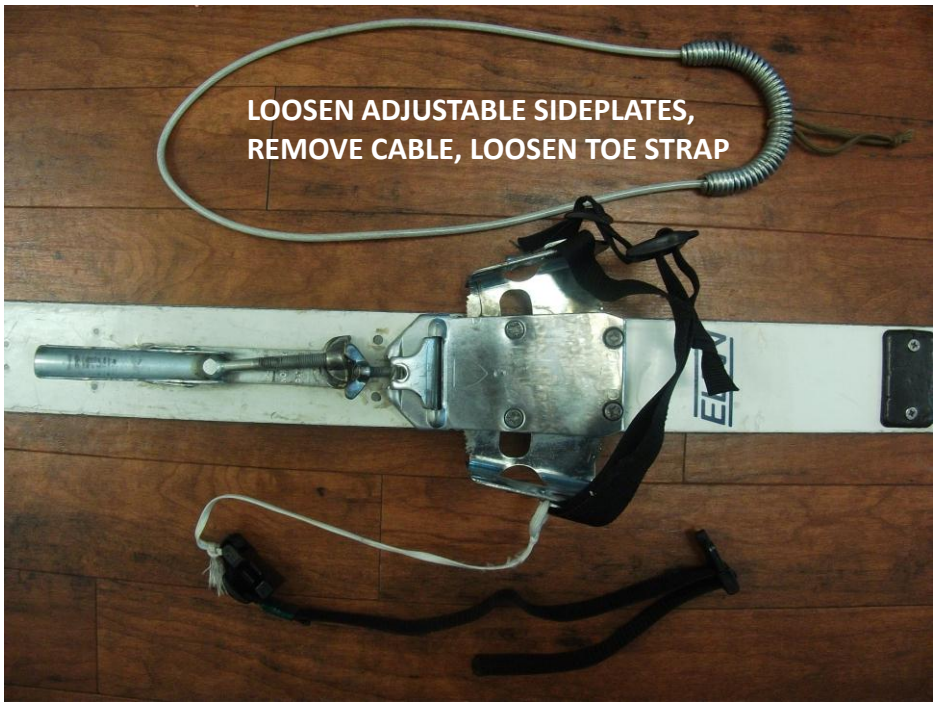
a. There are four different cable lengths used with the NATO 120 binding, each with a different color designation. Cables can be interchanged from one binding to another. NATO 120 bindings are no longer in production and cables can be problematic. The following is an approximate listing of the Vapor Barrier boot sizes the cables fit:

Cable color	Boot size
Red	6-9
Yellow	8-11
Black	10-13
Blue	11-15

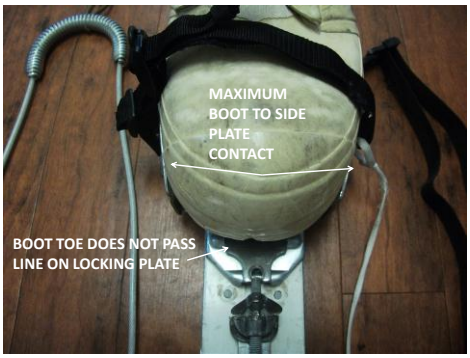
NOTE: The cables to boot size are a guide; some boots may fit differently.

b. To fit the binding to the boot:

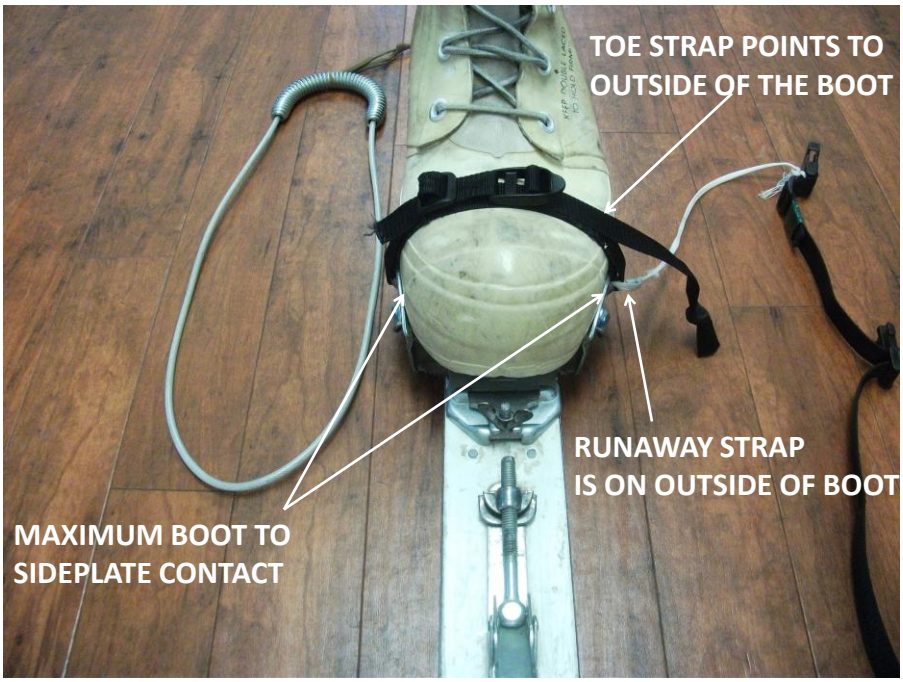
(1) Loosen the wingnut and locking plate to free the adjustable side plates. Loosen the toe strap.



(2) Place boot in the binding so that the toe of the boot does not exceed the line on the locking plate. Ensure the heel is centered.

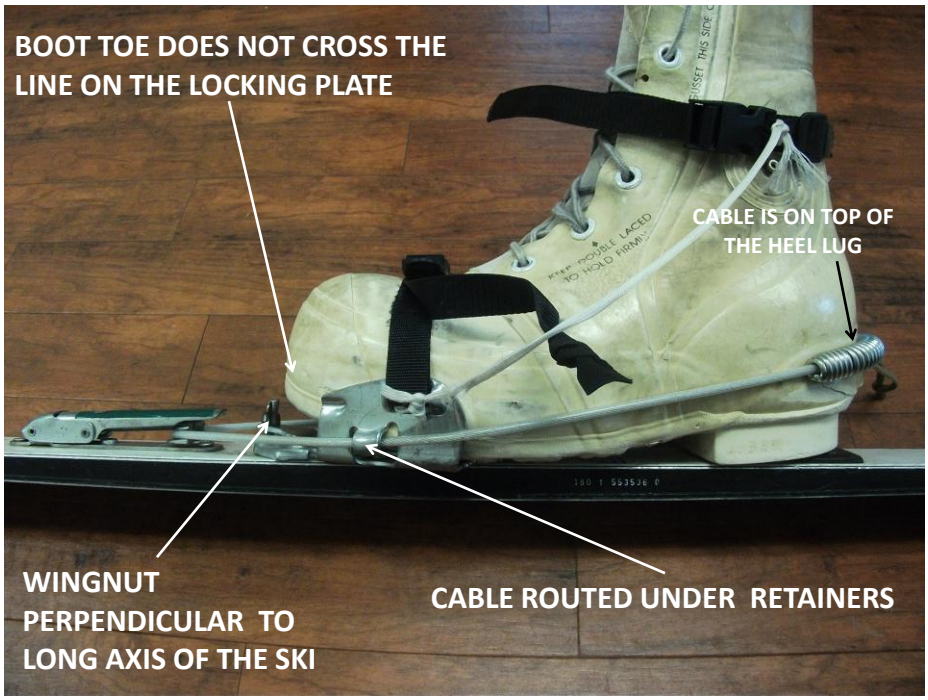


(3) Adjust side plates inward so that there is maximum contact with the sides of the boot. Engage the locking plate and hold it down with a finger. Remove the boot and carefully adjust side plate's inward one notch. Reengage the locking plate and the tighten wing-nut. Adjust the wing nut so that its long axis is perpendicular to the long axis of the ski. This will minimize damage to the toe of the boot.



(4) Adjust the toe strap to keep the toe firmly in the binding, but not too tight as to restrict circulation. Ensure the toe-strap remains close to the laces of the boot or it will slide off resulting in a release from the binding. The tail of the toe strap should point to the outside of the foot. This will help you remember which ski is the left and which is the right. Ensure that the runaway strap is fixed to the outside of the ski as well.

(5) Place the cable over the top of the boot and engage it under the retainers on the side plates. To get an initial sizing, the binding tension adjuster is turned in or out so that the cable is within 1/2 inch of the heel with the front throw in the open position.



(6) Place the cable onto the lug on the VB boot and engage the front throw. There should be some resistance and a positive snap when the front throw is closed. Check the inside of the boot to ensure there is no wrinkling or other deformations that will cause hot spots/blisters. Flex the boot rapidly back and forth. Check the fit to ensure the heel is still centered, the toe is still aligned and no deformations occurred inside the boot. Adjust as necessary.

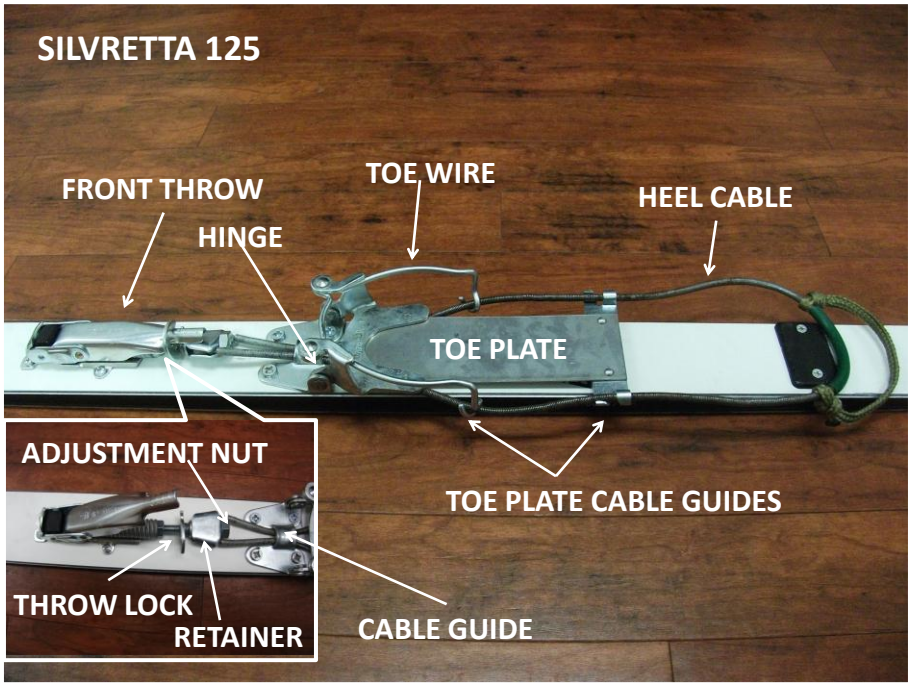
(7) Repeat the process on the other boot.

Learning Step/Activity 6 – Fit the Silvretta 125 binding to the Vapor Barrier Boot (or other issued boot as required).

a. There are four different cable lengths used with the Silvretta 125 binding, each with a different color designation. Cables can be interchanged from one binding to another. Silvretta 125 bindings are no longer in production and cables can be problematic. The following is an approximate listing of the Vapor Barrier boot sizes the cables fit:

Cable color	Boot size
Red	6-9
Yellow	8-11
Green	10-13
Blue	11-15

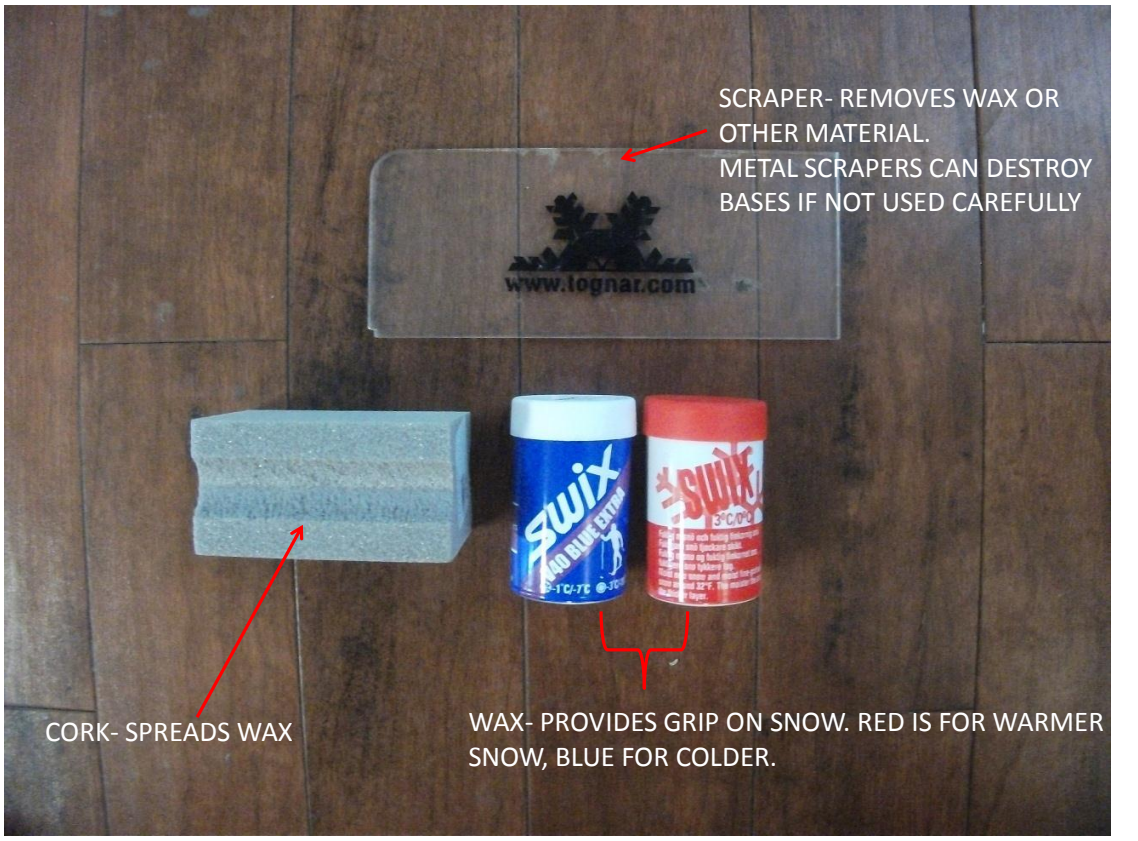
b. If it is necessary to change the cable lift the front throw and loosen the throw lock. Slide the cable out of the retainer then out of the cable guide. Remove the cable from the toe plate cable guides. Select the cable size for the boots and install in reverse order.



c. Slide the VB boot into the toe wire until it stops. Lift the heel cable over the heel lug on the VB boot. Close the front throw. There should be a positive snap, no wrinkles on the VB boot and the boot is centered. If there is too much or too little tension, open the front throw and turn the adjustment nut until the desired tension is achieved. Close the throw lock. The boot should pivot on the hinge easily. If you require a bit more control or the toe wire is not holding your foot securely, a toe strap can be made from nylon webbing. Route the webbing under the toe wire as close as you can to the laces of the VB boot.

Learning Step/Activity 7 – Prepare skis for movement (Wax skis).

a. Waxing. Military skiing needs a method that is simple and effective. The two wax system provides maximum performance for most conditions while minimizing the amount of wax carried. Wax works when pressure is applied to the ski in the snow. Snow crystals penetrate (grip) the wax giving the ski traction on the flats and uphill. When the pressure is released and the ski is slid forward, the snow crystals release the wax and the ski glides on a thin film of water. The film of water is formed by the friction between the ski and the snow. If the correct wax is applied properly, the snow crystals will grip during the kick and release during the glide. The ski will be too slippery if the wax is too hard or too thin. If the wax is too soft or too thick, the ski will be too sticky.



b. The two wax system is designed for a wide range of temperatures and conditions: A hard wax (blue) for dry, cold snow and a soft wax (red) for wet snow or when extra grip is required in dry snow such as pulling a sled or ascending a hill when climbing skins are not available. First select the proper wax for the temperature and snow condition.

Note: Remember, if a hard wax is applied first, then a soft wax can be applied over it. But there is no way to apply a hard wax over a soft wax for it to be effective. It is like putting peanut butter over jelly.

Next crayon the wax evenly over the center 1/3 of the ski base, approximately six inches in front of the front throw and six inches behind the heel plate. Using a cork (natural or synthetic) spread and smooth the wax on the ski base. Applying several light coats is better than one thick coat. If you do not have a cork then you can use the heel of your hand in a leather glove or the trigger finger mittens.

c. If skis are too slippery and are not getting any grip, apply the ***TLC principle*** one step at a time until the desired effect is met:

- ***T***hicken the layer of wax in the original area,
- ***L***engthen waxed area to the entire length of the ski

- ***C***hange to a different wax (softer) and start over in the original position.

If TLC doesn't work, it may be time to use climbing skins or switch to snowshoes.

d. If the skis stick and will not glide, use a scraper to remove some of the wax.

e. Applying wax to a ski is best accomplished in a warm place with a warm ski. If outdoors the wax and the ski should be the same temperature. Warm wax on a frozen ski will result in a glob that is hard to spread.

f. If you have been issued a no wax ski, under most backcountry conditions you should not have to wax to get adequate grip. Keep in mind though; the pattern on no wax skis is meant for un-groomed snow and you may get some backslip if you are on the groomed or very hard packed snow. A no wax ski can have wax applied to the base to augment if needed.

ATTACHED BY A LOOP AT THE TIP, HOOK AT THE TAIL AND GLUE IN BETWEEN

PROVIDES EXTRA TRACTION WHEN SLED HAULING,BREAKING TRAIL IN VERY DEEP SNOW OR VERY WET SNOW CONDITIONS

LENGTH MAY BE ADJUSTABLE OR FIXED ACCORDING TO MANUFACTURERS INSTRUCTIONS.

WIDTH MUST BE EDGE TO EDGE AT THE <u>WAIST</u> OF THE SKI. <u>YOU DO NOT NEED TO CUT THEM TO FIT THE SIDECUT OF YOUR SKI!</u>

g. Climbing skins are made of heavy cloth with a directional plush that affords extra grip to ascend a steep hill, pull a sled or moving on extremely wet or icy snow when wax fails. Skins are not for general movement on flat to rolling terrain. They are affixed to the base of the ski by a tip and tail attachment and glue on the base side. Climbing skins are indispensible for back country moving.

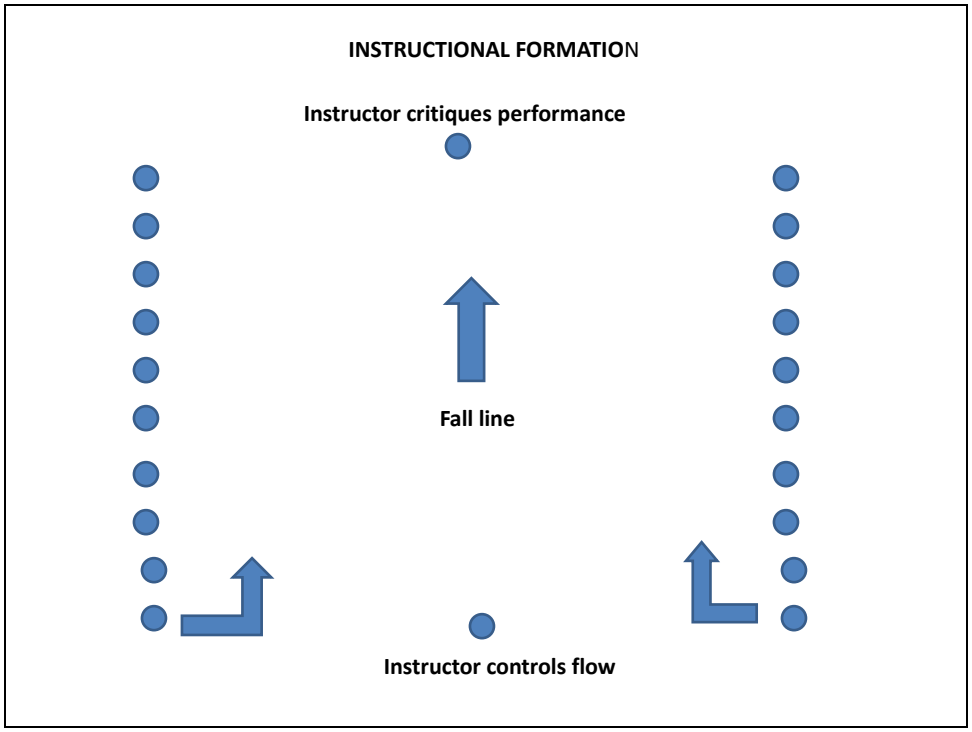
Learning Step/Activity 7 – Stretch and warm-up for skiing.

As in any athletic activity, you should stretch and warm-up prior to beginning any ski activities. Some of the stretches and warm-up exercises that are appropriate are:

(1) Hamstring stretch.
(2) Thigh stretch.
(3) Calf stretch.
(4) Side Straddle Hops.
(5) High jumper.

Learning Step/Activity 8 – Demonstrate the athletic stance.

NOTE: Start with the students on line. Students do not need poles at this point. Ensure that the wind, sun or any other distractions are to the student's back. This is applicable whenever talking your students through any of the ski lessons.



a. The athletic stance is a stable, relaxed, in balance position that allows you to react quickly and easily. To do it – relax your back muscles and cup your upper body pulling your navel in towards your backbone. Your weight should be centered over both your feet and your feet should be about shoulder width apart. The ankles should be flexed and the knees slightly bent. When viewed from the side there should be a generally straight line from the shoulder, to the tailbone, to the heels.


ATHLETIC STANCE

b. Get the feel for having skis on your feet. Try picking up one ski at a time. Push the toes down towards the ground and then raise the toes up. Now rotate the ski to the left and right. Try it with the other ski. This is rotary motion and will help you point the ski in a desired direction.

c. In the athletic stance rock back and forth on your skis from your heels to your toes. You should feel in control. Now stand straight up, arch your back slightly and try the same thing.

NOTE: Some students may fall. Good transition to the next LSA.

Learning Step/Activity 9 – Demonstrate proper controlled falls and recovery on flat snow covered terrain.

a. Controlled falls can help to prevent injury.

b. The easiest method is to just sit down. Attempt to keep the skis parallel and relax into a seated position. The idea is to land on the buttocks, and the meaty portion of the thigh and calf.

c. Recovery is easier with poles but not necessary. First pull the skis under the hips and place them side by side. Then holding both ski poles together with the baskets in the snow, grasp the poles with one hand just above the basket and one hand near the top of the poles. Now pull up off the snow. As the hips leave the snow, step towards the ski baskets with the ski closest to the baskets and begin to stand up. On a slope the procedure is the same, but to start, you must ensure that the skis are below the body (further downhill) and perpendicular to the fall line. The uphill ski will be used to stabilize you as you stand up. If you lost a ski(s) in the fall, you should get to a standing position, and then put the skis back on, replacing the downhill ski first.

Learning Step/Activity 10 – Walk on flat snow covered ground using skis.

Do not use poles. Begin walking as you would in marching. Skis should remain flat on the snow. Transfer your weight smoothly from ski to ski. As you walk, the heel of your boot should rise naturally off the ski. Look a few feet in front of your ski tips.

Learning Step/Activity 11 – Shuffle on flat snow covered ground using skis.

a. To transition from walking to shuffling, simply add a glide to the step. Ensure proper balance and weight shifts are taking place. Keep the length of the glide small – in other words try to stay balanced over the skis. Shuffle in a straight line and then in a circle.

Note: Check the student's heels to ensure they are still centered and toe straps are still lined up. This will save hassle later.

b. Drills

(1) Scooter- Have student use one ski at a time without poles. Push with free foot and glide on the ski. Used to reinforce the glide in the shuffle and maintaining ankle alignment.

(2) Walk shuffle walk- As stated. Used to reinforce the difference between walking and shuffling.

Learning Step/Activity 12 – Demonstrate proper pole usage.

a. Ski poles are mainly used for aiding in balance. However they can also be used to provide propulsion.

b. It is important to understand how to hold the ski pole. Bring the hand up through the wrist leash and place the thumb over the wrist leash where it attaches to the top of the ski pole. The strap should run across the palm of the hand. Failure to follow this procedure may result in a broken thumb in the event of a fall. Adjust the straps so that they are snug through the palm of the hand.

NOTE: Avoid gripping the pole tightly. This squeezes the blood out of the fingers and will result in cold fingers and possibly lead to a cold weather injury.

PASS HAND THROUGH THE STRAP FROM THE BOTTOM UP.

ALLOW THE STRAP TO RUN ACROSS THE PALM

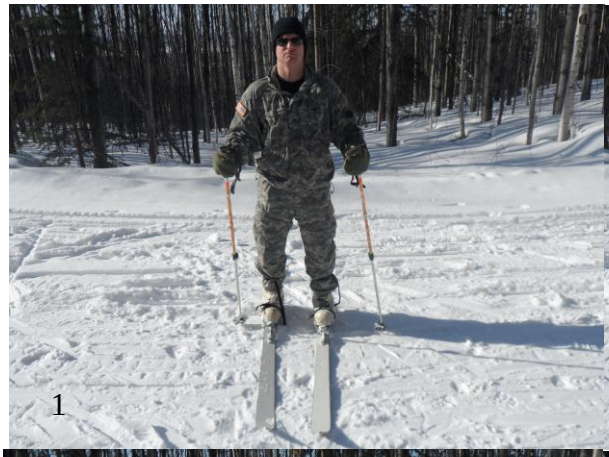
DO NOT GRIP THE POLE TOO TIGHT.

THIS WILL DECREASE BLOOD FLOW AND CAUSE COLD FINGERS AND MAY LEAD TO A COLD INJURY

c. While walking, the ski pole is placed even with or slightly ahead of the opposite foot. For example, the right foot and the left pole, left foot and right pole. This allows establishing timing and rhythm. To provide propulsion simply give a push with the ski pole in the trail position. After a short glide the opposite pole should be planted. Avoid pushing with the tricep muscle alone as fatigue will set in quickly. Instead push with both the triceps and lattisimus (under the shoulder toward the back) muscle.

Learning Step/Activity 13 – Demonstrate the step turn.

The step turn is accomplished by opening the ski tips in small steps. To turn to the right move the right ski tip a few inches to the right. Then move the left ski tip until you are back in the athletic stance, with skis parallel. The tails should move minimally. Continue to do this until you make it to the desired position. This is the simplest turning method and is easiest to master. This turn is also known as the "star turn" or "fan turn" for the shape that is produced in the snow after execution of a turn.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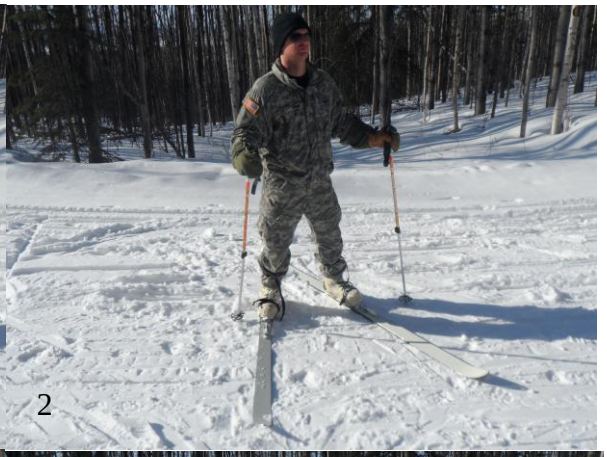
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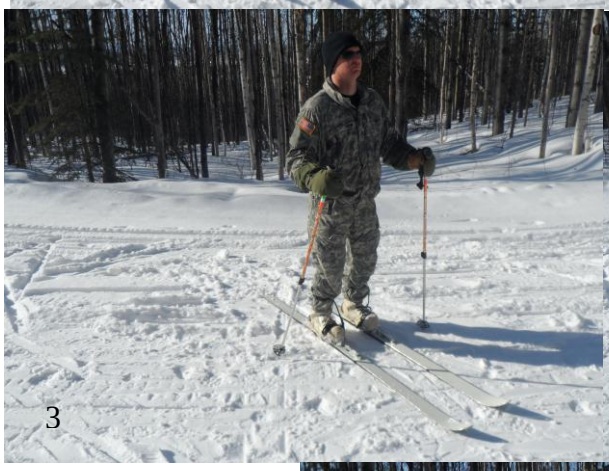
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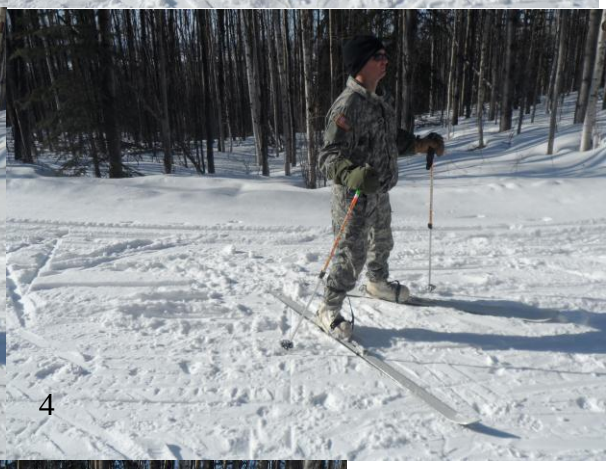
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Learning Step/Activity 14– Demonstrate the kick turn.

This turn is more difficult to master. This turn is used to reverse direction. The ski poles are used for balance. In this demo we will initiate the turn with the right ski.


With your right hand plant your right pole behind you and between the tails of your skis. Plant your left ski pole between your skis. Pick up the right ski and rotate your leg 180 degrees so that the feet and skis are facing opposite directions.


Now pick up your left ski and rotate it 180 degrees to match the right ski bringing your left hand and pole with you as you make the turn. On sloping terrain, always initiate the turn with the downhill ski.

NOTE: At the completion of this lesson, the instructor can move to ELO B or ELO C if snow-covered downhill terrain is not available.

Learning Step/Activity 15– Store skis for long term or transportation.

a. To store skis for long term make any repairs necessary and apply a light coat of hard wax to the bases. Apply a very light coat of vegetable oil to the bindings to prevent rust.
b. To make a bundle for easy transportation:
    (1) Place the skis together base to base.
    (2) Insert the poles up through the toe straps and loop the pole straps over the shovel of the skis.
    (3) Wrap the runaway straps around the skis and poles and tighten until snug.

c. To carry skis on the rucksack:
(1) Slide the ski down through the side compression straps until the cable is over top of the top strap.
(2) Secure the skis together at the shovel. The poles can be attached under the toe strap, carried in the hands or collapsed and secure to the sides of the rucksack.
(3) Be aware that you are now “taller” and will hit contact objects overhead much more readily.

Enabling Learning Objective B:
Ski Lesson 2: Hill Climbs and Gentle Descents

ACTION	Climb and descend gentle (less than 20º) snow covered hills without turning
CONDITION	On gentle snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier demonstrated ability to walk uphill, traverse hills (parallel and half-herringbone), and ascend hills using the side step and herringbone technique. Soldier demonstrated controlled falls and recoveries on sloping terrain. Soldier demonstrated kick turns and herringbone turns. Soldier demonstrated straight runs in parallel stance and Telemark stance. Soldier demonstrated step turns during a downhill run. Soldier demonstrated a gliding wedge and a braking wedge.

Learning Step/Activity 1 – Climb (Walk) Uphill on skis

NOTE: This task will reinforce the need to properly wax skis.

Apply the techniques learned in Ski Lesson 1 to begin walking uphill. Take small steps and ensure that you place the ski flat on the snow and weight the ski by pressing the ski into the snow with the front of the foot. Some common problems are not fully weighting the ski causing it to slip backwards. Shorten your step and press firmly into the snow; sometimes you may need to slap your ski onto the snow surface. You are trying to get the wax to adhere to the snow, temporarily giving you traction. If all else is being done properly and you are still slipping, you need to adjust your wax.

Learning Step/Activity 2 – Demonstrate controlled falls and recovery on sloping terrain.

NOTE: After students move uphill, have them practice controlled falls and recovery.

a. The easiest method is to just sit down. Attempt to keep the skis parallel and relax into a seated position. The idea is to land on the buttocks, and the meaty portion of the thigh and calf.

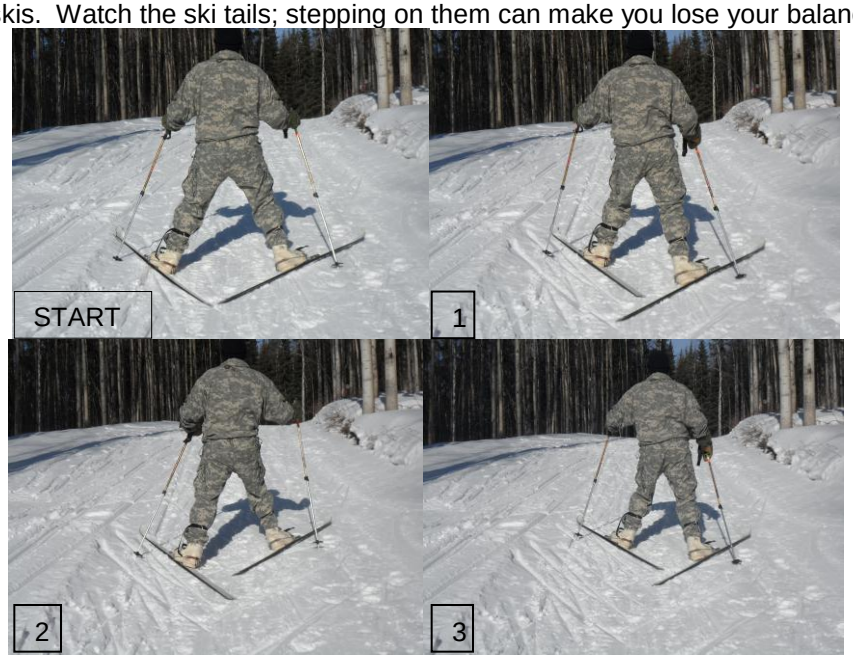
b. Recovery is easier with poles but not necessary. First pull the skis under the hips placing the skis side by side and across the fall line. Then holding both ski poles together with the baskets in the snow, grasp the poles with one hand just above the basket and one hand near the top of the poles. Now pull up off the snow. As the hips leave the snow, step towards the ski baskets with the ski closest to the baskets and begin to stand up. The uphill ski will be used to stabilize you as you stand up. If you lost a ski(s) in the fall, you should get to a standing position, and then put the skis back on, replacing the downhill ski first.

Learning Step/Activity 3 – Ascend hills using the herringbone and sidestep techniques.

NOTE: Explain the concept of fall line to the students at this point. The fall line is the natural line a ball would roll if you placed it on the slope and gave it a push.

a. On short steep sections of the slope the herringbone is an effective way to gain elevation. However, this method quickly fatigues the leg muscles and is difficult to sustain for long periods.

b. Face uphill with the ski tips spread wide to form a V with the skis. Then rotate the knees inward to put pressure on the inside edges of your skis. Now shift your weight to one ski and move the un-weighted ski forward a short step. Shift weight to the advanced ski and edge it inward. Repeat this process using the ski poles for balance in order to make progress uphill. Keep the ski poles on the outside of the skis. Watch the ski tails; stepping on them can make you lose your balance and fall.



Common Errors:
Back slip of skis- most of the time the student is not in a good V shape with the skis. The skis are on the inside edges but the ski tips are not pointed out enough.

Stepping on ski tails- Ensure the step is far enough in front of the opposite ski that the tail is not caught.

c. On very steep sections, the side step can be used. Place yourself perpendicular to the fall line with the uphill edges of your skis engaging the snow slope. Shift weight to the downhill ski. Now take a short step with the uphill ski. Ensure the ski edge engages the snow. Shift weight to the uphill ski and bring the downhill ski parallel with the uphill ski. Poles are used for balance. Short steps allow proper weight shift and prevent loss of balance or falls. The side step is also an effective method to go downhill and provides the most control on a steep section that you may not be comfortable with.

Learning Step/Activity 4 – Traverse hills with half-herringbone technique.

For long movements up a sustained slope, the best method that will cause the least amount of fatigue is the traverse. When traversing uphill, keep the uphill ski pointed in the direction of travel. The downhill ski is placed in the best position to maintain balance and traction while walking. If looking at the skis, the downhill ski resembles a half herringbone position. Make sure that the traverse angle is not too shallow (no elevation gain) or too steep (straight uphill is too fatiguing). Find a happy medium. The pole in the uphill hand can be adjusted to be shorter or the skier can "choke up" on it. This reduces fatigue and keeps the hands below the shoulder.

Caution: Maintain proper intervals between Soldiers on traverses. If a ski back slips the follower can get hit in the face with the tail.

Learning Step/Activity 5 – Demonstrate a kick turn on a slope.

At times there will be a need to change direction. The same kick turn that you learned on flat ground is effective for changing direction on a slope.

a. As you come to the end of a leg of a traverse, place your skis directly across the slope and side by side. Stomp down a small platform to ensure a steady position. This will help everyone else in the unit.

b. Execute a kick turn as on flat ground initiating with the downhill ski first.

c. Begin the next leg of the traverse. Everyone behind the leader uses the same method in the same spot.

Note: Do not allow Soldiers to begin cutting the corner. This greatly increases the signature of the trail and can lead to confusion. If the unit is spaced properly, there should be no bunching at the transition points.

Learning Step/Activity 6 – Demonstrate a herringbone turn on a slope.

a. A second way to change direction is to transition from a traverse to a herringbone facing up the fall line and slowly moving around into a traverse in the opposite direction. You may need to exaggerate the herringbone position to maintain a grip on the snow. This turn is for use on moderately sloping terrain.

Learning Step/Activity 7 – Demonstrate straight downhill runs in both the parallel stance and Telemark stance.

NOTE: Choose terrain that has a very gentle slope and has a natural run-out (i.e. no obstacles, and flat ground at the end of the slope that will naturally allow the students to come to a stop). Demonstrate to the students that you will come to a stop gradually without any effort on their part (i.e. they don't need to know how to stop).

NOTE: There are four fundamentals to skiing that must be mastered: BALANCE MOVEMENTS, ROTARY MOVEMENTS, and EDGING MOVEMENTS AND PRESSURE CONTROL MOVEMENTS. Explain these to students and define each one. It will help as you try to make corrections on technique.

NOTE: Establish a start point for students with two ski poles to serve as a gate that students can use for balance. This is necessary because students will not use poles at this point.

a. The bull fighter stance: You need to side step into position uphill from the start point (poles). Grasp the poles and maneuver your skis so that they are parallel to each other and pointing down the ski slope. From this position, slide one ski back and forth over the snow to remove any snow that has built up on the base. Now repeat with the other ski.

b. Release the ski poles and shuffle forward. Once the skis start to move, relax, and focus on the athletic stance and keeping your weight centered over both feet. You should feel the weight more on the balls of the feet than the heels. Once you come to a stop, turn around come back up and do it again.

c. As this gets easier try a few things. Shuffle your feet back and forth without lifting your heels. Try standing on one foot then the other. Hop up and down. The point is that you need to stay ready for anything not locked into a rigid stance.

d. DRILLS:

(1) Beat boots as the student move down hill. Helps with pressure and balance.

(2) Throw a football to the student as they are moving downhill. This keeps the hands in the correct position. Also get the eyes off the ski tips, a common mistake at this point.

(3) Ski on one ski.

(4) Reach down and pick up an object from the snow.

(5) Ski under a ski pole - the ski limbo.

NOTE: Learning to Telemark is not absolutely necessary but it is a very handy skill to have when in backcountry snow. This section of the Lesson Plan can be by-passed.

e. Demonstrate the Telemark position when students have mastered the above. The stance is the most important part of learning to Telemark ski:

(1) One ski/foot will be downhill (also know as the front foot or outside ski). Your knee should be directly above your toes of your front foot. Both the ankle and the knee should be bent giving you a forward cant. Your front foot will be hidden from view by your front knee when you are in a good Telemark position.

Right arm lifted for clarity

(2) The uphill foot or back foot is bent at the toe with the heel lifted off the back ski. You support half your weight with this ski and half with the front ski. Ensure that you are standing on the ball of your foot and not your tippy-toes Try to keep the heel of the back foot as low as you can but still off the back ski. Both knees should be snugged up together. You thighs should be at an angle to the snow. Your butt should be over the heel of your back foot.

Note: Have students do the "1000 Telemarks" down the ski slope. This involves rising up and transitioning to the Telemark stance with the left (or right) foot forward, then sinking into the Telemark, then rising up transitioning to right foot (or left foot) and repeating until the student is proficient in transitioning. Kind of like iron mikes on skis, but the stance is tighter.

Learning Step/Activity 8 – Step turn during a downhill run.

At times there will be a need to change direction. The simplest means of doing this is to begin by straight running and place all the weight on the ski opposite the desired direction of turn. Now lift the other ski, opening the tip slightly toward the desired direction of turn. Shift weight onto the ski that you just moved on match with the other, now un-weighted ski. Continue until you have made the desired direction change.

Learning Step/Activity 9 – Demonstrate the gliding wedge.

a. The gliding wedge is the foundation from which all other ski instruction progresses.

NOTE: On flat ground demonstrate a good wedge.

b. Start with skis parallel; now push the ski tails of the ski apart until they form an inverted V shape. The tips of the skis should be about six inches apart. You should feel most of your weight on the inside of your foot from the knuckle of the big toe through the arch to the heel.

NOTE: Show students narrow to wide wedges.

c. As you vary the size of the wedge, you will change the amount of pressure on the inside edges of the ski. A larger V means more edge pressure. A good athletic stance is important, no matter how wide or narrow the wedge; this means that your ankles and knees are flexed. You should start in the bullfighter stance we used earlier for straight runs and after you push off you will apply pressure to the inside of the skis and form the wedge. Glide in this position until the terrain flattens out, turn around, come back up and do it again.

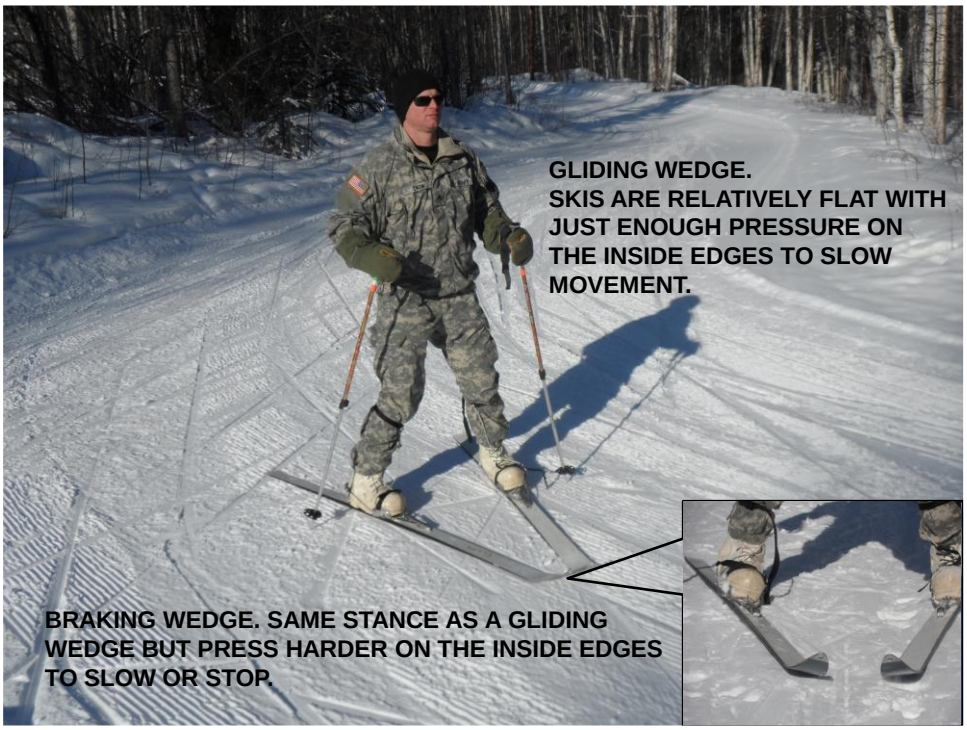
d. Your edges should engage very little in the gliding wedge; the ski should be relatively flat in relation to the snow.

e. Common errors and fixes:

(1) Straight legs. Flex at the knees and ankles. Beat boots while gliding.

(2) Student turns. Weight is not centered over both skis. Feel the weight centered over both heels.

(3) Knees together causing too much edging. Flatten skis. Simulate holding a beach ball between theknees.



Learning Step/Activity 10 – Demonstrate the braking wedge.

NOTE: On flat ground demonstrate a good braking wedge.

a. Start with skis parallel; now push the ski tails of the ski apart until they form an inverted V shape. The tips of the skis should be about six inches apart. Knees should be holding a basketball; this gets the skis on edge.

NOTE: Show students narrow to wide wedges.

b. To form a braking wedge, push the knees inward while pushing the ski tails outward to engage the edges of the ski. Maximum braking occurs when the V formed by the ski is wide, the knees are angulated inward and the weight is shifted to the heels of the foot. This will increase pressure on the inside edge of both skis. This technique is used to stop!

c. Common errors and fixes:

(1) Straight legs. Flex at the knees and ankles. Beat boots while gliding.

(2) Student turns. Weight is not centered over both skis. Feel the weight centered over both heels.

(3) Cannot brake. Edges not engaged. Have student exaggerate knee and ankle flex and decrease the distance between knees.

d. Drills: Once students have been shown both techniques, have them perform gliding wedge to braking wedge at an area you choose. Also have students go from straight run to gliding wedge to braking wedge and back to straight run. Ski poles can be used as a stop sign for places you want the students to transition to a braking wedge.

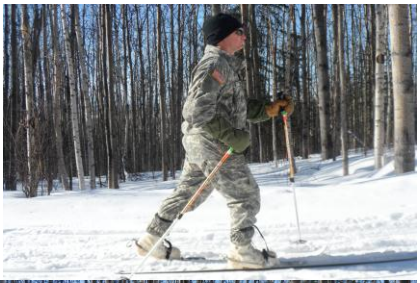
Enabling Learning Objective C:
Ski Lesson 3: Basic Cross Country

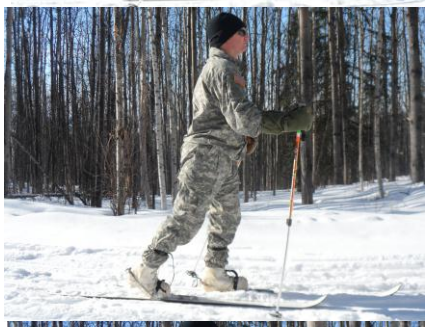
ACTION	Move on skis over gentle snow covered terrain (Double Pole and Diagonal Stride)
CONDITION	On gentle, rolling snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier demonstrated the diagonal stride. Soldier demonstrated double poling.

Learning Step/Activity 1 – Demonstrate the diagonal stride.

NOTE: If time allows or you want to focus on cross country skills, you can move directly into Ski Lesson 3 from Ski Lesson 1.

a. The basic movement of the diagonal stride is the walking step. Forward motion and glide are increased when more effort is applied to the step. The added effort is obtained by a push off coordinated with an increased push from the ski poles.





NOTE: Begin diagonal stride in a flat open area without using ski poles. Tell students to use swinging arm movements for rhythm and timing.

b. Start by leaning forward with a good athletic stance. Then shift weight to the right ski. Next slide the left un-weighted ski straight forward by a springing motion from the ankle, knee and hip, straightening the body and shifting the weight to the left ski.

Complete the motion by straightening the right knee and pushing off from the right foot; this will also complete the weight shift. Keep the weight on the gliding left ski and as the glide nears completion, bend the left knee and ankle in preparation for the next push off. Meanwhile the right ski is moved forward in preparation for the next step. As the right ski comes parallel to the left ski, the next step is made with the right ski by pushing off with the left ski.

c. Using the ski poles can increase the amount of glide. The ski poles are used in the same manner as when marching or walking; that is right ski pole is forward when the left leg is forward and the left ski pole is forward when the right leg is forward. While pushing off with the right foot the left pole is simultaneously planted and the muscles of the arm and shoulder are used to push from the ski pole and propel the skier forward. The right ski pole is used when pushing off with the left foot.

d. The entire motion of the diagonal stride should be a smooth, rhythmic flow of motion. Timing is the key and this is the area that you should focus on.

e. Drills:

(1) Practice without poles first, using the arms for balance and timing.

f. Common Errors and Remedies:

(1) Shuffling. This indicates uncertainty with balance. More time on skis and drills without poles will help with balance.

(2) Ski tips slide backwards. This indicates poor timing, improper weight shift or improper waxing of skis. Have students count to develop a rhythm. Try to push down on the ball of the foot rather than back. Imagine smashing a bug. Student may need to adjust wax.

Learning Step/Activity 2 – Demonstrate double poling.

a. Start on flat ground with skis parallel. Use both arms in a coordinated effort with an upper body compression to produce propulsion. Ensure that the pole plant is done with the pole grip ahead of the pole basket.

b. Drills

(1) Double pole with arms only

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(2) Double pole with body compression only.

(3) Double pole with arms and body.

c. Common Errors and Remedies.

(1) Weight is on the backs (heels) of skis. Student is not using the athletic stance.

(2) Double poling with the arms only. Use body compression and arms.

Learning Step/Activity 3 – Demonstrate double pole with kick.

Start out on flat terrain. Review diagonal stride and double poling. Now begin by walking and double poling. Explain that the kick can be timed before, during or after the poling. Move slowly at first until timing and rhythm fall into place, then increase propulsion. Switch kick foot from left to right and back to left, using different sequences. You will get a continuous fluid ‘classic’ cross country movement with this technique.

Enabling Learning Objective D:
Ski Lesson 4: Basic Nordic Downhill and Intermediate Cross Country

ACTION	Demonstrate wedge turns to control speed on gentle to moderate (between 20-30º) snow covered terrain. Combine basic cross country techniques to move efficiently over gentle to moderate snow covered terrain (Double Pole with Kick)
CONDITION	On gentle to moderate snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier demonstrated linked wedge turns, side slips, and the ability to ride the lift. Soldier demonstrated double pole with a kick and appropriate cross country techniques for the terrain.

Learning Step/Activity 1 – Demonstrate wedge turns.

NOTE: This LSA is performed without ski poles.

a. Turning is one method used to control your rate of descent. To turn simply begin in a gliding wedge and turn in one direction to create a small "C" in the slope.

NOTE: Set a ski pole out about 10 meters down slope from your position. Have students initiate the turn when they reach this pole.

b. Steering is physically turning the ski with your foot. While moving in the gliding wedge, actively steer the opposite ski towards the desired direction. This will become your outside (or downhill ski). If you want to turn to the left, actively steer the right ski. Remember that rotary movement we tried in Ski Lesson 1. While you are moving, this rotary motion will help you steer or point your ski in the desired direction.

While steering this ski, place additional pressure (weight) on the steering ski by flexing at the ankle and bending the knee. This will increase the edge pressure on the outside ski and you will begin to turn (You should feel most of your weight on the inside of your foot from the knuckle of the big toe through the arch to the heel.) The inside ski should be kept relatively flat as you make the turn. Turn around the pole, come to a stop, walk uphill and repeat the process on the same side.

NOTE: Transition to the other turn only after students have mastered the first (left or right) turn.

c. Now that you have the basic concept down, we will have you un-weight your skis prior to actively steering. Rise to initiate the turn, then sink or flex to execute the turn. Gradually round the turns out from a small "C" to a large carved "C". For this portion of training you will start in one direction and as you cross the fall line, you will rise, steer the outside ski and make the turn. Again, stop after making the turn, return to the start point and repeat.

Learning Step/Activity 2 – Link wedge turns.

NOTE: This LSA is initially performed without ski poles. As students master the wedge turn without poles, introduce ski poles.

a. Now that you have figured out how to turn to both sides, you are going to link those turns together. After going through the first turn, simply continue moving across the fall line and initiate a turn in the opposite direction and continue this process down the slope.

b. Drills:

(1) Slalom through ski poles.

(2) Keep hands pointed in the direction of travel as if they were headlights.

(3) Point skis, nose, knees and toes in the direction of travel.

c. Common Errors and Remedies:

(1) Cannot turn. Apply pressure to the outside ski (squash the bug) and flatten the inside ski.

(2) Ski tips crossing. The skier is looking at the ski tips. Have the student focus a few feet in front of the ski tips in the direction of travel.

(3) Inside ski runs down the fall line. Flatten the inside ski and increase the edge pressure on the outside ski.

(4) Twisting upper body. Allow the inside hip to move in the direction of travel. Look in the direction of travel and down slope. Actively steer skis with ankles.

(5) Skier is bent at waist and is poorly balanced. Get back into the proper athletic stance. Emphasize the rise and fall with the knees and ankles, not by bending at the back and waist.

Learning Step/Activity 3 – Demonstrate the side-slip.

NOTE: Progression to develop a Christy (skid) from a wedge turn requires introduction of a side slipping or skidding at this time. Some students may have accidentally performed a basic Christy during wedge turn practice. When this happens, let it happen. The student is naturally progressing into the wedge Christy.

Begin by standing on a slope with skis across the fall line and poles spread wide. Now roll the knees towards the fall line to release the edges and begin to side slip. Practice both the left and right side slip. As you shift the weight from the balls of the feet to the heels, the direction of side slip will change. If the balance is centered you will slide down the fall line. If it is on the balls of the feet, you will side slip down and slightly forward. If the balance is on the heels you will slip down and slightly backward. Try it while facing across slope. Then rotate the upper body and arms until they are oriented down the fall line and try the same exercise.

Learning Step/Activity 4 – Ride the lift.

a. There are some things to remember when training at a ski area. The lower skier has the right of way - always. Look uphill before exiting a cutoff trail and merging onto a main trail. Always ski in control. If you are out of control, execute a controlled fall.

b. Get into position as directed by lift operator. Remove ski pole leashes and hold ski poles in the outside hand. If you are on the left hold your poles in your left hand; if you are on the right, hold the poles in your right hand.

c. An instructor or lift operator will place the T-bar behind your buttocks. The T-bar should ride just below your buttocks. Continue standing and let the T-bar pull you up the hill. DO NOT SIT DOWN ON THE T-BAR. Use your free hand to hold the center of the T-bar for balance. If you fall, roll to the outside and get away from the main travel path of the lift. Your instructor will let you know (BEFORE starting) where to meet if you fall off the lift.

NOTE: Ensure that students can handle the terrain serviced by the lift before going up. Check trail maps or with the lift operator.

NOTE: Explain the loading and unloading procedures appropriate to the lift you are using. Explain emergency procedures. Then review slope etiquette.

NOTE: Now that all of the bases are covered, let the lift operator know that you have students loading that have never used the lift before. They can slow the lift down and ensure that students get on the lift safely.

NOTE: The instructor for the squad should get on last. This will allow him to ensure all students load safely. It may be a good idea to work in buddy squads. One squad leader can move on the lift in front of the group while the other loads the students and ensures they all get on the lift safely.

Enabling Learning Objective E:
Ski Lesson 5: Basic Nordic Downhill (continued)

ACTION	Demonstrate wedge Christy, stem Christy and basic Telemark turns to control speed on moderate snow covered hills (skis match after the fall line)
CONDITION	On gentle to moderate snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier demonstrated the wedge Christy, stem Christy and basic Telemark ensuring that skis matched after the fall line.

Note: <u>MASTERY</u> of Ski Lesson 5 is the absolute minimum for the Military Skier to handle the type terrain a unit is expected to encounter. At this point the unit must begin a sustainment program skiing several times each week. Begin to incorporate longer (10-15miles) movements carrying fighting loads at the minimum. Progress to sled hauling and finally carrying the sustainment loads the unit is typically going to have. Units unwilling to devote time to sustainment will suffer greatly.

Learning Step/Activity 1 – Demonstrate the wedge Christy (matching skis after the fall line).

NOTE: The wedge Christy may be performed with or without poles. If the skier is too dependent upon the poles for balance, take the poles away.

a. By now, you know how to make turns and get down a moderate slope. You also have practiced the side-slipping technique. There are two different ways to start this drill. One starts by traversing a slope and turning into the hill. The other starts with wedge turns down the slope and transitions into the wedge Christy from there.

b. Method 1: Begin by traversing across the slope in a parallel stance. Actively steer the skis uphill to stop. Skis should be parallel with the uphill ski slightly more advanced. As you traverse across the hill the skis should skid (this is also known as Christy). This method gets you a feel for what the end of the wedge and beginning of the next turn should feel like. After you come to a stop, kick turn and try this drill in the opposite direction.

Now begin the drill by traversing across the slope in a wedge. Once you reach the fall line match skis (bring skis to a parallel position, uphill ski slightly advanced), and actively steer them uphill as you did earlier.

You should focus on rising up to steer and initiate the turn and matching and sinking into the skid (Christy) to control the turn.

NOTE: Have students practice until they feel proficient.

NOTE: As the students progress, have them start the turn more and more in the fall line. Students should progress to moving right down the fall line in the wedge, moving from wedge to parallel to turn with Christy. As students become proficient with both turns begin linking wedge Christies; make sure that students are matching skis AFTER the fall line. Turns should be large and "C" shaped at this point.

NOTE: The second method is appropriate for those who have skied before and are frustrated by the slower pace of the first method. Keep in mind that you should still begin this activity on a gentle slope.

c. Method 2: Begin by making some short radius wedge turns in the fall line. Be sure that the ski tips are not too close together. You will need to work on the shape of your wedge turn, focusing on making round turns instead of shallower S-shaped turns. You are also going to need a bit more speed (this is accomplished by a smaller sized wedge or less of a V shape).

Steer the outside foot, knee and ski into the new turn. The speed is necessary because the round turns slow you down (round turns are great for controlling your speed on steeper slopes).

You should be using your edges more. This helps you control your speed and helps you to shape the round turn. Once this is comfortable, think of your inside ski. Now lighten **(DON'T LIFT)** the inside ski as you move across the fall line. It should slide along side your outside ski and you skid (Christy), skis parallel until you go back into the wedge and start the process all over again. Another way to think of this is to transfer your weight to your outside ski while lightening the inside ski.

NOTE: This whole activity is a drill. It can be done from top of slope to bottom. One common error is leaning into the slope. Direct the student to keep the weight centered over skis. Using the hands as headlights will also help. Another common error is to twist the upper body in an attempt to make the skis turn. This is bad. Again have the student use hand as headlights. Another error is dragging the ski poles or using them as out-riggers for balance. Lose the poles and only add them in after the student is proficient without them.

Learning Step/Activity 2 – Demonstrate the stem Christy (matching skis after the fall line).

NOTE: The stem Christy may be performed with or without poles.

a. Though you might think this is just another wedge turn, it is not….it is used when the going gets fast, dicey and when your pack is heavy. In other words it is a technique used by advanced skiers the world over. It produces a quick controlled turn initiation, thus avoiding the abundant speed present in a parallel turn. The stem Christy also provides side to side stability.

b. To begin traverse across a slope. Stand up tall and stem your outside ski out as you would for the wedge. Then step onto this ski, shifting your weight to the stemmed ski. Steer your ski into the fall line. Lighten the inside ski. Sink with your body as you move through the fall line. Your skis will match (or at least they should) as they did in the wedge Christy and you will finish the turn with the same skid as the wedge Christy.

If you are having a problem getting the inside ski to come parallel with the outside ski, try lightening the inside ski AND pulling the heel into the downhill or outside ski. As you finish the turn, stand up, stem the other ski out and step onto it for the next stem Christy.

NOTE: Have students practice on one side then the other and then link the turns.

c. The main motion now that will be repeated in all other ski lessons is stand up, sink, stand up, sink as you make each turn. This is fundamental to skiing no matter what method of turning you are using. It allows you to weight and un-weight your skis.

d. There are three main points to keep in mind while performing wedge Christies or stem Christies:

(1) Use plenty of up and down movement; start tall and sink through the turn.

(2) Shift your weight onto the stemmed (or wedged) ski.

(3) Lighten the inside ski as your skis come through the fall line.

e. Drills:

(1) Garlands- Have the students link a series of turns for a short distance one after another trying to stay in the same groove. Reinforces steering of the skis.

(2) Human slalom- Students line up in the instructional formation. The first student skis down a short distance, turns and stops. The second skis down, turns around the first and stops, third student skis down, turns around the first, then the second, then stops. The following students repeat using each other as turning poles. Reinforces the need to steer the skis.

Learning Step/Activity 3 – Demonstrate the basic Telemark (also known as Telemark Christy, matching skis after the fall line).

NOTE: Telemark skiing is not absolutely necessary. This LSA may be eliminated.

NOTE: The Telemark Christy may be performed with or without poles.

a. The Telemark turn is a hard turn to master but is very useful for use in challenging snow conditions.

b. We need to review the Telemark stance. On a flat spot, sink into the tele position, one foot forward and one foot back. Your weight should be evenly distributed between both feet. Try a very low stance, then try a taller stance. Find what is most comfortable for you. You should feel your weight on all of your front foot and the ball of your rear foot.

Now try it while traversing across a shallow slope. Drop the uphill ski back and get into a comfortable Telemark position. You will turn up hill which will bring you to a stop. Kick turn and try it the other way.

If you have the diagonal stride down, you have the stance down. The stride motion is the same as the Telemark position with one exception. Your arms stay to the front in the Telemark position, they are stationary and relaxed in front of you (the same position you have kept while performing any of the downhill techniques in past lessons).

c. Basic Telemark from a half wedge. Begin with a straight run on a shallow slope. Point one ski straight and point the other ski out as if it were in a wedge. Keep a minimum amount of weight on the wedged ski; you should feel the inside edge brush lightly against the snow.

d. Now weight the wedged ski to initiate a turn. At the same time sink into a Telemark stance. Think of sliding the wedged (outside ski) ski forward and the inside ski backwards. Steer the outside ski through the turn. You will turn uphill to a stop. Point your skis downhill again, move in a half wedge and try the turn in the opposite direction.

e. Once you are comfortable with a single turn, practice executing the turn over and over with a drill known as garlands. To execute the garland drill, traverse across a slope in the half wedge. As you move across the fall line execute a turn. As you come to a stop, point the skis down the fall line again and execute another half-wedge to Telemark turn. You will be doing the same turn (left or right), until you have reached the bottom of the hill or come to the edge of the ski run. If this is the case try it the other way and again stay with the same turn until you reach the bottom or other side of the ski run.

f. Another method is to start on one side of the slope in the Telemark stance. The downhill ski is in the rearward position. Ride this stance across the hill until you want to turn. Shift most of your weight to the front foot. You should feel the weight on the inside of the foot from the knuckle of the big toe, through the arch to the inside of the heel. You will begin to turn downhill. Once you have begun to return back across the hill switch the feet and repeat.

f. Now you will try to link these turns. The key for now is to start in the half wedge and initiate the turn and sink into the Telemark position before the fall line. You should traverse across the fall line in the Telemark position, then move back to the half wedge position to initiate the next turn, and again sink into the Telemark before the fall line.

Learning Step/Activity 4 – Choose techniques for the terrain.

On a backcountry movement, conditions will change constantly. Different conditions call for different techniques. You are starting to develop a repertoire for these different conditions. Getting good at a single technique will not serve you well when the conditions are not suited to that technique. Wedge turns, side-slipping, braking wedge, wedge christies, stem christies, Telemark christies, kick turns may all be used on a particular movement.

NOTE: Get the students into different conditions. Powder, breakable crust, wind slab, hard pack, and bumps. As you get them into each situation, have them try different techniques. Let them get used to the feeling of each, the body position that works well for them and the technique that allows them to turn their skis best. Explain the fore-aft stability of a Telemark position and how it is appropriate for powder and breakable crust that is working to throw them forward or backward. Explain the importance of the wedge position and the side to side stability that it affords. Side-slipping is skiing and will work for steep icy conditions or narrow terrain. Work them in difficult situations; watch their technique to ensure they do not develop bad habits. Some call this mileage and it is what will develop better skiers. After a few hours of practice in different conditions, get them back to the groomed and the students should notice a marked improvement in their skiing ability.

Enabling Learning Objective F:
Ski Lesson 6: Intermediate Nordic Downhill and Advanced Cross Country

ACTION	Demonstrate wedge Christy and basic Telemark turns to control speed on moderate snow covered hills (with pole plant and skis match before the fall line). Demonstrate basic skating techniques.
CONDITION	On gentle to moderate snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier demonstrated the wedge Christy and basic Telemark turn (with pole plant and matching skis before the fall line. Soldier demonstrated basic skating techniques.

Learning Step/Activity 1 – Demonstrate the wedge Christy (matching skis before the fall line).

a. Now that you are comfortable matching your skis after the fall line, you will transition to matching your skis before the fall line. There really is not much to it other than practice. There are some things to consider. Flexion and extension are what allow you to work your skis. You have seen this throughout all of the ski drills you have done up to now. Rise and fall. Tall and small. Try turning without the rise and fall. Now try it with this motion. “Flexion and extension allow you to control and use the pressures that gravity and centrifugal force create against your edges. They are the key to more carve and less skid (Christy)” from Free Heel Skiing by Paul Parker. Flexion and extension keep you from becoming stuck in a position as you move down the hill.”

b. At this point the poles will become more important. The idea is to keep the hand and poles in the same forward position as before. But now you will begin to sting the snow with a pole plant to initiate the new turn. This pole position and the pole plant helps keep the body oriented down the fall line. This ‘quiet’ upper body becomes very important as you begin to transition to turns in the fall line. Turning the upper body with the turn is a sure way to fall.

c. Work on short radius turns and on long sweeping turns. Turning before the fall line means you maintain or increase your speed. Turning in or after the fall line means you will slow down. You now know and have the techniques for moderating your speed as you move down a slope.

Learning Step/Activity 2 – Demonstrate the Telemark Christy (matching skis before the fall line).

Everything that applied for the wedge Christy applies here as well; just try it from half wedge to Telemark Christy and match the skis in the Telemark position before the fall line. Pole plants, flexion and extension and a quiet upper body are all just as important.

Enabling Learning Objective G:
Ski Lesson 7: Advanced Nordic Downhill

ACTION	Demonstrate open stance parallel and open stance Telemark turns on moderate to steep (between 30 and 35º) snow covered terrain
CONDITION	On gentle to moderate snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) (or other appropriate ski equipment as prescribed by unit)
STANDARD	Soldier demonstrated open stance parallel and open stance Telemark turns.

Learning Step/Activity 1 – Demonstrate open stance parallel turns.

NOTE: Most students begin to perform the open stance parallel as they practice the wedge Christy. This is the natural progression and when you see it encourage it.

a. There are two important areas that you need to focus on as we advance in skiing technique. The knees and the ankles. Try for a moment to ski with the knees bent but the ankles straight. You will immediately notice that you are off balance. You bend forward at the waist to compensate for this lack of balance and are then thrown backward as you over-compensate. Your knees act as shock absorbers, but without flexed ankles, bent knees do nothing for you.

To start, make some medium radius, skidded parallel turns. Point the skis down the fall line and gain some momentum in the athletic stance. Extend your legs by extending your ankles and begin the turn (the tall position). You are going to get the most out of your weight on the downhill run. Steer the skis into the turn. The main difference is that you are not in a wedge position at any point in the ski. If it sneaks in to control your speed that is fine, but we need to move away from it.

Pole plants down the fall line initiate the next turn. The pole plants help with timing. They should not be used as a staff to lean on and provide balance.

NOTE: If students are having a hard time with poles, practice without the poles until they have the turns down.

b. At this point most of your turns will feel skidded and choppy. You have all seen the skiers that look smooth, not matter what the conditions. To get you there we will try some edge control. Traverse across a slope and get a bit of speed. Extend the ankles and tip the uphill ski onto the uphill edge. At the same time transfer your weight to this uphill ski. With this accomplished roll the uphill ski onto the downhill edge. This will initiate a turn and pull you into the fall line as you smoothly change edges and steer into the fall line. Sink through the turn. With the turn complete try the same drill on the other side. This drill should help you to make smooth edge changes and move you toward carving your turns as opposed to skidding your turns.

c. Here are some tips to producing a smoother parallel turn. Do these things and you will be as smooth as any alpine skier.

d. Focus on the inside ski. Most parallel drills focus on the outside ski. Because the outside ski is weighted more than the inside ski, people tend to ignore it. But if you put some focus on it and play with pressure and edging of the inside ski you will transform your turns into smooth, carved turns.

e. Focus on the inside knee. Your inside ski must be steered just as you do with the outside ski. Too much focus on the outside ski can lead to crossed ski tips as the inside ski gets away from you. To remedy this, point your inside knee in the direction of the turn. Moving into the turn with this pointy knee will get the inside ski tip moving in the right direction. As the terrain gets stepper, leading with the inside knee will help make your turns quick and get your body aligned for the turn. It will also get the inside ski out of the way early and allow the outside ski to do the right thing without crossing over your inside ski.

f. Edge your inside ski. Skis that are edged equally are more likely to stay parallel. This is especially true in loose snow, where your skis will want to move in different directions. On hard pack snow, failure to edge skis equally will result in crossed skis. Try to tip both skis over onto their edges at the same time. Make a series of turns and consciously focus on edging the inside. In powder conditions, edging means tipping the ski onto its edge rather than trying to have it bite into the snow.

g. Slide the inside ski forward. Sliding this inside foot forward as you initiate your turn automatically shifts weight to the outside ski and allows you to get a better edge with both skis. It allows your body to remain facing down the fall line. As your skis come out of the fall line, let that inside ski slide backward before you begin to initiate another turn.

h. Weight the inside ski. On hard pack the downhill ski gets most of the weight. But in powder the weight is more evenly distributed between the skis. Try weighting the inside ski on the whole little toe side. Having the ability to do this will allow you to change your weight distribution to match the conditions you are skiing in.

Learning Step/Activity 2 – Demonstrate open stance Telemark turns.

NOTE: Most students begin to perform the open stance Telemark as they practice the Telemark Christy. This is the natural progression and when you see it encourage it.

a. Now we are getting to the true Telemark turns. While practicing the Telemark motion you probably felt yourself transitioning from sequential steppy turns to more fluid Telemark movement. The main difference between the Telemark Christy and the open stance Telemark is that the turn initiation begins with the skis in a parallel position rather than from a wedge position. The turn becomes carved instead of skidded.

b. Here are some additional tips to focus on as you transition to the open stance Telemark. These tips are taken directly from the free heel skiing guide:

c. Tuck your back leg under you. Think of bringing your rear knee cap into the bend on the front knee. The back leg is the often neglected leg in the Telemark turn. Many students new to the Telemark turn make the common error of letting their back leg flop about behind them with little weight placed upon the ski. But because you should have your weight distributed equally between the two legs it is just as important as the front leg. Your rear heel should be raised off the rear ski and directly underneath your buttocks.

d. Think of knees as headlights. Point your front knee or headlight beam towards your new destination. Once you have this concept down, focus on the back knee and try to point its beam into the new turn.

e. Big toe, little toe. When you edge your skis into a turn, you should feel the pressure under the big toe side of the front ski and the little toe side of the rear ski. This will edge your skis properly. Note that with this tip, it is not just the toe of the foot but the whole side of that foot that has pressure on it. But thinking big toe, little toe should stick in your mind. This concept will also help prevent you from tip toeing on the rear ski. Your entire rear forefoot should remain on the ski.

f. Dropping your rear heel. This tip puts a number of things together. You have learned to put half your weight on the rear ski. You have learned to use the big toe, little toe concept to get the skis to edge properly and to give you more control of the turn. Now try to relax and bend your rear ankle even more so that the heel drops closer to the ski. Stay on edge but try to get as much of the rear foot

on the ski as possible. This tip gives even more control over that rear ski. Your hips will naturally tuck underneath your body to relieve the tension in your calf and Achilles tendon created by this dramatic flexion in the ankle.

g. Do more with the hips. A good Telemark skier has the same 'quiet upper body' that a parallel skier has; that is the upper body moves and faces down the fall line. A Telemark skier's hips rotate with the turn rather than face down the hill as with a parallel skier. With the upper body pointed down hill, you essentially have a spring and when the edges are released for the next turn, the abdomen, back muscles and hips rotate the skis around into the new turn. You should actually feel the abdomen muscles working for you. You will feel the new front hip punching around and into the new turn. Concentrating on this front hip helps you to anticipate the next turn.

h. Skiing from the waist up. You have learned to focus out in front of you, rather than on your ski tips. You have learned to keep your hands (poles) out in front of you, facing down the fall line. You have learned to keep your torso facing down the fall line. Pole plants become more important to help with timing. Think tap and turn. Tap the slope in front of you and turn around the pole. This is true of parallel and Telemark turns.

Enabling Learning Objective H:
Perform Route Finding During Movement

ACTION	Perform Route Finding During Movement
CONDITION	On snow covered terrain with military skis, bindings, poles and appropriate boots for temperature range (as determined by instructor during daily risk assessment) and a requirement to move a unit.
STANDARD	Soldier chose a route based on the capabilities of the unit and equipment available

Learning Step/Activity 1 – Identify classifications of ski runs.

a. The table below is based on slopes on a groomed snow resort setting. These designations are left in the description as a point of reference. It has been adapted to include terrain that a military skier will encounter such as trees, Alpine tundra and open tundra.

Note: A 100% slope is 45°.

Trail Rating	Symbol	Level of difficulty	Description
Green circle		Easiest	The easiest slopes at a resort. Green Circle trails are generally wide and groomed, typically with slope gradients ranging from 6% to 25% (3°-14°). Avalanche danger is negligible due to low slope angle. In wooded areas trees will be generally mature and widely spaced. Deadfall may be present, but easily avoided. Tundra and Alpine tundra areas are well covered and obstacles such as creek beds are easily negotiated. Brush areas are generally small and easily skied through. Snow conditions are consistent and wide spread from light powder to wind slab. Tougher snow conditions are easily avoided.
Blue square		Intermediate	Intermediate difficulty slopes with grades commonly ranging from 25% to 40 %.(14°-21°) These slopes are usually groomed at a resort. Blue Square runs make up the bulk of slopes at most ski areas, and are usually among the most heavily trafficked. Avalanche danger is low due to low slope angle. In wooded areas trees will be more narrowly spaced with thicker concentrations. In Alpine tundra, areas are generally well covered with spotty bare patches, variable conditions of wind slab, breakable crust and sastrugi. Brush areas more difficult to ski through and creek beds require more route finding. Snow conditions range from deep powder, consistent wind slab, intermittent breakable crust and spotty sastrugi .
Black Diamond		Advanced	Amongst the most difficult at a given mountain. Terrain tends to be steep typically 40% and up (21° to 45°) and may or may not be groomed. The main qualifier between blue and black is the slope angle and wide spread nature of conditions; eg the entire slope is covered with un-avoidable breakable crust rather than isolated patches; the slope is very steep (greater than 30°) and the run out may not be visible or have many IV lines to contend with; sustained maneuvering around obstacles is necessary. Avalanche considerations are the norm. This type terrain is usually the realm of very advanced level skiers. In some instances terrain can be mitigated to a more manageable level, but will require extensive route finding and considerable time. In wooded areas trees will be more narrowly spaced with thicker concentrations. In Alpine tundra, areas are generally well covered with spotty bare patches, variable conditions of wind slab, breakable crust and sastrugi. Brush areas very difficult to ski through and creek beds require extensive route finding. Snow conditions range from very deep powder, wide spread wind slab, breakable crust and very deeply sculpted sastrugi.

b. Define the various types of snow conditions. Each type of condition presents its own challenges and benefits.

- Powder-Light, fluffy snow, found during and immediately after snowfall. Light powder is up to mid shin deep. Deep powder up to knee deep. Very deep is up to mid thigh. Once snow is knee deep, close scrutiny must be given to the cost/benefit of moving Soldiers through that area as breaking trail will be extremely arduous, slowing movement to meters per hour. Skiing downhill in powder can be made easier by skiing on the ski bases instead of the ski edges.

The motion is much like marking time during Drill and Ceremonies. DO NOT LEAN BACK. This can cause the skis to shoot out from under you. Shift weight to the heel of the feet to keep the shovels close to the surface of the snow.

- Groomed or corduroy-Snow that has been tilled by a grooming machine. This snow condition is favored by beginners and the majority of recreational skiers, in that it tends to be relatively forgiving, easy to turn upon, and requires less skill to negotiate than powder snow. The name comes from the look of the snow after it as groomed, as it looks like corduroy fabric. This is the best place to learn to ski.

- Granular snow-Snow with large crystals, i.e., small pellets. Depending on sun and temperature conditions, it may be wet granular snow—meaning that there is a considerable amount of unfrozen water in it, or loose granular snow, which has no unfrozen water. Wet granular snow will form a snowball; loose granular snow will not. Wet granular conditions are often found in the springtime. Loose granular conditions are generally produced when wet granular snow has re-frozen and then been broken up by snowgrooming apparatus.

- Corn snow-The result of repeated daily thaws and nightly re-freezing of the surface. Because of the thaw-refreeze cycle, snow crystal shapes change over time, producing crystal shapes somewhat akin to wet granular, but larger. When still frozen in the morning, ski conditions can be much like groomed or granular. Late afternoon usually produces easier conditions as the snow softens. Beware that too much softening can introduce free water into the snow pack resulting in heightened avalanche danger.

- Slush-When the sun heats the snow and causes it to become very wet and very heavy or after a heavy rain event. Skiing in these conditions can be difficult.

- Variable- "Variable" simply means that all types of snow can be on the mountain, ranging from hard pack to breakable crust. It is usually a secondary classification.

- Ice/Hard-Pack- Skiers typically regard any snow condition that is very hard as "ice". In fact, true ice conditions are comparatively rare. Much of what is perceived to be ice is actually a frozen granular condition—wet granular snow that has refrozen to form a very dense surface. Telling the difference is comparatively easy; if one can get a ski pole to stand up in it, the surface is likely to be more of a frozen granular surface than an icy one—and while it is certainly not as enjoyable as many other snow conditions, skilled skiers and snowboarders can successfully negotiate it. Another form of icy condition can be found at higher elevation resorts in the Rocky Mountains and in Europe; direct sunlight can melt the top layers of snow crystals and subsequent freezing produces a very shiny, slick surface. Touring can be very difficult as wax may not provide enough grip. Climbing skins may be the only way to gain traction.

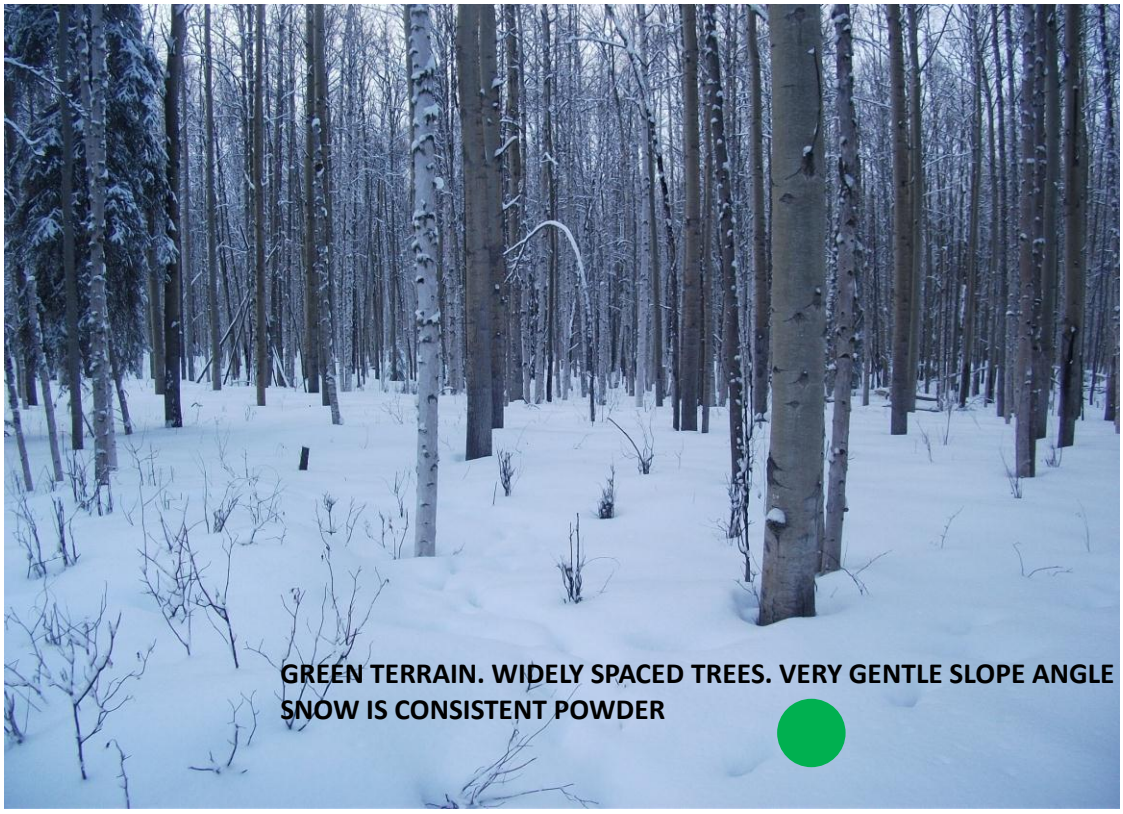
- Breakable Crust- Soft snow is covered by a harder upper layer upon the surface. This crust can be created by freezing rain, direct sunlight, and by wind loading which packs down the upper layers of the snowpack but leaves lower layers more or less unaffected. Crusts are extremely challenging conditions. In alpine areas beware of avalanche possibility. When skiing this type of snow it is usually best to negotiate hills in long traverses. Keep skis in a Telemark stance to increase stability front to back.

- Wind Slab- very hard snow formed by wind action. Much like hard pack. Surface is usually covered in small ripples and can be easy to negotiate. Sastrugi can also be present. When covered by a few inches of powder the skiing conditions will improve greatly.

- Sastrugi- Wind sculpted snow that has many raised features. Very difficult to ski and can result in injury to knees and ankles. Very common in wide open areas (Tundra) subject to strong winds. When skiing in alpine areas, the technique is like skiing breakable crust. Sleds can easily get hung up on the raised portions.

c. Evaluate route based on snow conditions and slope angle and terrain rating.

Green circle		Easiest	The easiest slopes at a resort. Green Circle trails are generally wide and groomed, typically with slope gradients ranging from 6% to 25% (3°-14°). Avalanche danger is negligible due to low slope angle. In wooded areas trees will be generally mature and widely spaced. Deadfall may be present, but easily avoided. Tundra and Alpine tundra areas are well covered and obstacles such as creek beds are easily negotiated. Brush areas are generally small and easily skied through. Snow conditions are consistent and wide spread from light powder to wind slab. Tougher snow conditions are easily avoided.



Blue square		Intermediate	Intermediate difficulty slopes with grades commonly ranging from 25% to 40 %.(14°-21°) These slopes are usually groomed at a resort. Blue Square runs make up the bulk of slopes at most ski areas, and are usually among the most heavily trafficked. Avalanche danger is low due to low slope angle. In wooded areas trees will be more narrowly spaced with thicker concentrations. In Alpine tundra, areas are generally well covered with spotty bare patches, variable conditions of wind slab, breakable crust and sastrugi. Brush areas more difficult to ski through and creek beds require more route finding. Snow conditions range from deep powder, consistent wind slab, intermittent breakable crust and spotty sastrugi .

BLUE TERRAIN LARGELY DUE TO SLOPE ANGLE. SNOW IS CONSISTENT POWDER ON WINDSLAB. SPORADIC SASTRUGI

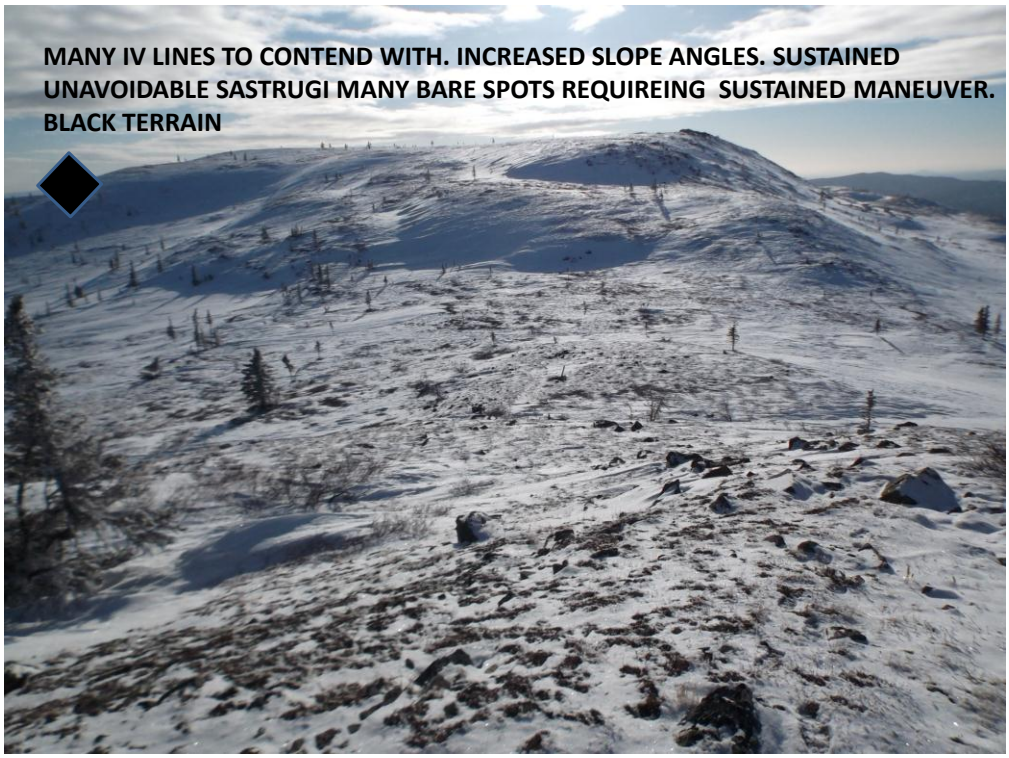
GREEN TERRAIN. WIDELY SPACED TREES. SNOW IS POWDER ON WIND SLAB. MILD SLOPE ANGLES

BLUE TERRAIN. TREES SPACED CLOSER. SLOPE ANGLE INCREASED. CONSISTENT POWDER

BLUE TERRAIN. TREES ARE WIDELY SPACED. SLOPE ANGLE IS INCREASED. BRUSH IS DIFFICULT TO AVOID. SNOW IS CONSISTENT POWDER.

BLUE TERRAIN. TREES CLOSLY SPACED. SLOPE ANGLE IS MILD. SNOW IS CONSISTENT POWDER. MANEUVER IS RESTRICTED TO LINKING LANES.

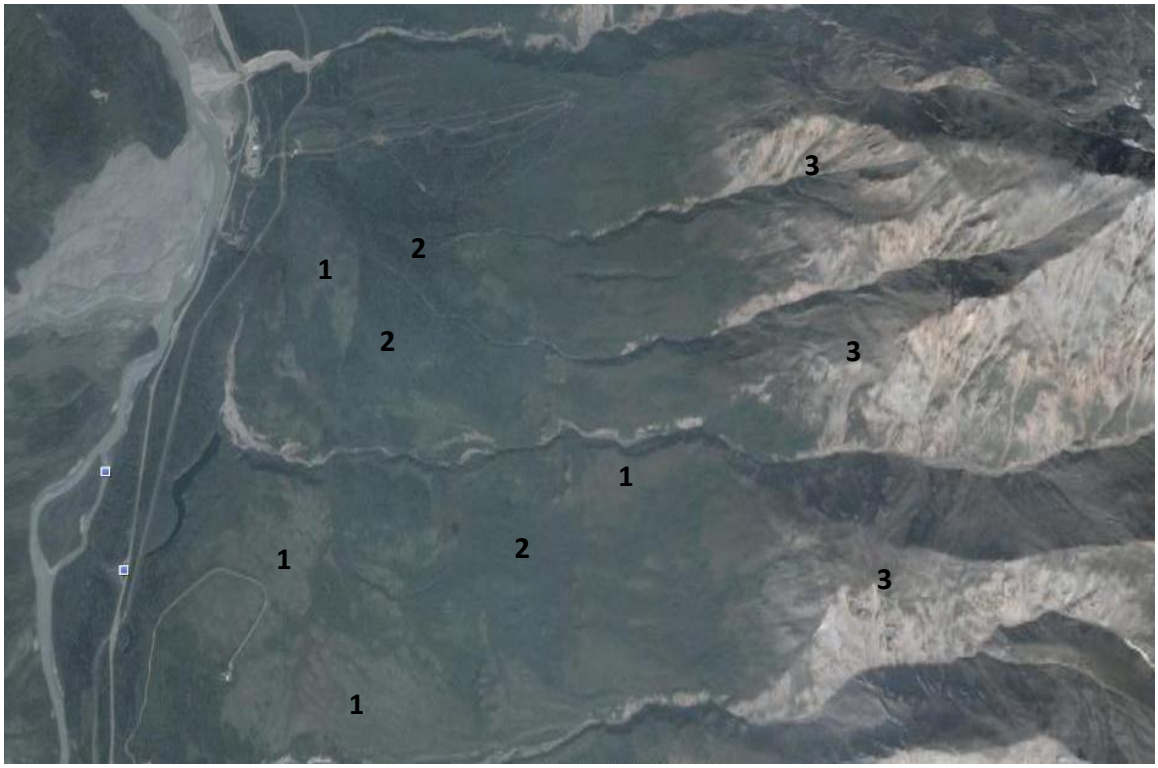
Black Diamond		Advanced	Amongst the most difficult at a given mountain. Terrain tends to be steep typically 40% and up (21° to 45°) and may or may not be groomed. The main qualifier between blue and black is the slope angle and wide spread nature of conditions; eg the entire slope is covered with un-avoidable breakable crust rather than isolated patches; the slope is very steep (greater than 30°) and the run out may not be visible or have many IV lines to contend with; sustained maneuvering around obstacles is necessary. Avalanche considerations are the norm. This type terrain is usually the realm of very advanced level skiers. In some instances terrain can be mitigated to a more manageable level, but will require extensive route finding and considerable time. In wooded areas trees will be more narrowly spaced with thicker concentrations. In Alpine tundra, areas are generally well covered with spotty bare patches, variable conditions of wind slab, breakable crust and sastrugi. Brush areas very difficult to ski through and creek beds require extensive route finding. Snow conditions range from very deep powder, wide spread wind slab, breakable crust and very deeply sculpted sastrugi.




TREES CLOSE TOGETHER WITH INCREASED SLOPE ANGLE. UNAVOIDABLE BRUSH. SNOW IS CONSISTENT POWDER
BLACK TERRAIN.


BLACK TERRAIN. VERY COMPLEX MOUNTAIN TERRAIN. HIGH SLOPE ANGLES. VARIABLE SNOW CONDITIONS. MANY IV LINES.

Learning Step/Activity 3 – Select routes using imagery.



a. Aerial photographs can help you plan a route. Mountain areas:

- 1. Light green and tan. These areas are generally open with low brush-Willow, Alder or Black Spruce. Wind will have a large effect due to the lack of obstacles. Wind slab, breakable crust, sastrugi and large drifts will be wide spread. Skiing is generally easy in these areas as long as the vegetation is managed. Keep trails close to tree line edges to conceal them.
- 2. Dark green. These areas are generally mature forest-White Spruce, Poplar, Birch and Aspen. Snow tends to be deeper because the wind does not strip it away. There may be areas with a dense understory of brush that may require trail cutting.
- 3. Light gray. This is high Alpine zone. Generally wide open and affected by the wind in the same way as #1. Avalanche danger must be considered. Trails will be difficult to impossible to conceal.

Tundra areas: (Color will be same as above with respect to vegetation.)

1. Old trails are more frequent than you may believe especially closer to populated areas. These will become decisive terrain as snow conditions get deeper. Very easy for a ski unit to move on. Ahkio movement is also relatively easy.

2. Old river channels that have filled in may have less vegetation to contend with. The banks will allow concealment of tracks and provide cover to fight from if necessary. The forest will tend to be more mature. The many meanders will add considerable distance.

3. Sloughs off the main river if firmly frozen can be skied with ease. The sides of old channels and sloughs will tend to have mature trees.

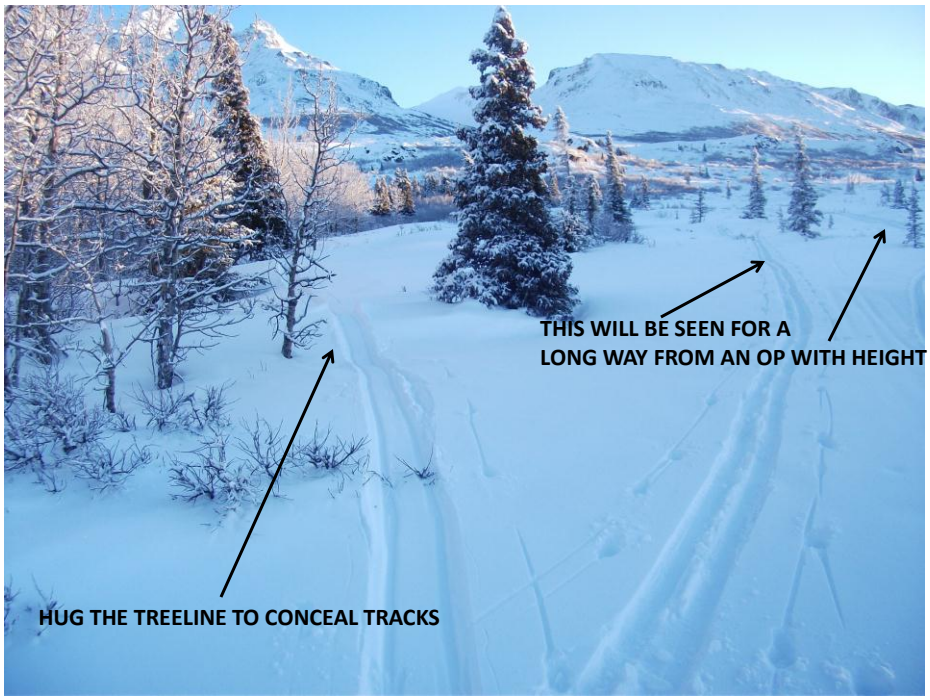
Learning Step/Activity 4 – Select routes on different terrain

a. Ascending a slope is perhaps the most strenuous part of any movement a Soldier will do. Things to remember;

- Unless the entire unit has been issued climbing skins do not attempt to ascend straight up.
- You can make one long traverse or several short traverses.


Soldiers making traverses.

- In Alpine tundra areas it may be more desirable to make as few switchbacks as possible to limit the possibility of sending debris down on those below and to lessen the signature left.
- The most heavily laden skier or squad should be the top concern.
- Breaking one trail is more efficient than many.
- Follow natural contours and treelines as much as possible. This takes some of the angle out of the slope and will help conceal your up-track.



b. Descending a slope can be quite taxing as levels of ability are challenged. Things to remember :

- Ski skills on groomed snow do not necessarily transfer to ungroomed snow. Let go of your ego.
- Select routes based on the least skilled and/or the most heavily laden skier in the unit. An evacuation due to injury will become the event for the day.
- Make use of long traverses with gentle angles.
- Pick turning areas in advance
- Carrying an approach load changes your center of balance and you will be more top heavy.
- Controlling a sled on a descent is very difficult even for very experienced skiers.
- Trees don’t care.

Angulation- moving in a diagonal or lateral plane in a flexing or extending manner. The bending movements occurring in the feet, knees, waist, and spine, which are used to adjust/ control the angle of the ski (edge) on the snow surface.

Anticipation- movement in preparation for weight transfer (shift) from one ski to the next or in preparation for turning, during which the upper and lower body are brought into a twisted relationship.

Balance- the action of maintaining equilibrium. "Static Balance" is maintaining balance while stationary, and "Dynamic Balance" is maintaining balance in motion.

Camber- the bow shape of the ski, which distributes the skier's weight over the entire running surface of the ski.

Carving- turning the ski over the snow where the tail of the ski follows the path created by the tips.

Center of Mass (CM)- the point of the body where the skier's weight is most centered.

Christy- a turn where both skis skid on corresponding edges at some point during the turn.

Control Phase- the point in the turn where the skis are guided through the intended arc.

Countered Stance- a stance where the legs and torso are twisted in opposite directions (counter rotation). A slight counter is used at lower level maneuvers. Counter increases at higher levels.

Diagonal Stride- most commonly used maneuver to negotiating flat terrain. Cross country skiing.

Double Poling- maneuver where the ski poles are the only source of propulsion. Both poles are used simultaneously, with a distinct forward lean.

Double Pole w/ Kick- similar to double poling, except that a single kick is used to aid in propulsion.

Edge Angle- the degree of tilt of the ski along its long axis in relation to the surface. Degree of edge adjustment is primarily determined by how far the ski is away from the hips (CM). Fine tuning adjustments are made at the ankles and knees.

Edge Change- adjusting the edge angle from one edge of the ski to the other.

Edge Control Movements- movement of the hips, knees and ankles to adjust the edge angle to the maneuver being performed.

Extension- straitening of the leg muscles, resulting in a taller stance. Extension/ flexion movements are used to control pressure on skis.

Fall Line- imaginary line running down the slope in relation to the skier. The path a ball would take if it rolled down the slope.

Flexion- shortening of the leg muscles, resulting in a shorter stance.

Flow- movement that is continuous and uninterrupted.

Garland- series of turns across the hill that *do not* result in direction changes across the fall line.

Glide- forward motion of one or both skis over the snow.

Grip- traction gained by use of wax.

Guide- to direct motion by physical action.

Herringbone- a hill climbing maneuver where the skis are in a V. The herringbone is executed using the inside edges of both skis.

Initiation Phase- the phase of the turn during which a change from edge to edge allows the skis to be turned or a direction change to start.

Kick- applying force down or stepping on, the ski that sets the wax into the snow, providing momentary traction.

Matching- steering the skis from a wedge or *stemmed* position to a parallel position.

Pivot- the point on the ski around which the ski rotates. This point can be adjusted through shifts in pressure fore and aft on the ski.

Poling- using the ski pole for propulsion.

Pole Plant (touch)- use of the pole as a timing and terrain sensing device when skiing downhill. A pole plant most often begins the initiation phase of a turn and corresponds with edge change. <u>This is done by touching the pole to the snow, not by sticking the pole into the snow.</u>

Preparation Phase- the point in the turn, which the skier prepares for, the next turn; also referred to as the finishing point.

Pressure Control Movements- actively adjusting the pressure between the ski and snow usually performed by Flexion/ Extension.

Rotary Movements- rotation, or a tendency toward rotation, of either the body as a whole or of one part of the body relative to another.

Sidestepping- uphill movement with skis perpendicular to the fall line. Lifting the uphill ski directly uphill, then bringing the downhill ski up to match it accomplishes movement.

Sideslipping- lateral slipping of the skis straight down the fall line.

Skidding- skis move forward and sideways simultaneously, while pivoting occurs.

Sliding- gliding in the same direction the skis are pointed.

Slipping- releasing the ski edge (flattening) results in slipping. The skier is moving in a direction other than where the skis are pointed.

Steering- turning the feet to guide the skis in the desired direction.

Traverse- the line that crosses a slope by crossing the fall line.

Wedge- a fundamental position for the skis to introduce speed control while skiing downhill. The skis are steered into a V position where the tips are close to each other, the tails are displaced further apart.

Weight Transfer- shift in body weight from one foot to the other

SECTION IV. SUMMARY

Check on Learning.

1. What is side cut?
The difference in width between the tip, waist and tail of the ski.

2. What is a braking wedge?
A braking wedge is essentially a gliding wedge with the inside edges dug into the snow more to slow and ultimately stop a skier.

SECTION II. INTRODUCTION

Motivator: The main advantage of skijoring is that soldiers expend minimal energy while being towed as opposed to the often arduous tasks of cross-country skiing or snowshoeing. You and your Soldiers will be better rested and ready for follow-on missions once they arrive at their destination. Heavy rucksacks, crew-served weapons systems, and ahkio groups may be loaded on tow vehicles while troops skijor with minimal gear (fighting load carrier, helmet, and weapon). Furthermore, skijoring may allow light forces to keep pace with mechanized or armored units without the extensive use of additional transportation assets.

Terminal Learning Objective

ACTION	Move over snow by skijoring
CONDITION	In a snow covered environment, given a Small Unit Support Vehicle (SUSV) or snow mobile(s), two 50m static ropes, a pair of military skis,and ski poles. While wearing vapor barrier boots, Extended Cold Weather Clothing System (ECWCS), ballistic helmet, goggles, fighting load carrier, rucksack with presecribed packing list and weapon.
STANDARD	Move over the designated course by skijoring without injuring yourself or fellow Soldiers.

Safety Requirements: All exposed skin will be covered, goggles must be worn and a lookout must be posted on the tow vehicle, and vehicle speed will not exceed 15 MPH.

Risk Assessment: Medium (Reference USARAK Pamphlet 385-4)

Environmental Considerations: None

Evaluation: You will observe a demonstration and then you are expected to skijor behind a snow machine or SUSV. Your instructor may determine that you have not attained a skiing skill level that will allow you to safely conduct this exercise. You will also be tested on your knowledge of skijoring movements during a one hour written examination at the conclusion of the course (Refer to training schedule for date/time of exam). You must score a 70% on the written exam. If you fail the written exam, you will be given a second exam after re-training has been conducted. If you fail this second examination, you will be dismissed from the course.

Instructional Lead-In: This lesson will give you an opportunity to skijor behind a SUSV and/or a snow machine.

SECTION III. PRESENTATION

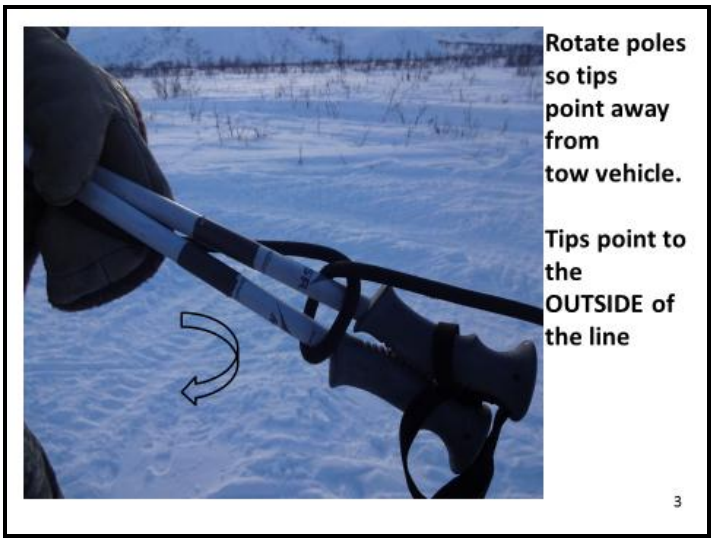
Learning Step/Activity 1 - Prepare skijor rigging for the SUSV.

a. Connect two ropes 120 to 150 feet long to the rear of the tow vehicle. Stow rucksacks inside the tow vehicle.

b. Sling weapons over the shoulder with the muzzle to the outside of the column.

c. Space skiers, in column of twos, at equal intervals behind the vehicle, to the outside of the ropes. Maintain a gap of approximately ten to twelve feet between individuals.

d. Half-hitch the rope around the ski pole shafts just below the handles. Hold the poles under the outside arm. Rest against the baskets of the ski poles.



e. The last soldier on each rope inserts the shafts of both ski poles halfway through the loop. Grasp the poles on each side of the loop, in a manner similar to water-skiing.

f. Post a lookout in the SUSV facing the rear of the tow vehicle. Establish communication with the driver.

g. Cover all exposed skin and wear goggles.

CAUTION: Skiers are never allowed to fasten themselves directly to the rope. In case of a fall they must be able to immediately release the rope, to avoid serious injury. If a soldier falls, the skiers immediately

behind the fallen skier must be able to release the rope so that they can maneuver to avoid the fallen skier.

Learning Step/Activity 2 - Move over snow by skijoring.

a. The vehicle operator:

(1) starts and stops gradually.

(2) follows the easiest route that the terrain permits.

(3) does not exceed 15 MPH.

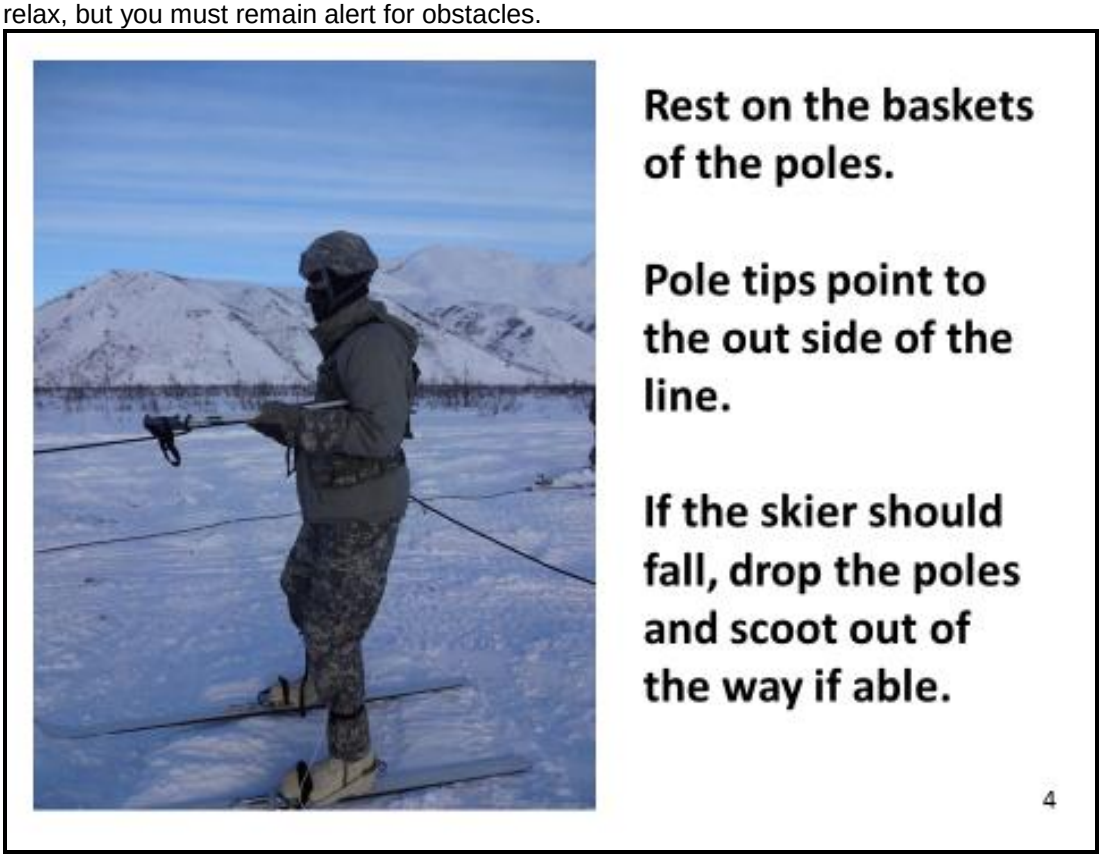
(4) Avoids steep slopes, obstacles, and sharp turns. Whenever these cannot be avoided, reduces speed to allow the skiers to negotiate the obstacle.

b. The lookout advises the driver when to speed up, slow down, or stop.

c. Personnel skijoring:

(1) When the vehicle begins to move, shuffle your feet forward a few steps. Gradually lean back and place your weight onto the tow rope. Failure to do so will most likely result in the skier being jerked forward abruptly enough to cause a fall.

(2) Once under way, lean slightly backward. Keep your upper body generally erect, with the knees slightly flexed, to act as shock absorbers. The skis may be in a slightly wider than normal stance, and one ski should be slightly advanced. This will increase your stability, as well as your ability to compensate for irregularities in the terrain and the vehicles' rate of movement. You should be able to relax, but you must remain alert for obstacles.



(3) If a sharp turn is necessary, speed is reduced to a walk. You can walk/shuffle around the corner. Do not drop or step on the tow rope. Once the last skier has completed the turn, speed is gradually resumed.

(4) When descending hills, keep the rope taut by using a braking wedge. If you find that you are unable to control the rate of descent, and collision with the vehicle is imminent, drop the rope and maneuver to avoid the vehicle. On short downward slopes the vehicle should temporarily increase speed so that you do not need to brake. On longer steep slopes, you should descend independently of the vehicle and regain the rope at the bottom of the hill.

(5) If you fall, release the rope and roll to the outside of the column to avoid being run over by the next soldier on the rope.

NOTE: Students that have had a minimum of 40 hours of ski training and have demonstrated a reasonable proficiency on skis (as determined by NCOIC and instructor consensus) will have the opportunity to skijor.

NOTE: Using the techniques described above students will execute a skijoring exercise on the trails surround the Black Rapids Training Site. All Risk Management procedures will be followed IAW the USARAK Pamphlet 385-4 Risk Management Guide for Cold Weather Operations.

SECTION IV. SUMMARY

You now have practical experience skijoring. You can use this technique to move Soldiers efficiently provided they are proficient skiers.

Check on Learning.

1. What is maximum speed of the tow vehicle?
Answer - 15 MPH.

2. How do soldiers hold the rope?
Answer - The rope is half-hitched around the ski poles just below the handle.