

# NORTHERN WARFARE TRAINING CENTER SKI MANUAL

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**SECTION II. INTRODUCTION**

**Motivator:** While it is unlikely that you will use skis on a foreign battlefield, it is a fact that you will train to fight here in Alaska. For much of the year the terrain is snow-covered. During training exercises, if you do not have either skis or snow shoes, you will be at a distinct disadvantage and training will be confined in and around cleared roads and trails. Skiing is also an excellent means to conduct physical training with the added benefit of additional cold weather training.

**Terminal Learning Objective**

<b>ACTION</b>	Move over snow on skis
<b>CONDITION</b>	Given the military ski, NATO 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), ECWCS, other issued cold weather clothing items, ballistic helmet, LCE with 2 quarts of water, weapon and a 5 kilometer snow-covered course with varied terrain.
<b>STANDARD</b>	Complete a 10 kilometer ski movement. Meet all critical performance measures IAW the student evaluation plan.

**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

<b>ACTION</b>	Prepare Skis and Skiers for travel over snow
<b>CONDITION</b>	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)
<b>STANDARD</b>	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 soldiers 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. Black Diamond ([www.bdel.com](http://www.bdel.com)) makes collapsible ski poles with a fool proof locking mechanism called the flick-lock. It is better than most other designs where the locking mechanism is inside the pole making it difficult to repair.

b. Parts of a ski:

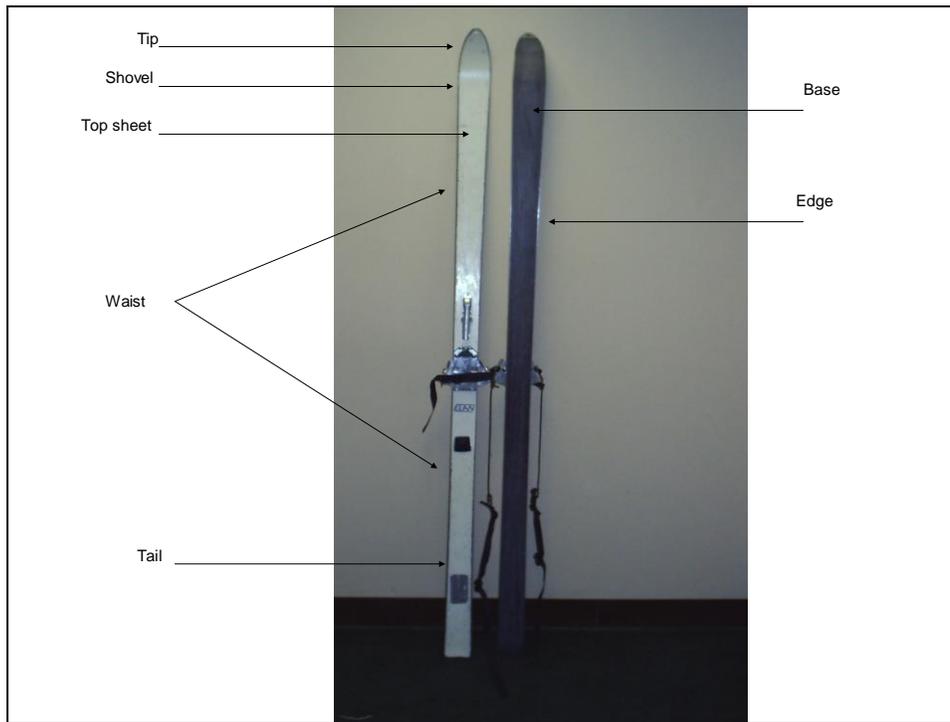
- (1) Tip. In your ski tips there is a hole that can be used to drag skis or improvise a litter.
- (2) Shovel. Uprturned portion of the ski that provides flotation on snow by keeping it on the surface of the snow.
- (3) Waist. This is the middle third of the ski.
- (4) Tail. Back of the ski. The metal groove cut into the tail on some skis is for climbing skins.
- (5) Base. Plastic bottom of the ski.
- (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 form a smooth arc with

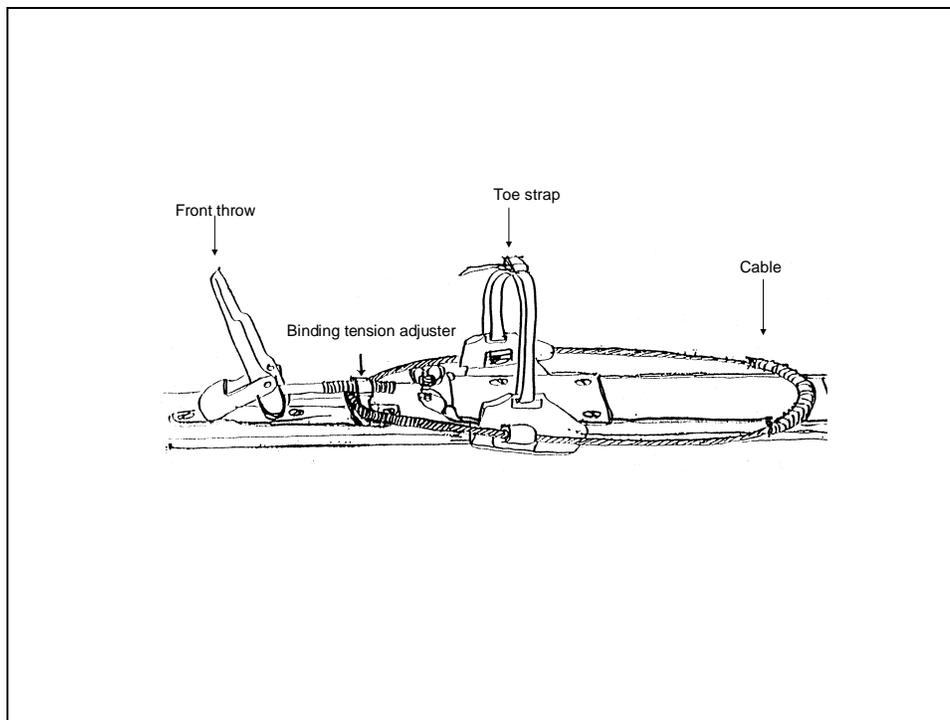
no wax pocket. The military has generally selected a ski with single camber to a camber and a half.

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

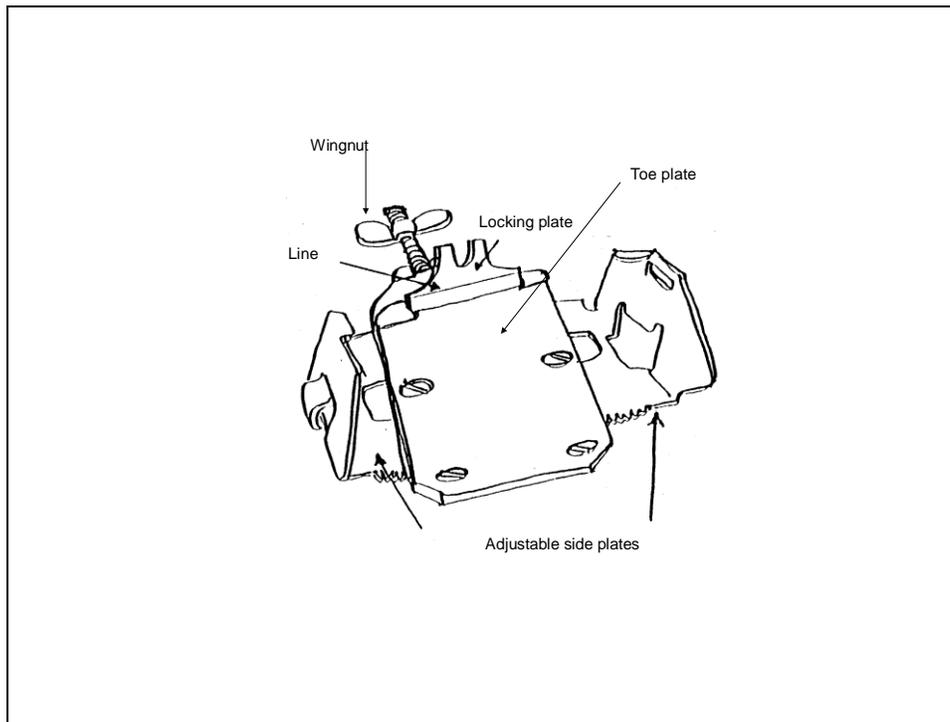
(10) Core. Wood or plastic guts of the ski. Gives the ski its load bearing capacity.



Military Ski w/ NATO 120 binding



NATO BINDING



Detail of NATO 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 160 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 chest height.

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 Simple Green or a Citrus Cleaner made for skis. Apply the cleaner liberally to the ski base. Then using a ski wax scraper, scrape old wax off. When using a scraper insure 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 than remove it carefully with the corner of a scraper or a fingernail.

b. Once the base is clean, take a simple mill bastard file or a ski edge tuner and file the edges to a 90-degree angle, removing any burs in the edges. Next round the edges from the tip to just past the shovel and from the tail six inches toward the waist. These areas of the edges do not need to be sharp. At this time if any repairs need to be done the ski is ready. First take a true bar or any straight edge that will not bend. Start at the tip of the ski. Place the true bar across the edges and look for light under the bar. Now work toward the tail. If the ski base is flat, there should not be any light under the bar. If there is light under the ends of the true bar, the base is convex and the plastic or P-tex base should be taken down with a plastic or metal scraper. If there is light in the middle, the edges will need to be filed until they are flush with the base.

c. If there are scrapes or gouges in the base then take a P-tex repair candle, which matches the color of the ski base, for the repair. Light the repair candle over the flame of a regular candle. Then hold the repair candle over a metal scraper until a blue flame appears. By rotating the repair candle between the thumb and forefinger, dark soot deposits will be minimized. Hold the repair candle close to, and parallel to, the ski to maintain the blue flame. Once the gouges have been filled in, allow the repairs to cool to the touch. Next scrape the ski base with a scraper to remove excess P-tex until the base is smooth. Now the ski base is ready to wax. If more severe damage has occurred and cannot be repaired then exchange the skis, or take them to a ski pro shop for professional repair.

d. All metal should be kept free of rust.

e. Inspect binding for broken parts and replace as necessary.

f. 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 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 heel piece over the cable. Cables can be interchanged from one binding to another. NATO 120 bindings are no longer in production. 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 wingnut to free adjustable side plates.
- (2) Place boot in binding so that the toe of the boot is in line with the line on the locking plate and the heel is centered.
- (3) Adjust side plates so that there is maximum contact with the sides of the boot. Engage the locking plate and tighten wing-nut.
- (4) Adjust binding tension adjuster so that the cable is within 1/2 inch of the heel tab with the front throw in the open position.
- (5) Adjust toe strap to keep the toe firmly in the binding, but not too tight as to restrict circulation.
- (6) Remove boot and carefully adjust side plate's inward one notch. Reengage locking plate and re-tighten wing-nut. Adjust 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.

## Learning Step/Activity 6 – Prepare skis for movement (Wax skis).

a. Waxing. Military skiing needs a method that is simple and effective. The two wax system, supplemented with klister 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. 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 the cork then you can use 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:

- **Thicken** the layer of wax in the original area,
- **Lengthen** waxed area to the entire length of the ski
- **Change** to a different wax (softer)

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

e. Use the two wax system for snow in its original state. Use klister for snow that has melted and refrozen, or very old, wind hardened or crusty. There are two types of klister to match conditions. Universal, for changing corn snow conditions from 23 degrees to 50 degrees Fahrenheit. Green, for extremely cold conditions on old or refrozen snow. To apply klister, simply apply two thin strips to the waist of the ski. Then quickly spread the klister over the ski base with a plastic scraper. Klister is an art that takes a lot of time to master. If done incorrectly can be a terrible experience.

f. 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.

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 a glue on the base side. Climbing skins are indispensable 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.

Carrying a weapon. Attach the sling to the rear sling swivel and the slip ring (where the hand guards attach to the receiver). Hang the weapon over your neck and firing side shoulder, muzzle down. The weapon can be placed behind the canteen on the firing side hip to keep it out of the way while using ski poles. Or attach the sling at the slip ring and the small of the butt stock and hang in the same manner. Another method is by use of a “three point sling” available commercially.

## 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. Think about catching a basketball with both hands – this will put your arms and hands in the correct position.

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. 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. Insure 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.

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. 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.

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 squeezing the poles as this forces blood out of the fingers.

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. 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 for the shape that is produced in the snow after execution of a turn.

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

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

<b>ACTION</b>	Climb and descend gentle (less than 20°) snow covered hills without turning
<b>CONDITION</b>	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)
<b>STANDARD</b>	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. 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 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. Watch the ski tails; stepping on them can make you lose your balance and fall.
- 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. 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 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 direction is not too shallow (no elevation gain) or too steep (straight uphill is too fatiguing). Find a happy medium.

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. To maintain your balance, always initiate with the downhill ski. Everything else is the same as on flat ground.

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

a. At times there will be a need to change direction. The kick turn on a slope is difficult to master. The easiest 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.

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

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.

(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. Your 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.

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 the knees.

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**

<b>ACTION</b>	Move on skis over gentle snow covered terrain (Double Pole and Diagonal Stride)
<b>CONDITION</b>	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)
<b>STANDARD</b>	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.
- (2) Practice diagonal poling while gliding on both skis.
- (3) Have students count 1,2,3,4, 1,2,3,4 to develop rhythm and timing.
- (4) Use different tempos, ride the glide.
- (5) Shuffle with a pause. Shuffle with a pop.

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.
- (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

<b>ACTION</b>	Demonstrate wedge turns to control speed on gentle to moderate (between 20-30°) snow covered terrain. Combine basic cross country techniques to move efficiently over gentle to moderate snow covered terrain (Double Pole with Kick)
<b>CONDITION</b>	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)
<b>STANDARD</b>	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 (imagine that you are squashing a bug with your outside foot). 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, 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)**

<b>ACTION</b>	Demonstrate wedge christy, stem christy and basic telemark turns to control speed on moderate snow covered hills (skis match after the fall line)
<b>CONDITION</b>	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)
<b>STANDARD</b>	Soldier demonstrated the wedge christy, stem christy and basic telemark ensuring that skis matched after the fall line.

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: The telemark christy may be performed with or without poles.

a. Now we can finally free our minds because we will free our oppressed heels that have been kept on the ski up until now (other than your 1,000 telemarks drill, when you have taken a fall and let your skis flop around, or when your evil instructor made you cross country or move uphill).

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. 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.

**Enabling Learning Objective F:**

**Ski Lesson 6: Intermediate Nordic Downhill and Advanced Cross Country**

<b>ACTION</b>	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.
<b>CONDITION</b>	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)
<b>STANDARD</b>	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.

Learning Step/Activity 3 – 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.

Learning Step/Activity 4 – Demonstrate basic skating techniques.

a. On flat terrain, or to gain speed on a gradual downhill, or to move up a very gradual flat uphill section, the skating technique can be the best method.

b. Start on a very gradual downhill section. Start moving in the herringbone. As you step from one ski to the other give a little push to glide on the new ski. You should be able to use the same duck-footed position but push a little harder from one ski to another and let each ski glide before the next push. As you push off one ski, try to put the gliding ski down on its outside edge. Transfer all your weight to the gliding ski. As you gain some confidence move to a flat section of trail. Here you actually can get onto the outside edge of the gliding ski. The weight shifts from the pushing ski to the outside edge of the gliding ski. You then roll this ski over to the inside edge for the next push. Repeat this process and you are skating.

c. You can use your poles to help skate. Push off with your poles at the same time you push off with a foot. This is known as V2. In actual cross-country skate skiing there is a slightly different motion, but that is not important here as you do not have the long poles used for this technique.

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

<b>ACTION</b>	Demonstrate open stance parallel and open stance telemark turns on moderate to steep (between 30 and 35°) snow covered terrain
<b>CONDITION</b>	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)
<b>STANDARD</b>	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 steeper, 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 finish your turn 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 forward before you shift your weight.

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.

### Glossary of Ski Terms

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**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. This is done by touching the pole to the snow, not by sticking the pole into the snow.

**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 (LBE/LBV, Kevlar 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

<b>ACTION</b>	Move over snow by skijoring
<b>CONDITION</b>	In a snow covered environment, given a SUSV or snow machine(s), two 50m static ropes, the military ski, NATO bindings, ski poles and vapor barrier boots (or other appropriate ski equipment as prescribed by unit), ECWCS, other issued cold weather clothing items, ballistic helmet, goggles, LCE with 2 quarts of water, and weapon
<b>STANDARD</b>	Move over the designated course by skijoring.

**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. Tie a small fixed loop in the end of each rope. 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.