

SNOW SCRAMBLING

SNOW TRAVEL

AVALANCHE AWARENESS

SELF ARREST USING ICE AX

SNOWSHOE AND CRAMPON



What to bring:

- Your Syllabus
- Clothing and equipment you want us to look at
- Ice Ax, if you have it, with the adze taped

What we cover:

- Ice Ax Technique
- Avalanche Awareness
- Snow Field Trip information and signup directions

What to read prior to class

***Freedom of the Hills* 8th Edition**

Chapter 16

Snow Travel	pages 320 - 344
Route finding	pages 351 - 356
Avalanches	pages 356 - 374

Chapter 26

The Cycle of Snow	pages 541 – 551
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OR

***Freedom of the Hills* 7th Edition**

Chapter 16

Snow Travel	pages 306 - 329
Route finding	pages 338 - 343
Avalanches	pages 343 - 359

Chapter 26

The Cycle of Snow	pages 525 - 536
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A few words about Ice axes

The original ice axes were specialized tools for cutting steps on long ice routes in the Alps, prior to the existence of crampons. They were used only by 'guides' who were hired to carry loads and cut hundreds of steps. Today's ice axes are more generalized tools, used for a variety of purposes. They are much shorter, lighter, and stronger than their predecessors.

For the purposes of the Alpine Scrambling course (as well as the Basic Climbing course), a general-purpose ice ax is quite adequate. They tend to be lighter and less expensive than the more specialized 'technical climbing' ice axes and ice tools. Inherent problems occur with axes that are too long or too short. Most people do just fine with a 70 centimeter ax unless they are tall (over 6'2", use a 75 centimeter length) or short (under 5'2" - use a 65 centimeter length). If in doubt about the length, stand up in a relaxed position and hold the ice ax by the head with your hand, arm down, holding the ax length along your leg. The spike at the end of the ax should end next to your ankle bone, not on the floor.

Beware of getting one of the new designs with an aluminum pick (too soft), or one with a head which is uncomfortable to hold. Sometimes you will be holding the ax head in the arrest grip for hours at a time. Metal shafts are stronger than wood and are required

While the ice ax is attached to the pack, all sharp edges and points must be padded for safety. Don't forget to get protectors that are designed for that purpose when you purchase your ice ax. Also, a wrist loop or lanyard is very handy. You can buy ones specifically made for this purpose, or make one with a length of tubular nylon or accessory cord. It needs to be fairly strong, so use at least 6 mm cord. 7 mm is better.

A general purpose Scrambling ax need not be excessively sharp, but don't store it in damp locations or it may rust. It will be your constant companion on Scrambling trips for many years (remember it is required on all Scrambles).

If you have any questions, any of the Alpine Scrambling Committee members, your field trip instructors, and Scramble trip leaders will be happy to answer them for you.

Avalanches

Avalanches are the greatest danger on winter and spring scrambles. Since many scrambles cross slopes with avalanche potential, you must practice avalanche awareness and avoidance. Avalanche conditions can be hard to predict. So as a general rule, avoid potential avalanche terrain. Assume conditions are never completely safe.



Avalanche Conditions Information Recording. Before every winter trip, you (*every member of the party*) should check the NOAA Avalanche Information recording (updated daily at 9 am and 3 p.m.). **Call 206-526-6677.** Checking the information regularly will make you a better informed and safer winter scrambler - - - and as you listen regularly, the technical portion of the information becomes easier to understand. Avalanche ratings:

Low -	generally fairly safe.
Moderate -	avalanches possible; use caution.
High or Extreme -	avalanches likely and occurring - don't go to the backcountry!

Recognizing and avoiding avalanche hazards can dramatically lower your chances of being caught in a slide. Most avalanches are triggered by the victims, not by elements of nature. Avoidance cannot be emphasized enough.

- Enroll in an avalanche course to educate yourself more about avalanche avoidance.
- Check the Avalanche Information line, know the area where you are going, and know what is above you where you can't see.
- Don't assume someone's tracks in front of you indicate that the area is safe - - most people have little knowledge about avalanche potential.
- If you become uncomfortable in an area, tell the leader.
- The best protection is to stay home when avalanche potential is high.

Equipment and protection: All participants going anywhere with avalanche potential are recommended to carry:

- A shovel (see page 22 for additional information) for digging snow pits or to dig out victims of an avalanche. After an avalanche, the snow immediately settles into "concrete", and you will not be able to uncover a victim without a shovel. Every party

member should carry one (if you do, and a friend doesn't - it's your life on the line, not his).

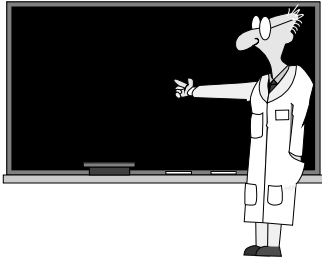
- A ski pole to use as a probe for locating a buried victim.
- An avalanche transceiver to give a chance for survival from an avalanche.

Types of Avalanches:

- Loose snow (starts from a point and spreads out in a fan shape).
- Slabs (large area breaks loose at once). Almost all accidents are caused by slab avalanches triggered by the victim. Most avalanches in the Cascades are slabs.

Where and when they occur:

- Where they have occurred before (old avalanche paths -- treeless gullies or slopes).
- Most occur on slopes of 30 to 45 degrees, although large avalanches may occur between 25 and 60 degrees, and in the Cascades avalanches have occurred from less than 25 degrees up to almost 90 degrees because of wet heavy snow. They also occur on steep slopes above more gentle slopes -- always know what is above you.
- Narrow valleys and gullies are dangerous, as are short steep openings in trees.
- In the Cascades, avalanches are more likely to occur on north and east slopes.
- More likely to occur on convex slopes (where the slope curves over the top of a ridge and tension forms because of the bend). Avalanches may occur on concave slopes (at the bottom of a hill), but generally the snow is anchored at the bottom of the hill.
- Under cliffs and rock bands.
- Avalanches can occur on slopes as short as 50 feet. Short slopes are more dangerous because more people travel on them and don't expect avalanches - 45% of victims are caught on slopes of less than 300 feet.
- Where the snow is not anchored (open areas or areas of sparse trees).
- On lee slopes (from winds blowing snow from windward to lee slopes). Lee slopes face away from the wind, and windward slopes face into the wind.
- On sun-warmed slopes in mid-winter, and south facing slopes in the spring.
- About 80% of avalanches occur during or shortly after storms (before the snow has settled).
- During storms if snow is falling at the rate of 1 inch or more per hour, or more than 8" total.
- From significant new snow that has not settled (within 24-48 hours after a storm).
- From rapid changes in weather: wind, temperature, snowfall -- especially warming temperatures.
- From heavy wet snow, or rain (adds significant weight to the snowpack, and lubricates layers).
- In Washington, most avalanches are related to storms and to wind.

**Warning signs:**

- Recent avalanche activity. If you see it, you shouldn't be there.
- Settling or cracks in the snow, or hollow or 'whomp' sounds under your feet when walking.

Route selection:

- Ridges (away from cornices), dense forest, and wide valley bottoms are safest.
- Slopes of less than 25 degrees or greater than 45 degrees.
- Windward side of ridges (wind scoured) (In Washington, usually the west & south slopes).
- If you must cross an open area, 1) unhook your pack waist belt, 2) cross high and near the top, 3) go straight up or down rather than across, 4) cross quickly one at a time in the same steps as the leader, 5) cross very quickly; the less time you spend in an avalanche path, the safer you are, and 6) watch each other cross.

If you are caught:

- Make swimming motions to stay on top, work your way to the side, and keep your mouth shut so it's not packed with snow.
- Just before you stop, make an air space in front of your face with your hands.
- Remain calm - conserve oxygen and energy, and wait for rescue.

If you see a victim of a avalanche:

- *You are the victim's only hope of survival. If you go for help, no matter how close, the victim most likely will run out of oxygen and not survive; after 1/2 hour the victim has only a 50-50 chance of survival.*
- Watch the person travel down the slope, so you can better determine where the victim is buried.
- Mark where you last saw the victim, and search down-slope.
- If you rescue the victim, treat for suffocation and shock.

SNOW | FIELD TRIP

SNOW TRAVEL, SELF ARREST PRACTICE

ICE AXE PRACTICE

DATE: See the Alpine Scrambling course page on the [Olympia branch website](#)

LOCATION: TBA

DURATION: Approximately eight (8) hours

REVIEW: Snow Travel, Self Arrest, 10 essentials and Knots

EQUIPMENT REQUIRED:

- Ten Essentials
- Standard day trip equipment and pack
- USGS quadrangles - TBA at the previous Snow lecture - and compass.
- Rain gear
- Sunscreen and lip protection
- Ice ax with the adze taped
- Pack fitted with loops and straps to secure ice ax

What we cover:

- Ten Essentials
- Knots
- Ice Ax – Self Arrest
- Kicking steps in snow
- Plunge stepping downhill
- Climbing in balance
- Self belay
- Glissading
- Route finding
- Evaluating your equipment
- Evaluating your physical conditioning

PURPOSE:

The purpose of this field trip is to introduce students to snow travel.

Winter conditions are very unpredictable, so be prepared for the possibility of snowstorms and/or intense sunshine. If you are in good physical condition and are properly equipped, this field trip will be a very enjoyable experience.

NOTE:

This is an outdoor practice under winter conditions, so dress accordingly. Lunch will be taken at a time convenient to your group. You will be tired and wet at the end of this trip, so be sure to have a dry set of clothing available in your car. **Important:** All cars carry chains and a shovel!

OBJECTIVE:

The primary objective of this field trip is to learn the proper procedures for safe travel on snow.

Students will learn, through the experience and assistance of their instructors, the following skills:

1. Self-Arrest Practice

Your instructor will fully explain and demonstrate all ice axe arrest positions. Each of you must successfully perform an arrest in each position to receive student credit.

Your instructor will demonstrate, and then you will practice arrest positions in the following sequence:

- a) Feet first, face down
- b) Feet first, face up
- c) Head first, face down
- d) Head first, face up

We will begin each new position at slow speed; don't be afraid to ask your instructor to hold you on the slope at the start if this seems to help. Ask your instructor to show you, again before you try a position you're not sure about. If you have difficulty with a certain position, be sure to let your instructor know.

2. Snow Travel Techniques

- a) Handling and carrying of an ice axe
- b) Use of ice axe in steadying oneself on steep slopes
- c) Rest step
- d) Step-kicking
- e) Traversing
- f) Switchbacking
- g) Self-belay
- h) Rotating leaders to enhance party progress

3. Descending

- a) Glissading
- b) Plunge step
- c) Descending in uphill tracks
- d) Descending facing inward

4. Fixed Line (Optional – Weather and Student Skills Based)

Practice traveling on a fixed line.

SNOW TRAVEL SELF-ARREST SKILLS EXPECTED		
<p>Ten Essentials</p> <p>Knots Bowline Square knot Water knot Figure 8 rewoven Figure 8 loop Prussic Double Fisherman</p> <p>Map & Compass Orienting the map Finding your position Taking a bearing Following bearings Offsets Navigation in bad weather</p>	<p>Self Arrests Head up on stomach Head down on stomach Head up on back Head down on stomach With pack on (all 4) Without ice axe (all 4)</p> <p>Snow Travel Handling/carrying ice axe Rest step Step kicking Traversing/switchbacks Self-belay Rotate leaders</p>	<p>Descending Glissades (sit/stand) Face out (plunge step) Face in (uphill tracks)</p> <p>Snowshoe Travel Route finding Pre-trip study</p> <p>Observation of terrain Picking a route Accounting for weather</p>

Weather conditions at this time of year are unpredictable. In the past, we have experienced snow storms, rain, and intense sunshine. Come prepared for all of this weather.

Driving conditions. If you are a driver, you should check on driving conditions prior to leaving for a trip. See the appendix for telephone numbers for driving conditions.

Tape your Ice Ax. It is mandatory that you tape the sharp edges of the adze end of your ice ax for this field trip. The adze should be covered with several layers of duct tape. This will greatly reduce the chances of slashing yourself by accident. We will not use or teach the use of ice ax wrist loops on this field trip. After the trip you should promptly remove the tape from your ice ax and dry it in order to prevent rust.

Waterproof rain pants will make your weekend of snow sliding a lot more comfortable. A nylon pair or heavy foul weather gear will work OK for this trip.

Waterproof your boots. Make every effort to waterproof your boots. Information on traditional and the latest high tech waterproofing materials is available for any local outdoor store. Note that various leather and synthetic boot materials require specific waterproofing materials. Be sure to match your boot with the correct product.

Cotton clothing is unacceptable. Under no circumstances are jeans or any cotton clothing acceptable for field trip activities. This is a very wet field trip and you will need clothing that will provide warmth when wet.

Drivers: Parking is limited - you must carpool to and from this field trip. If you are a driver, you should have tire chains (and know how to install them), an insulating pad (to lay on while installing chains), a shovel, jumper cables, full tank of gas, sand for traction, and other necessary winter driving essentials.

SNOW II

SHOWSHOE TRIP, SELF ARREST PRACTICE

DATE: See the Alpine Scrambling course page on the [Olympia branch website](#)

LOCATION: TBA

DURATION: Approximately eight (8) hours

REVIEW: Snow Travel, Self Arrest, 10 essentials and Knots

EQUIPMENT REQUIRED:

1. Ten Essentials
2. Standard day trip equipment and pack
3. USGS quadrangles - TBA at the previous Snow lecture
4. Rain gear
5. Sunscreen and lip protection
6. Ice ax with the adze taped
7. Pack fitted with loops and straps to secure ice ax

PURPOSE:

The purpose of this field trip is to give you the opportunity to learn to use snowshoes, improve your snow travel skills and to practice self-arrest techniques with your ice axe.

OBJECTIVE:

The primary objective of this field trip is to build student confidence and to practice a variety of snow travel and ice axe self-arrest techniques.

A. Snow Travel

1. **En route to the practice area -- all groups will practice:**
 - a) Rest step
 - b) Step kicking
 - c) Ice axe carry
 - d) Ice axe self-belay
 - e) Plunge step
2. **At the practice area, you will practice:**
 - a) Descending downhill in the uphill tracks
 - b) Descending downhill using the plunge step
 - c) Descending downhill facing inward

B. Self-Arrest Practice

Your instructor will fully explain and demonstrate all ice axe arrest positions. Each of you must successfully perform an arrest in each position to receive student credit. Your instructor will demonstrate, and then you will practice arrest positions in the following sequences:

- Feet first, face down
- Feet first, face up
- Head first, face down
- Head first, face up

Students will begin each new position at a slow speed. Don't be afraid to ask your instructor to hold you on the slope at the start if this seems to help. Ask your instructor to show you, again, before you try a position you're not sure about. If you have difficulty with a certain position, be sure to let your instructor know.

C. **Fixed Line**

You will practice traveling on a fixed line.

D. **Sitting Glissade**

Following a demonstration of the correct sitting glissade method, each of you will practice this pleasant and easy method of descending on snow.

E. **Avalanche Safety**

PRACTICE & OBJECTIVES

1. Recognition of avalanche slopes.
2. Avoidance of avalanche areas and tips for avalanche victims.
3. **Rescue Techniques**
 - a) Visual clues
 - b) Probing
 - c) Rescue beacons

SNOW TRAVEL SELF-ARREST SKILL EXPECTED		
<p><u>Skill</u></p> <p>Ten Essentials</p> <p>Knots Bowline Square knot Water knot Figure 8 rewoven Figure 8 loop Prussic Double Fisherman</p> <p>Arrests Head up on stomach Head down on stomach Head up on back Head down on stomach With pack on (all 4) Without ice axe (all 4)</p>	<p>Snow Travel Handling/carrying ice axe Rest step Step kicking Traversing/switchbacks Self-belay Rotate leaders</p> <p>Descending Glissades (sit/stand) Face out (plunge step) Face in (uphill tracks)</p>	<p>Snowshoe Travel Route finding Pre-trip study</p> <p>Observation of terrain Picking a route Accounting for weather</p> <p>Map & compass Orienting the map Finding your position Taking a bearing Following bearings Off sets Navigation in bad weather</p>

Avalanches are a danger to anyone traveling in the backcountry in the winter. At this field trip, you will learn to recognize the snow and weather conditions that precede avalanches, the kinds of terrain where they occur, and the signs of past avalanche activity. You will learn which areas provide the most safety and which must be avoided. You will learn techniques for crossing a questionable slope, what to do if you're caught, and how to go about rescuing a victim. You will use both probes and avalanche beacons in a simulated exercise, and have the opportunity to

examine a snow pit.

Additional Reading:

- *Snow Sense, A Guide to Evaluating Snow Avalanche Hazard, 4th Edition 1994*, by Jill Fredston and Doug Fesler (the *Mountaineers* Snowshoe Course recommends this book)
- *Avalanche Safety for Skiers and Climbers*, by Tony Daffern
- *The Snowy Torrents: Avalanche Accidents in the United States 1972-79*, by Knox Williams and Betsy Armstrong
- *The ABC of Avalanche Safety*, by Ed R. LaChapelle
- *The Avalanche Handbook, 2nd Edition*, by McClung & Schaerer