



THE **BELLINGHAM MOUNTAINEERS**

# **2024 Basic Mountaineering Course Student Manual**

# 2024 Basic Mountaineering Course

## Student Manual

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# 2024 Course Schedule

Date	Type	Title	Location
Jan. 16	Lecture	Intro Meeting	Backcountry Essentials
Jan. 30	Lecture	Mountaineering Equipment	Bloedel Donovan Gym
Feb. 6	Lecture	Mountain Weather, Fear & Risk	Backcountry Essentials
Feb. 17-18	Lecture	Wilderness First Aid	South Whatcom Fire Authority Station 18
Feb. 27	Lecture	Avalanche Awareness	Backcountry Essentials
March 2	Field Trip	Avalanche Awareness	Austin Pass
March 12	Lecture	Online Mapping	Backcountry Essentials
March 19	Evaluation	Knots Evaluation	Trailhead Gym
March 23-24	Field Trip	FUNDamentals	Pine & Cedar
April 2	Practice	Belay Practice	YMCA
April 9	Lecture	Rock I	Trailhead Gym
April 13	Field Trip	Rock I	Mt. Erie, Anacortes
April 23	Practice	Lead Belay Practice	YMCA
April 30	Lecture	Rock II	Backcountry Essentials
May 4-5	Field Trip	Rock II	Skaha Bluffs, Penticton, BC
May 14	Lecture	Snow I	Backcountry Essentials
May 18-19	Field Trip	Snow I: Basic Skills	Austin Pass
May 30	Evaluation	Crevasse Rescue Evaluation	TBD
June 1-2	Field Trip	Snow II: Crevasse Rescue	Mt. Baker
June 22-23	Field Trip	Designated Makeup Weekend	TBD
July 9	Lecture	Glaciers Lecture	Backcountry Essentials
July 13	Field Trip	Alpine Ice Group A*	Mt. Baker
July 14	Field Trip	Alpine Ice Group B*	Mt. Baker
July 16	Exam	Final Exam	Cornwall Park
Sept. 30		Graduation Applications Due	
Oct. 8	Party!	Fall Rendezvous	TBD

\*For Alpine Ice, students will be divided into two groups and should only attend their group's assigned dates.

**Weekday lectures begin at 7 p.m. except in special cases. Locations may change and will be confirmed by email before each event.**

Backcountry Essentials: 214 W. Holly St., Bellingham

South Whatcom Fire Authority Station 18: 686 Chuckanut Dr., Bellingham

Trailhead Gym: 909 Squalicum Way STE 108, Bellingham

YMCA: Whatcom Family YMCA, 1256 N. State St., Bellingham

Bloedel Donovan Park: 2114 Electric Ave., Bellingham

Cornwall Park: 3424 Meridian St., Bellingham





# Introduction

Welcome to the Basic Mountaineering Course. We look forward to working with you, to your success in this course, and to a safe and enjoyable climbing career for you.

All of the people who run the course are volunteers. By the time it's over, they will have put in hundreds of hours to make the program run smoothly. However, there are responsibilities for you too. You will enjoy the course more if you:

- Recognize that a high level of fitness is mandatory to complete the climbs and to ensure that you are not a liability to your climbing party.
- Know that you are primarily responsible for your safety and progress in this course.
- Understand that a satisfactory level of mountain climbing knowledge and skill performance is required to pass the course.
- Have a positive attitude and seek additional help and information when needed. Don't be afraid to ask. The people working with the course enjoy helping you.
- Be at the lectures, field trips and climbs **on time**.
- Prepare by reading the assignments and having the proper equipment and the knowledge to use it. Be organized.
- Be flexible! Many situations which are unplanned have turned out to be valuable learning experiences because students are flexible, patient and alert to the learning possibilities. Sometimes lectures, but particularly field trips, may not run exactly as planned.
- Watch the climb leaders. Pay attention because they are one of your sources for learning. They have been carefully screened by the Climbing Committee and have extensive climbing experience.
- Practice the "leave no trace" philosophy and clean climbing. This means be aware of the fragile alpine environment and act to protect it from harm. If you can answer "no" to the question, "Will others know I have been here?" then you have been a clean climber.
- Plan to give something back in the future, such as assisting on field trips for the next year's class. This volunteer spirit is what makes this class a success.

If you have questions or problems during the course, please feel free to contact members of the Climbing Committee or the Basic Course Coordinators. We want to hear your comments, both good and bad, as they help us improve the scope and quality of this course.



## **Lecture Objectives**

The lecture series has several objectives:

- Highlight, explain and elaborate on key mountaineering principles and concepts
- Supplement the textbook material
- Provide specific information on upcoming field trips
- Serve as a central meeting time to answer questions, address problems, clarify policies and procedures, etc.

The text for the climbing course is ***Mountaineering: The Freedom of the Hills***, 9th edition, written and published by The Mountaineers. You must read the required chapters before each lecture.

Lectures begin promptly at 7 p.m., unless noted otherwise. Arrive a few minutes early so you have time to chat with fellow students and the instructors, and to find your seat. If lectures are held over Zoom, log in 10 minutes early to make sure you're able to view the meeting. Be prepared to share video and audio.

## **Field Trip Objectives**

Field trips offer you the chance to practice, under a qualified instructor, the material presented in the lectures and in the text. Field trips are where you learn to develop your climbing skills, so it's important that you come prepared. The adage that you get out of something what you put into it certainly applies to this course. Your instructors will not make you into a climber; YOU will make yourself into one with their help. Review lecture and text material before each field trip. To get the most out of a field trip, practice the material beforehand on your own. At the field trip, work to challenge yourself. You can always do more than you think you can.

Each field trip must cover a great deal of material in a very limited time. It is often difficult to train such a large class safely without becoming too impersonal. You can help by keeping in mind the following:

- Prepare for each field trip. Review all materials and handouts, and practice beforehand.
- Be ready for full, long days at each practice. Get sufficient sleep the night before, and don't plan a big night when you return home.
- Volunteer to carry group gear and save room for it in your pack.
- Do not bring family, friends or pets to the field trips.
- Be on time. Arrive early enough to park and make whatever preparations are necessary so you are ready to begin at the starting time.
- Stay with your group, and don't wander out of the area.
- Remember that your instructors and leaders are all volunteers. All have something to teach you and deserve your attention and courtesy.

## **Missed Activities**

Attendance at lectures and field trips is essential for continuation in the course and for graduation. It is your responsibility to be present and on time for all activities.

The course is a progression, so you may not be able to continue in the course if you miss something. For example, missing the Rock II field trip means you can't finish the course or go on Basic Rock climbs. And missing Snow I means you can't continue with future field trips like Snow II and Alpine Ice or go on Basic Glacier/Alpine climbs. It also means you can't graduate from the course or participate in future club climbs.

Missed lectures and field trips are nearly impossible to make up. This is for many reasons:

- We are only able to hold some of the course activities on certain dates. We set our schedule more than a year ahead of time in order to secure permits and permissions from land managers and in cooperation with other mountaineering organizations.
- Our volunteers already put in hundreds of hours to make the course run on the scheduled dates, so it's difficult to ask them to put in more time for student makeups.
- Makeups with other branches are only available for some dates/field trips, and in many cases, they don't cover the same material we instruct. For example, none of the other branches offer Alpine Ice, and each branch teaches crevasse rescue in different ways.

Contact the Basic Course Coordinator as early as possible if you think you may miss an activity. They will try to help you make up the activity, but it may not be possible.



## **Conservation/Stewardship Requirement**

The Mountaineers, founded in 1906, have long demonstrated a tradition of commitment to wilderness conservation and minimal impact practices. This tradition has broadened in scope and action over the years but remains one of the core functions of The Mountaineers.

The Bellingham Branch requires all students in the Basic Mountaineering Course to "give back" by completing the following activities to be eligible for graduation:

- Perform 7 or more hours of an approved environmental stewardship activity such as trail maintenance, meadow restoration, salmon stream restoration, beach cleanup, road maintenance, etc.
- Complete the Mountaineer's [Protecting Public Lands 101](#) online course (<http://tinyurl.com/55ap9czr>).

To receive credit, email the branch at [bellinghammountaineers@gmail.com](mailto:bellinghammountaineers@gmail.com) with the following information after you've completed the online course and your volunteer hours:

- Date of work party
- Location
- Party size (if possible)
- Group leader contact info
- Pictures

Students have found many personal rewards from these activities, including:

- Introduction to a new area
- Protection of the wilderness through proper trail construction and maintenance
- Increased comfort and efficiency in backcountry travel
- Pleasure and pride during trail use on later trips
- Shared enjoyment of contributing with other students and volunteers
- Increased appreciation for the magnitude of labor and expense for trail upkeep

You'll find opportunities to participate in these activities through The Mountaineers, Volunteers for Outdoor Washington, Washington Trails Association and other groups.

## **Climbing Graduation Requirements**

To graduate from the course, you must complete the following within the year of registration:

- Attend all the required lectures and practice sessions and pass the written exam.
- Satisfactorily complete each of the required field trips.
- Reach the summit and complete in a competent manner three Basic Experience Climbs, including at least one Rock (BR) and one Glacier (BG) climb.
- Have a current Wilderness First Aid (or equivalent) certification.
- Complete conservation/stewardship requirements.
- Apply for graduation by the date listed on your graduation application form.
- Demonstrate overall competency to the level that any leader will climb with you.

## **A Standard of Judgment – The Climbing Code**

*"Climb if you will, but remember that courage and strength are naught without prudence, and that a momentary negligence may destroy the happiness of a lifetime. Do nothing in haste; look well to each step; and from the beginning think what may be the end."*

– Edward Whymper

All Mountaineer-sponsored climbs must adhere to The Mountaineers Code of Conduct and **The Climbing Code**:

- A climbing party of three is the minimum, unless adequate prearranged support is available. On crevassed glaciers, two rope teams are recommended.
- Carry the necessary clothing, food, and equipment.
- Rope up on all exposed places and for all glacier travel. Anchor all belays.
- Keep the party together, and obey the leader or majority rule.
- Never climb beyond your ability and knowledge.
- Never let judgment be overruled by desire when choosing the route or turning back.
- Leave the trip schedule with a responsible person.
- Follow the precepts of sound mountaineering as set forth in textbooks of recognized merit.
- Behave at all times in a manner that will reflect favorably upon mountaineering and The Mountaineers.



## **Basic Experience Climbs**

The purpose of the Basic Experience Climbs is for you to experience what you have learned in the lectures and field trips. Your field trip experiences take on new dimensions when you face them in the mountains. The climbs are chosen to enable you to gain experience, have fun and learn more about your abilities and the mountains.

Basic Experience Climbs will be scheduled generally from May through September. To graduate, you must successfully complete (i.e., reach the summit and return to the trailhead) three scheduled Basic Experience Climbs in a safe and competent manner. One must be a rock climb (BR), one must be a basic glacier climb (BG), and the third may be a basic alpine (BA), glacier or rock climb.

We recommend and encourage you to complete an alpine climb as it allows you to use a variety of skills. The terrain may involve a little rock climbing, some scrambling and even some glacier travel all within the same trip. We also suggest you attempt glacier climbs early in the season for favorable snow conditions.

Students may participate on Basic Experience Climbs or scrambles with any branch. The schedule for the club's climbs, scrambles and all other activities for all branches is available on the web ([mountaineers.org/activities](http://mountaineers.org/activities)). The website also has references and other useful information for specific climbs. Note some climbs may be scheduled by leaders using the student Google group email.

You should start your climbing early in the season as the changing weather and mountain conditions may make it difficult to successfully complete the three required trips. Plan to go on more than three climbs to help assure you don't get "weathered out" or otherwise aren't able to summit on one or more of them.

Climbers are expected to be in good physical condition before participating on trips. All climbs and scrambles are not suited for all climbers or scramblers. You should consult guidebooks (Beckey's Alpine Guides, etc.), trip reports (Mountain Project, Peakbagger, etc.), maps, and knowledgeable persons to determine what climbs or scrambles are within your capabilities. Talking to the leader before signing up is encouraged.

After completion of the Basic Mountaineering Course, graduates are welcome to return for participation in field trips within two years of graduating and if space is available.

We offer this for continued learning opportunities for our students. Many will return to field trips to get a more concrete understanding of techniques and skills, or to become more comfortable in various styles of climbing.

## **Student Responsibilities**

1. Be realistic in your choice of climbs – Basic Experience Climbs vary in difficulty and strenuousness.
2. Basic Experience Climbs are not field trips. Review the skills that will be needed for the climb prior to leaving home. Practice tying knots, belaying and setting up to rappel before the climb.
3. Prepare by researching the climb, understanding the route and current conditions (snow, river crossings, etc.), and knowing the weather.
4. Be sure to bring the equipment that the leader requires even if not part of the standard list for that type of climb (e.g., an ice axe and crampons for a rock climb). If unsure, contact the leader to confirm the need and understand the conditions that require the equipment.
5. Volunteer to carry the rope and other group gear, and have space in your pack for it. Your leaders are often already carrying additional gear such as a climbing rack and extra pickets.
6. **Be on time!**
7. Be sure to leave trip details (including planned summit and route, trail head location, expected return time, time when overdue, leader name and phone number, and other Mountaineers to call if leader does not answer) with a responsible contact person.
8. Remember that you are part of a Mountaineers team and are not being “guided” to the summit. Do what you can to help the team succeed. Speak up if you have concerns. Watch your leaders to see what they’re doing, and be ready to help.

## **Fear and Risk Assessment**

Climbing is inherently dangerous. And it can be scary! This course requires psychological commitment to make it through these challenges. A primary purpose of this course is to reduce the risk you experience when going into the mountains, and there will be a lecture to discuss dealing with fear. Although fear and risk are in some ways unavoidable, know that it is never inappropriate to speak up about your fears or concerns for risk.



## **Reporting an Overdue Climber**

Climbs are often long and strenuous, take place on Mother Nature's terms, and are carried out with safety as the foremost concern. As a result, some trips are late in returning to the cars or arriving home. Occasionally, climbers must bivouac an additional night and not return until the following day. For this reason, it is important that relatives or close friends advised of your activities do not overreact to your tardiness. Do not promise to return by a certain time – spouses, parents and others have been known to panic if you have not returned by then.

Climb leaders have been chosen for their technical ability, reliability and leadership qualities. They have the ability to perform and assist with proper first aid procedures and mountain rescue. They pre-designate someone at home to notify the Climbing Committee Chair in case the party is late returning. This initiates the proper rescue procedures. If this is necessary, or if help is requested by persons who have been sent by a climbing party, families of the party will be notified.

**In no case should rescue authorities be contacted directly.** Instead, if a climber has not contacted home after a scheduled Basic Course Climb by noon on the day following the climb, relatives and friends of the climber should attempt to reach the following individuals in the order listed until successful contact is made and the person acknowledges that they will pursue the matter and advise the proper authorities.

Position (see Student Gradebook for contact info)

1. Trip Leader
2. Climbing Committee Chair
3. Bellingham Branch Chair

Please be assured that there are always enough people monitoring the course trips and activities that, should rescue personnel be required, the student's family will not be required to initiate the rescue process.

Fill in the trip leader's name and phone number and leave a copy of the form on the next page with the person who expects you to come home before each climb. Discuss this procedure with your spouse, relative, or friend prior to going on field trips and climbs.

## Climb Itinerary

To Be Left with a Responsible Person

Date and Departure Time	
Date and Estimated Time of Return	
Climb Leader(s) and Phone Number(s)	
Climb Participants and Phone Numbers	
Trailhead, Vehicle Make, Model, License Number	
Climb and Route Description	

## What to Do if a Climber Is Overdue

Climbs are often long and take place on Nature's terms with safety as the foremost concern. As a result, some trips are late in returning to the trailhead. Occasionally climbers bivouac an additional night and return the following day. **Climb parties are not considered late unless they have not contacted home by noon of the day following the return date specified above.**

**In no case should rescue authorities be contacted directly.** Instead, relatives and friends should attempt to reach the following individuals, in the order listed, until successful contact is made and the person acknowledges that they will pursue the matter and advise the proper authorities.

Contact List:

1. Trip Leader (see contact information in gradebook).
2. Climbing Chair
3. Branch Chair





## **Physical Conditioning**

*"It would puzzle a materialist to explain how frequently the reward of beauty is associated with the discipline of toil, as if nature consciously reserves her noblest effects for those who take some trouble to earn them."*

– Arnold Lunn

Conditioning is essential to safe and successful mountaineering. You should be prepared to carry a 30 lb. day pack 10 miles in a day, with a 4,000 foot elevation gain; or carry a 45 lb. overnight pack six miles in a day with a 2,500-3,000 foot elevation gain. You don't have to be a track star or have superhuman strength or endurance for the course but should, nevertheless, be in good condition. Otherwise, you may be unable to keep up with the party, slow down the party enough to cause the summit not to be reached, or cause delays that will jeopardize the safety of the party. Also, inadequate conditioning will contribute to a loss of alertness and inability to respond to the demands of the environment, jeopardizing your safety and that of the party. In addition, if you are in shape, you will get far more enjoyment out of the field trips and climbs.

If you have any medical condition that might limit your activity level, you should clear your involvement with your doctor and inform the trip leader of your situation.

The course will start to become more strenuous by the first snow field trip so start conditioning yourself now. The following is a recommended approach to obtain the required conditioning:

- Begin now a consistent program of aerobic conditioning of a minimum of 30 minutes, three times a week. This can be jogging, bicycling, aerobic dancing, etc. Running stairs or running uphill is particularly beneficial (if your body can stand it).
- Try to get into the mountains frequently to hike, snowshoe or ski.
- In the spring, try to take short hikes with substantial elevation gain such as Chuckanut Mountain. Below are several hikes that will get you started and can be done in almost all seasons and any weather:
  - **Pine and Cedar Lakes**, 4-6 mi. RT, 1,300-1,600 ft gain, 2-3 hrs.
  - **Chanterelle Trail**, 10 mi. RT, 2,500 ft gain, 3-5 hrs.
  - **Fragrance Lake**, 2-5 mi RT, 100-1,800 ft gain, 1-2 hrs.
  - **Oyster Dome and South Chuckanut Mountain**, 6-7 mi RT, 1,600-2,000 ft gain, 3-4 hrs.
- Join the Conditioning Hiking Series (see newsletter or Mountaineers.org for details).
- Consider developing some upper body strength and muscle tone through weightlifting, push-ups, pull-ups, aerobic dancing or calisthenics. Hand strength can be developed by squeezing a rubber ball or hand grip. This will dramatically improve your rock climbing ability and enjoyment.



## **Club Standards**

It is the policy of The Mountaineers that participants in Mountaineers activities and events, and persons present on Mountaineers premises (collectively "participants"), comply with standards of personal conduct set forth below. For purposes of this policy the term "Mountaineers premises" shall include all Mountaineers properties, whether leased or owned by The Mountaineers. The term "activity" shall include all Mountaineers events, including courses, trips and social events. The term "participants" shall include members of The Mountaineers and guests. The phrase "could reasonably be expected to" shall be measured by reference to the judgment that would be exercised by a reasonably prudent person in the context of the activity, event, and/or location presented.

1. Participants shall exercise personal responsibility and shall refrain from conduct during Mountaineers activities and on Mountaineers' premises that could reasonably be expected to impair the safety of the party, individual participants, or the collective participation and enjoyment of others.
2. Participants shall:
  - a. Respect private and public property.
  - b. Obey federal, state, and county, and municipal regulations.
  - c. Treat all persons present with respect and comply with The Mountaineers' Member Code of Ethics and the Prohibited Behavior Policy. Harassment will not be tolerated.
3. Participants shall minimize the environmental impact on the outdoors by practicing Leave No Trace principles.
4. Alcoholic beverages are prohibited during Mountaineers activities and otherwise on Mountaineers premises when such use, or, if use is otherwise permitted, the extent of such use, could reasonably be expected to impair the safety of the party or individual participants, or the collective participation and enjoyment of others.
5. No participant, other than a qualified law enforcement officer in compliance with the terms of his or her employment and commission, shall bring a firearm to or possess a firearm during any Mountaineers activity or onto any Mountaineers premises. Such law enforcement officer shall, on occasions other than non-overnight social events, inform the leader of the officer's possession of any firearms.
6. Except alcohol as permitted elsewhere under this policy, the possession and/or use of non-prescribed drugs, including cannabis, whether or not permitted by state law, is strictly prohibited during Mountaineers activities and on Mountaineers premises.
7. Pets are not allowed in Mountaineers activities and/or premises without the consent of the leader, except that such advance permission shall not be required for activities specifically listed to include pets, such as "Hikes with Dogs". The term "pet" under this policy does not include, and this policy shall not apply to, service animals.

Participants shall comply with any additional rules established by board, branch, division, or committee policies or procedures. In the event of a conflict, this policy shall take precedence.

# **Resources**

These organizations share important information about mountains, trails and weather.

## **Route and Trail Information**

- **Mountaineers Pages:** [mountaineers.org/activities/activity-overviews/climbing](http://mountaineers.org/activities/activity-overviews/climbing)
- **Washington Trails Association:** [wta.org](http://wta.org)
- **Climber's Discussion Forums:** [cascadeclimbers.com](http://cascadeclimbers.com), [mountainproject.com](http://mountainproject.com), [nwhikers.net](http://nwhikers.net), [peakbagger.com](http://peakbagger.com)

## **Avalanche/Mountain Weather Forecast:** 206-526-6677

- **Cascades and Olympics:** [nwac.us](http://nwac.us)
- **British Columbia:** [avalanche.ca](http://avalanche.ca)

## **Weather**

- **General Forecasts:** [windy.com](http://windy.com), [mountain-forecast](http://mountain-forecast)
- **Cascades and Olympics:** [www.wrh.noaa.gov/sew/forecast03.php](http://www.wrh.noaa.gov/sew/forecast03.php)
- **British Columbia:** [weather.gc.ca/forecast/canada/index\\_e.html?id=BC](http://weather.gc.ca/forecast/canada/index_e.html?id=BC)

## **Washington Highway Pass Info**

- 888-766-4636
- [wsdot.wa.gov/travel/real-time/mapwsdot.wa](http://wsdot.wa.gov/travel/real-time/mapwsdot.wa)

## **North Cascades NP, Ross Lake NRA, Lake Chelan NRA**

- **Marblemount:** 360-854-7245
- [nps.gov/noca](http://nps.gov/noca)

## **Mt. Baker-Snoqualmie NF**

- **Mt. Baker Ranger District,** Sedro Woolley: 360-854-7200
- Glacier Public Service Center, Glacier: 360-599-2714
- [fs.usda.gov/mbs](http://fs.usda.gov/mbs)

## **Washington State Parks**

- **Region 2 Office:** 220 N Walnut, Burlington; 360-755-9231
- [parks.wa.gov](http://parks.wa.gov)

## **Washington Department of Natural Resources:** 800-527-3305

- **Northwest Region:** 919 North Township, Sedro Woolley; 360-901-1000
- [dnr.wa.gov](http://dnr.wa.gov)

The following are emergency contacts only – not for information:

- **Whatcom County Sheriff:** 360-384-5360 *or* 911
- **Skagit County Sheriff:** 360-336-9450 *or* 911



# Introduction and Leave No Trace Lecture

## Required Reading:

*Freedom of the Hills (9e)*, Chapters 7-8

## Objectives:

- Meet one another
- Review Leave No Trace ethics
- Preview course
- Understand requirements and answer questions

## Outline:

1. Introductions
2. Leave No Trace
3. General course guidelines and expectations
4. Overview of field trips and lectures

## Additional Resources:

*Leave No Trace: Outdoor Skills & Ethics, Pacific NW Volume, the National Outdoor Leadership School*

*Leave No Trace Center for Outdoor Ethics, [Int.org](http://Int.org)*

## **Environmental Concerns and Guidelines**

As climbers and backcountry travelers we need to understand our effect on the wild lands we use for recreation. Taking responsibility for the proper care of these lands is important. Increasing pressure from population growth and the growing popularity of outdoor recreation creates more and more impact on our fragile mountain ecosystems. Making careful choices to lessen our impact makes a difference both for the wild lands we visit and our ability to enjoy visiting them in the future.

As the Northwest's largest outdoor activity club, The Mountaineers has always taken a strong stand on wilderness resource conservation. Our membership is not facing a change in philosophy. What is changing are the techniques and current thinking about the best ways to have a "leave no trace" ethic.

Leave no trace: One must travel and camp with care, deliberately planning and guiding one's actions, so as not to harm the environment or disturb others.

Seven Basic Principles of Low Impact Recreation:

- Plan ahead and prepare
- Travel and camp on durable surfaces
- Dispose of waste properly
- Leave what you find
- Minimize campfire impacts
- Respect wildlife
- Be considerate of others



# Equipment Lecture

## Required Reading:

*Freedom of the Hills (9e)*, Chapters 2-3

## Optional Equipment:

Bring any gear that you want to discuss with instructors after the presentation.

## Objectives:

- Become familiar with the clothing and equipment needed for alpine climbing
- Begin to use the concept of "systems thinking" for your gear
- Learn how and when to acquire equipment
- Start thinking about how to plan for field trips and climbs

## Outline:

1. 10 Essentials
2. Non-Technical Equipment
3. Technical Equipment
4. Lightweight Philosophy
5. Buying vs. Renting vs. Borrowing

## Introduction:

Each person is responsible for providing their own equipment. If you have an outdoor background, you probably already own many of the necessary backpacking items. The equipment is not all needed at the beginning of the course. You may begin with the basics and slowly acquire the rest. Some items (e.g., tents, stoves, food storage containers) may be rented or shared rather than purchased.

The required equipment varies with the type and duration of the trip. The **Required Equipment Matrix** (page 72) shows what equipment is needed for each activity in this course. It has evolved from the concept of being fully prepared for the most severe weather conditions, unplanned emergencies, and accidents, which may cause serious delay, possible injury, and other hardships.

## Additional Resources:

*The Mountaineering Handbook*, Craig Connelly © 2005 Ragged Mountain Press/McGraw-Hill (Ch. 17-18)

*Backcountry Skiing: Skills for Ski Touring and Ski Mountaineering* (Mountaineers Outdoor Expert Series), Martin Volken, Scott Schell, Margaret Wheeler © 2007 Mountaineers Books (pp. 51-62)

*Alpine Climbing: Techniques to Take You Higher*, Mark Houston and Kathy Cosley © 2004 Mountaineers Books, 2004 (pp. 80-102)

## **10 Essentials**

The 10 Essential systems answer two basic questions: 1) Can you respond to an accident or emergency? 2) Can you safely spend an unexpected night – or more – out?

1. First aid supplies and knowledge
2. Insulation
3. Hydration
4. Illumination
5. Navigation
6. Sun protection
7. Nutrition
8. Repair kit and tools
9. Emergency shelter
10. Fire

These essentials should be carried by each person traveling in the backcountry, whether on an extended backpacking adventure or out for a short afternoon hike. This way each person has access to necessary items if they're separated from the party.

## **Technical Equipment**

Technical equipment consists of items that help safeguard your life, such as ropes, prusik cords, webbing/slings, carabiners, harness, helmets, ice axe, crampons, belay device.

The club provides ropes for all climbing field trips and many club climbs. Sometimes, the climb leader and the rope leaders provide ropes. Basic Course students are NOT required to buy ropes. However, you might wish to purchase a rope later in the season after you are certain of your climbing interest.

With several of the necessary items there are a lot of options available. However, with the following three items, they must meet these specifications:

- **Snow Picket:** 24"
- **Personal Anchor:** 120cm sewn **nylon** sling (i.e. double-length sling)
- **Rappel extension:** 120cm **Dyneema** or **Spectra** sewn sling

You are provided with the following:

- Foot prusik (13'5" black 6mm perlon)
- Waist prusik (6'6" black 6mm perlon)
- Autoblock loop (5' bright green 6mm perlon)
- Chest harness (9'6" dark green tubular webbing, 1")
- 2 x double slings (9'0" navy tubular webbing, 1")



## **Non-Technical Equipment**

Non-technical equipment consists of everything you would carry on a hike or backpacking that excludes the technical equipment. This includes a backpack, tent, sleeping bag, stove, cook pot, water purifications system, sit pad, comfort clothing, required food storage containers, etc.

## **Lightweight Philosophy**

Go lightweight! Technical equipment required for some climbs can add 10-25 lbs. to the weight of each climber's pack. For reasons of safety and comfort, learn to evaluate gear based on weight in addition to function.

From a biomechanical standpoint, the maximum percentage of body weight which can be carried and sustained is about 25-35. Individual fitness and tenacity can alter this rule of thumb. Nonetheless, individual gear should be selected and group gear should be distributed with this rule in mind.

Consider some of the following reasons to minimize pack weight:

1. When climbing, speed often equates to safety – such as when trying to beat an approaching storm or darkness. Crossing glaciers or avalanche terrain as quickly as possible helps minimize exposure to dangerous conditions.
2. The weight of items you wear and carry on a trip matters. Over time, more weight means greater fatigue, diminished balance, lower strength-to-weight ratio, and possibly more time to get there and back – all of which can increase the risk of accidents. Leaving behind a safety-related item to reduce weight also creates risk. You are always faced with trade-offs with potentially serious results.
3. Lightweight gear often enhances safety, not diminishes it, because it is more likely to be taken along (e.g., a light helmet). Safety shouldn't be compromised by choosing lightweight equipment. A 15-20 oz ice axe can be just as functional for basic climbing as a 36 oz axe. (There are some exceptions to this: certain aluminum crampons are not suitable for steep ice or for mixed ice/rock conditions. Ask advice of fellow climbers and instructors.)
4. Your individual decisions affect the whole climbing party. Climbing is a team activity – so the group moves as fast as the slowest member. Being the slowest member of the group or struggling to keep up can weigh heavily on a climber's mental state and add greater difficulty to an already challenging situation.

Tips for minimizing pack weight:

1. Justify every extra item that goes into your pack.
2. Share group items efficiently (e.g., tent parts, water filter, stove, pot). A group of three persons sharing camping items is the most weight efficient.
3. Distribute group gear according to ability to carry.
4. Use quick-cook foods (e.g., dehydrated foods).
5. Reevaluate your gear after each trip – what did you use, what didn't you need?

Consider the following table, which compares the minimum and maximum weight of

selected items from an overnight pack with gear for a glacier climb.

<b>Non-Technical Equipment</b>	<b>Minimum Weight (lb.)</b>	<b>Maximum Weight (lb.)</b>
Pack	3	8
Tent (2-person)	2	9.5
Pad	1	2
Sleeping bag	1	3.5
Clothing (raingear, etc.)	3.5	6
Comforts (camp shoes, etc.)	0	2
Cooking kit (stove, pot(s), etc.)	2	6
<b>Subtotal</b>	<b>11.5</b>	<b>37</b>
<b>Technical Gear</b>		
Belay device	0.2	0.3
Crampons	1	2.3
Harness	0.6	1.7
Helmet	0.6	1.4
Ice ax	0.9	2.3
Carabiners	1	2
Rescue pulley	0.2	0.5
Prusik cords/slings	3	3.5
Rope	3	8
<b>Subtotal</b>	<b>10.5</b>	<b>22</b>
<b>TOTAL</b>	<b>22</b>	<b>59</b>

The greatest opportunity for weight savings comes from carefully selecting lightweight non-technical equipment. Some gear weighs twice as much but gains you little in functionality.

Although technical climbing equipment contributes less than non-technical equipment to the overall weight of an overnight pack, the added weight is still very significant. This is especially true when you consider that on the summit day, when you are climbing the most difficult terrain, your day pack will contain all your technical gear.

## **Buying vs. Renting vs. Borrowing**

**Note: Do not purchase equipment until after the equipment lecture.**

You'll need to purchase the following items if you don't already have them:

- Belay device
- Carabiners
- Harness
- Helmet
- Slings for personal anchor and rappel extension
- Pulley
- Nut tool (aka Chock Pick)

Rent or borrow the following items unless you're sure you'll use them regularly enough to purchase:

- Shovel
- Avalanche transceiver, probe, and flotation (backcountry skis, board, snowshoes)
- Rock shoes
- Mountaineering boots
- Crampons
- Ice axe
- Picket
- Food storage container

Key considerations in buying gear:

- Does this gear have the functionality I'll want in the mountains?
- Does it function well as a part of the rest of my gear system? Do I have another piece of gear that would do the same thing just as well?
- Is this gear useful in various situations? Could I find another product that would be more adaptable/versatile?
- How well will this gear hold up over the long run?
- Does this gear fit me really well?
- Are there any special nuances to the piece of equipment?

## **When to Have Specific Equipment**

Whether you borrow, rent or purchase gear, the main thing is that you find a way to have the required equipment with you for each field trip. Reference the **Equipment Matrix** on page 72 before each field trip.

<b>Avalanche</b>	<ul style="list-style-type: none"><li>• Warm clothing</li><li>• Gaiters</li><li>• Goggles/glasses</li><li>• Thermos</li><li>• Warm boots</li></ul>
<b>Knots Evaluation</b>	<ul style="list-style-type: none"><li>• Harness</li><li>• Webbing, cord, prusiks, rappel extension</li><li>• Belay device</li><li>• Personal anchor</li><li>• Carabiners</li></ul>
<b>FUNDamentals</b>	<ul style="list-style-type: none"><li>• Overnight pack</li><li>• Helmet</li><li>• Sleeping bag, pad, tent, stove</li><li>• Belay gloves</li><li>• Water purification/storage</li><li>• Cell Phone with CalTopo / Gaia</li></ul>
<b>Rock I / II</b>	<ul style="list-style-type: none"><li>• Rock II only: Chock pick/Nut Tool</li><li>• Boots (ideally mountaineering)</li></ul>
<b>Snow I</b>	<ul style="list-style-type: none"><li>• Ice ax</li><li>• Picket</li></ul>
<b>Snow II</b>	<ul style="list-style-type: none"><li>• Pulleys</li><li>• Crampons</li></ul>



# **Equipment Resources**

## **Discounts**

Use the discounts available with your Mountaineers membership:  
[mountaineers.org/membership/benefits](http://mountaineers.org/membership/benefits)

## **Local Shops: Shop Bellingham first!**

### Backcountry Essentials

214 W. Holly, Bellingham  
360-543-5678

### REI

400 36<sup>th</sup> St., Bellingham  
360-647-8955

## **Shopping in Surrounding Cities**

### Ascent Outdoors

2201 15th Ave W, Seattle, WA  
206-545-8810

### Pro Mountain Sports

5625 University Way, Seattle  
206-522-1627

### Mountain Equipment Company

111 2nd Ave East, Vancouver  
604-872-7858

## **Online Shopping**

### backcountry.com

### backcountrygear.com

### campsaver.com

### eddiebauer.com (First Ascent)

### gearx.com

### American Alpine Institute

1513 12<sup>th</sup> St., Bellingham  
360-671-1505

### Sierra

4313 Meridian St., Bellingham  
360-527-0636

### Valhalla Pure Outfitters

88 W Broadway, Vancouver  
604-872-8872

### Feathered Friends

263 Yale Ave. N, Seattle  
206-292-2210

### Wonderland Gear Exchange

122 NW 36th St, Seattle  
206-582-1987

### omcgear.com

### reioutlet.com

### sierra.com

### steepandcheap.com

## **Gear Repair**

### Rainy Pass Repair

4415 Stone Way North, Seattle  
888-747-7867

### Dave Page, Cobbler

3509 Evanston Avenue North, Seattle  
206-632-8686

# Lectures: Mountain Weather, Fear and Risk Assessment

## Mountain Weather

### **Required Reading:**

*Freedom of the Hills (9e)*, Chapter 28

### **Objective:**

- Learn about Northwest weather and trip planning

### **Outline:**

1. Weather forecasts
2. Origins of weather
3. Local weather patterns
4. Where to find weather data

### Additional Resources:

*Mountain Weather: Backcountry Forecasting and Weather Safety for Hikers, Campers, Climbers, Skiers, and Snowboarders*, Jeff Renner © 2005 Mountaineers Books

*The Weather of the Pacific Northwest*, Cliff Mass © 2008 Univ. of WA Press

## Fear and Risk Assessment

### **Objective:**

- Learn about assessing fear and risk

### **Outline:**

1. Understanding that fear is a common aspect of mountaineering
2. Learning to distinguish between fear and true risk
3. Reviewing tools to separate risk calculus from fear

### Additional Resources:

*Breaking the Halo*: [youtube.com/watch?v=Ttdn24dE9SU](https://www.youtube.com/watch?v=Ttdn24dE9SU)

*Will Gad TEDx on risk*: [youtube.com/watch?v=MTdFkPTTnsA](https://www.youtube.com/watch?v=MTdFkPTTnsA)



# Wilderness First Aid (WFA)

Books and supplemental written materials will be provided on the first day of class.

**You will be required to complete approximately 8 hours of videos and study materials prior to the course.** These will be provided by Backcountry Medical Guides via email approximately 1 month before the WFA course.

Things to bring:

- Day pack, with whatever 10 Essentials you have already
- If you own them, trekking poles, sit pad/sleeping pad, and/or ice axe
- Clothing for cold and wet weather
- Snacks, lunch, and water
- Pen/Pencil (lecture notebooks will be provided)
- Sunglasses, Sunscreen, Hat
- Warm/Dry clothes for extended time outside (prepare for rain)
- Comfortable clothing for hands-on sessions on the ground
- Any medications you might need for the day (Typical for all Mountaineers Events)
- WFR-R Participants (if relevant): Previous WFR Certification

This class is a mix of lecture/discussion and practices/scenarios over two full days.

## **Objectives:**

- Manage risk through pre trip planning and preventative techniques: communications, first aid kits, sports nutrition and hydration, rider and equipment checklists, trip itineraries.
- Assess and treat life threatening emergencies: Airway management, hemorrhage control, CPR, shock, and stabilization.
- Practice common trauma techniques: Wound and fracture management, head injuries, neck and spine injury, blunt trauma, burns, dental and eye trauma.
- Develop important judgment skills for the assessment and evacuation of medical and environmental emergencies in the backcountry: heat and cold emergencies, animal bites and stings, lightning and adverse weather, search and rescue basics, cardiac and respiratory emergencies, diabetes, seizures, anaphylaxis.

Successful completion of the course will earn each student a Wilderness First Aid Card.

# Avalanche Awareness Lecture

## Required Reading:

*Avalanche Essentials*, Bruce Tremper

*Freedom of the Hills (9e)*, Chapter 17

## Objectives:

- Identify avalanche terrain
- Discuss avalanche forecast
- Identify and perform field tests to determine snowpack stability/instability
- Recognize weather and terrain factors contributing to stability/instability
- Apply safe travel techniques
- Perform rescue through fast and efficient transceiver use, probing and shoveling

## Outline:

1. Avalanche phenomenon
2. Terrain analysis
3. Snowpack
4. Weather
5. Stability evaluation
6. Human factors and risk assessment
7. Decision making
8. Beacons/transceivers
9. Rescue

## Additional Resources

Northwest Avalanche Center, [nwac.us](http://nwac.us)

Avalanche Canada, [avalanche.ca/training](http://avalanche.ca/training)

*Snow Sense*, Jill Fredstone and Doug Fesler

*Allen & Mike's Avalanche Book: A guide to staying safe in avalanche terrain*, Allen O'Bannon and Mike Clelland © 2012 Falcon Guides

*Avalanche Safety for Skiers and Climbers*, Tony Daffern

*Staying Alive in Avalanche Terrain*, Bruce Tremper

*Avalanche Handbook*, David McClung and Peter Schaerer



# Avalanche Awareness Field Trip

## Required Equipment (*see equipment matrix on page 72*):

- Clothing for winter travel
- Snowshoes, backcountry skis and skins, or splitboard and skins
- Shovel/transceiver/probe\*
- Daypack
- Food/water
- 10 Essentials

\* Bring these items, if at all possible. The branch has a few of each available if you do not own or cannot rent these.

## Outline:

1. Avalanche phenomenon
2. Terrain analysis
3. Snowpack
4. Weather
5. Stability evaluation
6. Human factors and risk assessment
7. Decision making
8. Beacons/transceivers
9. Rescue
10. Snow pit evaluation, if time and conditions permit

## Field Trip Tips:

- **Boots:** You want boots you can stand around in snow without getting cold. Rent plastics or mountaineering boots. Don't wear anything that's not waterproof.
- **Clothing** (layer system): Wear clothing that allows you to stay warm while you're working at various stations (rather than hiking).
- **Food:** Make sure your food is accessible because you'll be eating on the fly.
- **Don't forget your sit pad!** You'll want a small piece of foam to sit/stand on.
- **A thermos of hot drink goes a long way.**

# **Avalanche Awareness Quiz**

Name:

*Freedom of the Hills can be used to find most of these answers.*

1. Name the 9 types of avalanche problems that are used in North American avalanche forecasts.
  
  
  
  
2. Describe the difference between a loose avalanche and a slab avalanche.
  
  
  
  
3. What are the three components of the avalanche triangle (what three components are needed for an avalanche to occur)?
  
  
  
  
4. What is the significance of slope angle?
  
  
  
  
5. What's the difference between snow that slides and snow that stays in place?
  
  
  
  
6. What does it take to start an avalanche?
  
  
  
  
7. Name at least three red flags that indicate that avalanches are likely to occur (bonus points for listing more than three red flags).
  
  
  
  
8. What steps can you take to try to reduce your risk while in avalanche terrain?
  
  
  
  
9. List internet resources for the Northwest avalanche forecast, the Canadian avalanche forecast, and the national avalanche center (use google to find this information).





# Navigation Online Course

Prior to the Navigation Lecture students must take one online class. The Navigation Instructor will send out further instruction, completion requirements, and a link to the course on the Coassemble eLearning Platform.

## *Online Map & Compass*

This is the Mountaineer's main online course, involving navigation, map and compass work. It will take a few hours (or more) to complete. The course is self-paced and doesn't need to be completed in one sitting.

The supplemental book "Wilderness Navigation, 3rd Edition. Finding Your Way Using Map, Compass, Altimeter & GPS" is recommended for the online course. However, it is possible to complete the course without it.



# Digital Mapping and Trip Planning Lecture

## Required Equipment:

- Cell Phone with CalTopo or Gaia

## Optional Equipment:

- Laptop
- Compass
- Altimeter

## Objectives:

- Understand the different coordinate systems
- Learn how to measure and plot bearings
- Understand the basics of altimeters
- Become familiar with both CalTopo's web and mobile apps
- Learn how to create new maps on CalTopo
- Learn how to utilize trip plan offline
- Discuss key tips for off trail travel

## Outline:

1. Review the differences in CalTopo's web and mobile apps
2. Learn the various base layers and overlays available
3. Creating new routes and markers
4. How to export and import GPX files
5. Using a map offline using the cell phone app
6. Recording a track in the cell phone app
7. Discuss how to minimize impact while traveling off trail
8. How to develop a good plan and minimize the time looking at your phone in the field
9. Taking the path of least resistance
10. Familiarizing yourself with the terrain around you
11. Discuss homework for FUNdamentals

# Rope Handling and Knots Examination

## Required Reading:

*Freedom of the Hills (9e)*: Chapters 9-11 and pages 393-395

## Pre-Examination Assignment:

Learn these knots and hitches:

- **Single Overhand Knot:** Commonly used as a backup knot behind a primary knot
- **Double Overhand Knot:** Used to tie off the free end of each individual rappel rope, or to finish a loose end on a Figure-8 or Bowline
- **Flat Overhand Knot:** Used to join two ends of rope together for rappelling
- **Water Knot:** Used to tie two ends of tubular webbing/slings together
- **Double Fisherman's:** Used to tie two ends of perlon or two rope ends together
- **Figure-8 Loop (Figure-8 on a Bight):** Used to attach end of rope to carabiner or middle of rope when one direction of pull is expected
- **Rewoven Figure-8:** Used when tying in end of rope to harness, or attaching rope to anchor without carabiners
- **Butterfly Knot:** Used to make a loop in middle of rope when pull may be exerted in either direction
- **Bowline:** Used to make a non-slipping loop in the end of a rope; *not currently recommended as a climbing knot*
- **Girth Hitch:** Used to attach tied loops of sling or perlon around anchors, or through harnesses or carabiners without having to open them
- **Clove Hitch:** Used when making adjustments to anchor tie-in
- **Münter Hitch:** Used for friction belay from pearabiner
- **Prusik Hitch:** Adjustable friction knot used for ascending a rope
- **Autoblock:** Used for rappel backup
- **Mule Hitch:** Used by belayer to "tie off" a fallen leader so belayer's hands are free
- **Rappel Setup**

## References:

Knots Videos - <https://www.bellinghammountaineers.com/knots-video/>

## Required Equipment:

Harness, large locking pear-shaped carabiner (pearabiner), all other carabiners, slings, practice rope section, 6mm perlon slings, belay device, personal anchor, rappel extension

## Objective:

Demonstrate proficiency in the knots and hitches used in climbing



## Mule Knot with an Overhand Backup

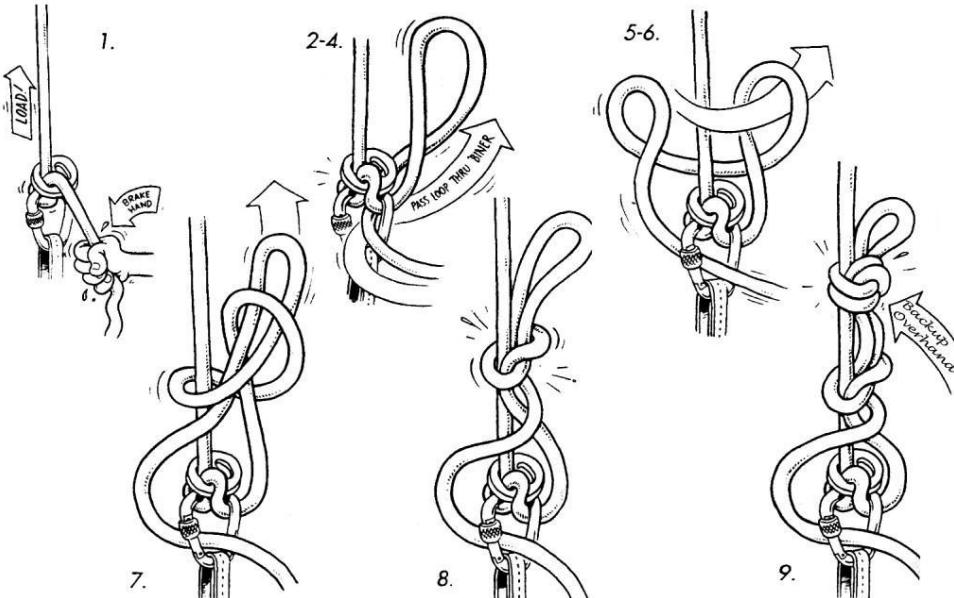
Mule knot video: <https://www.youtube.com/watch?v=n8IFuH5Wu2w>

This knot holds a load when used in conjunction with either a Münter hitch or a belay plate. It is also a great knot to safely free your hands while belaying.

The overhand backup is necessary to prevent the Mule knot from untying. If the Mule knot alone is used to stop a rappel, it can untie itself; the weight of the rope hanging beneath the knot can apply enough pressure to untie the knot.

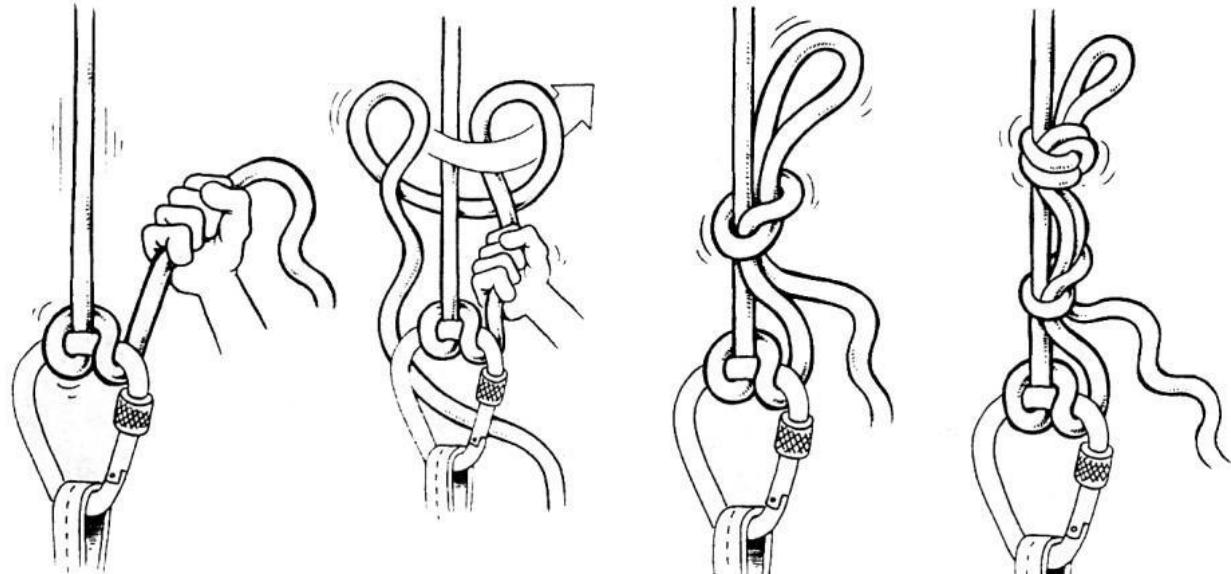
Note: Although the Mule knot can be untied while loaded, it can be very difficult to do so. Assume you are using a belay device and locking carabiner. If you load the Mule knot and forget to pass the rope through the locking carabiner before tying the Mule knot, it will lock. To unlock the Mule knot, loop the free end of the rope around your foot. Stand in the loop to apply pressure to unlock the knot.

To form a Mule knot in conjunction with a belay device:

1. Lock the belay device with your brake hand (here, the right hand is the brake hand).
  2. Loop the slack (behind your brake hand) through the locking carabiner on your harness from right to left.
  3. Feed the slack under and back to the right of the loaded rope.
  4. Form a loop (half-twist – clockwise).
  5. Take another bight of the slack and feed it under and to the left of the loaded rope.
  6. Form a loop in this bight of rope (half twist – counter-clockwise).
  7. Feed this second loop (the left loop) over the loaded rope and through the first loop.
  8. Tighten the knot formed with the two loops, leaving a tail.
  9. Using the tail, tie a single overhand knot on the loaded rope.
- 

It's important to remember that the first loop is always taking the load and the second loop goes through the first (fed over the loaded rope).

## **Münter-Mule Combination**



This combination can be used to tie off a loaded rope. It can also be used in place of a Mariner knot when using a cordelette.

When using the Münter-Mule combination, load the Münter hitch to correctly position the knot before you tie the Mule knot.

Tie the Mule knot in front of the Münter hitch (toward the victim and away from the belayer).

When using the Münter Mule combination, do not pass the rope through the locking carabiner before tying the Mule knot.

## **Belay Escape**



**Step 0:** Fall is arrested (belayer omitted for clarity).

**Step 1:** Tie off belay device with Mule knot backed up with a single overhand knot. The load is now on the belayer's harness and the belayer's hands are both free.



**Step 2:** Attach a prusik hitch to the rope and clip it into the anchor. Use only a perlon (nylon). Dyneema/Spectra melts at too low a temperature for friction hitches.

**Step 3:** Untie the device-Mule and gently transfer the load to the perlon using the belay device. While keeping a hand on the brake strand, tie a figure-8 on a bite and clip it to the anchor. Then remove the rope from the belay device.



# **Rappel Setup with Autoblock Backup**

The following gear is used:

- Seat harness
- Locking pearabiner
- 2 x locking carabiners
- Autoblock loop
- Double-length nylon sling (personal anchor)
- Belay/rappel device
- 120cm Dyneema sewn sling

## **Rappel Setup:**

1. Your double-length nylon sling (personal anchor) will remain clipped into the anchor until these steps are 100% complete and you're ready to rappel.
2. Loop the 120cm Dyneema sling through the hard points of your harness. Clip both ends with a locking carabiner and your belay device.
3. Tie a figure-8 knot about halfway between your harness and the carabiner at the end of the Dyneema sling.
4. Clip another locking carabiner to your belay loop and clip your autoblock loop into it.
5. Wrap the autoblock (your smallest, bright green perlon loop) around both strands of the rope 3 or 4 times and clip the free end back into the locking carabiner on your belay loop. Lock this carabiner.
6. Pull rope up through your autoblock so there's some slack in the rope in front of you.
7. Put both strands of the rope into your belay device and clip both strands with your locking carabiner. Lock this carabiner.
8. Test the system by moving your rappel device towards the anchor and fully loading your rappel system. Ensure that your personal anchor has slack at this point.
9. From the anchor to your harness, review each piece of the system and ensure lockers are locked and the rope is properly threaded.
10. Place one hand above the autoblock and one below. The pinky side of the hand above the autoblock will tend it as you descend.
11. Once you are certain your system is complete, yell, "On rappel!"
12. Unclip your personal anchor from the anchor and begin to lower.
13. Always keep at least one hand on the ropes while descending.

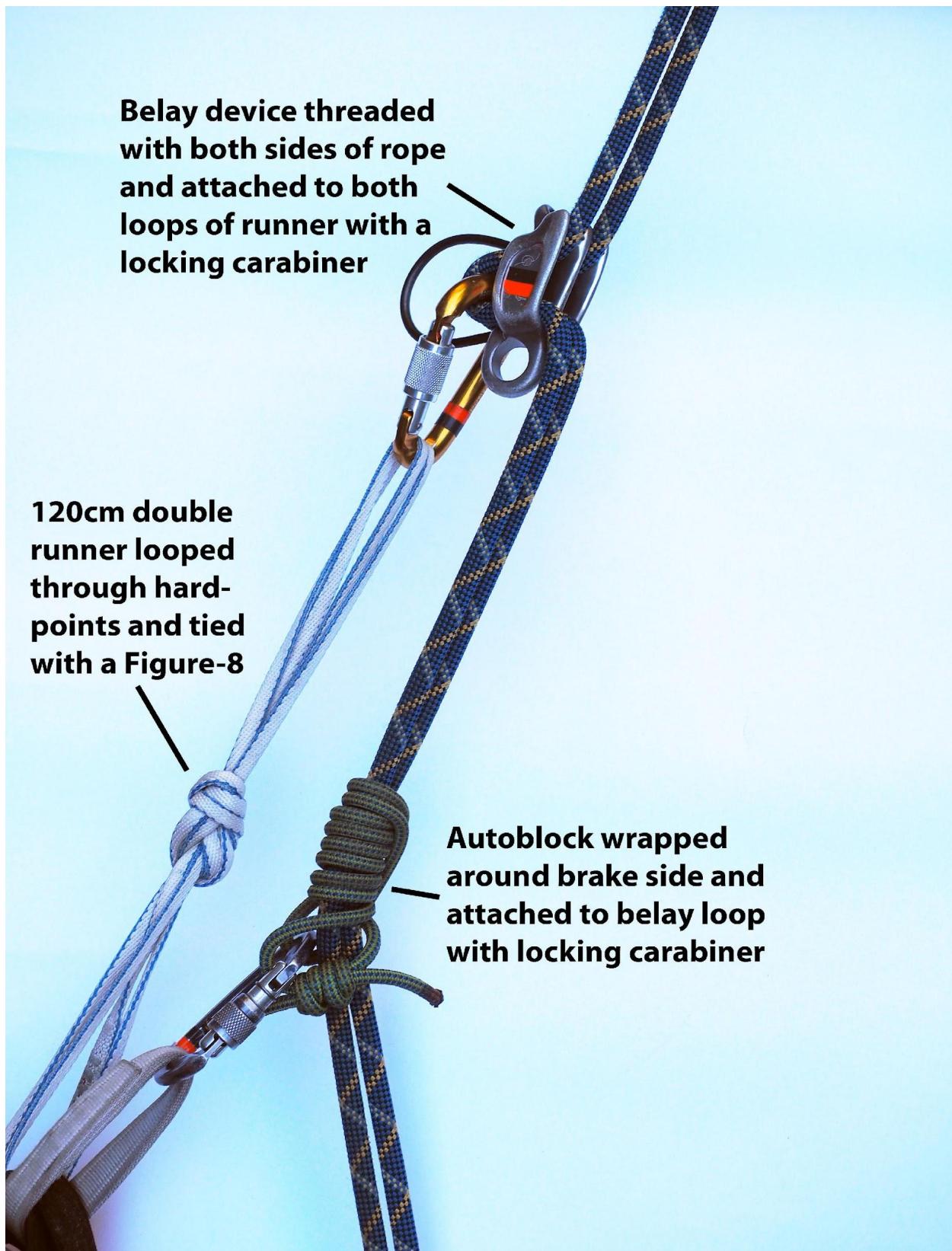
## **Why use an autoblock backup?**

This is the preferred method used to back up a rappel. It can be used at any time but is very effective to back up the following: an injured climber, descending long multipitch rappels, rappelling in the dark and when objective danger such as rock or ice fall is present.

The ADVANTAGE of this method is if the climber falters and loses control, the autoblock backup will automatically lock off the rappel. The TRADEOFF of this method is the time it takes to set up. Also, the autoblock backup adds significant drag to the rappel, especially at the top of a double rope rappel. As a result, it takes longer to descend.



## Rappel Setup with Autoblock Backup (cont.)



# FUNDamentals Field Trip

## Required Equipment (*see equipment matrix on page 72*):

- 10 Essentials
- Overnight gear
- Carabiners, prusiks, slings, personal anchor, belay device, helmet, chest harness, belay gloves, harness, rappel extension
- Cell phone with downloaded navigation homework map

## Objectives:

- Practice climbing techniques
- Practice trip planning skills
- Practice basic navigation skills
- Practice off-trail travel
- Check backpacking, camping skills and physical fitness level

## Outline:

Saturday

1. Hike to Cedar Lake and set up camp
2. Review how to rack gear
3. Rotate through stations
4. Belaying with a belay device
5. Hip belay
6. Münter belay
7. Rappelling
8. Belay escape
9. Never-ending prusik with a pack
10. Knot check, rope coiling, and racking gear

Sunday

1. Navigation course



# Top Rope Belay Practice

## Required Reading:

*Freedom of the Hills (9e)*, Chapter 10: Belaying

## Required Equipment:

- Harness
- Helmet
- Belay device and pearabiner
- Personal anchor
- Carabiners (locking and non-locking)
- All slings and prusiks

## Outline:

1. Tie in
2. Climbing commands
3. Belay
4. Belay escape
5. Single pitch demonstration – climb, belay, lower or rappel

# Rock I: Anchors, Belay and Rappels

## Lecture and Evaluation

### Required Reading:

*Freedom of the Hills (9e)*, Chapters 9-11

### Pre-Lecture Assignment:

Quiz (p. 45)

### Required Equipment:

Climbing harness, chest harness, carabiners, slings, prusik loops, personal anchor, belay device, helmet, rappel extension

### Objectives:

- Learning the components of roped climbing
- Review belaying, rappelling and anchors
- Practice trip planning skills

### Outline:

1. Lecture
2. Quiz review
3. Stations
  - Belay escape and tying into an anchor
  - Rappel with belay device using autoblock and leg wrap
  - Dulfersitz Rappel
  - Three-Locker Rappel (improvised carabiner brake)
  - Rope coil and throw using commands
  - Anchor building

### Additional Resources:

*How to Set Up an Improvised Rappel (Three-Locker Rappel)*, [youtu.be/VjWzxRJ9vtk?t=203](https://youtu.be/VjWzxRJ9vtk?t=203)

*How to Rock Climb* (Fourth edition), John Long © 1998 Falcon Press

*Rock Climbing Anchors: A Comprehensive Guide*, Craig Luebben © 2007 Mountaineers Books





## Rock I Quiz

Name:

1. What knot do you use to tie into the end of a rope?
2. What are some advantages of tied slings?
3. Can non-locking carabiners be substituted for locking carabiners? If so, how?
4. What are three attributes of a good belay location?
5. What is the difference between a dynamic and static rope?
6. What is the primary function of the belayer?
7. How does a belay device work?
8. What are some advantages and disadvantages of a Münter belay?
9. When is a good time to use a hip belay?
10. Why is it important to remember the **ABCs** of setting up belays?
11. What are the four, basic elements of a rappel?
12. What are some potential problems when rappelling?
13. What does SERENE stand for?





# Rock I: Anchors, Belaying, Rappels and Basic Rock Climbing Field Trip

## Required Equipment (*see equipment matrix on page 72*):

- 10 Essentials
- Carabiners, prusiks, climbing harness, chest harness, personal anchor, slings, belay gloves, belay device, helmet, rappel extension
- Boots must be worn for the required segments of the field trip, but once requirements have been completed, rock shoes may be worn.

## Outline:

1. **Scramble** to the top of Mt. Erie.
2. Rotate through the following stations:
  - Belaying
  - Rappel setup
  - Rappelling (backup with both autoblock and leg wrap)
  - Multipitch rappelling
  - Belay escape
  - Anchors (static and dynamic)
  - Three-locker rappel
  - Dulfersitz rappel
  - Hip belay
  - Climbing
  - Fireman's belay

**Helmets are mandatory** at all climbing stations. Dress appropriately for the weather and be on time!

## Field Trip Tips:

- All gear should be taped/marked with nail polish (but don't cover up important identification numbers on carabiners and other gear) so that you don't lose it or confuse it with others' gear.
- Gear on your harness should be carefully organized and arranged so that it's easy to get to for various stations. Be sure to re-rack your gear carefully after use.
- Slings should be tied up so they don't hang down too far (they should come down to your mid-thigh and no lower)!
- You need to be able to access gear for each station. Leave some carabiners free of gear so you can access them.
- Go to the bathroom before you put your harness on and buy a harness that can be unclipped in the back (keeper straps).



# Lead Belay Practice

## Required Reading:

*Freedom of the Hills (9e)*, Chapter 10: Belaying

## Optional Videos:

- [AAC Universal Belay Standard: Lead Belaying](#)
- [Belay Masterclass: 11 Part Series](#)
- [Largest Study on Climbing Falls: Part 1](#)

## Required Equipment:

- Harness
- Helmet
- Belay device and pearabiner
- Personal anchor
- Optional: Assisted braking belay device (GriGri, Mammut Smart, Mega Jul, etc.)

## Outline:

- Practice phase 1 of lead belaying
  - Tie in
  - Position to avoid clashing
  - Observe for catch and fall trajectories
  - Protect climber from a ground fall for first 2 to 3 bolts
  - Managing slack
- Practice phase 2 of lead belaying
  - Managing slack
  - Catching a fall: soft catch or assist climber to avoid ledges
- Skills stations
  - Managing slack
  - Demo of assisted braking belay devices: GriGri, Mammut Smart, Mega Jul, etc.

# Climber Roles and Responsibilities

	Follower	Leader
1	<p>Flake out rope with leader's end on top.</p> <p>Tie rope to harness.</p> <p>Tie rope to anchor with clove hitch.</p> <p>Double check leader's harness and tie-in.</p>	<p>Build anchor.</p> <p>Tie in to climbing rope.</p> <p>Double-check belay anchor.</p> <p>Double-check belayer's harness and tie-in.</p>
2	<p>Set up belay.</p> <p>While belaying leader:</p> <ul style="list-style-type: none"> <li>● Pay close attention to leader.</li> <li>● Keep sufficient slack in rope to prevent leader from being pulled from stance.</li> <li>● Feed more slack when leader is clipping a piece of pro.</li> <li>● Take back excess slack when leader has finished clipping the piece of pro.</li> </ul>	Climb pitch, setting pro as needed.
3		<p>Finish pitch.</p> <p>Build anchor and tie in to anchor with climbing rope.</p> <p>Call "off belay" to follower.</p> <p>Pull up slack rope.</p>
4	<p>Take leader off belay.</p> <p>Optionally put a sling over shoulders to hold pro as it is removed when following.</p> <p>Tend any rope that is being pulled up by leader.</p>	
5		<p>Put follower on belay.</p> <p>Call "belay is on" to follower.</p>
6	<p>Break down anchor and stow pieces on shoulder sling and/or harness.</p> <p>Follow the pitch:</p> <ul style="list-style-type: none"> <li>● Remove pro while climbing.</li> <li>● Pull pro first, while keeping it attached to sling and rope.</li> <li>● Remove the pro from the sling and rack it.</li> <li>● Remove the sling and carabiner from the rope and rack it.</li> <li>● Continue until reaching the belay anchor.</li> <li>● Don't climb so fast that you create slack in belay rope</li> </ul>	Flake rope in a pile as it is brought up.
7	Anchor into the belay anchor. (Use personal anchor and tie in using the climbing rope with a clove hitch.)	Take follower off belay.
8	Carefully transfer to the leader all pro that was removed on the previous pitch.	Re-rack pro in preparation for next pitch.
9	Re-flake rope so leader's end is back on top.	
10	Put leader on belay.	<p>Remove personal anchor and rope tie-in to belay anchor.</p> <p>Lead the next pitch.</p>



# Rock II: Climbing Technique Lecture

## Required Reading:

*Freedom of the Hills (9e)*, review Chapters 10-11, read Chapters 12-13 and Appendix

## Pre-Lecture Assignment:

Quiz (p. 51)

## Objectives:

- Combine components of roped up climbing into a complete climbing system.
- Practice being a follower
- Belaying a leader
- Rope management at belay stations
- Cleaning the gear
- Gear exchange
- Dismantling anchors
- Explore climbing techniques and terminology
- Practice trip planning skills

## Outline:

1. Lecture
  - Yosemite Decimal System
  - Types of climbing
  - Climbing ethics
  - Equipment and gear
  - How to be a follower
    - Belaying a leader
    - Cleaning gear
    - Dismantling anchor
2. Demonstration
3. Quiz review
4. Slideshow of basic rock climbs
5. Basic climbing skills

## **Rock II Quiz**

Name:

10. How are falls measured?
11. What is the "V-angle"?
12. At what degree does having two anchor points become essentially useless?
13. What side of your body should you anchor to while using a device belay? A hip belay?
14. What does the climbing command "cleaning" mean?
15. What items need to be checked before starting a rappel?
16. Explain 4 different climbing techniques.
17. What is the difference between active and passive rock protection?
18. A leader is 30ft off the deck and 5ft above the last piece of pro. If the leader falls at this point how far will they fall?
19. At what point in the pitch is the impact force the highest for the leader?
20. Why is rope management critical?
21. What are some ways you can attach a sling to a natural anchor?





# Rock II: Climbing Technique Field Trip

## Required Equipment (*see equipment matrix on page 72*):

- 10 Essentials
- Prusiks, slings, personal anchor, carabiners, belay device, helmet, belay gloves, chock pick, climbing harness, rappel extension, chest harness, boots, and rock shoes (optional)

## Outline:

Students will be broken up into small teams and will practice the following techniques over the course of two days.

1. Climb with a pack
2. Climb with boots
3. Rappel with a pack
4. Down climb
5. Rappel using three-locker setup
6. Belay a leader, follow and clean gear
7. Multipitch climbing
8. Belay escape (if not signed off from Rock I)
9. Set up a top rope anchor
10. Climbing different rock features: crack, face, slab, dihedral, chimney



# Snow I: Snow Travel and Ice Axe Use Lecture

## Required Reading:

*Freedom of the Hills (9e)*, Chapters 16, 21, 27

## Pre-Lecture Assignment:

Quiz (p. 56)

## Objective:

- Safe snow travel
- Practice trip planning skills

## Outline:

1. Snow gear
  - Ice axe, leash options, boots and gaiters, crampons, slings and carabiners, shovel, wands, clothing, sit pad, snow protection
2. Snow and winter camping
  - Shelters – tents, igloos and caves
  - Melting snow
  - Staying warm
  - Ethics
3. Snow travel techniques
  - Self-belay
  - Step kicking
  - Moving in balance
  - Ascending (rest step)
  - Descending (plunge step, glissade, side step)
  - Self-arrest
4. Building anchors in snow
  - Pickets and bollards
5. Belay
  - Prusik belay
  - Standing carabiner ice axe belay
  - Anchored sitting hip belay
6. Roped climbing
  - Maintaining pace
  - Rope management
  - Running belays
  - Rescue coils
  - Group arrest
7. Quiz review

## **Rescue Coil**



**Step 1:** Attach to the rope at the predetermined distance with a figure-8 on a bight and two, opposite and opposed locking carabiners. This is done since one of the carabineer gates could rub on your pants, unlock unknowingly, and potentially open while self arresting.



**Step 3:** Continue coiling until you reach the end of the rope.



**Step 2:** With one arm at 90°, hold rope and start coiling towards the end, around neck.



**Step 4:** Tie off the end of the rope with a double overhand around all the coils. The coils can stay under your arm or be placed in the top of your pack.



## **Snow I Quiz**

Name:

1. What knot does the middle person on a glacier team use to tie into the rope and why?
2. What is the purpose of using a chest harness and when does a glacier climber put one on?
3. What makes snow travel trickier than hiking or rock climbing?
4. What are the main functions of an ice axe?
5. At what angle should a picket be placed and why is this important?
6. Why are the belay methods used on snow quicker and less formal?
7. You should always use gloves when using an ice axe. T/F
8. You should use a leash with your ice axe. T/F
9. What is the difference between self-belay and self-arrest grip on an ice axe?
10. If a self-belay fails and there are critical consequences, you need to be prepared to self-arrest. How should you be holding the axe in this instance?





# Snow I: Snow Travel and Ice Axe Use Field Trip

## Required Equipment (*see equipment matrix on page 72*):

- 10 Essentials
- Overnight gear
- Raingear, gaiters, waterproof boots, sunscreen, and snow glasses
- Ice axe, crampons, helmet, harness, slings, carabiners, personal anchor, prusiks, chest harness, picket, belay device, and shovel

## Objectives:

- Practice trip planning
- Practice all styles of arrest, simulate falling with crampons and glissading.
- Setup and review individual camps. Discuss snow camping.
- Demonstrate snow still.
- Walkabout practicing snow travel and ice axe technique.
- Practice snow anchors, belay techniques, and passing a picket ("clipping through").
- Mid-clip vertical picket demo.
- Rescue coil demonstration and practice.
- Simulate glacier travel-wand use, end runs, running belays, and group arrest.
- Z-Pulley and C-Pulley demonstration.

## Field Trip Tips:

- Don't forget your sit pad! You'll want a foam piece to sit/stand on.
- Place your harness and climbing gear someplace where you can easily access it. It's a pain to empty your entire pack in order to dig out your harness.



# Crevasse Rescue Skills Check

## Required Reading:

*Freedom of the Hills (9e)*, Chapters 16 and 18

## Required Equipment:

- Boots and crampons.
- Climbing harness, ice axe, carabiners, slings, prusiks, personal anchor, rescue pulley, and belay device.
- Headlamp.

Be prepared for wet/marshy ground.

## Objective:

1. Z-Pulley setup, practice, and sign off
2. Practice putting on crampons and ensuring a good fit

## Additional Resources:

*Bellingham Branch Crevasse Rescue Video*, [youtube.com/watch?v=kKLbn7WDF7A](https://youtube.com/watch?v=kKLbn7WDF7A)

*The Illustrated Guide to Glacier Travel and Crevasse Rescue (1<sup>st</sup> edition)*, Andy Tyson and Mike Clelland © 2000 Climbing Magazine

# **Crevasse Rescue Step-by-Step Instructions**

There are many ways to perform crevasse rescue. For consistency, please use this method to help create a smooth learning experience for everyone.

You are the end person in this scenario. Every student will perform the crevasse rescue from this position and these directions have been written from that perspective.

## **I. Fallen Climber Yells “FALLING!”**

### **II. Initial Response**

1. Both you and the middle person drops into the self-arrest position.
2. Shout for help from other climbers in the area.
  - Extra help quickens the rescue.
  - These instructions assume no other help is available.
3. Yell to the fallen climber in an attempt to determine their current state.
  - It is difficult to hear in the crevasse so be loud
4. Talk with the middle person about what happened and decide on next steps.

### **III. Transferring Fallen Climber’s Weight to Middle Person**

1. The middle person adjusts to the safest and most comfortable arrest position.
2. Gradually release out of the self-arrest position and transfer the fallen climber’s weight to the middle person (still arrested). Be prepared to drop back into self-arrest on a moment’s notice.
  - Holding the victim’s weight is usually not difficult for the middle person due to rope entrenchment into the side of the crevasse.
3. Using your waist prusik (from Texas prusik system) self-belay towards the middle person. Approach carefully probing for crevasses with an ice axe and be prepared to self-arrest should the middle person need help.

### **IV. Building the Initial Anchor**

1. Select a spot in well-consolidated snow for the initial anchor near the middle person’s feet and rope, allowing for enough room to build the anchor. If needed, stomp on the snow to harden it.
2. Place a vertical picket to build your initial anchor.
  - If a sling is being used it needs to be top clipped.
3. Attach a large locking carabiner (the Anchor Carabiner) directly to the picket’s sling. This will act as the master point for the anchor. Remove the original carabineer from the picket.



4. Attach a loop of 6mm perlon cord to the rope with a prusik hitch and attach the loop directly to the Anchor Carabiner. Ensure the carabiner gate is up and away from the prusik loop's knot.
5. Push the prusik hitch toward the victim until it is tight on the anchor and ensure the hitch is tight/clean.

## V. Building the Main Anchor

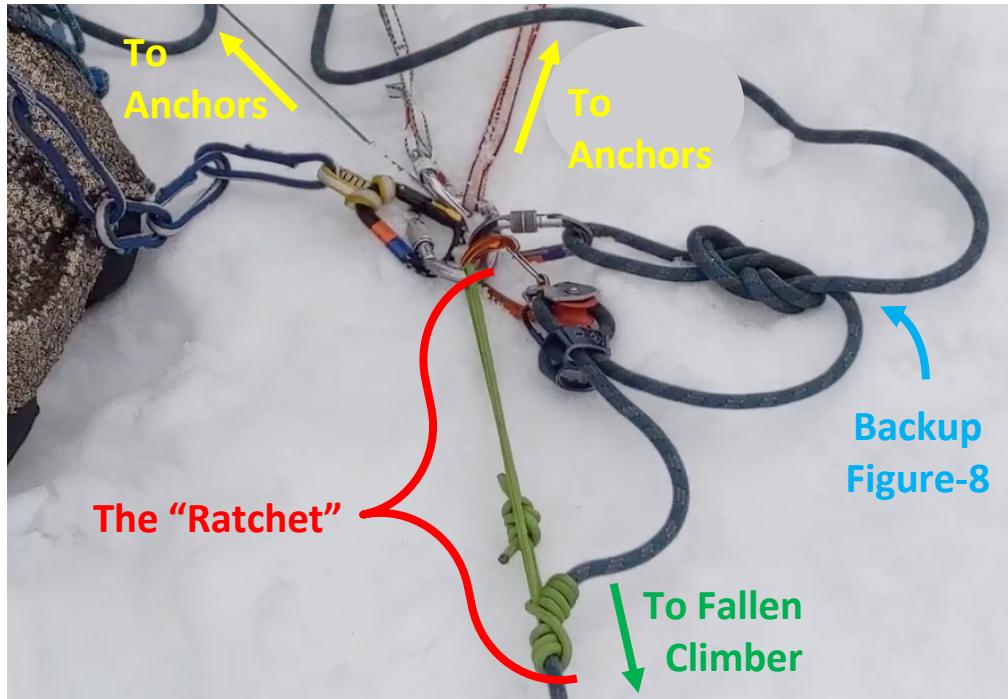
The main anchor must be strong enough to hold the full weight of the fallen climber for long periods of time, with the absolute confidence that it will not fail.



1. Get a picket from the middle person who is still in the self-arrest position.
2. Clip the picket's sling directly into the Anchor Carabiner.
3. Lock the Anchor Carabiner. This carabiner should not be opened after this point.
4. Stretch the picket's sling out across the snow surface to determine roughly where to start building the "deadman" anchor. Ensure the anchor is being built in well-consolidated snow and that there is a proper V-angle between the two anchors.
5. Construct the "deadman" anchor.
6. Once completed, the middle person carefully transfers the fallen climber's weight to the anchor. During this time be prepared to arrest in case of the anchor fails.
7. Once the weight has been transferred both you and the end person clip your personal anchors to the Anchor Carabiner using locking carabiners.
8. Both you and the middle person untie from the rope.

- The middle person removes both prusiks while you only remove your foot prusik.

## VI. Construction of Backup Figure-8 and Ratchet System



- As soon as the middle person creates enough slack in the rope, create a figure-8 knot and attach it with a locking carabiner to the Anchor Carabiner. Ensure the gate is up and that several inches of slack exists between the knot and the prusik hitch holding the fallen climber.
  - There should be enough slack as soon as the middle person unites and removes their prusiks from the rope.
  - Even though this is a backup, it is important to get it tied as soon as possible.
- Build the “Ratchet” by attaching a belay device, rescue pulley, and non-locking carabiner to the rope and the Anchor Carabiner between the prusik and the figure-8 knot. Ensure the gate is up and away from the snow.
- At this point the Anchor Carabiner should have four carabiners attached to it, from:
  - Your personal anchor (locker)
  - Middle person’s personal anchor (locker)
  - Ratchet pulley (non-locker)
  - Figure-8 backup (locker)

## VII. Approaching the Crevasse

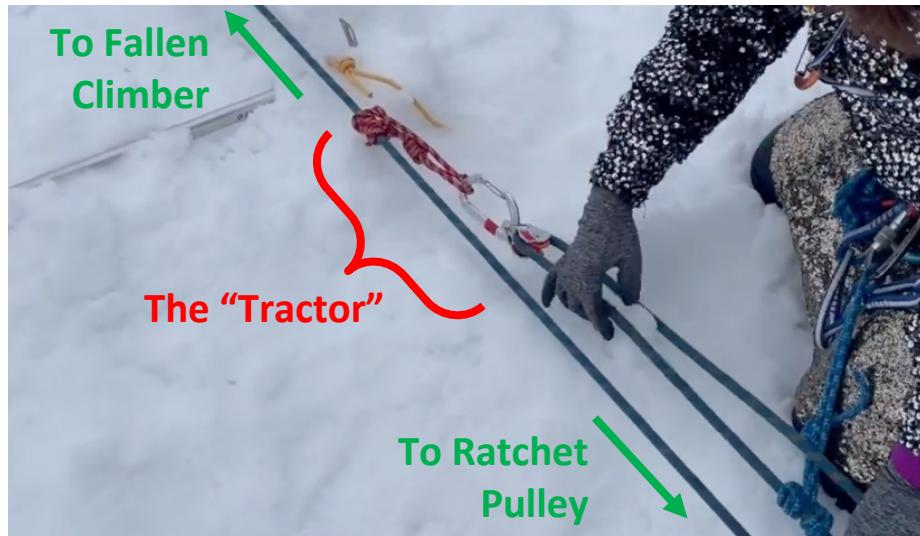
1. Make sure you have a rescue pulley, loop of 6mm perlon, carabiners, slings, and ice axes to take with you to the crevasse lip.
  - With these, all three rescue methods can be implemented.
  - The middle person's gear can be used if needed.
2. Slide your waist prusik all the way to the figure-8 backup. If it was removed previously, re-attach it to the rope.
3. Reflake the rope and tie the end with a rewoven figure-8 directly to the Anchor Carabiner.
  - Tying the figure-8 knot directly to the Anchor Carabiner makes it easier to not mistake it for the backup knot and also saves you a locking carabiner for later use.
  - This closes the system and prevents you from potentially falling off the end of the rope into the crevasse.
  - This is not performed in the crevasse rescue demonstration video.
4. Unclip your personal anchor from the Anchor Carabiner.
5. Self-belay yourself towards the crevasse lip by sliding your waist prusik along the rope. Carefully probe for crevasses with your ice axe as you travel.
6. Try to establish voice contact with the fallen climber to provide reassurance and get information about their condition.
7. Prep the lip of the crevasse by cleaning out the snow around the fallen climber's rope.
  - Let your teammate know that you are going to be kicking snow down and could potentially hit them with it.
  - Sit down and kick the snow into the crevasse. Exercise extreme caution to make sure you do not kick the rope.
  - Continue to excavate the lip using your hands until the rope is completely visible and no longer entrenched in the snow.
8. Place an ice axe directly beneath the rope going to the fallen climber, at a right angle to the rope, and as close as safely possible to the crevasse lip. Make certain that the head of the ice axe is on the downhill side, with the pick implanted in the snow, so neither the rope to the fallen climber nor another rescue rope will slide off the axe when hauling.
9. Anchor the ice axe with a quick anchor to prevent it from falling into the crevasse.
  - This can be as simple as taking the axe's leash, balling it up, and burying it in the snow.

## VIII. Selecting Rescue Method

Evaluate both the fallen climber's condition and the condition of the crevasse lip to select one of the following:

- If they are unresponsive/unable to assist and the rope will not entrench, use the Z-Pulley method.
- If they can contribute to the rescue, i.e. has one good hand, and there is enough extra rope to lower a bight down to them, use the single C-Pulley method, particularly if the rope is badly entrenched in the crevasse lip.
- If many rescuers are available, i.e. another rope team, and the rope will not entrench, use the quick Direct Pull method.

### A. Z-Pulley Method



1. Attach a loop of 6mm perlon cord with a prusik hitch to the fallen climber's rope near the crevasse lip.
2. Attach a pulley between your prusik and the end of the rescue rope. Use a non-locking carabiner to attach it to the perlon loop. This prusik, pulley, and carabiner are collectively called the "tractor."
3. Return to your position near the middle person, sliding your waist prusik as a self-belay.
4. Clip your personal anchor into the Anchor Carabiner and remove your waist prusik.
5. Unclip the backup figure-8 knot from the Anchor Carabiner and untie the knot (the knot that was just unclipped, not the rewoven tail figure-8).

6. Starting from the rewoven figure-8 at the anchor both you and the middle person pull on the loose end of the rope to haul the climber from the crevasse.
  - The ratchet should be self-tending but keep an eye on it to ensure the prusik is not being sucked into the ratchet's pulley.
  - As you haul, the tractor will get closer to the anchor. Do not let the tractor get too close to the ratchet. This would result in a loss of mechanical advantage and necessitating resetting the tractor.
7. Once the tractor gets within a foot of the ratchet, slide the ratchet's prusik down the rope toward the fallen climber and ensure the prusik is set.
8. Gradually release the rope and ensure the ratchet prusik holds the victim's weight.
9. Retie the backup figure-8 backup and reclip it to the Anchor Carabiner.
10. Reattach your waist prusik to the rope between the backup figure-8 and the tractor pulley.
11. Unclip your personal anchor.
12. While self-belaying, reset the tractor by sliding it along the rope towards the crevasse lip.
13. Self-belay back to the anchor.
14. Clip your personal anchor into the Anchor Carabiner and remove your waist prusik.
15. Unclip the backup figure-8 knot from the Anchor Carabiner and untie the knot (the knot that was just unclipped, not the rewoven tail figure-8).
16. Together, resume hauling until the fallen climber is carefully extracted from the crevasse. Continue to reset the tractor as needed.
  - Periodically check on the fallen climber's well-being and once they are close to the crevasse's lip, proceed with caution.
  - Ensure that they do not get sucked into, and potentially crushed by, the crevasse lip.
17. Communicate with the fallen climber about how you can help them get over the crevasse lip. You may need to self-belay and assist them.
18. Continue to haul until they are two body lengths away from the edge of the crevasse to help ensure they do not accidentally slide back in.

## B. C-Pulley

1. Attach a pulley between your prusik and the end of the rescue rope.  
Attach a locking carabiner to it.
2. Lower the pulley and carabiner to the fallen climber. Ensure the rope is over the padded portion of the lip.
3. The fallen climber clips the carabiner to their belay loop.
4. Self-belay back to the anchor.
5. Clip your personal anchor into the Anchor Carabiner and remove your waist prusik.
6. Starting from the rewoven figure-8 at the anchor both you and the middle person haul the fallen climber from the crevasse. Keep the backup figure-8 in while you haul.
7. As hauling occurs you will need to manually capture the progress by pulling the slack created in the fallen climber's originally loaded line through the ratchet prusik.
  - This is easier if an extra rescuer is available.
  - If the fallen climber's line is too entrenched for progress capture, attach an additional loop of 6mm perlon cord with a prusik to the new haul line, i.e. the tail end of the rope. Clip it to the Anchor Carabiner with a locking carabiner and manually capture progress with the prusik.

## C. Direct Pull

1. Self-belay back to the anchor.
2. Clip your personal anchor into the Anchor Carabiner and remove your waist prusik.
3. Have several rescuers haul on the rope below the ratchet until the fall climber is rescued from the crevasse.
  - Note this method offers no mechanical advantage but is a quick and easy option if many rescuers are available.
4. As the hauling continues ensure the ratchet is properly capturing progress.



## **Notes:**

### Rescuers

- Frequently a combination of methods can be used. For instance, the fallen climber can climb or prusik most of the way out of the crevasse, then a C-pulley method can be used to get them over the crevasse lip, often the crux of the rescue.
- With any mechanical advantage system, be especially careful as the fallen climber approaches the lip of the crevasse during hauling. Near the crevasse lip the force of the pull tends to pull the climber in toward the crevasse wall, potentially causing serious injuries. Fatalities have occurred from overzealous hauling.

### Fallen Climber

- During the accident, remember to yell "Falling!" Spread-eagle your body to try to slow or stop your fall.
- When you stop falling, check that your tie-in carabiners are not cross loaded.
- While in the crevasse it will be hard to communicate with your climbing partners. In a real life situation do not waste energy frantically yelling. Stay calm and try not to panic.
- Situate yourself and give your partner a few moments to complete the construction of the anchor before you start trying to prusik up the rope. The action of prusiking bounces you on the rope, and this can be extra difficult for your partner trying to rescue you.
- Clip the climbing rope temporarily to your chest harness. The chest harness will need to be unclipped when you reach the lip of the crevasse otherwise it can be very difficult to get over the crevasse's lip.
- If you are able to prusik up and you've given your partner a few minutes to build the anchor, start climbing up the rope.
- Once you've done a couple of cycles of prusiking, you can clip your pack tether to the rope between your prusiks and tie-in knot and then remove your pack.
- If you are unable to prusik or climb, dress warmly and use your parka hood to keep falling snow out of your clothing.

# Snow II: Glacier Travel and Crevasse Rescue Field Trip

## Required Equipment (*see equipment matrix on page 72*):

- 10 essentials
- Overnight gear
- Ice axe, crampons, slings, prusiks, personal anchor, carabiners, harness, chest harness, helmet, shovel, rescue pulley, and picket

## Objectives:

- Travel on a glacier as a rope team
- Successfully complete a z-pulley rescue from each climber position
- Practice trip planning skills

## Outline:

Saturday

- Hike to camp and set up
- Practice snow anchors
- Practice crevasse rescue
- Practice putting on crampons

Sunday

- Roped glacier travel
- Crevasse identification/probing
- Crevasse Rescue
- Break camp and hike out



# Alpine Ice: Basic Techniques for Travel Field Trip

## Required Reading:

*Freedom of the Hills (9e)*, Ch. 19

## Required Equipment (see equipment matrix on page 72):

- 10 Essentials
- Raingear; gaiters; waterproof boots Sunscreen and snow glasses
- Ice axe with head guard, crampons, helmet, harness, carabiners, slings, prusiks, personal anchor, rappel extension

## Objective:

- Practice travel on alpine ice
- Use ice axe and crampon techniques, under real-world summer and fall conditions
- Practice trip planning skills

## Outline:

1. Glacier talk (features, ice flow, compression zones and icefalls)
2. Walking on ice without crampons (gentle terrain).
3. Step cutting on short, small ice ramps, including diagonal steps and making a turn, and sidesteps for descending.
4. Alpine Ice Talk (brief discussion of the proper conditions to make an ice ascent and a bit of ice climbing history)
5. French Technique (crampons on)
6. Pied (foot positions): Marche, À plat, En canard, and Troisième
7. Piolet (ice axe positions): Canne, Rampe, Ramasse, Poigard, Panne, "Allain," Manche, Appui and Ancre
8. Top roping on short steeper ice, including a brief introduction to climbing with two tools and front-pointing
9. Ice anchors: Chopping a bollard and drilling a V-thread with an ice screw

## Additional Resources:

*Climbing Ice*, Yvon Chouinard

*Alpine Climbing: Techniques to Take You Higher*, Kathy Cosley and Mark Houston

# Final Exam

## Required Review:

Everything that you have read in your courses to this point

## Required Equipment:

- Potluck item
- Soft pencil and eraser
- Knot-tying practice rope
- Gear needed for basic rock climb with steep snow approach

The exam will have a variety of formats and is open book. Material on this exam may cover:

- Equipment
- Avalanche avoidance and rescue
- Navigation
- WFA and wilderness emergency response
- Rock climbing or scrambling
- Snow climbing or scrambling
- Glacier travel (for climbers)
- Miscellaneous topics that have come up but do not fit into any of the above



# Required Equipment Matrix

	A	FIELD TRIPS								CLIMBS	
		A V Y	F U N D	R O C K I	R O C K II	S N O W I	S N O W II	I C E	R O C K	G L A C	
	<b>TECHNICAL EQUIPMENT</b>										
1	Student Gradebook and pen	X	X	X	X	X	X	X	X	X	
2	2 double slings (heavy webbing)		X	X	X	X	X	X	X	X	
3	Personal anchor (sewn nylon)		X	X	X	X	X	X	X	X	
4	Rappel extension (Spectra or Dyneema)		X	X	X	X	X	X	X	X	
5	Colored autoblock/prusik (bright green perlon)		X	X	X	X	X	X	X	X	
6	Climbing harness (w/ belay loop)		X	X	X	X	X	X	X	X	
7	Climbing helmet		X	X	X	X	X	X	X	X	
8	At least 6 matching non-locking carabiners		X	X	X	X	X	X	X	X	
9	At least 4 medium size locking carabiners		X	X	X	X	X	X	X	X	
10	Large pear-shaped locking carabiner (HMS style)		X	X	X	X	X	X	X	X	
11	Locking carabiner with belay loop isolation	O	O	O	O	O	O	O	O	O	
12	Tube-style belay device (must accept 2 rope strands)		X	X	X	X	X	X	X	X	
13	Belay gloves with leather palms		X	X	X				X	O	
14	Foot and waist prusiks (black perlon)		X			X	X	X		X	
15	Chest harness (dark green webbing)		X			X	X	X		X	
16	Chock pick (nut tool)				X				X		
17	Rescue pulley (with side plates)					O	X	X		X	
18	Ice axe					X	X	X	X	X	
19	Steel Crampons (non-rigid)						X	X	X	X	
20	24" Snow picket					X	X	X		X	
21	Shovel	O				X	X	O		O	
22	Avalanche probe	O									
23	Avalanche beacon	O									
	<b>CLOTHING</b>										
1	Wool/synthetic cap or a lightweight balaclava	X	X	X	X	X	X	X	X	X	
2	Sunhat or bandana	X	O	O	O	X	X	X	X	X	
3	Base Layer (no cotton) top and bottom	X	X	O	O	X	X	X	X	X	
4	T Up to three insulating layers	X	X	X	X	X	X	X	X	X	
5	Windbreaker	O	O	O	O	O	O	O	O	O	
6	Hard shell jacket	X	X	X	X	X	X	X	X	X	
7	Pants (wool/synthetic)	X	X	X	X	X	X	X	X	X	
8	Hard shell or rain pants	X	X	X	X	X	X	X	X	X	
9	Gaiters (long preferred)	X	X	O	O	X	X	X	X	X	
10	Socks (1-2 pair)	X	X	X	X	X	X	X	X	X	
11	Climbing boots	X	X	X	X	X	X	X	X	X	
12	Rock shoes			O	O				O		
13	Mitts or gloves	X	X	X	X	X	X	X	X	X	
14	Mitts or gloves extra pair	X	X			X	X	X		X	
15	Lightweight liner gloves	X	O	O	O	X	X	X	X	X	

C	OTHER EQUIPMENT	FIELD TRIPS							CLIMBS	
		A V Y	F U N D	R O C K	R O C K II	S N O W I	S N O W II	I C E	R O C K	G L A C
1	Day pack, frameless, or summit pack*	X	X	X	X	X		X	X	
2	Overnight pack*	O	X			X	X		**	**
3	<b>T</b> Sunglasses (with side screens on snow)	X	X	X	X	X	X	X	X	X
4	<b>T</b> Sunscreen	X	X	X	X	X	X	X	X	X
5	<b>T</b> Lip balm with sunscreen	X	X	X	X	X	X	X	X	X
6	<b>T</b> Water bottle(s)	X	X	X	X	X	X	X	X	X
7	Compass	O	O	O	O	O	O	O	O	O
8	<b>T</b> Map	X	X	X	X	X	X	X	X	X
9	<b>T</b> Cell Phone or GPS with Downloaded Route	X	X	X	X	X	X	X	X	X
10	Sleeping bag (down/synthetic)		X		X	X	X		**	**
11	Insulating pad for sleeping		X		X	X	X		**	**
12	Tent (can be shared)		X		X	X	X		**	**
13	<b>T</b> Emergency shelter (tube-tent, plastic bag, radiant barrier)	X	X	X	X	X	X	X	X	X
14	Toiletries	O	X	O	X	X	X	O	X	X
15	<b>T</b> First aid supplies	X	X	X	X	X	X	X	X	X
16	<b>T</b> Knife	X	X	X	X	X	X	X	X	X
17	<b>T</b> Head lamp (extra batteries)	X	X	X	X	X	X	X	X	X
18	<b>T</b> Fire starter	X	X	X	X	X	X	X	X	X
19	<b>T</b> Food	X	X	X	X	X	X	X	X	X
20	Extra food	X	X	X	X	X	X	X	X	X
21	<b>T</b> Extra clothing	X	X	X	X	X	X	X	X	X
22	Stove/fuel (share)		X		X	X	X		**	**
23	Pot (share)		X		X	X	X		**	**
24	Bowl/cup		X		X	X	X		**	**
25	Spoon		X		X	X	X		**	**
26	Insulating pad for sitting	O	O	O	O	O	O	O	O	O
27	Water purification method	O	X		O	O	O	O	X	X
28	Altimeter	O	O			O	O	O	O	O
29	Snowshoes and poles	X				O	O	O		
30	"Blue bag"	X				X	X	X	X	X
31	Food Storage					X	X		**	**

**X = Required**

**O = Optional**

**T = 10 Essentials**

***Italics = Supplied by Course***

\* One internal frame pack with overnight capacity that can be compressed for day climbs may be used instead of two separate packs.

\*\* Overnight gear is required on certain rock and alpine climbs and scrambles.

**Note:** All personal gear should be marked with the owner's name or initials in a prominent place. This helps with identification in the event of loss or theft, or when gear becomes intermingled with that of others.

Carabiners and similar articles should be marked with paint, enamel nail polish or auto tape in a distinctive color or pattern. Clothing should also be marked. If you lose something on a field trip or climb, contact the trip leader to see if it was turned in.

