2020 Basic Mountaineering Course Student Manual

Table of Contents

2020 Course Schedule

Date	Type	Title	Location
Jan. 21	Lecture	BMC Intro	Backcountry Essentials
Feb. 4	Lecture	BMC Equipment	Backcountry Essentials
Feb. 8-9	Lecture	Wilderness First Aid	The Firs
Feb. 19-20	Lecture/Field	Navigation Group A*	SAR
Feb. 25	Lecture	Avalanche Awareness	Backcountry Essentials
Feb. 29	Field Trip	Avalanche Awareness	Austin Pass
March 18-19	Lecture/Field	Navigation Group B*	SAR
March 24	Evaluation	Knots Evaluation	YMCA
March 28-29	Field Trip	FUNdamentals	Pine & Cedar
April 2	Practice	Belay Practice	YMCA
April 7	Lecture	Rock I	YMCA
April 11	Field Trip	Rock I	Mt. Erie, Anacortes
April 16	Practice	Optional Outdoor Practice	Larrabee State Park
April 21	Lecture	Rock II	Backcountry Essentials
April 25-26	Field Trip	Rock II	Skaha Bluffs, Penticton, BC
May 5	Lecture	Snow I	Backcountry Essentials
May 9	Field Trip	Snow I	Austin Pass
May 12	Lecture	Mountain Weather	Backcountry Essentials
May 28	Practice	Crevasse Rescue Evaluation	Bloedel Donovan Park
May 30-31	Field Trip	Crevasse Rescue	Mt. Baker
June 2	Lecture	Glaciers	Backcountry Essentials
June 13	Field Trip	Alpine Ice Group A*	Mt. Baker
June 14	Field Trip	Alpine Ice Group B*	Mt. Baker
July 11-12	Field Trip	Designated Climb Weekend	TBD
July 21	Exam	Final Exam	Cornwall Park
Sept. 30		Graduation Applications Due	
Oct. 13		Fall Rendezvous	TBD

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

Lectures begin at 7 p.m. except in special cases.

Backcountry Essentials: 214 W. Holly St., Bellingham
The Firs: 4605 Cable St., Bellingham
SAR: Whatcom Search & Rescue, corner of Northwest Ave. and Smith Road, 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.
- Are 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 leaders of climbs. 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***, most recent edition, written and published by The Mountaineers. You must read the required chapters before each lecture.

Lectures are planned to 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.

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. This will guarantee developing your climbing skills as quickly as possible.
- 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.
- Do not bring family, friends or pets to the field trips.
- 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

Missed lectures and field trips are nearly impossible to make up. Because attendance at lectures and field trips is essential for continuation in the course and for graduation, students must plan accordingly. It is your responsibility to be present at all activities. Contact the Basic Course Coordinator early if you think you may miss an activity.

If you are unable to make up a field trip, you won't be able to participate in club climbs or graduate from the course.

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 Protecting Public Lands 101 course offered at mountaineers.org/courses.

To receive credit, email bkbduffy@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 of 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.
- Complete a Wilderness First Aid (or equivalent) training class.
- Participate in an approved environmental stewardship activity such as trail maintenance, meadow restoration, salmon stream restoration, beach cleanup, road maintenance, etc.
- 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.

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. 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.
4. 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.
5. 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.

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 Climbing Code**:

- A climbing party of three is the minimum, unless adequate prearranged support is available. On crevassed glaciers, a minimum of two rope teams is recommended.
- Rope up on all exposed places and for all glacier travel when appropriate. 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 deciding whether to turn back.
- Carry the necessary clothing, food and equipment at all times.
- Leave the trip itinerary 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 reflects favorably upon mountaineering and The Mountaineers with minimum impact to the environment.

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.

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). The website also has references and other useful information for specific climbs.

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.), maps and knowledgeable persons to determine what climbs or scrambles are within your capabilities. Talking to the leader before signing up is encouraged.

Branch Climbs Policy

After completion of the Basic Mountaineering Course, graduates are welcome to return for participation in field trips, as long as the two conditions are met:

1. The individual graduated from the BMC within two years of the current course. Individuals who have not participated in longer than two years will be evaluated on a case-by-case basis.
2. There is space available. Current course students get priority on all climbs.

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.

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 on first page).
2. Climbing Committee Chair
3. Branch Chair

Photocopy this page so you have copies to fill out for all your Mountaineers climbs.

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. These hikes will get you started and can be done in almost all seasons and any weather. See Ken Wilcox's *Hiking Whatcom County* (Northwest Wild Books, 2003) for details:
    - **Pine and Cedar Lakes**, 4-6 mi. RT, 1,300-1,600 ft gain, 2-3 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.
- 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

All members of The Mountaineers, in order to attain the Club's purposes ... "to explore, study, preserve and enjoy the natural beauty of Northwest America" ... in spirit of good fellowship shall subscribe to the following:

- Exercise personal responsibility and to conduct themselves on Club activities and premises in a manner that will not impair the safety of the party or prevent the collective participation and enjoyment of others.
- Respect private property.
- Enter the outdoors as visitor, leaving behind no debris, environmental scars or other indications of their visit which reduce the enjoyment of those who follow.
- Minimize the environmental impact on the outdoors by using campfires only in properly designated areas and extinguishing completely after use; preventing sources of pollution (e.g., human waste) from reaching watercourses; and carrying out all garbage.
- The use of alcohol and other recreational drugs is incompatible with Mountaineer activities because of their effects on ability and judgment; their use is prohibited when such use would affect the safety of the party or impair the collective participation and enjoyment of others.
- Pets, firearms or any other items which will impair the safety or enjoyment of others shall not be brought on Mountaineer premises or taken on club activities.
- Obey those specific regulations imposed by the Board of Trustees, Branches and Divisions of The Mountaineers, which are necessary to implement the above.

Those Mountaineer members who deviate from this philosophy and from the specific Club regulations may be subject to the disciplinary procedures of the Club, including expulsion.

Resources

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

Route and Trail Information

- **Mountaineers Reference Pages:** mountaineers.org/activities/activity-overviews/climbing
- **Washington Trails Association:** wta.org
- **Climber's Discussion Forums:** cascadeclimbers.com, mountainproject.com

Avalanche/Mountain Weather Forecast: 206-526-6677

- **Cascades and Olympics:** nwac.us
- **British Columbia:** avalanche.ca

Weather

- **Cascades and Olympics:** www.wrh.noaa.gov/sew/forecast03.php
- **Cascades and Olympics:** wowweather.com
- **British Columbia:** weather.gc.ca/forecast/canada/index_e.html?id=BC

Washington Highway Pass Info

- 888-766-4636
- wsdot.wa.gov/traffic

North Cascades NP, Ross Lake NRA, Lake Chelan NRA

- **Marblemount:** 360-854-7245
- 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

Washington State Parks

- **Region 2 Office:** 220 N Walnut, Burlington; 360-755-9231
- parks.wa.gov

Washington Department of Natural Resources: 800-527-3305

- **Northwest Region:** 919 North Township, Sedro Woolley; 360-901-1000
- 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
4. Overview of field trips and lectures

Additional Resources:

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

lnt.org

Environmental Concerns and Guidelines

As climbers and backcountry travelers, we need to understand our affect 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 not 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:

1. In popular places, concentrate use and impact.
2. In pristine places, disperse use and impact.
3. Stay off places that are lightly impacted or just beginning to show effects.
4. Minimize noise and visual intrusion.
5. Pack out everything you brought with you.
6. Properly dispose of anything that cannot be packed out.
7. Leave things as they were or in better condition.

Please refer to *Leave No Trace: Outdoor Skills & Ethics* Pacific Northwest volume by the National Outdoor Leadership School.

Wilderness First Aid (WFA)

Required Equipment:
Books and supplemental written materials will be provided on the first day of class.
Also bring:

- Day pack, with whatever 10 Essential Systems you have already
- Ice axe and/or ski poles; and a sit pad/sleeping pad, if you own them
- Clothing for cold and wet weather
- Lunch and water (see below)

This class is a mix of lecture/discussion and practices/scenarios.

Objectives:

- Primary and secondary survey
- Soft tissue injury treatment
- Muscle, bone and joint injury treatment and prevention
- Treatment and prevention of heat- and cold-related injuries
- Individual conditioning
- High altitude illness treatment and prevention
- 10 essential systems and improvisation of first aid supplies
- Backcountry first aid kits
- Backcountry hydration and nutrition
- Small party accident response, evacuation considerations, and when to go for help

Successful completion of the course will earn each student a Wilderness First Aid Card, which will be current for three years.

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 Essential Systems
2. Non-Technical Equipment
3. Technical Equipment
4. Lightweight Philosophy
5. Buying vs. Renting vs. Borrowing

Introduction:
Each person is responsible for providing his or her own equipment. If you have an outdoor background, you probably already own many of the necessary hiking and backpacking related 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 may be rented or shared (e.g., tents and stoves) rather than purchased.

The required equipment varies with the type and duration of the trip. The **Required Equipment Matrix** (pages 58-59) 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, by Craig Connelly © 2005 by Ragged Mountain Press/McGraw- Hill (Ch. 17 and 18)

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

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

10 Essential Systems

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's hike. This way each person will have access to necessary items if he/she is separated from the rest of the party. 10 essential systems items in someone else's pack will be of no use to the separated member.

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.

You *will* need the following equipment:

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

You are provided with the following:

- Foot prusik (13'5" black perlon)
- Waist prusik (6'6" black perlon)
- 2x prusik loops (4'0" green/yellow perlon)
- Autoblock loop (5'5" red/yellow perlon)
- Chest harness (9'6" silver tubular webbing, 1")
- 4x single slings (5'6" navy blue tubular webbing, 1")
- 2x double slings (9'0" forest green 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, such as a backpack, tent, sleeping bag, stove, cook pot, water purifications system, sit pad, comfort clothing, 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 30-35% for men and 25-30% for women. That means that a 160 lb. man can haul a pack of about 50 lb., and a 135 lb. woman can haul 40 lb. Of course, 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. Also, crossing glaciers or avalanche terrain as quickly as possible helps minimize dangers associated with snow instability.
2. The weight of the stuff you wear and carry on a trip matters: more weight means greater fatigue, diminished balance, lower strength to weight ratio, and possibly a longer time to get there and back. Fatigue, diminished balance and taking a long time increase the risk of accidents. But leaving a safety-related item behind to reduce weight also creates risks. So 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 needn'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. No one wishes to be the slowest member of the group.

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.

Non-Technical Equipment	Minimum Weight	Maximum Weight
Pack	3	8
Tent (2-person)	5.5	9.5
Pad	1	2
Sleeping bag	1	3.5
Clothing (raingear, etc.)	3.5	6.0
Comforts (camp shoes, etc.)	0	2
Cooking kit (stove, pot(s), etc.)	2	6
Subtotal	**16**	**37**
Technical Gear		
Belay device	0.2	0.3
Crampons	1.0	2.3
Harness	0.6	1.7
Helmet	0.6	1.4
Ice axe	0.9	2.3
Carabiners	1.0	2.0
Rescue pulley	0.2	0.5
Prusik cords/slings	3.0	3.5
Rope	3.0	8.0
Subtotal	**11.5**	**23.0**
TOTAL	**27.5**	**60.0**

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 of your technical gear.

Buying vs. Renting vs. Borrowing

Note: Do not purchase equipment until after the equipment lecture. Special discount packages are sometimes offered by several suppliers, and these are announced at the equipment lecture.

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

- Belay device
- Carabiners
- Compass
- Harness
- Helmet
- Slings for personal anchor and rappel extension
- Pulley

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

- Shovel
- Avalanche beacon
- Avalanche probe
- Rock shoes
- Plastic boots
- Crampons
- Ice axe
- Picket

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? Is the gear heavier than I'll want making the fact that it holds up less valuable?
- Does this gear fit me really well?

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 pages 58-59 before each field trip.

Avalanche	Knots Evaluation	Navigation	Fundamentals	Rock I	Snow I
Warm clothing	Harness	Compass	Overnight pack	Chock pick	Ice axe
Gaiters	Webbing, cord, prusiks, rappel extension		Helmet	Mountaineering boots	Pulleys
Goggles/ glasses	Belay device		Sleeping bag, pad, tent, stove		Pickett
Thermos	Personal anchor		Belay gloves		
Warm boots	Carabiners		Water purification/ storage		

Equipment Resources

Local Shops: *Shop Bellingham first!*

Backcountry Essentials
214 W. Holly, Bellingham
360-543-5678

American Alpine Institute
1513-A 12th St., Bellingham
360-671-1505

REI
400 36th St., Bellingham
360-647-8955

Sierra
4313 Meridian St., Bellingham
360-527-0636

Shopping in Surrounding Cities

Ascent Outdoors
5209 Ballard Ave. NW, Seattle
206-545-8810

Valhalla Pure Outfitters
88 W Broadway, Vancouver
604-872-8872

Pro Mountain Sports
5625 University Way, Seattle
206-522-1627

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

Mountain Equipment Co-op
130 West Broadway, Vancouver
604-872-7858

Wonderland Gear Exchange
7750 15th Ave. NW, Seattle
206-582-1987

Online Shopping

amazon.com
backcountry.com
backcountrygear.com
campsaver.com
eddiebauer.com (First Ascent)
froogle.com

gearx.com
mountaingear.com
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

Avalanche Awareness Lecture

Required Reading:
Avalanche Essentials, Bruce Tremper
Freedom of the Hills (9e), Chapter 17

Pre-Lecture Assignment:
Online quiz

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 (www.nwac.us)
Avalanche Canada (www.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 pages 58-59):*

- Clothing for winter travel
- Snowshoes or backcountry skis (with skins)
- Shovel/beacon/probe*
- Daypack
- Food/water
- 10 Essential Systems

* 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.**

Navigation Lecture/Field

Required Reading:
Freedom of the Hills (9e), Chapters 5-6

Required Equipment:
- Compass with base plate and adjustable declination; recommend compass with inclinometer and mirror
- Soft pencil and eraser
- Footgear suitable for wet/marshy grass
- Clothing for outdoor activity in any weather
- Headlamp
- Clipboard (optional, but handy)

Objectives:
- Reading map
- Topo features
- Longitude, latitude and UTM
- Declination
- Compass use
- Other navigation tools (altimeter and GPS)

Navigation Lecture/Practice I Outline:
1. Lecture
2. Flat field bearing-taking exercise

Navigation Lecture/Practice II Outline:
1. Lecture
2. Flat field flag-to-flag navigation exercise

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
- **Mule Hitch:** Used by belayer to "tie off" a fallen leader so belayer's hands are free

Web knot-tying reference: ***Animated Knots by Grog***, animatedknots.com

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

Objectives:

- Demonstrate proficiency of the knots and hitches used in climbing

Outline:

1. Demonstrations: Knots in use and belay escape
2. Knot and hitch, and technique stations

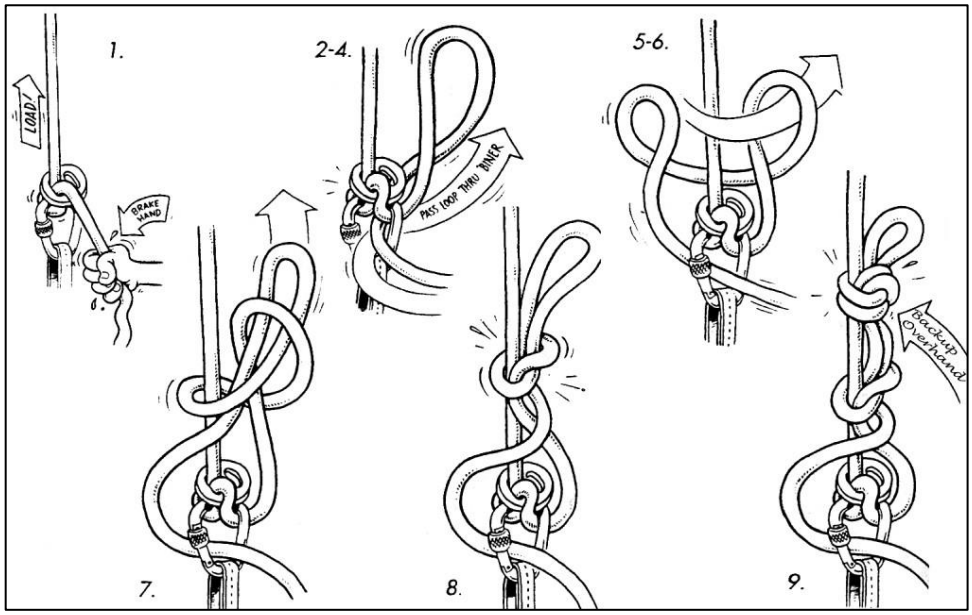
Mule Knot with an Overhand Backup

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

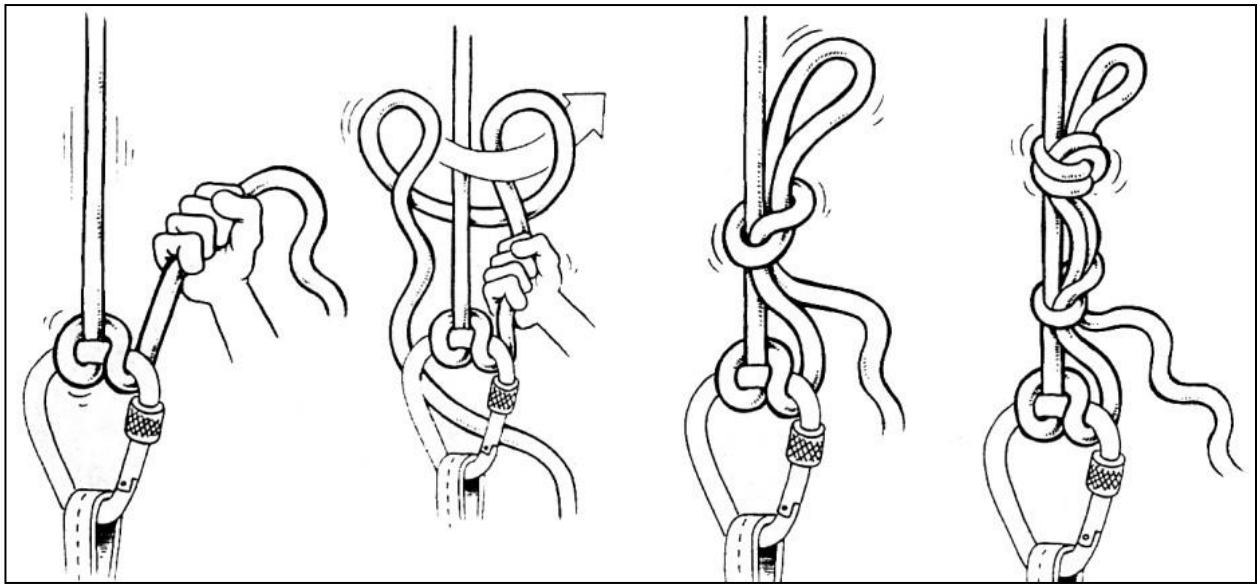
To form a Mule knot in conjunction with a belay device:



1. From the belayer's perspective, lock the belay device with your brake hand (for this example, assume the brake hand is your right 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



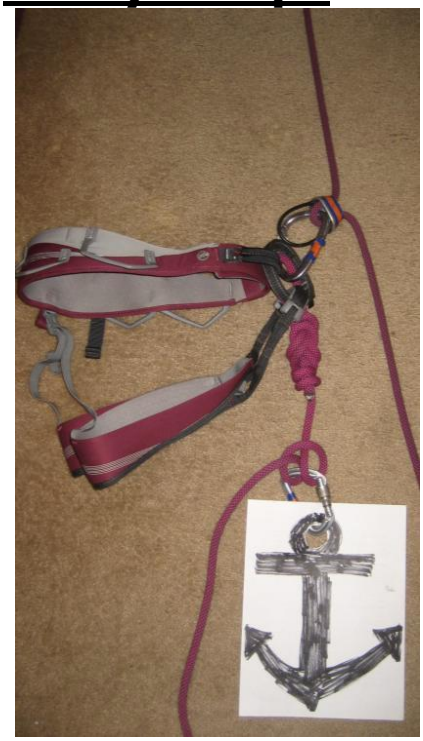
This combination can be used to tie off a loaded rope. It can also be used in place of a Mariner knot when using a cordelette.

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).

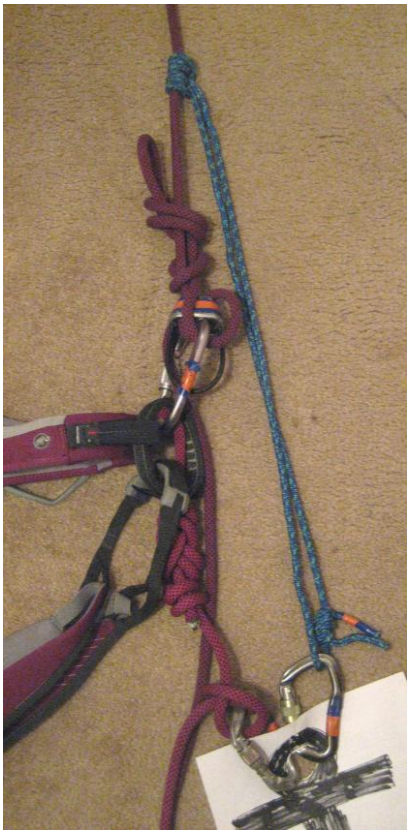
When using the Münter Mule combination, do not pass the rope through the locking carabiner before tying the Mule knot.

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 locking carabiners
- Autoblock loop
- Double-length nylon sling
- Belay/rappel device
- 120cm Dyneema sewn sling

Rappel Setup:

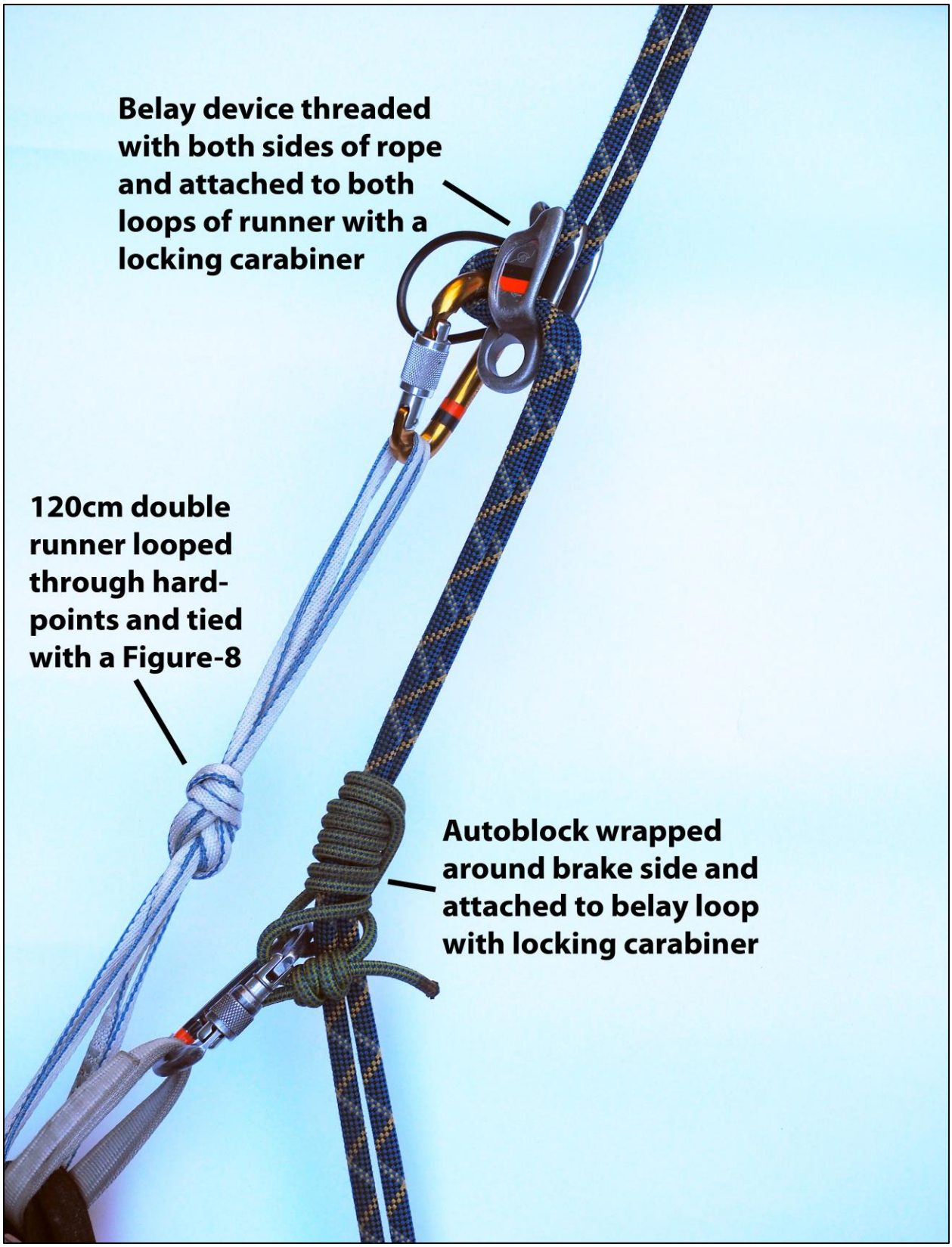
1. Your double-length nylon sling (personal anchor) will remain clipped into the anchor until the following steps are 100% completed and you are ready to rappel.
2. Loop the 120cm Dyneema sling through the hard points of your harness. Clip both ends with a locking carabiner and your belay device.
3. 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 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 your system by removing all the slack in the rope and getting your belay device near the anchor. Weight this system and check that everything remains in place. Does your autoblock hold tension on the rope?
9. Are your carabiners locked?
10. Once you are certain your system is complete, yell, "On rappel!"
11. Unclip your personal anchor from the anchor and begin to lower.

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 pages 58-59)*:

- 10 Essential Systems
- Overnight gear
- Carabiners, prusiks, slings, personal anchor, belay device, helmet, chest harness, belay gloves, harness, rappel extension

Objectives:

- Practice climbing techniques
- 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. Rotate through stations
3. Belaying with a belay device
4. Hip belay
5. Münter belay
6. Rappelling
7. Belay escape
8. Never-ending prusik with a pack
9. Knot check and rope coiling

Sunday

1. Navigation course

Field Trip Tips:

- Bring a large Ziploc bag for your map so it doesn't get wet and so that it is visible and accessible.
- Make sure you're comfortable reading topo maps and using your compass before this trip! If you struggled in the Navigation Lecture/Field find a way to refine your skills before Sunday.

Belay Techniques Practice

Required Equipment:

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

Outline:

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

Rock I: Anchors, Belays and Rappels Lecture and Evaluation

Required Reading:
Freedom of the Hills (9e), Chapters 9-11

Pre-Lecture Assignment:
Online quiz

Slide show and videos should be viewed prior to this evening. These will help with the quiz.

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

Objectives:
- Learning the components of roped climbing
- Belaying, Rappelling, Anchors

Outline:
1. Lecture
2. Stations
    - Belay escape and tying into an anchor
    - Rappel with belay device using autoblock and leg wrap
    - Dulfersitz Rappel
    - Munter Rappel
    - Rope coil and throw using commands
    - Anchor building
    - Top rope cleaning

Additional Resources:

How to Rock Climb, by John Long Fourth edition © 1998 by Falcon Press

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

Ropes, Anchors and ERNEST

Ropes are a classic symbol of climbing. They are pieces of equipment that set climbers apart from hikers or scramblers. Ropes are important components for both belaying and rappelling. In both cases, safely anchoring the rope in is an absolute necessity.

A few years ago, the American Mountain Guides Association (AMGA) adopted a mnemonic to help guides engineer safe anchors. The mnemonic was SERENE and is described in *Mountaineering: Freedom of the Hills*, among other sources.

Lately, the AMGA has updated its standard and created a new mnemonic for guides and climbers to use. The new guideline for creating a safe anchor is based on the word ERNEST. Let's see how it works:

A safe anchor should be **EQUALIZED**, so that any load can be shared proportionately by all components. Keep in mind that some parts of the anchor and the belay chain may be stronger or weaker than others. Weaker components should have less force applied to them or be backed up.

If any part of the anchor fails, the entire anchor must not fail. Therefore, any part that may fail needs to be backed up. Anchors must be **REDUNDANT**.

If a part of the anchor does fail, shock loading may have a disastrous effect on the rest of the anchor. If you consider **NO EXTENSION** as a part of your anchor design, the failure of one component should have less effect on the rest of the anchor.

A good anchor is **STRONG**. It has a strength greater than any other part of the belay chain. It is carefully selected, designed and constructed.

You can take all of these to extremes: You can equalize with a backup and then add another backup for more strength and redundancy. You may add sling material to reduce the possibility of extension and shock loading. But how much time do you have for a given pitch or climb? How much equipment are you willing to carry for anchors? Would the consequences of an unchecked fall be disastrous or inconvenient? Your judgment must take these concepts into account to create an anchor that is **TIMELY**.

As you climb, you will develop judgment. Your partners all hope that it will be good judgment. That judgment will assist you as you create anchors that are equalized enough, redundant enough, have little enough extension, are strong enough and are timely, given your situation.

Watch your instructors and leaders as they place anchors. Analyze the anchors. Look closely at each component. Observe how the anchor is aimed. Notice how much or how little time is needed to set up certain anchors. Ask questions about the anchors. Take every opportunity to learn about anchors as you learn about being a safer climber.

Rock I: Anchors, Belays, Rappels and Basic Rock Climbing Field Trip

Required Equipment *(see equipment matrix on pages 58-59):*

- 10 Essential Systems
- 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)
    - Clean top rope anchor
    - Munter 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 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).

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:
Online quiz

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

Outline:
1. Lecture
   - Yosemite Decimal System
   - Types of climbing
   - Climbing ethics
   - Equipment and gear
   - How to be a follower
2. Demonstration
3. Review quiz
4. Slideshow of basic rock climbs
5. Basic climbing skills (Movie: *Moving Over Stone*)

Climber Roles and Responsibilities

	Follower	Leader
1	Flake out rope (leader's end on top of flaked pile). Tie rope to harness and to anchor with clove hitch. Double check leader's harness and tie-in.	Build anchor. Tie in to climbing rope. Double-check belay anchor. Double-check belayer's harness and tie-in.
2	Set up belay. While belaying leader: • Pays close attention to leader • Keeps sufficient slack in rope to prevent leader from being pulled from stance • Feeds more slack when leader is clipping a piece of pro • Takes back in the excess slack when leader has finished clipping the piece of pro	Climb pitch, setting pro as needed.
3		Finish pitch. Build anchor and tie in to anchor with climbing rope. Calls "off belay" to follower. Pull up slack rope.
4	Take leader off belay. Put sling over shoulders to hold pro as it is removed when following. Tend any rope that is being pulled up by leader.	
5		Put follower on belay.
6	Break down anchor and stow pieces on shoulder sling and/or harness. Follows the pitch: • Removes pro while climbing • Pulls pro first, while keeping it attached to sling and rope • Removes the pro from the sling and rack it • Removes the sling and carabiner from the rope and rack it • Continues until reaching the belay anchor	Flake rope in a pile as it is brought up.
7	Anchor in to the belay anchor. (Use personal anchor and tie-in using the climbing rope with a clove hitch.)	Take follower off belay.
8	Transfer to the leader all pro that was removed on the previous pitch. Pieces should be transferred with care!	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.	Remove personal anchor and rope tie-in to belay anchor, and lead the next pitch.

Rock II: Climbing Technique Field Trip

Required Equipment *(see equipment matrix on pages 58-59):*

- 10 Essential Systems
- Prusiks, slings, personal anchor, carabiners, belay device, helmet, belay gloves, chock pick, climbing harness, rappel extension, chest harness 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 Munter
6. Belay a leader, follow and clean
7. Multipitch climbing
8. Belay escape
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:
Online quiz

Suggested Equipment:
Ice axe

Objective:
Safe snow travel

Additional Resources:

Alan and Mike¹s Really Cool Backcountry Ski Book, Alan O'Bannon and Mike Clelland. Note: funny book with good tips on winter camping and building snow shelters; hilarious illustrations!

Outline:

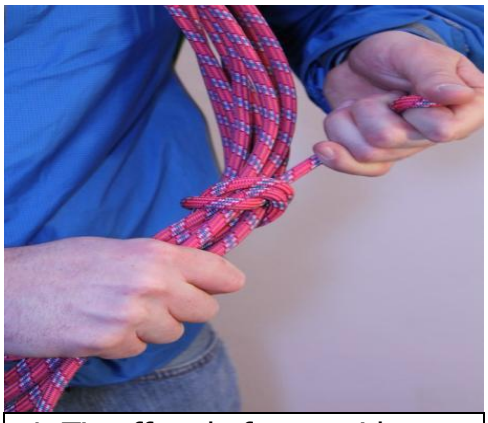
1. Snow gear
    - Ice axe, leash options, boots and gaiters, crampons, slings and carabiners, shovel, wands, clothing, sit pad, snow protection
2. Snow and winter camping
    - Shelters – tents, igloos and caves
    - Melting snow
    - Staying warm
    - Ethics
3. Snow travel techniques
    - Self-belay
    - Step kicking
    - Moving in balance
    - Ascending (rest step)
    - Descending (plunge stepping, glissade, side stepping)
    - 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

1. Attach to the rope at the predetermined distance from center person with a figure-8 on a bite and a locking carabiner.

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

3. Continue coiling until you reach the end of the rope.



4. Tie off end of rope with a double overhand around all the coils.

5. Complete!

Snow I: Snow Travel and Ice Axe Use Field Trip

Required Equipment *(see equipment matrix on pages 58-59):*

- 10 Essential Systems
- Overnight gear
- Raingear; gaiters; waterproof boots Sunscreen and snow glasses
- Snowshoes with poles
- Ice axe, crampons, helmet, harness, slings, carabiners, personal anchor, prusiks, chest harness, picket, belay device, shovel, rappel extension

Objectives:

- Hike to self-arrest practice area. Practice all styles of arrest, simulate falling with crampons and glissade.
- Hike to Austin Pass and set up camp.
- Observe individual camps and discuss snow camping.
- 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.
- Z-Pulley and C-Pulley demonstration.
- Simulate glacier travel-wand use, end runs, running belays and group arrest.
- Pack up camp and retreat.

Field Trip Tips:

- Don't forget your sit pad! You'll want a foam piece to sit/stand on.
- Consider checking in with your gear group to see what kinds of stoves others have. It's helpful to have the same type of stove as others. In case of problems you'll have the ability to use others fuel or spare parts.
- 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.

Mountain Weather Lecture

Required Reading:
Freedom of the Hills (9e), Chapter 28

Objectives:
- 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, by Jeff Renner, 2005, The Mountaineers Books

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

Crevasse Rescue Techniques Practice

Required Reading:
Freedom of the Hills (9e), Chapters 16 and 18

Required Equipment:
- Boots and crampons must be brought to this practice.
- Climbing harness, ice axe, carabiners, slings, prusiks, cordelette, personal anchor, rescue pulley, belay device
- Headlamp

Be prepared for wet/marshy ground.

Outline:
1. Z-pulley setup and practice
2. C-pulley setup and practice (time allowing)

Additional Resources:

The Illustrated Guide to Glacier Travel and Crevasse Rescue, by Andy Tyson and Mike Clelland, 1st edition (2000), Climbing Magazine

Crevasse Rescue Step-by-Step Instructions

This describes how a well-equipped rope team of three climbers performs a rescue of an end person's fall into a crevasse. An end person fall is the most likely scenario.

Victim Yells "FALLING!"

First Response

- Rope team drops into self-arrest positions.
- Rope team shouts for help from other climbers in the area. Extra help quickens the rescue. These instructions assume no other help is available.
- End person and middle person communicate about what happened and next few steps.

Initial Anchor Installation

End Person and Middle Person: Transfer Victim's Weight

- Middle person adjusts to safest and most comfortable arrest position.
- End person gradually releases self-arrest, transferring victim's load to middle person and maintains readiness to drop back into self-arrest. Holding the victim's weight usually is not difficult for the middle person due to rope entrenchment into the side of the crevasse.
- End person slides waist prusik (from Texas prusik system) to self-belay while carefully approaching middle person. End person also probes route for crevasses with ice axe and is ready to self-arrest, should middle person need help.

End Person: Install Initial Anchor

- Select a spot for the initial anchor in well-consolidated snow and/or work harden it, next to the rope and close to the middle person's feet, allowing enough room for proper anchor building.
- Properly place a vertical picket to build your initial anchor.
- Use a **non-locking** carabiner to attach the sling extending from the initial anchor to two doubled loops of 6mm cord. This is your Master Loop.
- Attach a loop of 6mm perlon cord to the rope with a prusik hitch, then attach that loop to the Master Loop with a **locking** carabiner, keeping the gate up and away from the tie-off loop.
- Slide the prusik down the rope toward the victim to take slack out of the anchor.

Main Anchor Installation

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

End Person: Determine Type and Location of Main Anchor

- Get pre-slung picket from the middle person.
- In well consolidated snow, construct a V-angle anchor using a proper "deadman"

and clip it to the Master Loop with a **non-locking** carabiner with the gate up. To construct the deadman, premeasure your distance to the Master Loop by stretching the deadman's double sling across the surface of the snow toward the spot where the main anchor will be placed.
- Clip your personal anchor to the Master Loop using a **locking** carabiner.

Middle Person: (Aha! Finally!) Transfer the Victim's Weight to the Anchor
- Carefully ease out of self-arrest position, transferring the victim's weight to the anchor.
- Clip your personal anchor to the Master Loop using a **locking** carabiner, then untie from the climbing rope.

End Person: Construct Backup Figure-8 and Ratchet
- As soon as the middle person creates slack in the rope above the anchor, temporarily attach a figure-8 knot to the Master Loop with a gate up **locking** carabiner. This provides a temporary, but secure, backup should the prusik fail.
- Clip a belay device, rescue pulley and a **non-locking** carabiner to the rope, between the prusik and the figure-8 knot, and attach it to the Master Loop with the gate up. The prusik, belay device, rescue pulley and carabiner are collectively called the "ratchet."
- The Master Loop should now have seven carabiners attached to it, from:
    - Initial vertical anchor (non-locker)
    - Main deadman anchor (non-locker)
    - Your personal anchor (locker)
    - Middle person's personal anchor (locker)
    - Ratchet tie-off prusik (locker)
    - Ratchet pulley (non-locker)
    - Figure-8 backup (locker)

Perform Rescue

End Person: Approach Crevasse Lip and Pad Lip with Ice Axe
- Make sure you have a rescue pulley, tie-off loop, carabiners, slings and ice axes to take to the crevasse lip. With these, all three rescue methods can be implemented.
- Pull the slack created when middle person untied from rope through their waist prusik, all the way to the figure-8 backup.
- Unclip your personal anchor from the Master Loop.
- Cautiously approach the crevasse lip, probing with your ice axe and sliding the prusik along the rope as a self-belay.
- Try to establish voice contact with the victim in the crevasse to provide reassurance and to gain information about their condition.
- Place an ice axe directly beneath the rope going to the victim, 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, so that

neither the rope to the victim or another rescue rope will slide off the axe during the haul.
- Anchor the ice axe to prevent it from falling into the crevasse.

End Person: Select Rescue Method to Employ

- Evaluate both the victim's condition and the condition of the crevasse lip to select one of the three following options.
  1. If the victim is unresponsive or unable to assist, or the rope will not entrench, use the Z-Pulley.
  2. If the victim is able to contribute to the rescue, has one good hand and there is enough extra rope to lower a bight, use the Single (C) Pulley Method, particularly if the rope is badly entrenched in the crevasse lip.
  3. If many rescuers are available and the rope will not entrench, use the quick Indirect Pull.

End Person: Employ Rescue with Help from Middle Person and Any Other Rescuers
Z-Pulley

- Take a bight of rope in the slack beyond your waist prusik, attach a rescue pulley and **locking** carabiner to this bight of rope, then lower the rescue pulley and carabiner over the padded crevasse lip to the victim. Victim clips the carabiner to their belay loop.
- Return to your position near the middle person, sliding your waist prusik as a self-belay. Once back to the anchor area, clip in to the Master Loop with your personal anchor.
- Keep the figure-8 loop at the Master Loop in place while you and the middle person haul the victim from the crevasse. A piggyback system can be used for more pulling power if necessary.
- Attach a prusik to the haul line for progress capture, and make sure someone tends it.

Indirect Pull

- Return to your position near the middle person, sliding your waist prusik as a self-belay. Once back to the anchor area, clip in to the Master Loop with your personal anchor and remove your waist prusik.
- Several rescuers haul on the rope below the ratchet until the victim is rescued from crevasse. This method offers no mechanical advantage, but is a quick and easy option if many rescuers are available.
- Make sure the ratchet is capturing progress during the haul.

Notes

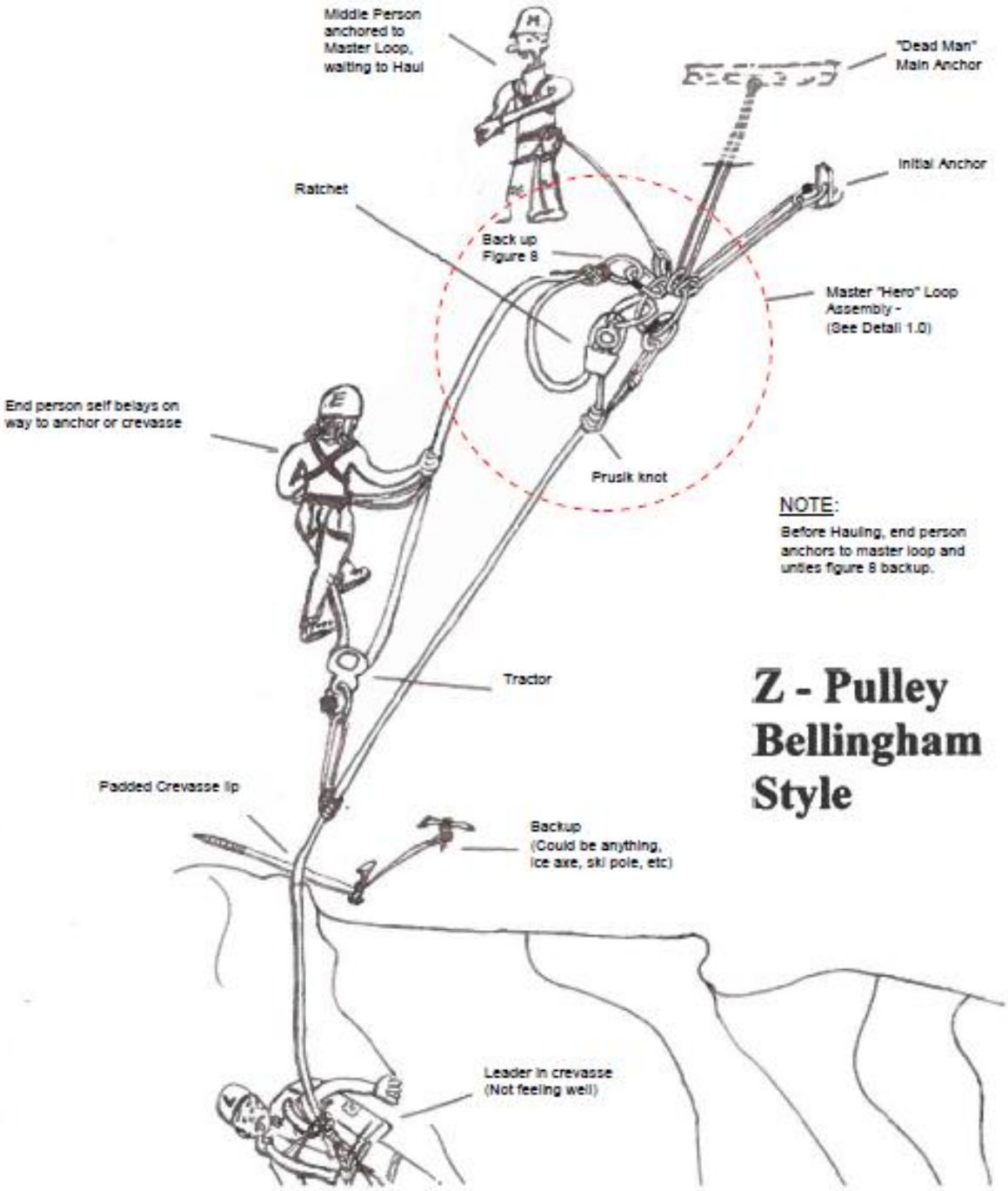
Rescuers

- Frequently a combination of methods can be used. For instance, the victim can climb or prusik most of the way out of the crevasse, then a Single (C) Pulley can be used to get the victim over the crevasse lip, often the crux of the rescue.
- When hauling, rescuers can use extra prusik hitches as handles on the rope.
- With any mechanical advantage system, be especially careful as the victim approaches the lip of the crevasse during hauling. Previously the victim has been hauled straight up, but near the crevasse lip the force of the pull tends to pull the victim in, towards the crevasse wall, potentially causing serious injuries to the victim. Fatalities have occurred from overzealous hauling.

Victim

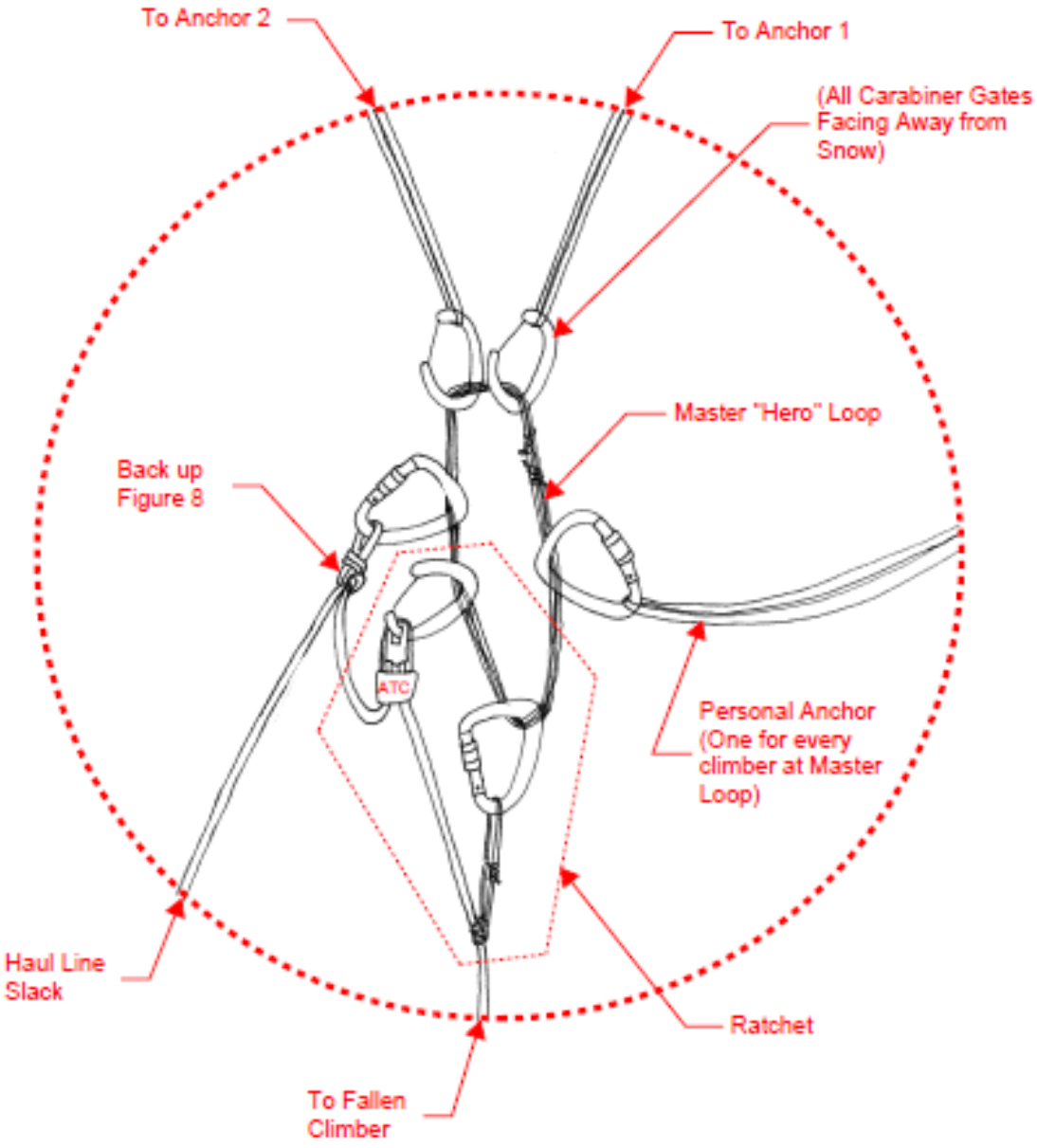
- During the accident, remember to yell "Falling!" Spread-eagle your body to try to slow or stop your fall.
- Hang on to your ice axe during the fall.
- When you stop falling, check your climbing rope tie-in, then clip the climbing rope temporarily onto the carabiner on your chest harness. The chest harness will need to be unclipped when you reach the lip of the crevasse.
- Tie your ice axe off out of the way.
- Remove your pack and clip it with a sling (pack tether) to the rope below your prusiks.
- Climb or prusik all or part way out if you are able. If climbing the side of the crevasse, remember to slide your prusiks up as you go (self-belay).
- If you are unable to prusik or climb, dress warmly and use your parka hood to keep falling snow out of your clothing.
- Do not waste energy yelling without reason. Your rope partners are working on rescuing you safely. They won't be able to hear your whining anyway.

Z-Pulley Crevasse Rescue



Adapted 2006 by Predrag Vadjic and Matt Roelofs from a 1992 handout by Loren Foss and Ross Prather, with input from Dave Anthony, Dan Bean, Glenn Eades, Allen Frees, Marcia Hanson, Sam LeBarron, Dave LeBlanc, Bob Shafer, Ken Small and Erhart Wichert. 1995 update by Zac and Becky Segal. 2019 update by Minda Paul and Zach Newhard.

Crevasse Rescue Hero Loop Detail 1.0



Snow II: Glacier Travel and Crevasse Rescue Field Trip

Required Equipment *(see equipment matrix on pages 58-59):*

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

Outline:

Saturday

- Hike to camp and set up
- Practice crevasse rescue
- Practice snow anchors
- 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 pages 58-59):*

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

Objective:
To practice travel on alpine ice, and use ice axe and crampon techniques, under real-world summer and fall conditions.

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

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

X = Required
O = Optional
T = 10 Essential Systems
Italics = Supplied by Course

		FIELD TRIPS						CLIMBS	
		AVY	FUND	ROCK I	ROCK II	SNOW I	SNOW II	ROCK	GLAC
A	**TECHNICAL EQUIPMENT**								
1	*Student Gradebook* and pen	X	X	X	X	X	X	X	X
2	*4 single slings (blue webbing) and 2 double slings (green webbing)*		X	X	X	X	X	X	X
3	Personal anchor (sewn nylon)		X	X	X	X	X	X	X
4	Rappel extension (Spectra or Dyneema)		X	X	X	X	X	X	X
5	*Colored autoblock and prusik slings (red/yellow and green/yellow perlon)*		X	X	X	X	X	X	X
6	Climbing harness (w/ belay loop)		X	X	X	X	X	X	X
7	Climbing helmet		X	X	X	X	X	X	X
8	At least 6 matching non-locking carabiners		X	X	X	X	X	X	X
9	At least 4 medium size locking carabiners		X	X	X	X	X	X	X
10	Large pear-shaped locking carabiner (HMS style)		X	X	X	X	X	X	X
11	Tube style belay device (must accept 2 rope strands)		X	X	X	X	X	X	X
12	Belay gloves with leather palms		X	X	X			X	O
13	*Foot and waist prusiks (black perlon)*		X			X	X		X
14	*Chest harness (silver webbing)*		X			X	X		X
15	Chock pick (nut tool)				X			X	
16	Rescue pulley (with side plates)					O	X		X
17	Ice axe					X	X	X	X
18	Crampons (non-rigid)						X	X	X
19	Snow picket					X	X		X
20	Shovel	O				X	X		O
21	Avalanche probe	O							
22	Avalanche beacon	O							
B	**CLOTHING**								
1	Wool/synthetic cap (consider fitting helmet over a lightweight balaclava)	X	X	X	X	X	X	X	X
2	Sunhat or bandana	X	O	O	O	X	X	X	X
3	Base Layer (no cotton) top and bottom	X	X	O	O	X	X	X	X
4	**T** Up to three insulating layers	X	X	X	X	X	X	X	X
5	Windbreaker	O	O	O	O	O	O	O	O
6	Shell	X	X	X	X	X	X	X	X
7	Pants (wool/synthetic)	X	X	X	X	X	X	X	X
8	Rain pants	X	X	X	X	X	X	X	X
9	Gaiters (long preferred)	X	X	O	O	X	X	X	X
10	Socks (1-2 pair)	X	X	X	X	X	X	X	X
11	Climbing boots	X	X	X	X	X	X	X	X
12	Mitts or gloves	X	X	X	X	X	X	X	X
13	Mitts or gloves extra pair	X	X			X	X		O
14	Lightweight liner gloves	X	O	O	O	X	X	X	X

X = Required O = Optional
T = 10 Essential Systems
Italics = Supplied by Course

C	OTHER EQUIPMENT	FIELD TRIPS						CLIMBS	
		AVY	FUND	ROCK I	ROCK II	SNOW I	SNOW II	ROCK	GLAC
1	Day pack, frameless or rucksack*	X	X	X	X	X	X	X	X
2	Overnight pack*	O	X			X	X	**	**
3	**T** Sunglasses (with side screens on snow)	X	X	X	X	X	X	X	X
4	**T** Sunscreen	X	X	X	X	X	X	X	X
5	**T** Lip balm with sunscreen	X	X	X	X	X	X	X	X
6	**T** Water bottle(s)	X	X	X	X	X	X	X	X
7	**T** Compass	X	X	X	X	X	X	X	X
8	**T** Map	X	X	X	X	X	X	X	X
9	Sleeping bag (down/synthetic)		X		X	X	X	**	**
10	Insulating pad for sleeping		X		X	X	X	**	**
11	Tent (can be shared)		X		X	X	X	**	**
12	**T** Emergency shelter (tube-tent, plastic bag, radiant barrier)	X	X	X	X	X	X	X	X
13	Toiletries	O	X	O	X	X	X	X	X
14	**T** First aid supplies	X	X	X	X	X	X	X	X
15	**T** Knife	X	X	X	X	X	X	X	X
16	**T** Head lamp (extra batteries)	X	X	X	X	X	X	X	X
17	**T** Fire starter	X	X	X	X	X	X	X	X
18	**T** Food	X	X	X	X	X	X	X	X
19	Extra food	X	X	X	X	X	X	X	X
20	**T** Extra clothing	X	X	X	X	X	X	X	X
21	Stove/fuel (share)		X		X	X	X	**	**
22	Pot (share)		X		X	X	X	**	**
23	Bowl/cup		X		X	X	X	**	**
24	Spoon		X		X	X	X	**	**
25	Insulating pad for sitting	O	O	O	O	O	O	O	O
26	Water purification method	O	X		O	O	O	X	X
27	Altimeter	O	O			O	O	O	O
28	Snowshoes and poles	X				O	O		
29	"Blue bag"	X				X	X	X	X

* 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 be marked also. If you lose something on a field trip or climb, contact the trip leader to see if it was turned in.