2016 Program Handbook

AMC BOSTON CHAPTER
ROCK PROGRAM

Revised and edited by Wes Huang

"The best climber in the world is the one having the most fun!" – *Alex Lowe*

"Life is either a daring adventure or nothing at all." – *Helen Keller*

WARNING: Climbing is a dangerous sport. You can be seriously injured or die.

Do not depend solely on any information or opinions contained in this handbook. Your climbing safety depends on your own judgment based on competent instruction, experience, and a realistic assessment of your climbing ability. If you are unwilling to assume complete responsibility for your safety, do not use this handbook.

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We would like to extend a special thanks to the past editors of the program handbook for their contributions over the years: Pablo Acosta, Brian Balukonis, Judy Bayliss, Ron Birk, Tom Boydston, Adam Chu, Chris Dame, Wes Huang, Dennis Maher, David Oka, Ken Spargo, Al Stebbins, Lilly Vollmann, and Mare Weiss.

Rock Program logo designed by Katie Cisto.

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Introduction

Welcome to the AMC's Boston Chapter Mountaineering Committee's Rock Climbing Program. Boston has a very active climbing community dating back to the 1920's when some of the first routes at Rattlesnake Rocks were attempted. Boston's AMC climbers have been pioneers, establishing first ascents in some of the world's most challenging venues: Alaska, Canada, and elsewhere. In more modern times, graduates of the AMC Rock Climbing Program have gone on to put up some of the hardest rock routes in the Northeast, and made first ascents of some of the world's most difficult mountains. That pioneering spirit and tradition is carried on today by you, the participants in this program. The Boston climbing community has a wide range of different climbers; all sharing four common passions: for the outdoors, for climbing, for individual challenge, and for the community. You are about to embark on an exciting journey; we sincerely hope this program will enrich your outdoor experience.

Legacy

Thousands have taken this program over the years. Many have made it up Mt. Rainier and the Grand Teton. Some have gone on to climb "The Nose" on El Capitan and reached the summit of Denali. A few have climbed high in South America and Nepal, and at least one has made it to the summit of Everest. Many never venture far from the Quincy Quarries. Yet all have started their rock climbing or mountaineering career in this program. Wherever you may fall in this spectrum we hope you catch our enthusiasm for climbing. It is contagious! You will never know where (in the world) it will lead!

Program Leaders

We depend entirely on volunteers to make the Rock Program happen. Everyone you see volunteers their time every year to build the Boston climbing community. We would like to express our appreciation and gratitude to all the people who help make this program possible.

In particular, we would like to acknowledge the efforts of several groups of people. First, there is the Organizing Committee that starts working months ahead of the program to make all the arrangements for the program. Then there are the weekend leaders who orchestrate the program weekends. They are the ones who absolutely, positively, have to be there each day, arriving first leaving last, and handling any emergencies, all while maintaining an appearance of calm and control. Next are our instructors; without them we could not carry on the oldest continuous, and most successful volunteer-led rock climbing instruction program in the world! Finally, there are our assistants, most of whom took the program recently and have that contagious enthusiasm mentioned earlier. Please take a moment to say "thank you" personally to all our volunteers; that personal note is what keeps them coming back year after year.

Program Overview

The AMC Rock Program covers the basic skills to climb safely outdoors, with a focus on seconding multi-pitch trad climbs. However, these skills will serve you well for toproping and sport climbing too.

Requirements

Besides an interest and willingness to learn about rock climbing, the only requirement is that you have a harness and a helmet. If you need a harness or helmet, we will loan them to you at no cost (though a deposit is required). No prior climbing experience required – every year we have "never-evers" to experienced sport climbers who enjoy the program.

Rock climbing shoes are nice to have, but are not absolutely essential; students have completed the course in sneakers or hiking boots. (Also, we do have a bin of old climbing shoes for your use on program weekends.) All other gear is provided for the program weekends, but if you have your own carabiners, slings, and belay device, feel free to bring them.

Program materials

At knots night, you will receive a packet with the following materials:

- Program handbook – this booklet
- Our textbook: *How to Rock Climb!* (5th edition) by John Long
- A "Green Book" in a ziploc bag with a pen
- A 6-8' section of rope to practice knots – this must be returned at the end of the program

Program sessions

The Rock Program consists of knots night and four instructional weekends:

- At knots night, we hand out materials and loaner helmets and harnesses, describe how the program works, and go over knots that you will need to know.
- You must attend both Saturday and Sunday of Belay & Anchors weekend.
- For the other required weekends (Rappel, Ascend, and Graduation), you can choose whether to attend on Saturday or Sunday.

For the instructional weekends, we form groups of around 5-6 students with an instructor and an assistant. (Graduation weekend, however, is structured differently.) The instructional weekends start 8:15-8:30am. The formal instruction usually runs until 1:00pm or 2:00pm, though it can vary with the weekend, instructor, group, weather, etc. We teach rain or shine, so be prepared for the weather!

After the formal instruction, we will have topropes set up for climbing if the weather is nice (or at least not bad!) Plan on sticking around – it's a great way to get to know the instructors, assistants, and your fellow students better, not to mention getting practice climbing. This informal part of the program weekends runs until around 4:30pm or so. Join us for a beer or food afterwards at Darcy's, our traditional post-climbing pub!

Missed weekends

Both days of Belay & Anchors weekend are required and cannot be made up; this is the foundation of our program. We have limited ability to offer makeups, so please come to the regular weekends. However, we will offer makeups on Optional Weekend (just Saturday) where you can make up one (and only one) of the other weekends.

Communications

We will have an email distribution list (via MailChimp) for official rock program announcements. We also have a Facebook page "AMC Boston Rock Program" for photos, social interaction, and to connect with people. If you have any questions during the program, you can email us at rock@amcbostonclimbers.com

We will also set up a carpooling spreadsheet where you can add yourself if you need a ride or can offer a ride to the program weekends. We encourage carpooling in part because it's a great way to get to know your fellow students better (who may be your climbing partners for years to come!)

Post-program events

There are two AMC Boston Mountaineering Committee events right after the Rock program to get your climbing career moving. (Note that these events are not part of the rock program.) Mark your calendars now!

New Seconds Weekend (Saturday May 14 – Sunday May 15)

This event is open only by invitation to graduates of the Rock Program. New seconds (i.e., rock program graduates) will be matched with experienced leaders for an amazing weekend of multi-pitch trad climbing at the Shawangunks (a.k.a. the Gunks) in the Mohonk Preserve near New Paltz, NY, approximately 90 miles north of New York City and about a 3.5 hour drive from Boston. The Gunks are a major east coast climbing destination and have a storied history dating back to the 1930's. Climbs at the Gunks are typically 2-3 pitch trad climbs, with many routes at moderate difficulty ratings that have overhanging roofs/ceilings, great views, positive holds, and lots of exposure. We will camp nearby and have a catered dinner on Saturday night. It's a fantastic weekend, not to be missed!

Memorial Day Weekend at Acadia (Saturday May 28 – Monday May 30)

Located in the Leominster State Forest in Leominster, MA, (about a 1 hour drive from Boston), Crow Hill has a variety of great (and tough) climbs for toproping and trad climbing. More details about this event will be available at Graduation weekend.

Program Rules

Helmets

You are required to wear a helmet at all times during the program, whether at the top or bottom of the cliffs.

Anchoring

Everyone must be anchored / tied-in when approaching the edge of a cliff.

Be responsible for your own and for others' safety

Rock climbing involves certain inherent risks. These are minimized where possible, but climbing requires vigilance from all program participants. **Each participant is responsible for his or her own safety and for the safety of those around them**. Check with the instructor before attempting any exercise. Understand the risks involved. Double check your knots and harness buckles and those of the people around you. Be careful not to knock any rocks down the cliffs; there may be someone below.

Program participation

We reserve the right to terminate a student's participation in the program due to safety or other issues.

Things you should know

Green books

Your Green Book is the only record of what you have done in the program, so do not lose it, and remember to bring it every weekend! (If you do forget your green book, ask a weekend leader for a replacement page for that day.)

There are three different kinds of skills/activities listed in the Green Book:

- Required Program Weekend skills – you can expect to complete these by attending the corresponding program weekend.
- Optional Program Weekend skills – an instructor may or may not cover these skills on the corresponding program weekend.
- Required Program Activities – located on pages 2-3 of the Green Book, these are skills that you are responsible for completing sometime during the program.

You must get all required skills signed off to be graduated from the program. (Make sure your instructor signs your Green book each day – you may not see him or her again before the end of the program, or that instructor may not remember what you did a week later!)

Ask questions and be an active learner!

We want students to become independent climbers. This means that by the end of the program, you should be confident that you are tying knots correctly, building good toprope anchors, belaying competently, able to set up your own rappel, etc. – and not be dependent on an instructor to check what you're doing. Ultimately, you must be responsible for your safety while climbing. To reach this level of competence:

- Ask questions! If you don't understand why something is done a certain way, ask a question. If you don't understand the underlying principles, ask a question!
- Practice! Go over your knots at home until you can tie them quickly and correctly. Take advantage of any opportunity to practice belaying. If you want to practice a skill more, talk to your instructor or a weekend leader.
- Volunteer! When an instructor asks for someone to start building an anchor, don't just sit back and watch. Don't be afraid to make mistakes; that's how we all learn. (Better to make a mistake here, where it will be caught, than when you are out climbing on your own!)

We encourage you to go with a different instructor for each day of the program. You will get different presentations and different opinions from each instructor. Use this to enhance your learning experience. There is generally no single correct way to do anything in rock climbing, and each instructor will have his or her own set of practices and as well as perspectives on efficiency and risk.

Learning to trust the system

We require you to climb and take a fall for two reasons. First, other students need practice catching a fall while belaying. Second, you need to learn to trust the system – that the anchor

will hold, the belayer will do his or her job, the rope will become taut, and your harness will keep you from plummeting to the ground. Some fear of falling is natural (and part of the thrill of rock climbing!) While intellectually knowing how the system works helps overcome this fear, there's no substitute for taking falls until you develop an intuitive confidence in the system. Then you can focus on enjoying the climbing rather than fear falling.

Meet people

This program is not just about learning skills for rock climbing; it's also an opportunity to meet kindred spirits! Get to know your fellow students, the instructors, and the assistants. Many students end up climbing with people they meet through the rock program for years afterward.

The AMC Boston Mountaineering Committee does have some events during the rest of the year. Attending those events is a great way to meet more of the AMC climbing community. (See the Life After the Rock Program section.)

However, if you want to get out climbing a lot, you will need to be proactive. Post to our Facebook page (AMC Boston Rock Program)! Don't be shy about asking instructors or assistants to take you climbing after the program. It will be up to you to take the initiative though: you can offer to organize a day trip or a weekend, to drive (or maybe just mention "beer"!) Many of our instructors and assistants are happy to help our rock program graduates get started leading sport or trad after the program.

Give us feedback

We hope you enjoy the program! We will be actively soliciting your feedback during the program using online surveys. Your feedback helps us decide what changes we need to make in subsequent years.

Please feel free to make comments or ask questions directly to any of the Organizing Committee members. You can also send an email to rock@amcbostonclimbers.com.

Climbing and Safety

Statistically, rock climbing is not very dangerous. However, the potential for danger is always present. A "minor oversight" could result in a long fall to the ground and serious injury. Someone new to climbing outdoors should feel justifiable concern about the dangers of rock climbing. Let's examine some of the possible risks while rock climbing.

Environmental dangers

Falling rocks are the main environmental danger while climbing, though injuries due to falling rock are not that common. Most of the time, this is caused by a climber above you accidentally knocking rocks off a ledge, though there are some places where natural rockfall occurs regularly. Even a small rock can cause serious injury; wearing a helmet is an important way to mitigate this risk. You should also be constantly alert for falling rocks. If you accidentally dislodge a rock, you need to yell "ROCK!" and if you hear someone yell from above, get out of the rock's way, or at least make sure it hits your helmet (instead of your face, neck, etc.)

Reliability of gear

Generally speaking, ropes, slings, carabiners, and harnesses do not break – they are engineered to withstand much higher forces than what you can exert on them in a fall. Manufacturers of climbing gear must meet stringent specifications for UIAA / CE certification.

While ropes do not break in normal climbing, they can be cut: for example by repeated rubbing over a sharp rock edge. Similarly, a carabiner should not be loaded across a sharp rock edge. We will cover these and other things to be aware of when building a toprope anchor.

Human error

This is by far the primary cause of accidents in rock climbing, and it is entirely avoidable with your vigilance and by following standard practices.

It is the responsibility of the climber to verify the safety of the situation before climbing. Is the anchor secure? Is all the gear in good condition? Are the carabiners locked? Are your knots tied correctly? Are your and your belayer's harnesses worn correctly? Is the belayer positioned properly? Is the belayer competent? If the answer to any of these questions is not a firm "YES", then DO NOT CLIMB! If you do not trust the situation, then change the setup, change your belayer, or choose not to climb, but always use your OWN judgment.

While climbing, there are still more things to be aware of. For example, understand when falling might cause you to take a swing and be prepared for it. Do you have a clear communication plan with your belayer? Are you properly anchored on multi-pitch trad climbs or rappels? Etc.

Perhaps more than anything else in this course, we want to teach you to assess climbing situations on your own so you can be responsible for your own safety.

Instructional Weekends Overview

Beforehand

You have some homework for each program weekend/day:

- reading (see the program weekend pages for details)
- practice your knots, learn new knots
- complete the online feedback for the prior weekend/day

Where

The program is held at the Quincy Quarries in Quincy, MA. *Park in the large parking lot on Ricciuti Drive.* If that lot fills up, you can park on Ricciuti drive on the opposite side of the street. (See the Quincy Quarries section on page 10 for more information)

NOTE: Do not leave gear or valuables visible in your car! While rare, there have been a few incidents over the years…

When

Arrive by 8:15-8:30AM. The instruction will run to around 1pm-2pm, but plan on staying afterwards to climb until 4-5pm! (Also, there are program requirements that you must complete outside of the formal instruction period.)

What to bring

You must bring:

- climbing harness
- helmet
- your Green Book
- your practice rope – to demonstrate and learn knots

If you forget any of these things, see a weekend leaders; they have a few extras you can use for the day. You do not need to bring the textbook or this handbook.

There will be a lot of standing around during the instructional part of the day, so dress appropriately! And remember, *we teach rain or shine!* It is early spring, so the weather can change dramatically – you should be prepared to be waterproof from head to toe (hat/hood, jacket, pants, shoes) if there's any chance of rain.

Other things to bring:

- rock climbing shoes – if you have them
- food: lunch, snacks, goodies to share with your instructor and assistants ☺
- water or other (even hot) drinks
- extra layers, hat, gloves, etc.

When you arrive

The weekend leaders will be set up in the small parking lot on Ricciuti Drive.

- First, sign in at the student sign-in station (not the instructor/assistant sign-in station).
- Then see the weekend leader who is arranging students into instructional groups. (The other weekend leader will be coordinating the instructors/assistants.)

Note:

- There is a port-a-potty that we arrange for during the program at the small parking lot.
- We will have a bin of old climbing shoes that you can borrow; these must be returned at the end of the day.

Instructional groups

Your group for the day will generally consist of 4-6 students, an instructor, and an assistant. We encourage students to go with different instructors each weekend/day. You will get a variety of perspectives and different presentations on rock climbing this way.

Each instructional group will have a bag of gear to use for the day that includes ropes, slings, carabiners, etc. Students will be asked to divide this gear up amongst themselves to carry to the cliffs. All this gear must be returned to the weekend leaders at the end of the day. You'll have a short hike (no more than 5-10 minutes) to the cliffs.

Instruction

Each day will generally start with setting up a toprope anchor, and from there you will cover the required skills for the day. Instruction generally lasts until 1-2pm, though it can vary with the program weekend and the group.

Our instruction is hands-on: while an instructor or assistant may demonstrate a skill, you are going to have to do it yourself. Volunteer to help out when the opportunity arises, ask questions, and don't be afraid to make a mistake – that's a part of the learning process.

You will also be doing some climbing – and falling – during the program. Don't worry about what grade you're climbing, just have fun! Climbing outside is different and, in ways, harder than climbing in the gym.

Make sure you get your Green Book signed off at the end of the day!

Afterwards

If the weather is good (or at least not bad), there will be topropes available to climb after instruction finishes until 4:30pm or so, so plan to stick around and climb! Feel free to come in the afternoon of days that you are not receiving instruction.

At the end of the day, a group will often go to Darcy's, our traditional post-climbing pub, for food and/or beer. Join us!

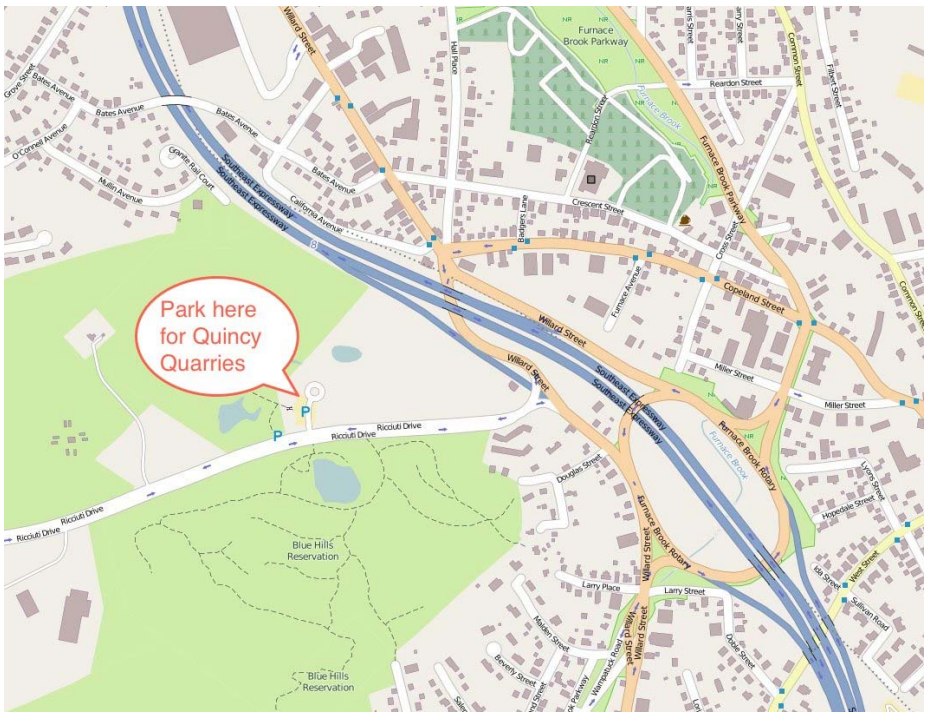
Quincy Quarries

Boston area climbers have been climbing at the Quincy Quarries at least since 1927. This is where America's large scale granite quarrying industry was born in 1825 to provide the stone for the Bunker Hill Monument in Charlestown. During the next 140 years, over 50 quarries operated in Quincy, which became known nationwide as "The Granite City". The Granite Railway, one of the first railroads in the United States, was established in here 1826 to transport granite from the quarries. The last active quarry closed in 1963, and in 1985 the Metropolitan District Commission (now DCR) purchased 22 acres to establish the Quincy Quarries Reservation. Until relatively recently, the quarries were filled with water. Some old photos show climbers starting from boats, and jumping off the cliffs into the water was a popular (and dangerous) activity! By 2001, the quarries were filled with soil from the Big Dig, and easy access to several walls spurred new route development.

Directions to the Quincy Quarries parking lot on Ricciuti Drive in Quincy, MA:

From Boston: take I-93 South to Exit 8 (Furnace Brook Parkway); make a right hand turn at Men's Wearhouse and Tux onto Ricciuti Drive. The parking lot is 0.2 mi ahead on the right.

From I-93 North: take Exit 8 (Furnace Brook parkway). Follow the sign for "I-93/Rt-3 North, Quarry Hills, Willard St." It will look like you're getting back on to I-93 North, but at the last minute, you can stay right for Quarry Hills / Willard St. Proceed to the stop sign, turn left to go under I-93, then make the first right at the stop sign (at Men's Wearhouse) on to Ricciuti Drive. The parking lot is 0.2 mi ahead on the right.



Belay & Anchors weekend

Saturday April 2 AND Sunday April 3

Readings from How to Rock Climb! by John Long

- Chapter 1: "The Climbing Game"
- Chapter 4: "Ropes, Anchors, and Belays", particularly:
    - Rope Care (p. 94) ★
    - Tying In, Harnesses, Carabiners (pp. 102-107)
    - Anchors (pp. 107-116) ★★
    - The Belay (pp. 157-169)
- from Chapter 5: Angle of the Dangle (p. 183), SRENE anchors (p. 186-188) ★★
- from Chapter 6: Climbing Voice Signals (p. 221) ★
- from Chapter 7: Coiling the Rope (pp. 268-271)
- from Chapter 8: Lowering / The Belayer's Role (pp. 275-276)
- from Chapter 9: Toproping (pp. 286-290)

Read the *Belaying for Lead Climbing* **section starting on page 17 of this handbook.** ★★★

This week's knots

Rewoven figure 8, Fisherman's backup, Bowline, Water knot, Figure 8 on a bight, Girth hitch, Clove hitch and Münter hitch.

Notes

For this weekend (only) we will have instructional groups for new belayers (or anyone else who wants some extra time to learn/review belaying). After you sign in, let the weekend leader know if you want to join a new belayer group.

Belaying and building anchors are the two most fundamental skills in rock climbing. We will start each day by building a toprope anchor. This will take some time the first day as we discuss the principles behind toprope anchors; we will reinforce these principles throughout the rest of the program.

On Saturday, we will cover multiple methods of toprope belaying. In order to practice belaying, other students will climb and take a fall for the belayer to catch. (Note: all belays will be backed up in order to ensure the climber's safety.) Taking a fall will enable you to develop trust in the system, that you can take a fall without getting hurt.

On Sunday, we will introduce the process for climbing a trad pitch and start learning to lead belay. You will learn about the different types of trad gear and how to remove and re-rack it.

Rappel Weekend

Saturday April 9 or Sunday April 10

Readings from How to Rock Climb! by John Long

- from Chapter 7: “Rappelling” (pp. 250-267) ★★

New knots

Auto-block, Double fisherman, EDK (flat overhand bend)

Notes

You will spend most of your time in your instructional groups, but at some point (after you are comfortable rappelling) you must go to the “free rappel” station (atop the Q wall and/or the J wall) to complete that requirement.

Rappelling is a technique used by climbers to descend a fixed rope in a controlled and safe manner. In toprope climbing rappelling is usually not necessary. Many trad climbs have a walk-off from the top, but on many climbs you will need to rappel. There are other situations where you may need to rappel: bad weather, approaching darkness, inability to complete a climb due to difficulty, and injury/rescue situations.

We will cover how to set up a rappel, a variety of techniques for rappelling, and the relevant knots. You will do several rappels during the course of the day. (Note: all rappels will be backed up with a toprope belay to ensure student safety.) At the free rappel station, you will do a rappel where you have no contact with the rock for at least part of the rappel.

Ascend Weekend

Saturday April 16 or Sunday April 17

Readings from How to Rock Climb! by John Long

- from Chapter 7: “Getting Back Up” (page 267)

New knots for this week

Klemheist, Bachmann, and Prusik.

Notes

You will spend most of your time in an instructional group, but at some point you must go to the bucket station to “catch the bucket”. This station will give you the opportunity to catch a simulated leader fall and experience the greater forces (as compared to toproping) in catching a fall. When you arrive at this station (at the bottom of the Q wall), join the queue of students who are also hauling/raising the bucket. When it is your turn to catch the bucket, the instructor at that station will guide you through the exercise. The bucket will not be set up all day, so make sure you get this skill completed while it is running.

Ascending a rope is seldom required in practice, but it is a useful skill to know for when you need it. Situations in which you may need to ascend a rope include:

- Your rappel ropes don’t reach the next anchor, so you need to go back up to try another descent.
- If you fall when climbing an overhang, you may not be able to swing back to the rock.
- If you (as a second) are stuck (and have no other options), you can ascend the rope instead. Note that you should look for other options in this situation before ascending the rope.

We will show you three different friction hitches to use for ascending and the procedure to ascend efficiently and safely. (Note: ascending students will be backed up on toprope belay for safety.) We will also make you ascend over a bulge which requires

This weekend should provide ample time for you to complete any remaining program requirements.

Optional Weekend

Saturday April 23

Notes
This is weekend is optional and only meets on Saturday (not Sunday).

The purpose of this weekend is to climb, practice skills, and work on Program Requirements. In particular, we recommend getting at least one of the two required "Follow a trad leader on a pitch" done before Graduation Weekend. It's also nice to get the climbing and belaying Program Requirements done before Graduation Weekend.

This weekend is also the only day that we are offering makeups. We have limited ability to offer makeups, so please attend the regularly scheduled weekends if possible. However, you can make up one (and only one) of the other weekends (Rappel, Ascend, or Graduation) on this day.

Graduation Weekend

Saturday April 30 or Sunday May 1

Read the *Fixed Anchor Cleaning* **section starting on page 23 of this handbook. ★★★**

Note
This weekend is structured differently that the other instructional weekends. We suggest coming a little later (not before 8:30am) to give us some time to set up the four stations that you must visit to get requirements signed off:

- Toprope anchor building – you must independently build a toprope anchor and explain why it is a good anchor. Usually located atop the Q/R/S walls.
- Knots – you must be able to tie and explain the use of all the required knots. Usually located under the big tree at the entrance to Quincy Quarries.
- Fixed anchor cleaning – we will demonstrate how to clean a fixed anchor, and then you must do it. Fixed anchors (generally bolt anchors) are atop all sport climbs and some trad climbs. Cleaning the anchor means removing your toprope anchor and setting up for rappel. This should be an application of skills/principles that you have learned in the program. Usually located in front of the S wall (Knight's wall).
- Multi-pitch rappel – You will do a two-pitch rappel: setting up your first rappel, rappelling down to a ledge, pulling the rope, and setting up your second rappel. Instructors will be on hand to monitor the rappels, and students will be on belay during this exercise. Usually located atop J/K wall.

There will also be opportunities to complete any remaining program requirements. (We encourage you to complete these before graduation weekend. There is often a long line to do the program requirement of seconding a trad pitch.)

Once you are done, fill out the feedback section at the back of the Green Book, and turn it in to a weekend leader who will verify that you have completed everything. You can stay and climb for the rest of the afternoon, but any borrowed helmets and harnesses (as well as the practice rope segment) must be returned by the end of the day.

Crow Hill Climbing & Potluck BBQ

Saturday May 7 (rain date Sunday May 8)

Note

Come for a casual day of climbing and socializing to celebrate the conclusion of the Rock Program! Crow Hill is located in the Leominster State Forest in Leominster, MA, about an hour west of Boston. There are a variety of great (and tough) climbs for toproping and trad climbing.

In the afternoon, we will have a potluck BBQ down by the lake.

More information about this weekend will be sent out towards the end of the program.

Belaying for Lead Climbing

Eric Engberg and Wes Huang

Belaying is the most important skill we teach in the rock program. You should practice belaying until it becomes second nature, so that you can do it well without even thinking about it.

However, just because you can belay without thinking about it doesn't mean that you should, particularly when it comes to lead belaying. Toprope belaying and lead belaying seem very similar on the surface – taking in rope versus paying out rope. However, there is a huge difference: when you are lead belaying, you are in a lead climbing situation, and there are a myriad of things you should be doing and be aware of in that situation.

The belaying for lead climbing, then, is not just about paying out rope and being ready to catch a fall. Even as a second, you should be an active and equal partner of the climbing team.

Basic lead belaying

Let's start with the basics:

Cardinal Rule of Belaying #1: Always maintain control of the belay.

This means never ever take your brake hand off the brake strand, no matter what, and keep your brake hand in the brake position whenever possible.

The second part of lead belaying is often thought of as paying out rope as the leader climbs, but really the belayer's job is to keep the right amount of rope between the leader and the belayer. This means that the belayer may need to take in rope as well as pay out rope. Sometimes, this means making constant adjustments. Here are a few examples:

- when the leader clips the rope into some protection, you let out rope, and then take in any extra slack after the protection is clipped.
- as the leader keeps climbing (after clipping protection above his or her harness), you will need to take in rope before paying it out again.

How much rope is the right amount of rope between the leader and belayer? As a general rule, there should be a slight “smile” between your belay device and the first piece of protection. We will show you what this means during the program. Realize, though, that some leaders will want a looser or tighter belay than others.

This slight “smile” in the rope is the result of what we call slack in the system. If the leader falls, any slack results in a longer fall. Now you might think that there should ideally be no slack in the system in order to minimize the distance of the fall. However, this is not practical, and if you tried to do this, you would end up violating one of the following rules of lead belaying:

Cardinal Rule of Belaying #2: Never pull the leader off the climb.

Cardinal Rule of Belaying #3: Never short-rope the leader.

Obviously, you shouldn’t pull on the rope and cause the leader to fall. However, it’s just as important to make sure you have solid footing – so that you don't lose your balance and stumble

(or fall) while belaying, thereby pulling the leader off.

Short-roping the leader means not giving the leader enough slack. As a leader, there's nothing worse (aside from being pulled off a climb) than going to make a move and being abruptly stopped by the rope.

For these reasons, we want some slack in the system, but not too much – a leader does not want to take an extra-long fall!

While climbing, a leader might call “WATCH ME!” to the belayer. This means, "I'm about to do a hard move and I might fall, so be ready to catch me!" In addition to readying yourself, this usually means giving the leader a little tighter belay: taking up some slack, because the leader might fall, but also being ready to pay out rope quickly, because you know the leader is about to do a move, and you especially don't want to short-rope the leader on a hard move.

Finally, once you put a leader on belay, you must keep them on belay until you are absolutely certain that they have asked you to take them off belay. Thinking that the leader is “probably” at the top of the climb doesn't cut it. In the worst case, when the leader pulls up the rope, you will have to feed it all through your belay device, but this is much less dangerous than taking the leader off belay prematurely.

This basic level of lead belaying is basically about the mechanics of belaying, but there is much more to do in lead climbing situations and also in lead belaying.

Pre-climb communication

As the belayer, you are just as important as the leader as part of the climbing team, so you have the right (and the responsibility) to know the overall plan: what route you're going to climb, how many pitches, how you'll get down, how long it will take, what contingencies might occur, etc.

For each pitch, you should know where the leader expects the pitch to end, perhaps where he or she hopes to place gear or clip fixed gear, and, most importantly, what the plan is for when the leader finishes the pitch. On multi-pitch climbs, the leader will stay at the anchor, and put you on belay. On single-pitch climbs, the leader might instead want to be lowered or to rappel. Keep in mind that the plan may change during the pitch. No matter what the plan was at the outset, you must keep the leader on belay until you are clearly asked to take him or her off belay.

Communication during or at the end of a climb can be a problem. There are many climbs where you will not be able to see or hear the leader after some point. This may be because the climb goes over a roof or around a corner, or because there's too much wind to hear anything. If this is going to be a problem (and perhaps even if you don't think it will be), you should agree on a plan before the climb. Some climbing teams will carry radios for these situations, but you should still have a plan in case batteries die. A plan usually involves sequences of rope tugs to convey the belaying commands; there is not necessarily a standard scheme, so be sure to discuss a plan at the outset.

There are a few other things to discuss before the start of a climb. Does the leader want you to give a warning when near the end of the rope? What should you do if the leader runs out of rope? Does the leader want you to bring anything up when you climb – water, shoes, jacket, guidebook, etc.?

Preparing to belay

At the start of every pitch, the leader and belayer should decide on a position for the belayer to belay from. There are several factors to consider:

- Safety of the belayer – Even the most cautious leader on the most solid rock occasionally breaks a hold, dislodges a rock, or drops some gear, and it often heads straight down towards the belayer. Wearing a helmet is prudent, but being in a position safe from falling objects is even better.
- Anchoring – If the start of the pitch is exposed, then the belayer should be anchored. Otherwise (e.g., at the start of most climbs or on a gigantic ledge in a multi-pitch climb), you have a choice. If the leader significantly outweighs the belayer, the belayer should probably (but not necessarily) be anchored. The advantage of being unanchored is that the belayer can move around, for example to dodge any falling rocks.
- Contingencies – Where will the belayer be pulled if the leader falls? To avoid being smashed into the rock, the belayer should generally be as close to the face as possible.
- Stance – The belayer has good footing, is comfortable, etc.

Once you've decided on a position for the belayer, there are a few other preparations. It's conventional for the belayer to flake out the rope (or at least do something to convince the team that it will feed easily and be free of knots).

At the start of a climb, the team should decide what to do with the “dull” end of the rope. Most of the time, the prudent thing to do is to have the belayer tie in. However if the rope is especially kinked or twisted, a common strategy is for the leader to stretch it out by climbing and let the rope naturally untwist before the belayer ties in. If the belayer does not tie in, you should generally tie a knot in the end of the rope – there have been far too many accidents, particularly on single pitch sport climbs, where a leader is lowered off the end of the rope and falls to the ground.

Finally, the leader and belayer should check each other's harnesses, tie-ins, etc.

Intermediate lead belaying

The next level of lead belaying adds more things you should be doing or thinking about while you're belaying. The general theme of this level is that you should be actively considering the current situation and responding accordingly, both for your own and for the leader's safety.

At the start of a climb, the belay doesn't help until the leader clips the first protection. (Obviously, this is different for exposed starts.) Instead, you can help by spotting the leader. Your belay device should be set up to start belaying immediately, and there should be enough rope out so the leader isn't short-roped. Take a solid stance and hold your hands up at the ready. Keep your hands cupped and don't stick your thumbs out to avoid getting injured. Remember that you aren't trying to catch the leader – your objective as a spotter (depending on the situation) is to make sure the leader lands upright (on his or her feet), to direct the leader towards a good landing spot, to keep the leader's head and back from hitting anything, or to make sure the leader doesn't stumble or fall after landing.

Another thing you should do at the start of a pitch is to assist the leader with rope management.

For example, if the rope is getting in the way of a foothold, move it out of the way. You may need to change your position to make this happen. You can generally assist the leader in this way until the second or third piece of protection has been clipped.

While you are belaying, you should regularly (if not constantly) ask yourself, “What would happen if the leader fell now?” If the leader would fall right on top of you, then move! On multi-pitch climbs, what happens if the leader falls before clipping the first piece of protection and falls below the anchor? If you would be pulled off a ledge, then shorten your tie-in! If you would be turned to one side, will you be able to keep your hand in the brake position? If not, change your position! Some of these issues may be mitigated if the leader clips part of the anchor as the first piece of protection to provide an upward pull for the belayer. Even so, good belaying will often require you to change your position frequently, especially at the start of a pitch.

A good belayer will anticipate when the leader is going to clip a piece of protection and be ready to quickly pay out slack. Clipping can be the most dangerous moment for a leader because there is a lot of slack in the rope until the protection is clipped. Ideally the belayer should pay out just enough slack so that the leader's motion is unimpeded by the rope, allowing the clip to be made quickly. Sometimes a leader will call, “CLIPPING,” to let you know when this will happen (especially in desperate situations!) Usually, more than one arm's length of rope (what you can quickly feed through your belay device) is required to make a clip. This is another situation where changing your position can help; moving towards or away from the anchor is a way of quickly adjusting the amount of slack in the rope.

One last thing to keep in mind is that on a multi-pitch climb, another leader (e.g., from the party behind you) may arrive at your anchor while you are belaying. Depending on the climb, they may be able to build an anchor in another spot. However, on some climbs, there will be no choice but to build an anchor right where your anchor is or to share the same fixed anchor that you are using. This can also occur when the fixed anchor for your belay also serves as a rap station, and another party rappels down. Remember that your first responsibility is to belaying your leader. If another party may compromise your belay or if you’re uncomfortable with what they’re doing (vis-à-vis your belay), you should say something. Almost all climbers will be proactively reasonable about this. However, you shouldn't be unreasonable – remember, that other leader is at some risk while not anchored. In most situations, there shouldn't be any problem with another leader anchoring and perhaps even bringing up his or her second while you are still belaying your leader, so invite them up, move over a little bit, and share the spot or the fixed anchor.

End of the pitch

The leader has reached the top of the pitch, now what? First and foremost, you must keep the leader on belay until you are clearly asked to take him or her off belay. There have been many accidents because of miscommunication at this moment. Also, don't yell “Belay Off” until the rope is completely out of your belay device so that you don't drop your device when the leader starts pulling up rope.

If the leader is going to stay at the top and you are going to second the pitch, you have a few responsibilities. The first is to make sure your end of the rope doesn't escape – if you're not already tied in, do it right away. As the rope is being pulled up, watch to make sure that it's not

stuck on rocks or tree roots and that there are no knots or tangles that will get stuck at draws. At some point, you need to yell, “That's Me!” Remember, you may not feel the tug if the rope is tied into an anchor. Make sure that you will have enough slack to move around to do what you need to do before climbing. Besides putting on climbing shoes, you should tidy up a bit at the base of a climb (pack up the rope bag, put your packs off to one side, cover them if it might rain, etc.) as other people might come and start the climb before you're finished. Make sure you bring everything you're supposed to: pack, shoes, water, jacket, guidebook, etc. While all this is going on, you should also strive for efficiency – time is safety (or at least more climbing opportunity).

Once the leader tells you that you're on belay, clean the anchor and start climbing!

If you don’t clearly hear the leader tell you that you’re on belay, don't assume that you are! Just because the leader pulled up the rope and it hasn't moved for a minute doesn't mean that you're on belay – the leader may be rearranging things, adding a redirect, etc. Yell up to the leader, “Am I ON BELAY?” Hopefully you hear a response. Try a few times. Otherwise, wait for the sequence of rope tugs you agreed upon beforehand. Oops, did you forget to do that? Now you're in a difficult situation. Periodic tugs on the rope, as though the leader is trying to pull up slack as you climb, probably mean that you're on belay. However, as a new second, just sit tight and let the leader reestablish communication (e.g., by downclimbing). Once you're more experienced, you might clean the anchor and start to climb anyway, but this is risky because you might not be on belay. If the rope gets pulled up as you climb, that's a good sign; if not stay put until it does.

When the leader reaches the top of a single pitch climb, another possibility is that the leader will come down. This is common in sport climbing but can happen on trad climbs too. Usually this means that you will lower the leader, but it's possible that the leader will rappel. (The leader may clean the pitch on the way down.) If you are lowering the leader, there is no reason to take the leader off the belay. The leader will probably ask for some slack in order to set up for being lowered. If there is any possibility of not having enough rope, you should have tied a knot in the end to prevent the leader from accidentally being lowered off the end of the rope. If the leader is rappelling, you should let the leader know when both ends reach the ground (or not).

Advanced lead belaying

We don't expect students in the rock program to have the skills we describe here under the “advanced” level; these require extensive experience with lead belaying and experience being a lead climber. Nevertheless, we describe them here for your future reference.

At the “advanced” level of lead belaying, you become a second set of eyes for the leader. You may have a better perspective on the climb from your position and from the fact that you aren't leading. You should watch how the rope is running below the leader and alert the leader, for example, if it needs to be flipped around some obstacle. Does the leader need to extend a sling to reduce rope drag? Warn the leader if the rope runs behind his or her leg. Watch for back-clipping and z-clipping. Consider letting the leader know if some gear the leader placed falls out.

In the basic level of lead belaying, the belayer's objective was to be sure to catch a lead fall and to manage slack to keep the fall as short as possible (without short-roping the leader or pulling the leader off the climb). At the advanced level, the objective is to stop the fall appropriately.

The appropriate way to stop a fall can be very context specific with a lot of different possibilities.

Usually a short fall is best, but there are exceptions. For overhung sport climbs, a leader falls into free space, so it doesn't matter if the leader falls a little further. The holy grail in sport climbing is to give a “soft catch” which generally involves jumping up at the right time. Also, there can be situations in both trad and sport climbing where falling a little further makes the difference between the leader slamming into rock and swinging into free space.

On the other hand, if you’re on a runout slab climb and the leader falls and starts rolling and tumbling down the slab, the appropriate response may be to jump down and run backwards to stop the fall even sooner.

In most cases, you don't have to do anything overly drastic, but you should be aware of the options. The right response may change several times during the course of a single pitch, and of course being tied in tight to an anchor will limit your options.

Fixed Anchor Cleaning

Bob Rogers and Wes Huang

Editor's note: Do not use this article as your sole guide for cleaning fixed anchors! This article is to supplement the instruction we offer in our program. While it is detailed, there are many aspects of cleaning a fixed anchor that are hard to put into words and which we will show you during the program.

Introduction

A modern fixed anchor consists of 2 bolts. Usually each bolt will have a short section of chain and a quicklink at the end of the chain.

For single pitch climbs (trad or sport) with a fixed anchor, the leader will build a toprope anchor using the bolts, usually just using a quickdraw on each bolt, clip the rope into this anchor, and then be lowered to the ground by the belayer. The rest of the party will climb the route on this toprope anchor.

The last climber in the party must "clean" the anchor, i.e. remove the toprope anchor that the leader built, and somehow get back to the ground without leaving any personal gear. We refer to this process and transition as Fixed Anchor Cleaning.

Local Ethics and Wear & Tear on Fixed Anchors

Why not just use the fixed anchor as a toprope anchor? The problem is that a weighted rope running through the fixed anchor wears away the anchor hardware. Dirt or sand in the rope is the main culprit, but that's a reality of climbing outdoors. Even though fixed anchors are made of steel, this wear does add up. You will see grooves in fixed anchors, particularly on popular routes. These grooves can eventually create sharp edges, which are dangerous because they can damage or cut ropes.

If every climber were lowered on the fixed anchor, that hardware would have to be replaced more frequently. Generally, a nonprofit local climbing organization takes on the stewardship of maintaining fixed anchors, and they are usually the ones to set the local ethic for a crag on how the fixed anchors should be used. This ethic is a balance between replacing fixed anchor hardware (using their limited funds) and climber safety.

Generally, fixed anchors are placed at the top of a climb when it is not feasible to walk off or when the climbing above the anchor is not interesting. There are two ways to get down:

- Rappelling – this puts the minimum wear on an anchor because the rope is unweighted when it is pulled, but it involves a more complicated transition.
- Lowering – this is a simpler and quicker transition but does put wear on the anchor.

The local ethic for most crags these days is that it is acceptable to lower once per climbing party, i.e. for the last climber. There are some crags where it is never acceptable to lower from a fixed anchor in which case the last climber must rappel. There probably aren't any crags now where toproping through a fixed anchor is acceptable. The local ethic does vary, so check with local climbers at the crag or read the guidebook.

Communication

Here's the most important thing about cleaning fixed anchors: Before you start climbing, talk to your belayer about what you're going to do once you get to the top. Depending on how you're going to clean the fixed anchor, your belayer may or may not be taking you off belay. There have been far too many accidents because the climber thought she was on belay, but the belayer though he was supposed to take the climber off belay.

Lowering Transitions

The transition to lowering depends on the details of the fixed anchor. Fixed anchors will have either:

- Quickclips -- essentially large steel carabiners attached to the bolt or at the end of the chains. There are other similar types of hardware, such as open cold-shuts; the key characteristic is that you can clip or drop the the rope into this hardware.
- Quicklinks, rappel rings, or chains -- a quicklink or rappel ring may be attached directly to a bolt hanger or at the end of chains, but sometimes there are just chains. The rope must be threaded through this hardware.

These transitions are easiest when you have a good stance at the fixed anchor. The procedures below describe this situation first and then address what to do if the stance is poor or nonexistent.

Lowering from Quickclips

This is almost trivial, and you will stay on belay during the transition.

1. When you get to the top of the climb, tell your belayer to give you some SLACK.
2. Clip the rope into the quickclips.
3. Remove the rope from the quickdraws, and then remove the quickdraws from the anchor.
4. Tell your belayer to TAKE, and then LOWER.

This transition is quick and easy, so if you do not have a good stance at the top of the climb, you should be able to grab something (a handhold or one of the quickdraws) and hold yourself in place while you do the transition.

Lowering from Quicklinks, Rappel Rings, or Chains

There are several different ways to make this transition, but here is a basic procedure. You will stay on belay during this transition.

1. When you get to the top of the climb, tell your belayer to give you some SLACK.
2. Make a bight in the rope between the toprope anchor and your belayer.
3. Push this bight through the quicklinks, rap rings, or the bottom links of the chains.
4. Tie a figure-8 on this bight and clip it to your belay loop with a locking carabiner.
5. You are now on belay from the figure-8 on a bight through the fixed anchor, so you can remove the toprope quickdraws from the rope and the anchor.
6. Untie your original tie-in (the rewoven figure-8) and pull that rope through the fixed anchor.

7. Tell your belayer to TAKE, and then LOWER.

There can be complications with this method:

- You will waste 5-10 feet of rope using this method: from the figure-8 on a bight you've clipped into your belay loop, to the end of the rope. If this will prevent you from being lowered to the ground, then:
    1. Retie into the end of the rope (through your harness tie-in points with a rewoven figure-8);
    2. Unclip and untie the figure-8 on a bight from your belay loop.
- If there isn't a good stance at the top of the climb, you will need to "go in direct" to the anchor, essentially hanging from the anchor, to make the transition. (See the next section on going in direct.) This can make the transition much more awkward.
- Very rarely, you will encounter chains with links too small to push a bight of rope through. This situation is more akin to a rappelling transition and is covered in the last section.

Going In Direct to a Fixed Anchor

"Going in direct" means attaching yourself directly to the fixed anchor. This is always necessary for a transition to rappel, and only rarely for a transition to lowering. This must be done without using the climbing rope because you will need to reconfigure the rope for rappelling (or for lowering).

Going in direct can be error prone because there are more slings and/or quickdraws attached to you and the rope, and it is easier to get confused and unclip in the wrong order. You should at all times be connected to both anchor points (the two bolts), either via the toprope anchor, the direct connection, or the rappel rope. This is a transition that you do alone, without a partner to check you, so make sure you double check your new system before you disconnect the old system: check that everything is configured correctly, that locking carabiners are locked, etc.

If you have a good stance at the top of the climb, going in direct is fairly easy:

1. Girth-hitch a sling to your harness tie-in points.
2. Attach the sling to both bolts with locking carabiners.

If it is awkward to use the bolts for any reason, then it's fine to clip a link or two down the chains, just as long as you leave the bottom points of the anchor free for the rope.

If you don't have a good stance at the top of the climb, going in direct is more complicated because you will need to put at least part of your weight on the anchor. Here is a basic procedure:

1. Girth-hitch a sling to your harness tie-in points, and attach the sling to one bolt with a locking carabiner.
2. Put a second quickdraw on the other bolt and connect it to your belay loop. (Do not use the toprope anchor quickdraw that is already on that bolt; otherwise you will be disconnected from that bolt.)

3. Put your weight on the quickdraw connected to your belay loop.

Always double check your new connections to the anchor before proceeding!

Rappelling Transitions

Rapping from a fixed anchor requires you to transition twice: from the rope to a direct anchor connection and then, after setting up the rappel, back to the rope.

1. Go in direct to the fixed anchor (see the previous section), and tell your belayer to take you OFF BELAY.
2. Dismantle the toprope anchor and clean the gear from the fixed anchor. (Obviously not any gear you are using for your direct connection to the anchor!)
3. Pull up a bight of rope and feed it through the quicklinks, rap rings, or bottom links of the chains. Tie a figure-8 on the bight and clip it to your harness with a carabiner; this is a "keeper knot" to keep you from dropping the rope -- it's very embarrassing to be stranded at the top of a climb without a rope!
4. Untie your original tie-in (the rewoven figure-8) and pull the end through the fixed anchor.
5. You must now set up the rope for rappelling; it has already passed through the fixed anchor, so you just need to pull up enough rope to get both ends on the ground.

   The usual rappelling practices apply here. If your rope has an accurate middle mark, you can pull the rope through the chains until your reach the mark, then remove your tie-in and drop that end. In the worst case, you may need to pull up the whole rope to set up your rappel. You can also take advantage of the fact that you have a partner on the ground who can tell you when the ends are down. In any case, don't drop the rope!
6. Set up your rappel and transfer your weight to the rope, then undo your direct connection to the anchor. Don't forget to take all your gear with you when you rappel!

Transitions for Small Chains

You may encounter chains where the links are too small to pass a bight of rope through. In this case, the transition to lowering or rappelling is a little more involved:

1. Go in direct to the fixed anchor.
2. If you are rappelling, tell your belayer to take you OFF BELAY. If you are lowering, it's best to just ask your belayer for some SLACK.
3. Pull up a bunch of slack, tie a "keeper knot," and clip it to your harness.
4. Untie your original tie-in (the rewoven figure-8), and thread the end through the bottom links of the chains.

If you are lowering:

5. Tie into your harness through the tie-in points with a rewoven figure-8.
6. Unclip and untie the "keeper knot".

7. Tell your belayer to TAKE.
8. Undo your direct connection to the anchor.
9. Tell your belayer to LOWER.

If you are rappelling:

5. Tie a second "keeper knot" on the end of the rope, and clip it to your harness.
6. Unclip and untie the first "keeper knot".
7. Set up a rappel as before.

Climbing Movement

Wes Huang

Our program focuses on the safety systems and skills for rock climbing, but not on the physical act of climbing up a rock face. You will improve with practice, and you can ask any of our instructors or assistants for some pointers during the course (or better, during toprope climbing after the formal instruction is done). The following are some notes that outline important concepts of climbing movement.

Balance

- Balance is essential to climbing
  - Climbing is hard because you must learn to balance your body in 3 dimensions!
  - Very subtle shifts/changes can make a huge difference in your balance.
- Most of the time when climbing, we are in static equilibrium
  - Gravity pulls down, effectively at our center of mass (COM).
  - Support forces, generally from hands and feet, counteract the gravitational force.
  - This is easiest to see in a plane. It must be true in 3D, so it is true in every plane.
- Base of support – I will define this as the area around points you're standing on.
  - Balance is easy when your COM is inside the base of support
  - When your COM is outside the base of support, you need other forces to balance.
  - Those forces generally come from hands (but may also come from feet, etc.)
  - The further your COM from the base of support, the more force is required.
  - How does the base of support change as you climb?
- Your balance feels worst when your COM is at the edge of your base of support.
  - You can move your COM within your base of support.
  - You can change your base of support.
  - What are the tradeoffs between a wider and narrower base of support?
- Exercise: Think about where you ideally want each handhold or foothold.
- Exercise: Don't "power through" a move: figure out how you can do it more easily.

Hands

- There are many different terms for the different kinds of handholds.
  - Jug, sidepull, crimp, sloper, pocket, undercling, pinch, gaston
- Key questions:
  - In what directions can you pull on a given handhold?
  - How strenuous is it to exert the force you need?
- Don't forget that you can use your hands to push too!
- Straight arms versus bent arms
- Gym-climbing exercise: Glue hands – your hand sticks to a hold where it is first placed and releases only after the other hand has been moved.

Feet

- There are a few terms for different footholds: edge, smear
- Feet are usually used for standing on, but you can also use them to pull and push!

- Exercise: Silent feet – practice precision footwork by looking where you're going to place your foot, and placing it on the first try without any noise. Don't look away too soon!

Turning

- Turning is fundamentally a way of moving your center of mass (COM)
  - By turning, you put one hip against the wall.
  - This lets you have your COM closer to the wall, especially when you have to bend your knees.
  - This can provide better stability and more freedom to move your COM.
- Pivoting
  - In order to turn, you usually need to pivot your feet on a foothold from an inside edge to a backstep (outside edge).
  - Step on a foothold so there's enough room to pivot (if you will need to pivot).
- Gym-climbing exercise: Same-side-in Traverse/Climbing
  - Whenever you want to move your right hand, your right hip must be turned into the wall, and vice versa. Use any holds; don't restrict yourself to a set climb.
  - When you move a hand, both feet are on footholds.
  - You may reposition your feet as necessary in between moving hands.

Flagging

- Flagging is a useful, but intermediate to advanced technique.
- Flagging is when you are standing on only one foot and extend the other leg to one side (without stepping on that foot).
  - That extended foot may or may not touch the wall, depending on the situation.
- Flags can be used to keep you from barn-dooring, but in many situations flags are used to position your COM to improve your balance and to extend your reach.
- The "normal" (or "back-step") flag
  - The right leg extends out to the right side or vice versa.
  - Foot you are standing on is usually a back-step (i.e., outside edge towards wall).
  - Usually, you are using the opposite hand and foot, e.g., stand on left foot, holding with right hand; flag with right foot, reach with left hand.
- Reverse flags -- the inside and outside flag
  - The right leg extends out to the left side or vice versa.
  - Usually only useful on overhanging climbs.
  - Outside flag: the extended leg is behind you
  - Inside flag: the extended leg is in front of you, between you and the rock.
  - Usually, you are using the same hand and foot, e.g., stand on left foot, holding with left hand; flag with right foot, reach with right hand.
- Gym-climbing exercise: Traverse/Climb using a flag every time you move a hand
  - You may reposition your feet as necessary in between moving hands

Drop knee

- An intermediate to advanced technique, really just an extreme turn.
- For example: right hand on hold (sidepull), edge with right foot, backstep with left foot, (left hip turned into the wall), bend left knee, and reach with left hand.
- To avoid injury, keep your foot and knee in alignment!

Life after the Rock Program

Your life will never be the same after the Rock Program. You'll be constantly asking yourself "When and where am I going climbing next?" Here are some ways to fuel your new addiction.

Go climbing

There are a number of opportunities for climbing around the Boston area. You can often just bring your own personal gear (harness, belay device, shoes) and climb with these groups.

- *AMC Boston Rock Program Facebook Page*– Post on our page to find people who want to go climbing!
- *Wednesday nights at Quincy Quarries* – Wednesday night has been the traditional AMC climbing night at Quincy Quarries. Not sure if this still happens. Most climbers show up between 5pm and 6pm and climb until dusk. When there is no formal get-together at Quincy Quarries, you still have a pretty good chance of meeting folks who are climbing.
- *Boston Rock and Ice Climbing Meetup* – there are regular events for climbing around Boston, both outside and in the gym, as well as trips further afield. For more information, see: http://www.meetup.com/bostonrocks/
- *Mountaineering, Climbing, & Backpacking of New England Meetup* – there are regular events, including many climbing events, in a variety of locations but often in New Hampshire. See http://www.meetup.com/MountaineeringNewEngland/
- *Worcester Climbers Google group* – a pretty active group/list in the Worcester area. See http://groups.google.com/group/climbworcester/
- *AMC Boston Mountaineering Committee* – organizes several climbing weekends:
    - *Memorial Day Weekend at Acadia National Park*
    - *Summer Rendezvous* – sometime between July and September
    - *Fall Frolic (or Old Seconds Weekend)* – in October at the Gunks

  You generally need to make your own arrangements for climbing partners for these weekends.

Buy some gear

A good place to start is to buy enough gear to go toproping on your own:

- personal gear – harness, helmet, chalk bag, shoes, belay device, locking carabiner
- dynamic climbing rope
- nylon webbing for setting up toprope anchors – since some Boston area crags have trees far from the edge, we'd suggest at least one 40' piece and a 20' piece of 1" tubular nylon webbing. You may also consider buying static rope instead, but it is more expensive.
- carabiners for toprope anchors – at least two for the master point, but when you have bolts at the top, you'll want two locking carabiners to connect to the bolts.

See the "Buying gear" section for more information and advice.

Make some climbing friends

- *Boston AMC Climbers' Nights* – Social events usually held the first Thursday of the month from September through June. Come talk about climbing and share your latest

adventure! Look for email announcements or check the website http://www.amcbostonclimbers.com/ for details.

- Don't be shy about asking to go climb with people!

Read some stuff

- You will start receiving *The Crux*, the AMC Boston Mountaineering newsletter.
- Check the AMC Boston Mountaineering website http://amcbostonclimbers.com/ for information on upcoming events
- Buy or subscribe to some magazines, such as:
    - Climbing
    - Rock and Ice
    - Alpinist
- Other recommended websites:
    - http://www.neclimbs.com: Run by Al Hospers, loads of info and condition reports
    - http://www.gunks.com: The official Gunks climbing web site
    - http://www.animatedknots.com: The ultimate online knots guide
    - http://www.rockclimbing.com: Climbing routes and info
    - http://www.mountainproject.com: More routes and info

Take other AMC instructional programs

- *The Ice Climbing Program* – The ice climbing program will hold an informational meeting in early to mid December. Look for an email announcement or check the website for information on the program. Space in the program is very limited and is open to those who have taken the rock program (or have the skills taught there) and have experience in cold weather hiking.
- *Self-rescue class* – offered twice a year, in the spring and the fall, and taught by a professional instructor. To get the most out of this class, we recommend waiting until you have had some experience building technical (i.e., gear) anchors and leading trad. Email workshops@amcbostonclimbers.com for more information.

See some films

There are a number of outdoor film festivals that are shown in the Boston each year. Of particular interest are: the Reel Rock Film Festival (typically in September or October at the Regent Theater in Arlington) and the Banff Mountain Film Festival (typically in February at the Somerville Theater).

Be an assistant next year

We love to have graduates come back and help out with the Rock Program. It's a great way to engage with the climbing community, refresh your skills, and give back to the program. Watch for email announcements next spring, and come help out with knots night and the program weekends!

Buying Gear

One of the great joys of being a climber is buying gear. Here's some pointers to get you started.

Where to buy gear

- *Local stores*: REI and EMS both have several stores in the Boston area; EMS also has stores in New Hampshire. Both companies have a good selection of climbing gear.
- *Other stores:* you may find yourself near one of the following stores which generally have a better and wider selection of gear than REI and EMS
    - Rock and Snow, New Paltz, NY
    - International Mountain Equipment (IME), North Conway, NH
    - Ragged Mountain Equipment, Intervale (near North Conway), NH
    - Outdoor Gear Exchange, Burlington, VT
    - Alpenglow Gear, Bar Harbor, ME
    - Cadillac Mountain Sports, Bar Harbor, ME
- *Online stores*: There are many reputable web sites that sell climbing gear. Most offer free shipping for orders over a certain amount.
- *Other online resources*:
    - Use a search engine such as Google Product search to find the best deals for a specific item.
    - http://www.steepandcheap.com/ is a website that sometimes has good deals on gear that you want. There are several websites for getting alerts on Steep and Cheap deals of the moment.

You don't have to pay full price

- If you are patient, you can buy almost anything at 20% or more off list price.
- EMS has some sales ("club days" for members of an outdoor club, and "upgrade your gear sales") a few times a year during which (almost) everything in the store is 20% off Students can get 15% off at EMS stores any time.
- REI offers coupons for 20% off one item to members a few times a year. Lifetime membership at REI costs $20; you are then eligible for a member rebate/dividend (usually 10%) on full-price purchases.
- Most online retailers will have a sale at least a few times a year (usually during the typical holidays). You can sign up for their email list to get notifications.

What gear to buy

The rest of this section has specific advice on buying gear. In general, there are three things that you will want to balance:

- cost
- weight – all those grams add up, particularly after you've been carrying your gear all day
- personal preference – is the harness comfortable? do you like only full sized carabiners? etc.

Essentially all gear from major brands is UIAA/CE certified to meet minimum standards, so safety is not an issue when buying new gear. Note that "major brands" doesn't just mean Black

Diamond and Petzl, but also includes Mammut, Wild Country, Mad Rock, Trango, Metolius, CAMP, and so on.

Gear buying advice

The following advice focuses on gear that you need to go toproping and sport climbing. Trad gear is beyond the scope of this booklet, but it is usually not hard to find a "gearhead" who is happy to talk about gear.

- *Harness* – usually comes in S, M, L according to waist size. There are a number of women-specific harnesses available. Also see *How to Rock Climb!* pages 103-105.
    - Comfort is key. It's best if you can try on the harness and hang on it, though not many local stores are currently setup to do this.
    - Features to consider: standard buckles versus speed buckles, whether leg loops are adjustable (useful for ice climbing), how many and type of gear loops.
    - If you think you might try ice climbing, get a harness with slots for ice clippers, and make sure that the harness is large enough to fit over your winter clothing (i.e., pants, jacket, and underlying layers).

- *Climbing shoes* – There are a variety of brands and styles, some sold in US sizes, others in European sizes. Sizing can vary a lot from brand to brand. Also see *How to Rock Climb!* pages 10-12.
    - Comfort is key. For a first pair of shoes, get something that you can wear all day. They shouldn't be too tight, but also shouldn't be too loose.
    - Leather shoes will stretch a bit (sometimes by a half US size)
    - Try on several pairs at a local store. Buy them from your local store so they'll continue to stock a selection of rock climbing shoes!

- *Helmet* – Get a climbing-/mountaineering-specific helmet. Make sure it fits your head and is comfortable to wear. The chin strap should be tightened so that the helmet does not shift, exposing part of your head. Most climbing helmets have features to attach a headlamp over the helmet. Try some on at a local store, and buy from your local store so they'll continue to stock a selection of helmets! Also see *How to Rock Climb!* page 14.

- *Chalk bag* – There are a few different styles and a lot of different patterns/designs. You may want a chalk bag with a zippered pocket to hold your keys while climbing. Many (most?) climbers use a chalk sock to hold the chalk in their chalk bag.

- *Belay/rappel device* – Also see *How to Rock Climb!* pages 163-165.
    - A plain ATC device, such as the Black Diamond ATC, is fine for toproping, sport climbing, and seconding trad climbs.
    - You may want an ATC device that has a high-friction side, such as the Black Diamond ATC-XP or the Mammut Vader.
    - If you think you will eventually lead trad climbs, you should consider getting a belay/rappel device that can be set up in an autolocking (or "guide") mode, for example the Petzl Reverso or the Black Diamond ATC-Guide.

- *Carabiners* – Also see *How to Rock Climb!* pages 105-107.
    - There are different carabiners for different purposes:
        - Belaying/rapelling – typically a HMS carabiner which is larger and has a round (as opposed to I-beam) profile.
        - General locking carabiners – for connecting yourself to an anchor, can be smaller (but still large enough to take a clove hitch) and therefore lighter.
        - General non-locking carabiners – for clipping stuff (shoes, water bottle, etc.) to your harness.
        - Carabiners for draws and quickdraws – generally a straight-gate or sometimes wire-gate carabiner for the pro side, and a bent-gate or wire-gate for the rope side.
        - Racking carabiners – for clipping gear to your harness or gear sling
    - Characteristics of carabiners:
        - Gate – straight gates are traditional; bent gates are for the rope side of draws only and supposedly allow for easier clipping; wire gates are lightweight (and minimize gate flutter) but usually require a notch-nose.
        - Nose:
            - notch-nose – for wire-gate or cheap straight/bent-gate carabiners. There's no reason to get straight/bent-gate carabiners with a notch-nose – the nose can snag on gear loops or gear slings (annoying), and they're not that much cheaper than keylock carabiners.
            - keylock – a snag-free nose design
            - clean wire – a nose for wire-gate carabiners that doesn't snag, found on the Wild Country Helium and Black Diamond Hoodwire. The Petzl Ange carabiner has a unique snag-free gate/nose design.
        - Shape: D-shaped are perhaps most common; pear-shaped or HMS carabiners are generally used for belay/rappel; oval carabiners can be handy for racking gear and for toprope anchors.
        - Size – some carabiners are "full size" while others are smaller. Small carabiners are generally lighter, but you may or may not like the feel of smaller carabiners, depending on what you are using it for.
        - Gate opening – a larger gate opening makes it easier to get a rope in/out.
    - For locking carabiners, you have the choice between screw-gate and autolocking. While autolocking carabiners have the advantage of locking automatically, this can be annoying when you have to clip several things (especially one-handed). Some people advise against getting autolocking carabiners so you get in the habit of locking/checking your carabiners.

- *Dynamic Climbing Rope* – your first rope should probably be a single (as opposed to double/half or twin) 60 meter rope. We'd advise against getting anything shorter. Though 70 meter ropes are becoming more common, they weigh more and are rarely required in the northeast. Single rope diameters range from 10.5 mm to below 9 mm. Thicker ropes are generally more durable but will weigh more. A thick durable rope is good for toproping, but a moderate-thickness (therefore less durable) and lighter rope is more desirable for lead climbing. A non-dry rope is fine for rock climbing and is

cheaper. (Dry ropes have a waterproof coating that can be useful for ice climbing.) Some ropes have a middle mark that is applied by the manufacturer, and there are also "bipattern" ropes that have a different sheath pattern on each half of the rope. You should be able to buy a reasonable basic first rope for $130 or less. Also see *How to Rock Climb!* pages 89-94.

- *Slings* – you will need a few single (24 inch / 60 cm) and double (48 inch / 120 cm) nylon slings that are 9/16-11/16 inch or 15-18 mm wide. You will use these slings for tying into an anchor, holding gear that you clean, possibly assending, etc. For general purpose slings, we recommend nylon instead of high-tensile webbing (e.g., spectra, dyneema, etc.) Many people prefer sewn slings, but you can tie your own nylon slings: use 5' of webbing for a single, 9' for a double. Your slings/webbing should be rated to at least 10 kN or 2250 lb. Also see *How to Rock Climb!* pages 94-97.

- *Quickdraws* – for sport climbing, you use quickdraws to clip bolts.
    - You can buy quickdraws, but you can also make your own by buying the components separately. However, quickdraws (at least when on sale) can often be purchased for less than the two carabiners.
    - See the carabiners section above for discussion about notch nose versus keylock.
    - The "dogbone" is the specialized sling that connects the two carabiners. Ideally your set of quickdraws would have at last a few longer dogbones. Dogbones are typically 12-18cm long and typically have some mechanism (e.g., rubber insert) to keep the rope-side carabiner from rotating.
    - Many people buy quickdraws and later convert them to alpine draws for trad climbing by replacing the dogbone with a high-tensile single sling.

- *Rappel Brake Hand Backup* – take 3-5 feet of 5-7 mm nylon accessory cord and tie a loop with a double fisherman's bend. The exact length you need depends on the diameter of the cord that you use, how many wraps you use in your friction knot, and where you attach the backup to your harness.

On Leading

Wes Huang

Seconding and toproping are great because you're outside and climbing on real rock, but there's nothing like being on the "sharp end" of the rope. When you're on lead, you're the one who's going to take a fall if you slip or pop off. Leading requires a solid understanding of, your own climbing ability and confidence in your technical ability to place protection. It's about calculated risk – the combination of your abilities and the potential consequences, compared with your personal level of risk tolerance. I can see how it appeals to the adrenaline junkie, but for me it brings an acute focus on being in the moment: looking for possible handholds and footholds, knowing where my last piece of pro is and where the next will be, and executing every move smoothly and efficiently. No one can tell you when you're ready to lead – that's something that you have to decide for yourself.

How to start leading

There are three main ways to start leading:

- *Find a mentor* – This is perhaps the best way to start leading. Find someone who will show you the ropes (so to speak) and take you to different places to climb.
- *Professional instruction* – Many guides will teach you to lead, typically in 2 or 3 days of semi-private instruction. This can be a bit costly, but has the advantage of providing professional instruction from a highly trained individual.
- *Go out on your own* – While not recommended, a number of people have learned to lead this way. There are a number of excellent books that cover the required skills.

Preparations for leading trad

There are many ways to prepare yourself for leading trad:

- *Climbing outdoors* – Just gaining a lot of experience climbing on real rock, toproping or seconding sport or (especially) trad climbs, will serve you well.
- *Lead climbing in the gym* – This can be a good way to start leading. You've learned how to lead belay in the rock program; to lead in the gym you also need to understand how to clip draws (i.e., don't back-clip or Z-clip). You should be able to get someone to show you this in the rock program, but the local rock gyms do offer lead climbing classes. Lead climbing in the gym will give you the experience of leading (and the opportunity to safely take a lead fall!) However, gym lead climbs are all on overhanging walls, so they are more strenuous than trad or sport climbs at moderate grades.
- *Sport climbing* is a great way to start leading outdoors without having to buy a lot of gear. Boston is a 2 hour drive from Rumney (NH), the sport climbing mecca of the northeast!
    - You need to learn how to clip bolts, to clip the rope into draws properly, and to clean a sport anchor.
    - Beyond what you already have for toproping, you just need some quickdraws. (See the "Buying Gear" section of this booklet for some advice.) There are many easy to moderate difficulty climbs (5.2 to 5.8) at Rumney that have only 4-8 bolts. (See the guidebook for details.) Between you and your climbing partner, you will want at least 8 quickdraws (but ideally 10-12). Don't forget that beyond one

quickdraw per bolt, you'll also need draws or other anchor-building stuff (slings or cord and carabiners) for the two-bolt anchor at the top of the climb.
    - Please note that you should not toprope through the fixed hardware (quick clips, etc.) atop sport climbs to minimize wear. Build your own anchor instead.
    - Also see *How to Rock Climb!* Chapter 8 (on sport climbing).
- *Reading* – There are a number of books you can read to learn more about leading and placing gear:
    - *How to Rock Climb!* 5th edition, by John Long – Since you already have this book, start here with Chapter 6, "The Art of Leading", Chapter 5, "Belay Anchors", and pages 107-53 on Anchors and Rock Hardware.
    - *Climbing Anchors*, 2nd edition, by John Long and Bob Gaines. Some material from this book has been incorporated into the 5th edition of *How to Rock Climb!* but this book provides more in-depth discussion.
    - *Rock Climbing Anchors*, by Craig Leubben.

  Also see the "Further Reading" section later in this booklet.
- *Practice placing gear and building technical anchors* – It's best to practice on the ground. While you're out toproping, try placing gear in between climbs. Get some feedback from a mentor on your placements and on the rigging for your technical anchors.

Gear

One of the great things about trad climbing is that you get to buy more gear! Shopping for gear is something that you can totally obsess over – not only are there technical specifications and personal preferences to consider, but there's also the challenge of finding everything for at least 20% off list price! (See the "Buying Gear" section of this handbook.)

It's best if you can lead on other people's racks for a while to figure out what types of gear you like and other personal preferences before you buy gear. (For example, what kinds of cams and nuts you like, racking strategies, and so on.) Trad gear isn't cheap, and it's going to last you a while, so make sure you know what you want! It's beyond the scope of this handbook to go into more detail on gear, but you should have no problem finding a "gear head" who is happy to discuss gear ad nauseum.

Your first trad leads

So you've learned to place gear, practiced building technical anchors, and are mentally prepared to start leading. Here are a few suggestions on doing your first leads:

- *Mock lead* – It's useful to practice a trad lead on toprope. Your belayer belays you on toprope, but you're also tied into a second rope that you clip into protection as you climb. When you reach the top, you build an anchor, pull up the lead rope, and belay your second from the top. This gives you the experience of doing a trad lead without the risk of falling on your gear placements. Hopefully, your second is your mentor who can give you feedback on your placements after climbing and cleaning the pitch. *Boardwalk* (5.5) at Crow Hill is a great climb for a mock lead. Quincy Quarries has several climbs that are also suitable.
- *Your first trad lead* – Find a climb well within your climbing ability. Hopefully you are

doing your first trad lead with a mentor who will give you feedback on your placements after he or she climbs and cleans the pitch. Note that trad leading is not just about placing gear correctly; there's also the questions of where to place it, whether to extend the draw, protecting the second, rope drag, and so on. In addition, you are now responsible for route finding! Again, *Boardwalk* at Crow Hill, and several climbs at Quincy Quarries are good for first leads. There are also many easy-to-moderate climbs in the Gunks that are suitable for a first lead. One strategy at the Gunks is to choose a climb that has an easy last pitch (such as *Dennis* or *Layback*) and you can swing leads with your mentor!

- *Don't push the grade* – You shouldn't be in any rush to push the difficulty of your trad climbs when you start leading. Take some time to do climbs well within your climbing ability and just gain experience placing gear and building anchors.

Guidebooks

As you start leading trad, you'll want to start your collection of guidebooks. There are a number of iOS/Android apps that are now available:

- MountainProject app (free) – take the web site with you when you climb!
- The Gunks App ($$) – has great photos of routes and their starts but thin on beta and doesn't have all the routes in the guidebooks.
- rakkup App / Rock Climbs of Acadia ($$) – the App version of the new guidebook to climbing in Acadia National Park.

Here are some guidebooks that should (probably) eventually be in your climbing library:

- *Boston Rocks*, 2nd edition, by Richard Doucette and Susan Ruff. Covers climbing and bouldering in the Boston area (east of Worcester).
- *Rumney* by Ward Smith. Covers sport climbs, bouldering, and the few trad climbs at Rumney (NH).
- *The Climber's Guide to the Shawangunks: the Trapps*, by Dick Williams. This is the grey book with the salamander on the cover that "everyone" has. This book is comprehensive, but it can be difficult to route-find from the descriptions/photos.
- Other guides to the Gunks include *The Gunks Guide* by Todd Swain. This and other guides to the Gunks are generally not as comprehensive as the above but may have better route photos/descriptions.
- *The Climber's Guide to the Shawangunks: the Near Trapps and Millbrook*, by Dick Williams. Most of the moderate climbs at the Gunks are in the Trapps, but there are some in the Near Trapps that you may want to do someday.
- *North Conway Rock Climbs*, by Jerry Handren. Covers the east side of the White Mountains, including Whitehorse and Cathedral in North Conway and much more.
- *Secrets of the Notch* by John Sykes. Covers the west side of the White Mountains, including Cannon cliffs, but not Rumney. Unfortunately, this book is currently out of print.
- *Rock Climbs of Acadia*, by Grant Simmons. The new guidebook to climbing in the National Park.
- Note that there are some new guidebooks expected for New Hampshire any year now…

Further Reading

In addition to this list, also see the recommended books and guidebooks in the "On Leading" section.

Skills

The following books can add to your skills as a climber:

- *Climbing Anchors*, 2nd edition, by John Long and Bob Gaines, published by Falcon, a great follow-up to the "How to Rock Climb!" book, especially if you get into leading.
- *Mountaineering: The Freedom of the Hills* edited by Steven Cox, Kris Fulsaas, published by The Mountaineers, this is THE comprehensive guide to mountaineering, a must have book for any climber.
- *The Self-Coached Climber: the guide to movement training performance,* by Dan Hague and Douglas Hunter, published by Stackpole Books. Starts with principles of movement in climbing and continues on to physical and mental training.

History

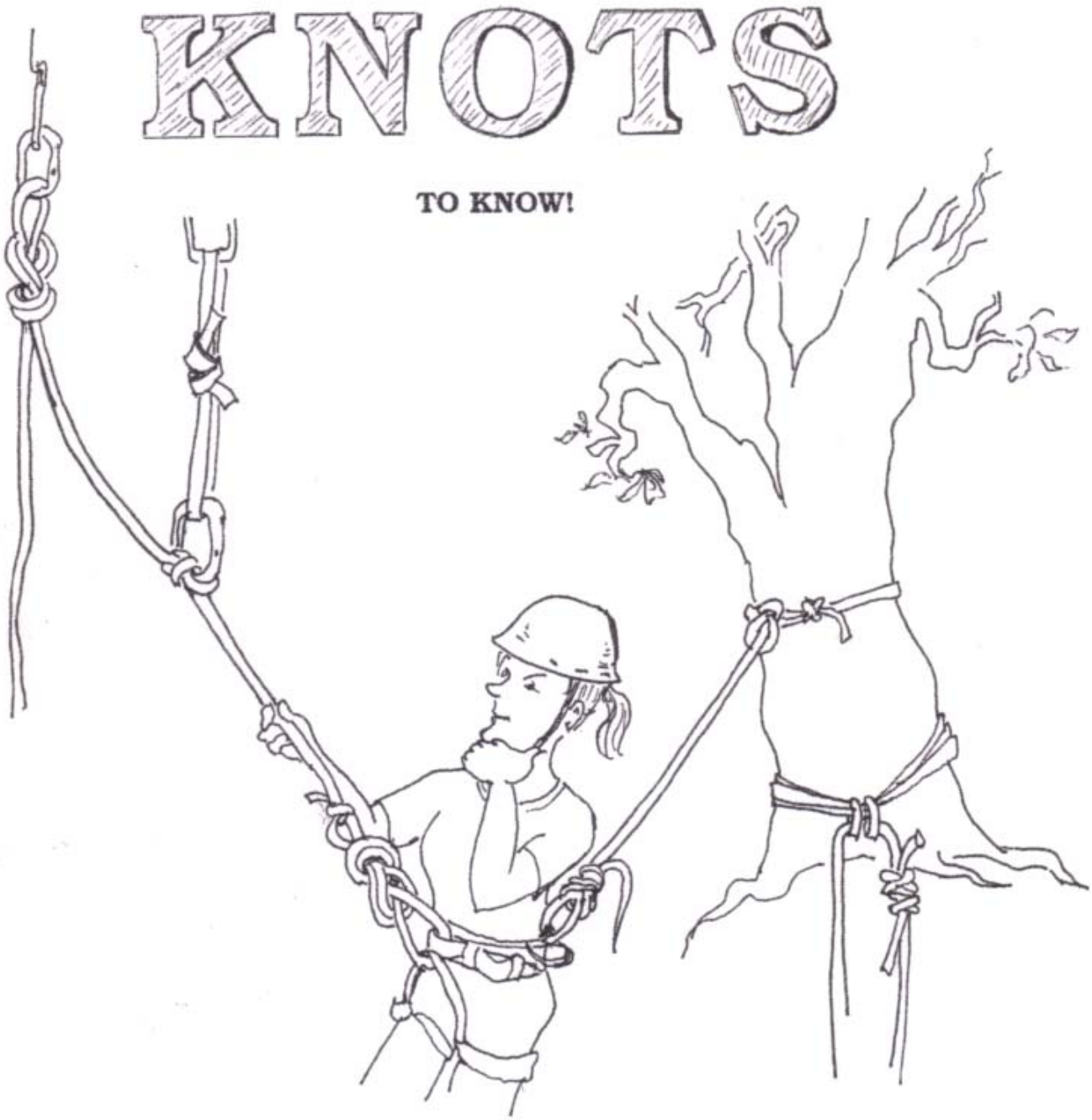
The development of climbing over its history, the accomplishments of different generations of climbers, and the evolution of the techniques, equipment, and attitudes of climbers makes fascinating reading.

- *Yankee Rock and Ice: A History of Climbing in the Northeastern United States* by Laura Waterman, Guy Waterman and S. Peter Lewis, published by Stackpole Books, THE book on the history of climbing in the Northeast, a great read and highly recommended.
- *Camp 4, Recollections of a Yosemite Rock Climber* by Steve Roper, published by The Mountaineers, the early history of big wall climbing in Yosemite Valley.
- *Climbing in North America* by Chris Jones, published by the University of California Press – A thorough, if somewhat old (1976) book, detailing the history of mountaineering with more of a focus on western North America. Although out of print, new and used copies are available online.

Other

- *Accidents in North American Mountaineering* – published every year by the American Alpine Club (AAC), this book contains descriptions and analysis of accidents in rock climbing, ice climbing, and mountaineering. The purpose of this book is to make people aware of common dangers and mistakes in climbing so that they can become safer climbers. For the last few years, there has also been a "Know the Ropes" article that describes best practices in a particular part of climbing (Rappelling in 2012, Lowering in 2013). If you join the AAC, you receive a copy of this book as part of your membership.

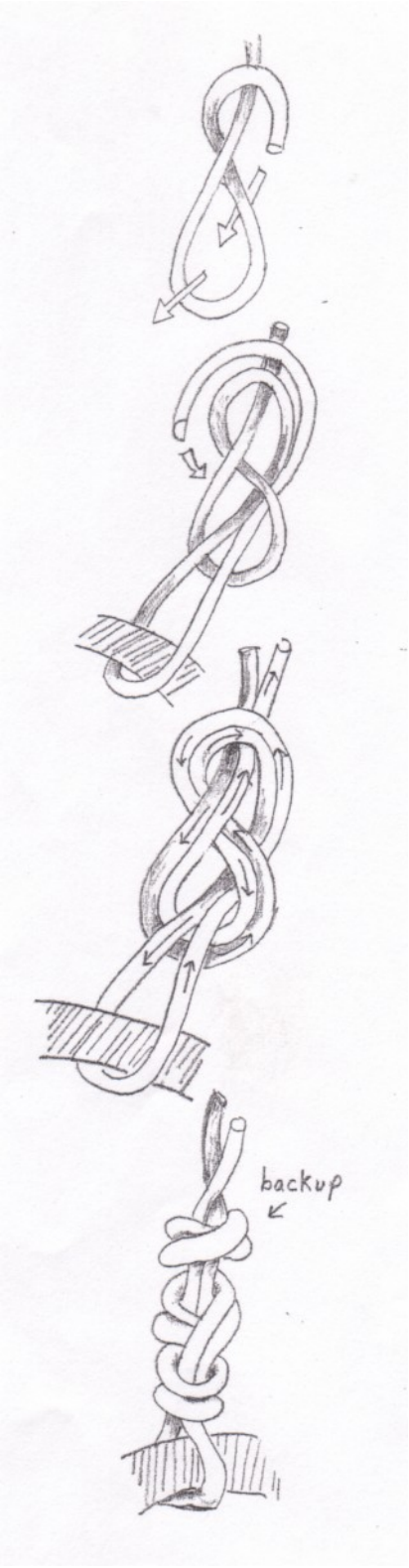
Knots



Illustrations by Judy Bayliss

Note: you may find the website http://www.animatedknots.com/ helpful for learning knots.

Rewoven Figure 8



This is the most widely used tie-in knot because it is strong, secure, and easy to visually inspect. The rewoven figure 8 should be tied directly to the harness.

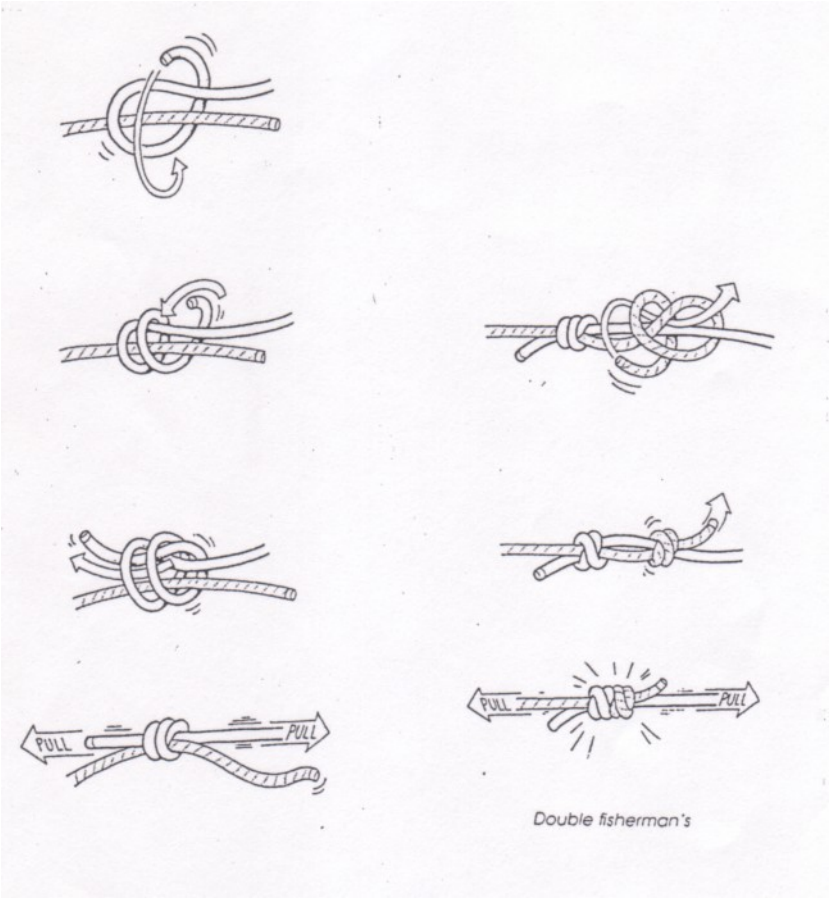
1. Tie a single eight in the rope two to three feet from its end.
2. Pass the free end of the rope through the harness tie-in point(s), then retrace the original eight. Keep the loop that passes through the harness as short as possible.
3. Tightly cinch all four strands of rope exiting the knot, and secure the rewoven figure 8 with a back up knot.

Fisherman's Backup

1. Make sure you have 15-18 inches of free rope coming out of the primary.
2. Coil the free end twice around the standing rope, toward the primary tie-in knot.
3. Pass the free end out through both coils, and cinch the Fisherman's knot snugly against the primary tie-in knot.

Remaining tail should be around 3 inches long.

Double Fisherman's Knot



1. Coil the free end of one rope twice around the second rope, and pass if back through the inside of the coils.

2. Repeat the above procedure, this time coiling the second rope around the first, but in the opposite direction so the finished knots are parallel to each other.

3. Pull on all four ends coming out of the knots to cinch them snugly against each other. The remaining tails should be about three inches long.

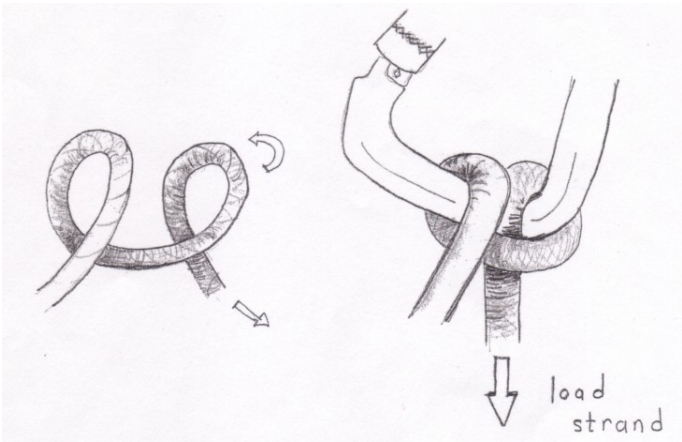
Clove Hitch

The clove hitch provides quick adjustment, uses a small amount or rope, but has a tendency to loosen when not loaded. Be sure it is kept tight at the bottom of the carabiner, away from the gate. The reliability of a clove hitch can be improved by using a locking carabiner. The LOAD strand of the clove hitch should be situated near the spine of the carabiner.

Twist two coils of rope into the rope, then pass the second coil in front of the first.

1. Clip both coils into a carabiner, with the load strand situated near the spine of the carabiner.
2. Cinch the clove hitch tight.

Münter Hitch

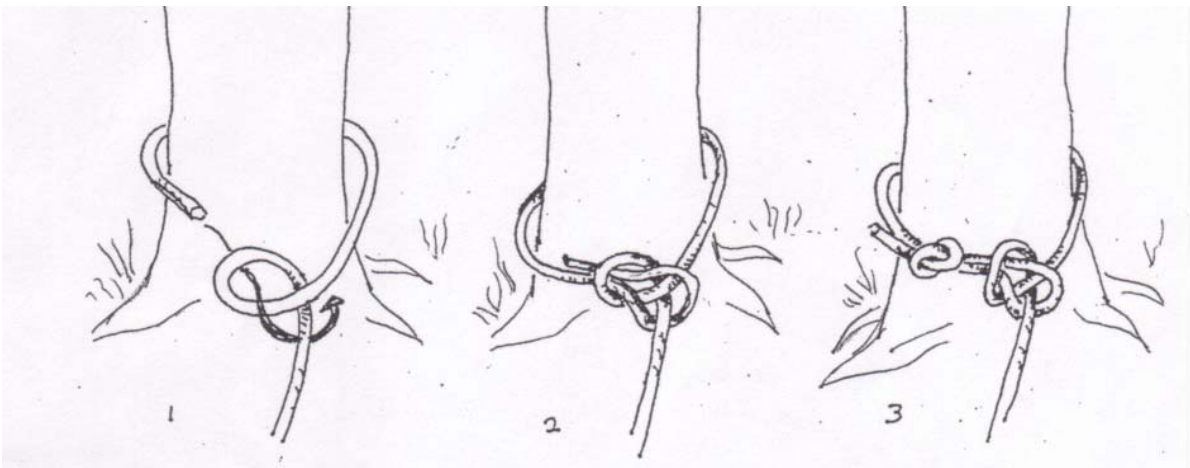


1. Twist two coils into the rope as shown.
2. Fold the second coil back toward the first.
3. Clip a locking carabiner into both coils. Lock the carabiner.

Make sure the Münter hitch is oriented with the load strand next to the spine of the carabiner.

Bowline

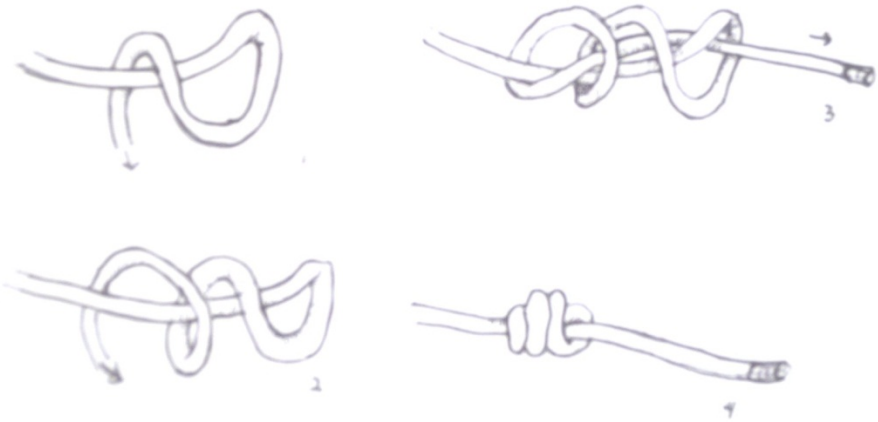
A good knot to anchor your rope to a tree or other features.



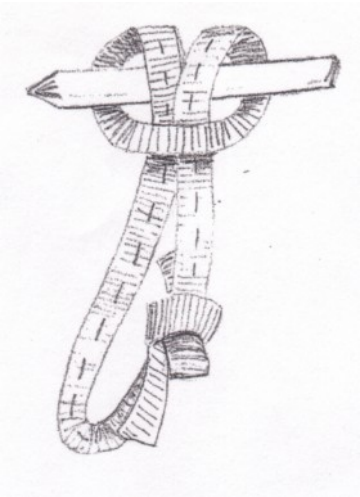
1. Pass the free end around the tree. Twist a coil into the rope, with the free end coming out on top and the loop facing the free end.
2. Pass the free end up through the coil, down around the standing end of rope and then back down through the coil. (a rabbit comes out of its hole runs around the tree and back down its hole.)
3. Tie a Fisherman's Backup knot on the loop around the anchor. Be sure to tie this knot as shown in the illustration.

Triple Barrel knot

A good knot for the ends of the rope when rappelling



Girth Hitch

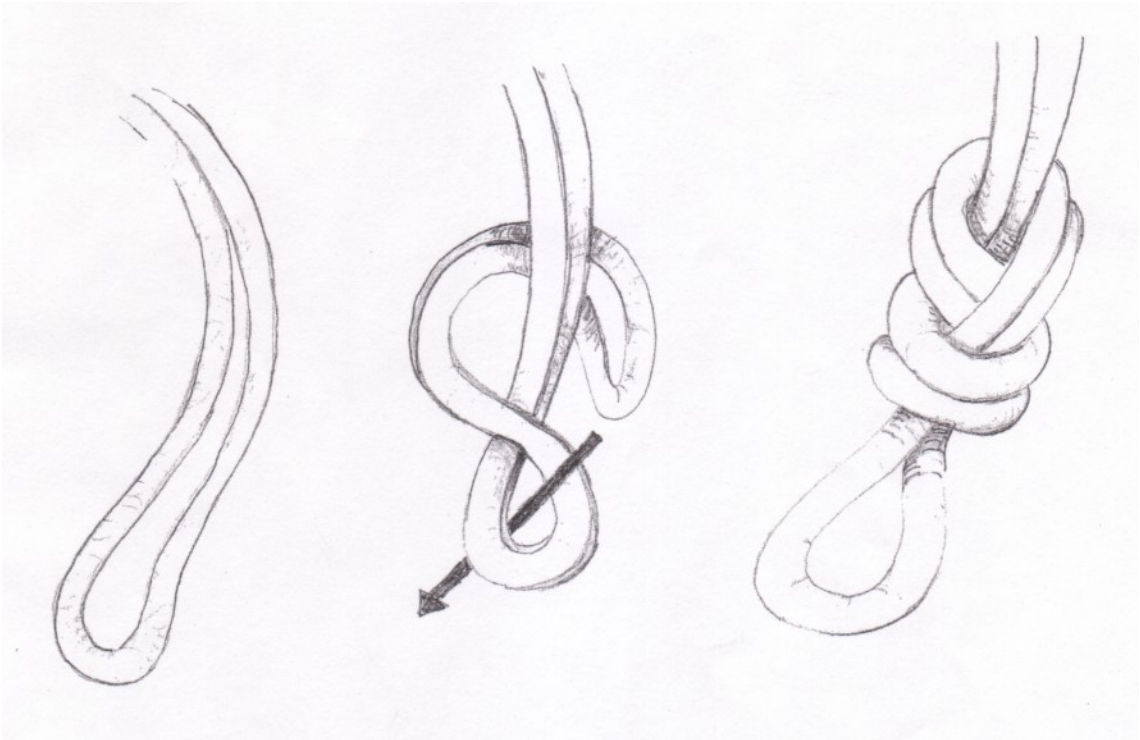


The girth hitch works well for tying off trees and chock stones. When slinging chock stones with a girth hitch, be sure that the hitch is near the outside of the chock stone. This limits the load on the chock stone and is less likely to rotate the chock stone out of the crack. The girth hitch is also good for attaching a sling to your harness for clipping into anchors, and for connecting slings together.

Pass a loop of sling around another sling, tree, chock stone or other fixed object.

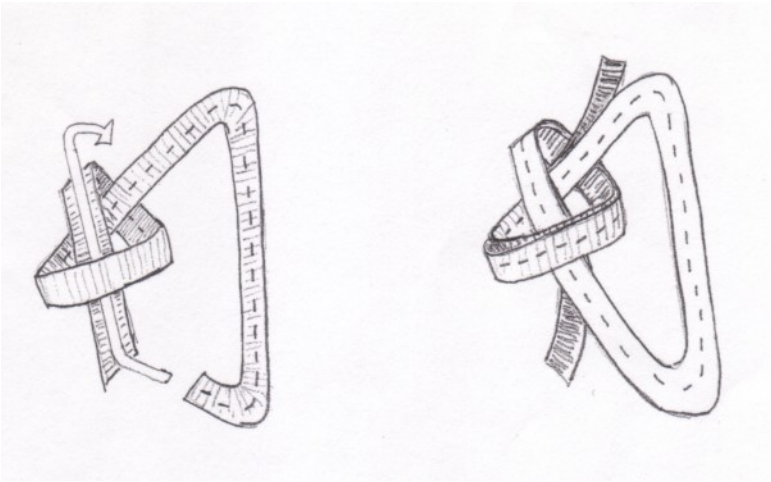
Pull the sling through itself, fastening it to the object you passed it around.

Figure 8 on a Bight



Water Knot

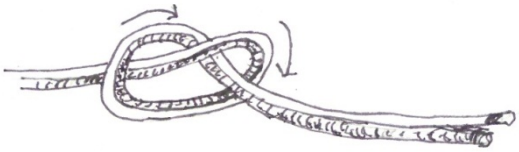
Climbers most commonly use the water knot for tying webbing into loops. Keep the tails at least 3 inches long and inspect the knot before each use. “Set” the knot by loading the sling with body weight. Some people “fix” the tails by taping or lightly sewing them so the knot cannot creep.



1. Tie a single overhand knot in one end of the webbing.
2. Match the other end of the webbing to the first end and retrace the original overhand knot.
3. Both tails should exit from different sides of the knot, and should be about 3 inches long.

EDK

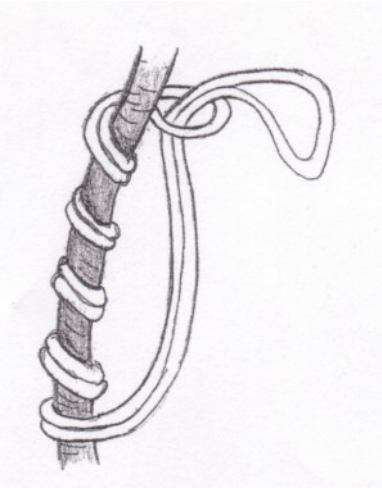
The EDK (European Death Knot), or the flat overhand bend, can be used to join two ropes together for rappelling.



- the tails must be at least 12 inches
- this knot must be well dressed!
- tighten the knot in 4 ways:
    - ends of same strand (x2)
    - ends of opposite strands (x2)

Friction Knots

Klemheist

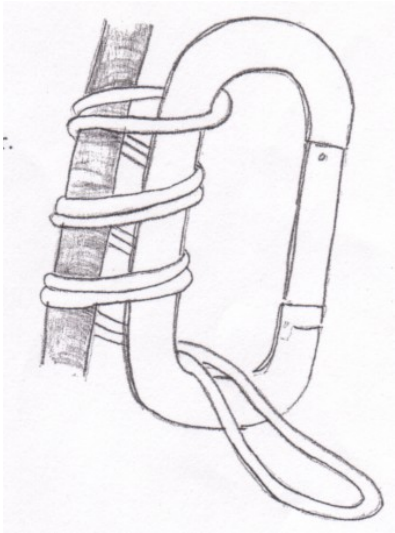


1. Wrap a loop of cord or webbing sling 4 or 5 times around the rope.

2. Pass the other end of the sling through the loop, and clip into the sling where it conies out of the loop.

As with other friction knots, add more wraps if it slips.

Bachman

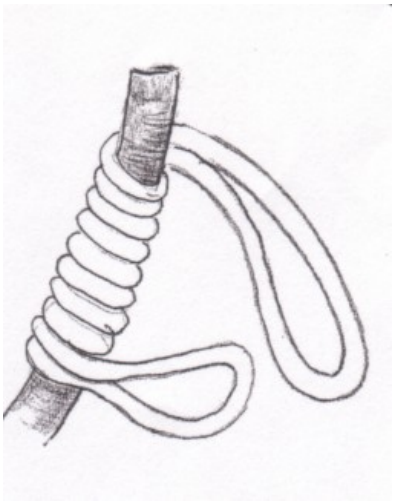


1. Clip a loop of cord into a carabiner.

2. Place the carabiner against the rope, wrap several times around both the spine of the carabiner and rope.

3. Clip into the sling where it comes out the bottom of the carabiner.

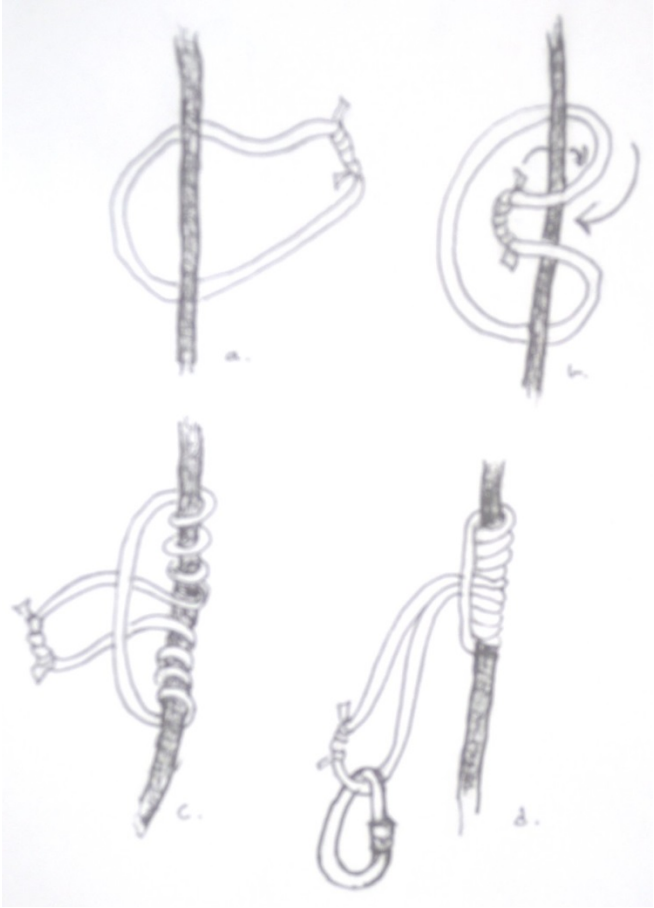
Autoblock



1. Wrap a loop of cord or webbing sling 4 or 5 times around the rope.

2. Clip both ends of the sling to a locking carabiner that is attached to your harness.

Prusik



1. Put a looped piece of cord behind the rope it's being tied to. Pass one side of the loop through the other side of the loop while wrapping it around the rope in the middle.

2. Wind the cord around the rope at least three times.

3. Do not let the winds overlap and tighten the knot evenly.

Coiling a rope (butterfly)