CMC/PPG Basic/Intermediate Rock Climbing

(as of:) May

2025

Mountaineering School Student Handbook

The purpose of this document is to identify the class objectives, schedules and assignments pertaining to the CMC Pikes Peak Group BMS Rock Climbing Class.

Pikes Peak Group
BMS Rock

Introduction

Welcome to the Colorado Mountain Club Pikes Peak Group BMS Rock class! The goal of this class is to give you the starter skills to pursue your outdoor rock climbing career safely. In this course you will learn about climbing gear, knots, communication, safety, belaying, rappelling and an introduction to climbing anchors. We will also discuss climbing etiquette and how to interpret rock climbing route information (also known as "beta"). We will teach you what you initially need to know to climb on a toprope, communicate with and belay your climbing partner safely, rappel, and evaluate climbing situations with some level of safety and consideration of other climbers and the environment. Hopefully this will open up a world of climbing to you. Those of you that decide that rock climbing is something you would like to continue, should next look into the Basic Anchors course and the Lead Sport Climbing. Later on, if you feel a pull of progression or want a different type of climbing experience, you should consider traditional or “trad” climbing, or use your knowledge for technical alpine climbing to get up our many beautiful peaks here in Colorado or worldwide.

We hope that our instructors and classes will inspire you to continue your training and to build your skills and experiences. We want to help you reach your rock climbing goals but we must stress that this class is only step one. We encourage you to continue your rock climbing education through the other climbing courses offered with the Pikes Peak Group. You may use this knowledge in addition to gaining experience as a prerequisite for High Altitude Mountaineering School (HAMS) or the CMC PPG ARC Pro courses.

Rock climbing gear can be a significant investment. You may not yet know if rock climbing is for you. If you are hesitant to purchase your own gear for the course please reach out to the instructors. We may be able to find gear for you to borrow for the field days. However, the club only has limited gear to lend students. It is recommended to use your own gear as much as possible to gain familiarity with your own systems. A good source for used gear in Colorado Springs are: Gearonimo Sports, Mountain Equipment Recyclers and the Facebook group *Colorado* Climbing Gear Exchange. We will emphasize purchasing a basic climbing kit first. The readings, along with the classroom presentations, should help you make good gear decisions. If you still have questions, please let me know.

<u>Pikes Peak Group Volunteers:</u>

All classroom lectures and Field Day exercises are done by CMC Pikes Peak Group (PPG) volunteers. The PPG volunteer corps is what makes possible all of our education programs, including Basic Mountaineering School. As you move through the program, ask yourself if you would want to become an instructor or leader. There are many opportunities and the club is always on the lookout for the next generation of aspiring teachers and those who wish to give back.

Course Dates

Classroom Zoom Sessions:

Session 1: Date announced on course webpage - Zoom class. 6:00-7:00ish

Session 2: Date announced on course webpage - Zoom class. 6:00-7:00ish

Field Trips (students must complete both sessions):

Session 3 ("Ground School"): Date announced on course webpage – in person – 5pm

Session 4 (Field Day): Date announced on course webpage - Field session at Castlewood Canyon.

If Session 4 is cancelled (due to weather) - reschedule to June date

Course Goals

Upon completion of the class, you should be able to:

Properly put on and wear a climbing harness and helmet
Properly tie in to climbing rope
Belay a climber on a top rope
Lower a climber on a top rope
Climb a vertical rock pitch up to 5.5 difficulty
Safely rappel down a vertical rock pitch
Demonstrate proficiency in tying climbing knots discussed and utilized during class Evaluate a sample climbing anchor systems for proper construction

You will be required to learn these knots/hitches: figure 8 follow through, figure 8 on a bight, butterfly knot, bowline, water knot, double fisherman, munter hitch (for belay and rappel), clove hitch, flat overhand knot (for joining two ropes for rappel), safety/stopper knot, klemheist hitch, autoblock hitch, and prusik hitch. This is a big list but don't get intimidated. You will not be expected to be an expert in all of these.

Students will receive a skills checklist at the Thursday field session. Please bring this with you to each of the field days you attend. Students will demonstrate those skills to an instructor and have each skill checked off on the spreadsheet. Students must have all skills checked off by an instructor to graduate from the course.

You will <u>NOT</u> be expected to or receive instruction on how to:

Lead climb or lead belay.
Build toprope or multi pitch anchors.
Use traditional protection gear ("trad").
Clean a sport or toprope route.
– These skills will be taught in other CMC PPG rock climbing courses.

Reading Assignments

Students should have received *Mountaineering: The Freedom of the Hills*, as the textbook for Wilderness Fundamentals or Wilderness Trekking School which is a prerequisite for BMS Rock Climbing. Some of you may have received a waiver for Wilderness Fundamentals. If so, you should purchase or borrow a copy for the reading assignments. *Freedom of the Hills* will be a useful textbook throughout BMS; and most of the material covered will be pulled from it. In addition, most answers to the exam are found therein.

Mountaineering – The Freedom of the Hills – 9th edition

Chapter 9, "Basic Safety System," pgs. 150-171

Chapter 10, "Belaying," pgs. 172-201

Chapter 11, "Rappelling," pgs. 202-223

Chapter 12, "Alpine Rock Climbing," pgs. 224-251

Chapter 13, "Rock Protection," pgs. 252-266

Chapter 14, "Leading on Rock," pgs. 267-287

Online Zoom Class Agenda

Session 1 - Zoom:

Gear and Safety Systems

For gear topics, see supplement handout received prior to first lecture. It will contain a gear list for the field days and information about climbing equipment.

Safety Checks

1. **Introduction and Principles:**

   Climbing is a partnership sport. This partnership especially includes the pre-climb safety check, before you even reach for the first handhold. This is a mandatory climbing ritual and must never be taken for granted. Your skill at observing the rigging of your partner's

safety system, double checking and even triple checking, should continue to improve over time along with your other climbing abilities.

- Pre-climb safety check reviews integrity and rigging of climber/belayer safety components.
- The correct rigging of the climber's safety system is essential to its proper function.
- Consistent setup, consistent tying of knots/hitches, and consistent partner safety check all add significant assurance to the full functioning of the safety system. -- Four eyes are much better than two.

Note: This is ignited by the climber.

2. **Preparatory Checks:**

- Inspect your rope while flaking it out.
- All soft goods – cord, webbing, dogbones, harness, etc. should get a visual inspection.
- Know the main harness types and what you're looking for:
    - Alpine bod harness- special note: Once the main carabiner is secured (becoming an integral part of the harness's integrity) never unlock to clip something else in or out during the climb.
    - Harnesses that require buckles must be double backed
    - Speed-adjusting harnesses

3. **Pre-climb Partner Safety Check:**

One way to do this systematically is to start from the climber/belayer and work toward the rope, taking turns checking each other. Check each component of the climbing safety system**.**

- **Belayer's Check of Climber -**
    - Climber's helmet on, tight and secured properly
    - Climber's harness buckled (doubled back if indicated) and on snugly.
    - Climber tied in to rope properly-
        - Rope is properly through both "hard points" of harness.
        - Correctly tied "Figure 8 follow-thru" snuggly dressed with right amount of tail.
    - Climber has all gear needed for the climb (personal anchor system, auto block, prussiks, anchor system and sufficient number of quickdraws if leading).
    - Tether is correctly hitched to harness.

- **Climber's Check of Belayer:**
  - Belayer's helmet on, tight and secured properly.
  - Belayer's harness buckled (doubled back if indicated) and on snugly.
  - Belay system set up properly
    - ATC/belay device and Carabiner through belay loop.
    - That carabiner is locked with the belay device and bight of rope through it.
    - Rope through belay device properly
    - Rope oriented such that belay action can be accomplished efficiently.
  - If necessary, belayer is properly anchored with locked carabiner.
  - The plan for the climb should be clearly communicated between climber and belayer before climbing.

Rock Climbing Communication

1. **Introduction and Principles:**

Communication between climbing partners begins with the discussion that surrounds the partner safety check. It then includes the climber conveying his/her plan for the climb to the belayer. Communication continues at various points throughout the climb and doesn't end until the climber is back on the ground and off belay.

Partners vocalize actions, intentions, needs or problems to each other to help the climber to ascend, set anchor, descend, etc., while ensuring constant safety.

2. **Communication Technique:**

- Use standard commands and command formats whenever possible.
- Use single commands until each is responded to or acted upon.
- Keep commands crisp, clear and concise; that becomes essential as the climber advances up and communication is hindered by distance, wind and/or obstructions.
- Don't chatter.
- Do not use explanations or justifications. These are unnecessary and reduce clarity.
- Do not use "about to" commands. Relay command when needed or when a task is accomplished.
- When the belayer is a long way from climbing partner, shout as loud as possible and space out each syllable.
- Use the response "repeat command" if you couldn't clearly hear and understand your partner's command or communication.
- Preface commands with your partner's name, avoiding confusion in crowded areas.

- A climber's command always begins with Status then Function. The Belayer's command response is Function then Status. For example, to begin a climb, the climber says "Jack, On belay?" Then the Belayer says, "Jill, Belay on."
  Communicate your plans before you start to climb. This helps the belayer to think about what they should expect to hear, and when/whether they will ever let the climber off belay during the climb.

3. **Problems with Communication:**

These most often occur at or near the end of a pitch, when the climber is farthest away from the belayer. This is also when the consequences of miscommunication can be most severe (i.e., the climber is high up and potentially at a point when he/she needs to come off belay).

- Environmental factors – communication can become very difficult or impossible due to distance, obstructions or high winds.
- Be patient and don't take any chances in the case of uncertain communications.
- There are advanced solutions to these communication barriers, including whistles or radios. Note: Radios can malfunction or also be subject to obstructions.
- You should probably ask yourself if you should be climbing at all if you can't hear your partner due to high winds. Safety first!!
- If you can't hear or are unsure of your partner's command, say "Repeat Command."
- Never reduce the level of belay or protection without clear and certain communication. Again, use "Repeat Command" if unsure.
- You can say "Roger" or "OK" to indicate acknowledgement that you have heard a command or some piece of information. Agree on that between partners.
- The sequence of commands helps you to know what you think you are hearing. If you have problems remembering the sequence of climbing commands, think of them as a question – response scenario.
- We'll use Jack and Jill's example above. When Jill asks "Jack, on belay?" The appropriate question to think of in order to remember the command sequence is "Am I on belay?" If Jack needs help responding to Jill, he can think "Belay is on" and says "Belay on."

You will find that most rock climbers who don't go through BMS do not use the exacting safety and communication protocols that we use and teach. We recommend you begin your climbing career with others in BMS so you will gain experience before you have to make judgment calls on other climbers' safety protocol and whether you are willing to climb with them.

Basic Voice Commands used by Climber Partners

Who Says It?	Command	What it means
Climber	**"On Belay?"**	Do you have me on belay?
Belayer	**"Belay On"**	I am belaying you.
Climber	**"Climbing"**	I am, or will resume, moving up.
Belayer	**"Climb On"**	Response to "Climbing"
Climber	**"Slack"**	Give me some slack in the rope. (To indicate how much slack, the command is "Slack X feet," with X being the amount.)
Climber	**"Up Rope"**	Belayer to take in slack to reduce possible fall distance for climber.
Climber	**"Off Belay"**	I am secure and no longer need your belay. Remove rope from belay device.
Belayer	**"Belay Off"** (only after taking apart the belay.)	The climber is no longer on belay. Climber is fully on their own for safety. Rope is available to be pulled up for rappel.
Climber	**"Ready to lower" Or "Lower"**	Climber is on rope tension, through the anchor setup. He is ready for the belayer to let out rope and lower him/her.
Belayer	**"Lowering"**	Belayer lets out rope to lower climber.
Anyone	**"Rock"** (yell loudly, immediately, and repeatedly until falling object stops)	Falling objects. Take cover immediately. (looking up to see approaching danger is a normal reaction, but it risks serious head injuries.)
Climber	**"Take"** (or "Tension")	I expect to weight the rope. Take out rope excess and apply braking to hold me.
Climber	**"That's me"**	Stop taking in/tensioning the rope.
Climber	**"Clipping"**	Give me a little slack while I pull up the rope to clip into a bolt on the wall.

Climber	**"Watch me"**	Belayer to pay close attention with very responsive belay (moving with the climber while maintaining minimal slack).
Climber	**"Falling"**	Assume your braking position and brace for a pull on the rope.
Anyone	**"OK"**	I heard you.
Anyone	**"Rope"**	Rope is being pulled or dropped; called so others at base or climbing know a rope is coming and hopefully doesn't get hit by it.
Anyone	**"Repeat command"** Or **"Repeat"**	Say what you just said over again.
Anyone	**"Stop"**	There might be a problem. Do not relax belay or reduce any level of protection, but climber and belayer should not advance.

Elements and Techniques of the Climber's Belay

Objective/Main Principles:

Belaying is a fundamental technique for climbing safety, a system of using a rope to stop a climber's fall if one should occur. The person who is belaying takes in and lets out rope according to the climber's progression. This person should also be ready to keep open and effective communications with the climber.

Belay Setup:

- Choosing a belay spot - considerations:
  - Good visuals of the route
  - Safe position
  - Near any shade/cover from falling rock
  - Comfortable stance possible (you could be there a while!)
  - Availability of ground anchor tree or rock (if needed)?
- Set up Belay Anchor - considerations:
  - Used to hold the belayer in position during the belay in the case of a climber fall
  - Anchor base can be natural or created
  - Consider direction of pull from climber's possible fall
  - Consider consequences of not being able to move for
    - Rock fall
    - Communication
    - Visual

- Setup webbing or cord between anchor base and belayer's harness. Only use climbing rated pieces.
- Can use PAS, already hitched to harness, to tie into the anchor system.
- Follow principles of EARNEST

- Belayer Harness Setup
  - Buckled and donned correctly.
  - Locker carabiner through belay loop
  - Rope through Belay Device, properly oriented.
  - Wire of belay device and rope (through the belay device) locked into locker carabiner
  - Lock the locking carabiner
  - Double check everything is fed thru correctly (e.g. rope, device wire, belay loop thru locking carabiner)
- Climber's Harness Setup
  - Buckled and donned correctly
  - Figure 8 Follow-thru – main attachment of rope to climber's harness
  - Rope attached through 2 points on the harness
  - Climber's harness includes necessary gear for climbing tasks and safety
  - Helmet – aka Brain Bucket
    - On
    - Buckled/fastened,
    - Fit, tight and worn correctly
    - Rated for climbing
- Buddy Check
  - Belayer checking climber
    - Harness leg straps tight and double backed
    - Harness waist strap tight and double backed
    - Rope through 2 points of harness
    - Figure 8 Follow-Thru, dressed well
    - Rope tied off at other end
  - Climber checking belayer
    - Harness leg straps tight and double backed
    - Harness waist strap tight and double backed
    - Carabiner attached belay loop or equivalent on alpine bod
    - Belay device attached to carabiner
    - Rope through the belay device and locking carabiner (end of the rope on the braking hand side)
    - Locked carabiner
- Good practices
  - Long hair should always be tied back so as not to get caught in any part of the system
  - Loose clothing should not be worn or should be tucked in so as not to get caught
  - ALWAYS pay attention – everyone's safety begins with you!
  - Belayer's Hand is always on brake strand of rope!
  - Discuss route details (traverses, can the anchor be seen, cruxes…) and climbing plan, including what the climber will do at the anchor (e.g., be lowered, rappel)
  - Review commands to be used – discuss contingency communications if climb goes over a ledge, there is wind, etc.

Belay Technique:

- If it is deemed necessary, set the anchor, attach it to your harness, preferably via the PAS which is girth hitched to the front of the harness. Should be UIAA rated harness point.

- Buddy Check
- **P-B-U-S**
    - **Pull**
    - **Brake**
    - **Under**
    - **Slide**
- Watching climber
- Watching for falling debris

- Verbal communication with climber when possible and necessary
- Lower in control when climb is done --or--
- Off Belay when called
- ALWAYS pay attention – everyone's safety begins with you!
- Belayer - **NEVER let go of the rope with the brake hand!**
- Your belay technique should maintain a position of power for braking. Always think about if you are placing your hands in a position of power or weakness for accomplishing a brake maneuver at that split second.
- Important Points:
    - **NEVER let go of the rope with the brake hand**
    - ALWAYS pay attention – the climber's safety is in your hands. No chit chat, no goofing around, no taking pictures, no looking around at the scenery, no getting your snacks out.
    - Don't get your hand too close to the belay device or it could get severely pinched ○ Be aware of your surroundings (people climbing next to you, stepping on the rope…)
    - Your goal as you become a better belayer is to gain a feel for anticipating a climber's moves and need for rope.

Introduction and Process for Rappelling

Rappelling is a skill you should strive to acquire quickly. Rappelling is necessary in many situations; and you should begin to learn the ropes.

Rappelling is needed when the last climber of your group finishes a route and there are no mussy hooks at anchor. This climber must disengage the anchor, set up a rappel for descent and rappel down, in order to leave no gear behind. The following guidelines for rapping clarify the sequence of these skills; but they must be practiced in a safe environment until they are mastered.

Some Noteworthy Danger Points or Problems:

Rappelling is considered the second most dangerous activity (statistically) in rock climbing, behind very aggressive lead climbing. There are some dangerous points in this process, such as: it is usually the last thing a climber does in the climbing sequence and they could be tired, not paying attention to the rappel set-up or process, didn't have enough to eat/drink, etc.

Most of your rappel setup is going to be rigged by you, up on a climb, without the benefit of your partner's safety check. Here are some other dangerous factors to be aware:

- Not being anchored while setting up rappels.
- Dropping belay device, when inserting rope strands for rappel. Belay device must be almost removed from the carabiner to loop rope strands around it. Practice looping two rope strands into your carabiner without fully removing the belay device. Or attach the belay device with cord to harness.
- Dropping the rope while rigging the rappel system.
- Not wrapping both rope strands around the carabiner, after inserting through the belay device.
- Constructing friction back-up hitch cord too long, having it catch in the rappel device.
- Not having both rope strands touching all the way to the ground, or knots tied in ends of rope, to ensure that you don't rap off the ends of the rope before hitting ground.

Preparation Before You Leave the Ground:

- On-ground safety check must include rigging of your safety tether/Personal Anchor System (PAS) and its tie-in to your harness.
- You should have a belay device and preferably a back-up belay device or system on your harness.
- You should have at least a couple of locking carabiners. Prusiks and lengths of sewn webbing are helpful.
- Are you trained to use a munter hitch to rappel if you drop your belay device?

General Overview of Rappelling:

- You should know how a rappel system is set up, how it looks and all key structural and safety components before you construct it out on the rocks in a live situation.
- This includes the construction and use of the back-up friction knot that will brake your rappel in case something happens (like a rock from above knocks you out).
- This all should be practiced and viewed at least a couple of times on the ground.
- Your first rappels must be conducted with one or more instructors present.
- The braking action of your brake hand to stop your movement along the rope should become natural and second nature.

- You must be safely anchored before you begin to rig your rappel. What you anchor to depends on the situation, though most of the time you are at the anchor bolts at the top of the climb.
- We recommend girth-hitching a tether to your harness for securing to the anchor. (known as a PAS or Personal Anchor System)
- Once secured, all carabiners in your safety system must not be opened while they are active during a rappel.
- For this class, we will use two rope strands, with both strands wound into the rappel device and looped around the carabiner that connects that device to your harness.
- If one of those strands does not get looped around that carabiner the system will fail.
- At first, until you get good using both hands, your dominant hand is your brake hand – on the rope strands pointing downhill.
- The ropes should be fed into the rappel device as it sits on your harness
- The ropes are then pulled down and through the two slots of the belay device and clipped into the locking carabiner
- The carabiner is locked around both rope loop and belay-device cable.
- Construct your friction back-up knot attached with a small locking carabiner to your harness.
- Check that the friction back-up hitch, when fully extended and engaged on the rope, does not get within 3 or 4 inches of your belay device (if it gets caught in your belay device before it engages and locks the rope, that will compromise both the belay device and the auto-block knot).
- Rappelling with a friction back-up hitch is slower. You must keep your brake hand on the friction back-up hitch, around the rope, and manage the movement of that hitch along the rope, while you position the rope to feed through the belay device to rappel. Can be a complex movement.
- Pull the rappel system tight, and lean back against the system, tight, while still tied into the anchor. Make sure it holds and all looks good. (Your tether should be loose, while the rappel system is taut)
- Keep your brake hand on the rappel rope brake with your dominant hand while you detach your tether from the anchor.
- Keep your legs wide and out in front of you as you lean back and engage the belay device. Your legs should be perpendicular to the rock face (just like your lowering position when being lowered).

Overview of Knots for Climbing

Concerns Regarding Climbing rope:

- Piece of gear (with knots) that typically is not set up with redundancy.
- Main shock-absorption component in the safety line – dynamic force reduction.
- Exposed to the fullest range of potential damage and injury.

Rope Terminology:

Rope Preparation, Storage and Carry:

- Rope flaking
- Rope coiling
- Inspecting rope - whenever coiling or flaking rope you should be inspecting it for damage.

Importance of Knots:

- Students should pay particular attention to connections (knots, carabiners, prussiks, etc.) in their safety system – that's where accidents happen.
- Your knots should be route and repeatable - so that in each live situation, the repeatable components of your safety system are quick, efficient and safe.
- And then the rest of your brain can focus on the bigger picture of your climb and any circumstances that may be unique or random.
- Main take-home message: practice your knots at home.

Issues and Concerns Regarding Knots:

- Rope-strength reduction.
- Different diameter ropes – concerns for bends.
- Slippage, and needed length of tail (sufficient free-end length).
- Dressing the knot.
- Finish/safety knot.

Is there ever a time when you're not depending on some knot as a component of the safety system when you're climbing on rope? Answer: **NO**

Categories of Knots:

- Bend – a knot uniting two lines
    - Double Fisherman's bend
    - Water knot (used in webbing)
- Hitch – a knot tied to post, anchor, piece of gear, etc.
    - Clove hitch
    - Munter hitch
    - Girth hitch
- Loop knots (gear such as carabiner clips into) –
    - Figure 8 loop (figure 8 on a bight)
    - Rewoven figure 8
    - Butterfly loop (optional for this class)
    - Bowline (optional for this class)

- Friction hitches (aka seizing hitch)
    - Klemheist
    - Prusik
    - Autoblock

What You Should Know About Each Knot:

- Purpose and function.
- When and where to use it.
- Concerns/when not to use/things to watch out for.
- Primary method of tying – secondary if useful (usually should know 2 or 3).

Overhand Knot:

- Very useful, but not a rated knot for the action of climbing (like the Figure 8 Follow-thru).
- Biggest value is as a safety knot.
- Advantage of overhand is free end comes out parallel to standing end.
- Overhand is the 'beginning' knot for tying others, such as double fisherman's bend.
- Fisherman's bend uses a "double" overhand knot (two wraps). .

Double Fisherman's Bend:

- Purpose: Join two ropes together, end-to-end, as a rated knot for climbing and rappelling.

- Main use is long (two-rope) rappel. Or tying cordelette for an anchor. – If tied correctly, you will see "two x's" that fit flush together.
- Half of this knot (double overhand) is the best backup knot for critical connections, such as the end of a rope on a rappel.
- Less secure with increased differences in diameter of two ropes (in which case, back up using one more iteration of that bend).
- Tighten using alternating tugs on standing and free ends, and final pull on both standing ends.

Figure 8 on a Bight:

- Purpose: non-slipping loop knot, primarily at end of rope, for connecting rope to gear.

- Tied with two strands creating closed loop; gear must be opened to connect (carabiner)
- Fast, simple, highly-rated.
- Not recommended as an attachment point knot in the middle of rope (use a butterfly knot instead).
- Get to visually know the look of a properly tied Figure 8.
- Safety knot recommended, but not necessary if tied correctly.
- Becomes difficult to untie after being weighted.

Figure 8 Follow-thru:

- Purpose: connecting rope to harness or gear.
- Main use: attaching rope to climbing harness.
- Tied with a single strand, looped around both harness attachment points, then rewoven back.
- Allows attachment to non-opening gear.
- Fast, simple, highly-rated.
- Tighten pulling all strands that exit the knot.
- Safety knot recommended, but not necessary if tied correctly.
- Becomes difficult to untie after being weighted.

Girth Hitch:

- Purpose: connect a closed-loop rope or webbing directly to gear, harness, anchor, etc. ● Main use: webbing with girth hitch used as connection between two components, saving one carabiner.
- PAS is girth-hitched to harness.
- Connect girth hitch first. – Hitch can't come untied as long as second connection point maintained.
- Inspect webbing after heavy loading of girth-hitch.

Munter Hitch:

- Purpose: to provide an inline friction belay system for rope, around carabiner.

- Main use: backup belay option (e.g., you dropped your belay device).

- Reversible – belay end and load end can be switched, and knot will reform itself to suit.
- Unlike belay device, a munter's 'stop' position is the belay end of rope is parallel to load end – back-up with autoblock.

Clove Hitch:

- Purpose: Symmetrical hitch that tightens under load but is easily loosened, adjusted.

- Used as one connection in a multi-point anchor setup to allow for quick equalization, or as a quick tie-in that can be adjusted.
- Typically used 'inline' with gear; such as: using a carabiner to hitch onto
- Takes practice to use effectively.
- Safety/backup knot recommended.

Prusik:

- Purpose: to provide friction-based attachment to standing line of rope as progress capture or backup.
- Main uses: ascending rope in emergency situation, escaping belay in emergency.
- Closed-loop cord, does not work with webbing.
- Need at least two (preferably 3+) mm difference in diameter between rope and prusik.
- Important to maintain (redress) prusik as it deforms through use.
- Stiff cords or icy ropes substantially affect friction and slide potential of prusik.
- Balance level of “grab” with level of “jam” in choosing if need more wraps

Klemheist:

- Purpose: ascending rope
- Closed loop cord, works with webbing
- Klemheist knot is one directional
- Both loops point opposite the direction of travel.

Autoblock:

- Purpose: backup friction knot for rappel.
- Closed-loop cord, not webbing.
- Autoblock wraps go around both strands of rope, below belay device, locked to belay loop of harness with locking carabiner.
- Higher loop longer than lower loop, to help maintain integrity of knot. Like prusik, may need to redress.
- You must check that, under load, the autoblock knot cannot be pulled into the rappel device. If it isn’t properly dressed, your hand will get severely pinched, and the autoblock will hinder the braking action of the belay device.

Water knot:

- Purpose: join two pieces of webbing together, end-to-end, as a rated knot for anchors, etc.
- Main use: creating webbing loops for anchor system or connecting gear (allows for girth hitch)
- Two pieces of webbing must be the same width.
- No room for error. If you miss/mistake one follow-through path, your knot will fail.
- Tighten effectively, may still slip a little.
- Leave sufficient end lengths, with safety knot recommended.

Alpine Butterfly Knot:

- Purpose: to create a non-slipping attachment loop to rope inline.
- Main use: attachment point for middle climber(s), particularly when applying top and bottom belay. Also used to isolate damaged sections of rope in an emergency (e.g., your buddy's crampon …).
- Can also be used as part of a 'Z pulley' rescue system.
- Advantage is that rope ends come out of the knot linearly, same as a normal rope.

Emergency Contact Card

Please print and carry this card in the top pocket of your pack. It's a good idea to keep this along with any other information in a waterproof bag at all times. You must have this card in order to participate in field days.