FIELD TRIP 1 - Top-rope Belay/Lower, Belay & Anchor Intro.

Students will enter the class and this field trip with a wide range of climbing experience. To account for that, we have split the field trip in two groups. Students new to climbing and without prior belay experience can spend maximum time at station 1; Station 3 (Rope Ascending) will be done at Monday Night Skills for most students.

Students with climbing, and belay experience skip station 1, and start with station 2.

Station 3 (Rope Ascending) will be set up for students who breeze through station 2. Station 3 will also be available on Monday Nights through about May. For this course rope ascending is primarily a glacier travel self-rescue skill. Best not to overwhelm students with too much information this the first night.

Station 1 - Top-rope Belay/Lower with Belay Device. (Done on the Goodman C climbing wall).

We don't present all of the belay points at FT1 this first night. Let the students have fun and gain confidence. The full list of belay points is here for reference only, and repeated throughout the course. Some will choose to wear gloves for belay, but this is student's decision and not required. Boots or rock shoes are recommended, bring both if you have them. Goal is for students to get a feel for belay; and to begin feeling comfortable hanging on the rope and being lowered.

Working in pairs, students climb and belay each other a very short ways up the wall (maybe 3'-6'). The climber then weights the rope. Slack in the system and rope stretch will be experienced. Only after the climber has fully weighted the rope, does the belayer lower the climber. Repeat with increasing height only after belayers show competence. Both hands of the belayer should be on the brake rope when lowering.

- Harness correct fit & use per manufacturer. Waistbelt snug around the waist and above the hips. Buckle tails secured out of the way. Compare harness differences with your partner, different buckles, etc.
- Helmet: Snug and comfortable fit per manufacturer. Helmet is optional for top-rope climbing on the Magnuson climbing walls. Students decision.
- Tie in: Identify tie-in points for your harness. Tie-in with rewoven figure 8. Well dressed with 4"-6" tail. Additional overhand knot is optional, and not required.
- Partner check: Tie in both climbers. Identify points that are checked before climbing: Harness check - fit, buckles, wear; Tie-in check – rope to harness; Belay check - rope/belay device connection to belayer's harness belay loop, & carabiner locked. Establish sequence for check.
- Communication between climber/belayer: Established sequence: On belay? Belay is on. – Climbing. Climb. - Off belay. Belay off. Up rope. Slack. Discuss why using your partner's name. Discuss plan for being lowered, vs rappel.
- Rope handling and rope management: Keeping a hand on the brake rope at all times, being aware of brake position, and moving hands only when in a brake position.

- PBUS: Pull - Brake - Under - Slide. Pulling rope in for top-rope belay,
- Tube belay device: Examine the rope bends, and understand brake rope and brake position. Compare strong and weak brake positions. Discuss palm down vs. palm up.
- Belay stance: Discuss: How to anticipate direction of force on belayer; orient stance to protect brake hand; distance to the wall; weight of climber vs. belayer, and consequences. Decision whether belayer is anchored or not is considered situational, and is usually more appropriate for multi pitch climbing.
- Lowering: Be sure to communicate before lowering your climber. Also, look to insure they have weighted the rope before lowering, assuming you can see them. Both hands of the belayer should always be on the brake rope when lowering, and in the brake position.
- Big Picture: Both climber and belayer should keep an eye out for potential hazards: Watch your climber for pendulum swings, other climbers, etc. Very important considering our small crowded space, and many climbers wearing heavy boots. Situational awareness.

VIDEO LINKS.

- AAC Universal Belay Standard: **https://www.youtube.com/watch?v=BOIAYx-d4HE[7]**
- Rewoven figure 8 knot: **https://www.youtube.com/watch?v=Dmw_dWStg1k**

Knots for station 1 - Rewoven figure 8. What is a well dressed knot?

Station 2 - Munter Belay, Belay Tie-off, and Connecting to Anchor (Done on the ground, with students working in pairs).

Partner check. (see Station 1)

- Partner check.
- Examine the rope bends. Identify the maximum rope braking position (towards the load), but also understand that the minimum braking position (away from the load) still has adequate braking friction. As much braking as with a tube device in maximum brake position (away from the load).
- Practice bringing in, and feeding out rope with munter hitch. Learn to recognize the change of direction flip of the munter.
- Simple two point anchor rigging (Sewn sling w/figure 8), identify the focal point (aka power point), and connect to it with the climbing rope using a clove-hitch.
- Recognize, and pull test the clove-hitch.
- Practice going hands-free with tube style belay device. Have all tie-off knots well dressed and secure.

VIDEO LINKS.

- Anchor rigging. **Sewn sling w/figure 8 is the course default method for anchor rigging**. Shown in the first 30 seconds of this video. Clove-hitch is shown only as one of many different rigging methods possible. **https://www.youtube.com/watch?v=1UyInC0SkGo**

- Tie-off with tube device (slip knot on carabiner spine): **https://vimeo.com/17441295**
  Note: What they call "Plate" is what we call the belay device / ATC.
- Tie-off with tube device (mule knot): **https://www.youtube.com/watch?v=bQtjrog18xY**
- Tie-off with munter: **https://www.youtube.com/watch?v=IRYkca9xEjc**

Knots for station 2 - Munter hitch, Clove hitch, Figure 8, Mule knot (aka overhand slip knot).

Station 3 - Rope Ascending for Glacier Travel. (Goodman B)

Instead of prusiking down the rope, the student should be lowered on a Munter hitch from SERENE ground anchors. Start by having the student inspect and test the ground anchor rigging and tie-off before ascending the rope (each time). Ascending and lowering needs to be done with an instructor's supervision. Standard lowering procedure recommends a back-up for high lowers. This set-up is similar to a top-rope lower, keeping BOTH hands on the brake rope during lowering. We use skinny glacier ropes for this station (located in the storage space behind the climbing wall).

Station 3 will be available for students who breeze through station 2 only. For this course rope ascending is primarily a glacier travel self rescue skill. No hurry to learn this right away at the start of the course. Station 3 (Rope Ascending) will be available on Monday Nights through about May.

- Inspect anchor rigging, and rope tie-off.
- Set up Texas prusik system and adjust for climber's height.
- Partner check.
- Chest harness, use and function.
- Tie-in and prusik up the rope. Halfway to the ceiling, lower backpack on a leash on rope loop between tie-in and prusiks. Discuss why dropping pack can be beneficial.
- Back up: Back up by clipping into a bight of rope with a locking carabiner every 6'-10'.
- Discuss rope ascending, when would this be used?

VIDEO LINKS..

- **https://www.youtube.com/watch?v=GWH3lnnl0ro**
- **https://www.youtube.com/watch?v=2tyX-iHRi50**
- **https://www.youtube.com/watch?v=wjRy_iBRUyk**

Knots for station 3 - Figure 8 on a bight, Rewoven figure 8, Butterfly knot, Water knot (runners, flat), Double Fisherman's knot, Prusik knot. Bonus knot: Klemheist. The prusik is the course default friction knot, but other friction knots are welcome.

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FIELD TRIP 2: Rappels, Belays, Climbing, & Anchors

Students with rappelling experience, and are comfortable with rappel start with Station 2, followed by 3, 4, and 1.

If you start at Station 4, progression is 4, 1, 2, 3. Start at Station 3, progression is 3, 4, 1, 2. Start at Station 2, progression is 2, 3, 4, 1. Start at Station 1, progression is 1, 2, 3, 4.

Station 1: Rappel Introduction (Grass slope west of North Plaza)).

Students at this station make multiple rappels with extension, but without auto-block. Once students show good comfort and can rappel smoothly, only then add the auto-block. Students with rigid sole boots are recommended to wear hiking boots or running shoes. Idea is to make it easy for new rappellers.

- Partner check.
- Safe assembly and use of Personal Anchor System.
- Rappel with extension, but without auto-block. Experience a safe and smooth rappel.
- Rappel with extension, and auto-block only when and if ready.

Station 2: Rappel and Climbing (Outside wall, South Plaza).

Students make 3 climbs and descent via rappel, as time allows. Many will choose to wear gloves for rappel, but this is optional and students decision. Footwear: Rock shoes, boots, or both and Students choice.

- Partner check.
- Climbing technique. In control, balance & use of foot holds.
- Safe assembly, and use of Personal Anchor System for rappel. (see video below).
- Safe assembly, and use of extended rappel. (see video below).
- Safe assembly, and use of auto-block. (see video below).
- Use of rappel commands.
- Rappel safely, and comfortably with device.
- Rappel with device while wearing a pack.
- Demonstrate a leg wrap while on rappel.
- Demonstrate a Fireman's belay.

Rappel Video: **https://vimeo.com/113362076**

Station 3: Belay Weight Drop and Belay Tie-off (Basement).

The Station Leader raises the bag simulating a top-rope belay. Raising the bag is a good time to give the belayer a quick drop. The idea is to give the belayer an idea of the force involved, and the importance of considering the

direction of force. Once the bag is raised to the top, slowly lower the bag. Lowering the bag simulates belaying a leader. Surprise the belayer with quick drops only when the belayer is positioned in a safe location. Some will choose to wear gloves for belay, but this is student's decision and not required.

- Full Partner check. (see FT1 Station 1)
- Use of climbing commands.
- Rope handling and rope management. Keeping a hand on the brake rope at all times, being aware of brake position, and moving hands only when in a brake position.
- Belayer anchored, and not anchored? When, & why?
- Belayer position/stance considers direction of force.
- PBUS belay with device. Pulling rope in for top-rope belay, Pulling (feeding) rope out when belaying a leader..
- Tie-off the belay to go hands free. With full control, and with all tie-off knots well dressed and secure.
- Repeat the exercise with a munter belay, keeping in mind that the munter brake position is multi-directional.

Video links for belaying a leader. See FT1 for belay tie-off videos.

- **https://vimeo.com/124944154**
- **https://vimeo.com/80477504**

Station 4: Belaying a Leader and Follower, & Anchor Rigging/Connection. (South Plaza Boulders).

This is mostly an experience/ learning station. Students will be evaluated for connecting themselves to an anchor at FT3. The standard anchoring technique is using the rope, then tie in with a clove hitch to a locking carabiner that is in the power point of the anchor. Working in pairs students experience leading and following sequence. Switching roles, and repeat.

- This station is best introduced for each group as demonstration with one rope team that consists of two volunteer students. Many aspects can be discussed with the group during this dem demonstration. Following that students will practice this.
- One student belayed by the other leads up the boulders clipping through fixed pro. Begin with partner check.
- From bolts near the top of the boulders the leader rigs a SERENE anchor from fixed anchor bolts, and connects to the focal point, using the climbing rope in a safe manner. A single clove-hitch is recommended as tie-in to the anchor, a second connection is not required (students choice). Partner check each other's connection to anchor, and anchor rigging.
- Leader, belays their partner up directly from the anchor with a munter.

- Upon reaching the belay the follower (aka the second) also connects to the anchor with the climbing rope in a safe manner. Single clove-hitch recommended, a second connection is not required (students choice). Partner check each other's clove-hitch connection to the anchor, & anchor rigging.

VIDEO LINKS.

- **Sewn sling w/figure 8 is the course default method for anchor rigging**. Shown in the first 30 seconds of this video. Clove-hitch is shown only as one of many different rigging methods possible. **https://www.youtube.com/watch?v=1UyInC0SkGo**
- Belaying a second from anchor: **https://www.youtube.com/watch?v=Q3UlClqZqrE**
- Belaying a leader: **https://vimeo.com/124944154**

If time permits answer questions about:

- Anchor rigging.
- Body belays. Video: **https://www.youtube.com/watch?v=Tw6CHiFHXZI**
- Prusiking along a fixed line.
- Guide Mode for belaying a second. ONLY if time allows, and if students are able to demonstrate mastery belaying with a munter. Practice using the munter is priority.

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FIELD TRIP 3 - Rock Skills, Evaluation. (4 stations)

Station 1: Evaluation - Climbing, and Rappelling (Outside wall, South Plaza)

Students make 3 climbs and descent via rappel, or more. Many will choose to wear gloves for rappel, but this is optional and students decision.

Students demonstrate that they can identify and connect to the anchor focal point safely, and set-up a rappel without assistance. Students should be able to do this in 2-3 minutes or less. If they are taking longer, they need more practice. We also want to see that students can climb & rappel in control, and with a moderate level of comfort with the exposure.

- Partner check.
- Climbing technique. In control, demonstrating balance & use of foot holds.
- Safe assembly, and use of Personal Anchor System for rappel.
- Safe assembly, and use of rappel extension.
- Safe assembly, and use of auto-block.
- Use of rappel commands.
- Rappel safely, and in control with device.

- Rappel while wearing a pack.
- Demonstrate a leg wrap while on rappel.
- Demonstrate a Fireman's belay.

Rappel Video: **https://vimeo.com/113362076**

Station 2: Friction Slabs (North Plaza)

Lacing and fit of boots for slabs.

- Controlled movement (weight over foot).
- Smooth transition from one foot to another.
- Low angle slab – no hand contact.
- High angle slab – hands for balance only.
- Ascend each slab at least once (time permitting).

VIDEO LINKS.

- **https://www.youtube.com/watch?v=aANZAkL3fXQ**
- **https://www.youtube.com/watch?v=erjpRgr-6NI**

Concepts for discussion.

- Proprioception – when weight is over the ball of the foot.
- Why is "heels down" critical for slab climbing?
- Does "heels down" apply to other situations?
- What is the matter with edging on slabs?

Station 3: Evaluation - Belay Weight Drop, and Belay Tie-off (Basement)

Ask the student to talk about, and demonstrate their strategy for belaying a leader. Instructor raises the bag simulating a top-rope belay. Raising the bag is a good time to give the belayer a quick drop. The drop is to give the belayer an idea of the force involved, and the importance of considering the direction of force. Once the bag is raised to the top, slowly lower the bag. Lowering the bag simulates belaying a leader. Surprise the belayer with quick drops only when the belayer is positioned in a safe location. Some will choose to wear gloves for belay, but this is student's decision and not required.

Full Partner check. (see FT1 Station 1)

- Use of climbing commands.

- Rope handling and rope management. Keeping a hand on the brake rope at all times, being aware of brake position, and moving hands only when in a brake position.
- Belayer anchored, or not anchored? When, & why?
- Belayer position/stance considers direction of force.
- PBUS belay with device. Pulling rope in for top-rope belay, and Pulling (feeding) rope out when belaying a leader.
- Tie-off the belay to go hands free. Showing full control, and with all tie-off knots well dressed, snug, and secure.

VIDEO LINKS for belaying a leader. See FT 1 for belay tie-off videos.

- **https://vimeo.com/124944154**
- **https://vimeo.com/80477504**

Station 4: Low anchor rappel, & alternate rappel method (North Wall).

Another opportunity to see students rappel, and evaluate ready to climb.

- Partner check.
- Safe assembly, and use of Personal Anchor System.
- Safe assembly, and use of rappel extension.
- Safe assembly, and use of auto-block.
- Use of rappel commands.
- Sit-and-spin rappel with device, extension, and auto-block.
- Keep your rappel device weighted. Unweighting can lead to shock loading your rappel anchor.
- Options and considerations for not extending the rappel device.

Alternate rappel method using any 3 locking carabiners.

Safe assembly of 2 or 3 locking carabiners rappel method, demonstrated on the ground with extension and auto-block.

- Three locking carabiners are preferred. If only two locking carabiners can be used, climber must avoid rope friction against belay loop.
- Rappel with the 3 locking carabiner rappel method, extended and with auto-block, including partner check.
- Be careful about rope running over locking mechanism to open gate.
- Check - as much as possible on the flat roof - if the student's carabiners provide enough friction with the given rope. Size, shape and orientation of carabiners has an impact on friction. Doubling up on the top carabiner can provide additional friction.

VIDEO LINK

- **https://www.youtube.com/watch?v=lslG-Clp2qA**
  Note: we typically rappel from two strands of rope

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FIELD TRIP 4 - Snow Travel, and Introduction to Crevasse Rescue.

Snow Travel.

- Assess the runout.
- Step kicking.
- Walking in balance.
- Descending using plunge step.
- Use of crampons for snow travel. Points not too sharp. Basic crampon use only (snow travel, not ice climbing).
- Ice axe self-belay grip, and Self-arrest grip.
- Self-belay when snow conditions favor use of axe shaft. Soft enough for substantial shaft penetration depth. Note: Self-belay is often done with self-arrest grip.
- Low dagger position / High dagger position. When snow conditions favor use of axe pick. Snow conditions too firm for significant axe shaft penetration.

Video: **https://www.youtube.com/watch?v=qid9w1E7G0A** - Crampon use.

Self-Arrest.

Assess runout before each slide. Self-arrest positions are practiced and tested without wearing crampons, but understanding self-arrest is most effective when wearing crampons.

- Start with head uphill/facedown
- Start with head uphill/faceup
- Start with head downhill/face down
- Start with head downhill/face up

Glissade.

Assess runout before glissading. Discuss dangers of glissades. Self-arrest positions are practiced and tested without wearing crampons, but understanding self-arrest is most effective when wearing crampons.

- Safe ice axe position and grip.
- Proper body and feet position.
- Roll into self-arrest to the left side.
- Roll into self-arrest to the right side.

Introduction to Crevasse Rescue, and snow anchors.

Working in teams of 3 students hold a simulated crevasse fall, then transitioning from holding the fallen climber, to building & connecting to a snow anchor (aka, escape the belay). This is a simulated fall only (not a full load). An exercise for building snow anchors, and connecting to the anchor with a friction hitch to escape the fallen on rope. Not a full crevasse rescue scenarios, since is time is limited.

- Snow anchors. T-Slot. - We no longer decide what type of anchor to make for the first anchor in advance. Our previous method (vertical ice axe) is a poor anchor for soft snow conditions, and doesn't work well for hard snow either. Another option is the T-slot. Ice axe, or picket buried horizontal with a sling girth hitched. This type of snow anchor can be very fast, and secure with common spring/summer snow conditions. It is also pretty fast with hard snow.
- Friction hitch connected to anchor.
- Friction hitch backed up to anchor. With clove hitch (adjustable), bight of rope tied with an overhand, figure 8, or other knot to a locked carabiner.

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FIELD TRIP 5 - Glacier Travel & Crevasse Rescue Evaluation (evening session).

Held at Kite Hill, accessed from the south entrance of Magnuson Park on 65th St, and then north on Lake Shore Drive to E4 parking lot (**link to map**).

Roping up for glacier travel & crevasse rescue - for multi-rope team glacier travel (two or more rope-teams).

Students work together as a rope-team of 3 climbers. Simulating a crevasse fall response, with one person directing the response. Rotating with everyone having a turn as the person directing the response. Students are evaluated on safely demonstrating the 6 key points described below. This station covers the entire crevasse rescue, not only the rigging of a raising system (Step 6).

1) Roping up for glacier travel.

Details: For a rope-team of 3 climbers; divide the rope into 4 lengths, with both end climbers carrying ¼ of the rope (aka rescue rope). Carrying the rescue rope inside the pack is easier than coils on body. Coils on body are considered advanced.

Two carabiners (at least one locking) for tie-in connection to rope (butterfly, overhand, figure 8, clove-hitch).

2) Holding the fall.

Details: Lean back, or fall away from the fallen climber. Make the rope tight between rope-mates.

3) Anchor the rope, including back-up to friction hitch or rope grab. Communication between rope-mates holding the fallen climber.

Details: Includes building a snow anchor; and then transferring the weight of the fallen climber from the climber holding the fall to the snow anchor. This is usually done with a friction hitch, or rope grab (Tibloc, Micro-traxion, Roll-N-Lock, Ropeman, Duck, etc.) from the loaded rope to the snow anchor. Type of snow anchor used is dependent on snow conditions. Details for holding a crevasse fall, building snow anchors, and escaping are practiced at both FT4, and the SIG Snow FT.

Note: Prusik is the course default friction hitch although other friction hitches welcome.

Back-up for friction hitch (prusik, klemheist, rope grab, etc): Because both friction hitches and rope grabs fail a rope's sheath at around 4 kn (1 kn = 225 lbs.) it's important to back-up the prusik connection using the loaded rescue rope directly to the snow anchor. This can be done with a clove-hitch (adjustable), a bight of rope tied-off with an overhand, figure 8, or other knot to a locked carabiner at the snow anchor's powerpoint.

4) Safely approach the crevasse, and communicate with fallen climber.

Details: A number of ways to do this safely. All involve being connected to the snow anchor's power-point in some way. Bonus points if your method allows for quick descent to the fallen climber should they require emergency first aid.

5) Make a plan, including how to quickly assist a fallen climber who does not respond and may require emergency first aid.

Details: Rappelling to an unresponsive fallen climber may be the quickest way down. Assuming the fallen climber is responsive and able to assist consider your options. Can the fallen climber walk or climb out, ascend the anchored rope, assist with a drop loop 2:1, and will a raising system be utilized?

6) Raising systems, including rope entrenchment considerations.

Details: If the loaded rope is entrenched into the snow, you may choose to abandon the loaded rope for the raise. This may require extra rope; either from a second rope team, or planned for by a single rope team with the end climbers carrying extra rope.

Usually either a drop loop 2:1, or 3:1 (Z) pulley system. One of these two raising systems will usually work best with several people available to pull. A 6:1 raising system can be built by adding a 2:1 onto a 3:1 system. If you only learn one pulley system, make it the drop loop 2:1.

If possible have one person stationed and safely anchored near the crevasse, where they can communicate with and monitor the fallen climber during any raise. Should the fallen climber be jammed up against anything while being raised, it would be easy to injure them with the mechanical advantage of a pulley system combined with several people pulling.

VIDEO LINKS

- **https://www.youtube.com/watch?v=hkPmNPgrBVY** - Roping up for glacier travel.
- **https://www.youtube.com/watch?v=VbJ2Y3t_NkA** - T-slot snow anchor, shown at first 2 minutes.
- **https://www.youtube.com/watch?v=Z07LXfplRNs** - Transfer load, and escape.
- **https://www.youtube.com/watch?v=EhlanzaBtp4** - Check victim, and drop loop.
- **https://vimeo.com/145012490** - Prusik, and rope grab limits - 4kn. (Bonus video for geeks).