

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

So that 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 these students.

Students with gym climbing, and belay experience skip station 1, and do station 2. Everyone does Station 2.

Station 3 will be set up for students who breeze through station 2. Station 3 (Rope Ascending) will be available on Monday Nights through about May. 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 1 - Top-rope Belay/Lower with Belay Device. (Done on the Goodman C climbing wall).**

Do not try and present all these details at FT1. Let the students have fun and gain confidence. The full list of details is here only as reference, 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 recommended, both if you have them.

Working in pairs, students climb and belay each other a very short ways up the wall. 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 need to 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 on.– Off belay? Belay is off. Up rope. Slack. Discuss why using your partners name.

- 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. Note: PBUS is top-rope specific.
- 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. Discuss anchor. Decision whether belayer is anchored or not is considered situational, and usually more appropriate for multi pitch climbing.
- Lowering: Both hands of the belayer should always be on the brake rope when lowering, and in the brake position.
- Big Picture: The 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 large heavy boots.

Videos:

AAC Universal Belay Standard: <https://www.youtube.com/watch?v=BOIAYx-d4HE>

Rewoven figure 8 knot: [https://www.youtube.com/watch?v=Dmw\\_dWStg1k](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 Simple Anchor Rigging (Done on the ground, with students working in pairs).**

- Partner check. (see Station1 above)
- Practice bringing in, and feeding out rope with munter hitch. Learn to recognize the change of direction flip of the munter.
- 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 belay tie-off with munter. Going hands-free.
- Practice going hands-free with tube belay device. Mule or other slip knot, plus back-up tie-off knot or hitch.
- Simple two point anchor rigging (Sewn sling w/figure 8), and connecting to it with the climbing rope with a clove-hitch.

Videos:

Tie-off with munter: <https://www.youtube.com/watch?v=IRYkca9xEjc>

Tie-off with tube device (mule knot): <https://www.youtube.com/watch?v=bQtjroq18xY>

Tie-off with tube device (slip knot): <https://vimeo.com/17441295>

Simple two point anchor rigging. Sewn sling w/figure 8 shown at 0:05 to 0:40 in this video: <https://www.youtube.com/watch?v=1UyInC0SkGo>

Knots and hitches 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 ground anchors rigged SERENE. 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 two 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. 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, its 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 every 6'-10' or so.
- Discuss rope ascending, when would this be used?

Videos:

<https://www.youtube.com/watch?v=GWH3lnnl0ro>

<https://www.youtube.com/watch?v=2tyX-iHRi50>

Knots and hitches 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: Bowline.

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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 Station 3, Station 4, and Station 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 (South Plaza Boulders).**

Students at this station make multiple rappels with extension, but without auto-block. Once students show good comfort, 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.
- 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, or more. Many will choose to wear gloves for rappel, but this is optional and students decision.

- 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. Note: the acronym fits top-rope belay, but not lead belay.
- Tie-off the belay to go hands free.
- Repeat the exercise with a munter belay, keeping in mind that the munter brake position is multi-directional.

Videos for belaying a leader. For belay tie-off videos see FT 1.

<https://vimeo.com/124944154>

<https://vimeo.com/80477504>

**Station 4a: 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 (timepermitting).

Videos:

<https://www.youtube.com/watch?v=aANZakL3fXQ>

<https://www.youtube.com/watch?v=erjpRgr-6NI>

Concepts and 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 4b: 3 Locking Carabiner alternate rappel method. (Basement rappel ramps).**

- Any 2 or 3 locking carabiners.
- Practice safe rigging and use.
- Beware rope against belay loop with only two carabiners.

Videos:

<https://www.youtube.com/watch?v=IsIG-CIp2qA>

<https://www.youtube.com/watch?v=B-imsccvmHQ>

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## FIELD TRIP 3 - Rock Skills, Evaluation.

### Station 1: Belaying a Leader and Follower, & Anchor Rigging. (South Plaza Boulders).

Working in pairs students demonstrate leading and following sequence. Switching roles, and repeat. Some will choose to wear gloves for belay, but this is student's decision and not required.

- During this sequence, 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, 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 connection to anchor, & SERENE anchor rigging.

video links:

Simple two point anchor rigging. Sewn sling w/figure 8 shown at 0:05 to 0:40 in this video:

<https://www.youtube.com/watch?v=1UyInC0SkGo>

Belaying a second from anchor: <https://www.youtube.com/watch?v=Q3UIClqZqrE>

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 going hands free with munter. Practice using the munter is priority.

### Station 2: 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 3: Belay Weight Drop, and Belay Tie-off (Basement)**

Ask the student to talk about, and demonstrate their strategy for belaying a leader. 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 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. Note:the acronym fits top-rope belay, but not lead belay.
- Tie-off the belay to go hands free.
- Repeat the exercise with a munter belay, keeping in mind that the munter brake position is multi-directional.

Videos for belaying a leader. For belay tie-off videos see FT 1.

<https://vimeo.com/124944154>

<https://vimeo.com/80477504>

### **Station 4: Low anchor rappel, & alternate rappel method (Inside wall, Goodman C).**

- 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.
- 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.
- If only two locking carabiners, must avoid rope friction against belay loop.
- Rappel from high anchor station, with 3 locking carabiner rappel method extended and with auto-block, including partner check (if time allows).

Video links:

<https://www.youtube.com/watch?v=IsIG-Clp2qA>

<https://www.youtube.com/watch?v=B-imsccvmHQ>



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

### **Snow Travel Skills**

- 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). <https://www.youtube.com/watch?v=qid9w1E7G0A>
- 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.

### **Self-Arrest Skills**

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

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

## Glissading Skills

Assess runout before glissading

- 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

Working in pairs students hold a simulated crevasse fall, then transitioning from holding the fallen climber, to building & connecting to a snow anchor (aka, escape the belay). Done unassisted for simplicity. This is a simulated fall only (not a full load). An exercise building a snow anchor, and connecting to it with a friction hitch to escape the fallen on rope. In a real crevasse fall it's likely another climber would be available to assist. Either from a second rope-team, or rope-mate on fallen climbers rope-team. We do it here unassisted as a learning/teaching scenario.

- Friction hitch connected to anchor.
- Friction hitch backed up to anchor. With clove hitch (adjustable) or a bight of rope tied-off with an overhand, figure 8, or other knot to a locked carabiner.

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## FIELD TRIP 5 - CREVASSE RESCUE EVALUATION evening session

Held at Kite Hill, accessed from the south entrance of Magnuson Park, and then north on Lake Shore Drive.

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 all 4 key points described below.

### 1) Hold the fall and anchor the rope, including back-up to friction hitch or rope grab.

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. Usually with a friction hitch, or rope grab (Tibloc, Micro-traxion, Roll-N-Lock, Ropeman, Duck, etc.) from the loaded rope to the snow anchor. 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 friction hitch that we start all students with. Other hitches accepted, but students master prusik first.

Back-up for friction hitch (prusik, klemheist, etc): Because both friction hitches and rope grabs fail a rope's sheath at around 4kn 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.

## **2) 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.

## **3) 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?

## **4) Raising systems, including rope entrenchment considerations.**

Details: If the loaded rope is entrenched badly 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.

Try and 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.

Videos:

<https://www.youtube.com/watch?v=Z07LXfpIRNs>

<https://www.youtube.com/watch?v=EhlanzaBtp4>

<https://vimeo.com/145012490>

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