

TRAINING MANUAL FOR MICHIGAN 4-H

# OUTDOOR ADVENTURE CHALLENGE



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## Section: Rock Climbing & Rappelling



## **ROCK CLIMBING & RAPPELLING SECTION CONTENTS**

- General Rules and Etiquette
- Leave No Trace and Rock Climbing
- Setting Top Ropes and Rappels
- Definitions
- Climb Ratings

## **GENERAL RULES AND ETIQUETTE**

### **Prior to Trip**

- Gather and inspect equipment.
- Ensure that every participant (youth and adult) will have a helmet.
- Retire and replace any equipment that looks damaged, worn or is out-dated.

### **Climbing Site**

- When arriving on site, set up a safe zone and a helmet zone. For example any time walking or sitting within 25 feet of the climbing wall, when walking to set up a climb or on the top of a climb, belaying or climbing, a helmet should be worn. Wearing a helmet means that it is clipped and fits properly. Advise those with long hair to tie the hair back in a low pony tail and/or use a bandana to keep the helmet in place better.

### **Ready to Climb?**

- Belayer checks climber's harness to ensure it is properly fitting and all buckles are doubled back. Also, double checks Follow Through Figure 8 knot to make sure it is tied correctly.
- Climber checks belayer's harness to ensure it is properly fitting and all buckles are doubled back. Also, checks to make sure that the Locking Biner is locked.

### **Mandatory Communication**

- When ready climber asks belayer, "On Belay?"
  - If ready and no slack is left in the rope, the belayer responds, "Belay On."
  - Before stepping on the wall, the climber then warns, "Climbing."
  - If belayer is ready, responds, "Climb On!"
- If the climber falls he should yell, "Falling!"
- If the climber dislodges a rock, dirt, vegetation, loses a shoe, etc he should yell, "Rock!"
- If the climber needs a break he should warn, "Resting," and before letting go of the wall climber should hear the belayer respond with, "Thank you."
- Before resuming climbing, the climber then warns, "Climbing." If belayer is ready, responds, "Climb On!"
- If the climber feels he needs the rope tighter he should yell, "Take."
- If the climber feels he needs the rope looser he should yell, "Slack."
- When the top is reached, the climber should say "Lower me" or "Let it ride" and before letting go of the wall he should hear the belayer respond with, "Lowering"
- When the climb has ended and the climber is safely on the ground he should say, "Off belay"
  - Belayer responds, "Belay is off."
  - Climber responds, "Thank you, belayer."
- These phrases are also used with rappelling, just replace climb/climbing with rappel/rappelling.
- When setting a climb, before throwing the rope down yell, "Rope!"
  - If at the bottom of the climb and ready for the rope yell, "Clear!"

## **I dropped my Helmet, Figure 8, Carabiner, ATC, etc.**

- If you drop any of these items from a height of 4 feet or above, then the item needs to be retired. Either take it directly to the trash or mark it in a very obvious way so that it will not be used again.
- This also a reminder that gear should never ever, ever be thrown whether it is tossed to another person or to the ground, it is not a wise idea.

## **Belayer**

### Have readily available:

- Water
- Snacks
- Bug spray
- Bug head net
- Sunscreen

- As a belayer, don't be afraid to take a break, even if you have a line of climbers waiting to use any of these things. If you are tired, need to eat or use the bathroom, ask a waiting climber to locate another belayer.

## **LEAVE NO TRACE AND ROCK CLIMBING**

### **Plan Ahead**

Pick a climb that suits the skill level of you and your group to minimize the possibility of injury and need of rescue. Use appropriate equipment that has been thoroughly checked before the climb. Carpool to popular locations to minimize overcrowding at the trailhead. Develop adequate skills in all members of your climbing party. The ability to properly use removable protection preserves the adventure for future climbers.

### **Durable Surfaces**

If you have a group, ensure the staging area is large enough to accommodate you. Even though rock is highly durable, continual climbing can wear it down and break pieces off. Avoid cliff edges, cracks, and ledges that are prone to erosion, especially on soft rock types such as sandstone. When Bouldering (low, horizontal climbing across a rock face), ensure the ground is durable so your spotters or crash pad will not destroy vegetation. Excessive removal of rocks or other landscaping to make a bouldering problem safe should be avoided. Since most popular climbing routes have established descent trails, use them. Do not wrap rope around trees where the friction can destroy the bark. Instead, tie a sling around the tree and run your rope through the sling.

### **Dispose of Waste Properly**

Pack out worn out or discarded gear such as old webbing or discarded tape. Minimize the use of chalk. Keep your chalkbag closed to prevent spills. Clean up any spills that do occur.

### **Leave What You Find**

Use removable protection as much as possible. Use fixed protection sparingly. If you are climbing a new route, avoid lichen-covered rock, vegetated cracks, and areas that require lots of cleaning. Leave the rock as you find it rather than force a route that will leave a noticeable path.

### **Respect Wildlife**

Critical nesting sites are found in cliff faces for many birds. Other animals use rock outcrops for shelter. Be aware of closures, both mandatory and voluntary, and follow them. Keep alert for animals protecting their home and change or abandon your route to leave them space.

## Be Considerate of Other Visitors

Climb on weekdays or less popular times. Wear earth-tone clothes to minimize your visual impact while scurrying up a cliff face. Minimize noise while waiting to climb.

## SETTING TOP ROPES AND RAPPELS

### Equipment Needed for Setting a Climb

- Webbing (minimum, 1 inch nylon webbing rated for climbing, for anchors and to hold edge protection)
- Carabiners (to hold edge protection)
- Steel Tri Load Carabiner (for top anchor, to run rope through)
- Edge protection (canvas tarp)
- Dynamic Rope (minimum 10.5 mm)
- Harness (to secure yourself while setting climb)
- Locking carabiner (to secure yourself while setting climb)

### Equipment Needed for Setting a Rappel

- Static Rope (minimum 11 mm)
- Harness (to secure yourself while throwing rope)
- Locking carabiner (to secure yourself while throwing rope)
- If a climb is not set adjacent to the rappel then you will need everything necessary to also set a climb.

### The Basics of Anchors

All anchors whether they are for belaying, top roping, or rappelling should adhere to the concept of **S.R.E.N.E.**

**Strong:** Good anchor systems are built off of solid components, such as a strong tree or immobile boulder. If you aren't comfortable with the size of the tree, move keep looking for another component to use as an anchor.

**Redundant:** Anchor systems must be constructed of multiple components so that if any one component fails, the anchor will not fail.

**Equalized:** Building an anchor system so that the load is shared by all of the components decreases the chance that any one component will fail. Watch the angle between the slings at the focal point. This angle should always be smaller than 90<sup>0</sup> degrees, better is less than 60<sup>0</sup> degrees. At 120<sup>0</sup> degrees the forces in a two-point anchor become equal negating any advantage of a multi-point anchor. If the angle is close to 180<sup>0</sup> degrees, the force in the legs of the anchor approaches infinity – such an anchor is more dangerous than a single-point, non-redundant anchor.

**No Extension:** If a component does fail, the anchor system should be constructed so that the remaining components are not shock loaded.

## **DEFINITIONS** (via [www.rockclimbing.com](http://www.rockclimbing.com))

**Abseil** - v. UK English for rappel, from the German origin. See Rappel.

**Aid Climbing** - n Originally called direct aid or artificial climbing, aid climbing is a means of ascent where the climber's weight is supported primarily, or entirely, by slings attached to a device attached to the rock, rather than by the climber's own hands, feet and other body parts as in free climbing.

**Anchor** - n. That which attaches the belayer to the rock, or otherwise prevents the belayer from being pulled off the belay stance if the leader falls.

**Approach** - v. The journey to the base of a crag or route.

**Approach Time** - n. The time taken to reach the base of the route you are going to climb.

**Arete** - n. A narrow ridge, or corner, of rock or snow. Derived from the french word for "stop".

**Ascend** - v. To go up. Climbers ascend a route to get to the top.

**Ascenders** - n. Mechanical devices used to ascend a rope, consisting of a camming mechanism which bites into the rope when downward pressure is applied but allows movement when slid up the rope.

**Ascent** - n. A completed climb. 'Everest was one of my many ascents.' 2. v. The upward [not vertical] movement or progress [not motion] of a climber. Antonym: descent.

**ATC** - Air Traffic Controller. ATC is a proprietary (Black Diamond) belay device designed to facilitate smooth feeding of rope.

**Base Camp** - n The lowest fixed camp on a long route or other journey.

**Belay** - vb. the process securing the climber during a climb using a device to help stop the rope. Belaying allows a climber to fall and live to try again.

**Belay Loop** - This is a sewn loop which connects your waist and leg loops.

**Belay Device** - n. A device that attaches to the climber's harness through which the rope is threaded for belaying. Its primary purpose is to create friction quickly in the event of a fall so the belayer can stop the rope, which stops the leader's fall, simply by pulling against the device. The device creates a 'hairpin' turn in the rope at all times and allows the belayer to pay out or take in slack freely, and to stop or brake the rope in an instant. Common belay devices: ATC, GriGri, Sticht Plate

**Belay Station** - n. A secure stance consisting of an anchor, a rope, and a belayer with a belay device. The place where a belayer sits while belaying.

**Belayer** - n. a person who is belaying a climber.

**Big wall** - n. A large expanse of steep rock taking a minimum of three days to climb with conventional methods (free and aid climbing, hauling a bag with food water and shelter). El Cap and Half Dome in Yosemite Valley are big walls though both have routes that have been climbed in less than a day.

**Bolt** - n. A permanent anchor in the rock installed individually as a protection device, or with other bolts or protection devices as an anchor. The bolt is a metal shaft 3/8 inch or 5/16 inch in diameter (common sizes), driven into a hole drilled by the climber, and equipped with a hanger to attach a carabiner.

**Boulder** - n./v. a big rock typically climbed without a rope. May be head high to over 30 feet. Each boulder may have many distinct routes. Boulder problems are often top roped (See top rope), but climbing without a rope is thought to be better style. To boulder or to go bouldering is to climb boulder problems.

**Bouldering Pad** - n. A mat three to four inches thick, and roughly four feet square placed on the ground under a boulderer to cushion a fall. Also known as a crash pad.

**Brake Hand** - n. The hand that holds the rope on the opposite side of the belay device to the climber.

**Buttress** - n. A part of the mountain or rock formation that stands out from the main face.

**Carabiner** - n. A metal ring with a spring-loaded gate used to attach the rope to protection, and many other things. Slang: Biner.

**Chalk** - n. white drying agent used to keep a climber's hands dry. Sometimes called "white courage" 2. (vb.) to apply chalk to hands.

**Chimney** - n. a parallel sided constriction wider than body width. 2. (vb.) to climb a chimney.

**Clipping** - v. The act of putting a carabiner onto a bolt, the rope, or a piece of protection.

**Crack** - n. An inward split or break in a rock face.

**Crack climbing** - n. the act of climbing continuous cracks in the rock often requiring specific techniques and protection methods.

**Crimp** - vb. to grip in a way such that fingertips contact the hold with knuckles raised slightly.

**Crimper** - n. a small edged hold which is conducive to crimping.

**Crux** - n. the most crucial, difficult part of the climb.

**Daisy Chain** - n. A woven webbing sling with multiple loops used in aiding and belay stations.

**Dead Hang** - adj. Hanging from a hold with the arms straightened allowing body weight to be held by the skeleton rather than arm muscles. - good for relaxing the arm muscles

**Descender** - n. Any device used to rappel or abseil. ie: figure 8, rappel rack, stitch plate

**Doubled Back** - adj. Bringing your harness webbing loop back through the buckle when putting it on. This is an important part of ensuring that your harness is done up correctly.

**Downclimb** - vb. to climb downward rather than upward on a climb.

**Elvis leg** - n. the uncontrollable shake of a leg uncontrollably during a climb. Often due to a combination of nerves and over contraction of muscles.

**Face Climbing** - v. Climbing on the flat part of a rock face, considered to be the opposite of crack climbing.

**Fall Factor** - n. The length of the fall divided by the amount of rope paid out. Used when deciding how much strain has been placed on a rope or piece of gear after it has been fallen on.

**Fall Line** - n. The path of a climber if he were to fall off a climb.

**Figure 8** - n. a common rappel / belay device shaped like the number "8".

**Figure 8 knot** - n. Also known as the "double figure 8" or "figure 8 follow through". The most common knot used to attach the climber's harness to the rope.

**Finger jam** - n. Obtaining purchase in a crack wide enough for a finger but too narrow for a hand; can be achieved with one or more fingers. An advanced technique.

**Fist Jam** - n. A technique involving a fist being wedged into a crack in order to hold on.

**Fixed protection** - n. gear that is left on the rock for future use.

**Flake** - n. A rock formation where a 'flake' of rock sticks out from the rest of the wall.

**Flared Crack** - n. A crack with sides that are not parallel, but instead form two converging planes of rock.

**Gate** - n. The hinged part of a carabiner which opens to allow the clipping of a rope or piece of gear. etc.

**Gear Loops** - n. The loops attached to the waist belt on a harness that are used to hold gear.

**Hand jam** - n./v. Using your hand to gain purchase in a crack by twisting the hand, squeezing or spreading the palm, pulling the thumb down, making a fist, stacking both hands, etc. . .

**Hand Traverse** - n. Climbing horizontally using hands only.

**Harness** - n. Device the climber wears that attaches the climber to the rope so that in the event of a fall, the climber is held by the rope. (See belay.) Modern harnesses include leg loops and a waist band secured by a buckle system.

**Helmet** - n. Protection for the head from falling gear or rocks.

**Hold** - n. Any feature of the rock which affords the climber a place to grip with hands or feet. Also, for indoor use; small plastic molded climbing grips.

**Inverting** - v. Flipping upside down when falling off the wall.

**Jamming** - v. Placing and wedging a body part into a crack in order to hold yourself on the wall.

**Lead** - vb/n. to climb starting with the rope on the ground clipping into protection points on the way up.

**Locking Carabiner** - n. A carabiner with either a screw gate, or twist lock, locking mechanism.

**Lower Off** - v. To come down from a route after reaching the top or not being able to climb anymore.

**Mantel** - n./vb. a climbing technique involving the transfer of upward force from a pulling action to a pushing action much like a child would climb the kitchen counter to reach the cabinets above.

**Move** - n. Refers to the motion between holds.

**Off Belay** - n. Common climbing call from a climber to a belayer letting them know they are safe and no longer require belaying.

**Pendulum** - v. To swing in an arc on the end of a rope to gain access to an anchor or rock feature to one side of your current position. Also a dangerous situation that may occur during a fall, if the top piece of protections is off to one side.

**Problem** - n. A bouldering route.

**Prusik Knot** - n. A friction knot that when loaded, will lock on a rope. It is used when climbing a rope, backing up a rappel or locking off the belay system.

**Pulley System** - n. Where the rope runs through a series of pulley's and carabiners to gain a mechanical advantage when pulling the rope.



**Quickdraw** - n. two carabiners connected by a webbing (usually) or rope. Used to link elements of protection, or more commonly, to link the rope to a piece of protection.

**Rappel** - n/vb the act of self belaying down the length of a rope to descend.

**Rope - Dynamic:**

The rope is designed to stretch at a designated percentage given a static load of a designated weight (i.e. 6.5% stretch on static load of 80Kg). The reason these ropes are designed to stretch is to minimize and absorb some of the impact of a fall - imagine taking a 20' fall w/ no stretch, you could snap your back in two! These ropes are used in any/all lead climbing to protect the climber by absorbing the impact of a large fall. This is the standard in rock climbing. These ropes can be used for rappelling, top-roping and hauling gear like it's cousin, the static rope, but understand that these practices will put more wear and tear on the ropes and cause them to wear out faster.

**Static:** are the opposite of dynamic ropes and market their ability to NOT stretch under load. These are primarily used for rappelling, top-roping and hauling gear, however should NEVER be used for lead climbing.

**Runner** - n. a sewn or tied loop of webbing or rope used to connect protection elements.

**Slab** - n any climb that is less than vertical, especially those devoid of features requiring smearing of the feet.

**Smear** - n/vb the act of placing a large surface area of shoe rubber on a hold to create maximum friction.

**Sport Climbing** - n a school of climbing that generally emphasizes shorter routes, physically difficult movement, and bolted protection. This includes gym climbing and competition.

**Top rope** - n/vb. A climb that has the rope anchors preset at the top of the climb. In general this results in shorter falls than a "lead".

**Traditional/ trad / trad climbing** - n/adj Climbing that emphasizes longer routes and removable protection.

**Undercling** - n/vb a hold that requires fingers to face upward rather than downward.

**V ratings** - n. an open ended scale used to rate the difficulty of boulder problems. V0 (easiest)- V16 (most difficult.)

**Yosemite Decimal System (YDS)** - n. the most common system used to rate difficulty in the U.S. Most technical rock climbing is rated on a scale of 5.0 to 5.14c/d with higher numbers representing harder climbs.

**CLIMB RATINGS** ([www.rei.com](http://www.rei.com))

| <b>Climbing Route Classifications</b> |   |  |
|---------------------------------------|---|--|
| Class 1                               | Walking an established flat, easy trail.  |  |
| Class 2                               | Hiking a steep incline, scrambling, maybe using your hands.   |  |
| Class 3                               | Climbing steep a hillside, moderate exposure, a rope may be carried but not used, and hands are used in climbing. A short fall could be possible. |  |
| Class 4                               | It is steeper yet, exposed and most people use a rope due to the potential of long falls.   |  |
| Class 5                               | Climbing is technical and belayed roping with protection is required. It is not for a novice. Any fall from a Class 5 could be fatal.             |  |
| <b>Class 5 sub-categories</b>         |   |  |
| 5.1-5.4                               | Easy  | Climbing a steep section that has large hand and foot holds.                                   |
| 5.5-5.8                               | Intermediate  | Small foot and handholds. Strength and rock climbing skills required. Low to vertical terrain. |
| 5.9-5.10                              | Hard  | Not for beginners. Technical, vertical and may have overhangs. Rock shoes required.            |
| 5.11-5.12                             | Hard to Difficult   | Not for beginners. Technical, vertical and may have overhangs. Rock shoes required.            |
| 5.13-5.15                             | Very Difficult  | Not for beginners. Technical, vertical and may have overhangs. Rock shoes required.            |