



**American
Alpine Institute**

The Spirit of Alpinism

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**American Alpine Institute
– Winter Mountaineering in the Sierra –
Equipment List**

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It is essential that you do a careful job in selecting and preparing your equipment for this course. The weather in the mountains is a major objective hazard, even in the summer, and in the winter it can present extreme challenges to survival. Temperatures are typically in the teens but can easily drop to -10 to -20 F and be accompanied by high winds and blowing snow.

We will not head into the mountains until everyone has appropriate equipment. Showing up unprepared can result in a delayed start to the trip or an altered itinerary. For your own comfort and safety, please take this list seriously and come in good physical condition. If you have any questions about choosing your gear, feel free to call the Sierra Nevada Program Coordinator and ask for advice.

The equipment you bring must function well in a wide variety of conditions. Your clothing should be warm, lightweight, dry quickly, and allow good freedom of movement. The layering principle, based on several thin layers of insulation (rather than one thick one) meets these needs well.

As a general rule you should not bring more clothing than you can wear at one time. With the exception of extra socks and hand wear, avoid duplicating layers. Backcountry skiing and climbing is always a challenge. Travel light to make your experience more enjoyable.

Course participants often pair up before the course or at the rendezvous to discuss sharing the use of tents and stoves in order to save weight.

Please take the time to prepare your equipment carefully, and become familiar with it by using it in the field prior to your program. If you have any questions don't hesitate to call the Institute office or [AAI's Equipment Shop](#) (360-671-1570). We'll be happy to help you with big questions or little details. Please use us as a resource as you prepare for your program.

Clothing & Footwear

□ **Base Layer Top:** Bring one. This will be your base layer and should be midweight synthetic or wool. No cotton.

Weight: 5 - 8 oz / 140 - 225 grams **Materials:** Synthetic, wool.

□ **Base Layer Bottom:** Look for the same features as your Base Layer Top. Should be at least midweight. One pair is sufficient.

Weight: 5 - 8 oz / 140 - 225 grams **Materials:** Synthetic, wool, Powerstretch.

□ **2nd Layer Top:** A lightweight fleece shirt or hoody. A chest pocket is a helpful feature of this multi-use layer.

Weight: 13 - 16oz / 368-454 grams. **Materials:** micro weave fabrics, fleece. **Examples:** OR Radiant Hybrid, Patagonia R1 hoody, Mountain Equipment Eclipse

□ **Soft Shell Jacket:** Thin, light, stretchy, breathable but wind and snow-resistant layer that is comfortable to wear is ideal. Hoods are highly recommended. Size your jacket to be trim fitting, but large enough to fit over your base and second layers. This layer will go over your base and 2nd layers, but under your shell and parka if wearing this layer in combination with those layers.

Weight: 3 - 16 oz / 85 - 450 grams **Materials:** Schoeller, Nylon, Powerdry, or similar.

Examples: Patagonia Houdini, OR Ferrosi, Rab Cirrus, Arc'teryx Squamish Hoody or Gamma SL

□ **Soft Shell Pants:** Look for the same features as your Soft Shell Jacket. This will be your outermost layer most of the time for your legs. Thigh pockets are useful for storing small items. Your base layers need to fit under these pants comfortably.

Weight: 16 - 30oz / 450 - 850 grams **Materials:** Schoeller, Powershield, Powerdry, or similar

Examples: Patagonia Guide pants, Arc'teryx Psiphon AR Pants, Mammut Champ Pants

□ **Light Insulating Layer, Top:** The goal for this piece is to add warmth to your internal layering system. This layer fits over your softshell jacket and under your shell jacket. Hoods are optional but highly recommended. The weight and design of this piece will vary based on the other items of climbing that you are bringing.

Weight: 10 - 20oz / 283 – 566 grams **Materials:** Primaloft, down **Examples:** Patagonia Nano Puff or Nano Air Hoody, Arc'Teryx Atom LT, Wild Things Insulight Jacket, Rab Xenon or Strata Hoody

□ **Down Parka:** Expedition weight with hood. Baffled construction, includes a hood, pockets and offers sufficient coverage over your waist. Must fit over all of your other layers.

Weight: 35 - 55oz / 992 – 1560 grams **Materials:** down with nylon, epic, or event fabrics

Examples: Feathered Friends Frontpoint Volant or Helios Jacket, Rab Neutrino Jacket, Patagonia Down parka and DAS parka, Mountain Hardwear Sub Zero SL Parka.

□ **Shell Pants:** Made of a waterproof/breathable material, your lightweight shell bottoms must have full or hip length side zips. This garment should be extremely lightweight and packable. A zipper fly is a nice, but optional. Should be sized to fit over your base layers and softshell pants.

Weight: 8 - 16oz / 227 – 453 grams **Materials:** eVent, Gore-tex, h2No, or similar **Examples:**

Arc'teryx Alpha SL or Beta AR Pants, Patagonia Grade VI, or Marmot Precip

☐ **Shell Jacket:** This layer needs to be made of waterproof/breathable construction and ultralight. Your shell should be sized to comfortably fit over your other base and mid-layers (minus your parka). Choose the lightest, most packable shell that will still get the job done. Avoid extra pockets (one or two chest pockets is all you need) and hanging linings. Your hood must fit over your climbing helmet.

Weight: 8 - 20oz / 227 – 566 grams Materials: eVent, Gore-tex, h2No, or similar Examples: Rab Neo Alpine, Patagonia M10, Arc'teryx Alpha SL or FL, Westcomb Mirage, Marmot Precip.

☐ **Socks:** Bring two complete changes. No cotton. Adjust your sock system ahead of time to perfect your boot fit. Materials: wool, synthetic. Optional: thin sock liners.

☐ **Cold Weather Mountaineering Boots:** Insulated mountaineering boots are mandatory. Double boots (with an outer shell and removable liner) are the standard for winter conditions and frostbite prevention. Hiking boots and “snow boots” will not work for this course. Plastic mountaineering boots are available for rent locally. Please keep in mind that there are many rugged mountaineering boots that are not suitable for this program. Boots without a removable liner (La Sportiva Nepal, Scarpa Phantom Guide or similar) should only be considered if you don't get cold feet and your climb is after January. Call our Equipment shop if you have any questions about your purchase of boots. Shell Materials: Synthetic, plastic Liner: Thermo-moldable or High Altitude models Examples: La Sportiva Spantik, Baruntse, Scarpa Phantom 6000

☐ **Gaiters:** Knee height. Check the fit of the gaiter to your boot in advance to make sure the coverage is adequate. Not required for those with integrated boots.

Weight: 4 – 12 oz / 110 – 340 grams Materials: Schoeller, nylon, Cordura Examples: OR Crocodile

☐ **Glove Liners:** Need to be dexterous and comfortable, but not necessarily very insulating. Bring one pair. Materials: fleece, Powerstretch, or similar Mid-weight Fleece/Schoeller

☐ **Mid weight Softshell Gloves:** The most desirable glove is one that is comfortable and dexterous, so that it can be worn all day. It should be durable enough (leather/synthetic palms) to handle ropes, jumars and ice axes. These come in different weights, so choose the thickness that works with your glove system. Bring one pair. Materials: softshell, windstopper fleece, leather or similar Examples: OR Gripper Gloves, Black Diamond Scree or Impulse, OR ExtraVert

☐ **Expedition Gloves:** Composed of heavy-duty waterproof shells with extremely warm liners, these modular gloves MUST have removable liners. These gloves must be dexterous enough to handle ropes, carabiners, and jumars.

Weight: 9 – 14 oz / 255 – 400 grams Shell Materials: Gore-tex or similar Examples: Black Diamond Guide Gloves, OR Highcamp or Alti Gloves, and Marmot Ultimate Ski Gloves.

☐ **Beanie Hat/Toque:** A warm hat that must fit under your climbing helmet. Fleece, wool, or similar fabrics are best. Windstopper fabric makes hearing difficult. No tassels.

☐ **Buff or Balaclava:** Thin to medium weight. When combined with your hat and goggles this should completely cover your head and face. Materials: Powerstretch, fleece, polypro, Examples: Buff and OR powerstretch models

☐ **Sun hat:** A baseball cap or visor serves well.

☐ **Sun Glasses:** Choose a model with 100% UVA/UVB protection. A cord or strap to prevent dropping is an excellent accessory. Note: Those using contact lenses should also bring a pair of prescription glasses in the event that your contacts or solutions are lost or damaged by freezing.

☐ **Ski Goggles:** For use in high winds and heavy snow. These should be lightly tinted but not so dark that they will reduce visibility in low light conditions. They should block 100% of UV light. If you wear prescription glasses, these must fit comfortably over your glasses.

Climbing and Camping Equipment

☐ **Climbing Harness:** For alpine climbing, must have a belay loop. Make sure it fits your body when wearing bulky clothing. Gear loops are desirable.

Weight: 6 - 16oz / 170 - 453 grams Examples: Mammut Zephir Altitude, Camp Blitz, Black Diamond Couloir

Climbing Helmet: Lightweight, well ventilated, and comfortable. Models with a plastic shell are more durable, but are heavier than all-foam models. Must be UIAA approved for climbing.

Examples: Petzl Elios, Black Diamond Half Dome

☐ **Carabiners:** Bring two large, pear shaped (or Mütter) locking carabiners. Screwlock is preferred over autolocking or magnetic models. Examples: Petzl Attache, Black Diamond Vaporlock, Camp HMS Nitrolock

☐ **Ice Axe:** We recommend using an axe that is about 50cm. There are some days when the axe will be used only briefly, and spend most of the day strapped to the pack while you are climbing rock. Weight: 13-20 oz / 370 – 560 grams Examples: Grivel Airtech Evo, Black Diamond Raven Pro, Petzl Glacier

☐ **Crampons:** Flexible or semi-flexible. New-matic crampons are the easiest to put on with cold fingers. Only modern strap-on, step-in, or 'new-matic' crampons are acceptable. Older Scottish style strap-on crampons are not adequate. Examples: Petzl Irvis, Black Diamond Contact Strap, Grivel G12 or G10

☐ **Sewn runner/sling:** We require you to bring one (1) sewn nylon sling. Should be 120cm (48 in) in length. Thinner spectra/dyneema slings are not recommended.

☐ **Trekking Poles:** Two are required. Even if you don't normally use trekking poles, on this expedition in particular, they are invaluable in helping with balance while carrying heavy packs on snowshoes. Examples: Black Diamond Expedition Flick-lock, REI/Komperdell models

☐ **Snowshoes:** They should be equipped with an integral crampon and/or aggressive traction on the bottom of the snowshoes. Large profile basic models made by Tubbs, Atlas, and Sherpa do not work well and are not recommended. Models by MSR are proven and quite durable. Examples: MSR Denali, Denali Ascent, and Denali Evo Camping Equipment

☐ **Tent:** Lightweight 4-season tent capable of withstanding winds to about 40 mph and continuous, multi-day rain. Your shelter should weigh no more than 4 lbs per person. We normally pair up in tents so if you don't have one, you may be able to share.

□ **Sleeping Bag:** Down is the sleeping bag insulation of choice. Rated from -10F (-23C) to 0F (18C) If you know you sleep cold take this into consideration when purchasing/selecting your bag. **Weight:** 40 - 50 oz / 1.1 – 1.4 kg **Materials:** Shell - Dryloft, eVent, Epic, nylon, Fill - Down **Examples:** Marmot Lithium Membrain, Feathered Friends Snowbunting, Western Mountaineering Antelope, Mountain Hardwear Phantom

□ **Sleeping Pads:** Two are ideal. One should be a half-length inflatable pad. The second pad should be a full-length closed cell foam pad. Your inflatable pad should be a modern, lightweight, and packable version with an R-Value of at least 4. Newer pads are less bulky and take up only a tiny portion of your packs' volume. **Weight:** 8-20 oz each / 225 – 565 grams each

□ **Compression Stuff Sack:** Used to shrink your sleeping bag into the smallest size possible. **Weight:** 2-4 oz / 56 – 110 grams **Materials:** SilNylon, eVent, or similar.

□ **Large Internal Frame Backpack:** Choose the pack that fits your body best. An external frame is not adequate. Avoid bells and whistles like large, full-length zippers, separate sleeping bag compartments, etc. Removable hipbelt, suspension parts, and lid are ideal options. It is very important that your pack be in good working order and not prone to failures of any sort. Our packs are a hugely important item and a climber may not be able to continue due to a pack failure.

Weight: 4 - 6.5 lbs / 1.81 - 2.9kg **Size:** 60 – 80 liters **Examples:** Black Diamond Mission 75, Cilogear 60L Worksack, Mountain Hardware South Col 70, Wild Things Andanista

Cooking Equipment and Food

□ **Spoon:** Bigger is better. Avoid the plastic multi utensil sporks, they will break.

□ **Thermal mug:** 16-20oz with a lid. A 16oz wide mouth Nalgene or small Hydroflask are favorites of our guides.

□ **Bowl:** A lightweight Tupperware-type container is recommended. Avoid bowls (plastic or metal) since they are small, prone to tipping, and more fragile. Metal containers conduct heat more rapidly and lead to colder food and drinks faster than other materials.

□ **Stove:** Liquid fuel or canister stoves are acceptable. We may pair up on stoves at the rendezvous to save weight Examples: MSR Whisperlite, Reactor, or Windboiler, Jetboil Fuel: White gas or gas canister. 22oz of white gas or two 8oz canisters per person are usually sufficient. Fuel is available to purchase at the rendezvous for your course.

□ **Lighters:** Bring 2.

□ **Pot:** Pots: One 1½ - 2 quart pot is enough for one person. Two people sharing a stove might want to bring two pots if their meals are significantly different. **Materials:** Titanium, aluminum.

□ **Fuel Bottle:** For use with liquid fuel stoves. Leak-proof bottles designed for your specific stove such as Sigg or MSR are best

□ **Hydration:** 2.5-3 liters of water capacity minimum. Two or three water bottles, usually one-liter wide mouth Nalgene type, are required. Narrow mouth bottles are not functional and should not be used. Other similar plastic bottles (e.g. Gatorade) can work also. Hydration packs are not recommended, once they freeze they stay frozen for the duration of the trip.

Water Bottle Parkas: These are insulating jackets for your water bottles, one for each bottle. Must cover the entire bottle, including the lid. **Examples:** Outdoor Research, 40 Below

Food: AAI does not supply food on this program. Select meals that are relatively easy to prepare but also appetizing. For the days bring plenty of quick, high – energy lunch food. Please contact AAI if you need help figuring out what to bring.

Headlamp: A high output LED model. Bring fresh batteries and one set of extra batteries. Flashlights are not acceptable. **Examples:** Petzl Tikka XP, Black Diamond Spot

Other Essentials

Avalanche Equipment: If you have your own Avalanche Transceiver, Probe, and Shovel, please call AAI to confirm that they will be appropriate for this course. If you do not own these items they can be rented from AAI.

- Beacon
- Probe
- Shovel

Wristwatch: A model with an alarm that will wake you up is preferable. It doesn't need to be anything fancy.

Personal Toiletries: Bring a toothbrush, toothpaste, floss, hand sanitizer, personal supply of TP, etc.

Lip Protection: Bring 1 container/applicator with the highest SPF available. Sunscreen: With a Sun Protection Factor (SPF) of at least 30. For the fair skinned, the higher the SPF the better. Stick applicators allow you to apply without exposing fingers. Dermatone produces an effective 1" diameter stick as well as a translucent zinc oxide lotion. A 1 oz. tube is adequate. Sunscreen is prone to freezing in the cold and smaller containers fit well into pockets for warming.

Garbage Bags: Bring one or two larger ones. They serve a variety of uses. Trash compactor bags, if available, are more durable.

Personal Medical Kit: For sunburn, blisters, headaches, and minor cuts and scrapes. Your guide will be carrying a large first aid kit for the group. Plan to bring an adequate supply of any prescription medications based on counsel from medical professionals.

Multitool: Any multitool similar to a Leatherman is great. One should be shared amongst tent-mates. Smaller and simpler is better than overly complex.

Repair Kit: Include a Thermarest repair kit (for Thermarest pad users), crampon wrench and extra screws (if your crampons need it), small sewing kit, duct tape (can be wrapped on water bottles or trekking poles), pack waist buckle. Most of the items in this kit should be shared amongst tent-mates.

Pee Bottle: 1-quart size minimum. Nalgene 48oz widemouth collapsible canteen is a guide favorite. Plastic bottles from the store such as Gatorade bottles also work well. If you choose to bring one of these, use it carefully and make sure the capacity is adequate. Label your pee bottle well. Women must also bring a pee funnel; Freshette and PeeStyle make tried and true models.

Optional Equipment

The items listed below are not required, although many are nice “luxury” items that can make your expedition more enjoyable. Remember that a few ounces here and there add up to extra pounds on your back and knees during your expedition.

- Hand/Foot Warmers:** Recommended for people that are susceptible to cold hands and toes. These should be small, disposable type products like the ones made by Grabber Mycoal.
- Entertainment:** Books, games, cards, etc. Music players like iPods and MP3 players are popular because the device and media are small and relatively lightweight.
- Ear Plugs:** Defense against snoring and high winds in the area.
- Journal or Small Notebook:** Some climbers like to keep a journal or log for writing on the trip. Ballpoint pens work well in the cold and at altitude but other ink well type pens do not. “Rite-in-the-Rain” notebooks are more durable and more functional for the mountain environment than regular notebook paper.
- Camera:** We recommend small point and shoot cameras that can easily be carried in an outside pocket or small case outside your pack. If you can’t comfortably and safely carry your camera outside your pack, even in bad weather, you’ll miss the best photo opportunities. Though some climbers bring them, SLR cameras are not recommended because of weight and bulk. Make sure to bring extra batteries and keep them warm.