Enjoy the best camping season in Michigan!

Tips, Techniques, and Trail Thoughts for Winter Camping

Washtenong District Roundtable

December 7, 2000

Introduction

When we were asked to come give a talk on winter "survival" camping, our first reaction was that anybody who thinks they can learn all about winter camping in an hour is nuts. So, let's be clear: if you think that by reading this you're ready to do backcountry winter camping with a group of similarly inexperienced kids you're out of your mind.

We at Troop 8 do a lot of winter camping, and it really is a blast. Our polar bear campouts are some of the favorite trips every year, and we always do them in January and February as far north and snowy as we can. It works because the older guys and the adults have a lot of experience, and we do ruthless equipment checks. The older guys, for still more fun, do things like week-long backcountry ski tours.

According to Bob, it wasn't always this way. Twelve years ago, the troop snuck in just one polar bear campout in the lame weather the first weekend of December. We moved slowly into whole-troop winter camping first by doing winter trips just with older "Venture" boys, then with cabin trips where kids had the option to sleep out. After the PLC got used to these, we pushed for more full-blown winter camping, but by that point we had a lot of guys with experience to help the new kids. If you're just getting into winter camping, consider building up the way we did. Each trip then stays fun, so that guys want to do another, harder one next month or next year.

Finally, a word about "survival." **SILLY**. That's a good word. Troop 8 doesn't do survival. Survival usually involves hacking down trees and otherwise making a mess out of the woods. We just want to be good, comfortable, responsible wilderness travelers. If you know what you're doing and pay attention, you will never be put in a survival situation. Instead, you'll be having a snowball fight for fun in the middle of the blizzard. And if some poor fools get themselves in trouble playing "survival," you'll have the skills to bail them out.

Trip Safety Review

For all outings of any kind, safety depends on the three E's:

Equipment: Making sure everyone, and the group as a whole, has proper, robust, functioning gear for the trip, and knows how to use it.
Experience: Ensuring that all trip participants have the basic skills necessary for the trip contemplated, and that enough folks have more than the basic skills to be able to help the learners or deal with any unusual happening.
Environment: The vagarities of weather, snow conditions, and terrain. This "E" cannot be completely controlled, and instead must be planned for and adjusted for.

When the environment is friendly, weaknesses in experience or equipment can often be overcome (though it does tend to be annoying and hurts the "fun" of an outing). When the environment sours, though, equipment or experience failures swiftly multiply and become dangerous.

Winter camping is great fun, but involves a somewhat less friendly environment than summer trips. Weather systems in winter also move faster, and therefore conditions can occasionally surprise all but the most attentive. This means you have to pay closer attention to the Equipment and Experience pieces in order to have a successful campout.

The Warmth Equation

Most folks worry about staying warm in the wintertime, but it's really a very simple equation. Warmth depends on producing as much heat as is being lost.

Heat production comes from:

Food: having adequate calorie intake to provide lots of energy for a winter environment

Activity: use of large muscle groups produces excess warming.

Circulation: in areas without large muscle groups or insulating fat (hands, feet, ears, surface facial tissues), heat is delivered by warm blood flow from the body core.

Heat loss comes from:

Conduction: Contact with cold surfaces, like the ground while sleeping.

Convection: Heat carried away by passing molecules, like wind or water currents.

Radiation: Heat lost as infrared to the surroundings.

Evaporation: Heat lost through vaporizing water (perspiration, breathing, wet clothes, etc.)

If you're losing more heat than you're producing, hypothermia (reduced body core temperature) is the result. If an area which is dependent on circulation for heating does not have adequate circulation and loses more heat than it gains, frostbite (local freezing of tissue) is the result. Circulation can be reduced by tight clothing, the body's response to chilling, or by dehydration.

Paying attention to **both sides** of the heat equation is very important to staying safe and comfortable on a winter campout. Reducing heat loss by itself is not sufficient.

People Differences

We all know that different folks are bothered by the cold to different degrees. Some of this is genetic, relating to body type, racial background, and thyroid function. Some just has to do with upbringing and experience.

For kids, there's an additional pair of complications. Pre-adolescent and early adolescent bodies generally aren't as good at temperature regulation as adults; they run higher fevers and will drop in temperature more easily. Smaller, leaner boys are at a further disadvantage because their high surface-to-volume ratio makes them much easier to cool. As whales, seals, and other cold-weather mammals demonstrate, winter is the time when it's helpful to be carrying some fat for body insulation.

It's important that you recognize and discuss these individual differences. Boys will tend to play "macho" unless you help them to understand and accept the differences. You and the senior boys will also need to pay closer attention to the kids who are likely to have more difficulty. For example, your lean, wiry kids will always be colder than you, need to have one more layer on than you, and need to eat and drink proportionately more often. They can't follow the example of the adults or older boys; instead, they have to take the example and be a bit more conservative.

Equipment for Winter Camping

In order to be a safe winter camper, you have to pay very close attention to the first "E" - Equipment. Each and every scout going out on a winter trip has to have good quality gear appropriate to the trip.

Practically, this means that two weeks prior to the trip, scouts need to bring in all the gear they're bringing on the trip for a "gear check." In our troop, gear checks are mandatory for all scouts and parents, with the occasional exception of Venture scouts and Venture adult leaders with a lot of winter camping time. Gear checks are also ruthless. We routinely "throw out" gear that is inadequate by our standards. Having the gear check two weeks out gives you time to have a second, "final" gear check the week before the trip.

Since winter gear is expensive, we try to supplement younger guys with in-troop "loaner" gear. Older scouts generally have picked up more personal gear over the years, and don't have as large a "loaner" need.

Clothing – Basic Principles

During an average winter campout, it can be a nice, bright, sunny 30° day, then a cold, crisp, clear night at 0°, followed by a day of wind-driven snow. Activities range from standing around camp to all-out snow wars.

To accommodate this range of activity and weather without carrying way too much, *layering* is key. For strenuous activities, like cross-country skiing or snow-shelter construction, often a midweight polypro layer with a wind layer on top is sufficient even in the coldest temperatures. When resting or standing around camp, the need for extra insulation increases as heat production falls. Having a system which allows easy, quick adjustment is very important. Avoiding redundancy, so that you don't have excess weight to carry, is also important.

On most troop outings, cotton clothing is a poor choice. For winter or other cold-season camping, cotton is NOT ACCEPTABLE. This includes cotton flannel. Cotton acts as a negative insulator when wet, and can be dangerous in a cold-weather setting.

One rule to always pay attention to in winter camping is "watch the moisture." Evaporative cooling is a very strong effect, so a great deal of effort is spent managing gear made damp by perspiration or condensation.

Here are some basic clothing tips:

- Put p-cord pull tabs on every zipper on every piece of equipment or clothing. These will allow folks to operate the zippers with gloved hands.
- When layering, one needs to adjust the number of layers so that perspiration is kept to a minimum. Moisture in clothing or other insulating layers is a killer – the evaporative cooling it causes later when the body is not working as hard is very hard to overcome. One should therefore remove layers expeditiously when perspiring. If a hike or ski is coming up, a good rule of thumb is to remove layers until you "start cold." The work you do hiking will quickly warm you up.

- The brain is the body's big priority. Wear a hat & a hood!
- Cold hands and feet are caused by inadequate blood flow to those areas, as the body is trying to conserve energy. The remedy for cold feet is to add another layer to the LEGS. The remedy for cold hands is to add another layer to the TORSO. Then eat a bunch of gorp for fuel and dance around for a bit. Putting on an extra pair of socks won't work, unless the first pair are quite wet (in which case, you should change socks, not add socks) Too many socks makes things worse, because it may cut down circulation.

Winter Camping: Clothing and Personal Gear List

The following list is one we use for a general winter weekend backcountry trip. It should provide a pretty complete packing list for an individual scout or adult participant, with some guidelines for the type or quality of gear we expect. For individual outings, we "tweak" this list slightly according to the area, time of year, and goals/purpose of the trip.

1 Wool hat or equivalent

pile or fleece hats with ear flaps are great; pile or fleece balaclavas are really nice to sleep in, but somewhat light during the day (use a heavy one or bring a hat as well).

1 face mask (optional; your preference)

1 neck gaiter (or equivalent neck protection: balaclavas and turtlenecks work fine)

1 pair sunglasses

These should be glass or UV-filtering plastic. UV-filtering ski goggles which fit over prescription glasses are OK. Sunglasses with side flaps are great; non-tinted glass lens prescription glasses are acceptable. All glasses should have some sort of retaining strap to prevent loss or breakage in a fall. (I recommend Croakies for prescription glasses) Remember that the UV exposure during daylight hours is greatly intensified by reflective snow.

1 watch, with alarm

The days are much shorter, so it's important you use all your daylight well. Everyone needs a watch, hopefully with an alarm that will wake them up!

1 bandana (good for all kinds of things)

2 1/2 - 3 good upper insulating layers (go heavy)

An upper insulating layer covers the torso and both arms. 1 layer is the equivalent of a heavy sweater or jacket. A half layer could be polypropylene or wool long underwear (midweight to heavy). NO COTTON, as cotton offers no insulation when wet. Examples: midweight polypro long underwear top (1/2), heavy wool sweater (1), Long-sleeve wool shirt (1/2), pile/fleece jacket (1), ski jacket (1), expedition-weight polypro top (1). A sleeveless vest is acceptable as one insulating layer provided it is layered inside another layer and windproof shell.

1 wind/rain shell upper

This should not be insulated, but should be big enough to serve as an outer shell over several inner layers. If you've got a fancy-fabric one like Gore-tex, great! Waterproof nylon (like polyurethane-coated nylon rain jackets) is a definite no-no, because it doesn't breathe. As a result, these jackets will load inner layers with moisture, creating a real cooling problem.

1 winter parka with hood

Down or synthetic fill is fine. Should be roomy, so as to fit over inner layers. A parent's parka might be a good choice. This is your "stand around camp in" jacket.

1.5 - 2 lower insulating layers

A lower insulating layer covers the legs with the equivalent of a wool sweater in thickness. Examples: expedition-weight polypropylene long underwear (1); mid-weight long underwear (1/2) and wool pants (1/2).

1 lower wind/rain shell

Example: thin nylon pants, uninsulated ski pants. These should not be insulated. Fancy fabrics are great, but avoid urethane-coated nylon which doesn't breathe.

1 pair insulated ski pants or bibs (if not included, must have 2 – 2.5 full lower insulating layers)

Synthetics preferred, down OK; must fit over inner layers.

2 pair light silk or polypro socks (optional)

Worn as a lining sock under wool socks for comfort

4 pair wool socks.

Wool "stretch" blends (85% wool) or wool-polypro blends are great. Thorlo or similar synthetic blends are fine. Should be heavy wool socks, not thinner variety.

1 "bootie system" or 1 pair insulated boots (avoid heavy boots)

A "bootie system" includes 2-3 pair of layering insulated synthetic slipper/booties for wearing around camp. Commonly a plush pile slipper which fits over socks, followed by a polarguard or equivalent booty with a tough sole. A mukluk-sized outer layer is optional. One or more of the layers must have heavy insulation on the sole (ensolite pads can be cut in foot-shape for extra sole insulation). Weight and warmth-wise, these are preferred to insulated boots. If using boots, oversized boots are preferred to ones that barely fit, as circulation is most important to foot comfort. Person should be able to wear at least one pair of heavy wool socks inside an insulated boot without being tight. Sorels or equivalent with the heavy felt (removable) insulation are good; "duck shoes" with thin insulation are not sufficient. ABSOLUTELY NO TENNIES or other non-insulated, non-waterproof shoe.

1 pair nylon gaiters

Indispensable for keeping snow from getting down your boots.

1 pair wool gloves.

Thin, cheap $7 rag wool gloves that can be mistreated, worn when cooking, etc.

1 pair heavyweight gloves or mittens, or other glove layering system.

Mittens are preferred, though heavy thinsulate gloves would be OK. Ski mittens work well, or two pair of wool mittens with a nylon water-resistant mitten shell is even better.

1 waterproof mitten shell or covering

To be warn over wool mittens. Heavyweight ski mittens/gloves come with such an outer layer built in.

Equipment

For equipment, the most important consideration is quality. Cheap, low quality equipment should not be allowed on winter excursions. If you think it just might possibly break, it's guaranteed to fail on the first day.

Sleeping bag

Down or synthetic insulation, rated to an appropriate temperature. As a rule of thumb, the bag should be rated for 10 degrees lower temperature than what you anticipate. Synthetic is strongly recommended over down, because of down's poor properties when wet. We do allow mature, experienced boys and adults to use down in the winter, but we don't allow it for less experienced boys or adults. Two summer-rated bags can be combined to make one winter bag. Mummy or tapered bags only; no rectangular bags. NO FLANNEL lining.

1 3/4 Insulating pads

Closed-cell foam or open-cell foam inflatable (Thermarest) pad, full body length, with a second shorter pad (3/4 body length) for additional insulation. One of these should be ensolite (closed cell foam), and is used for all kinds of camp operations (sitting around, standing on while cooking or hanging out, etc.

Sleeping bag stuff sack (waterproof nylon).

Stuff sack should be large enough to hold an insulating pad & sleeping bag, with room to spare. Go LARGE. (Obviously, you can drop this one for internal frame pack folks).

1 waterproof nylon ground cloth (1 person sized).

This goes under sleeping pads and bag to keep you dry when sleeping in the snow.

Personal "ditty" bag: Insulated mug, spoon, bowl, toothbrush and paste.

12-oz. plastic cups that are available in any gas station work great. Don't use cups smaller than 12 oz. – they're too hard to handle with gloves, and you want folks to be drinking lots. Metal plates/bowls/spoons are bad news, because of the way they conduct both heat and cold. Plastic with some insulating ability only! Some toothpastes have poor cold-weather characteristics, so often just a toothbrush is fine in the winter.

Small Nylon duffle bag to aid in packing (food bag)

Pocket knife

Sunscreen and lip balm with high SPF.

Adjustable flame cigarette lighter & backup matches.

Large-mouth water bottle, plastic. NO small-mouthed bottles, metal canteens, etc.

In the winter, all water bottles freeze up from time to time. Small-mouth bottles are much more difficult to open. They also pose a serious scalding hazard when pouring hot water into the small opening.

Compass (NOT a cheap water-filled one!)

Small flashlight and extra batteries (batteries die very quickly in the cold). Headlamp preferred.

2 Candles (optional)

Save on flashlight batteries! Work well behind snow windbreaks in kitchens or snow shelters.

Large, frame backpack (or, alternately, a day pack and a pulk sled)

If you have access to an internal frame expedition pack, these are excellent for this type of activity, provided you are a very organized packer. Otherwise, a large external frame pack of good fit, with top extension bar. External frame packs should have 4 webbing lash straps added for lashing sleeping bag to bottom and day pack to top.

Day pack

This should be larger than the average bookbag backpack. To be worn on day ski/hike outings, with shovel, food, water, extra clothing.

Cross-country skis, bindings, boots, and poles, or snowshoes.

Travel in snow country with gear is very frustrating to downright impossible by "post-holing" through the snow with regular boots. Even with well-fit gaiters, there's considerable snow penetration into inner layers, and the process is exhausting.

Cross country/backcountry touring skis are one alternative. These should be moderately wide, with cable or heavy-duty 3-pin or NNN-BC type bindings. Boots, binding system and skis must pass leader's inspection. Waxables or waxless at your discretion. Boots must be above-the-ankle boot style, rather than the lower shoe-style boot, and should be large enough to allow good circulation with 2 pair of heavy socks. Poles should be shorter and thicker than x-country daytime poles; get aluminum over thin fiberglass. Snowshoes should be in good repair, and fit snugly to avoid detaching in a variety of terrain. In particular, straps and other attachment mechanisms should be thoroughly inspected for weakness.

Climbing “skins” (optional)

Avalanche transceivers

One per person required if you’re going ANYWHERE that avalanches are a possibility. Group members must be trained in their use.

1 High-quality stowable shovel

One per person in the backcountry is a good idea, one for every 2-3 people is a minimum. Used for building kitchens, digging shelters, building windbreaks, snowforts, anchors for tents or flies, etc.

Group Gear

Nylon shelters for everyone

Even if you are planning on building snow shelters or hiking in to a cabin, you should be prepared for an emergency bivy in all winter travel. Yeah, even small snow caves are nicer, but they’re not always possible.

Stoves & Fuel

White gas is preferred to propane, and you’ll need at least double the amount of fuel that you would use for the same outing in the summer time (or more, if you’re melting snow for water). You’ll also need a couple of “spare” stoves that people can use while working on repairs or un-clogging of their own stove. Stoves should all be equipped with insulated stands and aluminum reflectors.

Pots, pans, etc.

One set per patrol cookgroup of 3-4 boys. Key here is to go small; it takes WAY too long to heat up larger pots.

First Aid Kits

No special additional needs. Aspirin is helpful, and a hypothermia thermometer. We keep some of the chemical warming packs in each first aid kit as well.

Repair Kits

Everything breaks in the winter. You need to have repair kits for stoves, for skis & snowshoes, for packs, for nylon tents/flies/clothes, etc. Make sure at least a couple of people have a multi-tool with pliers.

Food Planning

Believe it or not, FOOD is probably the most important ingredient to staying warm on a winter campout. Everyone needs to be taking in lots of calories to balance the energy that is lost to the cold environment. Dehydration in the winter is also a real concern – lots of moisture is lost because of all the work being done to stay warm, but guys don't feel hot & thirsty the way they do in the summer.

This means that foods must be carefully planned. The first rule is that food should always be available to any kid, immediately. Each boy should have his own personal stash of GORP that's a good mix of complex carbohydrates and fats, and should be encouraged to munch (and drink) all the time. The cooked meals are fine, but are not a substitute for "grazing." We often drop lunch because of daylight issues and just do trail food all day.

Because dehydration is such an issue, you should plan menus heavy on liquid nourishment – soups, stews, and ready availability of hot cocoa, hot cider, etc. This gets everyone sucking down enough water without noticing.

Fats have twice as many calories per ounce as proteins or carbohydrates. While you certainly need plenty of complex carbohydrates in the winter for short-term energy, you need to consciously plan meals with a higher fat content than would normally be the case "in town." Fats provide the bulk of the long-term energy the body needs in the winter to keep warm. Meals with extra margarine and healthy amounts of cheese are key. Keep in mind that cheese needs to be cubed in advance: frozen cheese is extremely difficult to cut.

Because of the cold, winter is one of the times when meats become an OK thing to bring along on a campout. The extra fat that red meats provide is also welcome. Remember, however, that all meat must be pre-cut and separately packaged. In the winter, frozen meat is impossible to cut or separate, except with the sharpest saw!

Generally, cooking in the winter is a more difficult endeavor, so SIMPLICITY is very important. Winter camping is the time for the hearty one-pot meals, not the three-layer fudge marble cake cooked in the dutch oven.

Cooking Issues

Cooking in the wintertime poses a few extra challenges. The biggest of these is the amount of time it takes: certainly much longer than in the summer, especially if you're also getting water by melting snow. It's important to both plan for this time, and to take a number of steps to keep it under control:

- White gas stoves are definitely preferred. Gasoline has a higher heat output than propane, and doesn't suffer as much from the cooling effect of fuel use reducing the gas pressure in the stove. This is particularly a problem for propane stoves using the small, portable bottles. Soaking the bottle in hot water helps, but why go there?
- Cooking in military barracks style, with one or two cooks feeding 20 campers is definitely NOT the way to go. All winter cooking should be done in small patrol groups of 3-4 scouts, each with their own stove, pots, utensils, etc. Small pots and smaller amounts of food cook much more quickly and are easier to manage, and cleanup goes faster.

- Scouts should keep lids on pots to hold as much heat in as possible, and using aluminum reflector screens is very strongly recommended.
- In winter camping, cleaning up the cookwear is much more urgent than in the summer, because of the speed with which things freeze. Therefore, the cleanup should always begin immediately, with the cook starting the process and others finishing up.

Cooking is probably the most dangerous part of winter camping. Numb fingers are easily burned, and more importantly boiling water is easily spilled. DO NOT UNDERESTIMATE THIS RISK. Boiling water when spilled on winter clothing soaks through the clothing much faster than the person can get it off, and the clothing holds the hot water next to the skin. Water spilled down boots without gaiters or booties is particularly dangerous. Both cases will typically result in large areas of second degree burns.

When cooking, the best method is to build a "snow kitchen" complete with counters, shelves, and the like. Stoves should be set on small insulating pads made from plywood duck-taped to foam, so as to keep them from melting down into the snow. These can also be used for hot pots, though it's also really easy to set a hot pot down in a snow kitchen, as it burns itself an immediate pot-holder.

If you use picnic tables to cook on, boys must be especially attentive. Tables tend to accumulate small spills and get iced over, so that pots slide easily. NO SITTING AT PICNIC TABLES with hot liquids around or cooking going on.

Finally, it is very important that scouts wear wool (not fleece, polypro, nylon, or other synthetic) gloves when cooking, as the wool will be much more forgiving when handling hot items or bumping into stoves (the synthetic fabrics will melt and may cause burns). THEY MUST ALSO WEAR GLOVES WHEN HANDLING ANY STOVE FUEL. Escaping propane while handling propane hoses and spilled white gas can both cause "flash frostbite" due to immediate evaporative cooling on exposed skin.

If you are melting snow for water, a few additional tips are in order:

- Be careful not to burn the snow. Always start with some liquid water in the pot, then slowly add snow so that a liquid layer is maintained. Believe it or not, direct contact of solid snow to hot pot will cause the minor impurities in the snow to be scorched, leaving the whole pot of water with a "burnt" taste.
- A pot full of hot water can be "banked" overnight by putting it on an insulating pad and sealing it in a small snow cave (like a hole in the snow kitchen wall with a snow block placed in front of it). The snow is a great insulator – no conduction because of the pad, no convection in the "cave", radiation loss greatly reduced because the snow reflects most of it back, and little evaporation if you leave a lid on.

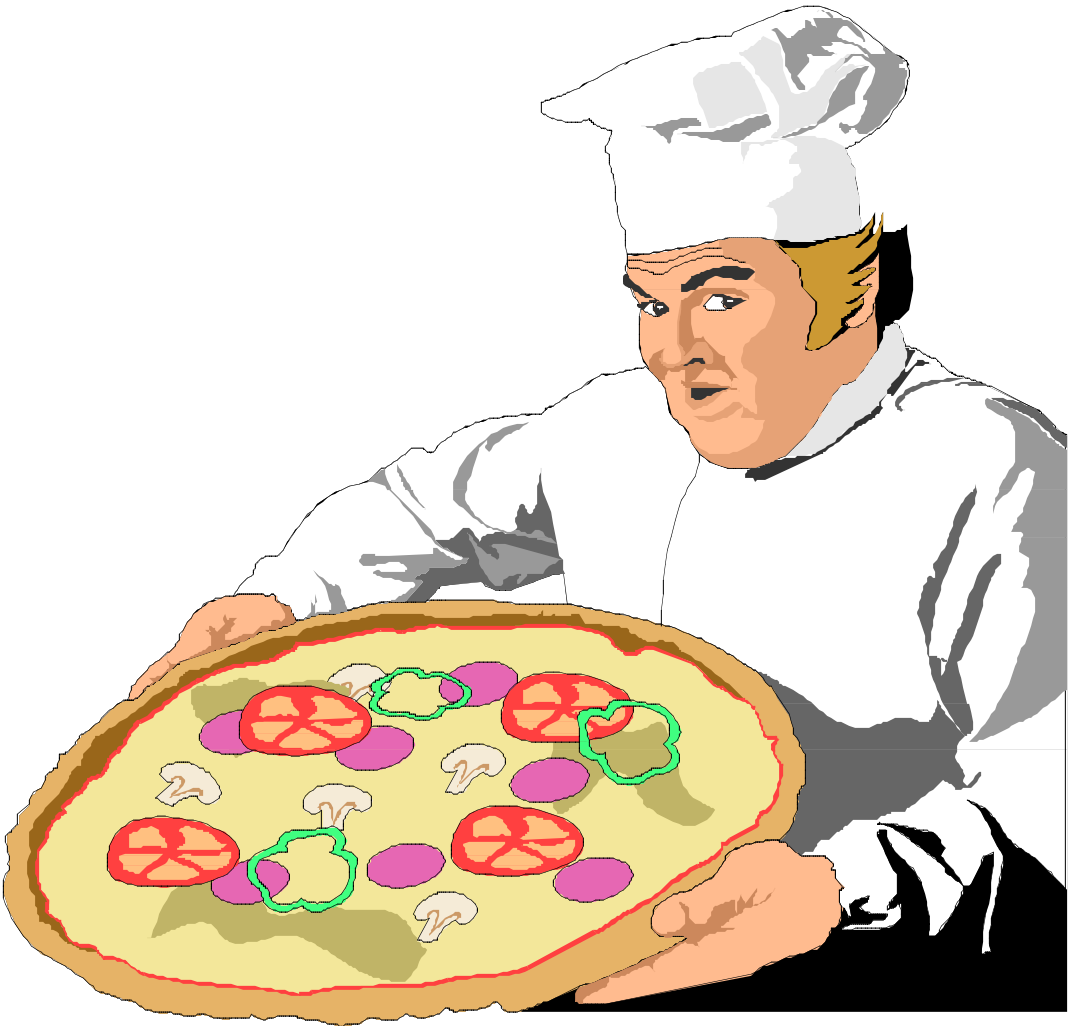
Lastly, a few miscellaneous tips and good practices:

- Individual water bottles should be insulated with foam & duct tape (or stuffed in some other insulating garb), and generally stored upside-down to keep the threads clear.
- Any food with water content must be cut into easy-to-cook pieces and properly stored before departure, since frozen food is impossible to cut in the field.
- To stay warm at night, it's important to consume some fats before bed. Fats take 4-6 hours to digest, and therefore provide a source of energy to the body in the middle of the coldest part of

the night. Cheese & crackers work well, along with a healthy dollop of margarine in your hot cocoa.

- Never cook with fire outdoors in the winter. For that matter, never use fire outdoors in the winter. Remember: insulating clothing works both ways. It keeps the cold out, AND it keeps the heat out. Your clothes will melt and catch fire before you feel any warmth.
- Because handling food is awkward in the winter, avoid items that will create a lot of crumbs or that are otherwise frangible. Repackage food into easily – opened and not easily dropped containers or envelopes. It's a pain to pick up three hundred ramen noodle fragments from the snow.
- Standard winter-time practice is to filter all rinsewater, pack out the solid chunks, and sump the rest in an inconspicuous and ecologically sound spot. Don't sump right next to trees, because animals may end up chewing on the tree bark as a result.

Remember, **LEAVE NO TRACE!**



Shelters

A whole variety of shelters are available to you in the winter time, some of which simply don't exist at other times of the year. Snow is a wonderful medium: if you've got a lot of it around, you can build the most amazing forts, snow kitchens, and shelters with all the accoutrements of home. You can also use snow to supplement other shelters, by building windbreak walls and other features.

Winter sleeping shelters are important to heat management in that they reduce radiation cooling (by putting something between you and the stars) and convective cooling (keeping you out of the wind). On their own they don't help with conductive heat loss, while they complicate evaporative losses.

At night, the body releases a considerable amount of moisture through perspiration and especially through respiration (breathing). Add to this any clothes drying (see below), and you get a considerable amount of moisture that has to go somewhere. Dealing with this moisture is very important to winter camping comfort.

At the same time, there can be large conductive heat losses to the ground. Doubling-up on ground pads helps a lot, but it's also important to prepare the site. This means either clearing the sleeping area of snow, or boot-stomping the snow until it is a firm, flat, "work-hardened" surface. Setting up on top of a loose drift and melting your way down into it is NOT the way to go!

No matter which shelter you choose, you always set up by laying down a personal groundcloth on top of the snow, then both insulating pads (and any other ground insulation you can cobble up), then your sleeping bag.

Tents

Tents are most troops' choice for winter camping. They have the advantage of being easy to set up, and providing a pretty good wind shelter. You must be careful about "3-season" tents, which are not designed to be snowed on and will sometimes collapse under the weight of a good snowfall.

The big disadvantage of tents in the winter is that they don't ventilate well at all. Moisture accumulates inside and tends to form an ice layer or even a little mini-ecosystem complete with "rain."

Flies

An alternative to using a tent is to set up a lightweight nylon fly over a prepared pit. Snow walls form the sides of the pit, with a snow floor and the nylon roof. This tends to provide much more work space than a tent, and with less weight. Ventilation is better, but resistance to high winds or wind-driven snow is a bit worse. Flies do have the advantage of allowing cooking underneath, provided attention is paid to ventilation.

Bivy Sacks

A unique 1-person, pole-less mini-tent. Very light weight and just fine for the winter. Their major disadvantage is that in a good snowfall you can get buried, which is mildly disconcerting. Some folks use them along with a hammock, which reduces heat loss to conduction and the burial problem.

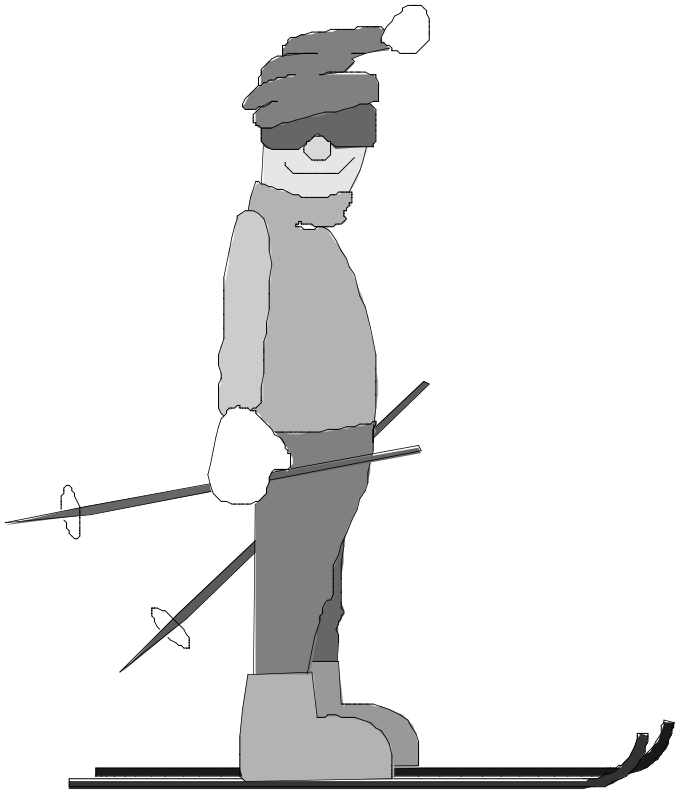
Snow Shelters

These are definitely the Ritz Carleton of winter camping. They come in all kinds of shapes and sizes, from simple snow caves to larger quinzhees to a variety of igloos. Snow shelters are incredibly warm, usually reaching an ambient air temperature of above freezing even on the frostiest days. They are humid, though, and don't ventilate well enough to cook in (or even have a large party in for a number of hours).

If you do use a snow shelter, be sure that you always have a shovel handy in the shelter. Igloos almost never change shape or collapse after setting up, but quinzhees and other snow caves will tend to "sag" over a period of days. (An igloo is formed out of cut snow blocks and is the most technically challenging to assemble, while the others are formed by piling or digging snow).

There's no way we can give adequate instructions here for building any of the shelters, so we'll refer you to one of the references at the end. It's probably not possible to build an igloo without some hands-on instruction, so if you've never done it before, stick to the dug-out shelter types. If you do try to build a shelter, though, don't underestimate the amount of effort it takes. Three-person shelters are typical, and they'll take a hard-working crew of three adults at least a couple of hours to finish. With kids or with less experience, add a few more people and a few more hours. Simple snow tunnels will take less, but still a bit more time than you'd guess.

In short, they make great camping projects, but don't count on a snow home as your group's primary shelter unless you've got an experienced crew of strong, high-school aged kids.



General Camping Technique

Winter is one of those times that shows up all kinds of small errors in camping skill and technique. Sloppy cooking is noticeable in the snow, poor clothing management makes you quickly uncomfortable, and ANYTHING YOU LEAVE OUT WILL BE BURIED AND LOST BY MORNING.

For this reason, it's important to work hard on "bombproof" camping technique. People need to keep track of their gear, and anything that is left out should be left out at an identified location and "standing up." Whenever the group goes to bed or leaves camp, the camp should be secured so that it can withstand a significant wind-driven snowstorm without human attention. Remember, weather systems move quickly in the winter, and what you see at dusk at 5:30pm can become something quite different by midnight. This kind of self-management and individual camping skill is the main part of the Experience component of safety in winter camping. Never set something down and walk away from it.

The following are some additional hints, tips, and tricks that form part of this magical Experience, or might at least shorten your road to getting there.

Keeping Warm

- Don't heat extra space. Stuff extra (dry) gear into sleeping bags to take up space, minimizing the space that the body needs to heat. Things that you don't stuff into the sleeping bag can be put under it to add to the ground insulation.
- Wearing layers to bed is OK. In particular, a good lower layer and your lightest pair of insulated booties is particularly helpful at keeping your legs and feet warm.
- A good hat or balaclava is essential for sleeping.
- Try to avoid breathing into your sleeping bag, as the added moisture is somewhat annoying over time.
- It's important to switch to a fresh, dry pair of socks at night. All socks accumulate moisture during the day, and at night when your body temperature is lowest, that moisture will really cool your feet.
- It's possible to use your body heat to dry out items of clothing during the night by evaporation, and you should do this (within reason). Keep such items in very close to you.
- Always remove boot liners and insoles at night and dry them out in your sleeping bag. The moisture they accumulate will make your feet much colder the following day. Many folks will also sleep with their boots as well; if you don't do this, you should tuck your boots inside your layers in the morning while you make breakfast to warm them up.
- "Holding it" at night costs more energy than getting up and doing the dreaded midnight pee. Some folks use pee bottles at night to avoid this, though it takes some dexterity. If you do use a pee bottle, make sure there's no way you could possible mix it up with your water bottle in the dark.
- Moisture will accumulate in your sleeping bag at night. Therefore, it's important as soon as you get up that you take your sleeping bag out and hang it up outside. This allows the moisture to evaporate and sublimate out. Failure to do this will decrease the insulating capability of your sleeping bag noticeably.
- An alternative to airing out your bag is to use a "vapor barrier" – a waterproof barrier inside your

sleeping bag, which traps the moisture. These take some getting used to, but they do reduce both heat loss and water loss (dehydration) at night.

- Fill water bottles before bed with hot water, then store in insulated spot (like boot, sleeve, or mitten), preferably upside down. Ice always forms at the top, so storing upside down will keep the threads clear. If a bottle gets frozen shut, a quick immersion of the threads in hot water will do the trick.
- Cold hands or feet can be relieved by overriding the body's shunting of blood away from them using centrifugal force. Swing your arms back and forth, or your legs back and forth, to force blood out to your fingers/toes. This also helps you warm up by using the large muscle groups, provided you've been eating and drinking well. This is called the "Ubangi" walk.
- Use one of your ground pads as a "mobile pad." Stand on it while cooking, sit on it while hanging out, etc.
- Brief, partial-body encounters with natural water (like plunging your leg into a river) are not as serious as one might imagine. Water tends to flash-freeze on the outer surface of layers, and what gets in usually just adds a bit to the perspiration moisture already there.
- Headaches, crankiness are signs of dehydration. Watch for them!

And a few other good techniques

- Pee stains in the snow are ugly for your fellow campers. Always cover up urine marks so as to leave no trace.
- Be sure to designate an area of snow which is meant only for melting for drinking water. This area should remain totally pee-free, dump-free, and waste-free.
- Normal practice for taking a dump in the winter is to shallow-bury it in snow (if there's no local latrine, of course) Remember, your dump will end up on the surface of the ground in the spring, so you should choose a spot that's not close to any springtime watercourse, and that's not going to be in the middle of a good campsite. Snowballs make great natural toilet paper (otherwise, you have to pack out your regular toilet paper).
- No fires. In these days of synthetics, they're totally ineffective at anything but setting your clothes on fire, and they're a real pain in the neck to try to get going in the snow, since so much of their heat is going into melting the surrounding snowpack.
- Snow is a really interesting thing. It changes form all the time. Remember that it takes a few minutes, so after packing or work-hardening snow, give it 15-20 minutes to "set up."
- Snow, by and large, is dry, at least if you keep a good insulating layer between you and it. Remember to brush off the dry snow before stepping into anywhere warm like a cabin, or snow shelter, or even a tent. That way you won't get wet.
- Shovels, skis, and poles can be set in snow and used as anchors for guide lines for tents or flies. A stick buried or packed in snow also works well.

Additional Reading

The following books may be helpful to add to your winter camping library.

O'Bannon, Allen. **Allen & Mike's Really Cool Backcountry Ski Book: Traveling & Camping Skills for a Winter Environment.** Falcon/Chockstone Press, 1996.

This book is a fun, easy read, with a lot of amusing cartoony drawings. Don't let it fool you, though. It's full of genuinely useful tips and tricks for backcountry winter travel. A great book to give to scouts who are planning a winter outing.

Townsend, Chris. **Wilderness Skiing and Winter Camping**. Ragged Mountain Press, 1994.

A more comprehensive "how to" text than Allen's book, but without all the fun drawings. This will provide somewhat more complete verbal descriptions and analyses.

Hampton, Bruce, and Cole, David. **Soft Paths: How to enjoy the wilderness without harming it.** National Outdoor Leadership School/Stackpole Books, 1988.

The original "Leave no trace" text, it contains a short but useful chapter on winter snow camping technique.

Wilkerson, J.A. editor, with Bangs, Cameron and Hayward, John. **Hypothermia, Frostbite and other Cold Injuries.** The Mountaineers: 1986

A specialty medical book which discusses in detail the causes, nature, and treatment of cold-weather environmental injuries. College-level reading and requires some understanding of common medical terms.

Conover, Garret & Alexandra. **The Winter Wilderness Companion: Traditional & Native American Skills for the Undiscovered Season.** Ragged Mountain Press, 1995.

An interesting text that approaches winter camping with a traditional/re-enactment flavor. It's definitely harder this way than with modern fabrics, but some of the techniques are interesting and it can make for fun discussion or an activity for experienced scouts.

Semion, William. **Michigan Winter Trails.** Globe/Pequot Press, 2001.

A general guidebook to good winter trails and camping in Michigan. A reasonable resource book to use when looking for a possible site for your adventure.

Wilderness Medical Society and National Safety Council. **Wilderness First Aid: Emergency Care for Remote Locations.** Jones & Bartlett, 1998.

This is our "official" Troop 8 first aid resource for scouts. We encourage all boys to purchase it along with their scout book when they first join. They use it as the reference for all T-2-1 and First Aid merit badge requirements. A great, easy-to-read but comprehensive text.