



Snow Camping
Manual
BearPaw
2019

High Adventure Team
Silicon Valley Monterey Bay Council
Boy Scouts of America

Edited and Compiled by
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Introduction

As a Boy Scout in the 1960's growing up in the Mojave Desert of California, needless to say I was a desert camper with minimal trips to the mountains. It was difficult for a youth on the trail to Eagle to go snow camping with a small desert troop and inexperienced adults leaders in high-adventure activities. Thus, the opportunity to learn how fun it was to snow camp did not occur until I became an adult leader.

My son joined a local troop and shortly afterwards attended our first BearPaw. Needless to say, we were worse than rookies; freezing to death, sleeping on a melted snow base foundation which turned into a lake under the tent, digging gear out from the snow storm that covered everything that night, the stove not working under freezing conditions, getting frost bite on my toes, driving home through a blizzard with chains onyou get the picture-a typical outing. This was one of the "best" adventures I have ever been on and got addicted to snow camping during my first disastrous attempt to live and play in the snow.

For the next several years, I attended BearPaw indoor training as well as camped in the snow several times a year, perfecting my skills, such as digging a hole which I hoped to turn into a snow shelter that happened to be ten feet deep, by accident, and 8 feet in diameter, trying to construct a roof after the fact....yah, right! Again, more outings occurred that started to become incredibly fun. Eventually I learned how to stay dry and warm, kicking back in my easy chair (a snow chair of course shaped into a recliner, with a pad to sit on to stay dry), watching my home troop having fun as Scoutmaster. At this point, it was time to step up and share my experiences as a member of the Silicon Valley Monterey Bay Council BSA High-Adventure Training Team. When the opportunity rose to assume the position of Event Director from George Denise who had been the Course Director for seven years, a fantastic mentor and friend, the decision to accept the offer was immediate.

What I am trying to say is that snow camping can be incredibly fun "if" one is prepared with some basic knowledge, which is essentially how to stay dry while packing for the elements with proper gear, clothing, stoves, tools, and other essentials. You will talk about your camping days as a scout, or adult for years to come. Many think snow camping is a freezing event. We are not sleeping directly on snow without shelter which is the first thing that comes to mind for those who have never done it as they pretend to shiver, especially in the middle of summer. We are prepared to sleep in nice warm snow shelters or tents in a water protected sleeping bag and thermal pad for comfort and moisture insulation. Walking through fresh powder that is anywhere from several inches to a few feet provides an experience that cannot be described to those afraid to journey into the wilderness (actually a commercial Sno-Park with expertise in having Boy Scouts winter camp there). This is what snow camping is about, a true high-adventure.

As with any sport, there is a certain amount of risk. We can never take that risk away completely. Indeed, Scouting is as much about teaching young men and women to "Be

Prepared,” to deal with adversity as it is to safeguard them from it. The goal of BearPaw Winter Camping Training is to lessen that risk by teaching one how to plan and be prepared. With a little knowledge, some common sense, and taking it one-step at a time, you should be able to enjoy winter camping with minimum risk to yourself and those entrusted to you. So sit back, pay attention, take notes and remember. This is just the beginning of new lifelong skills.

I would like to acknowledge and thank my predecessors: Raimo Vahamaki, who founded this course as Hi-Sierra Deep Freeze back in 1986 and chaired it from 1986 to 1995, Craig Bassett who chaired BearPaw from 1996 to 2001, and George Denise from 2002 through 2006. All did a fabulous job in putting together this activity and we all owe them a debt of gratitude for conceiving and developing this outstanding program for the youth and leaders of the BSA. May the leaders and scouts of today keep this activity going strong for many more years.

I also want to acknowledge Monte Crawford, who was my assistant for several years learning the administration aspects of this exciting high-adventure, and has now taken on the position of Event Director after a record breaking 10 years for me. Time to retire and turn the reigns over to an outstanding scouter who loves winter camping as much as me.

Mark Montrose

Event Director (2007-2017)



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BearPaw Indoor Training Agenda

Saturday, November 3, 2018

(Topic times subject to change)

8:00 AM	Registration and Check-in
8:30-8:45 AM	Opening and Introductions
8:45-9:30 AM	How to Dress for Snow Camping
9:30-10:00 AM	Snow Shelters
10:00-10:30 AM	Break
10:30-11:15 AM	Menus & Cooking for Snow Camping
11:15-12:00AM	Orienteering with GPS, Map & Compass
12:00-1:00 PM	Lunch – Provided Courtesy Troop 251
1:00-1:20 PM	What & How to Pack for Snow Camping
1:20-2:00 PM	Travel on Snow; Skis and Snowshoes
	Travel on Snow; Sleds vs. Backpacks
2:00-2:30 PM	Break
2:30-3:15 PM	Winter Emergency Care & Avalanche Safety
3:15-3:45 PM	Low Impact Camping: Leave No Trace
3:45-4:00 PM	Driving In Snow Country
4:00 PM	Closing

Event Director: Monte Crawford
(montecrawford@yahoo.com)

Outdoor Camping Experience

Friday, February 22 through Sunday February 24, 2019
Cisco Grove Campground
(Hwy I-80, five miles past Emigrant Gap before Donner Summit)



How to Dress for Snow Camping



How to Dress for Snow Camping

- ❖ Stay Warm and Dry
- ❖ Conserve Body Heat
- ❖ Maintain Thermal Equilibrium
- ❖ Protect Head and Trunk
- ❖ Strive For Versatility
- ❖ Dress In Layers
 - First Layer – Wicking
 - Second Layer – Insulating
 - Outer Layer – Water and Wind Repellant
 - Accessories
 - Waterproofing
- ❖ Synthetics
- ❖ Fiber Pile or “Fleece”
- ❖ Gore-tex
- ❖ Thermal Barriers
- ❖ If your feet are cold, put on a hat!

How to Dress for Snow Camping

When you are at a ski resort or mountain cabin with your family, you can play outside in the snow, and when you get too wet or too cold, you can come inside, change your wet clothes and warm up by the heater or fire. In cold weather camping, there is no inside other than the inside of your tent or snow cave. You have a limited number of changes of clothes, and taking off wet clothes in the tent has a tendency to get everything else wet. At night, the wet clothes you took off will freeze, making them that much more difficult to deal with.

In Wilderness, It Is Far Easier To Stay Warm To Begin With, Then To Try To Get Yourself Warm Again After Becoming Cold

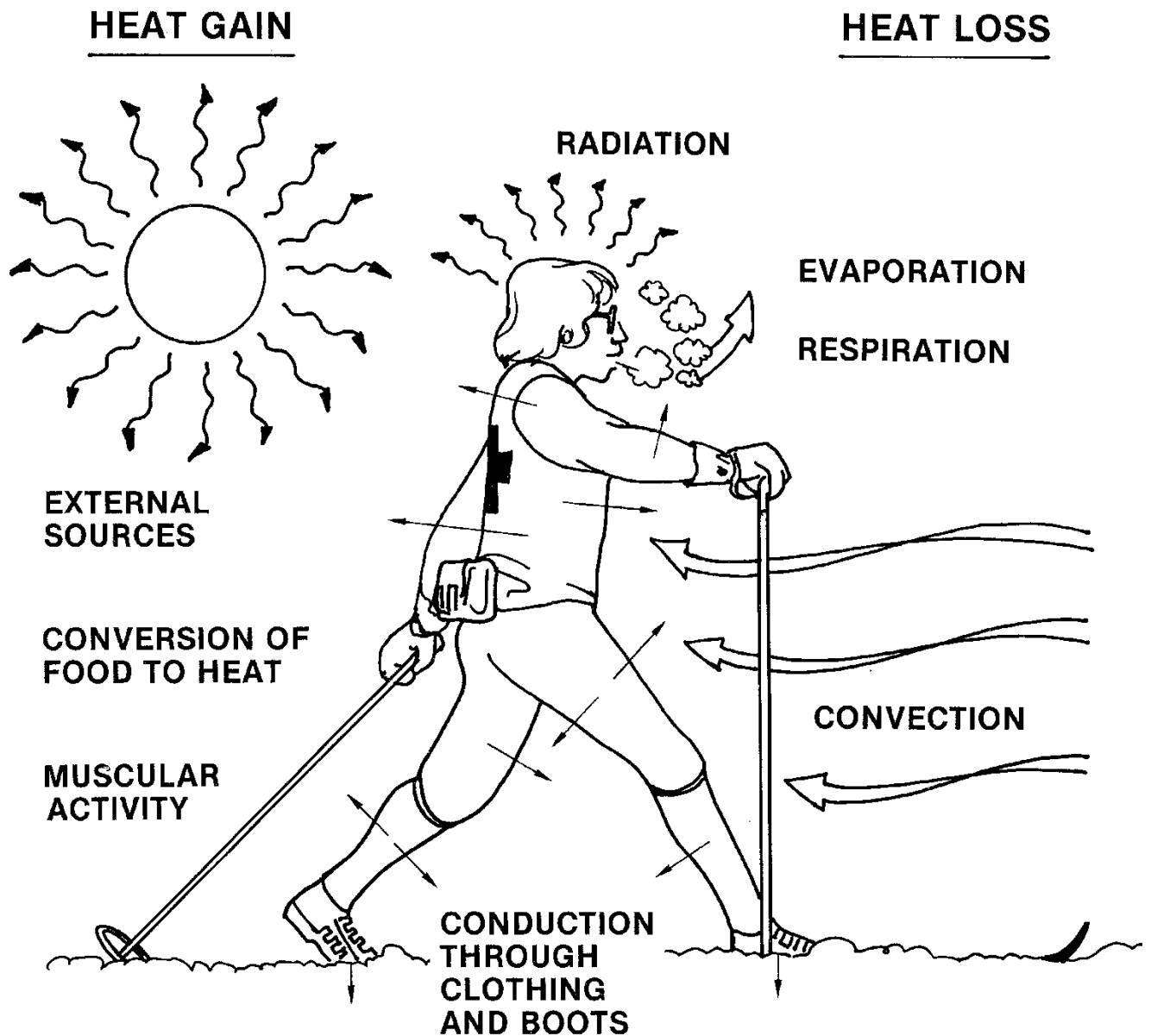
Conserve Body Heat

The goal in cold weather camping, then, is not to keep cold out; it is to keep your own body heat in.



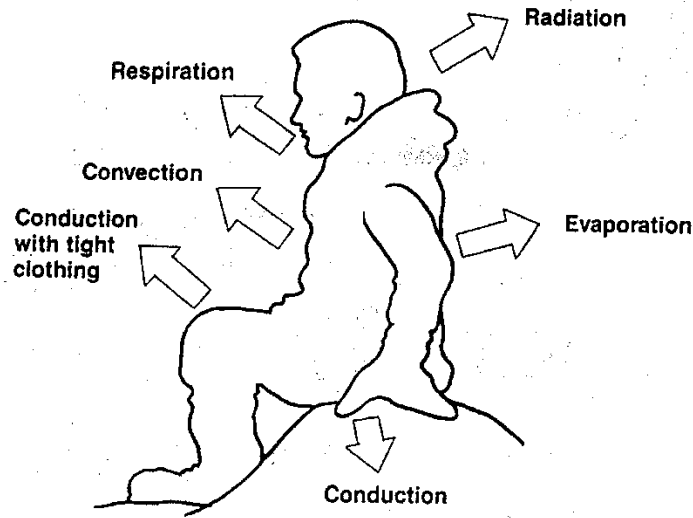
Maintain Thermal Equilibrium

The goal also is not to make yourself as warm as possible; rather it is to maintain "thermal equilibrium." You do not want to become too cold, nor do you want to become too hot, overheat, and begin to perspire. Perspiring will cause your clothing to absorb moisture, which helps it conduct heat away from your body faster, and the process of perspiration evaporating also lowers your body temperature. This will make you too cold later when you become less active and the outside temperatures begin to drop once the sun goes down.

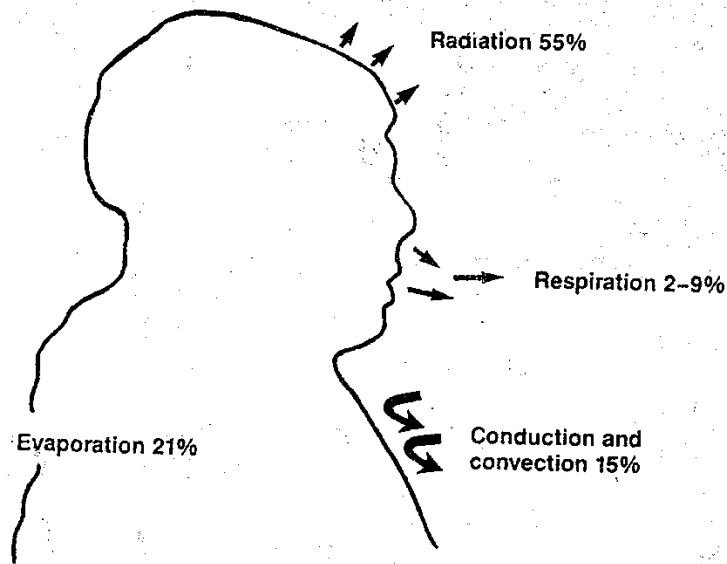


Protect the Head and Trunk (the Body Core)

While we do not want to leave any area unprotected, we are especially concerned with protecting the head and trunk. When the body core is warm, blood circulates out to the extremities much better, warming them too. If the core is cool, it is very difficult to warm it externally short of immersion in a hot bath. Keeping the core warm and dry with insulating clothing, warm high-energy foods and liquids, and a combination of exercising with adequate rest works the best.



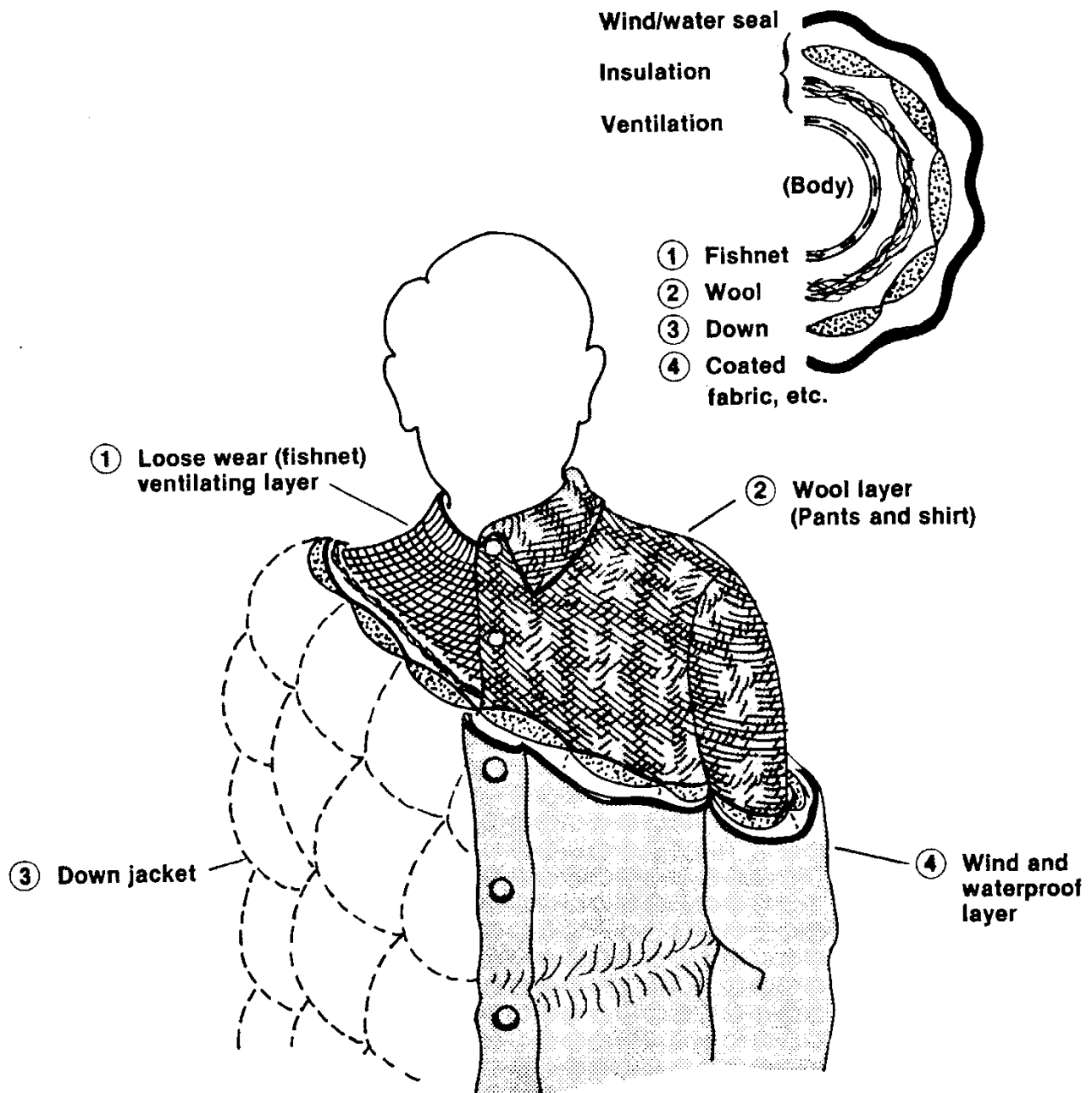
Types of Body Heat Loss



Types and Possible Percentages of Upper-Body Heat Loss

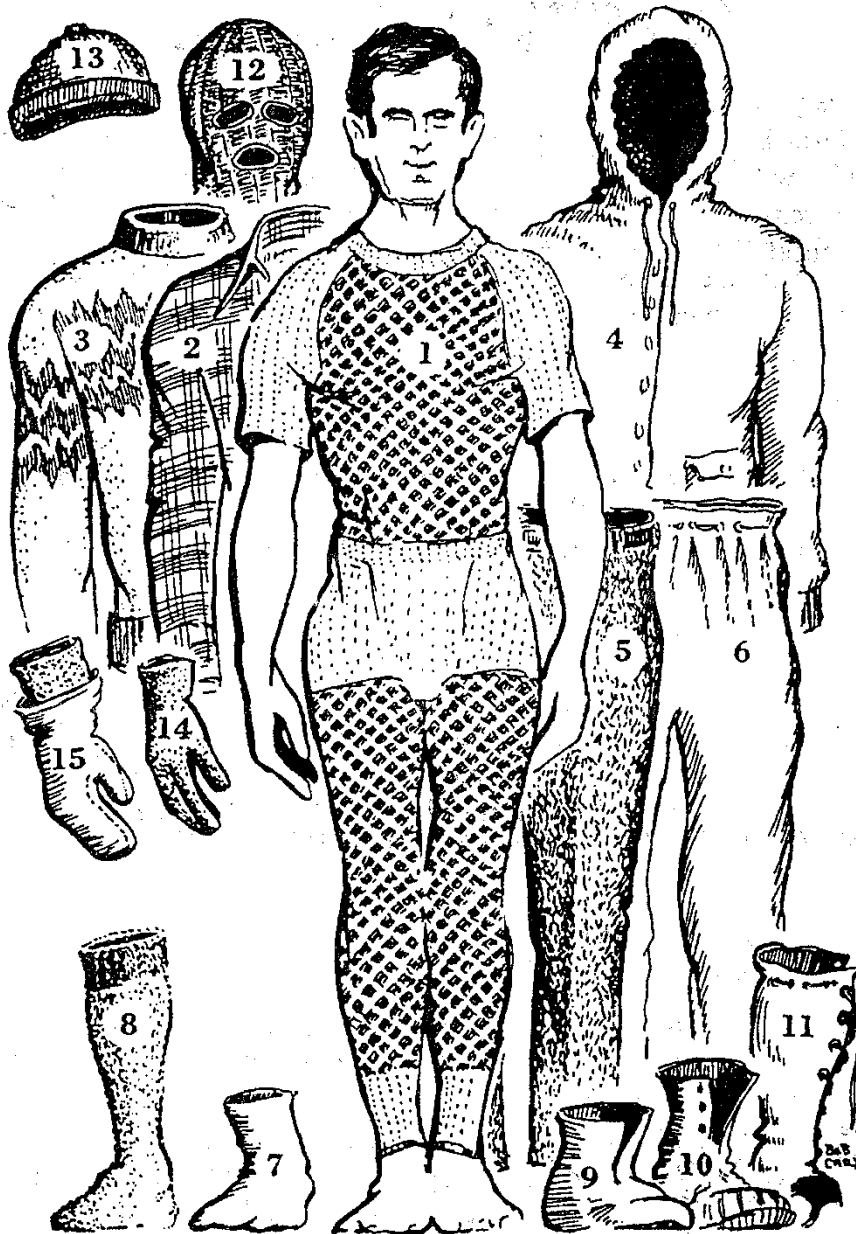
Strive for Versatility

Your wardrobe should be versatile, allowing you to adjust it and adapt it to a variety of conditions over the course of the day and night. The following illustration shows layering using traditional clothing fabrics:



Layering

The best way to achieve this versatility is through the use of layers of clothing.

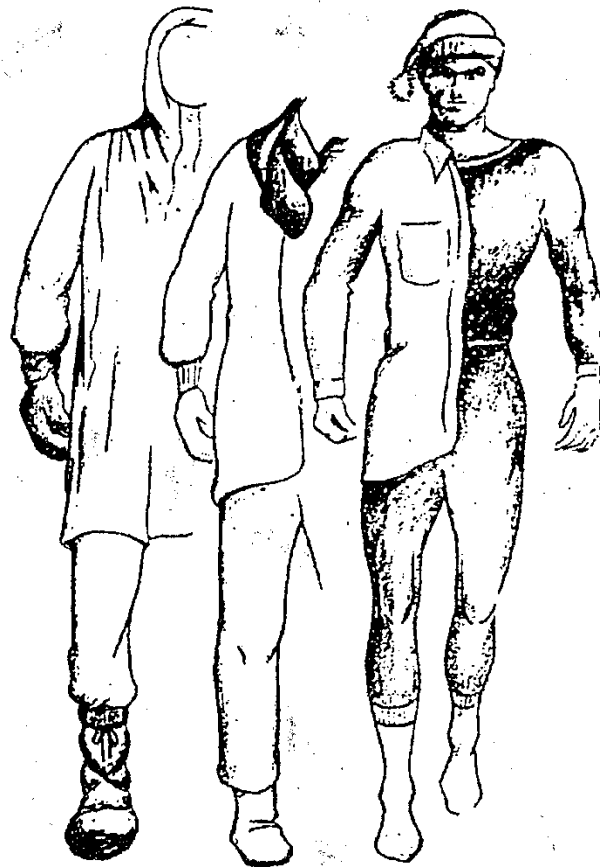


Types and Amounts of Clothing

1. long underwear; 2. shirt or inner layer; 3. sweater or light jacket; 4. wind or rain gear; 5. inner pants; 6. wind or rain pants; 7. wicker inner socks; 8. insulating socks; 9. boot liners; 10. and 11. footwear; 12. and 13. head coverings; 14. and 15. gloves and mittens

Layers include:

- Long underwear – ideally made of polyester, polypropylene, wool-poly blend, silk, or a wool-cotton blend (not the best)
- Insulating layer – synthetic fiber pile, wool, or wool blend is best
- Outer shell – Gore-tex and its clones are best, as they allow water vapor to escape, while keeping rain and melted snow out. This should be a wind breaker/water repellant layer with a hood.
- Rain suit or poncho - to keep out heavy snow and rain
- Accessories – sunglasses or ski goggles, wool or polyester “beanie”, or balaclava (covers face too, with opening for eyes, nose and mouth), polyester glove liners and insulated gloves with water repellant shell, polyester sock liners with polyester-nylon-wool blend insulated socks, rubberized, insulated leather boots, or rubber galoshes.



A Proper System of Layering

Synthetics

Synthetic materials, such as polypropylene and polyester have a very low water absorption factor. Polypropylene, for example, absorbs less than .1% of its weight in water. Instead, it wicks moisture away from your body to the outer layers, where it is either absorbed or wicked still further, depending on the make-up of that material. This is important, because we lose body heat much more rapidly through water than we do through air.

Fiber Piles

Fiber pile is mostly polyester. Polyester is a very stiff, springy fiber that holds its loft for trapping air. Pile begins as a thin, dense cloth which is then passed through napping machines until a thick pile, commonly called fleece, is achieved. Polyester wicks almost as efficiently as polypropylene. You can dip it in water, wring it out, and it will still retain its loft and keep you reasonably warm. Pile clothing is generally rated as 100 (light), 200 (medium), and 300 (heavy weight).

Wool

Wool and wool blends absorb moisture, but they also retain much of their loft and therefore insulating ability when wet.

Cotton

Cotton is probably the least desirable material for winter camping/snow play, because it absorbs water readily and when wet loses virtually all of its insulating ability.

Down

Down is a very good insulator as long as it is dry. It maintains greater loft for a given weight than any other materials, as long as it is dry. It mats down when wet, however, and loses almost all of its insulating ability.

Gore-tex

Gore-tex, along with a few recent clones, is essentially a thin, flexible Teflon membrane laminated between two layers of nylon cloth. This membrane contains 9 billion pores per square inch. Each pore is 20,000 times smaller than a drop of water, but 200 times larger than a molecule of water. It can still leak, especially in driving rains, and it needs to be close to the skin so that it does not get too cool and condense the water vapor moving up from the body and trap body moisture inside the shell.

Clothing—the Key to Comfort

Headgear. This is a matter of personal preference, but it always a good idea to have at least one stocking cap or knit cap for use under a parka hood or in the sleeping bag. Soft, insulated caps with ear flaps are good, but should be loose fitting.

Eye Protection. Goggles are best, but sunglasses and homemade snow shields will reduce glare from sun off the snow, a situation that can cause painful problems, and even "snow blindness."

Scarf. Wool or synthetic fiber makes an excellent cold weather protector, but make sure the scarf is plenty long.

Parka. The *amorak* or pullover parka should be windproof, should reach almost to the knees, and be large enough to fit over all the other garments. It should have a hood.

Hand Covering. This is a matter of personal preference that can be made up of any loose fitting combination of the following: wool gloves, wristlets, wool mittens, foam mittens, Dacron mittens, leather overmitts, or wind and waterproof expedition mitts.

Jacket. A lightweight jacket used in combination with other outer garments makes a better "layering" system than one thick, heavy jacket. A hood for extreme cold is a welcome addition.

Vest. This insulated garment keeps the vital organs, heart, and lungs warm. The best style has a flap in back to protect the kidneys. Detachable sleeves convert a vest to an insulated jacket.

Sweater. Wool or wool synthetic sweaters will keep you warmer.

Shirts. Wear full-cut, loose wool or wool and synthetic fiber.

Long Underwear. This can be wool, wool and cotton, wool and synthetic fiber, or synthetic fiber. Keep a spare set for emergencies and to sleep in.

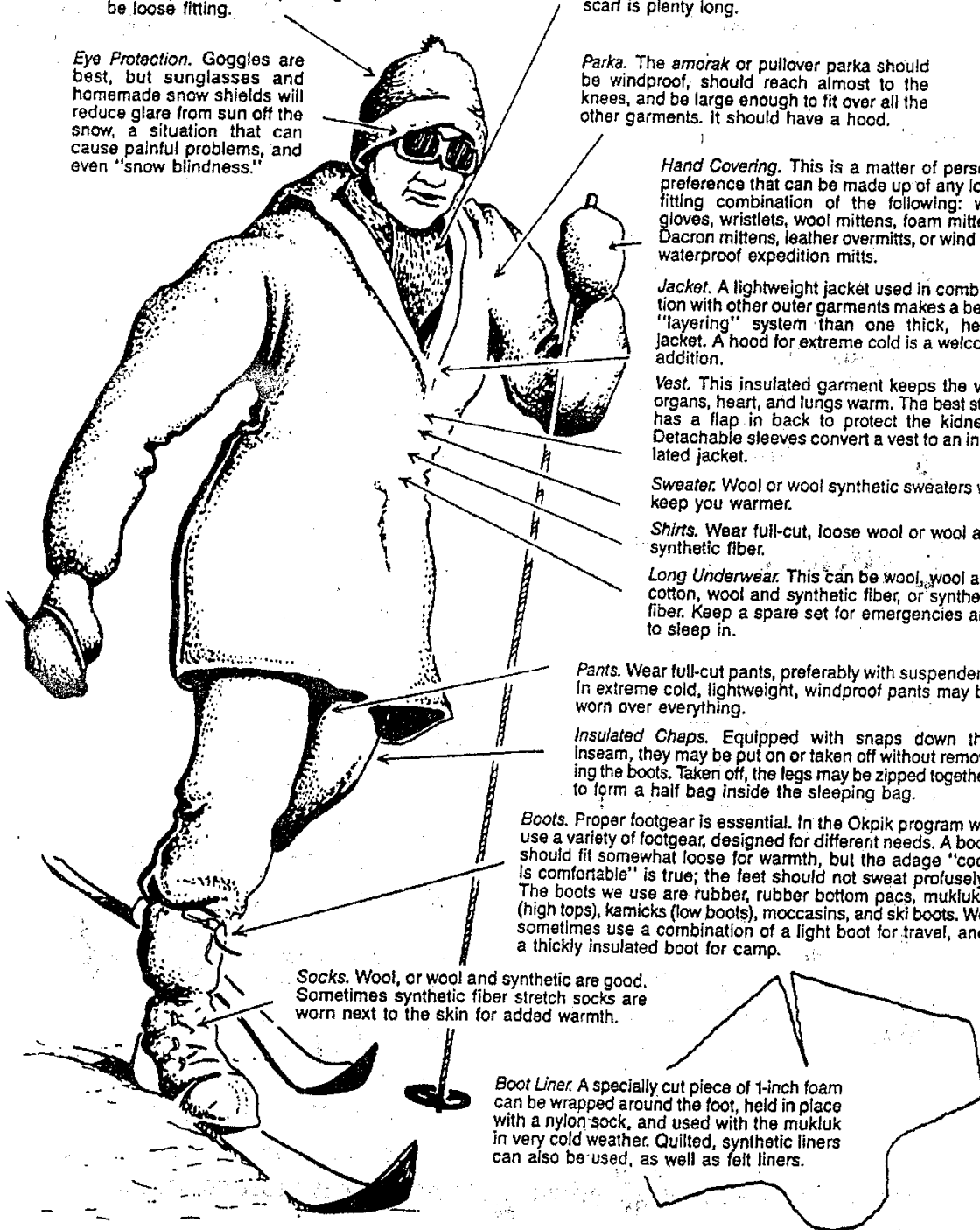
Pants. Wear full-cut pants, preferably with suspenders. In extreme cold, lightweight, windproof pants may be worn over everything.

Insulated Chaps. Equipped with snaps down the inseam, they may be put on or taken off without removing the boots. Taken off, the legs may be zipped together to form a half bag inside the sleeping bag.

Boots. Proper footgear is essential. In the Okpik program we use a variety of footgear, designed for different needs. A boot should fit somewhat loose for warmth, but the adage "cool is comfortable" is true; the feet should not sweat profusely. The boots we use are rubber, rubber bottom pacs, mukluks (high tops), kamicks (low boots), moccasins, and ski boots. We sometimes use a combination of a light boot for travel, and a thickly insulated boot for camp.

Socks. Wool, or wool and synthetic are good. Sometimes synthetic fiber stretch socks are worn next to the skin for added warmth.

Boot Liner. A specially cut piece of 1-inch foam can be wrapped around the foot, held in place with a nylon sock, and used with the mukluk in very cold weather. Quilted, synthetic liners can also be used, as well as felt liners.



Dressing for Snow Camping, The Ideal

There are many factors to consider, of course, but an ideal outfit, allowing maximum versatility, light weight, freedom of movement, and maximum wicking and insulating benefits, might include:

- Polyester long underwear with half-turtle neck
- 200 rated polyester pile pants
- 200 rated polyester pile jacket
- Gore-tex parka or Gore-tex insulated parka with hood
- Gore-tex shell pants or insulated pants
- Polyester pile face mask
- Knit wool cap, or polyester fleece cap
- Sunglasses or ski goggles
- Polyester glove liners
- Gore-tex outer gloves
- Polyester sock liners
- Plastic baggie thermal barrier for feet
- Polyester/wool/nylon trekker or ski socks
- Rubber coated leather boots, or rubber galoshes

Realistically

That's the ideal, but it can be fairly expensive, though prices have come down for a lot of these products in recent years.

As a practical matter, we might have to improvise, budgets being what they are. Also, see the Boy Scout Field Book, Okpik and Venture Crew Manual for Winter Camping for suggestions for making foam and nylon clothing inexpensively.

Here are some alternative suggestions:

Long underwear; any will do (synthetics or wool-blend are the best). Avoid cotton (buy at Any Mountain, Mel Cotton's, REI, Stevens Creek Surplus, Western Mountaineering, or any sporting goods store).

Trousers – ideally wool or wool blend. Army surplus work very well and are cheap (Any Mountain, Mel Cotton's, REI, Stevens Creek Surplus). Wool dress slacks can work (try Goodwill). Avoid jeans, they are made of cotton, absorb water, and do not insulate.

Turtlenecks – again, synthetics or wool-blends are better.

Wool Shirt or Sweater – medium weight, wool or synthetic.

Medium to Heavy Sweater – wool or synthetic.

Heavy Jacket or Parka – water repellant, or spray with water proofing.

Outer Shell Trousers – nylon shell, skiers pants, or rain pants. Any ski shop, Mel Cottons, REI, Stevens Creek Surplus, or rent at the Ski Renter.

Poncho or Rain Jacket and Rain Pants – any clothing store, Mel Cotton's, REI, Stevens Creek Surplus.

Accessories

And top this list off with:

Polypropylene Inner Socks – Mel Cottons, REI, Stevens Creek Surplus

Polypro/Wool/Nylon Blend Outer Socks – Mel Cottons, REI, Stevens Creek Surplus

Heavy Leather Boots with Sno-seal, or Rubber Coated Bottoms, Mukluks, or “Moon Boots” (foam insulated nylon boots with rubber bottoms – commonly called “after ski boots” – Mel Cottons, REI, Stevens Creek Surplus, or rent at the Ski Renter.

Polypropylene Inner Gloves – Mel Cottons, REI, Stevens Creek Surplus,

Insulated Nylon or Leather Outer Gloves – Mel Cottons, REI, Stevens Creek Surplus, Ski Renter

Polypropylene Pile Neck Gaiter, or Soft Wool Scarf (long) – Mel Cottons, REI, Stevens Creek Surplus, Ski Renter

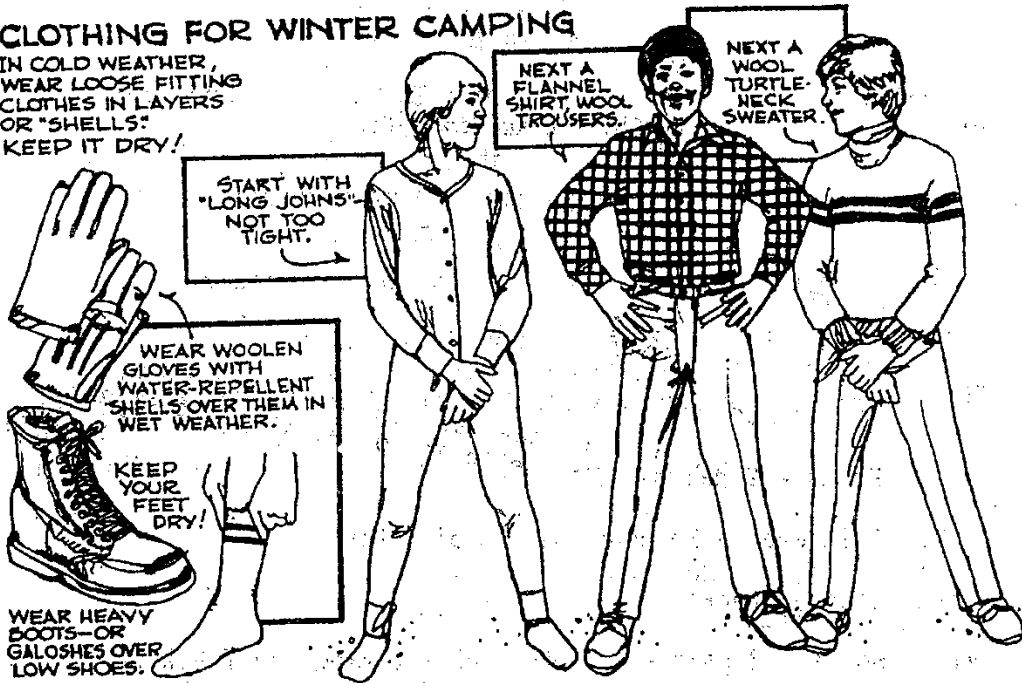
Sunglasses or Goggles (preferably both) – Mel Cottons, REI, Stevens Creek Surplus, Ski Renter

Polypropylene Pile Beanie or Cap, or Wool Cap – Mel Cottons, REI, Stevens Creek Surplus, Ski Renter

Polypropylene inner socks are inexpensive and sold at most outdoor shops and Scout Shops. Sno-seal and silicon spray for waterproofing clothes are sold in most outdoor shops and many hardware stores. Inexpensive gloves and hats can be purchased at surplus stores and hardware stores.

CLOTHING FOR WINTER CAMPING

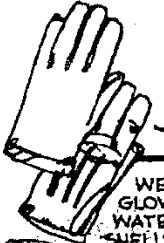
IN COLD WEATHER,
WEAR LOOSE FITTING
CLOTHES IN LAYERS
OR "SHELLS".
KEEP IT DRY!



START WITH
"LONG JOHNS"
NOT TOO
TIGHT.

NEXT A
FLANNEL
SHIRT, WOOL
TROUSERS.

NEXT A
WOOL
TURTLE-
NECK
SWEATER.

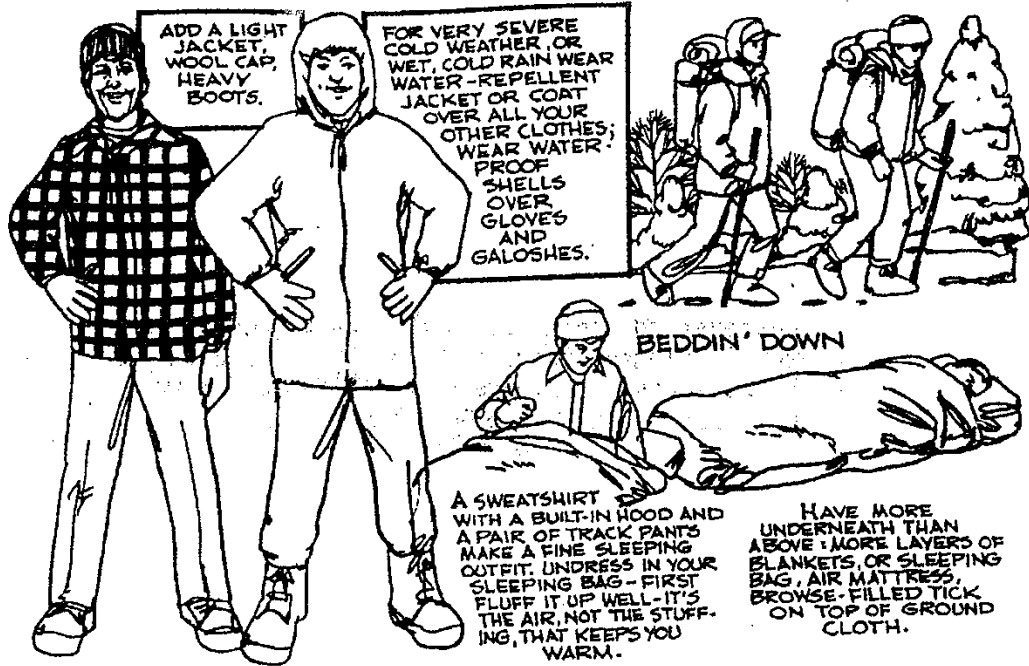


WEAR WOOLEN
GLOVES WITH
WATER-REPELLENT
SHELLS OVER THEM IN
WET WEATHER.



KEEP
YOUR
FEET
DRY!

WEAR HEAVY
BOOTS—OR
GALOSHES OVER
LOW SHOES.



ADD A LIGHT
JACKET,
WOOL CAP,
HEAVY
BOOTS.

FOR VERY SEVERE
COLD WEATHER, OR
WET, COLD RAIN WEAR
WATER-REPELLENT
JACKET OR COAT
OVER ALL YOUR
OTHER CLOTHES;
WEAR WATER-
PROOF
SHELLS
OVER
GLOVES
AND
GALOSHES.

BEDDIN' DOWN

A SWEATSHIRT
WITH A BUILT-IN HOOD AND
A PAIR OF TRACK PANTS
MAKE A FINE SLEEPING
OUTFIT. UNDRESS IN YOUR
SLEEPING BAG—FIRST
FLUFF IT UP WELL—IT'S
THE AIR, NOT THE STUFF-
ING, THAT KEEPS YOU
WARM.

HAVE MORE
UNDERNEATH THAN
ABOVE—MORE LAYERS OF
BLANKETS OR SLEEPING
BAG, AIR MATTRESS,
BROWSE-FILLED TICK
ON TOP OF GROUND
CLOTH.

More on Cotton and Wool

Even people who live in snow country do wear cottons and wools. But they avoid getting wet, and if they do get wet, they go inside, dry off, and change. The more the wardrobe contains cottons, and even wools to a lesser extent, the more the Scout needs to be aware that he can't allow himself to get wet. If he does, he needs to have a full set of clothes to change into.

Generally, on a two-day trip, try to be careful on the first day. On the second day, you can be more relaxed, as you are going to be getting into a warm car and heading home shortly. Save that big snow fight for the last day!

Thermal Barriers and Plastic Bags

A note on thermal barriers: Putting a plastic bag between your inner sock or inner glove and your outer sock or glove creates a waterproof "thermal" or heat barrier between your skin and the cold, wet snow. The inner sock or glove wicks moisture away from your skin so you don't get to "clammy", but stay relatively dry and comfortable. The plastic barrier keeps snow melt away from your skin and holds in body heat. The outer sock or glove insulates and protects the plastic thermal barrier.

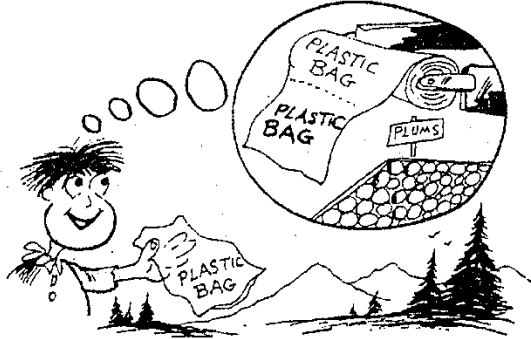
Plastic bags also are handy for making impromptu waterproof skirts (OK, kilts if you are a guy), leggings (one bag over each leg), waterproof vests (just cut a slot in the top of a large garbage bag for your head, and slots on each side for your arms, and waterproof hats (or waterproof covers for your hats). Always bring half a dozen or so large, heavy-duty trash bags (30 gallon) with you when winter camping (at least three for summer camping too – you never know when it is going to rain!).

Remember, you lose about one-third of your body heat through your head. As your body temperature begins to cool, your body slows down the circulation of blood to your extremities in order to keep the body core warm. So, if your hands and feet are cold, put on a hat!

It's the same at night. Wear a wool or fleece cap or beanie to bed. Keep your head warm, but don't put your face inside the sleeping bag. Your respiration contains moisture, which will collect and condense inside the bag, making you colder.

Do not wear cotton clothing to bed. It will absorb moisture from your body, causing you to become colder

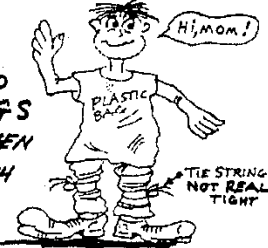
DOOLEY REMEMBERED TO SAVE SOME **PLASTIC BAGS** FROM THE GROCERY STORE'S FRUIT AND VEGETABLE DEPARTMENT.



KIDS! KEEP ALL PLASTIC BAGS AWAY FROM YOUR NOSE AND MOUTH AND FROM THE LITTLE KIDS, THEY ARE NOT FOR PLAY—BUT THEY CAN SAVE YOUR LIFE!

DOOLEY ALSO THOUGHT TO BRING 4 LARGE (30 GALLON SIZE) PLASTIC TRASH BAGS. HE THEN CUTS 3 HOLES IN ONE FOR HIS HEAD AND ARMS TO FIT THRU.

HE TAKES THE NEXT 2 BAGS AND HE WRAPS HIS LEGS WITH THEM AND THEN HE TIES THEM WITH SOME STRING.



THEN DOOLEY PUTS HIS CLOTHES ON OVER ALL THE PLASTIC BAGS. NOW DOOLEY CUTS 3 HOLES IN THE LAST BAG TO PUT HIS HEAD AND ARMS THRU, AND HE PUTS IT ON OVER HIS CLOTHES FOR WHEN IT RAINS OR SNOWS. PLASTIC BAGS ARE ONE OF THE BEST WAYS TO HOLD IN YOUR BODY HEAT FAST AND KEEP YOU WARM AND DRY WHEN IT GETS COLD.

TO KEEP HIS FEET WARM AND DRY, DOOLEY PUTS A PLASTIC BAG OVER EACH BARE FOOT,



THEN HE PUTS ON HIS SOCKS,



THEN HE PUTS ON ANOTHER PLASTIC BAG OVER EACH SOCK,

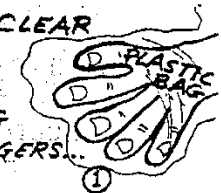


THEN DOOLEY PUTS ON HIS BOOTS OR SHOES.



NOW DOOLEY'S FEET ARE WARM AND SAFE FROM WATER. WET FEET IN SNOW COULD MEAN FROSTBITE!

TINA ALSO PUTS A CLEAR PLASTIC BAG OVER EACH HAND. SHE PUSHES THE BAG DOWN OVER HER FINGERS...



THEN TINA PUTS ON HER GLOVES OR MITTENS.



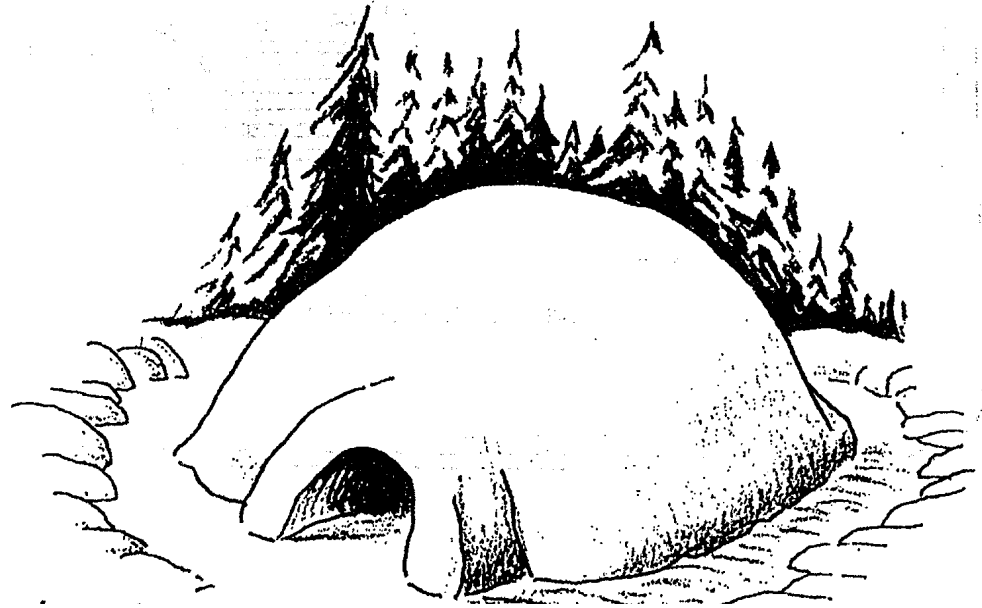
NOW TINA'S HANDS ARE SAFE FROM SNOW OR WATER. THE PLASTIC BAG SEALS IN HER BODY HEAT—LIKE SEALSKIN DOES FOR THE ESKIMO PEOPLE.



SAVE THE SEALS!



Snow Shelters



Snow Shelters

- ❖ Cabins
- ❖ 4-Season or Expedition Tents
 - Aluminum Poles
 - Guy Lines
 - Full Rain Flys
 - Vestibules
 - A-Frames
 - Dome Tents
 - Modified Dome Tents
 - Snow Stakes
- ❖ Natural Shelters
 - Emergency Shelters
 - Lean-tos
- ❖ Thermal Shelters
 - Tools for Digging Snow Shelters
 - Trench Shelters
 - Snow Caves
 - Igloos
 - Modified Igloos
 - Quinzees

Snow Shelters

Shelters

Shelters are an important consideration in planning for any type of cold weather outings. Your first winter campout should be in a cabin or other fixed shelter. The next time you may want to try a tent, or if in snow country, a “thermal” or snow shelter. You should even consider shelters for cold-weather hikes. Crew equipment, different from that used in mild-weather camping.

Types of Shelters

You can choose from a variety of shelters when you go winter camping. Possibilities include cabins, tents, thermal shelters, and other natural shelters.

Cabins

Your first cold-weather camping should be done at a camp or other location where cabins are available. A cabin can be small or quite large, like the lodge of many camps. The size is not the important consideration. The important part is how it helps you train for more extensive cold-weather camping. The staff cabins at Camp Hi-Sierra are available in winter. The tent cabins in Yosemite’s Curry Village are perfect for “first-timers”. The Okpik sleeping cabins (with front and rear doors) designed by the BSA Engineering Service are also available at Northern Tier BSA High Adventure Base.

Tents

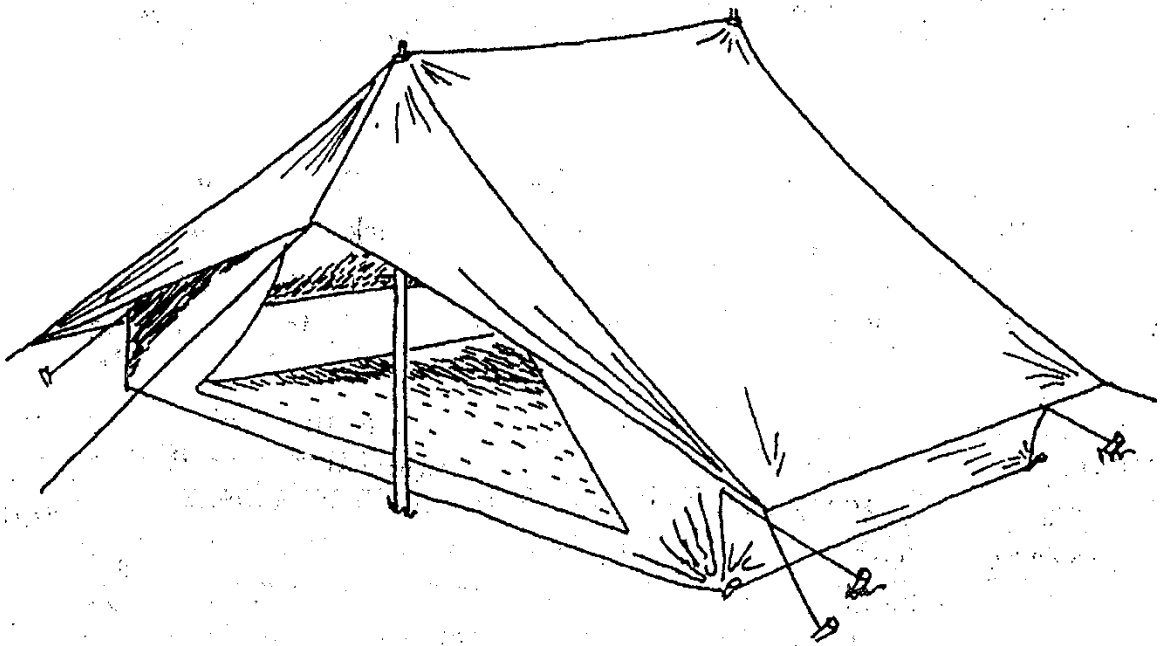
Many types and styles of tents are available. The BSA Supply Service is a good resource for tents. Most styles of tents work in cold weather. You may want one a little larger than the one you use in the summer, since cold-weather clothing and bedding take up more room. Your tent should be large enough so that you can sit up in it.

A good winter or “four-season” tent will have strong poles to hold up to wind and snow loading, it will have guy ropes that come out from the sides to add additional strength to the tent, especially in high winds, it will have a rain fly that comes all the way down to the ground, and it will have vestibules that attach on the ends of the tent to create an entryway out of the wind and blowing snow where boots can be removed without bringing mud or snow into the tent, and where some gear can be stored.

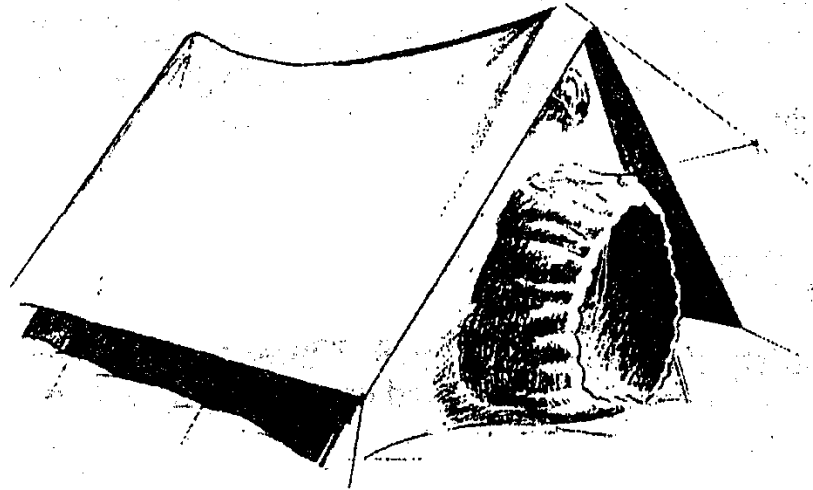
Bring clothing and boots into the tent at night, however, and put next to you to keep warm, or your boots will freeze. It can be very difficult to put them on in the morning if

this happens. Make sure they don't get your sleeping bag and other clothes wet, however.

If you camp in the mountains, you may prefer a mountaineering tent. A tent design that works well for cold-weather snow camping is the "A"-frame style tent. This tent is a BSA design made by the National Supply Division and developed by the Northern Tier National High Adventure Program as a year-round tent. It can be used with a self-supporting frame. The double entrances work well for weather protection and make zippers unnecessary. The tent will usually accommodate four campers, is large enough to dress in, and is spacious enough for extra equipment. The tunnel doors can also be used for storage. A vestibule can be attached to either end, extending the storage space available. In extremely low temperatures, water vapor from respirations and perspiration collects on the inside of the tent and freezes, forming a frost on the inside of the tent. A frost liner can be constructed to fit the inside of the tent to provide more insulation. This also helps to keep the tent frost-free in extreme low temperatures.



"A"-Frame Style Tent

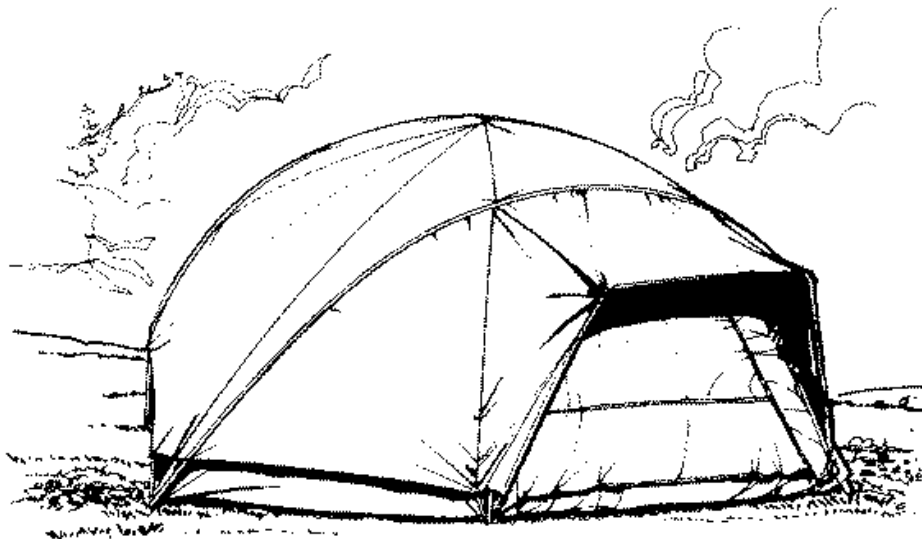


“A” – Frame Style Tent with Tunnel Entrances to Keep Out Snow

A frost liner is nothing more than a lightweight inner tent. It can be made of almost any lightweight, porous material. It should be suspended inside the tent with about two inches of space between it and the tent walls. The frost liner provides insulation and protection from the wind, helping hold heat in a smaller area, less affected by air currents. The warm, moist air inside the frost liner passes through the porous material and forms frost on the outside of the liner.

Each morning the liner can be taken out and the frost removed. It should be packed separately from the tent, dried as often as practical, and replaced inside the tent every morning.

CAUTION: Open flames should not be used in any tent. Refer to Guide to Safe Scouting for the BSA policy on the use of stoves and fuels.



Dome Style Tents provide stronger support against wind and snow buildup

The dome style tent is more stable in wind and heavy snow than the “A” – Frame Tent. Because of the rounded sides, It also provides more room alongside each camper inside the tent for gear.



Modified Dome Style Tents

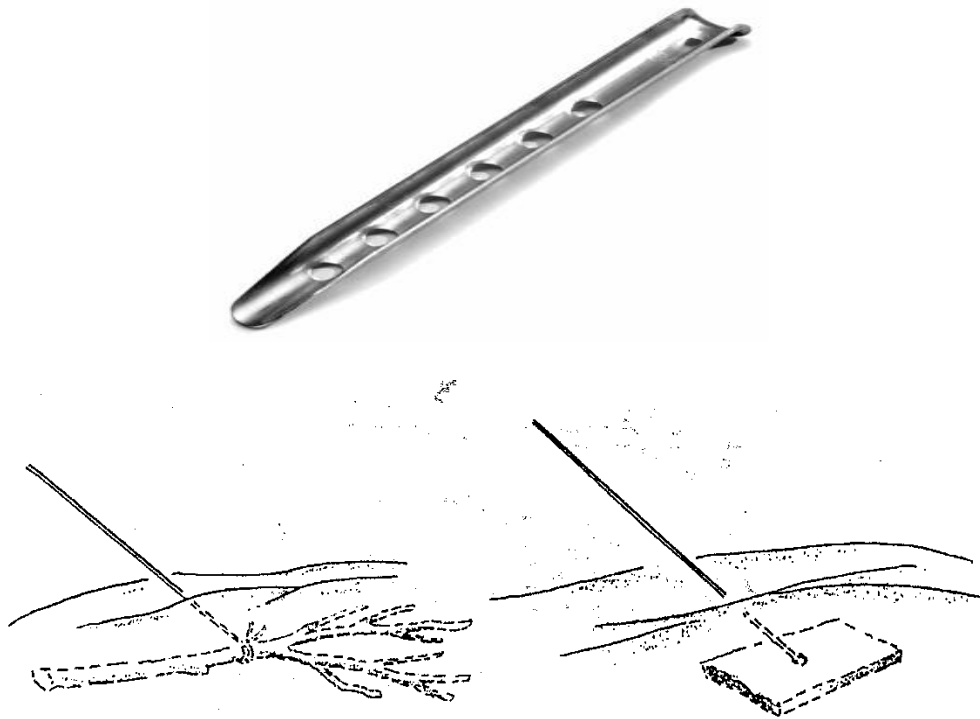
Modified dome style tents are constructed similarly to the dome style tent, but typically have lower profiles, allowing them to slip the wind easier and stand up even better than the dome style to winter storms.

Anchor Your Tent in Snow

It is always important to stake down your tent completely. Well-designed tents “slip” a certain amount of the wind, and rain flies keep rain and snow from touching the breathable fabric of the tent itself, plus they provide a dead-air space between the tent fly and tent, providing additional insulation. These features only work, however, if the tent and fly are stretched taut, set up properly, and staked down properly using all of the stakes.

Regular tent pins do not work well in snow. Special “snow stakes” do work well in snow. These are typically 1foot long, 2 inch wide aluminum sheet metal stakes,

curved slightly, and often with ½ “ holes drilled in them. They can be pushed into the snow at an angle and the tent attached at the top of the stakes as with regular tent stakes, or they can be buried in the snow sideways with the cord attached in the middle of the stake. When placed in loose or soft snow, and packed down, the snow tends to congeal or “firm up” over the next hour or so (as long as the temperature is below freezing), securing the tent for all but the strongest winds.



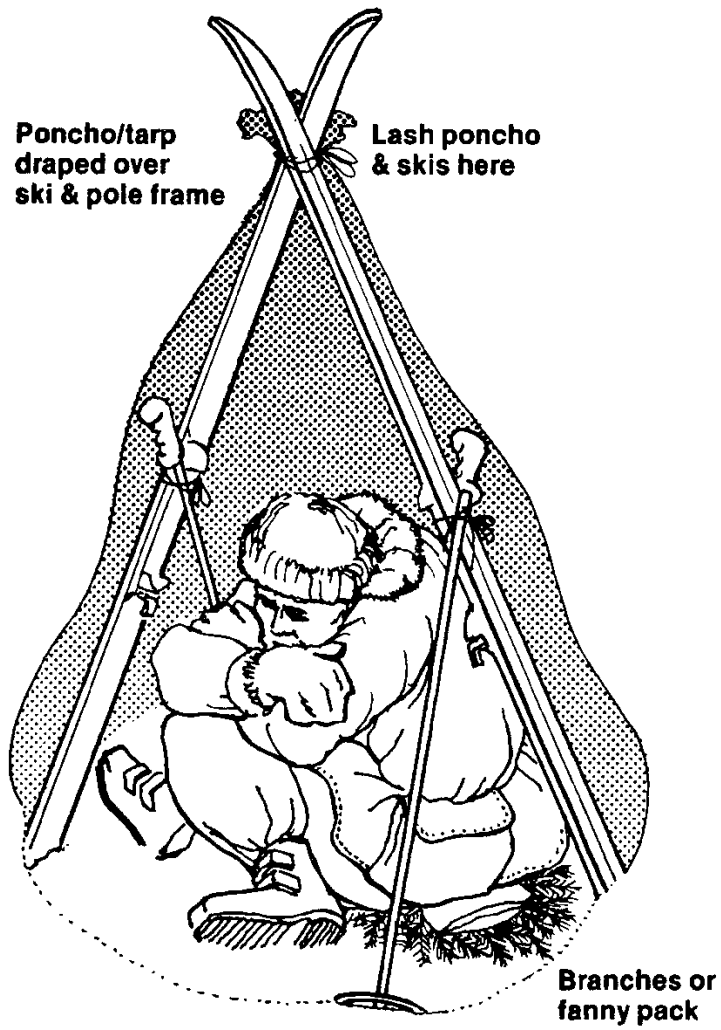
Two methods of holding down the tent ropes in the snow

Natural and Emergency Shelters

The use of natural shelters is encouraged as your group becomes more acquainted with cold-weather camping. When using natural materials, do so in accordance with the policies of low-impact camping and of your local council. While utilizing natural shelters can be an important tool in an emergency, we still need to limit our impact on the natural environment, even while practicing to **Be Prepared**.

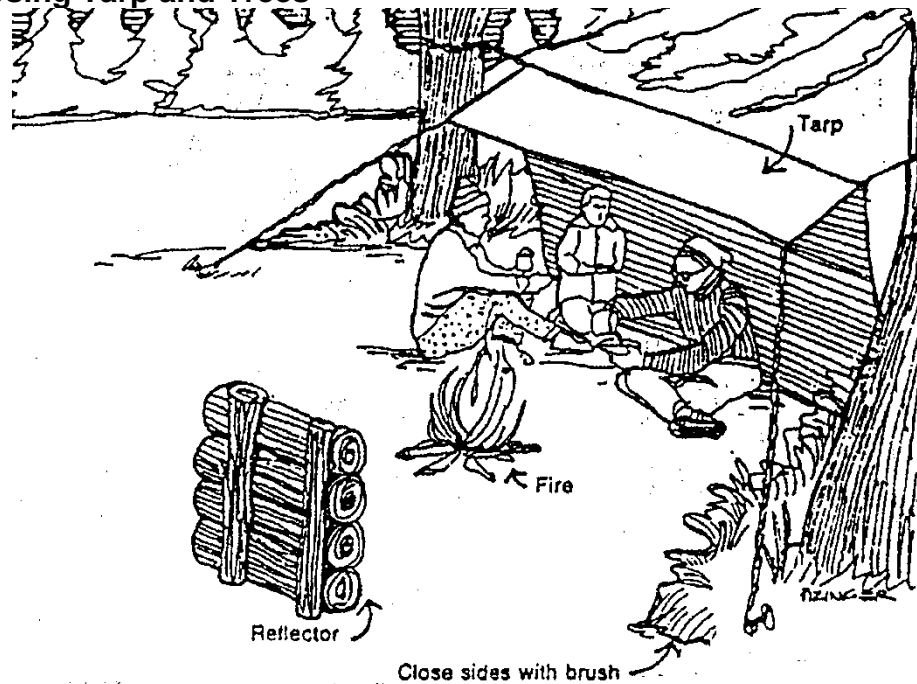
Many references on the construction of natural shelters are available. Use the ones that are appropriate for your area and climate. Trying to learn to build a cut-block igloo in parts of Utah and the Midwest, for example, may not be practical since the snow there often does not pack well. In areas of limited snow depth, a snow cave may not be possible, but a snow trench may work well.

Emergency Shelter Constructed Using Skis and Poncho

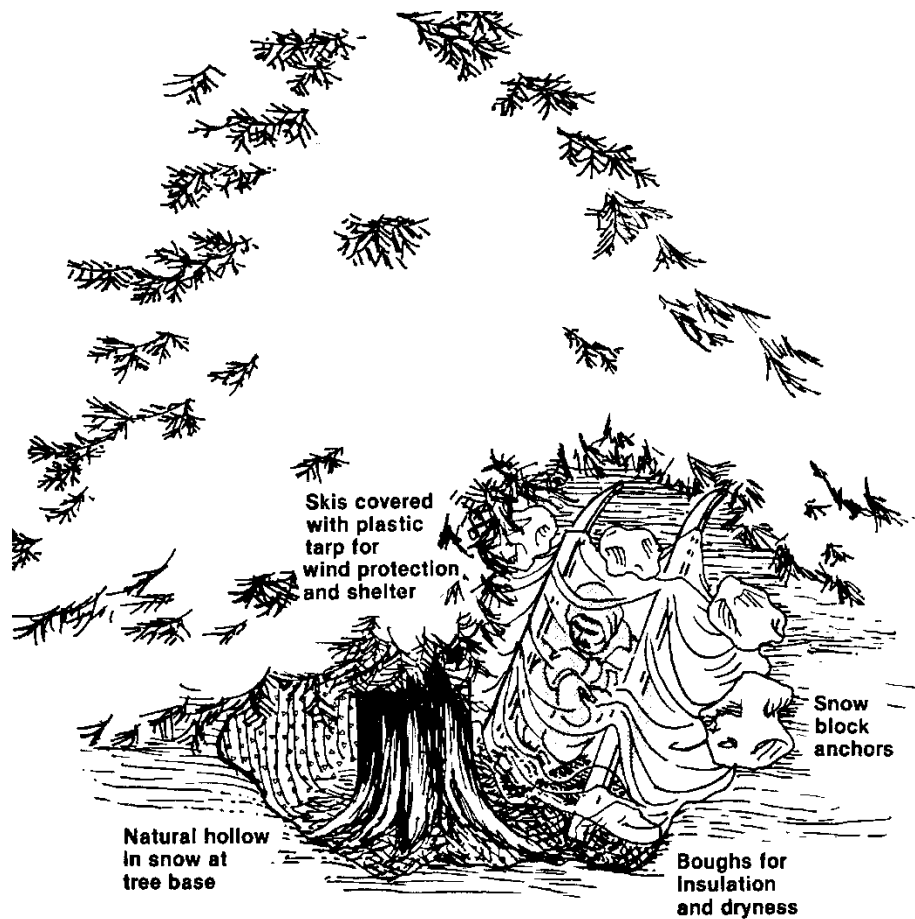


Cold weather demands a tighter closing of structures than mild weather does. This necessitates more attention to proper ventilation. Review the liquid fuel policy as well as the policy in your local area regarding the use of natural materials before you consider means for staying warm. Carbon monoxide is a product of inefficient burning of fossil fuels. It is colorless and odorless and can be deadly. Carbon monoxide is a threat in any camp, but is a greater threat in cold weather.

Lean-to Using Tarp and Trees



Natural Shelter Using Hollow at Base of Tree



Thermal Shelters

A thermal shelter is any natural shelter that, through insulation, uses the heat coming from the earth to warm it. In temperate climates the earth is continually giving off 12 degrees to 16 degrees Fahrenheit of heat. This doesn't sound very warm, since you know that 32 degrees Fahrenheit is freezing, but it makes a difference when the air temperature is well below freezing, or even below zero.

Snow is a very good insulator; actually, about the same insulating value as wood. Following is a chart comparing snow with several common materials for thermal conductivity and density.

Thermal Conductivity Values

<u>Material</u>	<u>Conductivity (cal/sec-C)</u>	<u>Density (gms/cm³)</u>
Air	0.00006	0.0013
Down	0.0001	0.006
Polyester (hollow fiber)	0.00016	0.006
Polyester (solid fiber)	0.00019	0.006
Snow	0.0004	0.25
Wood (pine)	0.0004	0.45
Polyester (solid)	0.0005	1.1
Cardboard	0.0007	1.1
Water	0.0014	1.0
Metals (typical)	0.1 – 1.0	3 - 9

With a good, insulated thermal shelter at –20 degrees F, the heat of the earth combined with the body heat of two people warms the shelter to around the freezing point. That is a difference of 52 degrees F from the temperature outside!

A shelter can be large, or small enough to accommodate one person in emergency or survival situations. The following are several important points about the thermal shelter:

- A door plug must be used, or any heat trapped is immediately lost.
- Each sleeper needs an insulating pad underneath his body. Even though the earth is giving off heat, it is still much colder than your body temperature. Unprotected, your body loses heat to the earth through conduction.
- Ventilation holes should be made at a 45 degree angle in the side of the shelter. Since warm, moist air passes through these vents, it is necessary to continually clear them of frost.
- Make the shelter so that you can sit up without touching the ceiling.
- The more insulating snow that is piled on the shelter, the warmer it will be.
- Do not use an open flame in a thermal shelter.

Building Snow Shelters

The snow shelters described in this handbook include the snow cave, the cut-block igloo, and the molded snow dome called the quinzees.

Patience and practice are both necessary to develop skill at building any type of snow shelter. If you are in the mountains, expert instruction is suggested. The mountains have additional hazards that go well beyond the scope of this guide. Avalanches and extreme temperature fluctuations are just two of the serious mountain conditions that necessitate competent, skilled instruction.

Snow shelters hold a certain fascination for Scouts, they are easy to construct, and they work very well. However, even in extremely low temperatures, snow-shelter builders usually get wet. Therefore, certain precautions should be taken. In a moist snow shelter, drying clothes is difficult. Follow these guidelines when building a thermal shelter:

- Pace the work on the shelter – let everyone get involved. Stop before perspiration becomes a problem. Remember to ventilate.
- Wear waterproof clothing, especially rain or snow pants. When building a snow cave, wear a hooded, waterproof jacket with the hood up, as you will be constantly kneeling in snow and rubbing against the top of the cave and cave entrance with your hood and shoulders.
- Proceed slower than you think you should to avoid overheating. Especially with waterproof gear on, most or all of the water vapor coming off of your body will be trapped and gradually get you wet on the inside.
- Scouts in the Scandinavian countries use a clothing item called a fotposer to keep legs and feet dry. The *fotposer* is just a large, waterproof sock that covers the boot and continues up the leg, fastening like a pair of chaps. Another Scandinavian Scout item used in shelter building, the *vindsekk*, or wind sock, is a small, portable shelter that provides protection when building a shelter.
- Try to keep mitts from getting wet.
- Watch out for snow on garments. Continue to use the buddy system and keep snow brushed off.
- Relax! You are not building a lasting monument. Snow shelters do not survive when warm weather returns.

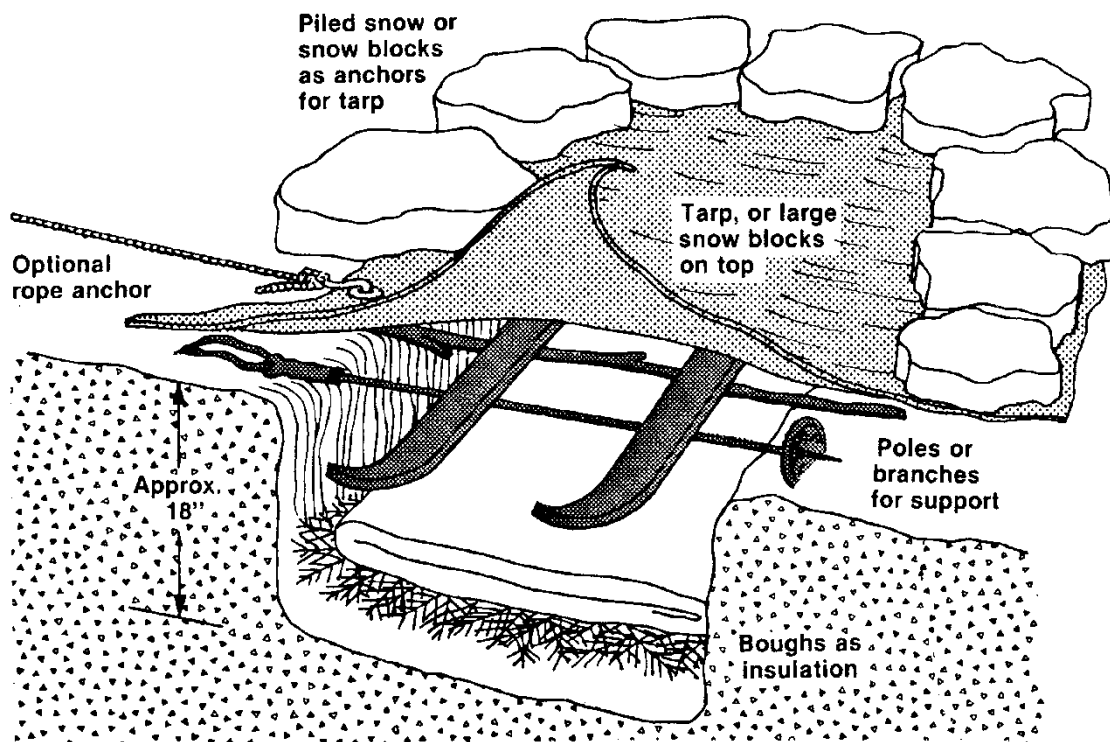
Ideally, the first time a group builds a snow shelter should be while camping in a cabin or tent. Learn how first, and then use the skills to build shelters in which you will actually sleep.

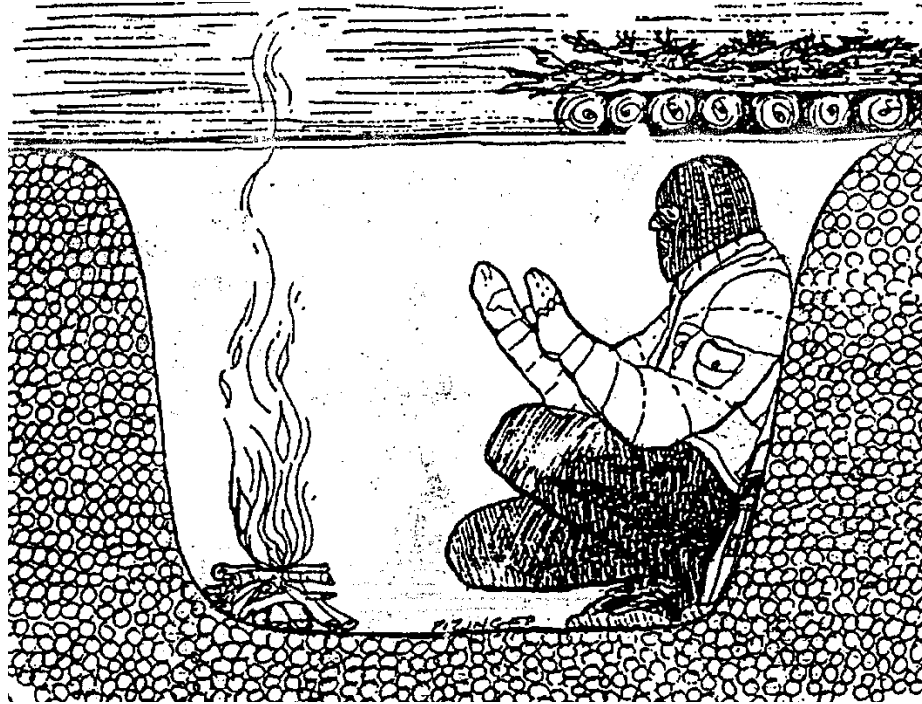
The temperatures in a well-constructed snow shelter with the entrance sealed will rarely be below freezing when campers are inside. If you leave the door wide open, however, the shelter will be the same temperature inside as outside. While ventilation is important in a snow shelter, the vent holes should go out at a 45-degree angle from the sidewall, as opposed to straight up. If you place the vent in the middle of the ceiling, the holes will get larger as the warmer air rushes out. Placed at a 45-degree angle in the side of the dome, the vent replaces the slightly cooler air lower in the snow shelter without causing a draft in the shelter.

When planning to construct any type of snow shelter, the following points must be considered:

- Never plan to build or stay in a snow shelter if the temperature is above freezing. Snow provides excellent insulation in below-freezing conditions, but it is cold and wet when temperatures are above freezing.

Trench Shelters



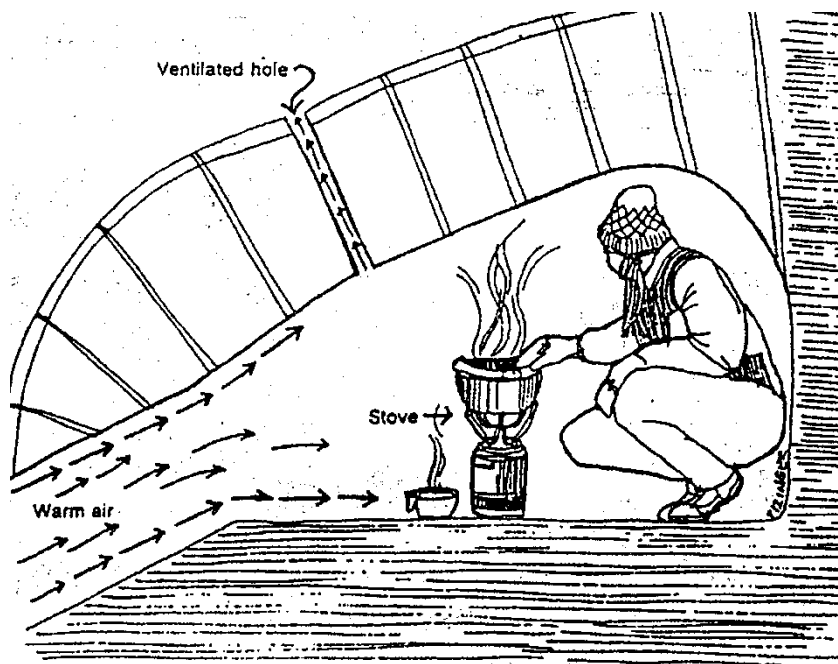
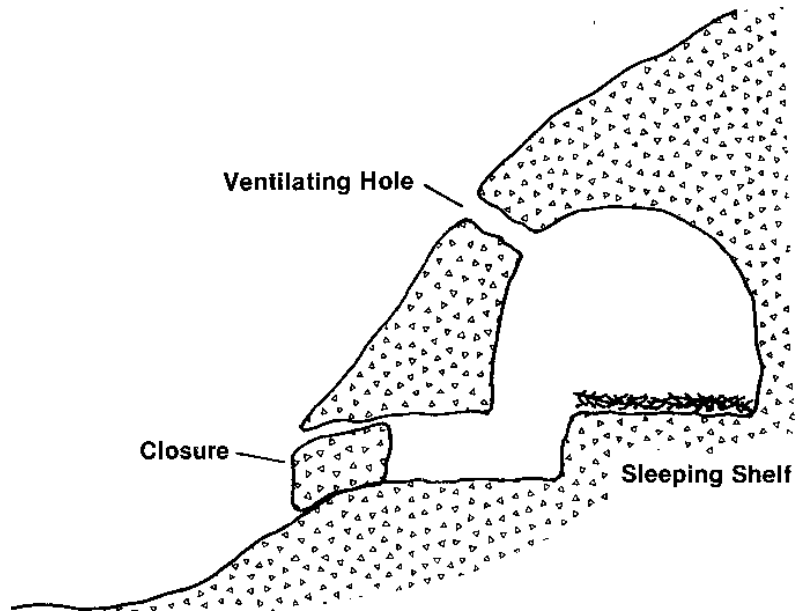


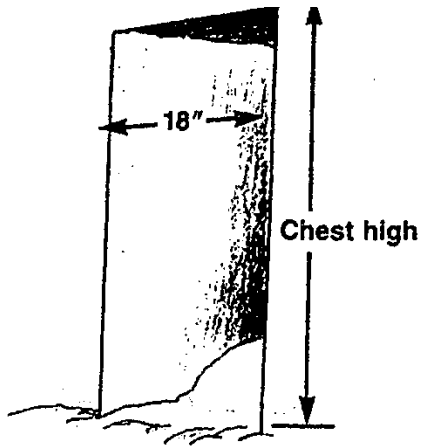
The snow trench can be stomped or dug quickly and with a tarp or snow cover provides good protection from cold wind.

- Always let the snow set at least 1 to 2 hours before starting to dig when constructing a snow dome or quinzee.
- Use the buddy system during snow shelter construction. It is important to have good supervision outside the structure, along with extra scoops and shovels in case of a cave-in.
- Make your entrance as small as comfort allows.
- The sleeping area should be equal or above the lip of the entrance.
- A smooth, arched roof is the key factor in snow shelter construction. One, for strength, and two, so melting water runs down the walls to the side of the shelter, rather than drip on the occupants. Make sure everyone understands this principle.
- Design the entrance so cold air is forced to the base of the crawl-way.
- Smaller shelters are easier to heat.
- Don't expose rock; snow is the best insulating material.

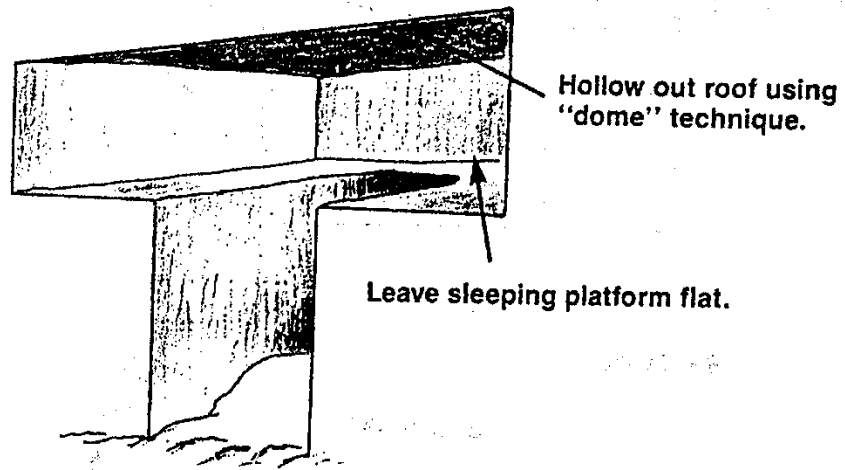
- When constructing snow caves in mountainous areas, consult a specialist regarding the proper location for constructing caves.
- When sleeping in a snow shelter, be sure to keep digging tools inside in case an unexpected exit is necessary.

Snow Cave Construction

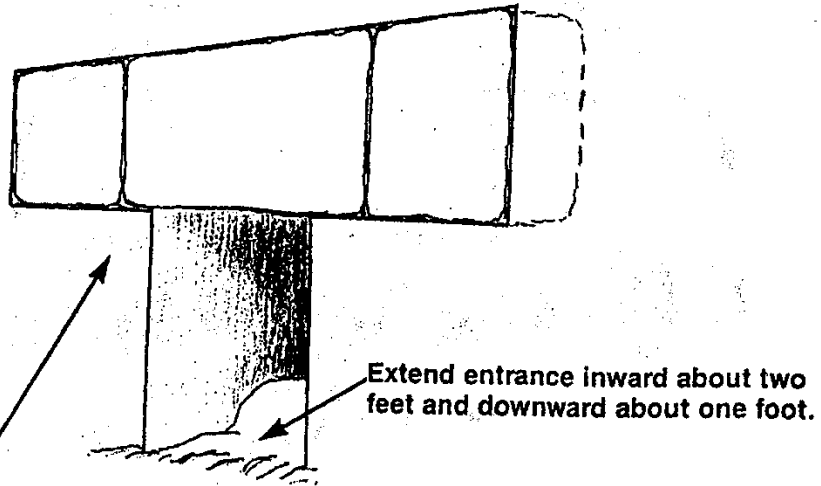




Dig the entrance tunnel 18 inches wide and chest high.



Remove a rectangular portion of snow crosswise to the entrance. Then dig upward and in all directions—leaving the sleeping floor flat.



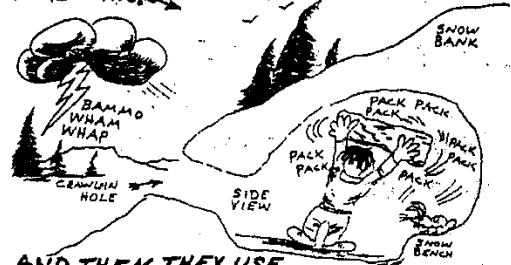
Cut entrance blocks and place them across the entrance.

THE SNOWSTORM OR BLIZZARD COMES ON FAST, SO THERE'S NOT MUCH TIME. DOOLEY'S MOM DOESN'T HAVE A SHOVEL, SO SHE PULLS OFF A SUN VISOR FROM THE CAR, OR A HUBCAP. THE VISOR THEN BECOMES A SHOVEL TO DIG A SNOW CAVE...



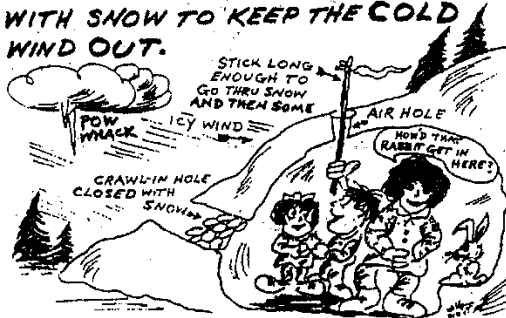
DOOLEY AND TINA HELP MOM, USING A HUBCAP AND A DIGGING STICK, 'CAUSE IF THEY USE JUST THEIR HANDS, THEY COULD GET TOO COLD.

FIRST, THEY DIG A CRAWL-IN HOLE, THEN THEY SCOOP OUT A SNOW CAVE BIG ENOUGH FOR THEM TO FIT IN EASY LIKE THIS.



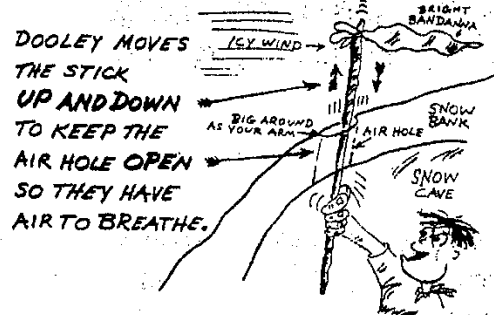
AND THEN THEY USE THE SUN VISOR, HUBCAP, A FLAT ROCK OR A CHUNK OF TREE BARK TO PACK THE SNOW GENTLY, SO THE CAVE WON'T CAVE IN ON THEM. ONCE INSIDE, THEY TAKE TURNS WARMING EACH OTHER'S HANDS AND FEET: HANDS UNDER ARMPITS, FEET AGAINST STOMACH.

WHEN THE SNOWSTORM FINALLY REACHES THEM, THE WIND GETS REALLY COLD. IT'S BELOW FREEZING. DEEP INSIDE THEIR SNOW CAVE, MOM, DOOLEY, AND TINA ARE WARM AND SAFE FROM THE COLD ICY WIND. DOOLEY HAS BROUGHT IN A STICK TO KEEP AN AIR HOLE OPEN, 'CAUSE THEY'VE CLOSED OFF THE CRAWL-IN HOLE WITH SNOW TO KEEP THE COLD WIND OUT.



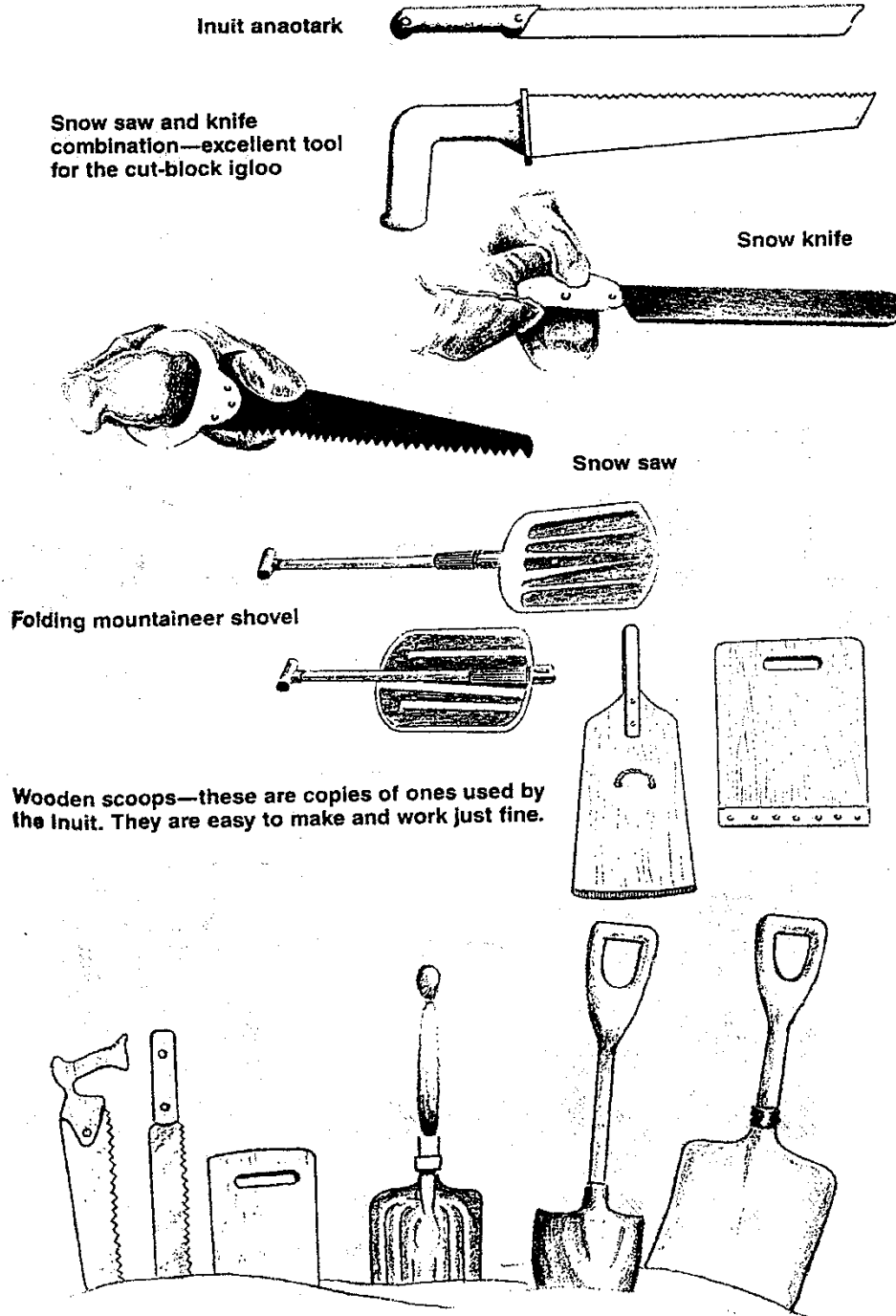
IF DOOLEY AND HIS FAMILY HAD STAYED IN THE CAR, THEY MIGHT HAVE FROZEN. A 2-FOOT THICK SNOW CAVE WALL IS A WHOLE LOT BETTER THAN A SKINNY CAR WINDOW BETWEEN YOU AND A BLIZZARD.

TINA TIES HER BRIGHT ORANGE BANDANNA ONTO THE STICK. THE BRIGHT PIECE OF CLOTH CAN BE SEEN BY ANYONE LOOKING FOR THEM.

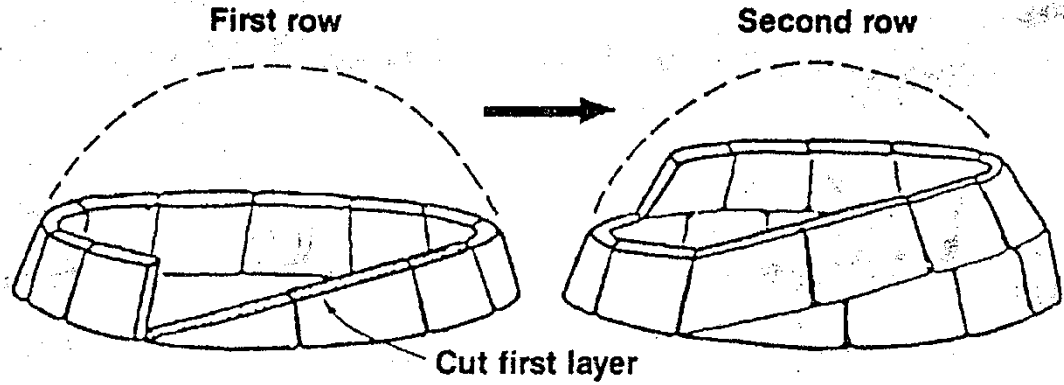


Igloos

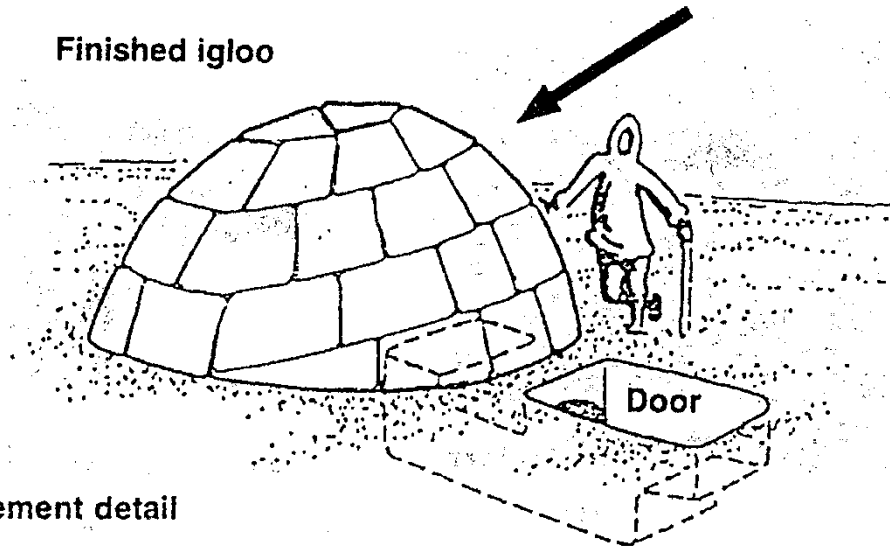
To build an igloo, start by tamping down and packing the snow in an area about ten feet across using snowshoes or skis. Outside this area, cut snow blocks of firm snow using a snow saw, snow knife, folding mountaineering shovel, large toothed tree limb saw (see illustrations):



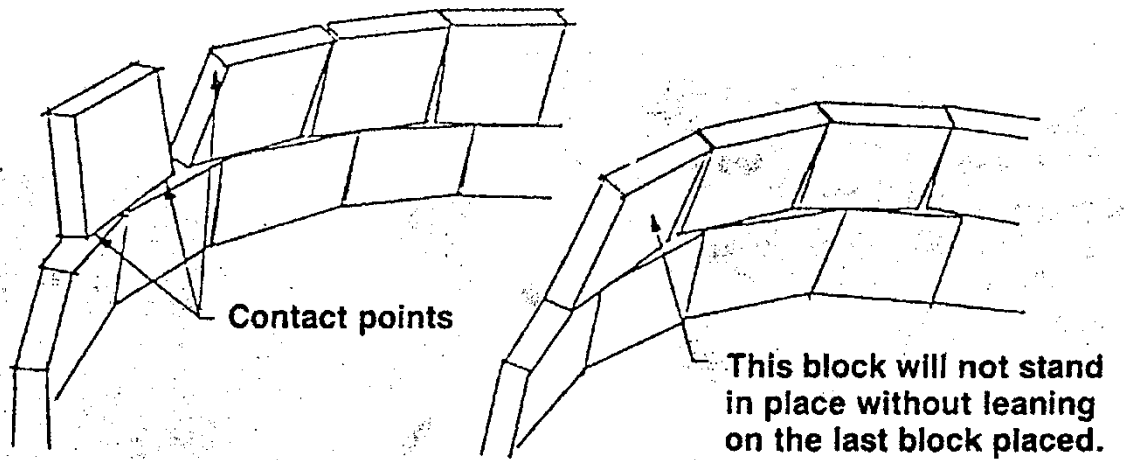
Begin laying the snow blocks in a circle. Cut the blocks in the first layer so that a ramp is formed, allowing the second layer to spiral up onto the first layer so that the entire igloo is a one continuous row spiraling from base to the top.

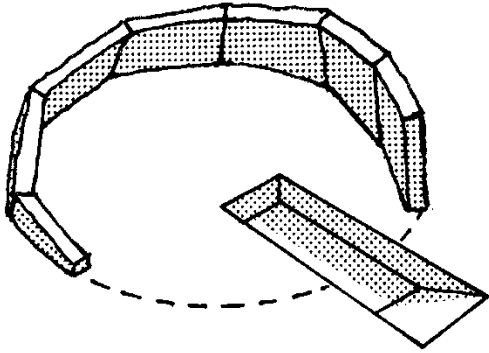


Finished igloo

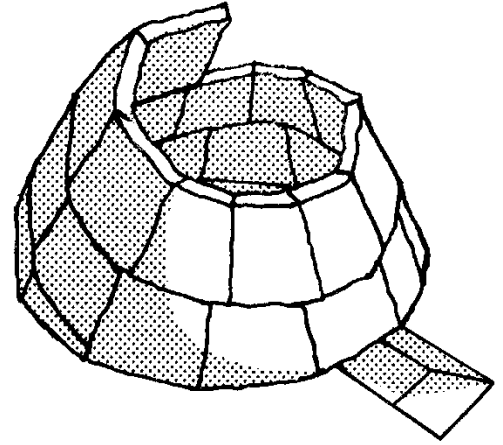


Block placement detail



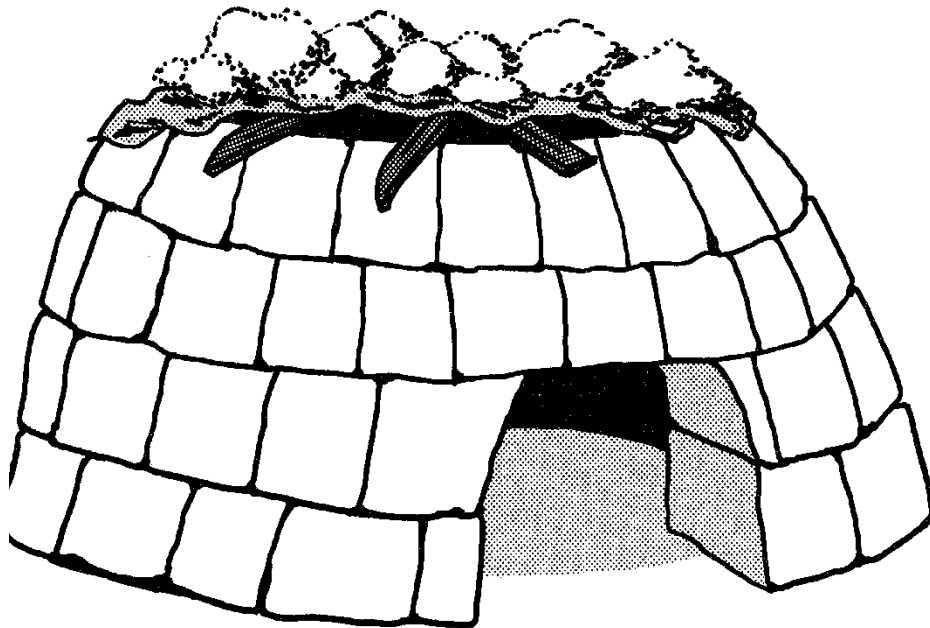


Starting row



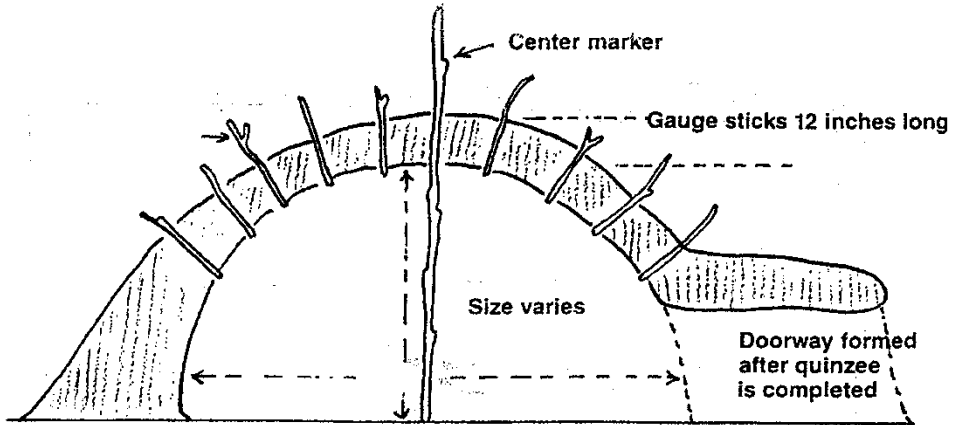
Later stage

Modified Igloo



Quinzees

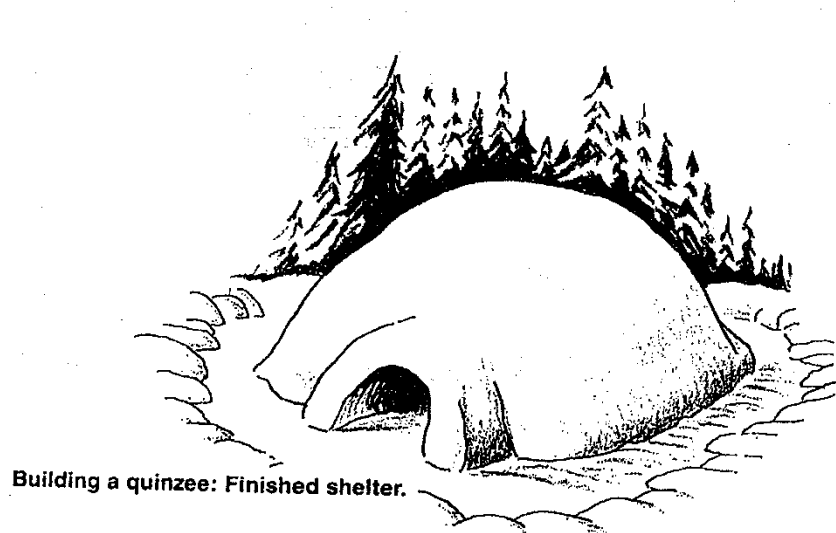
To build a quinzee, begin by piling up snow to a height of about six feet. Stir the snow as you accumulate it to help it re-settle and congeal. After it has settled, place one-foot sticks in the outside of the snow cave. Then hollow out the quinzee using the sticks as markers so that you don't make the walls too thick or too thin.



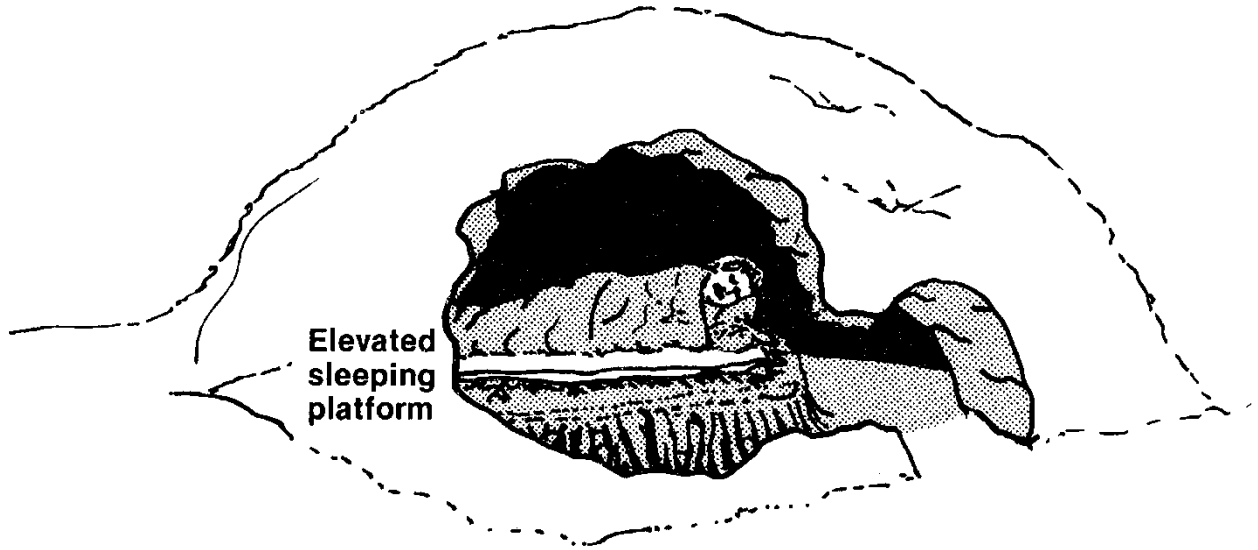
Building a quinzee: center pole and gauge sticks.



Building the quinzee: Shelter almost finished, still showing gauge sticks.



Building a quinzee: Finished shelter.



**Elevated
sleeping
platform**

Menus and Cooking In Snow



Menus and Cooking In Snow

- ❖ Nutrition
 - Fuel for Heat and Energy
 - Materials for Building and Maintaining Body
 - Regulates Body Processes
- ❖ Typical Energy Expenditures
 - Body at Rest: 60 –100 Calories Per Hour
 - Heavy Winter Activity: 400 – 1100 Calories Per Hour
- ❖ Best Source of Calories
 - Carbohydrates – 40%
 - Fats – 40%
 - Protein – 20%
- ❖ Winter Camping Foods
 - Freeze-dried Foods
 - Retort Meals
 - Frozen, Pre-cooked at Home Foods
 - De-hydrated Foods (at your local supermarket)
- Snack Foods
- Hot Beverages
- Cooking Utensils
- Eating Utensils
- Clean-up
- ❖ Suggested Menus
 - Breakfast
 - Lunch
 - Snack
 - Dinner
- ❖ Water
 - Filter
 - Chemical Treatment
 - Boiling

Menus and Cooking In Snow

Food and Water

Food and water are important considerations for cold-weather camping. Food should be easy to carry, store and prepare and provide the calories and bulk necessary to provide you with heat and energy, as well as supply needed nutrients. Plans should be made to collect and purify water as needed.

Nutrition

Except under survival conditions, well-clothed, sheltered, and trained campers use little more food in the cold than in moderate temperatures. However, caloric intake in cold weather increases for two reasons. First, the extra activity required by dressing and the hampering effect and weight of that clothing increases energy needs. Second, the stimulus of the cold gives you a ravenous appetite. However, because the body “fires” burn somewhat hotter in cold weather and because food affects morale, you will want to supply your group well.

Foods come from animal and vegetable sources, and serve three functions in the body:

- Serve as fuel to provide heat energy or calories
- Provide materials for building, repairing, or maintaining body tissues.
- Help regulate body processes.

Calories measure the amount of energy in the food you eat. They are furnished by carbohydrates, fats, and proteins.

Typical energy expenditures for an average size person are as follows:

Sleeping	60 Cal/hour
Lying Awake	70 Cal/hour
Sitting	90 Cal/hour
Standing	150 Cal/hour
Walking	250 Cal/hour
Shivering	Up to 450 Cal/hour
Heavy Activity	400-1100 Cal/hour
Maximum Continuous Output	600 Cal/hour

The best way to meet energy requirements for winter activities is to carry a quantity of high-energy food in your pack. Candy, cereals, or dried fruit provide almost immediate fuel for the muscles and heat for the body.

Carbohydrates. Carbohydrates are the main source of energy. They are grouped together as starches, sugars, and celluloses. Starches and sugars are quick-energy foods because they provide only energy. Starches are found in bread, cereals, flour, and potatoes. Sources of sugar in the diet include ordinary white or brown sugar, milk, and fruit. During digestion, starches and sugars are turned into simple sugars, which are then oxidized to give energy. The body does not digest cellulose (dietary fiber), but fiber helps move food wastes through the digestive tract, making them easier to pass. The best sources of fiber are whole grain cereals and breads, nuts, seeds, fruits, and vegetables.

Fats. Fats are the highest energy food, providing about 9 calories per gram. Carbohydrates and proteins each provide about 4 calories per gram in metabolism. They also furnish the natural sources for the fat-soluble vitamins A, D, E, and K. Fats can be either animal or vegetable in origin. Fats give a diet its “staying” qualities, helping to satisfy your appetite.

Fats and carbohydrates are called “protein spacers” since their presence prevents the body from having to burn its protein (blood and muscle) to give energy. The body selects carbohydrates to burn first, then fat, then protein, because of their relative ease of metabolism. A diet consisting of 40 percent fat, 40 percent carbohydrates, and 20 percent protein appears to be best in cold weather, for a number of reasons.

Protein. Protein is the most common substance, other than water, in your body. Its main function is the growth and maintenance of body structures. Supplying energy is a backup function for protein. Carbohydrates and fats have the primary responsibility for supplying energy. Protein serves this function only if not enough of those nutrients are available to meet the body’s energy needs. Protein can be either of animal or vegetable origin. Proteins are made of building blocks called amino acids. Most of the amino acids can be manufactured in your body, but some cannot, so these essential amino acids must be supplied by the foods you eat. Protein from animal sources (meat, fish, poultry, milk, and eggs) supplies all of the essential amino acids. Protein from vegetable sources (beans, peas, whole grains, and nuts) may have several of the essential amino acids, but rarely all of them.

Protein has another remarkable property: the specific dynamic action by which protein, in its own digestion and oxidation, increases body metabolism by 30 percent. This is a source of heat in addition to that normally produced by the muscles and the liver. In the cold, protein is an additionally protective food. Because the byproducts of protein metabolism are dependent on the kidney for excretion, water intake must be kept up to prevent damaging hard-worked kidneys when increased protein is eaten. This liquid can be in almost any form (water, fruit drinks, hot thin soups), except coffee. Not only does coffee increase nervous tension in cold climates, but it also

causes excess dehydration by stimulating kidney function. This decreases the body's ability to handle protein excretion.

Provisioning

Using *Best and Taylor's Physiological Basis of Medical Practice* as a reference, the best average temperature-climate diet follows, along with a recommended cold-weather diet.

Food Element	Temperate Climate	Cold Weather
Carbohydrates (4.1grms)	53%	40%
Fats (9.2 calories/gram)	35%	40%
Proteins (4.1 calories/gram)	12%	20%

The numbers of calories required per day is based on many factors and should be matched to the individual and the circumstances.

The quantity of calories utilized in winter program depends on many factors: weather, temperature, type of activity, etc. The following example of a day's ration is designed to be adjusted from between 3,000 and 4,000-plus calories per day. This ratio should be consumed along with 2 ½ to 3 quarts of water per day. The amount of water can be increased depending upon the amount of work, the temperatures, etc.



Winter Camping Foods

Food for winter camping trips can vary greatly according to individual needs and tastes. Generally, we are trying to travel light, so simple, dehydrated foods that do not require a lot of time and equipment to prepare and which can be purchased at your local supermarket work best. Summer campers can afford the time and energy for an occasional gourmet meal, but with the shorter daylight hours and colder temperatures, it is best for winter campers to plan menus for conservation of time and fuel. By using nutritious and quickly prepared meals, plus serving the foods and beverages hot, you are not putting out body calories to bring cold food or fluids up to or body temperature. Time and fuel may have priority during winter trips, so simple and fast-prepared meals are an advantage.

Freeze-dried Foods. There are numerous companies such as Mountain House, Richmoor, Chuck Wagon, and others that are marketing a wide variety of freeze-dried trail foods. Some of them have their own foil packets. All you need to do is add boiling water and wait five to ten minutes for the food to reconstitute and you have a hot, tasty meal. These main dishes are available in a wide variety such as chicken, stew, beef and potatoes, beef and rice, chili, etc.

During the winter when everything is cold, you have to use special effort to keep these packets of food and water hot during the reconstitution period or they might end up tough and chewy. To do this, you can keep the packet submerged in hot water or on hot rocks after adding the boiling water. If you set it aside on the snow while waiting for it to reconstitute, it will get cold in a hurry.

Retort Dinners. Retort dinners are fantastic, but are heavier than some dehydrated foods. They are packaged with their own juices in laminated foil packets. Drop these packages into a pot of hot water for several minutes to heat. You end up with a delicious hot meal with no cooking involved. The pouch can be opened and the food eaten without heating if necessary, during emergencies but hot food tastes better and does not take body calories to warm it up. You should experiment and decide if you prefer the slightly heavier retort pouches or the lighter weight meals that require a bit of cooking time in camp. The packets do not have to be kept frozen and have a shelf life of several years.

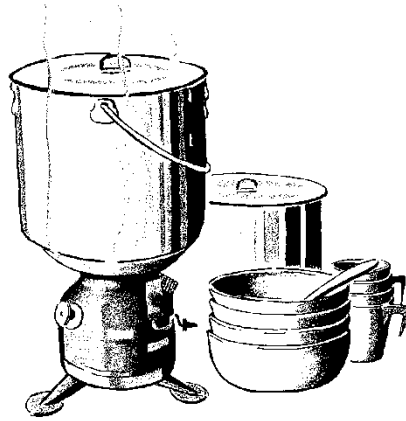


Frozen, Pre-cooked Meals. Winter camping allows you to use more techniques of meal preparation than does summer camping. For example, you can cook up batches of chili, stews, chicken and noodles, etc., at home before your trip. Put these cooked meals into seal-a-meal bags and into the freezer until you are ready to go. Make each seal-a-meal bag into an individual serving rather than make the bags contain portions for two, four, or whatever the number in the group. You can then pull out the required number of meals needed per trip. These watertight bags can be dropped into a pot of boiling water in camp, and you soon have a hot steaming meal. The individual serving bags thaw out much quicker than the larger portions do. These precooked packages of food can be kept frozen during winter tours and used as needed. Breads, muffins, cinnamon rolls or fruitcakes can also be baked ahead of time and kept frozen until needed.

Dehydrated Foods. If you do not prefer to purchase the more expensive freeze-dried foods from the specialty outdoor stores, you can find many good items at your local grocery store. These include Minute Rice, different types of instant potatoes, dried soup mixes such as Lipton's, assortments of instant breakfast cereals, dried fruits, and nuts.

Breakfast. You can cook up batches of scrambled eggs and sausage or ham, French toast, or other breakfast ingredients and package them in individual servings and freeze them in seal-a-meal bags. For breakfast in camp, drop these packets into a can of boiling water to thaw and have a hot breakfast with no campfire cooking involved. If you don't mind carrying a few extra items such as honey, jelly, or syrup, you can also bake up pancakes or waffles and package these in individual servings in seal-a-meal bags and freeze them in advance. When the packets are taken out of the hot water, they taste like you have just taken them off of the grill. There is a powdered jelly that is handy to carry. You open up a packet and add enough water to make the correct consistency to spread over French toast or pancakes. Powdered syrup can also be cooked a little at a time over the campfire for those breakfast pancakes and waffles. Open a steaming package of scrambled eggs and ham to go with the pancakes, add a hot beverage, and top it off with hot Instant Quaker Oats or Cream of Wheat which can also be obtained in individual packets. This gives you a good start for the day with a full fuel tank.

If you prefer not to eat directly out of the plastic bags, you can use a simple plastic or Lexan bowl. Make sure it is shallow enough to accommodate licking it clean when your meal is over. This minimizes clean up and gray-water to dispose of. **Low Impact Camping Techniques.** Once the bowl is licked clean, only a small amount of soap and water are needed to sterilize it and rinse it off. The used packaging material should be folded up into as small a package as possible and hauled out. The stews, chicken and noodles, or meal of your choice used for the evening meals can be eaten directly from the bags. It is no problem to keep these packets frozen while enroute during winter excursions by placing them on the outside edge of the backpack or sled exposed to the cold.



Cookset for three or four persons

Noon and Evening Meals. The noon meal can be much simpler, almost to the point of being just a “snack stop”. Along with a beverage to insure the intake of fluids, carry a few of the firmer backpack crackers or tortillas, a variety of cheeses, meat sticks and jerky sticks. Cheese has about two hundred calories per ounce and goes a long way toward sustaining you while snow camping all by itself. Mountain House has a very good freeze-dried tuna salad and a freeze-dried chicken salad in small packets. Just add cold water to the watertight package, stir it with a stick, and it goes well with cheese and crackers. Chuck Wagon and other suppliers also have a wide variety of these lunch-type foods plus many items that require only 15 to 20 minutes cooking for a nutritious evening meal.

Breads and Pastries. Pre-cooked breads, bagels, or fruitcakes are also good to take along. When carrying frozen bread, muffins, etc. on winter tours, you can take out the desired quantity ahead of time, put it in a plastic bag, and place it in an inside pocket in your shirt or coat. Body heat will thaw it out for the next meal. If using bread inside plastic wrappings, be careful not to get it too close to heat, or the plastic might melt and be difficult to separate from the bread (and the plastic can be hard to digest).

Snack Foods. You can prepare ahead of time various types of snack foods for winter excursions. Assortments of these mixtures are ground and mixed together into bars called pemmican, of which there are numerous variations. Each individual or group seems to have their own favorite concoction of trail mix or “GORP” (which stands for “good old raisins and peanuts”), including dried fruit, rolled oats, granola, chocolate pieces, M&Ms, peanut butter, honey, nuts, sunflower seeds, and other ingredients. A favorite of mine is one pound each of raisins, mixed nuts, and M&Ms. Dump them together into a bowl, mix them up and store them in smaller portions in plastic bags. These bags can freeze or thaw with no harm until they are taken from the pack or survival kit as a quick and easy snack.

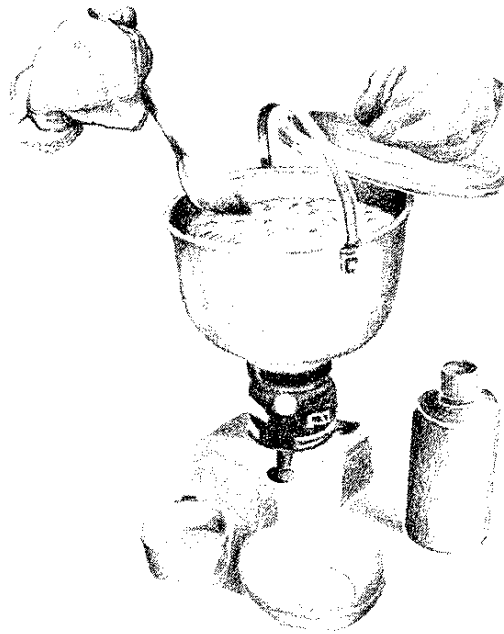
Hot Beverages. During the winter trips, always attempt to have some type of hot beverage such as instant coffee, tea, hot chocolate, hot Jell-O, Tang, or other mixes with each meal. Drinking hot beverages instead of cold helps put quick heat into your

system as well as the fluids that are essential. Coffee is not the best choice however, because it has no nutritional value and contains caffeine which is a diuretic (meaning it dehydrates you).

Cooking Utensils. A large assortment of pots and pans should not be necessary. Two or three nesting pots, typically one, two, and three-quart pots, or one very large, six-quart pot for the whole patrol together with a serving spoon should suffice. With these pots, you can always drop in a cooking pouch, or have hot water available for soup, instant cereals, instant drinks, etc. A cloth or plastic bag can be slipped over the pots so the soot on the bottom does not get on other items in your pack.

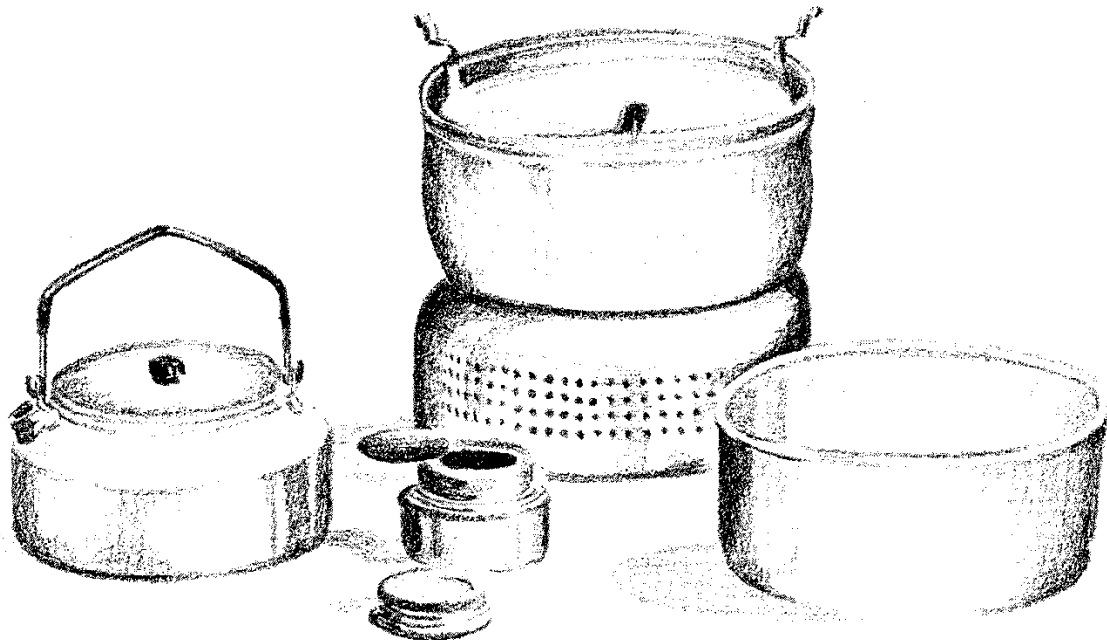
Eating Utensils. If metal cups and plates are placed by the fire, they will get too hot to use. If they are placed in the snow, they will get too cold, too quickly. The Sierra Cup, with its cooling metal rim can be serviceable in the winter, however, plastic or Lexan cup and bowl work best. If you use plastic, make sure it can handle boiling water. Plastic and Lexan utensils weigh very little and are easy to clean. Generally, you should not need to use a lot of utensils in winter. A large pot for boiling water for your cooking team (two to four members works well – you can cook in a large pot for the whole patrol - at Philmont BSA High Adventure Base, they teach one-pot meals for an entire crew of up to twelve), a pot griper (I use my Gerber multi-tool pliers), a plastic or Lexan bowl and/or cup, plastic spoon and fork, or a “spork”, and pocket knife should just about do it (again, a Gerber or Leatherman type multi-tool works well).

Clean-up. After meals, lick everything clean, add a drop of bio-degradable soap and a few drops of water, rub this around with your finger, pour it out, add a small amount of water for rinse, swish it around, pour it out and you are done! By using cooking pouches in the boiling water, the pot should never get dirty.



Coleman Peak I stove set on an insulating cover

a cup, bowl, and spoon for each member of the group.

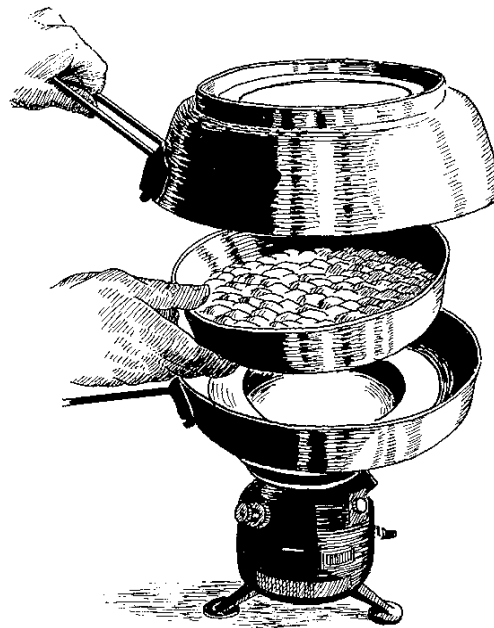


An alcohol stove and cooking set. These cooksets are excellent for groups of three to four people in cold-weather camping.

Summary

The foods for winter camping can vary greatly in content and type, depending on your desire for economy, pre-preparation, weight, bulk, and other factors. To help promote body energy and heat during winter tours, include fatty-type foods such as cheeses, sausage, peanut butter, and nuts. Fatty foods also take longer to digest than sugar and carbohydrate foods. By mid-morning, when the sugar and starch foods are about used up, the fat foods are still digesting and going into your system for body energy and heat.

Exerting energy in traveling over the snow plus the need to produce body heat in a cold atmosphere requires considerably more calories than are required on summer excursions. Include extra foods for this “double duty”. Remember that fatty foods generally contain more calories per ounce than starch and carbohydrate foods such as breads and noodles. Start with short tours and increase them as you gain experience and confidence. Experience and individual preferences will soon allow you to plan and better prepare your gear and food for excursions into remote areas without being burdened down with unneeded items.



Cooking on a Coleman Peak I stove
using a BSA Trail Oven

SUGGESTED MENUS

Breakfast

- Hot Tang, or hot cider
- Dried fruit, or dried fruit re-constituted by cooking in water
- Hot cereals – Instant oatmeal, instant cream of wheat, instant cream of rice
- Instant eggs (powdered or freeze-dried)
- Meat bar
- Cake bar, energy bar
- Hot drink- cocoa, hot tea (herbal to avoid caffeine), hot cider

Lunch

- Instant, fruit-flavored drink
- Hot, instant soup
- Cheese sticks
- Meat bars, or meat sticks, Italian dry salami, summer sausage, etc.
- Energy bars, Power Bars, jerky, etc.
- Bagels, mini-bagels, tortillas, pita bread, or crackers
- Peanut butter & jelly

Trail Snacks

- Instant, fruit-flavored drink
- Trail mix (raisins, peanuts, cashews, almonds, M&Ms, dried fruit, granola, coconut, etc.
- Dried fruit

Dinner

- Instant, fruit-flavored drink
- Instant soup
- Hot main dish- can be a one-dish meal, a retort meal, or a freeze-dried dinner, and should include a starch (rice, noodles, macaroni, or potatoes), broth or gravy (bouillon cubes, instant gravy mixes), meat (canned chicken, beef, chipped beef, or ham), and freeze-dried or dehydrated vegetables.
- Crackers, bagels, tortillas, pita bread, etc.
- Hot drink (cocoa, tea, hot cider)
- Dessert- can be one that requires preparation and cooling, such as a pudding, or an already prepared item.
- Extras – Sugar or sweetener, milk powder, cream powder, salt, pepper, Tobasco sauce, and your own favorite spices. Butter or margarine, honey, maple sugar, fruit soup mixes, flavored teas, instant hot soups and bouillons, special soups, extra snack items such as fruits and nuts. Adults may want coffee and tea. Don't forget paper towels and trash bags for leftover packaging to be hauled out!

Water

You should carry some type of water bottle or hydration system with you during the winter because the intake of fluids is essential for body efficiency and warmth. When traveling over the snow, there is often no running water visible to filter easily. You should not eat snow, as the process reduces body temperature. You usually do not have time to stop and melt snow and bring it to a rolling boil to prepare it for drinking while you are traveling, thus the importance of carrying water with you. By adding a little bit of snow to your water bottle periodically, and keeping the water bottle in a pocket near your body, your body heat will keep the temperature of the water above freezing, and the water will melt the snow and keep your bottle full.

If weight is not a big problem, some winter campers like to carry a small thermos jug. This can be filled with hot chocolate or hot soup. At mid-morning you can stop for a “mug-up” consisting of several sips from the hot thermos along with some fruitcake, cookies, or bagels, that have been carried in an inside pocket to thaw. You can finish consuming the contents of the thermos bottle with a similar in mid-afternoon. This pause with a hot drink and a snack helps to warm you up, lets your body rest a bit, and gives you a boost of energy to continue on. The thermos bottle can be washed out in camp each evening and if filled with water, it will not freeze in a tent or lean-to. That way, you can have a drink during the night if desired. In a properly constructed snow cave, a plain canteen of water will not freeze the way it would in a tent or lean-to. Before you leave camp the next morning, again fill the thermos with a hot beverage or soup for the midday stops.

While in camp, more water can be melted or filtered from streams for the following day. A couple of water bottles filled with hot water are also nice to toss into your sleeping bag just before you bed down for the night. Your body heat will help keep them warm and liquid, and their heat will help keep you warm.

A Note on Water Safety

Even in remote areas, water, snow, even fresh snow may be contaminated by three types of water-borne pathogens: viruses, bacteria, and large parasites.

There are three methods for treating water: boiling, chemical treatment with iodine or chlorine, and filtering.

Viruses: Water in wilderness areas in North America are generally free from viruses, however, it never hurts to be safe. Viruses are easily killed by both boiling and chemical treatment. Viruses are too small to be removed by most filters.

Bacteria: Many types of bacteria are found in wilderness waters in North America. Chemical treatment kills most bacteria. Filters are also effective with the smaller sized filters. Boiling kills all bacteria.

Parasites: Parasites include protozoa, amoebas, tapeworms, and flatworms. Giardia lamblia and Cryptosporidium parvum (crypto) are common parasites in North American waters. Some parasites are resistant to chemical treatment, but they can be filtered out and boiling kills them.

Chemical treatment affects the taste of water, and can take a little time. Iodine is more effective than chlorine. Most viruses, bacteria, and parasites are eliminated through chemical treatment.

Filtering can be slow and the filter cumbersome. Filters are also easily contaminated through careless handling however, they are effective against most viruses and parasites, but less effective against bacteria.



MSR MiniWorks Ex Ceramic Water Filter

Boiling is most effective against viruses, bacteria, and parasites, but it takes time and uses up fuel. If you are melting snow, remember to put a little water in the pan first, and add the snow slowly. Otherwise, the snow will wick up the water, the water will not be in the bottom of the pan to absorb the heat evenly and you run the risk of burning the pan.

Some experts say the only safe method of purifying water is to bring it to a full boil for five minutes. Others swear by their water filters. The official policy at Philmont BSA High Adventure Base recommends against water filters because of the risk of contamination, and against boiling because of the amount of fuel it is necessary to carry if it is done right, and the risk that campers will be impatient and won't bring it to a full boil long enough. They issue iodine to each crew, teach them to use it correctly, and require it be used.

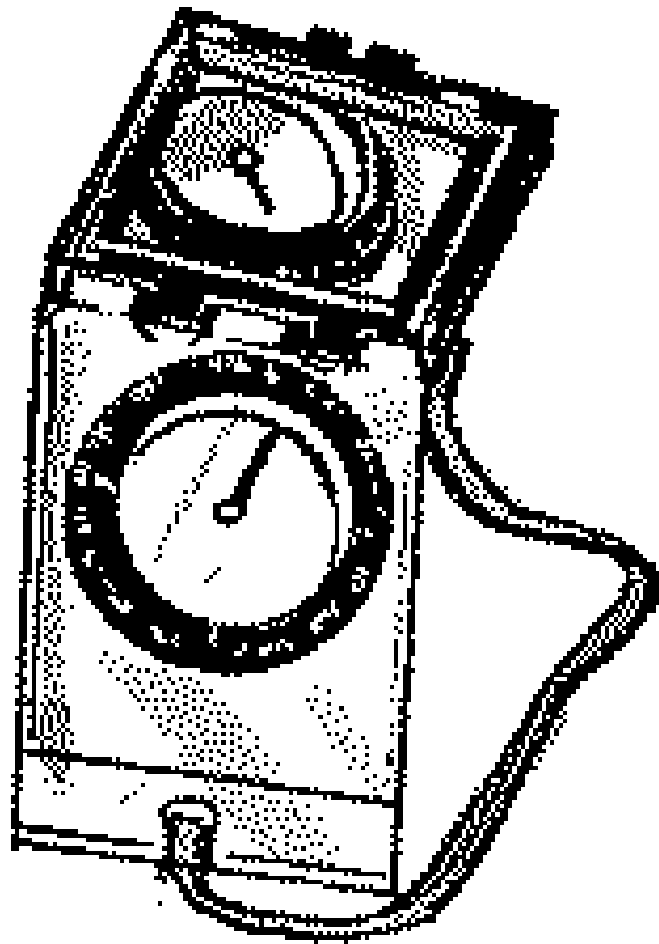


Nalgene one-liter, wide-mouth water bottles.



CamelBak Hydration System
(inserts into backpack as alternative to, or in addition to water bottles)

Orienteering & Navigation With Topographic Map, Compass & GPS



Orienteering & Navigation with Topographic Map, Compass & GPS

- ❖ USGS Topographical Maps
- ❖ 3-Dimensional Maps
- ❖ Compasses
- ❖ Orienting A Map
- ❖ Finding Your Location Using A Map and Compass
- ❖ GPS Global Positioning System
- ❖ Trilateration; Using Three Satellites to Compute Position (actually, four)

Orienteering & Navigation with Topographic Map, Compass & GPS

Daniel Boone once said he'd never been lost in his life, but he was "once a mite confused about where he was for several days."

If you are going to travel in the backcountry, you need to be able to read maps and to be able to determine where you are, where your objective is, and how you are going to get there (route finding).

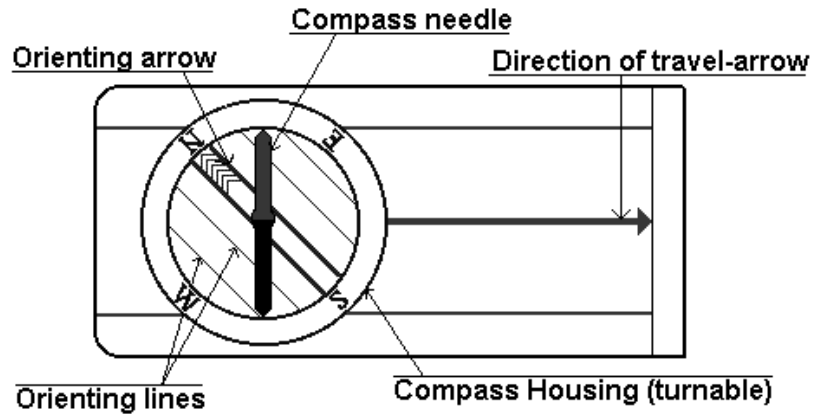
Maps: Topographic maps printed by the USGS and trail guides and recreational maps put out by park and forest service agencies are essential to backcountry navigation. Topographic maps show topography or land forms with contour lines, which represent constant elevations above sea level. Where contour lines are close together, the terrain is steeper; where they are farther apart, the terrain is flatter. Green represents vegetation, white, lack of vegetation. Blue represents water features: rivers, streams, lakes and marshes. Black represents manmade objects. Solid black lines depict paved roads, double dashed black lines represent dirt roads or "jeep trails". Single dashed black lines represent trails. With a little practice, terrain and prominent features are easily identified on the map and recognizable in the real world from the map.

Maps are generally oriented so that the top of the map is north.

Local trail guides and recreational maps have generally been updated more recently than topographic maps, so are more accurate in identifying current trails and roads.

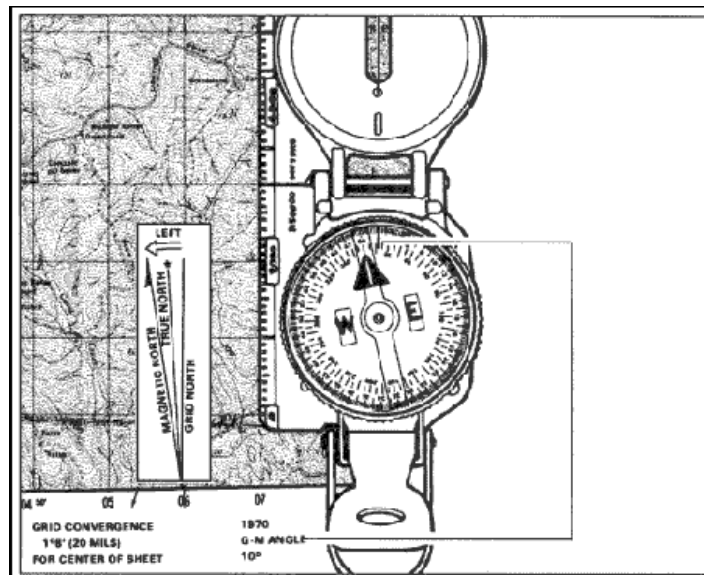
REI has a machine in most of their stores that allows you to print a very good quality "3-dimensional" topographic map of any area of the country of your choosing for about \$7.00 per map (well worth it).

Compass: A compass consists of a magnetized needle that revolves freely on a spindle enclosed in a case. Usually, the north end of the needle is red, and the south end is white. There is a rotating dial around the edge of the compass that is marked from 0 degrees to 360 degrees in a clockwise direction, with 0 and 360 representing north.



The Earth has a magnetic field consisting of flux lines traveling from the north magnetic pole to the south magnetic pole. The compass needle magnet will align itself with these lines of magnetic flux. The flux lines like to travel through objects of high permeability like iron or steel and therefore, the lines of flux in the neighborhood of steel will be locally distorted. The “north” needle on the compass, unless influenced by iron or other magnets, will point to the Earth’s magnetic north (about 15 degrees off of true north from Central California).

Orienting a Map: To use a map and compass correctly, you need to align the map with magnetic north, laying the compass on the map, and then turning the map until north on the compass (adjusted for magnetic north) and north on the map are the same.

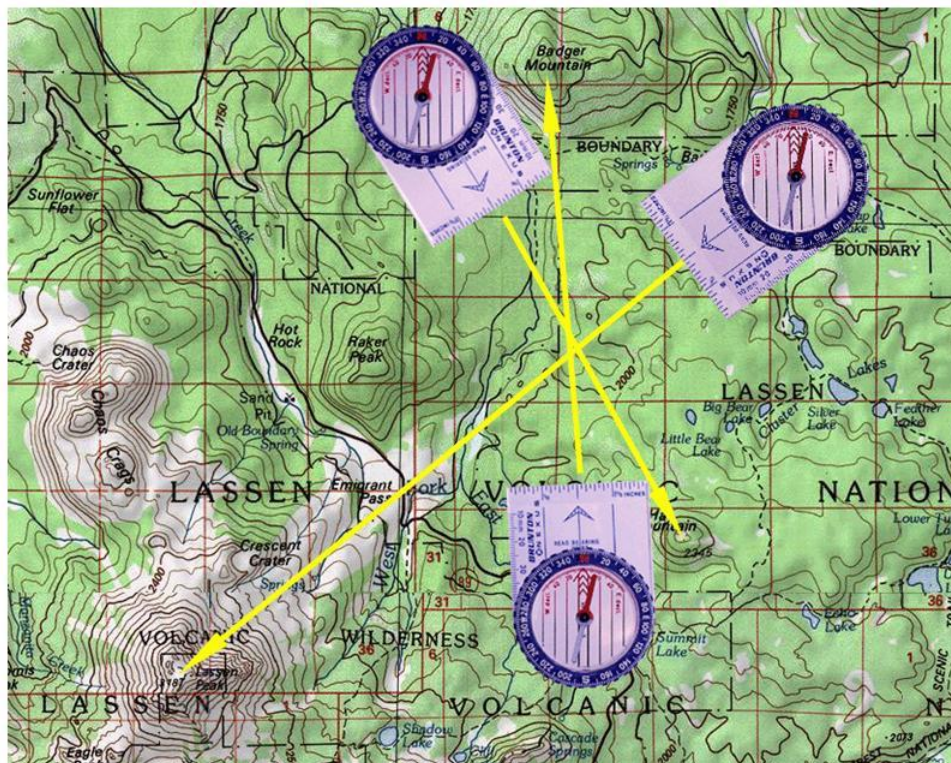


Once the map is aligned, find your location on the map, determine where you want to go, read the bearing in degrees with the compass on the map, then take a bearing of the same degrees sighting with the compass, identify a prominent object in the

distance at that bearing, and then using the prominent object as a reference point, hike toward it.

To find where you are, use prominent, easy to identify features that you can see and that are easy to find on the map, for example, the trail you are on, and two peaks. Site on each point and note their compass readings. One peak may be at 70 degrees, for example. Find that peak on the map, and take the opposite reading from that point. The opposite reading would be 70 degrees plus 180 degrees, or 250 degrees. A line drawn 250 degrees from the peak on the map should cross your position. If you do this from two prominent peaks, your position should be approximately where the two lines cross. If you are on a trail identified on the map, one sighting should suffice, as your position should be where the line drawn from the prominent point intersects the trail you are on.

Where Am I !



Global Positioning System (GPS)

The U.S. Department of Defense has placed twenty-seven satellites in orbit around the Earth. These satellites are precisely synchronized in time using atomic clocks. They transmit digital microwave (1.5GHz) signals containing their precise location P_0 and the exact time t_0 the message was sent. Small, handheld global positioning system (GPS) receivers can pick up the signals from these satellites and using their own clock to get the time t_1 that the signal was received, compute the distance d from the equation $d = ct$ where c is the speed of light and t is $t_1 - t_0$. This will give the user

his position within less than 15 meters. Differential GPS improves this to 3 to 5 meters and WAAS improves this to less than 3 meters. By getting the distance from multiple satellites, the GPS user can not only find his location but also precisely set the GPS unit's internal clock.



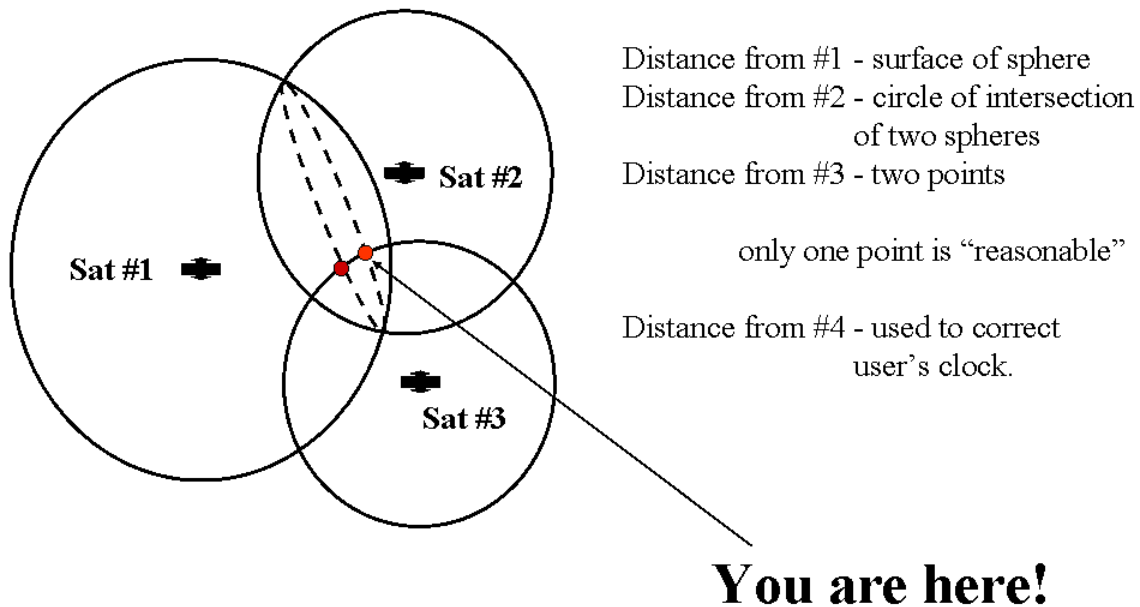
Garmin GPSmap 60CSx handheld

Trilateration Basics

A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location. This operation is based on a simple mathematical principle called **trilateration**. By determining the distance to three satellites, the GPS can pinpoint its location.

The distance r_1 from satellite one plus the satellite's position places the receiver somewhere on a sphere of radius r_1 from satellite #1. The distance r_2 from satellite number two further constrains the receiver's location to the circle of intersection of the two spheres. The distance from a third satellite intersects this circle with the third sphere giving two possible point locations. The GPS unit's electronics can usually eliminate one of these points as impossible. Additional satellites provide an error estimate that is used to fine tune the GPS unit's clock.

Trilateration



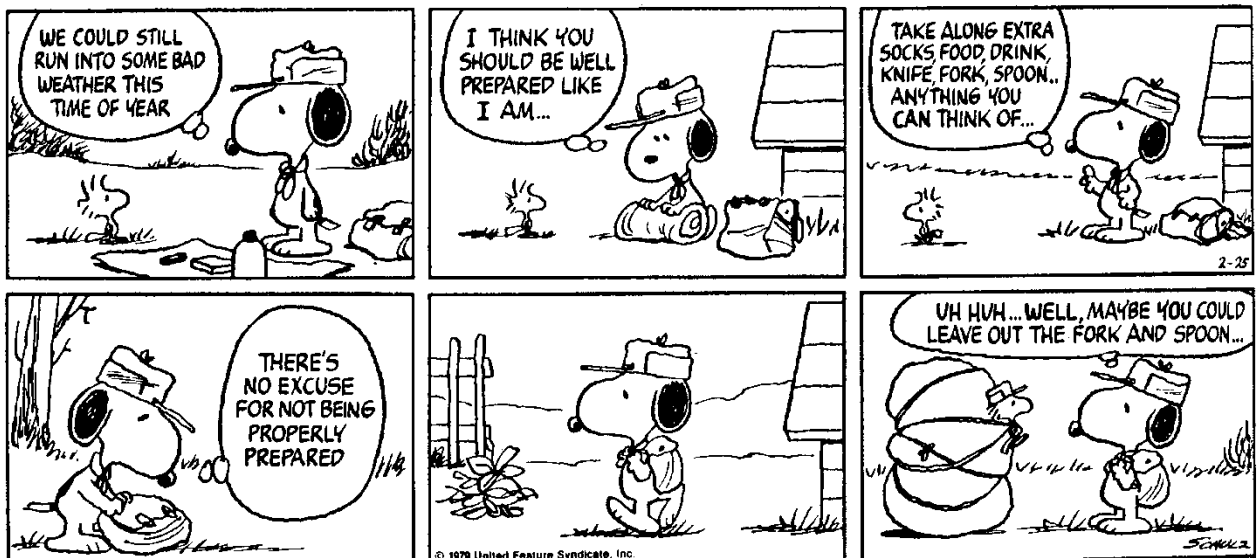
Each GPS comes with a set of instructions, which should be read carefully and practiced with, before using the GPS in a wilderness setting.

The GPS can be used to pinpoint your position on a map, and even to pre-plot your route on a map prior to embarking on a trek, identifying the coordinates of several points along the route on the map, then programming them into the GPS so that you can find these predetermined positions using the GPS as you travel.

The GPS is a relatively delicate instrument and it requires batteries, which can run down. It should not be relied on by itself, but rather, used in conjunction with a map and compass.

What and How to Pack for Snow Camping

When packing for snow camping, the goal, as with packing for summer camping, is to be sure you have everything you will need, but no more than that, and in the lightest means possible. Generally, you do not want to be carrying more than about 25% to 30% of your weight. If you weigh 100 pounds, your pack should weigh no more than 30 pounds. Our goal in winter camping is to stay warm and dry. To do this, we need to pack all the right stuff, and only the right stuff.

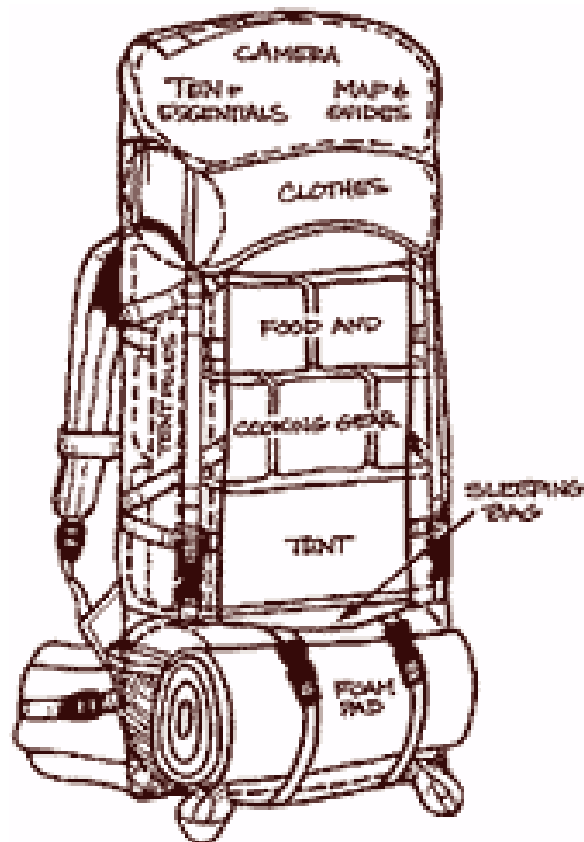


Winter Equipment Checklist

- Backpack
- Four-Season Tent (one for every two people)
- Ground cloth
- Ensolite Foam Pad or Thermarest Type Pad
- Insulated Sleeping Bag (Thinsulate, Holofil, or Foam)
- Sleeping Bag Liner (optional)
- Rain Poncho or Rain Suit - essential
- Spare Socks (Polyester liners and wool/polyester/nylon outer; one pair per day)
- Extra Set Polyester Long Underwear - essential
- One Extra Pair Wool or Polyester Fleece Trousers
- One Extra Wool or Polyester Fleece Shirt
- One Extra Wool or Polyester Fleece Sweater
- Extra Wool or Polyester Fleece Cap or Beanie
- Extra Pair of Wool, Thinsulate, or Polyester Gloves
- Backpacking Stove w fuel (one for every three people)
- Cooking Utensils
 - Metal Cook Kit w 2 Quart & 3 Quart Pot (one set for every three people)
 - Scouring pad
 - Biodegradable Soap
 - Cooking pliers
 - Small spatula
 - Small cooking spoon
 - Personal Eating bowl
 - Personal Cup
 - Personal Spoon
- Pocketknife - essential
- Two Quart Water Bottles with Water - essential
- Food Packed in Individual Food Bags
- Personal First Aid Kit - essential
 - Clean Wipes
 - Antiseptic
 - Small Pack Assorted Bandages
 - Mole Skin
 - Several 2" Gauze Pads
 - Several 4" Gauze Pads
 - 1 Roll 1" Roller Adhesive Tape
 - 1 Roll 2" Roller Adhesive Tape
- Matches - essential
- Fire Starter or Candles - essential
- Flashlight w Extra Batteries & Bulb - essential
- Watch
- Plastic Whistle - essential
- Personal Toilet Kit
 - Biodegradable Soap

- Toothbrush
 - Toothpaste
 - Comb or Brush
 - Metal or Vinyl Mirror
- Backpacking Towel
 - Compass & Map of Area - essential
 - Down or Fleece Booties with Rubberized Soles
 - Sunglasses and Ski Goggles
 - 50' 1/8" or 1/4" Nylon Cord
 - Trail Snacks – essential
 - Sunscreen and Lip Balm
 - 6 Extra Plastic Zip Bags and 6 Extra Heavy Duty Trash Bags
 - Toilet Paper (Be Prepared!)
 - Personal Sewing Kit
 - Camera with Film (optional)
 - Small Plastic Snow Shovel (optional)

This is a good illustration of how to pack your backpack.



What and How to Pack for Snow Camping

Backpacks

External and internal frame packs. There seems to be some confusion here about which style to choose. Here are some guidelines.

You should not be choosing between the two styles of packs. The sport in which you are participating should dictate which type to use (just like downhill or cross country skiing dictates which type of ski to use).

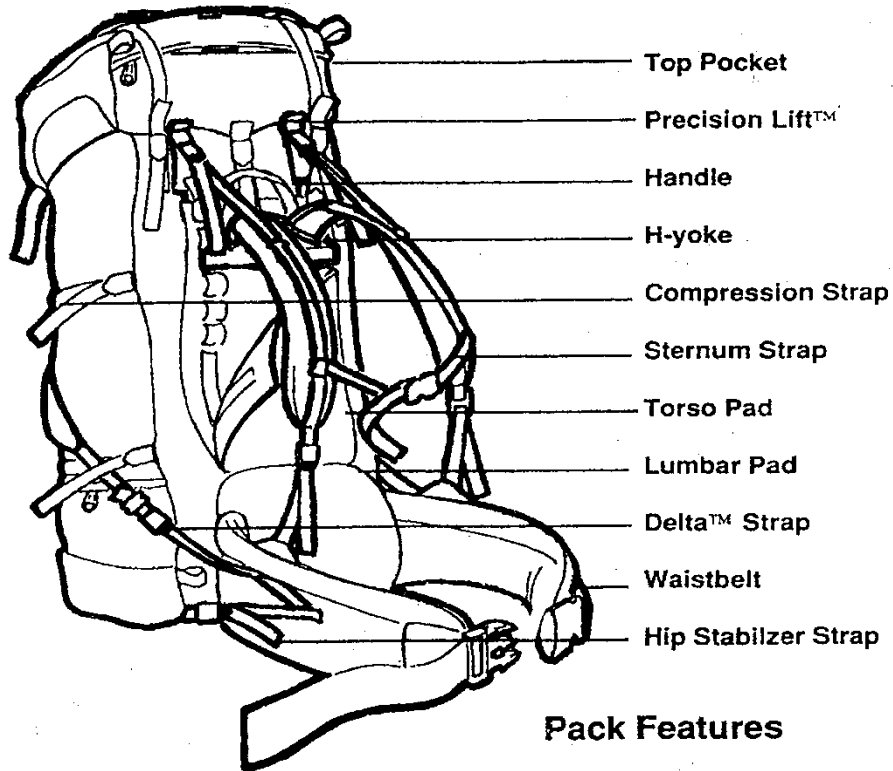
External frame packs are designed to carry weight on the hips. This weight is deliberately placed high so that the center of gravity of the pack is at least shoulder level. This high placement of the center of gravity minimizes the backward pull of the frame and allows the weight to be balanced on the pelvic girdle (which is a cone of bone – not muscle – and the strongest part of your body). This weight transfer is accomplished via the pack frame and an integral hip belt system. This external system is designed for hiking primarily on trails. The very thing that makes it so very efficient – the external frame itself – makes it less than ideal for other aspects of backpacking, namely climbing, steep off-trail work, or cross country skiing or snow shoeing.

If you need to lift your foot up 20+ inches to step up, raise your arms above your shoulders or have freedom to rotate your upper torso 90 degrees in either direction, then you need an internal frame style pack.

With an internal frame pack, the center of gravity is placed much lower for better control and balance. Because much of the weight is carried over the shoulders these packs have extensive adjustability in shoulder and hip area. This isn't as important in an external frame pack.

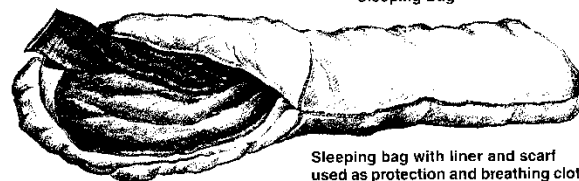
So there is no need to try and pick one style of pack over the other. They perform the same function but for totally different reasons. Don't be confused; let the particular sport you plan to engage in dictate which equipment you use.

INTERNAL FRAME SKI-BACKPACK



Sleeping Bags

Before you purchase a sleeping bag for cold weather camping, examine your needs and select one of the following categories. Then check the fills of bags in that category. Finally, check the construction features of the bags available.



Sleeping Bag Categories

The **camping bag** is designed to be carried in a car. It is usually designed more for comfort than for thermal efficiency. The bag is most often rectangular, heavy or bulky, and not easily compressed. It can be used in temperatures above 32 degrees Fahrenheit.

The **backpacking bag** is designed to fit in a backpack. This bag is usually a modified mummy bag, a thermally efficient shape. The fill is typically made of fibers that are compressible yet resilient. The bag should weigh less than 5 pounds and have a temperature comfort rating of 30 degrees Fahrenheit or lower.

The **winter expedition bag** should have a temperature comfort rating of 0 degrees Fahrenheit or lower. It must fit on a pack frame, and be of the highest quality due to the often life-threatening situations of its use. This bag will be heavier, perhaps six or seven pounds; to increase warmth we much increase weight.

Fills

There are many fills for sleeping bags, ranging from wool batts, to many types of polyester, to goose down. The fill has a great deal to do with the size and warmth of the bag. When investigating sleeping bags in a store, be sure to check on whether the fill will shift during use, making cold spots in the bag. The amount of loft is also important. It indicates the insulation factor.

What happens if our sleeping bag gets wet? If your bag is completely soaked, it will lose insulation and be wet for hours. A synthetic bag will lose about 10 percent of its warmth, gain 128 percent in weight, and take more than a day to dry. This becomes a major concern if you plan to use your bag in wet or humid conditions.

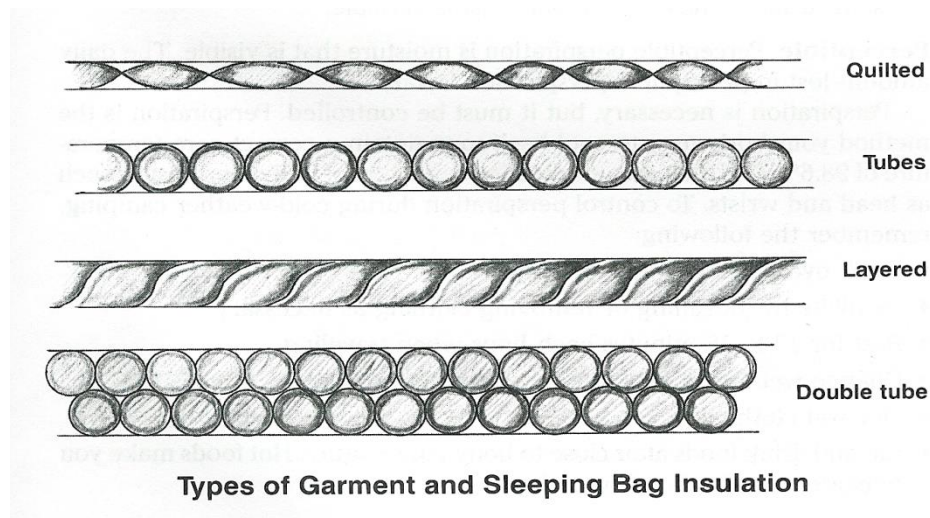
Carry your bag in a waterproof sack and sleep in a waterproof tent to minimize wetness problems.

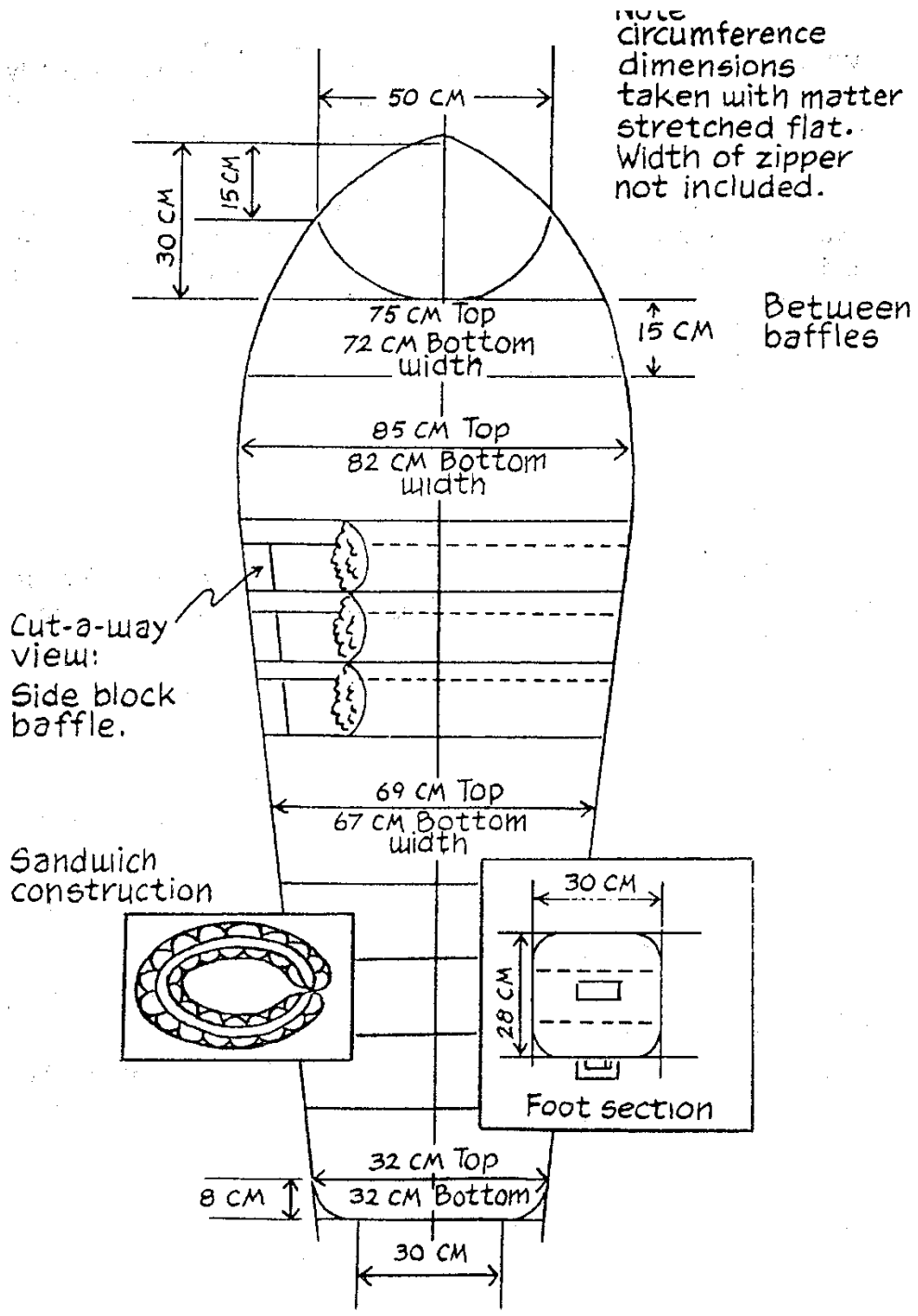
Construction

Check out the construction of the bags. The interior construction is hard to check except by asking questions at the store. External construction is easier to examine. Here are a few things to check for:

- Start with the stitching. If you can snag it with your fingernails, it's suspect.
- The shell should be of a fabric that does not allow the insulation to filter through. Uncoated fabrics are best so that body moisture can easily pass through.
- Turn the bags inside out to see how they are finished. In better bags, inside seams are stitched to seal fabric edges.

- Check the diameter and length of the draft tube. It should be longer and larger than the zipper it is covering.
- Check for zipper stiffener, a webbing strip running the length of the zipper to prevent snagging.
- Take off your shoes and climb into the bag. It should be cut generously enough to allow elbows, shoulders, knees, and feet to move without compressing the loft. Though you need to move, you don't want too much room. Excess room increases air flow and reduces the bag's thermal efficiency.
- Draw the hood closed to make sure that the air hole is near your mouth.



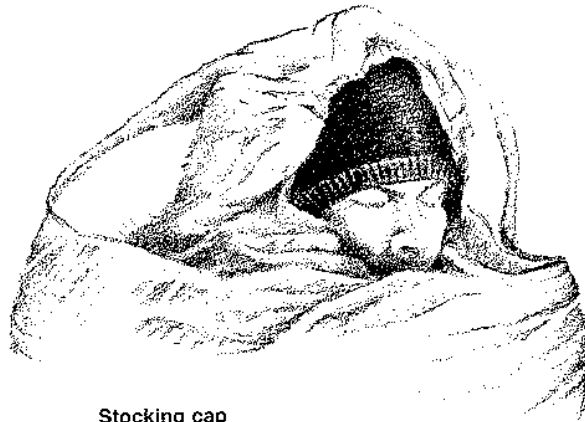


MUMMY BAG

The Rating System

Good sleeping bag manufacturers list a comfort rating on each bag. These will range from a summertime temperature to an Arctic condition. Pick the bag that has a comfort rating comparable to the coldest temperature in which you will be sleeping.

You should be comfortable sleeping outside at the bag's minimum temperature. But, you may have to partially unzip a bag or wear an extra sweater if conditions are different from those specified.



Stocking cap

Do You Have Trouble Keeping Warm?

Your body metabolism affects how warm or cold you are when you sleep. Physically fit people and those with more muscle tend to sleep warmer, but anyone can improve their comfort and warmth while sleeping by remembering the following tips:

1. Sleep on a pad. Sleeping pads provide insulation and comfort. Air mattresses, while soft and comfortable, offer virtually no insulation.
2. Drink plenty of water, even in cold weather. Dehydration from lack of liquids results in poor circulation to the extremities, causing them to become cold or even to freeze.
3. Eat before you go to bed. Hot foods are especially helpful.
4. Go to bed warm. Exercise to raise your body heat before sleeping.
5. Wear a sock hat or fleece hat to bed to control heat loss from the head and neck area.

6. Wear dry clothing for sleeping, and the more the better, up to the point where you're constricted. Waterproof clothing adds lots of warmth, but will cause some condensation of perspiration.
7. Use tents, shelters, or sleeping bag covers to get out of the wind. Wind reduces the insulation effectiveness of sleeping bags just as it does with clothing.
8. Place a bottle of hot water in your bag.
9. Sleep close to another person.
10. Sleep on your side in a fetal position, with extra clothing under your shoulder and hip.
11. Buy a warmer bag than you think you will need.

Keep your sleeping bag dry. While a synthetic bag only loses about 10% of its insulation ability if it gets wet, a down bag loses most of its ability to insulate (keep you warm). Sleeping bags become wet from outside moisture, from sweating on the inside of the bag, and from water vapor escaping from the mouth or nose into the bag.

To keep outside moisture from wetting the bag, place protective insulating material, such as a closed-cell foam pad, or a Therm-a-rest type sleeping pad (insulated air mattress) under it. Better still, use two closed-cell pads together, or one closed-cell foam pad and a Therm-a-rest type pad together.

Avoid sweating by wearing the least amount of clothing necessary inside the bag to keep warm and by using the proper sleeping bag for temperature conditions.

Try not to breath into the bag; if you do, moisture will collect and wet the bag or form ice crystals. If your face gets too cold, cover it with a towel or muffler.

When not in use, open the bag wide so that fresh air can get into it. Turn it inside out and hang it over the top of the tent, or on bushes or low hanging tree branches so that sun and wind can help dry it. Always shake the bag out and fluff it up when arising.

Here are two tips that will help you keep warm in your sleeping bag and let you get a good sleep:

- Eat a little something just before you crawl into the bag. This can be a candy bar, energy or power bar, energy drink, hot chocolate, etc. This gives your body a little energy and lets you sleep warmer.

- Always relieve yourself just before you go to bed. The act of getting out of a warm sleeping bag in the middle of the night to go outside can be **a chilling experience!**

Care and Cleaning

Synthetic sleeping bags insulated with polyester fill can be hand or machine-washed. A mild soap works well. Always rinse thoroughly; never use detergents or dry clean a synthetic-filled sleeping bag.

Use only the oversize, commercial, rotating drum washer; do not use a domestic, top-loading agitator. Use warm or cold water.

When drying a synthetic bag, use the lowest possible heat setting. Better still, line dry—it only takes 24 hours to dry most synthetic bags at room temperature.

Down sleeping bags should be hand washed. A mild soap will suffice. Use only the detergents designed for down bags, typically sold at backpacking shops. Other detergents will wash out the oils and destroy loft.

A down bag can be washed in a sink or bathtub using warm water. Hand washing will not remove stubborn stains, but the final result will be a clean bag with a surprising amount of loft. You may wish to soak heavily soiled items for several hours.

Gentle squeezing is all the agitation required; more rigorous action may cause seams to rip because down absorbs a great deal of water and becomes much heavier. Drain the water from the tub, pressing gently on the bag to remove excess water. Refill the tub with fresh water and agitate gently. After a thorough rinsing with at least three water changes, gently squeeze out as much water as possible.

Hang bag to air dry, remembering to support it evenly. After two to four days, the bag can be machine dried. Sleeping bags should not be dried in household dryers; only a large, commercial dryer has enough room. Use low heat and toss in a clean pair of tennis shoes; these help break up clumps of matted down.

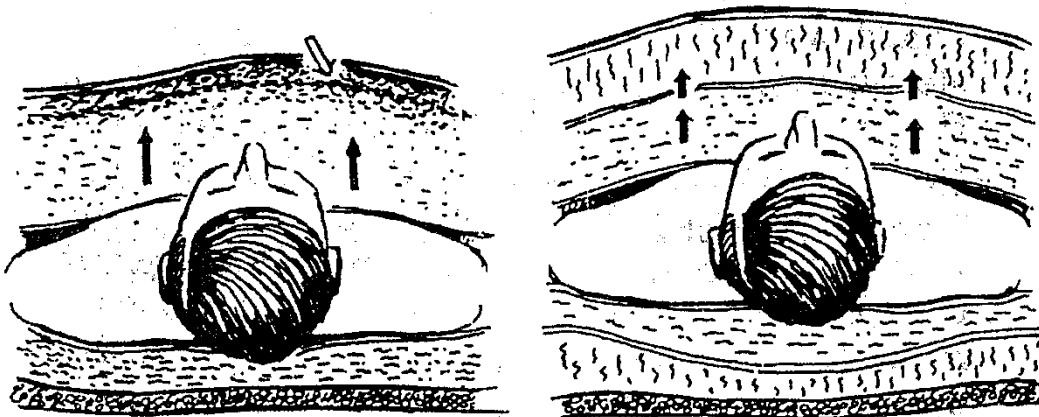
Down bags can be dry cleaned, but it is imperative that the cleaning fluid used is Stoddard's solvent. Conventional dry cleaning fluids will remove the oil from the down and destroy the loft.

You don't need to clean your down bag often. Try to keep your bag clean in the first place and wash it only when the loft has noticeably decreased, or when it is noticeably soiled or sweaty.

Storing Your Bag

In order to receive the best performance from your sleeping bag, it is essential that it be stored properly. A bag that is stored compressed (in a stuff sack) will lose its loft and its insulating ability. All fibers have a "memory." If the fiber is compressed for a long period of time it will "set" and remain compressed when released. To prevent this, all bags, synthetic or down, need to be stored in large storage bags or hung up by the foot. The more the bag is allowed to loft, the better it will serve you.

Controlling Moisture in Sleeping Bags



Frost forms when moisture hits the freezing point. A double bag passes moisture more efficiently. Frost will usually form between layers—not inside insulation as with the single bag.

Sleeping Pads

There are really only two types to use in winter camping: closed cell foam pads, such as the Ensolite pad, and insulated, self-inflating pads, such as the Therm-a-Rest. Closed cell foam pads insulate from the cold ground or snow, but do not absorb water. Insulated, self-inflating pads are soft and comfortable, and because of the insulation, the air inside the pad does not conduct heat away from your body.

Do not use open-cell pads, as they absorb water.

Do not use air mattresses, as the air in them conducts heat away from your body.

Ground Cloths

There are many possibilities. They need to be waterproof. They need to be lightweight. They should not be too bulky; they need to be easy to pack. If they have grommets in the corners for tying them down, that is a plus.

The “space blankets”, which are a brightly colored plastic on one side (typically colored red or orange, with the reflective aluminum Mylar on the other side work particularly well. Place them over the pad, under the sleeping bag, aluminum side facing up to reflect as much body heat back at you as possible.

Do not wrap the waterproof ground cloth over the top of yourself, or it will catch all of the water vapor coming off of you, condense it into water, and drip it back on you all night, resulting in a wet, and therefore less efficient, sleeping bag!

Packing Gear in Plastic Bags Inside Your Pack

Keeping dry is an essential part of staying warm in winter camping. Snow and rain seem to find their way into packs. When you change out of wet clothes and pack them, their moisture gets into everything. And there is always the danger of falling into a stream with your pack on. Pack individual pieces of clothing into zip-lock baggies, and even wrapping your sleeping bag in large trash bags helps prevent items in the pack from getting wet, or if already wet, from contaminating other clothing. As with staying warm, it is far easier to keep articles of clothing dry, then to dry it once it gets wet!

Extra Clothing

Extra dry clothes to change into if you get wet are essential. Clean clothes insulate better than dirty clothing. It is the air-pockets in the clothing that insulate; dirt and oils cause the material to compress, reducing its insulating ability. Carry extra polyester sock liners and nylon-wool-polyester outer socks for each day of your outing, up to three sets; extra polyester underwear for each day of the outing, up to three pair, one extra set of polyester long underwear, extra fleece sweater, extra pair fleece pants.

Rain Suit or Poncho

Heavy rains and snows will eventually get through your water repellent clothing; through the seams, zippers, around the neckline, and so on. A rain suit or poncho can add another waterproof layer to help keep water out. The rain suit is more stream-lined, stays close to the body, and is less likely to catch on branches, but catches more moisture coming off of the body and condenses, creating moisture inside the rain suit. Ponchos are looser and catch less body moisture, but blow up in the wind and catch on branches and other objects.

Backpacking Stove with Fuel

Small backpacking stove; one for every two to four campers; lightweight, versatility; white gas or propane/butane up to 6-8,000 feet; white gas above 8,000 feet. Propane/butane burns less hot at high altitudes.

Cooking Utensils

One to three nesting pots sized to fit well on the backpacking stove. One-pot meals are simplest and allow carrying just one pot, saving weight.

Pocket Knife

A small to medium size folding knife with several blades and tools to serve a variety of functions.

Two Quarts of Drinking Water

Water bottles or hydration system (Camelback, for example).

Personal First Aid Kit

- Band-aids
- Antiseptic
- 2-2" Sterile Compresses
- 2-4" Sterile Compresses
- 2 Triangular Bandages
- 1" Adhesive Roller Tape
- 1" Roller Gauze
- Mole Skin
- Scissors

Matches, Fire Starter

Strike-anywhere matches in waterproof container, fire starters (fire bugs, candles), Bic lighter.

Flashlight or Headlamp With Extra Batteries, Bulbs

Small flashlight or headlamp with extra batteries and bulb. Headlamp is more versatile, allowing hands to remain free for tasks other than holding flashlight.

Personal Toiletries Kit

- Toothbrush
- Toothpaste
- Comb or Brush
- Waterless Soap
- Clean wipes
- Tweezers

GPS, Map, Compass

GPS, topographic map of area camping in, compass

Six Extra 30 Gallon Trash Bags

Trash bags for packing dry gear in (sleeping bag, for example), or to keep wet gear in to keep it separated from the rest of the gear, to make waterproof leggings, kilts, vests, pack covers, etc.

Toilet Paper

Because bears aren't the only ones! Preferably bio-degradable.

Small Plastic Shovel or Snow Shovel

For digging snow shelters, kitchens, digging out tents and gear after it snows, digging out your vehicle after you get back to the parking lot.

Snow Camping Backpack List

Note: Every item must be in plastic sandwich bags (or equivalent inside the pack along with your name on everything).

Every scout must have:

- Snowshoes
- Pack
- Sleeping Bag (in waterproof bag)
Note: you may want to bring two sleeping bags or a sleeping bag liner. It will help you keep warm. Temperatures at night may get as cold as 0 degrees F.
- Sleeping Pad (closed-cell foam)
- Plastic for under sleeping pad
- Scout handbook (and blue cards for merit badges)

Clothes: (make sure these are in waterproof bags). This list will allow you to dress in layers.

- Pants (wool pants are best)
 - Shirt (long sleeve, wool preferable)
 - Long underwear
 - Sweatshirt or extra wool shirt
 - Water/wind proof coat (warn snow type coat)
 - Water/wind proof pants (like ski pants)
 - Hat warm (beanie type, full face mask preferred)
 - Mittens (2 pair), waterproof
 - Socks (3 pair), wool is best
 - Snow/cold weather boots (gaitors are optional and a good idea)
 - A complete change of clothes
-
- Goggles or sunglasses
 - Suntan lotion (SPF 15 or higher)
 - Chapstick or lip protection
 - Flashlight
 - Emergency food (does not require cooking)
 - Snacks (equivalent to 2-large candy bars per day)
 - Mess kit (utensils and drinking cup)
 - Canteen or water bottle that can be held insulated from freezing
 - Poncho
 - Rope
 - Knife
 - First aid kit
 - Compass
 - Matches (in waterproof container)
 - Plastic garbage bag (to cover the backpack and for trash)

Personal Care Items:

- Toilet paper (small amount)
- Toothbrush and toothpaste
- Soap and washcloth (small hand towel)

Every Patrol Must Have:

- Tent(s) and Fly (must have enough space for all patrol members)
- Plastic to go under tent(s)
- Stoves(s)
- Fuel (bring extra fuel as heating water and melting snow takes quite a bit)
Note: white gas stoves and fuel are best for high altitude and cold conditions
- Pots for cooking (and heating water) Make sure the pots are consistent with the meals you planned.
- Pot scrubber and soap
- Food
- Plastic garbage (small)

Optional Items

- Sled
- Shovel

Traveling On Snow Skis and Snowshoes



Traveling On Snow

Skis and Snowshoes

Snow tends to be soft, enveloping, and wet. Walking in snow more than a few inches deep can become tiring quickly, and your feet slogging through the snow, no matter how well your foot gear has been chosen get wet. The constant force of the snow against your footgear with each step drives the moisture into any opening it can find, and even through the microscopic pores of miracle fabrics such as Gore-tex. Even with good insulation, your feet can become frozen through this constant contact with the freezing snow. You quickly become fatigued, sweaty, over-heated, and your feet cold and wet.

Skis and snowshoes keep your feet on top of the snow and allow you to travel at a pretty good speed even in deep snow. Early trappers and mountain men actually ran many miles in their snowshoes as they checked their trap systems and hunted. Cross-country skis allow you to travel several miles per hour even on the flats using the kick-glide technique, and on the downhill, you can let gravity take over.

Snowshoes

There are several styles of snowshoes, each designed to accommodate certain conditions and terrain. Generally, they all are variations of an elongated oval. Early versions have a frame of ash, hickory, elm or other straight grain, pliable wood, cross bars for strength and support, and lacing or membrane to spread your body weight out over a broad swath of snow and still provide traction in the snow.

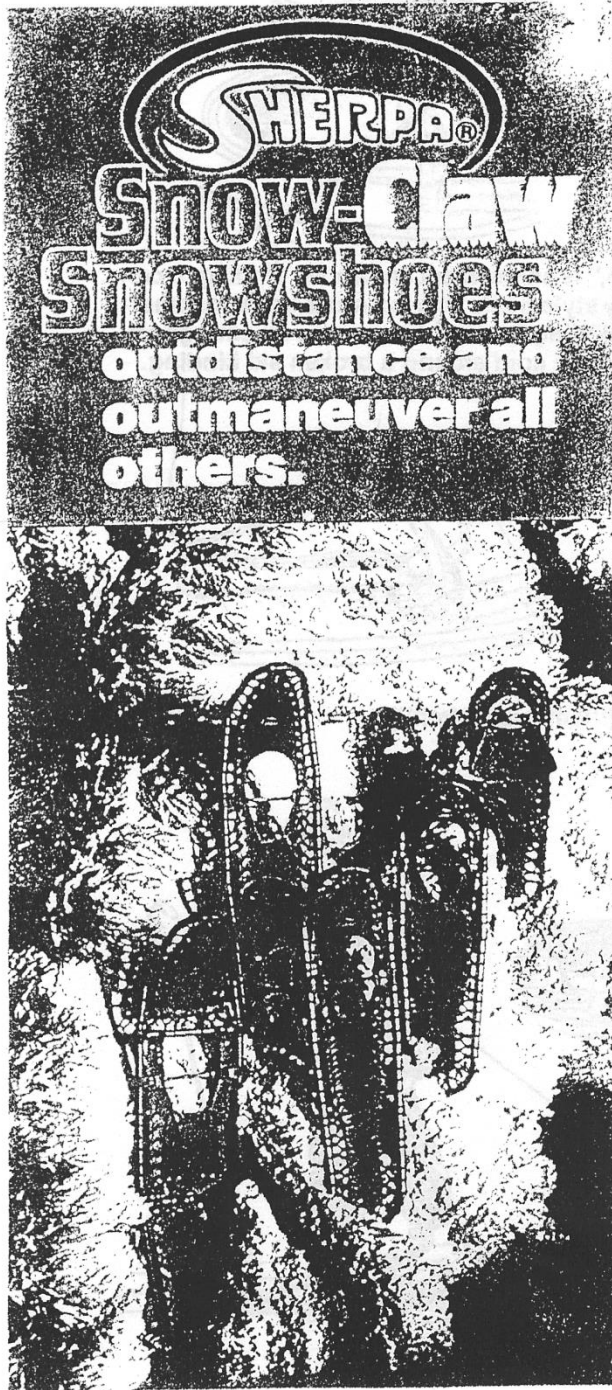
The foot is held in place by a binding that allows the foot to swivel up and down, rotating on the ball of the foot. There is a hole under the front of the foot that allows the toes to dip down through the lacing as the heel comes up, and then rise back up as the heel comes down.

Typically, the front is curved up so that the tip will not catch in the snow. Often there is a tail in the back that acts as a rudder, keeping the snowshoes tracking straight, especially when moving fast on relatively flat terrain.

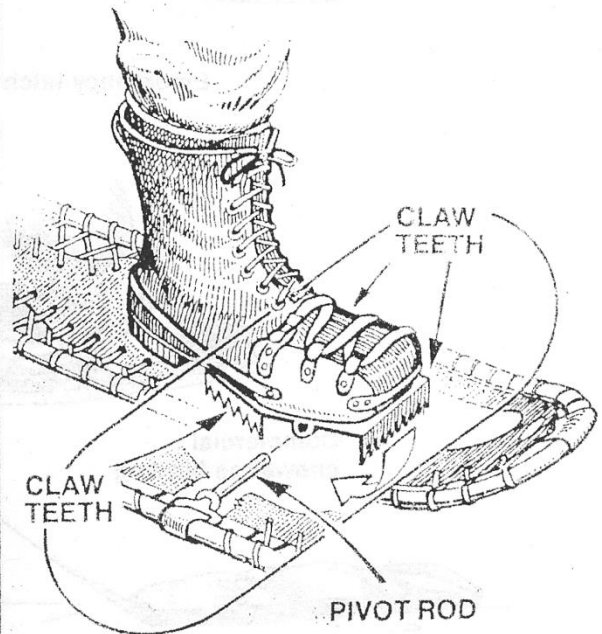
Often, especially with snowshoes made with membrane, which tend to have a smooth surface and therefore don't provide as much traction, there is a cleat or "claw" that the foot is bound to and that swivels with the foot, which digs into the snow and ice providing greater traction. This is especially helpful on hard packed snow and ice and when going up and down hill.

The trail or trapper is very long, up to six feet long, narrow, and with a long tail. It is well designed for traveling long distances on relatively flat terrain. The Maine or Michigan is a slightly shorter, slightly wider version. The slightly shorter, slightly wider

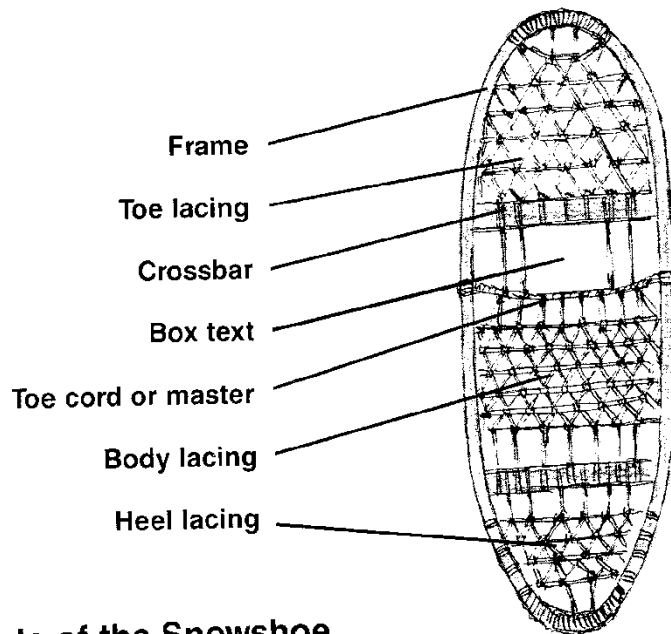
dimensions allow greater flexibility on slightly more varied terrain. The Green Mountain Bear Paw and the Bear Paw are wider and shorter, with no tail. These versions are much more flexible for use on varied terrain and moving in and out of trees and around rocks. The Green Mountain Bear Paw is probably the best all-around snowshoe.



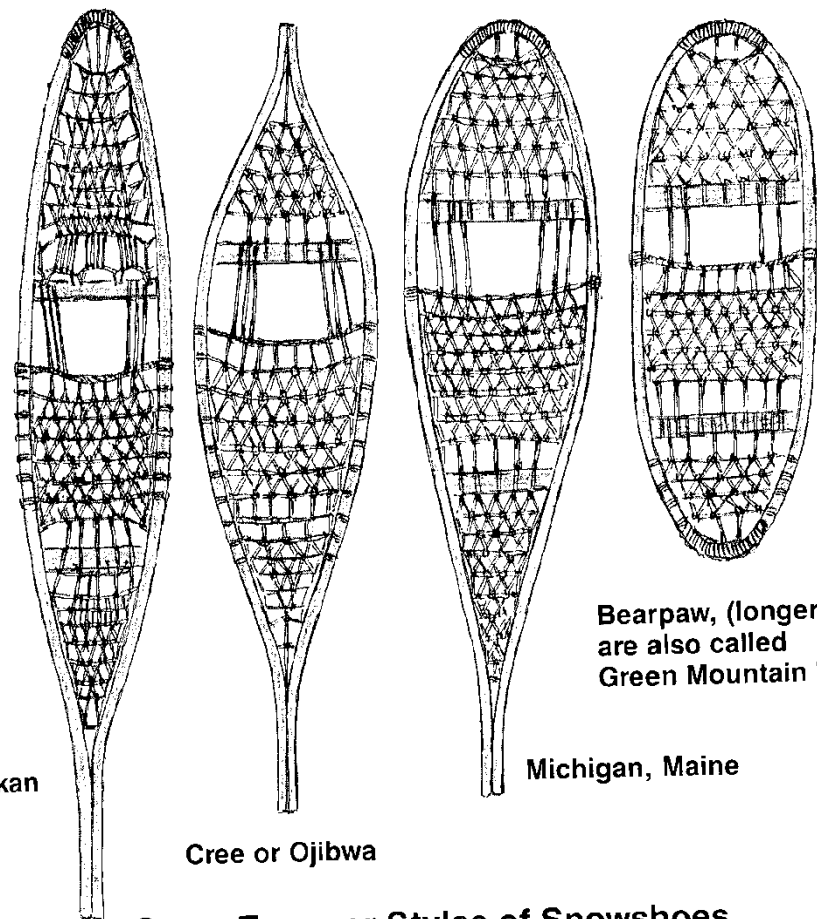
SHERPA
the advanced
snowshoe
with the
“pivot rod”
and
“rotary claw”



Patent No. 3,802,100



Parts of the Snowshoe



**Trail, Alaskan
Pickerel**

Cree or Ojibwa

Michigan, Maine

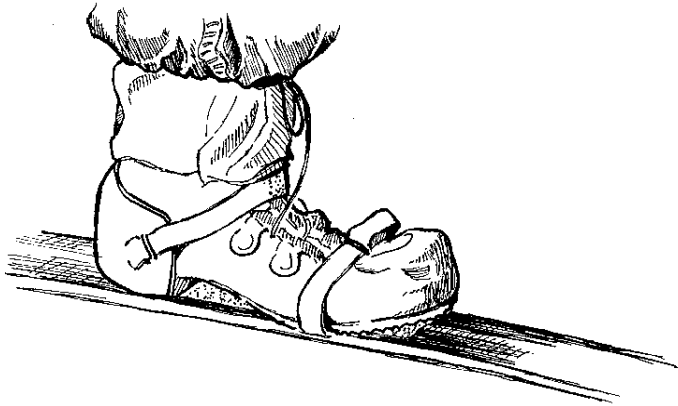
**Bearpaw, (longer types
are also called
Green Mountain Bearpaws)**

Some Types or Styles of Snowshoes

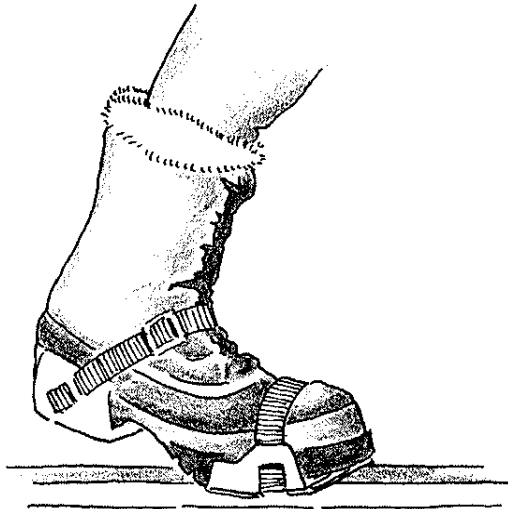
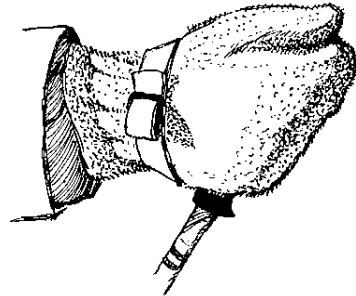
Boots to Wear With Snowshoes

Sorel or L.L. Bean type winter boots with leather uppers and rubber lowers vulcanized to rubber soles are one of the best choices for snow shoeing. These provide good protection from the elements, protection from snow and water, insulation to keep out the cold, they are flexible for walking and running, and they are relatively lightweight.

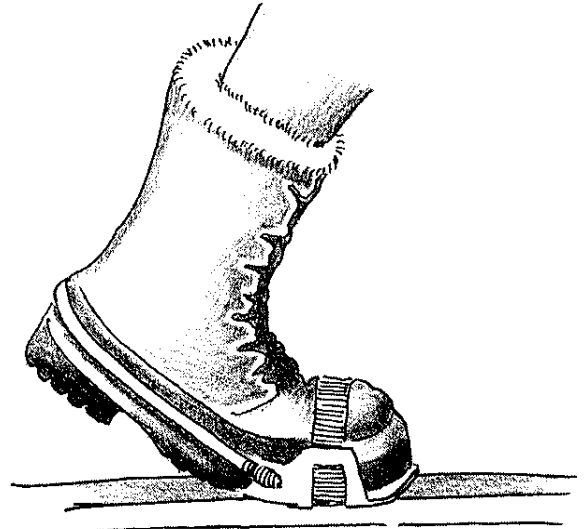
**Snowshoe and
ski binding**



**Ski pole
grip**



**Berwin-style cross
country ski binding with
heel cup**



**Berwin-style cross
country ski binding with
bungee-cord heel strap**

Ski Poles with Snow Shoes

Snow shoeing can be awkward, even with practice. Hiking up slope, going from slush in the sunlight to ice in the shade of a tree, suddenly sinking into an unexpected soft spot, all with a 30 or 40 pound pack on your back can be upsetting – literally! Hiking with a pair of ski poles with fairly large baskets at the end (the round piece that keeps the pole from simply sinking all the way up to your wrist when you put weight on it) can help keep you upright.

Cross-country and Mountaineering Skis

Cross-country skis or Nordic skis and mountaineering skis offer a faster and more exciting alternative to snowshoes. Traditional cross-country skis, sometimes called “skinny skis”, are designed for ski touring primarily on relatively level ground. Light weight, they offer hikers and joggers a chance to continue their exercise in winter on snow. The bindings are designed to leave the heel free so that the foot can bend while snowshoeing. Using the kick-glide technique, even beginners can soon find themselves gliding along the trail at up to several hours per hour.



Telemarking and mountaineering skis are shorter and wider than cross-country skis, providing more stability and control when carrying backpacks and when climbing, turning, and skiing down hill. These typically have bindings that allow the heel to remain free when traveling along level ground or up hill, but which can be locked down when skiing down hill. They also often have steel edges to cut into the snow and ice more while making turns, providing more control. Generally, mountaineering skis are

lighter than downhill skis or Alpine skis though some of the lighter downhill skis can make nice mountaineering skis with the right bindings. All skis have a slight hourglass shape. That is, the front or shovel of the ski and the back or tail of the ski is wider than the middles of the ski. The greater this hourglass shape is emphasized, the easier it is to carve turns and maneuver over varied terrain.



A binding adapter allows the heel to release for hiking and climbing uphill, while allowing it to be locked down for downhill skiing.



Typical alpine skis adapted to backcountry use.

Skins

“Skins” are available to assist when climbing up hill. Originally these were strips or sleeves of beaver or muskrat fur that slipped over the ski. With the hair laying flat and pointing toward the back of the ski, the ski would slide forward easily, but would not slip back because of the fur on the skins digging in. Modern skins are often made of special fabrics. Some waxless mountaineering skis have a fish scale pattern on the bottom, allowing them to slide forward easily, but keeping them from sliding backward without the use of skins.

Winter Footwear

Winter footwear needs to insulate against the cold, be water-resistant, supportive of the ankle, and provide good traction on wet and icy surfaces.

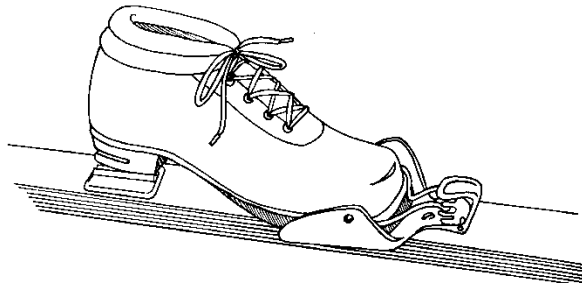
Modern boots are much better than they used to be, with many more alternatives to choose from.

For snowshoeing, you don't necessarily need specialized boots at all. Summer hiking boots can work. Wear sock liners, plastic bags to act as thermal barriers, heavy duty trekking socks made of a combination of wool and synthetics, and thoroughly

waterproof the outsides of your boots using a silicone spray or boot oil or wax made for this purpose.

Cross-country Ski Boots

Unlike downhill or Alpine ski boots, which do not need to be walked in very much, and therefore are extremely stiff to protect the ankles from sprains, cross-country and mountaineering skis are more flexible, particularly at the ankle. Most boots are designed to fit a specific binding system. Light touring boots are usually ankle-high, very flexible, and more comfortable than Alpine and mountaineering boots. Mountaineering boots are heavier, stiffer, and more insulated. They are a compromise between offering some of the added protection of a downhill ski boot and the flexibility and comfort of a Nordic ski boot that you will be “walking” in for many miles. Mountaineering boots are typically made of heavy leather, a combination of leather and synthetic fabric panels, or hard plastic with inner insulation.



Cross-country Ski Boots
(Illustration)

For hiking and snowshoeing, Sorel-type boots, with insulating liners, rubber lowers and leather or nylon uppers work well.

Winter Snow Boots



Sorel - Bear II (Black)

For really cold conditions, boots should have a soft outer shell and a versatile lacing system so that you can wear long socks under them. A thick insulated sole is also necessary so that you don't lose heat through the ground. Minimal seams help keep water out. Liners should be waterproof and breathable.

Winter Hiking Boots



Merrell® Rhinohide Waterproof Hiker

Mountaineering boots, made out of full-grain leather or waterproof materials like Gore-Tex and polypropylene, with waterproof/breathable liners and specifically designed for cold weather, can provide traction, support, warmth, and protection from moisture that no regular backpacking boot can provide.

Mountaineering Boots



The Salomon Pro Rock

Single leather mountaineering boots are generally easier to walk in than double plastic boots, but not as warm.

Double plastic mountaineering boots are lighter and warmer, and more rigid for better support when kicking in steps in steep snow and ice warmer, but not as comfortable for long, full-stride hiking. And they tend to be expensive.

Plastic Mountaineering Boots

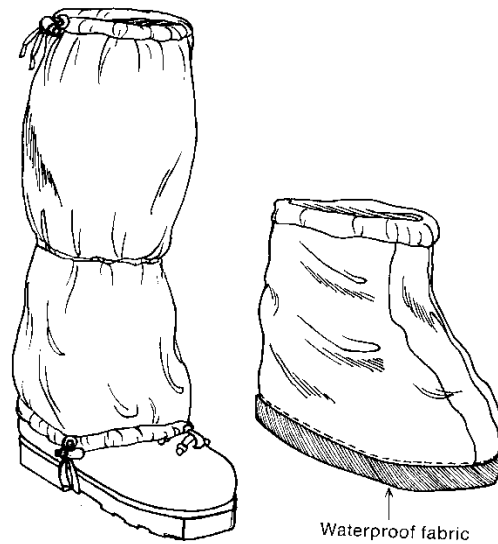


Scarpa Vega Mountain Double Boots

Gaiters

Another item you should seriously consider are gaiters. Gaiters fasten to the bottom of your boots, cover the top of your boots, and go halfway up your calves. They keep snow from getting into the top of your boots and they help keep your ankles and lower legs dry and warm, providing an extra layer of insulation.

Gaiters are cloth covers, usually nylon, which wrap around the ankle and lower portion of the leg, sealing the area between the boot and the pants leg. They provide extra protection against water, snow and other dirt getting inside the boot over the cuff.



Gaiter and overboot

Ski Poles

As with snow shoes, staying upright on two skinny boards with a heavy backpack conspiring with gravity to make you horizontal can be challenging. A quick stab with a ski pole can help stabilize you and keep you upright. A push backward on both poles can be used to propel you forward. When skiing down hill, a quick stab with a pole at the start of a turn can help define the turn and set your body position and weight shift correctly for the turn. As with the poles used with snow shoes, a larger basket at the end of the ski pole will work better in softer, deeper snow.

Trekking Poles

Trekking poles are ski poles with interchangeable and removable baskets. They can be used for downhill, cross-country, winter mountaineering, depending on the size basket you put on, and without any basket, for summer treks. Sectional poles are adjustable in height, and can be joined together to create an avalanche probe (hopefully, you will never need one).



Two-section trekking pole

Making Your Own Snowshoes

Following are several methods for making your own snowshoes.

BEAR PAW SNOWSHOES

MONTAGNALS INDIAN TYPE

BY BEN HUNT

Bear-paw snowshoes are fine for rough and wooded country. They are light in weight and are easily carried on a pack when they are not being worn.

STRAPPED TO A PACK

Cut a straight hickory, ash or elm sapling $3\frac{1}{2}$ inches at the butt end and at least 7 feet long.

← Rip it through the center and trim it down to size, using a drawknife for roughing and a spokeshave for trimming.

→

Bend them around the form before they dry out
Green wood bends nicely

ROUND PIECES OF LOG, NAILED TO PLANKS

SPOKESHAVE $9\frac{1}{2}$ "

$5\frac{1}{2}$ " D

$10\frac{1}{4}$ " D

BLOCKS HOLDING ENDS

BLOCK TO PREVENT SPLINTERING.

FORM can be made like this →

← or it can be sawed out of a 2" plank like this

• ORDER OF OPERATIONS •

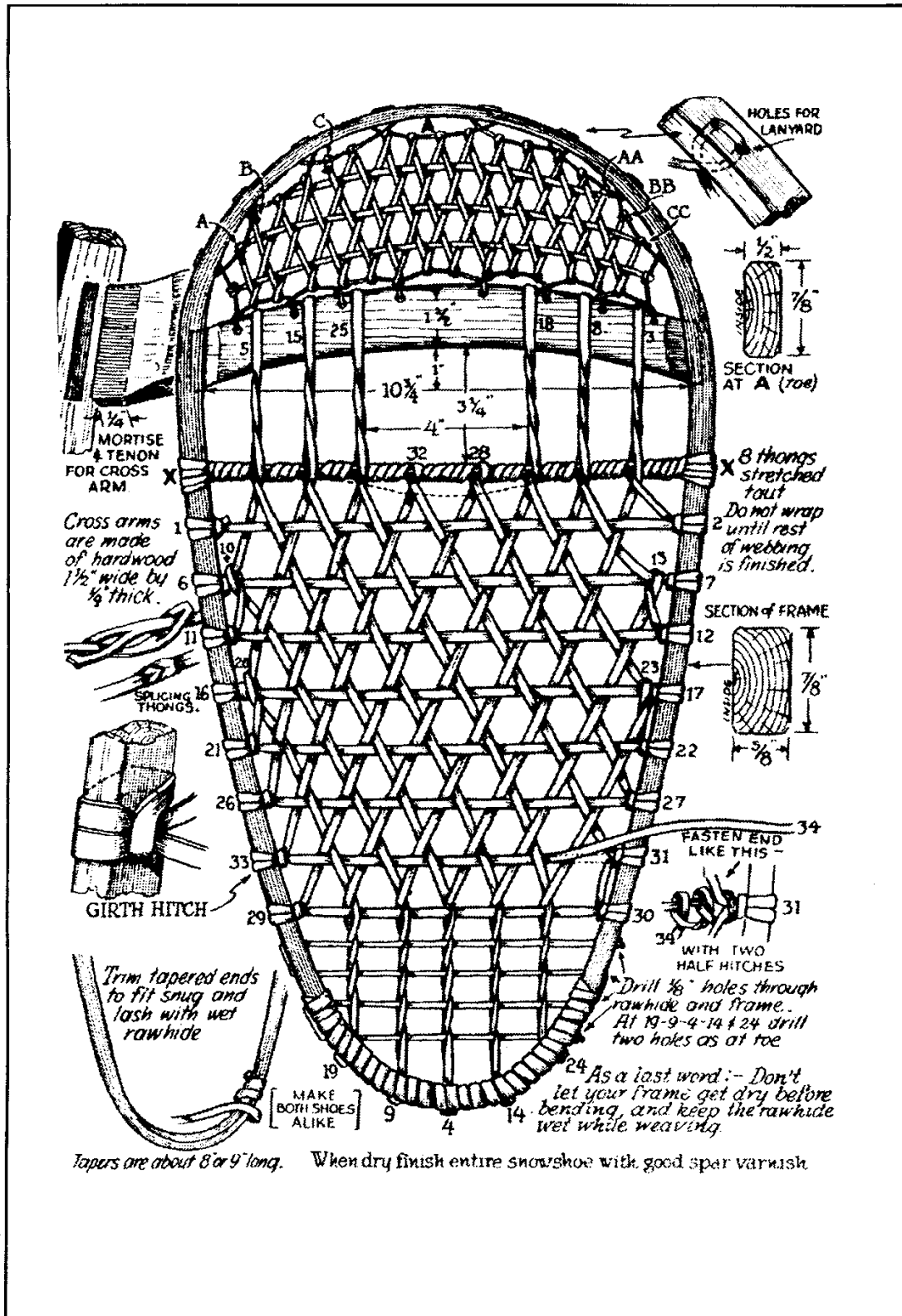
1. Make a form - either style
2. Rip sapling for frames.
3. Shape with drawknife and spokeshave.
4. Bend around form while green.
5. While frames are drying on form, make crossarms.
6. Remove frames when dry and tie end temporarily.
7. Cut mortises and set crossarms.
8. Wrap spliced end with wet rawhide and let dry.
9. Drill $\frac{1}{8}$ " holes for lanyard.
10. You are now ready for webbing.

WEBBING WITH WET CALF RAWHIDE

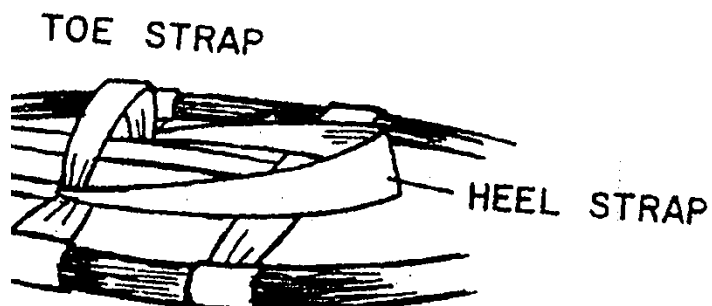
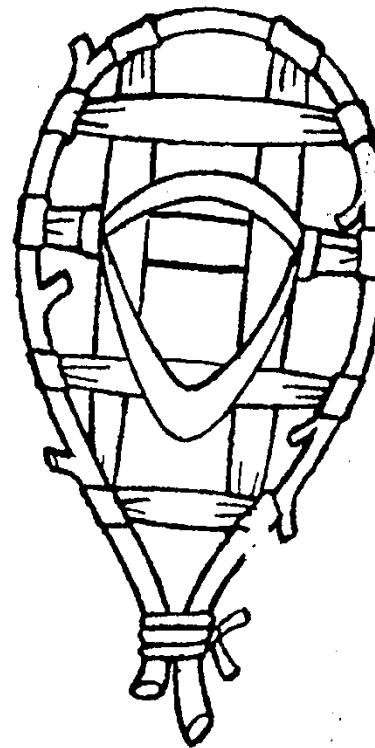
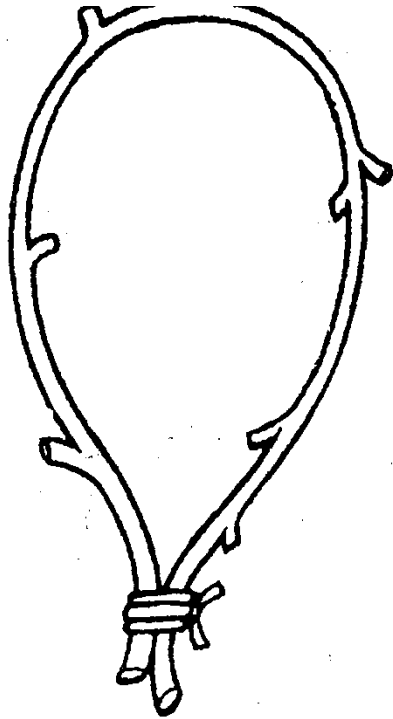
11. Thread $\frac{1}{8}$ " lanyard through holes in toe.
12. Weave diagonals, A to AA, B to BB & C to CC and knot.
13. Weave in cross strands & fasten with half hitches.
14. Put in cross thongs X-X.
15. Weave body section, starting at 1 and follow through carefully as shown.
16. Now you can wrap X-X.
17. Thread cross thongs in heel using an awl to spread up and down thongs.

N.B. You will save yourself a lot of time and trouble if you first make a full size drawing of a snowshoe on paper

Bear Paw Snowshoes (continued)



Quick, easy to make snowshoes made from a tree branch or sapling tree.



Snowshoes made from electrical conduit and diaphragm membrane.

SNOWSHOE CONSTRUCTION

Introduction:

The within style, technique, and mode of fabrication for snowshoes derives from the *ABC's of Winter Camping* manual distributed by the Santa Clara County Council BSA *Okpik* High Adventure Training seminar. It is by no means meant to be the only way to build snowshoes. Nor does it necessarily represent the best method of construction and best materials to employ. It does, however, represent a method which our troop has successfully used to produce over 40 pairs of shoes in 4 regular meetings plus a Saturday's time. While Scouts require supervision from adults and close assistance, as with any worthwhile Scouting endeavor, we found that most Scouts had the ability to contribute significantly to the construction of the shoes on their own. More importantly, we used the finished product in the wintery wilderness this past season and found them to work great.

Materials List (for 1 pair):

Qty/Pair	Description	Size
≈ 22 ea.	aluminum pop rivets	3/16" x 1/2"
≈ 44 ea.	bonded washers	#10 (1/2")
≈ 20 ft.	nylon webbing	3/4"
2 ea.	metal spring buckles	3/4"
2 ea.	metal keepers	3/4"
20 in.	diaphragm sheet (very strong)	1/16" thick 4" wide
20 ft.	EMT galvanized pipe	1/2"
80 ft.	braided nylon rope	3/16" thick
1 ea.	tube of silicon	
2 ft.	drill rod water hard	1/4"
2 ea.	hex cap screws	1/4"
2 ea.	nylon insert lock nuts	1/4"

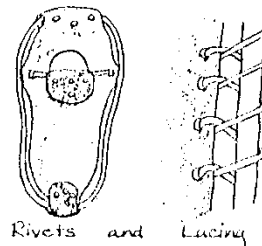
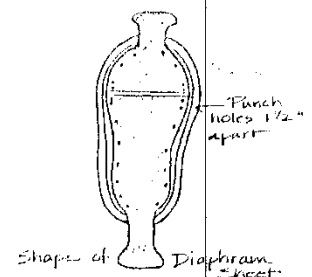
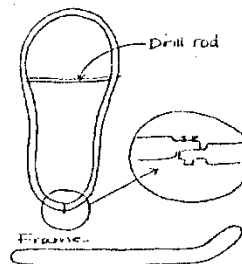
Recommended Tools:

vice, hacksaw; right angle drill (1/4"), chop saw, cutting board, sharp razor, pipe benders, needle-nose pliers, hole punch, pop rivet gun, silicon gun, normal shop tools, permanent marker

Steps of Construction (In General):

1. Bend pipe into desired shape of shoe
2. Cut ends while holding frame in finished shape; drill holes to mate ends; insert screw; affix nut
3. Mark for cross-piece (drill rod) and drill holes
4. Cut drill rod to width; undo screw, insert rod, relock
5. Cut off excess of screw; apply silicon to bottom end and where rod meets pipe; allow to dry
6. Lay pipe frame over diaphragm sheet; outline desired shape of diaphragm with permanent marker; place diaphragm sheet on cutting board and cut with razor; (do not cut toe-hole until last)
7. Mark with frame on top of sheet; hole punch where indicated or desired
8. Rivet diaphragm sheet at top, then bottom for tight fit
9. Lace rope after melting and rolling ends while hot to form a point; tie off rope
10. Cut toe piece and rivet in place as indicated; (very important to make cut rounded at cross-piece rod to avoid tearing)
11. Cut nylon webbing (and melt ends) and attach buckles with keepers; (for use with Lampwick Hitch)

Diagrams:



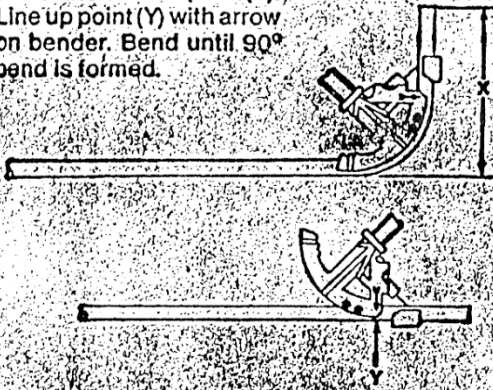
SEE ALSO
 P. 229-377
 Ch. 22 Snowshoeing

INSTRUCTIONS

FOR BENDING
1/2" THINWALL

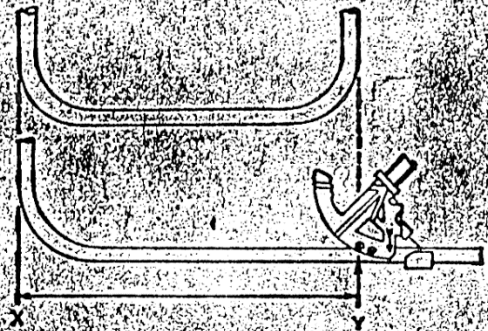
90° BENDS

Measure length of bend (X). Subtract 5" (bender take-up) from length (X) and mark length from the end of the conduit point (Y). Line up point (Y) with arrow on bender. Bend until 90° bend is formed.



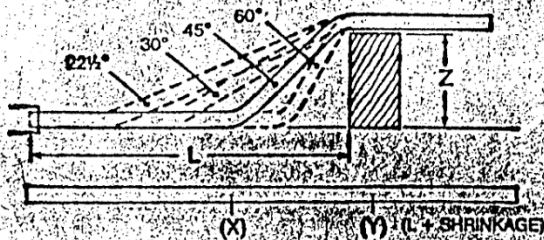
BACK TO BACK BENDS

Measure and mark distance on the conduit from a fixed point (X) to the back of the 90° bend point (Y). Line up point (Y) with (B) on bender. Make 90° bend.



OFFSET BENDS

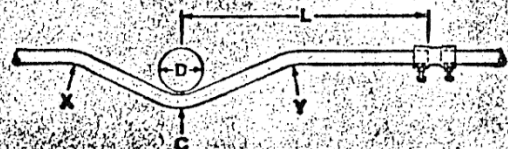
Measure height of offset (Z), multiply by a constant multiplier per angle of bend (see chart below) to determine distance between bends. Measure length (L) from end of conduit to offset and add shrinkage (see chart below). Mark this length on conduit point (Y). Subtract distance between bends and mark point (X). Using arrow on bender, make desired bend at point (X). Reverse bender and repeat at point (Y).



ANGLE OF BENDS	CONSTANT MULTIPLIER	SHRINKAGE/INCH OF OFFSET DEPTH
22-1/2°	2.8	3/16"
30°	2.0	1/4"
45°	1.4	3/8"
60°	1.2	1/2"

3 BEND SADDLE

Measure the diameter (D) of the object to be saddled (not to exceed 6"). Take length (L) and add 3/16" for every inch saddled. Mark this length point (C) from the end of the conduit. Multiply diameter (D) by 2.5 and mark this length to the left point (X) and right point (Y) of point (C). Align point (C) with (A) on bender, make a 45° bend. Reverse tube in bender, line up arrow on bender with point (X) and make a 22 1/2° bend. Repeat with point (Y).

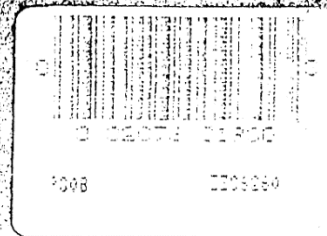


Manufactured and printed in U.S.A.

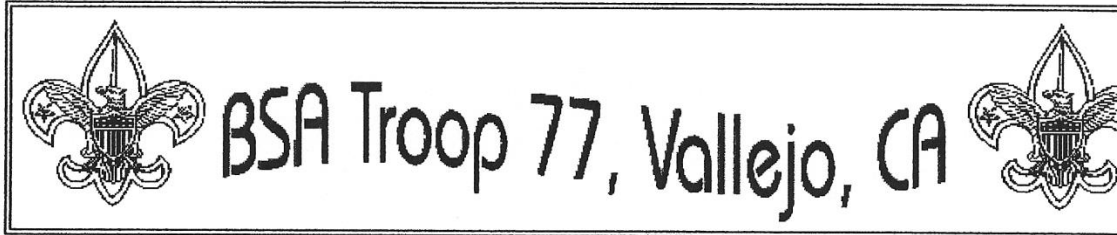
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Milwaukee, WI 53209

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A variation on the electrical conduit snowshoe.



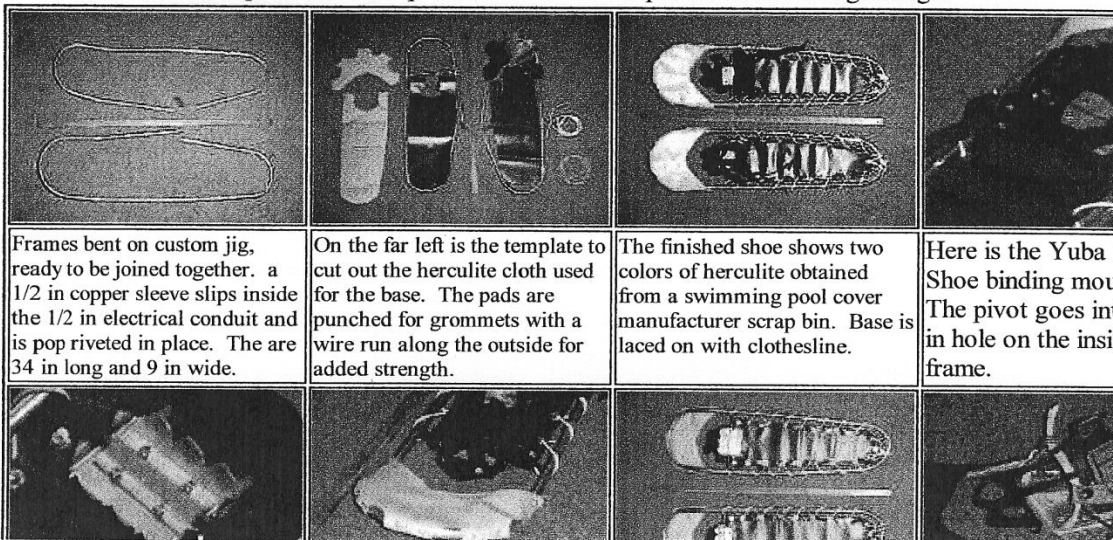
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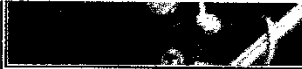



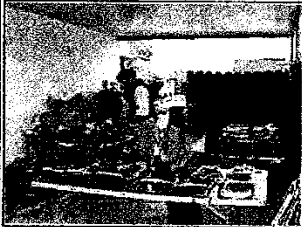


SNOWSHOE PROJECT

(or How to make snowshoes in four years)

Check out [Yuba Snow Shoes](#) for the real thing. They are GREAT people!

We started on these snow shoes a few years ago. The basic construction was accomplished the first year later tested. We learned that we had a problem with the foot support and boot binding. The binding swivels on an axle which runs across the shoe below the ball of the foot. We originally started with a 1/4 inch steel axle. After the first outing, it looked more like a paper clip. The upgrade for this was to use 3/8 inch steel axle and a brake line and sleeve over the 1/4 inch rod. I guess some engineer out there could have told us we might have had this problem. The second problem was proper support of the boot. We used some nylon straps and buckles which were alright as long as you did not side hill. We had constructed about 22 pairs of the shoes. Come the second winter, I came up with another idea to use a bicycle toe clip and parts from an old pair of ski boots. I sent a photo of this below. It worked very well but I could not find enough of the old (cheap) ski boots to make the part from. So now I decided to turn to the professional and the Internet. I sent out a few E-mails to several snowshoe companies in hopes that some one would have a binding for the right price for a Boy Scout project. I tested out a pair of bindings at the end of last year from [Yuba Snow Shoes*](#) in Sacramento, California. They worked great; then the snow melted, and the snowshoes were put away for another year. I contacted them this year and they were able to help me out to complete the project. The material cost of the shoe is about \$10.00 plus a lot of labor. Here are pictures of the process. Click on the picture to see a large image.



			
<p>Here is the cleat made from aluminum, cut, and the bent on a brake. The clamp holding it to the axle in 1x1 aluminum angle properly bent.</p>	<p>The toe cap piece of herculite is folded doubled at the tab, drilled and pop riveted in place.</p>	<p>Underside of snowshoes shoe the simple lacing used.</p>	<p>Here is the the Mod 2 binding made from b clip and ski boot part nylon strap. It worke to find the right ski b canibalize.</p>
			<p>Winter Campout plan February 10 & 11 at Point State Part in the Tahoe basin.</p>
<p>Snowshoe work shop at Bill's house January 01. Phil and Wil working on the Mk3 Mod3 updated axle and binding.</p>	<p>Axle now has a 3/8" brake tubing over the 1/4" axle rod for strength.</p>	<p>Project line-up awaiting axle/binding assembly to be installed</p>	

*I just learned this year that their parent industry, Pride Industries is a non-profit organization whose mis train and employ people with disabilities. So you know their heart is in the right place.

A PVC pipe version.

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1999 Snowshoe Project

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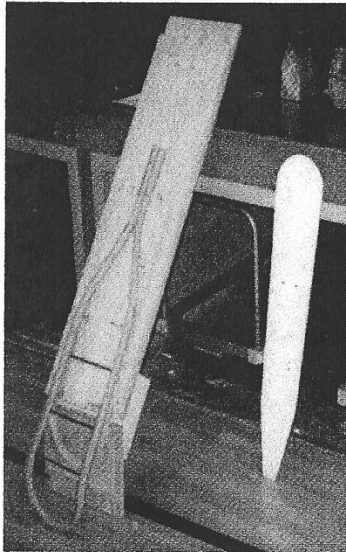


Photo at left: Snowshoe Frame in front of a plywood pattern for bending the PVC pipe and template for cutting a large deck. **Project Adult Leader** = Mr. Hitchings

Project Outline: The object is to create useful equipment for much less than retail, teach the scouts a practical skill, and expand the activities associated with winter camping. This is done using scout-supplied patterns and instructions, build snowshoes from PVC conduit, sheet webbing, lacing, old truck inner tube, some steel rod, and scout labor. These snowshoes have already been made by a San Francisco Bay Area Troop, based on information first publicized in the Scouting magazine in fall of 1998. As of Jan 2000, you can still order plans (and a free webbing sample) from:

George Long
13095 Monroe Drive
Thornton, CO 80241

Enclose check for \$15 payable to Explorer Post 2222

All the \$ goes to Scouting

Construction Tips

Follow the instructions, they were approved by the scouts! Persevere with folding the inner tube into the boot holder, it does work! The webbing is nylon reinforced neoprene, it should be available locally as it is used in a wide variety of applications, including inflatable water filled dams, dam liners, roofing membranes, etc. Its strong and durable, and tearproof. Try a roofing company or tent and awning company first.

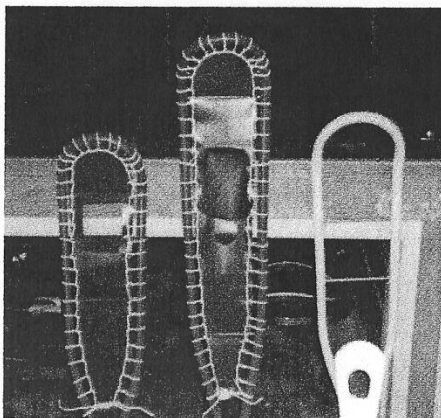


Photo at left: Small snowshoe almost completed, completed large snowshoe, grey PVC frame, and template for cutting the boot binding

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Various snowshoe shapes and sizes.

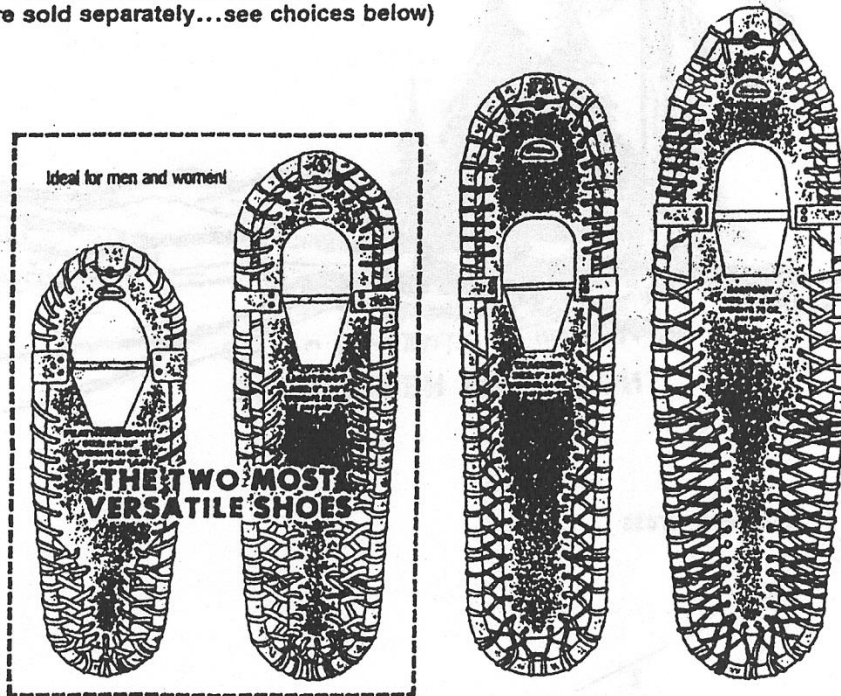
How to select the Sherpa Snowshoe and the Sherpa Binding that best suits your needs.

Always use the smallest snowshoe that can handle your maximum load (your combined body weight and pack equipment weight).

Example: John weighs 170 lbs. and carries a pack of 20 lbs. He plans to use snowshoes on both mountainous terrain and on flat terrain, but mostly flat terrain. The snowshoe suggested for John is the Lightfoot model.

Choice of 4 Snowshoes

(Bindings are sold separately...see choices below)



Model suggested for your load on	FEATHERWEIGHT™	LIGHTFOOT™	TRACKER™	BIGFOOT™
mountainous terrain or in dense brush:	100 to 250 lbs.	150 to 300 lbs.	225 to 325 lbs.	Not recommended.
flat or hilly terrain:	50 to 175 lbs.	125 to 200 lbs.	175 to 250 lbs.	200 to 350 lbs.

Choice of 3 Bindings

	ALPINE	CUSTOM	TUCKER
Binding Application	Recreational (not warranted for commercial or industrial use)	Premium Recreational; Industrial; Commercial	Premium Recreational; Mountaineering; Industrial; Commercial
Tooth Length	3/4"	3/4"	1 1/2"
Claw Metal	Tempered Aluminum	Stainless Steel	Solution Tempered Aluminum

Manufactured and Guaranteed by **SHERPA, INC.**, 6101 W. Dickens Ave., Chicago, IL 60639

Traveling On Snow Sleds vs. Backpacks



Traveling On Snow: Sleds and Backpacks

- ❖ Sleds versus Backpacks; Stability versus Ease and Versatility
- ❖ Commercial Sleds
- ❖ Homemade Sleds (reinforced toy sleds)
- ❖ Klondike Sleds (Dog Sleds)
- ❖ Pulling Sleds;
 - Ropes Front and Rear
 - Handles (front only)
 - Use Backpack Waist Belt to Attach

Traveling On Snow Sleds vs. Backpacks

Sleds versus Backpacks; Stability versus Ease and Versatility

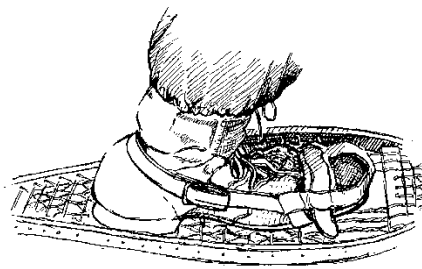
On short treks, an alternative to hauling your gear in a backpack is to haul it in a sled. As with most things, there are good points and bad for each method, and each has its own adherents. Even an internal frame pack makes you top heavy and less stable. Traveling on the sides of hills, over icy terrain, etc., especially when you are still developing your ski legs, can result in lots of falls. And falling is the easy part. Getting back up in soft snow while wearing skis and a backpack can be exhausting – especially about the tenth or fifteenth fall! The sleds create more friction in the snow, but they also add stability. As we all remember from physics, a three-point base (in this case, your two legs and the sled) is the most stable.



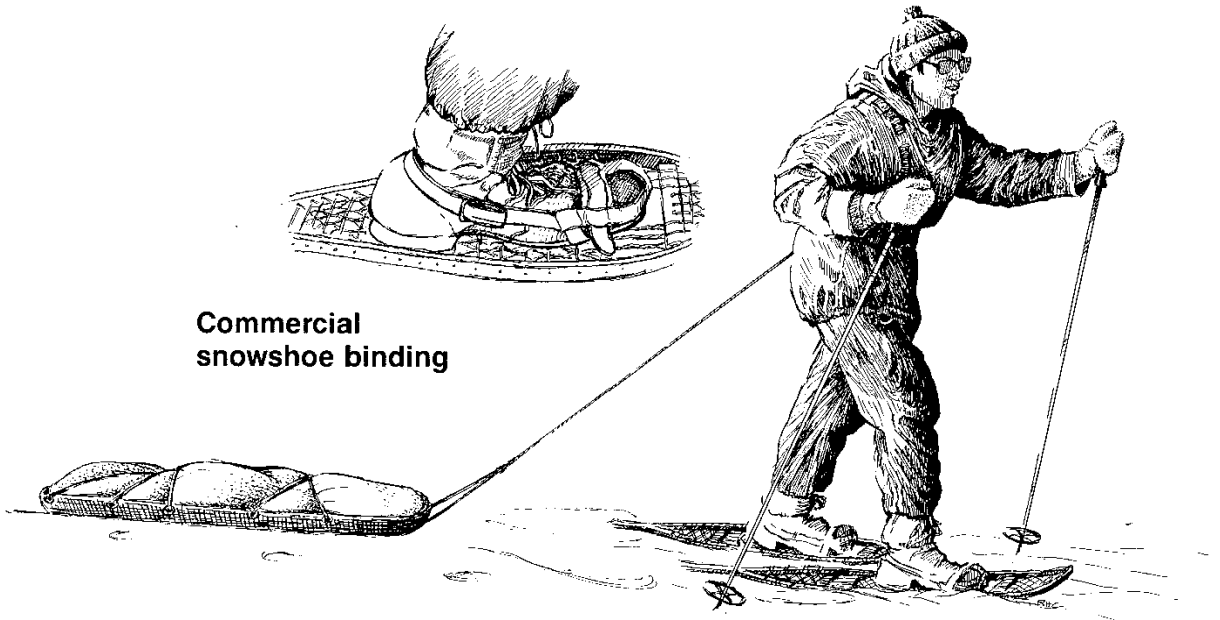
On longer treks, however, where large amounts of gear must be transported many miles, members often pull sleds and carry backpacks too. Short treks are therefore appropriate for practicing for the big hauls.



FIG. 1. THE EARLY SKIING METHOD OF TRANSPORTING LOADS.

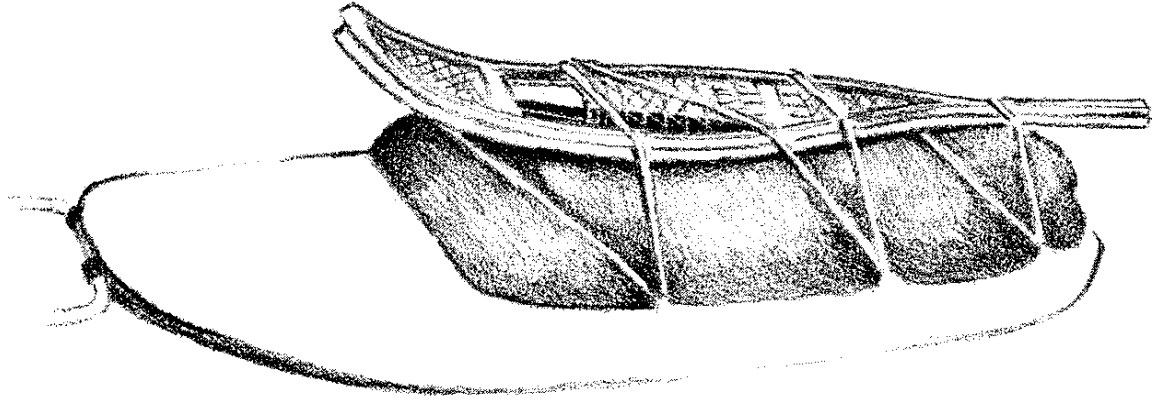


Commercial snowshoe binding



Commercial Sleds

Commercial sleds are made of fiberglass, have a zip open nylon cover, and waist harness.



Loading the sled—a sled cover can be almost any type of tarp, poncho, or similar cloth. Skis, snowshoes, or tools can be lashed on the top of the sled.

Homemade Sleds (reinforced toy sleds)

An inexpensive alternative is a children's plastic sled. The ends can be reinforced with fitted pieces of exterior plywood pop riveted to the sled, with a fitted piece of plywood in the bottom of the sled which can be taken out and double as a seat or table when cooking. Two handles made of PVC or electric conduit about eight to ten feet long can be attached to the sled with large eye screws.

A waist belt from an old back pack can be used to make a harness to attach it to your waist. The handles need to be long enough so that the sled doesn't ride up on the tails of the skis.

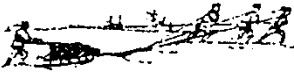
Pulling Sleds

Sleds can be a little unwieldy, especially if you use rope instead of rigid poles to secure it to your waist. If you use poles, the sled will follow dutifully at the proper, pre-determined distance. And while it will tend to pull sideways when you are moving perpendicular to the slope, it will still follow. If it is secured with a rope, however, then you will need to have a partner with a tail rope. Otherwise, when you travel perpendicular to the slope, the sled is still going to want to go vertical (down) and take you with it. Depending on how much weight you have in it, it may win. Just as unsettling, traveling down hill by yourself with a sled secured by a rope results in the sled attempting to go on ahead, usually over the top of you. Fore-warned is forearmed.

Still another version of the original. Can be pulled by people, but dogs preferred!

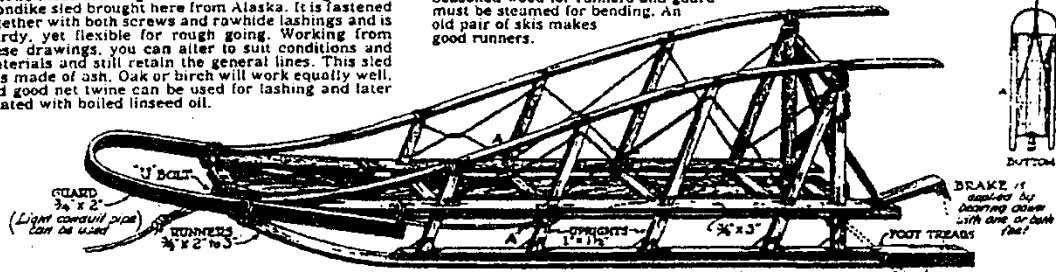
KLONDIKE SLED

20" wide x 6' or 7'
10 ft. is a good
size for scooping.

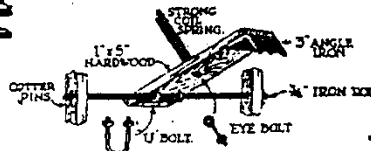
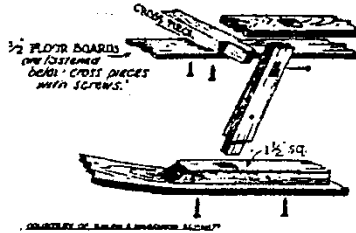
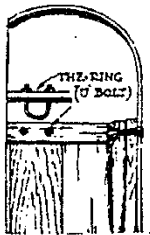


I made these drawings from a real honest-to-goodness Klondike sled brought here from Alaska. It is fastened together with both screws and rawhide lashings and is sturdy, yet flexible for rough going. Working from these drawings, you can alter to suit conditions and materials and still retain the general lines. This sled was made of ash. Oak or birch will work equally well, and good net twine can be used for lashing and later treated with boiled linseed oil.

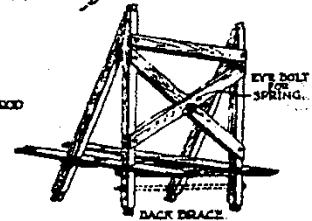
Seasoned wood for runners and guard must be steamed for bending. An old pair of skis makes good runners.



Use ski used as wooden runners. This one was sled with one.



BRAKE ASSEMBLY
A brake is a must in hilly country or when using dogs. It is usually all metal.



Informative & Entertaining Talk on: MUSHING

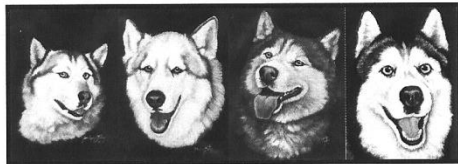
NORTHERN BREED SLED DOGS

Huskies want to run. They want to get away and go. They don't need a lure to chase, it's in their genes to run and work as a team. Not every Husky can be a lead dog. Legendary musher Leonard Seppala's lead dog TOGO was a natural, and he only weighed 48 pounds. By 9 months old, he was so persistent, Seppala put him in his team and TOGO went on to lead and win sled dog events for the next 12 years. A sled dog can recognize and remember a trail he hasn't seen for a year. Sometimes a lead dog knows more about the safest way to go on the trail than the musher does.

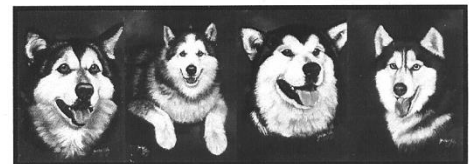
Sex is not a determinate factor in the quality of the sled dog. Power alone is not the sole factor and they don't have to be purebred. Enthusiasm, endurance, and the ability to work in a team are more important. Temperatures above 45 F are not good for mushing; rests to avoid overheating become too frequent. The ideal running temperature ranges from -10 F to +10 F.

When a Husky sees his musher coming with a harness, you would think he is going berserk, jumping, howling and barking. In fact, when the team first starts out, their speed has to be checked and slowed to avoid injuries and maintain control. Two northern breeds of sled dogs are the Alaskan Malamute and the Siberian Husky

WORKING SLED DOGS



SADIE SASKA ZACKY TIMBER



KONA NIKI LOBO TOGO



Adults or Children's Version



- Care and training of sled dogs
- Equipment & gear on display
- Iditarod & Yukon Quest

- Meet some live sled dogs
- Reading list for Arctic and sled dog adventures

**For information and details to speak to your group, call:
Robert Drewery (858) 273-3121 FAX: (858) 270-1329**

E-mail: doggonedogdriver@direcway.com

Winter Emergency Care



Winter Emergency Care

- ❖ Prevention
- ❖ Be Prepared!
- ❖ First Aid Kit
- ❖ Dehydration
- ❖ Heat Exposure
- ❖ Hypothermia
- ❖ Wind Chill Factor
- ❖ Frostbite
- ❖ Immersion Foot
- ❖ Snow Blindness
- ❖ Altitude Sickness
- ❖ High Altitude Pulmonary Edema
- ❖ High Altitude Cerebral Edema
- ❖ Emergency Transport

Winter Emergency Care

There is nothing particularly dangerous about snow camping, especially when planning and preparation are carried out correctly and it is done with equally well-prepared fellow campers. Wherever people go, people do sustain injuries. We as leaders need to be prepared to treat them.

The injuries and illnesses we might encounter in snow camping include all of the basic injuries and illnesses we might encounter anywhere: blisters, strains and sprains, lacerations, burns, sunburn, fractures, dehydration, heat exhaustion, and shock, plus a few conditions more specific to our sport: hypothermia, altitude sickness, snow blindness, immersion foot, and frostbite. Any discussion of injuries in the backcountry in winter needs to include a brief discussion on winter emergency transport.

Before First Aid: Prevention

Prior to any outing, a careful review of the potential hazards of the area to be visited should take place. Gain knowledge of any medical conditions or potential medical conditions of the members of your party. Study maps of the area. Consult experts: local park and forest service rangers, ski patrol, local mountaineering organizations. Review weather reports.

Be Prepared!

Once you have assessed the potential dangers, prepare to address them. A registered adult with advanced first aid training should accompany the group. This training could be American Red Cross Advanced First Aid, ARC Wilderness First Aid, National Ski Patrol Outdoor Emergency Care, or similar level of training. Carry a proper first aid kit, at least one for every two to four participants. Pack the *Ten Essentials*. Ensure participants wear correct clothing and footwear. Pack gear in plastic baggies inside packs to protect and keep dry. Where particularly dangerous obstacles can be avoided, they should be. Avalanche zones can be avoided. Don't camp under trees with dead limbs, or where there is danger of snow accumulation sloughing off onto tents. Don't travel across frozen lakes. Where specific gear and/or equipment can mitigate particular dangers, it should be included where practical.

First Aid Kit

A basic first aid kit for the winter backcountry should include:

- ✓ Band aids
- ✓ Roller bandages
- ✓ Gauze pads
- ✓ Clean wipes
- ✓ Antiseptic
- ✓ Personal medications
- ✓ Sunburn cream and Lip balm
- ✓ Mole skin
- ✓ Triangular bandages
- ✓ Butterfly bandages
- ✓ Tape

Dehydration

Most of the population is dehydrated most of the time. If your urine is yellow, you are partially dehydrated. Under normal conditions, you should be drinking about two liters of water per day; at higher altitude and as activity increases, water intake also needs to increase.

Symptoms of Dehydration

Symptoms of dehydration include yellowish tint to the urine, not needing to urinate, feeling tired and listless, headache, stomach ache, hot, dry skin, nausea, vomiting and inability to hold down water, loss of consciousness, and death.

Prevention and Treatment for Dehydration

Perspiration and respiration losses at higher altitudes and when exerting oneself physically can increase water loss up to two liters per day. Water loss by the body should be replaced as quickly as possible. Drinking enough to ensure that you are urinating regularly and that your urine is staying relatively clear is the best prevention.

Water loss through perspiration carries about one gram of salt per liter with it. Accordingly, someone exerting him or herself heavily might lose a maximum of two grams of salt per day. The average person obtains 10 to 15 grams of salt per day through food seasoning, so salt supplements should not normally be necessary, however, in extreme conditions, supplementing salt loss with salt tablets might be necessary. Since one regular tablet contains about .5 grams of salt, a maximum of 3 to 4 tablets per day should be the maximum that anyone might need.

If dehydration is suspected, have the patient drink large amounts of water, as much as they can hold, one to two liters of water. If they cannot keep it down, water with electrolytes (primarily salt or sodium and potassium) should be given. This might include Gatorade, PowerAde, and most soft drinks, preferably without caffeine, as caffeine is a diuretic, meaning it draws water out of the body. Ginger ale in particular goes down easier on an upset stomach.

Heat Exposure

Illnesses related to heat exposure include: heat cramps, heat exhaustion, and heat stroke. While heat stroke is unlikely in winter snow conditions, heat cramps and heat exhaustion are possible during and following strenuous activities, so we will take a moment to discuss all three.

Heat Cramps

Heat cramps are painful muscle spasms, usually of the leg muscles, which occur after strenuous exercise. Perspiring during exercise modifies the body's salt balance and may result in loss of essential electrolytes from the cells.

Prevention and Treatment for Hot Cramps

Heat cramps can be treated by resting the cramping muscles. The cramps can often be massaged out. Give water by mouth. A diluted (half strength) balanced electrolyte

solution maybe used. Commercial sports drinks, such as Gatorade are also effective. Patients with heat cramps should not be given salt tablets. They have adequate salts in their systems; they are just not distributed properly.

Heat Exhaustion

Heat exhaustion occurs when the body loses so much water and electrolytes through very heavy sweating that fluid depletion (hypovolemia) occurs. Usually, individuals suffering from heat exhaustion complain of feeling dizzy, weak, or faint, with accompanying nausea or headache. Their skin is usually cold and clammy and their faces are gray.

Prevention & Treatment for Heat Exhaustion

The prevention for heat exhaustion is to get the individual out of the heat, have them lie down, loosen clothing, and if fully alert, have him drink water or diluted electrolytes.

Heat Stroke

Heat stroke occurs when the body is subjected to more heat than the body can handle. The bodies cooling mechanisms are overwhelmed and the body temperature rises rapidly to the level where tissues are destroyed and death results. Heat-stroke patients have hot, dry, flushed sin; they do not sweat because the sweating mechanism has been overwhelmed.

Prevention & Treatment for Heat Stroke

Heat stroke is a life-threatening emergency; untreated heat stroke will always result in death. The entire body must be cooled by any means available. Remove the patient from the hot environment. Remove the patient's clothing and cover with wet towels or sheets. Place a fan on the person directly if possible. The patient should be transported to the hospital as quickly as possible.

Hypothermia

Normal body temperature of 98.6 degrees F or 37 degrees C must be maintained within a fairly narrow range for chemical reactions in the body to work efficiently. The body self-regulates to maintain normal body temperature in normal hot and cold temperatures. To deal with cold, the body's normal rate of metabolism is increased. "Goose bumps", muscles at the base of each hair cause body hair to stand up, creating a "dead air" layer next to the skin to help reduce heat loss through convection. Shivering, foot stomping, and jumping up and down all contribute to increasing metabolism, increasing body temperature.

The body can tolerate a drop of a few degrees of internal body temperature, however, when the core body temperature drops below 95 degrees F (35 degrees C), symptoms of hypothermia will occur; the body loses its ability to regulate the body temperature and to generate body heat. Progressive loss of body heat then begins to occur.

**Natural Setting for
Cold-Weather Injury**



“Decline In Body functions with Diminishing Core Temperature
Temperature Range in Degrees F **Body State**

99 – 96	Shivering begins and increases in intensity Coordination becomes difficult.
95 – 91	Shivering becomes violent. Difficulty in speaking. Thinking process weakened.
90 – 86	Muscles become rigid, shivering decreases. Mental state continues to decline.
85 – 81	Irrationality sets in. Mental state deteriorates to a stupor.
Around 80	Unconsciousness, lack of reflexes, erratic heartbeat.
Below 80	Death.

“Most documented cases of hypothermia have occurred in still air temperatures above freezing – between 35 degrees and 50 degrees F. In wet clothing and exposed to cold wind, the body core may cool sufficiently that the body becomes hypothermic in as little as one hour! It is extremely difficult to maintain body warmth when exposed to wind, moisture and cold unless these conditions have been anticipated and careful preparation has been made.”¹

1. The National Ski Patrol System Ski Mountaineering Handbook, Roder, Hans M., 1987 Edition.

Equivalent Wind Chill Temperatures

Still Air Temperature

		40	30	20	10	5	0	-10	-20	-30	-40
W		Equivalent Temperature									
I	5	35	25	15	5	0	-5	-15	-25	-35	-45
N	10	30	15	5	-10	-15	-20	-35	-45	-60	-70
D	15	25	10	-5	-20	-25	-30	-45	-60	-70	-85
	20	20	5	-10	-25	-30	-35	-50	-65	-80	-95
S	25	15	0	-15	-30	-35	-45	-60	-75	-90	-105
P	30	10	0	-20	-30	-40	-50	-65	-80	-95	-110
E	35	10	-5	-20	-35	-40	-50	-65	-80	-100	-115
E	40	10	-5	-20	-35	-40	-50	-65	-80	-100	-115
D											

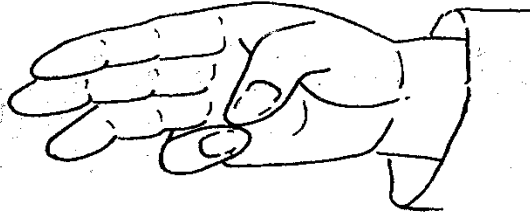
Prevention and Treatment for Hypothermia

Maintaining proper body temperature by staying warm and dry is the best prevention for hypothermia. Dressing correctly, using synthetics and wools versus cottons, dressing in layers, preventing perspiration through excessive overheating by removing layers, adding layers as you cool off. Wet clothing absorbs and transfers heat away from the body up to 100 times faster than other mechanisms. Bare portions of the body radiate very large amounts of energy to the cold environment. If the body is covered with a good insulated layer of dry clothing, including the head and hands, heat loss from radiation will be small. Cold wind carries away large amounts of body heat through conductive and convective heat loss. A layer of snow surrounding the body, as in a snow cave or snow trench, reduces substantially convective wind loss, radiative loss, and conductive heat loss.

Dress in insulating layers, keep dry, keep clothing clean (dirt and oils cause the fibers to mat, decreasing their insulating value), replenish body fuels and water for energy generation, get plenty of rest.

Simple Test for Hypothermia

Ask the patient to touch his thumb to his fingers, one at a time, first with the little finger, then the ring finger, middle finger, index finger, then in reverse. If he is beginning to suffer the loss of mental and physical coordination that comes with hypothermia, he will not be able to pass this simple test.



Testing for hypothermia

Mechanisms of Heat Loss

Body heat is lost through: 1) radiation (the transfer of heat from a warmer body to a colder body – you can feel heat radiation through a window on a hot day), 2) convection (the transfer of heat from a warmer body to cooler air passing over the body), 3) conduction (the transfer of heat from a warmer body to cooler water passing over the body), 4) evaporation through skin and lungs, 5) the process of your body warming inspired air as you breathe in cooler air, and 6) loss of heat through elimination of urine and feces.

Hypothermia is a medical emergency, which, if not treated immediately, can result in the victim's death.

Reducing Heat Loss

1) Heat loss from radiation can be reduced by covering the victim in dry, insulating material, getting him or her into a sleeping bag, or wrapping in a space blanket, and getting him or her inside a shelter. 2) Heat loss from convection can be reduced also by covering the victim in dry, insulating material and getting him or her into shelter out of the wind. 3) Conduction can be eliminated by getting the victim out of the rain, removing wet clothing, drying the victim, and dressing in dry, insulating clothing. 4) Evaporation can be reduced by keeping the victim dry by getting him or her out of the elements and by not letting him or her over-exert and perspire too much. 5) Loss of heat through the victim's body warming inspired air can be reduced by getting him or her into shelter and warming the air within the shelter, by building a fire, for example.

Heat Gain

Body heat can be increased through a combination of external heat sources, food metabolism, and muscular activity.

External Sources: The sun, hot fluids, fire, sharing body heat with others in a sleeping bag, direct application of external heat are sources of external warmth for the body.

Food Metabolism: The final product of food energy is actual work (about 25%) and heat (about 75%). In the process of food absorption and metabolism, heat energy is released.

Muscular Activity: Muscular action stimulates the chemical food processing in the body tissues.

To treat a victim who is becoming hypothermic, dry off, add dry layers and give hot fluids to drink. In severe and extreme weather conditions, the best external heat source is fire in an area sheltered from the wind, or get patient into a sleeping bag with one or two others and add bottles of hot water.

GIVES FIRST AID FOR HYPOTHERMIA



WATCH YOUR BUDDY FOR SIGNS OF HYPOTHERMIA.

RIGHT. IF HE HAS IT, HE'S LESS AND LESS LIKELY TO REACT TO THE EMERGENCY AS HE GETS WORSE.

HYPOTHERMIA OCCURS WHEN THE BODY LOSES MORE HEAT THAN IT PRODUCES.

HYPOTHERMIA CAN STRIKE IF YOU GET COLD, TIRED OR WET, OR IF YOU'RE OUT IN A STRONG WIND--OR ANY OF THESE COMBINED.

SYMPTOMS:

1. THE VICTIM GETS CHILLY, TIRED, IRRITABLE.
2. HE STARTS TO SHIVER.
3. HE STUMBLES, FALLS, LOSES HIS COORDINATION.

YOU NEED TO GET HIM WARM IMMEDIATELY!

IF YOU'RE ON THE TRAIL:

1. SHELTER THE VICTIM FROM WIND, RAIN AND SNOW.
2. GET THE VICTIM OUT OF WET CLOTHING AND INTO A DRY SLEEPING BAG ALREADY WARMED BY ANOTHER.
3. ONE RESCUER SHOULD STRIP, GET INTO THE SLEEPING BAG AND USE HIS BODY TO WARM THE VICTIM'S.
4. IF THE VICTIM IS AWAKE, GIVE HIM *SMALL AMOUNTS* OF A HOT LIQUID.
5. GET MEDICAL HELP FAST!



I LIKE TO BRR-BRR-BURRO-- I MEAN BURROW INTO MY BEACH BLANKET AFTER A SWIM IN CHILLY WATER.

IT'S IMPORTANT TO REMEMBER THAT HYPOTHERMIA CAN OCCUR IN MODERATE AS WELL AS FREEZING WEATHER. SWIMMERS WHO GET INTO COOL WATER SHOULD BE ALERT FOR IT TOO!



Frostbite

Very simply, frostbite is the freezing of body tissue. This typically takes place in freezing conditions, particularly to body extremities, which are exposed to freezing temperatures.

As body temperature begins to drop, blood vessels leading away from the body core constrict, slowing blood flow to the extremities in order to keep the critical organs warm and functioning as long as possible. This results in the extremities becoming colder more quickly, leading to their freezing. At the same time, extremities exposed to sub-freezing temperatures can freeze quickly even without a drop in body temperature. Body parts most susceptible to freezing include: toes and feet, fingers, nose, ears, cheeks, and chin. Freezing permanently damages cells. When the ice thaws, further chemical changes occur in the cell. As a result, the damaged cells die and gangrene sets in, or they become permanently damaged. If gangrene occurs, the dead tissue has to be amputated.

Symptoms and Treatment of Frostbite

Frostbitten tissue is cold, hard, and pale or darkly discolored. Blisters may appear on the skin. Frostbitten tissue is fragile and easily damaged. It should not be rubbed or massaged.

Treatment begins removing the patient from further exposure to the cold. Protect the frostbitten part from further injury. Do not allow the patient to stand or walk on a frostbitten foot, for example. Remove any wet or restricting clothing and cover the injured part loosely with a dry, sterile dressing. Evaluate the patient's general condition for signs or symptoms of systemic hypothermia. Support the patient's vital functions as necessary and transport the patient promptly to the hospital.

Do not try to re-warm the frostbitten part in the field. If this must be done, the frostbitten part should be immersed in water at a temperature of between 104 degrees and 108 degrees F. The water should never exceed 112 degrees F. The frostbitten part should be kept in the water bath until it feels warm and the color (redness) has returned. The process of thawing a frostbitten part is extremely painful. Re-warming should never be done if there is any chance the part will re-freeze. If a body part thaws and then re-freezes, the area of damage spreads and it tends to make the damage much worse.

Immersion Foot

Immersion foot, also called "trench foot" occurs when the foot has been exposed to cold water over extended periods of time, resulting in damage to nerves and muscles due to lack of circulation and therefore lack of oxygen. It is not always apparent to the victim, though it may become obvious at night as pale, pulseless, tingling feet, and it can lead to gangrene and amputation.

Symptoms and Treatment of Immersion Foot

Careful re-warming in a water bath just slightly warmer than body temperature is proscribed. If they are reheated too quickly, the feet may become reddened and swollen with a bounding pulse. If this happens, it may be necessary to slightly cool the feet to slow the process.

Snow Blindness

Snow blindness results from the outer layers of the eyes being burned by UV radiation bouncing off of the snow. The cornea (the clear layer at the front of the eye) is most easily burned. Its surface can become roughened and blistered. The lenses of the eyes can also become burned with increased exposure. Snow blindness sets in within 6 to 12 hours after the radiation exposure. The eyes become reddened and teary, they feel rough and sandy, and extremely painful.

Symptoms and Treatment for Snow Blindness

Treatment for snow blindness includes covering the eyes with sterile dressings and padding. Recheck for light sensitivity at half-day intervals. When the eyes are no longer extremely light-sensitive, you can remove dressings, but the patient should continue to wear sunglasses. Prevention is simply a matter of wearing sunglasses or goggles with side shields.

Altitude Sickness

Acute Mountain Sickness (AMS) is caused by a combination of physiological changes that take place in the human body when they travel from sea-level to altitudes above 8,000 feet.

Symptoms and Treatment for Altitude Sickness

Symptoms include: headache, insomnia, listlessness, loss of coordination, puffiness around eyes and face, cough, shortness of breath, fullness or tightness in chest, irregular breathing, loss of appetite, nausea, vomiting, reduced urine output, weakness, "heavy" feeling in legs. Usually altitude sickness clears up in a day or two. If symptoms get worse, a descent of 2,000 to 3,000 feet will usually clear it up.

High-altitude Pulmonary Edema

In high-altitude pulmonary edema (HAPE), body fluids leak into the lungs to a degree that interferes with respiratory function. HAPE is a potentially fatal condition, and survival depends on a rapid response.

Symptoms and Treatment for Pulmonary Edema

Early symptoms may include a persistent cough, decreasing ability to exercise, and breathlessness. As HAPE advances, a hacking cough appears, breathing will become strained and may include bubbling noises. Lips and nails may appear bluish-gray due to lack of oxygen in the bloodstream. Descent of at least 3,000 feet will usually clear up symptoms.

High-altitude Cerebral Edema

High-altitude cerebral edema usually develops over several days, and is caused by the vessels in the brain becoming leaky at high altitudes, resulting in the brain swelling with increased fluid. Ultimately the brain swells inside the cranium, putting pressure on the brain. Untreated, it can result in death.

Symptoms and Treatment for High-altitude Cerebral Edema

Early symptoms include loss of coordination, headache, and the loss of energy. Nausea and forceful vomiting may also be present. Descent is critical to survival.

Emergency Transport

Emergency transport in the backcountry in winter is made all the more difficult by the distance the victim must be transported, and the snow and ice that must be negotiated. Generally, it is better for someone to ski out and obtain help (take a buddy). The park and forest services have rescue snow mobiles with emergency transport toboggans. They can generally reach you before you can carry out an ill or injured victim. Emergency "care flight" helicopters are also available in most areas.

Sleds used to haul gear can be modified to be used for victim transport, and an emergency sled can be created out of the victim's skis and ski poles with the help of a simple kit that can be prepared ahead of time.

Avalanche Safety



Avalanche Safety

- ❖ Types of Avalanches

- Loose Snow
- Slab

- ❖ Ingredients for an Avalanche

- ❖ Proper Precautions

- ❖ What To Do If Buried In An Avalanche

- ❖ Use Common Sense!

Avalanche Safety

Winter is the most beautiful season of the year in the backcountry, and the most peaceful. Properly dressed and with the right equipment, camping in winter is every bit as fun and easy as camping during the other seasons.

But where there is snow and mountains, there is danger of **avalanche!**

Avalanche is a frightening concept. But danger from avalanches is minimal, if you take proper precautions.

Each year, hundreds of thousands of skiers, snowboarders, snowshoers, hikers, and campers head out into the winter backcountry. Out of all of those hundreds of thousands of people, on average, thirteen people in the United States are killed in avalanches each year. This compares favorably with traffic fatalities, 40,000 per year; and being killed by lightening, 500 deaths each year.

On average, each year, there are 7,800 avalanches recorded in this country.

Out of all of those avalanches, an average of 140 people are caught in them.

Of those 140, only 58 are actually buried.

And of those 58 buried, 13 are injured, and another 13 are killed. Thirty-two escaped uninjured.






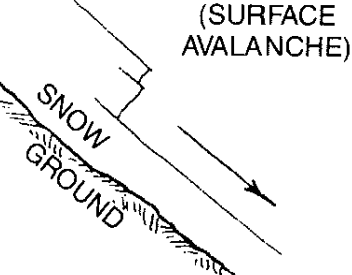
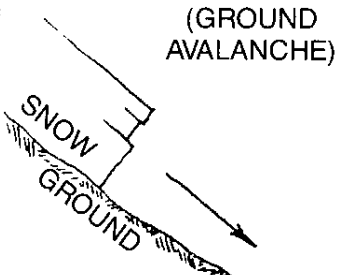
Odds are, if you did nothing at all in the way of taking precautions, you would be fine.

Of those killed in avalanches, 52% were backcountry skiers, 20% were mountain climbers, 13% were off-area skiers, and 15% were hikers, snow mobilers, or driving.

Thirteen fatalities in the entire United States each year aren't very many. Like I said, odds are pretty much in your favor going out the door that you are not going to get caught in an avalanche. But you can just about ensure that you won't be with just a few simple precautions.

But before we talk about these, let's take a look at what an avalanche is. Basically, there are two types of avalanches: loose snow slides, and slab avalanches.

Types of Avalanches

TYPE OF SNOW	<p>SLAB</p> 	<p>LOOSE SNOW</p> 	
TYPE OF MOTION	<p>IN THE AIR</p> 	<p>ON THE GROUND</p> 	<p>MIXED</p> 
FREE WATER CONTENT	<p>DRY NO FREE WATER</p>	<p>DAMP TRACE OF FREE WATER</p>	<p>WET FREE WATER VISIBLY PRESENT</p>
SLIDING SURFACE	<p>(SURFACE AVALANCHE)</p> 		<p>(GROUND AVALANCHE)</p> 

Loose snow is exactly what it sounds like, loose snow. Snow that is too loose and on a steep portion of a slope to adhere to. It can be dry and loose, or wet and loose. It typically starts at a point and grows in size as it advances

A slab, also as the name implies, occurs when a large block of snow breaks away as a slab. It can be any of a variety of snow types, from hard to soft. Typically, there is the surface slab that breaks away. Beneath it is a layer of loose, un-adhered snow, and under that either a firmer slab or the ground itself. Most, virtually all avalanche injuries and fatalities are caused by slab avalanches.

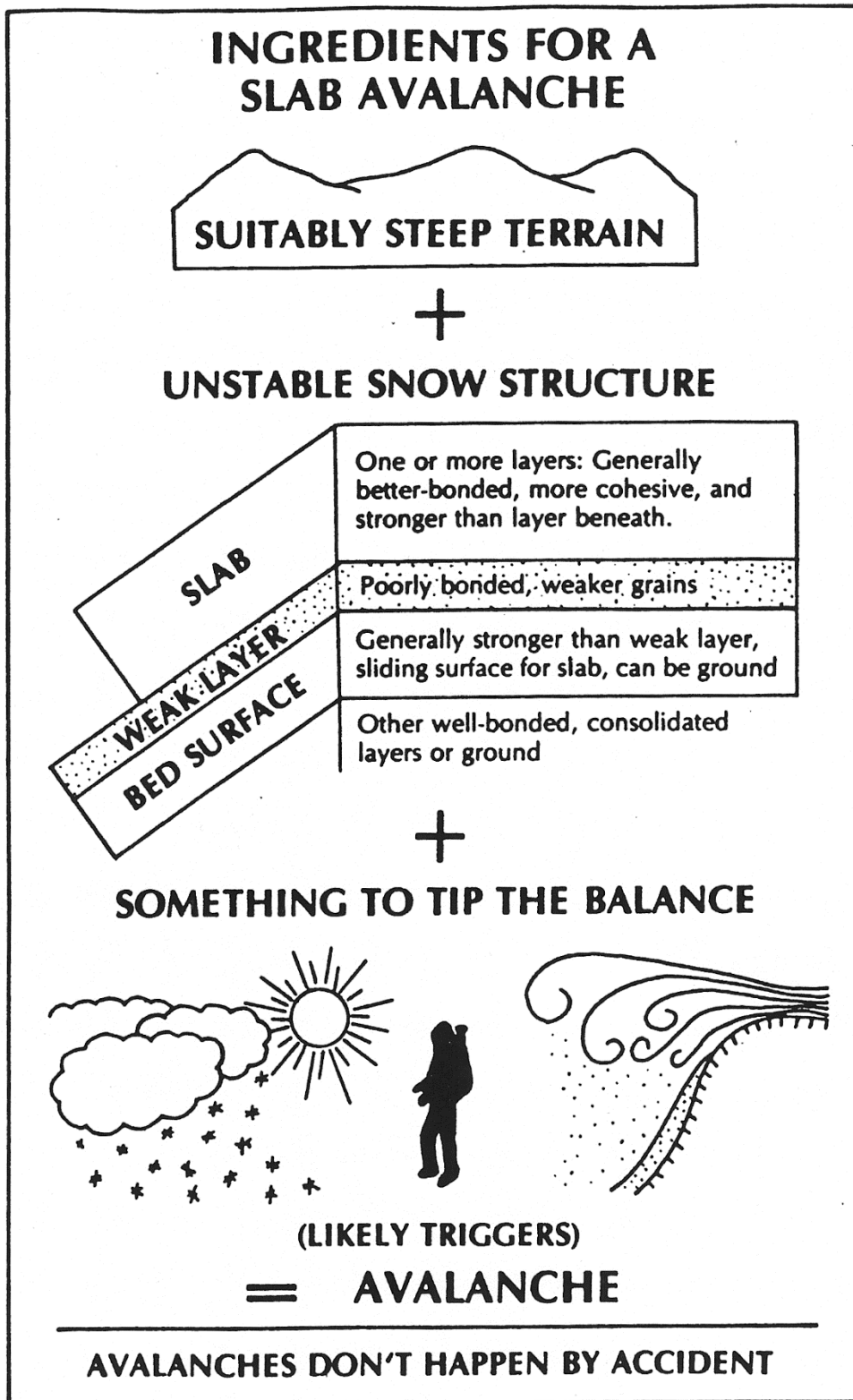
In a slab avalanche, the surface layer that breaks away may be made up of a fresh snowfall, it may be built up by wind slowly over time, or quite rapidly, or it may be loose snow that is metamorphosing, or melting down.

The next layer consists of a loose layer, either loose, angular snow that was laid down cold and “dry” and was quickly covered over and stayed cold, or a layer that is metamorphosing into depth hoar, a loose, coarse, granular snow. It provides a sliding surface for the surface layer.

Beneath this loose layer, is either a base layer, or the ground itself.

It takes three ingredients or conditions to create an avalanche: the correct steepness of the terrain, the correct snow conditions, and the trigger. The trigger can be a quick build-up of new snow in a storm, such that it's own weight overcomes its ability to adhere to the slope. It can be the melting down of the snow due to the sun. Or it can be humans walking or skiing across it in the wrong place in the wrong time.

Ingredients For An Avalanche



Proper Precautions

What can you do to protect yourself from avalanches? The best protection is to be aware of the signs of avalanches, and take proper precautions.

What are those precautions?

1. Never travel alone.
2. Always conduct the march such that only one person is exposed at a time.
3. Stay off avalanche paths, and especially out of release zones. Most avalanche victims start the avalanche themselves. Clear slopes, couloirs or chutes, timbered slopes where the timber is thinner, or markedly smaller or younger, or where the uphill branches are broken and damaged can indicate an avalanche path, or where snow debris indicates avalanches have already occurred. Travel around avalanche zones by going over the top along ridges, or along the valley floor.
4. Do not camp or bivouac or make rest stops at the foot of an avalanche path.
5. Carry avalanche cord (a 50' cord, colored yellow or orange, with arrows printed on it pointing to you, tied to your belt and trailing out behind you, with an empty plastic bottle on the end, which tends to ride or float on top of the snow in an avalanche, leading rescuers to you) or carry rescue transceivers, and some emergency rescue equipment, especially shovels, probes, and first aid kits.
6. Stay out of high risk areas immediately after heavy snowfalls, or periods of high wind. The lower the temperatures, the longer the danger period persists, sometimes for several days.
7. Do not assume the slope is safe just because one or more people have already crossed it. One avalanche was triggered by the 33rd member of an army unit to cross the slope.
8. Beware of the lee side of the mountains, and the slopes below cornices and deep drifts, especially those with convex profiles.
9. Most dangerous avalanches originate on slopes between 35 degrees and 45 degrees.
10. Read the weather reports and talk to local rangers or ski patrol prior to going out.

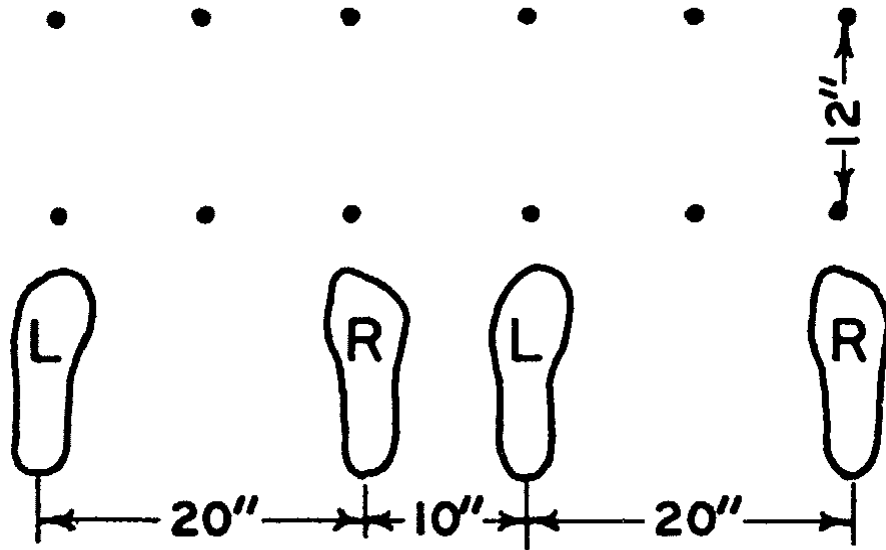
If you must cross an avalanche slope:

1. Remove your ski pole straps.
2. Unhitch the safety straps from your skis.
3. Close up your clothing, including your hood and put your hat and mittens on.
4. Loosen your backpack straps and undo your waist belt.
5. If you are buried, try not to panic; it uses too much time and oxygen.
6. In soft snow, you may be able to dig yourself out, or at least create a breathing area around your face. Snow firms up immediately as soon as it stops moving. Two out of three avalanche fatalities die from suffocation.
7. If you try to dig out, make sure you are digging up. Many victims have become disorganized and have actually dug down.

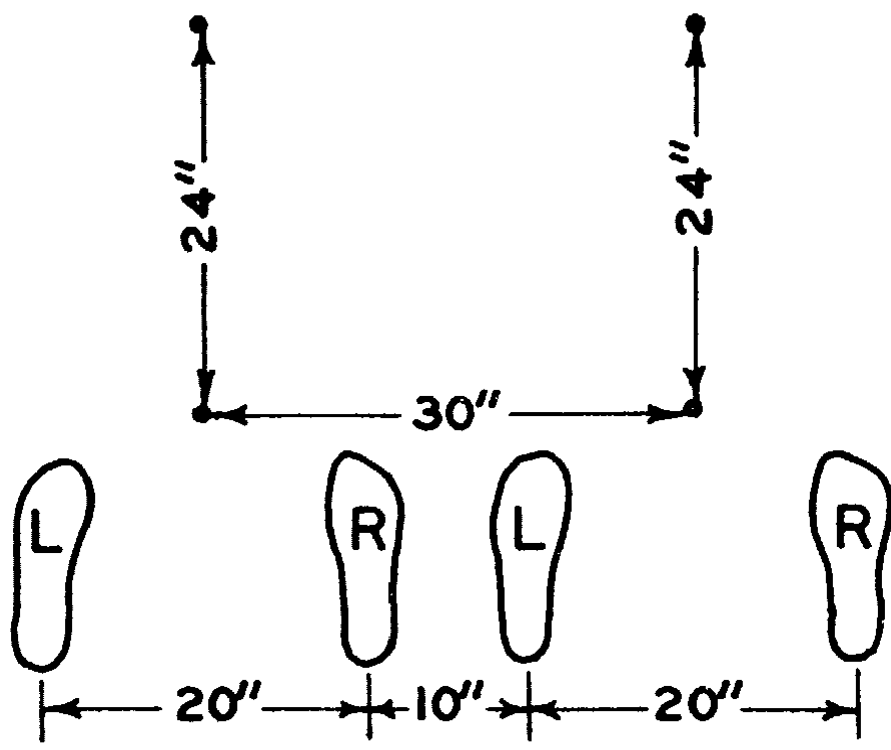
8. If you are coming to rest, try to reach out toward the surface with one hand; often a hand or foot sticking up has led rescuers to a victim.

If a member of your party is buried in an avalanche:

1. Don't panic. Check for further slide danger. Pick a safe escape route.
2. Mark the spot where the victim was last seen. This will help guide the search effort.
3. Quick search. If there are two or three survivors, they must make a quick search of the avalanche before going for help. If possible, one person should be left at the site to continue the search while two go for help.
4. Search the surface below the last seen point. Look for evidence or clues to his location.
5. Sole survivor – you must still make a search before going for help. Even the simplest search may require you to be covered.
6. Thorough search. If a rescue party can be summoned only after a few hours, the survivors must concentrate on making as thorough a search as possible. The chances of being rescued alive diminish rapidly over time.
7. Probing. If the initial search fails, begin probing with the heel of the ski, inverted ski pole, or ski pole with basket removed, or collapsible snow probe.
8. Send for help. If there are several survivors, send only two. The remaining can continue to search. Travel carefully and do not exhaust yourselves. You may need to lead the rescue party back again.
9. When the victim is found, immediately give first aid for suffocation and hypothermia. Clear nose and mouth of snow and administer mouth-to-mouth resuscitation and CPR as necessary. Clean snow out of clothing, and remove wet clothing and place victim in a sleeping bag with external sources of heat.



EXECUTION OF THE FINE PROBE



EXECUTION OF THE COARSE PROBE

Use Common Sense!

In one single year studied, over half of those killed by avalanches in the back country had chosen to ignore local weather reports warning of high avalanche danger and recommending against traveling in the backcountry for at least a few days.

Six Events in the Cascade Mountains

The following is a compilation of snow conditions which led up to six avalanche accidents or events at different times. In this instance the source is not an experienced avalanche hand but the local newspapers, which often report avalanche accidents on the front pages and with prominent headlines. An instructive common theme runs through these stories, connected by the incidental mention of snow and weather.

1. *"...more than a foot of new, wet snow fell yesterday. The National Weather Service had a travelers' warning out with extreme avalanche danger in the Cascades. They forecast heavy snow through today..."*
2. *"Numerous slides were reported in the park as warm, rainy weather hit the area yesterday...gale winds, rain, sleet and snow raked the mountain yesterday..."*
3. *"Eleven inches of snow fell at the pass overnight...The Forest Service warned that an extreme avalanche hazard existed in the mountains...The slides were caused by a sudden warming that raised the freezing level to about 4500 ft."*
4. *"'Avalanche warnings were ignored,' he said. We just didn't check the conditions'....conditions that turned worse from morning rain and midday sun on the wet, heavy snow."*
5. *"The Forest Service had posted a high avalanche hazard for the Cascade Mountains over the weekend because of heavy snowfall. Eighteen inches of new snow fell in the 3 days before the avalanche."*
6. *(Report of an August mountaineering accident.) "'There was a high-pressure ridge growing and a declining change of rain. We decided it looked feasible,' (survivor)...'But we've had 18 inches of fresh snow in the area in the past week, and there was a sheet avalanche up there that just gave way,' (investigator)."*

The ABC of Avalanche Safety

E.R.LaChapelle, The Mountaineers, 2nd Ed, 1985

In summary, avalanches are a low, but real danger, with the potential to kill just the same. With a little common sense, and by taking a few simple precautions, check with local rangers, ski patrol, and read local weather reports, you can minimize this danger. If you follow these guidelines, you will cut the odds of being trapped in an avalanche down to almost nothing.

Low Impact Camping In Snow: Leave No Trace



Leave No Trace for Winter Camping (Brief Overview)

Plan Ahead and Prepare

- Know the area and what to expect; ALWAYS check avalanche and weather reports prior to departure. Consult maps and local authorities about high danger areas, safety information, and regulations for the area you plan to visit.
- Prepare for extreme weather, hazards and emergencies.
- Monitor snow conditions frequently. Carry and use an avalanche beacon, probe and shovel. Educate yourself by taking a winter backcountry travel course.
- Visit the backcountry in small groups, but never alone. Leave your itinerary with family or friends.
- Repackage food into reusable containers.
- Use a map and compass to eliminate the need for tree markings, rock cairns or flagging.

Travel and Camp on Safe, Durable Surfaces

On the trail

- Stay on deep snow cover whenever possible; in muddy spring conditions, stay on snow or walk in the middle of the trail to avoid creating new trails and damaging trailside plants.
- Travel and camp away from avalanche paths, cornices, steep slopes and unstable snow.

At camp

- Choose a site on durable surfaces- snow, rock or mineral soil- not tundra or other fragile vegetation.
- Camp at a safe, stable site out of view of heavily-traveled routes and trails.
- Keep pollutants out of water sources by camping at least 200 feet (70 adult steps) from recognizable lakes and streams- consult your map.

Dispose of Waste Properly

- Pack It In, Pack It Out. Pack out everything you bring with you. Burying trash and litter in the snow or ground is unacceptable.

- Pick up all food scraps, wax shavings and pieces of litter. Pack out all trash: yours and others.
- Pack out solid human waste. In lieu of packing it out, cover and disguise human waste deep in snow away from travel routes and at least 200 feet (70 adult steps) from water sources.
- Use toilet paper or wipes sparingly. Pack them out.
- If necessary, use small amounts of biodegradable soaps for dishes. Strain dishwater into a sump hole.
- Inspect your campsite for trash and evidence of your stay. Dismantle all snow shelters, igloos or wind breaks. Naturalize the area before you leave.

Leave What You Find

- Leave all plants, rocks, animals and historical or cultural artifacts as you find them.
- Avoid introducing or transporting non-native or invasive species.

Minimize Campfire Impacts

- Campfires cause lasting impacts in the backcountry. Always carry a lightweight camp stove for cooking.
- Use dead downed wood if you can find it. Put out all fires completely. Widely scatter cool ashes.

Respect Wildlife

- Winter is an especially vulnerable time for animals. Observe wildlife from a distance. Do not follow or approach them.
- Never feed wildlife or leave food behind to be eaten.
- Protect wildlife and your food by storing rations and trash securely.

Be Considerate of Other Visitors

- Be respectful of other users. Share the trail and be courteous.
- Yield to other users. Prepare for blind corners.
- When stopped, move off the trail.
- Separate ski and snowshoe tracks where possible. Avoid hiking on ski or snowshoe tracks.
- Learn and follow local regulations regarding pets. Control dogs. Pack out or bury all dog feces.

Low Impact Camping In Snow: Leave No Trace (Detailed Material)

- ❖ Remember Why We Are Out Here;
Leave It Like You Found It, So Others Can Enjoy It Too
- ❖ Boy Scout Outdoor Code
- ❖ BSA Statement on Backcountry Use
- ❖ Leave No Trace Code
- ❖ Take Only Pictures, Leave Only Footprints (try not to leave footprints)
- ❖ Stay On the Trail
- ❖ Crossing Meadows
- ❖ Only Use What You Pack In
- ❖ Use Backpacking Stoves; Don't Build Fires
- ❖ Pack Out What You Pack In
- ❖ One Last Thought; How To Sh*t In the Woods

Low Impact Camping In Snow

Leave No Trace

One of the reasons we hike, and backpack, and camp in the backcountry is because we love it, so. We go there to bask in its solitude, to soak in its unblemished vistas, to explore and enjoy untrammelled wild places, to commune with wildlife, to be at one with nature.

John Muir said “In wilderness is the preservation of the world.” I believe in wilderness is the preservation of the soul. Each year, growing numbers of us hike, climb, backpack, kayak, and canoe (not to mention snowmobile and travel by all terrain vehicle) into the last remaining wild places on the planet. If we are not careful, we run the risk of overwhelming these special places.

From its inception, the Boy Scouts of America has had a strong wilderness ethic. I truly believe that more people have been introduced to the concept of wilderness conservation through the Boy Scouts of America than by any other single means or organization. The Boy Scout **Outdoor Code** states:

*As an American, I will do my best to
Be clean in my outdoor manners,
Be careful with fire,
Be considerate in the outdoors, and
Be conservation minded.*

It is important that we continue to explore and enjoy the outdoors, but it is also important that we work to protect and preserve it, so that our experience does not diminish the next person’s experience. And it is important that we teach this ethic so that the next person’s experience does not diminish ours. The Golden Rule applies even in the backcountry!

As recreational use of America’s wildlands has increased over the past few decades, concern about the effects of the impact this increased use was having also began to grow. Recreational use of America’s wildlands grew from 4 million visitors in 1965 to 15 million in 1984, an increase of 275%. To help protect the backcountry and wilderness areas, basic messages like, “Take only pictures, leave only footprints” and “Pack it in, pack it out” became the watchwords of the era. It was during this period that the fundamentals of *Leave No Trace* also began to be developed into a comprehensive philosophy of wilderness use.

Today, the *Leave No Trace* (LNT) educational program is a partnership between four federal agencies (U.S. Forest Service, National Park Service, Bureau of Land Management, and U.S. Fish and Wildlife Service), representatives from educational

programs and the outdoor industry. The program is managed by a non-profit organization called Leave No Trace, Inc. The National Outdoor Leadership School (NOLS), a non-profit wilderness skills school, is working with LNT, Inc. to develop educational programs and materials designed to promote responsible use of wildlands.

The following is a policy statement of the Boy Scouts of America on backcountry and wilderness use and its endorsement of the principles of *Leave No Trace*:

Backcountry Use

All private or publicly owned backcountry land and designated wilderness areas are included in the term "backcountry areas." The Outdoor Code of the Boy Scouts of America applies to outdoor behavior generally, but for treks into backcountry or wilderness areas, the principles of **Leave No Trace** apply. Scouts, Varsity Scouts, and Venturers who complete the requirements can earn a Leave No Trace patch. Within the outdoor program of the Boy Scouts of America, there are many different camping skill levels. Camping practices that are appropriate for day outings, long-term Scout camp, or short-term unit camping may not apply to wilderness areas. Wherever they go, Cub Scouts, Boy Scouts and Venturers need to adopt attitudes and patterns of behavior that respect the rights of others and make it possible for others and future generations to enjoy the outdoors."

Following is the code of conduct known as ***Leave No Trace***:

PLAN AHEAD AND PREPARE

- Know the regulations and special concerns for the area you'll visit.
- Visit the backcountry in small groups.
- Avoid popular areas during times of high use.
- Choose equipment and clothing in subdued colors.
- Repackage food into reusable containers.

CAMP AND TRAVEL ON DURABLE SURFACES

On the trail

- Stay on designated trails. Walk single file in the middle of the path.
- Do not shortcut switchbacks.
- When traveling cross country, choose the most durable surfaces available: rock, gravel, dry grasses, snow.
- Use a map and compass to eliminate the need for rock cairns, tree scars and ribbons.
- Step to the downhill side of the trail and talk softly when encountering pack stock.

At camp

- Choose an established, legal site that will not be damaged by your stay.
- Restrict activities to the area where vegetation is compacted or absent.
- Keep pollutants out of water sources by camping at least 200 feet (70 adult steps) from lakes and streams.

PACK IT IN, PACK IT OUT

- Pack everything that you bring into wild country back out with you.
- Protect wildlife and your food by storing rations securely.
- Pick up **all** spilled foods.

PROPERLY DISPOSE OF WHAT YOU CAN'T PACK OUT

- Deposit human waste in catholes dug 6 to 8 inches deep at least 200 feet from water, camp or trails. Cover and disguise cathole when finished.
- Use toilet paper or wipes sparingly. Pack them out in plastic bags.
- To wash yourself or your dishes, carry water 200 feet away from streams or lakes, and use small amounts of biodegradable soap. Scatter dish water after removing all food particles.
- Inspect your campsite for trash and evidence of your stay. Pack out all trash: yours and others'.

LEAVE WHAT YOU FIND

- Treat our natural heritage with respect. Leave plants, rocks, and historical artifacts as you find them.
- Good campsites are found, not made. Altering a site should not be necessary.
- Let nature's sound prevail. Keep loud voices and noises to a minimum.
- Control pets at all times. Remove dog feces from trails or camping areas.
- Do not build structures or furniture or dig trenches.

MINIMIZE USE AND IMPACT OF FIRES

- Campfires can cause lasting impacts to the backcountry. Always carry a lightweight stove for cooking. Enjoy a candle lantern instead of a fire.
- Where fires are permitted, use established fire rings, fire pans, or mound fires. Do not scar large rocks or overhangs.
- Gather sticks, no larger than an adult's wrist from the ground.
- Do not snap-branches off live, dead or downed trees.
- Put out campfires completely.
- Remove all unburned trash from fire ring, and scatter the cool ashes over a large area well away from camp.

ENJOY AMERICA'S WILDLANDS AND LEAVE NO TRACE

For Information and materials call:

1-800-332-4100

One last thought on *Leave No Trace*:

***In days of old
When knights were bold
And toilets weren't invented,
They left their load
Along the road
And walked off so contented.***

A childhood ditty; author unknown

“In the pursuit of unknowns, a ranging world explorer can throw open entire new universes, not to mention some curious dimensions of toiletry and disposal. Sometimes there’s just no place to dig a hole. Most of us never have occasion to pray that we won’t have to go big potty outside when it’s forty below or while dangling in midair between pitons on a hundred-foot rock face. In all probability, we are home knitting or walking the dog. Of course, anyone trudging on foot to the South Pole or climbing Mount Everest is already committed to a multitude of un-pleasantries. These breeds of outdoor enthusiasts are extraordinary souls and pride in their accomplishments does not spring from enduring the ordinary. The morning constitutional behind the morning paper is an ordinary, even enjoyable task when performed at home. But under adverse conditions, this simple activity can turn into a colossal calamity or feat of contortion. Consider the mishap Chris Bonington endured at 26,000 feet during an ascent on Everest, as described in his book *The Ultimate Challenge* (New York: Stein & Day, 1963):

Now we’ve got these one-piece down suits; it’s not too bad, in fact it’s comparatively easy to relieve oneself when wearing the down suit by itself. If, however, you are wearing the down suit and the outer suit, it is absolutely desperate, trying to get the two slits to line up....Afterwards, without thinking, without looking back, I stood up and shoved my windproof suit back on....I did not realize anything was wrong—until I poked my hand through the cuff! I tried to scrape it off—rub it off—but by this time the sun had gone, it was bitterly cold and it had frozen to the consistency of concrete.

“And take note of this poor woman, who also bought a suit of misery. A demented (my substitute for the explorer’s adjective “robust”) friend of mine was camped on Oregon’s Three Sisters during a blizzard when an imperious peristaltic contraction indicated it was time to crawl out of the tent and squat. So—out she crawled into a complete whiteout, with snow blowing horizontally on a wicked wind. Five layers of clothes had to be stripped from her rosy behind and shoved below her knees. Never mind the freezing, in retrieving her pants she found that each layer, not unlike a bird bath, had captured a supply of snow. Once the clothes were again clasped to her body, the snow began to melt. Winter campers call it the “soggies.” When questioned as to whether she might not have some helpful hint for others caught in such circumstances, her only reply came, “Hold it!”

“...If our wilderness world is to survive the onslaught of use (misuse) and overuse in the coming years, we must find better means for disposing of human waste. The numbers of both hardy explorers and more casual backcountry travelers continues to swell around the globe—and so does the volume of excrement.

“...The burgeoning feeling in the outdoor community is we can no longer afford—like knights of old—to leave our load along the road. One example, grievously noticeable to early spring backpackers, is the human waste of the previous season’s backpackers, is the human waste of the previous season’s visitors. After the snow melts, frozen lumpettes left by cross-country skiers sit plunk on top of the ground. As the weather warms, they thaw and ripen along with the rest of the landscape. For the early hiker seeking a few days solace in untrammelled places, this is a horrific sight. One might better have stayed home and scheduled a tour at the local sewage treatment plant.

“...There’s no question that improperly cared for waste can be a fierce affront to our aesthetics and a threat to our health. But at other times, leaving behind even the most properly buried deposits can cause irreparable ecological damage....Too many cat holes, too much disturbed earth, and the grasses vanish, leaving topsoil to the mercy of the wind and weather. It is better for us to tread gently than to be confronted later with another in the long line of mitigations—not always successful mitigations—we now face.

“...Packing-it-out—the practice of capturing and carrying fecal waste and sometimes pee out of the backcountry—is increasingly becoming a practical alternative to burial.

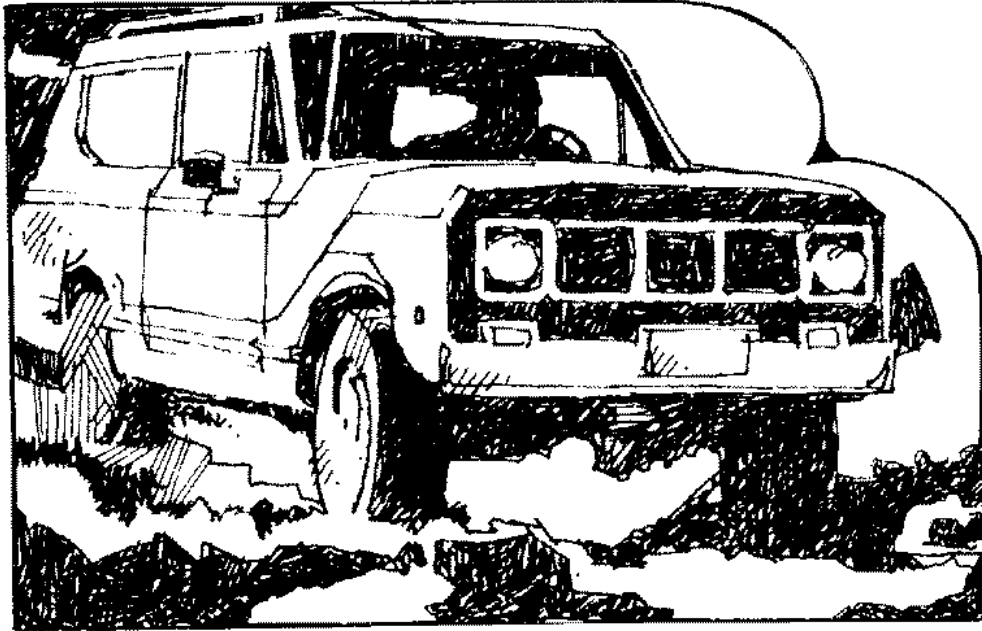
Excerpted from *How To Shit In the Woods*
Meyer, Kathleen, Ten Speed Press, Berkeley, California, 1989.

Thou shalt have a place also without the camp, where thou shalt go forth abroad: And thou shalt have a paddle upon thy weapon: and it shall be when thou shalt ease thyself abroad, thou shalt dig therewith, and thou shalt turn back, and cover that which cometh from thee.

Deut. 23:12-13

In other words, bury properly in soil “that which cometh from thee.” Don’t bury it in the snow, however! That’s just preserving it until spring for some poor camper to find freshly thawed out. Better yet, pack it out! It’s just like picking up dog poop. Turn a large baggie inside out, put your hand inside the bag, pick up the poop with the bag protecting your hand, pull it through the baggie turning the bag right side in (the poop is now inside the bag), seal the baggie, put it into a second baggie, zip that one shut too. Wrap a little duct tape around the whole thing for that extra secure feeling. Clean your hands (just in case).

Driving In Snow Country



Driving In Snow Country (Quick Summary)

- ❖ Test the Conditions
- ❖ Don't Drive Over 25 Miles per Hour
- ❖ Don't Make Sudden Movements or Turns
- ❖ Accelerate and Brake Slowly and Smoothly
- ❖ Slow and Steady Wins the Race
- ❖ Be Prepared!

Driving in Snow and Ice

The best advice for driving in bad winter weather is not to drive at all, if you can avoid it.

Don't go out until the snow plows and sanding trucks have had a chance to do their work, and allow yourself extra time to reach your destination.

If you must drive in snowy conditions, make sure your car is prepared with emergency supplies and that you know how to handle road conditions.

It's helpful to practice winter driving techniques in a snowy, open parking lot, so you're familiar with how your car handles. Consult your owner's manual for tips specific to your vehicle.

Driving safely on icy roads

1. Decrease your speed and leave yourself plenty of room to stop. Allow at least three times more space than usual between you and the car in front of you.
2. Brake gently to avoid skidding. If wheels start to lock up, ease off the brake.
3. Turn on your lights to increase your visibility to other motorists.
4. Keep headlights and windshield clean.
5. Use low gears to keep traction, especially on hills.
6. Don't use cruise control or overdrive on icy roads.
7. Be especially careful on bridges, overpasses and infrequently traveled roads. Even at temperatures above freezing, you might encounter ice in shady areas or on exposed roadways like bridges.
8. Don't pass snow plows and sanding trucks. The drivers have limited visibility, and you're likely to find the road in front of them worse than the road behind.
9. Don't assume your vehicle can handle all conditions. Even four-wheel and front-wheel drive vehicles can encounter trouble on winter roads.

If rear wheels skid...

1. Take your foot off the accelerator.
2. Steer in the direction of the skid until you regain traction. If your rear wheels are sliding left, steer left. If they're sliding right, steer right.
3. If your rear wheels start sliding the other way as you recover, ease the steering wheel toward that side. You might have to steer left and right a few times to get your vehicle completely under control.
4. If you have standard brakes, pump them gently.
5. If you have anti-lock brakes (ABS), do not pump the brakes. Apply steady pressure to the brakes. You will feel the brakes pulse — this is normal.

If front wheels skid...

1. Take your foot off the gas and shift to neutral, but don't try to steer immediately.
2. As the wheels skid sideways, they will slow the vehicle and traction will return. As it does, steer in the direction you want to go. Then put the transmission in "drive" or release the clutch, and accelerate gently.

If you get stuck...

1. Do not spin the wheels. This will only dig you in deeper.
2. Turn wheels from side to side a few times to push snow out of the way.
3. Use a light touch on the gas, to ease car out.
4. Use a shovel to clear snow away from the wheels and the underside of the car.
5. Pour sand, kitty litter, gravel or salt in the path of the wheels, to help get traction.
6. Try rocking the vehicle. (Check your owner's manual first — it can damage the transmission on some vehicles.) Shift from forward to reverse, and back again. Each time you're in gear, give a light touch on the gas until the vehicle gets going.

Sources: National Safety Council, New York State Department of Motor Vehicles, Washington State Government Information & Services

Winterize Your Car

Driving in the winter means snow, sleet and ice that can lead to slower traffic, hazardous road conditions, hot tempers and unforeseen dangers. To help you make it safely through winter, here are some suggestions from the National Safety Council to make sure that you and your vehicle are prepared.

Weather

At any temperature -- 20° Fahrenheit below zero or 90° Fahrenheit above -- weather affects road and driving conditions and can pose serious problems. It is important to monitor forecasts on the Web, radio, TV, cable weather channel, or in the daily papers.

Your Car

Prepare your car for winter. Start with a checkup that includes:

- Checking the ignition, brakes, wiring, hoses and fan belts.
- Changing and adjusting the spark plugs.
- Checking the air, fuel and emission filters, and the PCV valve.
- Inspecting the distributor.
- Checking the battery.
- Checking the tires for air, sidewall wear and tread depth.
- Checking antifreeze levels and the freeze line.

Your car should have a tune-up (check the owner's manual for the recommended interval) to ensure better gas mileage, quicker starts and faster response on pick-up and passing power.

Necessary Equipment

An emergency situation on the road can arise at any time and you must be prepared. In addition to making sure you have the tune-up, a full tank of gas, and fresh anti-freeze, you should carry the following items in your trunk:

- Properly inflated spare tire, wheel wrench and tripod-type jack
- Shovel
- Jumper cables
- Tow and tire chains
- Bag of salt or cat litter
- Tool kit

Essential Supplies

Be prepared with a "survival kit" that should always remain in the car.

Replenish after use. Essential supplies include:

- Working flashlight and extra batteries
- Reflective triangles and brightly-colored cloth
- Compass or GPS system
- First aid kit
- Exterior windshield cleaner
- Ice scraper and snow brush
- Wooden stick matches in a waterproof container
- Scissors and string/cord
- Non-perishable, high-energy foods like unsalted canned nuts, dried fruits, and hard candy.

In addition, if you are driving long distances under cold, snowy, and icy conditions, you should also carry supplies to keep you warm such as heavy woolen mittens, socks, a cap and blankets.

If You Become Stranded...

- Do not leave your car unless you know exactly where you are, how far it is to possible help, and are certain you will improve your situation.
- To attract attention, light two flares and place one at each end of the car a safe distance away. Hang a brightly colored cloth from your antenna.
- If you are sure the car's exhaust pipe is not blocked, run the engine and heater for about 10 minutes every hour or so depending upon the amount of gas in the tank.
- To protect yourself from frostbite and hypothermia use the woolen items and blankets to keep warm.
- Keep at least one window open slightly. Heavy snow and ice can seal a car shut.
- Eat hard candy to keep your mouth moist.

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Driving In Snow Country

By: George Denise-real life adventures (i.e., war stories)

Test the Ice

Driving on snow and ice is different. I learned once if I encounter it, test it. Come to a full, careful stop. Now start up slowly. Put on your brakes, gently and smoothly. See how the car responds.

I once pulled up to a stop light in South Shore Tahoe on a cold and icy day. I put on the brakes and the car immediately slid toward the ditch on my right. I let off of the brakes and the car straightened out but continued heading for the intersection (our light was red). I put on the brakes again, pumping them gently. Again, the car slid to the right. Obviously, my brakes were out of adjustment. I let off the brakes and pulled gently on the hand brake. Hand brakes only operate the rear wheels. It worked. The car stopped in a straight line and I avoided going into the ditch.

If you are new to driving on snow and ice, frozen parking lots is a fun way to get used to driving on ice. Get a little speed (no more than a few miles per hour). Then brake. Remember, gently!

After I put on my chains, I like to test them again.

Don't Drive Over 25 Miles per Hour in Snow and Ice

I never drive faster than 25 miles per hour with chains on. I learned that they physically break readily at 26 miles per hour, whereas they will last forever at 25. True story which is well documented.

Once I was coming down back from Truckee, headed back to Silicon Valley. It was Sunday, late afternoon. I was traveling with several hundred other skiers headed home. Everyone was driving too fast. They wanted to get home. It started to rain. Then the rain turned to light snow. It wasn't sticking yet. Everyone drove faster. We all knew if we could get down another couple of thousand feet, we would be out of it and we wouldn't have to put our chains back on. It was too fast. I knew it. But peer pressure... Suddenly, at Blue Canyon, we came around a bend to the north side of the mountain. The temperature was lower here. For about a quarter of a mile in front of me, the road was coated pure white with snow. There were about twenty cars already spread out over that quarter mile. Several were sliding uncontrollably. One was half over the side on the right. One was in the ditch on the left. One was straight ahead of me, sideways in the road. The car immediately in front of me (a four-wheel drive Bronco) hit his brakes. He went into a slide and following the fall-line perfectly, slid in an arching curve around to the left and into the snow bank. I tried to tap my brakes gently to slow down. I immediately went into the exact same slide as the Bronco. I was following exactly in his tracks. I tried turning the wheel a little. It had no effect. I tried tapping the brakes. No effect. I hit the brakes harder. No effect. I spun the wheel about. No effect. I told everyone to brace themselves and put their

heads down just before we slid into the back of the Bronco. We got out inspecting the damage. Another car slid into the back of mine. A pick-up full of locals pulled up to see if we needed help. Another car slid into them, then careened off like it was a giant game of bumper pool. I looked up the hill and saw thirty or forty cars sliding toward us. I saw a Greyhound bus sliding sideways. I saw a big rig sliding sideways into a Porsche 911. We all got into our cars and got out of there as fast (and as carefully as we could). Chains or four-wheel drive, the speed limit in snow and ice is 25 miles per hour. Don't exceed it. **And don't get out of your car if it puts you in danger of being hit by other sliding cars!**

Don't Make Sudden Movements, Turns, Accelerate, or Brake

My family took a ski holiday to Salt Lake City. I was attending classes at UC Berkeley and got out of class at 10:00 pm. The plan was to drive all night. It started to snow as we were coming out of Auburn. We had to put our chains on shortly thereafter. Soon we were in a blizzard going over Donner Summit. We were in a blizzard going past Truckee. We were in a blizzard going through Reno. Then we headed out across the desert. We were still in a blizzard. Seems the blizzard was going the same way we were. We were following a big rig. I figured as long as I stayed behind him, I would be able to find the road. Boy, he was fast. He kept pulling away from me. After a while, I couldn't see his taillights anymore, so I followed his tracks. Then he got so far ahead, his tracks were filling in. I began to worry. What am I talking about, I had been worried since it first started snowing. He must have been going 50 miles per hour, maybe faster. Fortunately, it was a straight road. I kept my hands locked on the wheel. I remember telling my wife, if anything runs out in front of me (snowshoe rabbit, maybe?), I would just hit it. I wasn't going to let the wheel turn, nor hit the brakes no matter what!

Slow and Steady Wins the Race

We made it! A couple of days later, we were coming down from Brighton, advertised as "The hill everyone in Salt Lake City learned to ski on." It was about 5 degrees below zero. The hill was steep. I had seen several people looking at our California license plates. I knew what they were thinking: "Flatlanders"! I put it in first gear and we started down the hill. I stayed in first and used the emergency brake to slow from time to time. No sudden movements with brakes, steering or accelerator. We made it down fine. However, I counted nine cars with Utah plates in ditches on both sides of the road on the way down! Maybe now they'll have more respect for Flatlanders! Probably not.

Be Prepared!

Make sure you are well equipped, just in case you get buried in a snow bank for several days. Items to carry:

- ❑ Chains
- ❑ Chain tighteners
- ❑ Repair Links
- ❑ Tarp
- ❑ Parka
- ❑ Raincoat or Poncho
- ❑ Gloves
- ❑ Cap
- ❑ Goggles
- ❑ Ski Mask
- ❑ Flashlight, extra batteries, bulbs
- ❑ Shovel
- ❑ Bag of sand (for traction)
- ❑ Flares
- ❑ First Aid Kit
- ❑ Extra Food
- ❑ Extra Water
- ❑ Blankets or Sleeping Bags
- ❑ Battery Operated Radio with extra batteries

Important note: Always practice putting on your chains at home before you go. You don't want to be learning how they work, or worse yet, discover they don't fit, while crouched down beside your car while it is snowing six inches an hour!