The High Adventure Team
Santa Clara County Council
Boy Scouts of America
Presents

# Introduction to Winter Camping

**University of Scouting**

# Agenda

How To Dress For Snow Camping
Snow Shelters
Traveling on Snow: Skis and Snowshoes
Traveling on Snow: Sleds vs. Backpacks
Menu Planning and Cooking In Snow
Orienteering With Map, Compass & GPS
Lunch
Winter Emergency Care
What and How To Pack For Snow Camping
Low Impact Camping In Snow: Leave No Trace
Avalanche Safety
Driving In Snow Country

# How To Dress For Snow Camping

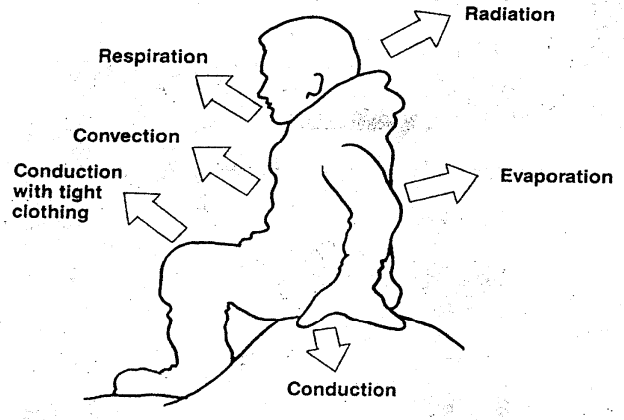
# How to Dress for Snow Camping

- 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
- Wear Synthetics
- Fiber Pile or "Fleece"
- Gore-tex
- Thermal Barriers
- If your feet are cold, put on a hat!

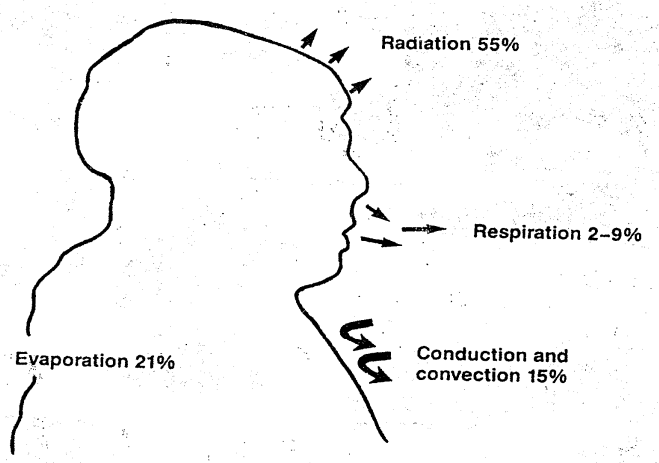
# Stay Warm and Dry

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

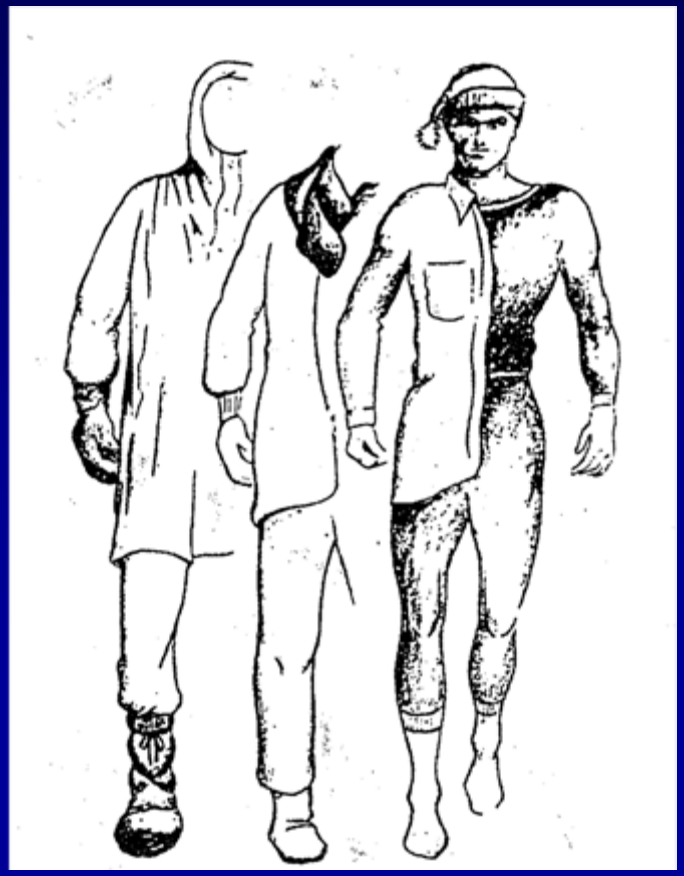



Types of Body Heat Loss




Types and Possible Percentages of Upper-Body Heat Loss

# Dress In Layers



**Outer Shell - Insulating Layer - Inner Wicking Layer**

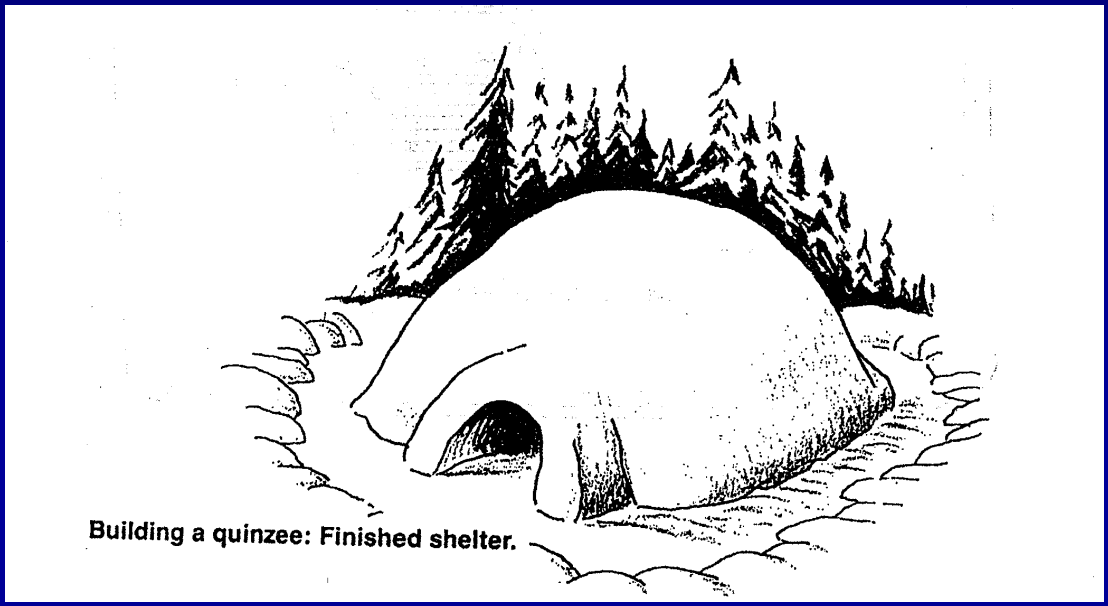
# Wear Synthetics

Synthetic materials, such as polypropylene and polyester have a very low water absorption factor. Polypropylene, absorbs less than .1% of its weight in water. Instead, it wicks moisture away from your body . This is important; we lose body heat much more rapidly through water than we do through air.

# Use 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.

# Snow Shelters



Building a quinzee: Finished shelter.

# Snow Shelters

- 4-Season or Expedition Tents
  - Aluminum Poles
  - Guy Lines
  - Full Rain Flys
  - Vestibules
  - 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

# Four-Season Tents

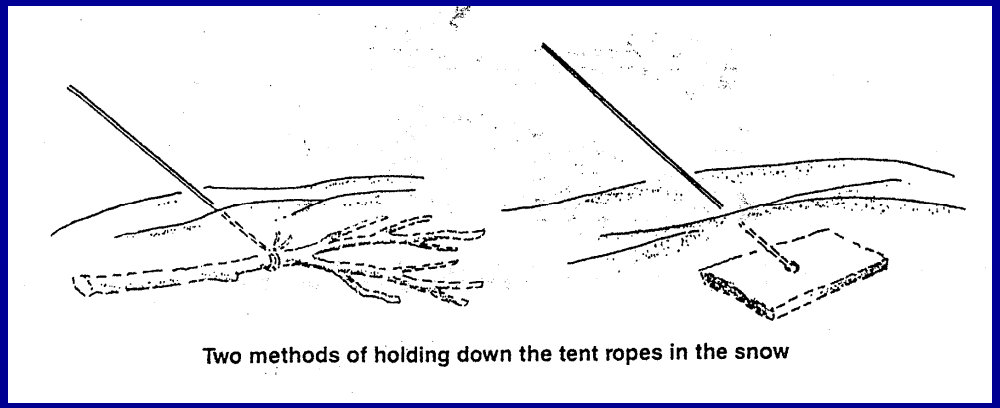
A good four-season tent will have aluminum poles to hold up to wind and snow loading, guy ropes that come out from the sides to add additional strength, especially in high winds, it will have a rain fly that comes all the way down to the ground, and it will have vestibules that attach on the ends of the tent to create an entryway out of the wind and blowing snow where boots and gear can be stored.

# Four-Season Tents

# Snow Stakes

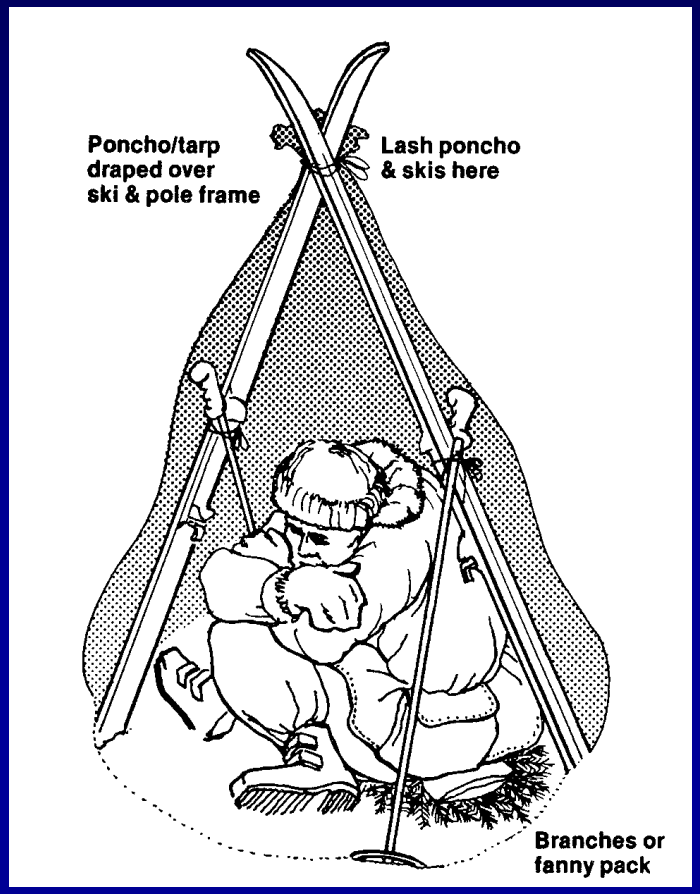
Special "snow stakes" are typically 1foot long, 1 inch wide aluminum sheet metal stakes, curved slightly, and often with ½ " holes drilled in them. When placed in loose or soft snow, and packed down, the snow tends to congeal or "firm up" over the next hour or so (as long as the temperature is below freezing), securing the tent for all but the strongest winds.

# Snow Stakes

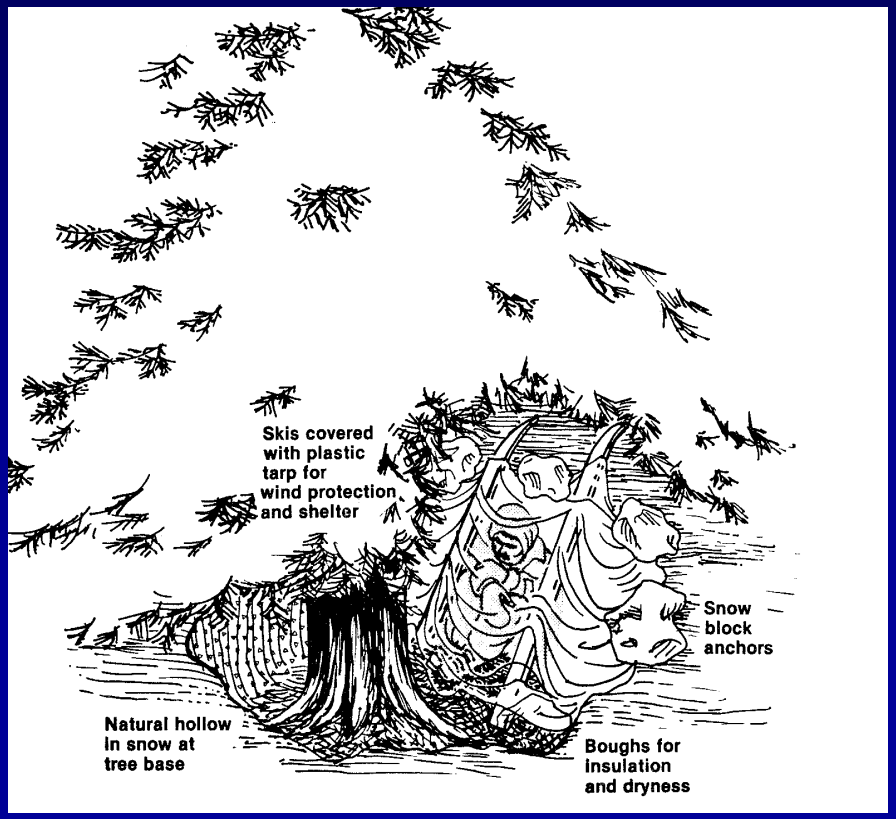


Two methods of holding down the tent ropes in the snow

# Emergency Shelters



# Natural Emergency Shelters



# Snow Shelters

Snow shelters include the snow trench, the snow cave, the cut-block igloo, and the molded snow dome called the quinzee.

Snow shelters are easy to construct and they work well.

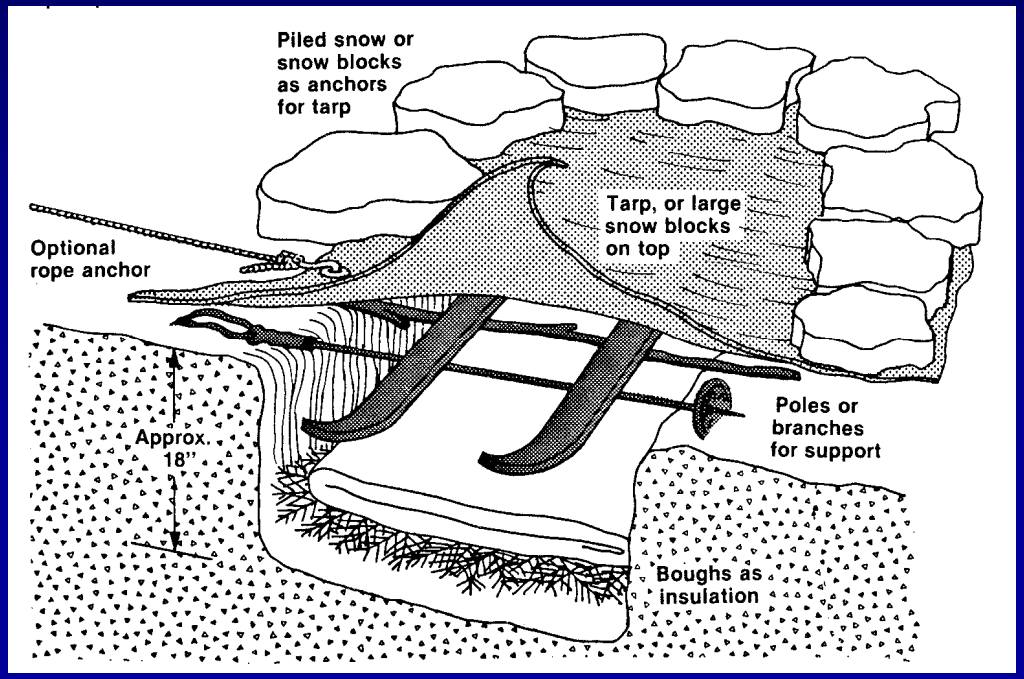
Even in extremely low temperatures, snow-shelter builders usually get wet. Pace the work, don't overheat and perspire.

Wear waterproof clothing, especially rain or snow pants.

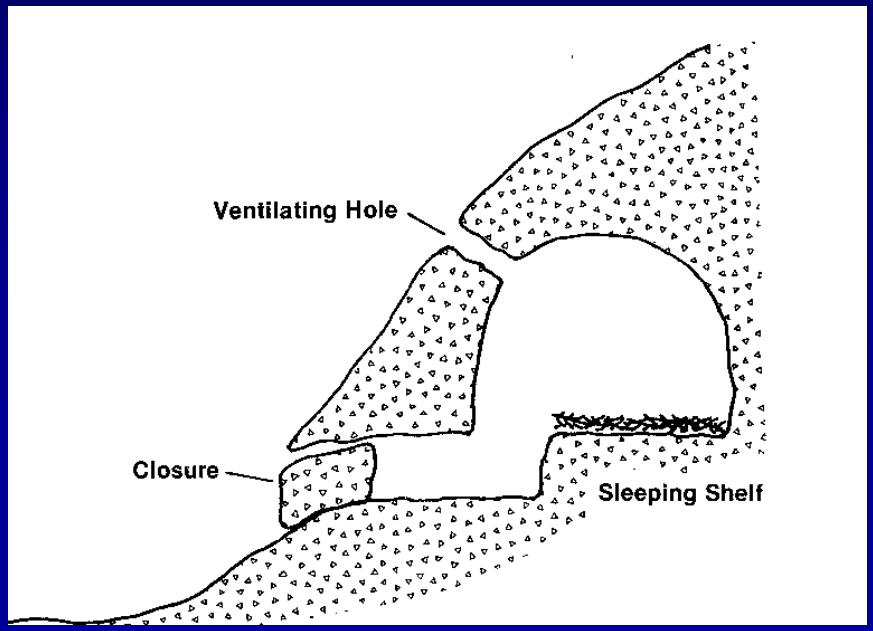
# Thermal Conductivity Values

| ***Material*** | ***Conductivity (cal/sec-C)*** | ***Density (gms/cm3)*** |
|---|---|---|
| *Air* | *.00006* | *.0013* |
| *Down* | *.0001* | *.006* |
| *Polyester (hollow fiber)* | *.00016* | *.006* |
| *Polyester (solid fiber)* | *.00019* | *.006* |
| *Snow* | *.0004* | *.25* |
| *Wood (pine)* | *.0004* | *.45* |
| *Polyester (solid)* | *.0005* | *1.1* |
| *Cardboard* | *.0007* | *1.1* |
| *Water* | *.0014* | *1.0* |
| Metals (typical) | .1 – 1.0 | 3 - 9 |

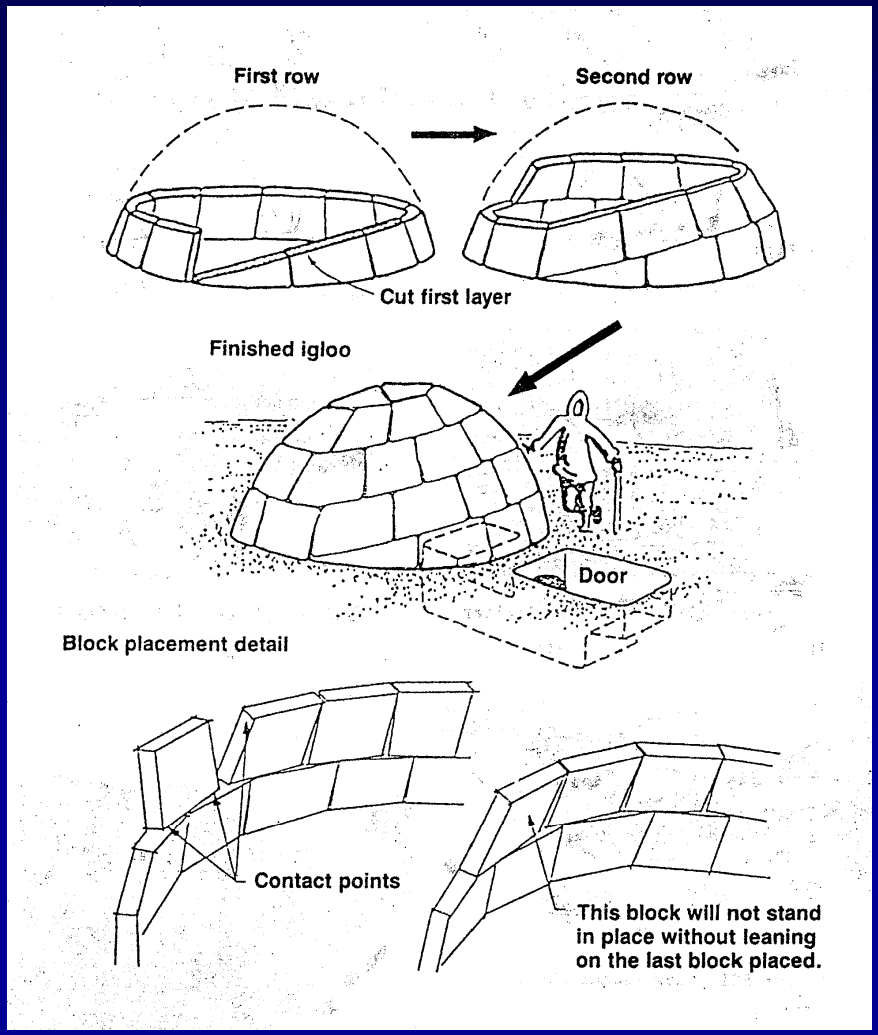
# Trench Shelters



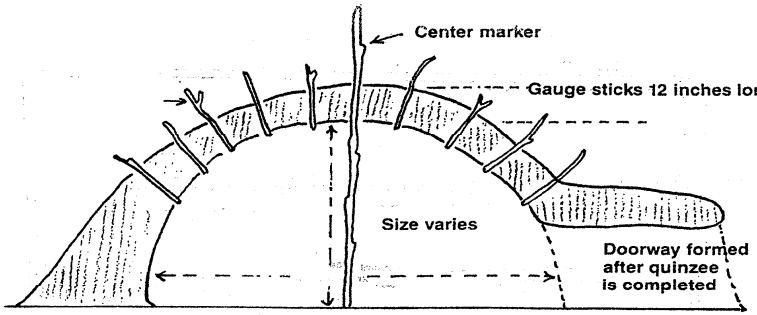
# Snow Caves



# Igloos

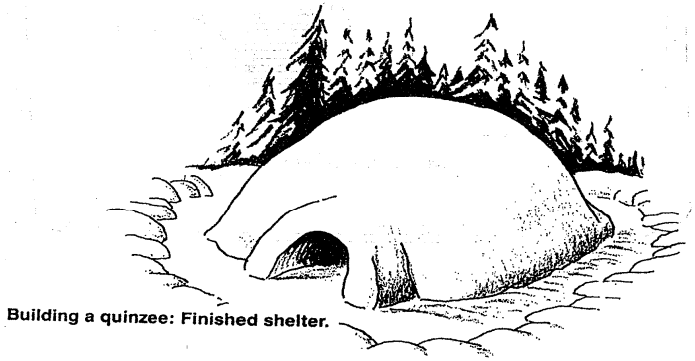

First row
Second row
Cut first layer
Finished igloo
Door
Block placement detail
Contact points
This block will not stand in place without leaning on the last block placed.

# Quinzees



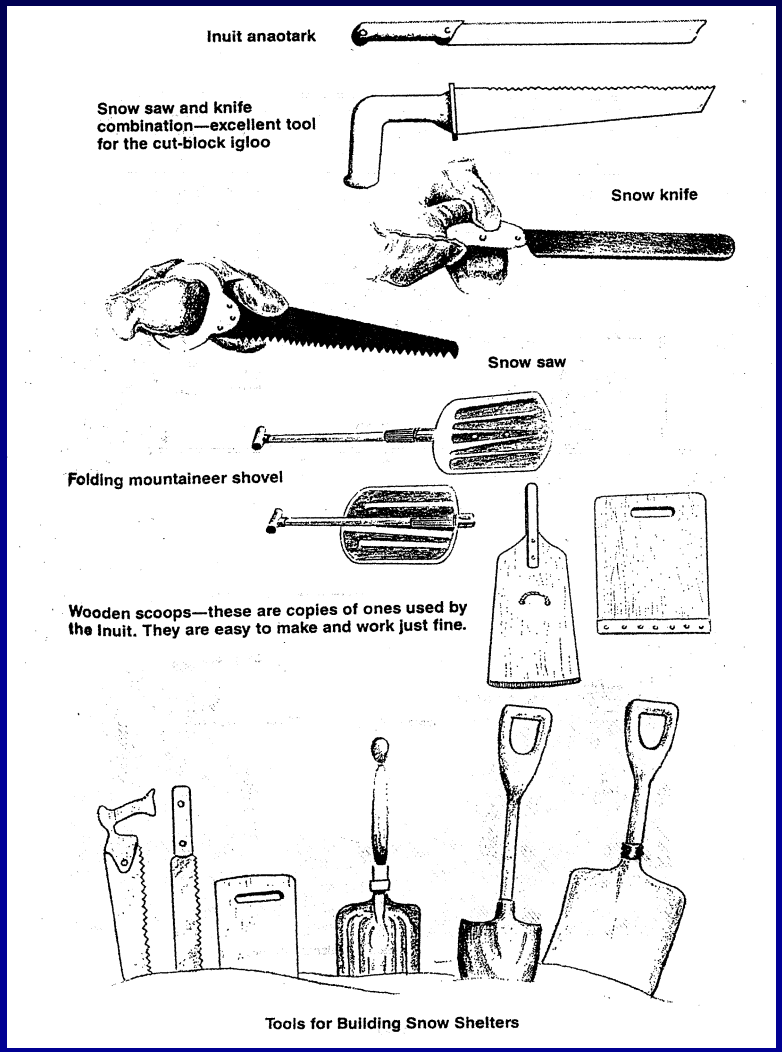

Building a quinzee: center pole and gauge sticks.

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



Building a quinzee: Finished shelter.

# Snow Tools




Tools for Building Snow Shelters

# Traveling On Snow: Skis and Snowshoes

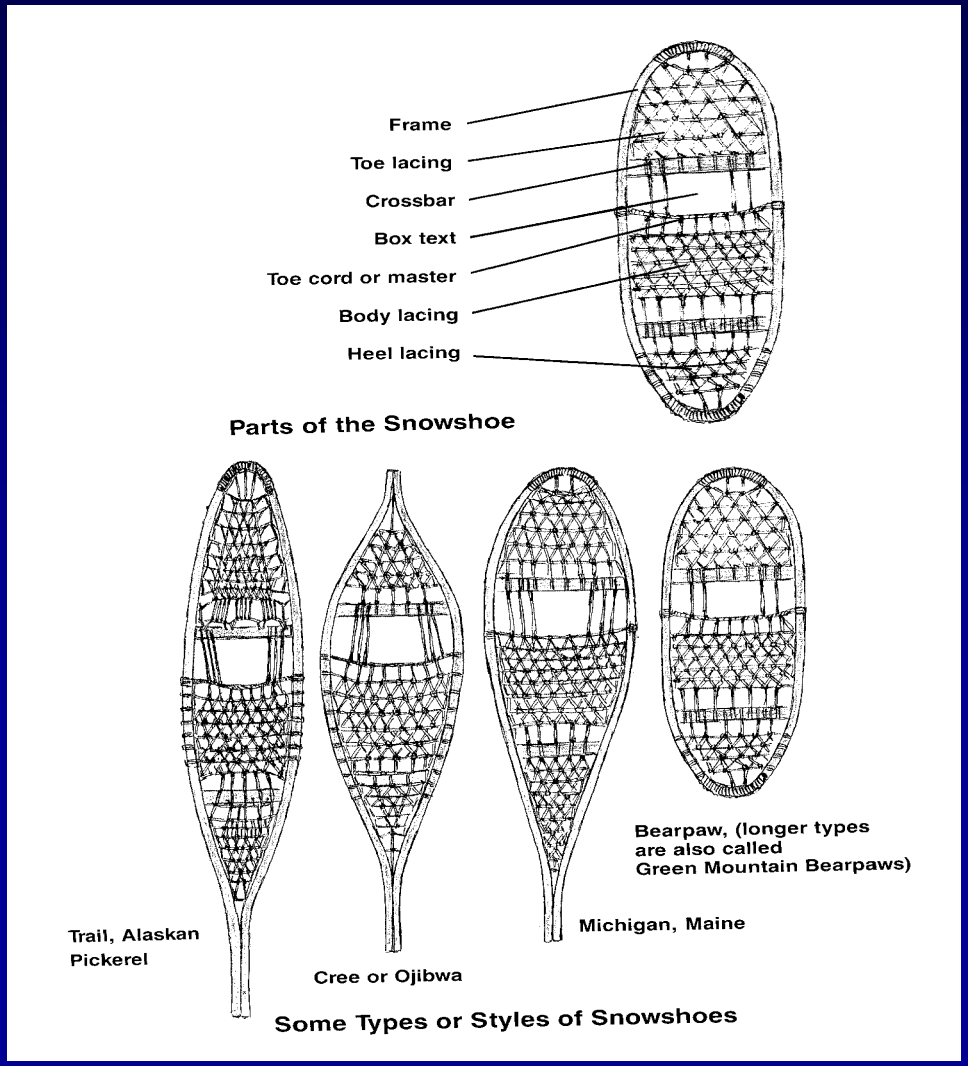
# Traveling On Snow: Skis and Snowshoes

- Snowshoes
  - Why snowshoes and skis.
  - Traditional
  - Contemporary
  - Making Your Own
- Skis
  - Cross-country Skis
  - Mountaineering Skis
- Ski Skins
- Boots
  - Cross-country
  - Sorels
  - Hiking Boots
  - Winter Mountaineering Boots
  - Plastic Mountaineering Boots
- Gaiters
- Ski Poles
- Trekking Poles

# Why 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, gets 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.

# Traditional Snowshoes



## Contemporary Snowshoes

Contemporary snowshoes are made of aluminum alloy, have neoprene platforms instead of lacing, and "claws" for gripping hard snow and ice. They are lighter and stronger than traditional snowshoes.

# Homemade Snowshoes

A number of methods and materials have been employed in making inexpensive snowshoes:

- Wood
- Metal Conduit
- PVC Piping

# Snow Boots

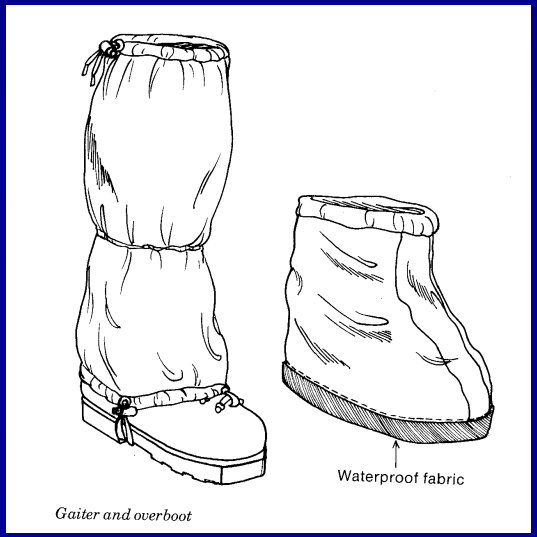
- Water-proofed Summer Boots
- Winter Hiking Boots
- Winter Mountaineering Boots
- Plastic Winter Mountaineering Boots

# Skis

- Cross-country
- Mountaineering

# Accessories

- Ski "Skins"
- Ski Poles
- Gaiters



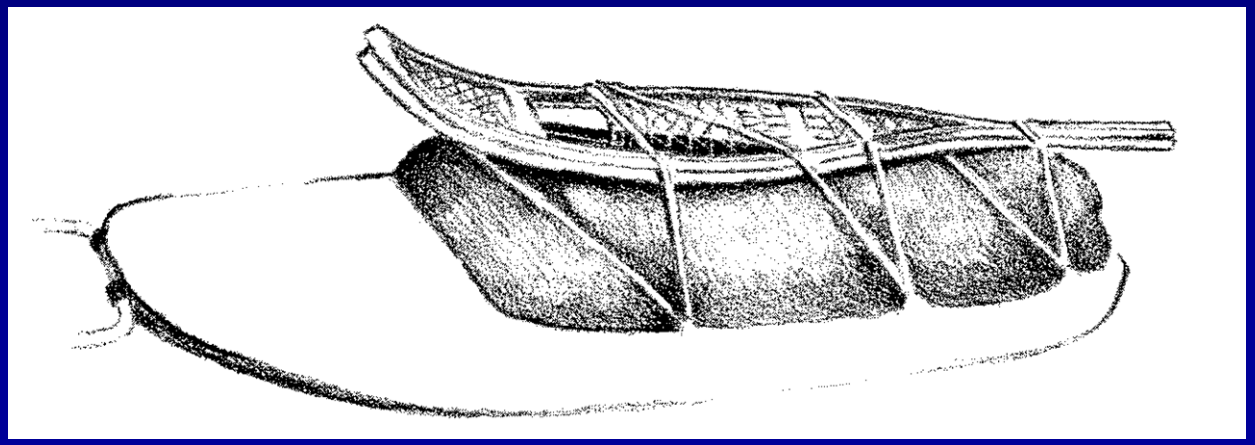

*Gaiter and overboot*

# Traveling On Snow: Sleds versus Backpacks

# Traveling On Snow: Sleds versus 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

# Commercial Sleds



# Homemade (modified) Sleds
# Model shown: Paris Expedition model 960

**Assembly:**

1. Use one piece of rope around the full perimeter so you are pulling on the entire coaming (edge) of the sled rather than just the tow points.

2. Tie large knots after the rope exits the tow points so the rope cannot slip back through.

3. Once the rope is threaded through the pipe, tie a loop on the outside using a figure 8 or simple overhand on a bite.

3. The end loops are clipped into a waist harness to finish the “pulk”.

# Menus and Cooking In Snow

# Menus and Cooking In Snow

- Food and Water Requirements
- Fuel for Heat and Energy
- Human Energy Expenditures
- Recommended Cold Weather Diet
- Winter Camping Foods
- Suggested Menus
- Cooking & Eating Utensils
- Clean-up
- Water

## Food And Water Requirements

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.

# Fuel For Heat and Energy

Food serves three functions in the body:
It serves as fuel to provide heat energy or calories,
It provides materials for building, repairing, or maintaining body tissues.
It helps regulate body processes.

# Human Energy Expenditures

| | |
|---|---|
| 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 |

# 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% |

# Winter Camping Foods

Freeze-dried Foods
Retort Meals
Frozen, Pre-cooked Meals
Dehydrated Foods
MRIs

# 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.

# SUGGESTED MENUS

**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.

# SUGGESTED MENUS

## Trail Snacks

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

# SUGGESTED MENUS

**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.

**Cooking Utensils.** You don't need a lot: two or three nesting pots, or one large, four to six-quart pot for the whole patrol, a serving spoon, and a pot griper or Leatherman-type multi-tool with pliers. 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.** You should not need to use a lot of utensils in winter; 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

Lick bowls and spork 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 boiling 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.

# What and How To Pack for Snow Camping

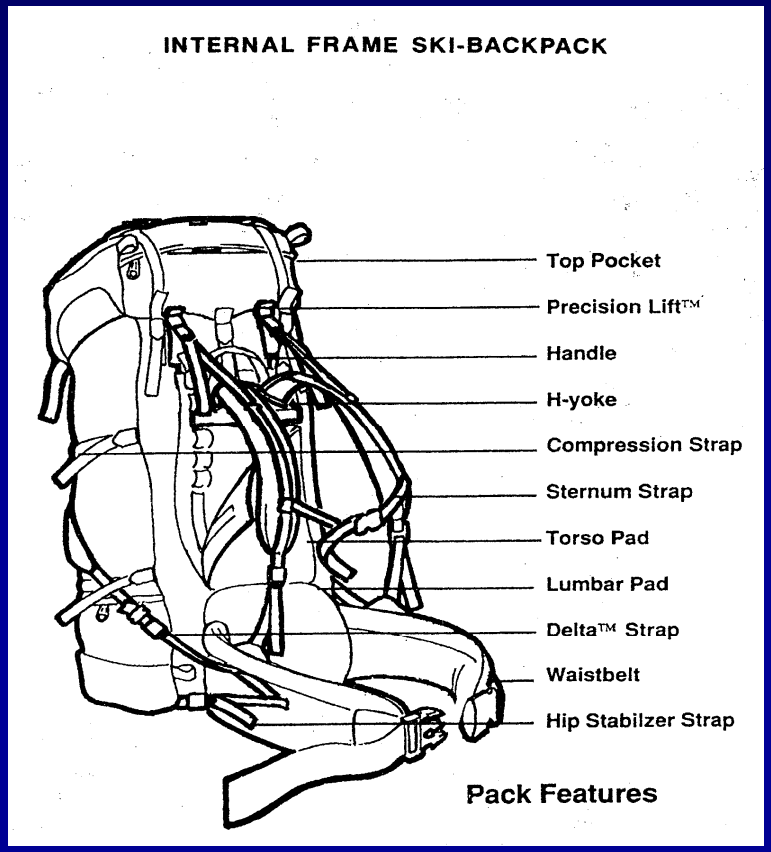
# Important Considerations

- Take Everything You Might Need, - in the Lightest Weight Possible
- No More Than 25% - 30% of Body Weight
- Internal Frame Backpack

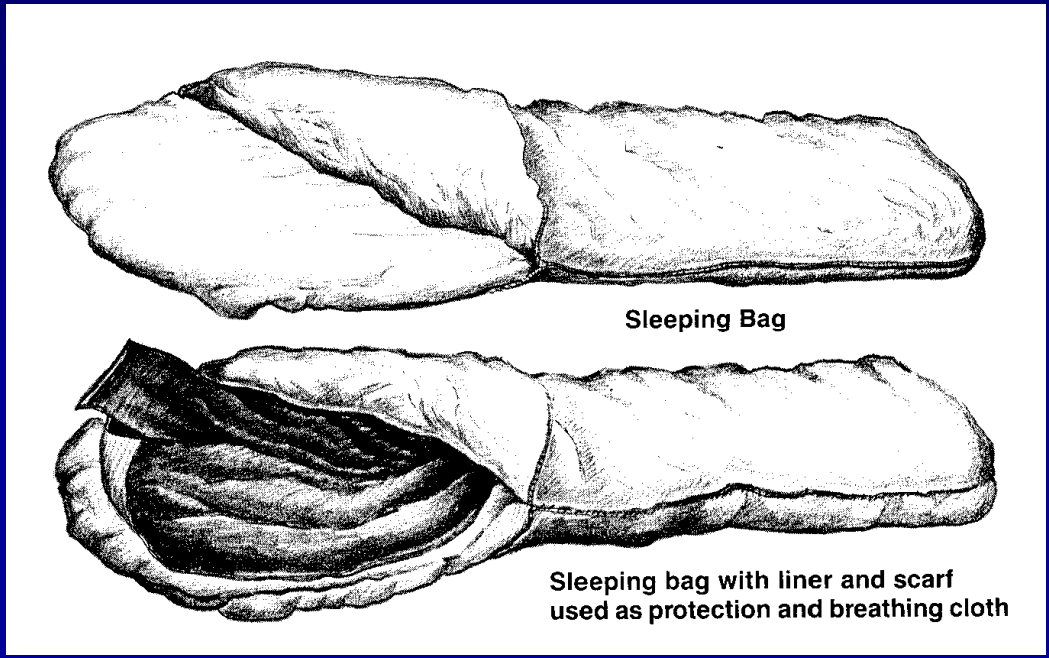
# What and How To Pack for Snow Camping

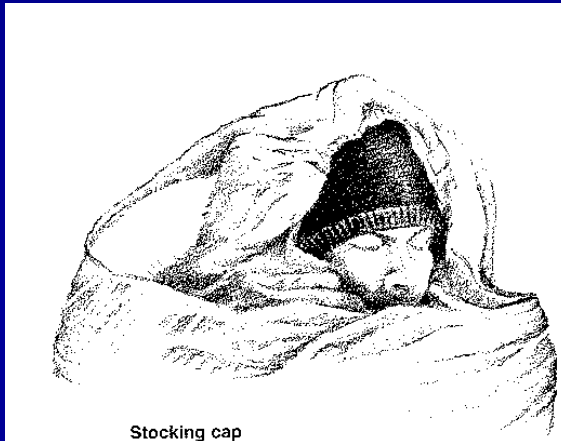
- Four-Season Tent
- Ground Cloth
- Sleeping Pad – Ensolite or Therm-a-Rest
- Sleeping Bag; Rated to 0 Degrees, Synthetic
- Pack Everything In Zip-lock Bags
- Extra Clothing
- Rain Suit or Poncho
- Backpacking Stove With Fuel
- Cooking Utensils
- Pocket Knife
- Two Quarts of Drinking Water
- Food
- Personal First Aid Kit
- Matches, Fire Starter, Candles
- Flashlight or Headlamp With Extra Batteries, Bulbs
- Personal Toiletries Kit
- Compass, Map of Area
- 6 Extra 30 Gallon Trash Bags
- Toilet Paper
- Small Plastic Shovel or Snow Shovel

# Internal Frame Backpack



# Synthetic Sleeping Bag With Hood Rated to 0 Degrees Fahrenheit



# Insulated Sleeping Pad

Two types of pads 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; they absorb water.

Do not use air mattresses; the air inside conducts heat away from your body.

# Pack Everything In Plastic Trash Bags

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!

# Water

- Carry at least two liter water bottle or a hydration system with you
- Even with a hydration system, carry at least one liter bottle for use with water filter and for mixed drinks.
- When traveling over the snow, there is often no running water visible to filter easily.
- Do not eat snow, as the process reduces body temperature and freezing does not kill bacteria and parasites.