

## Winter Personal Gear & Clothing

"There is no such thing as bad weather,  
just poor choices in gear & clothing."

Obviously, you can't bring an entire closet full of clothing to snow camp, so you want to have layers that serve multiple purposes that you can use individually or in conjunction with other layers to fit weather conditions from hot and sunny to windy, cold, snowstorm. As your environment or activity changes, so will your clothing needs.

It is not, as so many believe, a matter merely of piling on more and heavier clothing as the temperature drops. It's not necessary to pack three or four or five extra sweaters.

**Keeping warm** is a combination of **insulation** and **moisture control** (both outside dampness and body perspiration). Staying warm in the winter is having the proper clothing layers and knowing how to use them effectively.

We tend to overdress when active and underdress when we stand around. Clothing should be adapted to the types of activities that are participated in. Always "**THINK LAYERING**." Layering allows for flexibility for changing weather conditions and physical activities. Clothes should be kept to the minimum, and replaced during halts in activity.

The idea behind layering is that every piece has a purpose. You put together multiple pieces that deal with all the variables. If one variable changes; for example, the rain stops, you can take off your rain shell. If it gets a little warmer, but it's still raining, you can take off an insulating layer, but leave your rain shell on.

**Keeping dry is vital:** It's important to avoid overheating, perspiring and subsequent chilling; when on the move and active in the winter.

After setting up your tent or snow shelter, you need to change all your clothing. Your clothes will be sweaty and have snow melt all over, so they will be wet and you will get cold. Take all of your clothing off and put fresh clothing on.

Keep in mind that being at snow camp is not a fashion show. Wear what you need to stay warm and dry.

The 3 Ws of layering:

- **Wicking** – base or inner layer
- **Warmth** – middle/insulating layer(s), and
- **Wind/Water** – outer layer

### Upper Body Layers

The **Base or Inner Layer** is typically a light to mid-weight wool, polypropylene or polyester long-sleeved shirt. The purpose of the inner layer is to draw perspiration away from the skin to the next layers, which makes the wearer feel warmer and more comfortable. This transfer of moisture happens due to **capillary action** - moving the moisture away from your skin so that it can evaporate and not

make you cold. This is called **wicking**, and thus the fabrics that assist in this process are called wicking fabrics. When moisture has moved from the skin into (non-absorbent) clothing, it has more surface area and will evaporate faster.

Merino wool and synthetic materials such as polyester and microfiber-based fabrics are good fabric choices for a base layer as these fabrics do not absorb moisture, but instead transfer moisture well. Synthetic fabrics can also carry special finishes, such as UV protection, insect repellent and anti-bacterial agents which reduce odours.

**Mid layer(s)** – a mid to expedition weight polar fleece or wool shirt, jacket or pullover that adds an additional layer of warmth.

- vest
- wind shirt or jacket that is very lightweight – it just provides wind protection or a lightweight puffy jacket – not so heavy that it restricts you from moving

**Outer layer** is typically a big synthetic layer jacket or parka ideally with a hood. It should be big so that it can fit over all the layers or breathable waterproof shell jacket. An ideal outer garment is of wind-resistant and water-repellent material.

Non-breathable waterproof clothing; such as, a plastic rain jacket is not good to have a snow camp as it will not allow wicking away of moisture where it can evaporate and the jacket will cause you to become damp inside (think raining inside your jacket – wet on the outside and on the inside).

Zipper pulls added to all jacket zippers make them easier to use while wearing big mittens.

### Hand layers

Mittens are generally warmer than gloves because fingers come into direct contact with each other, passing warmth from one to another. Gloves separate each finger, providing better dexterity. It's handy to have a pair of gloves close by for doing camp chores and preparing meals.

The ideal hand layering system would include:

- a pair of liner gloves
- a pair of warmer gloves or mittens
- a big insulating mitt, and then,
- a shell mitten to go over top of that

Liner gloves are because you always want something on your hands, the warmer gloves or mittens start to add some insulating layers because the liner gloves aren't very warm, and then the shell mittens provide some waterproofing for a variety of activities.

If you don't have the ideal hand layering system, it's a good idea to bring several pairs of gloves and mittens so you will have dry gloves or mittens to change into when your gloves or mittens get wet. Knitted mittens or mitt-liners inside water-repellent over-mittens are best. Finger gloves are not sufficiently warm in sub-zero weather even with an outer mitten. Remember to bring lots of extra pairs of mittens!

**Head layers** – recommend at least two warm hats, not including one that you would bring for sleeping. One should be a lighter weight hat that you can wear while doing activities. It's good to have at least one much warmer toque that covers your ears. On a really cold day, you can have a fleece neck gaiter and combine it with a balaclava. It's good to have a hood in your upper body layers. Bring extra toques.

## Lower Body Layers

### Base layer

Start out with a similar base layer to the top.

- Lightweight to mid-weight, made out of either wool or synthetic material
- Long johns or tights that are not made out of cotton

### Mid / insulating layer(s)

If you're a colder person, you probably want to bring an extra mid / insulating layer

- Soft shell pants or
- Ski pants

### Outer layer

For the top layer on the bottom, a big pair of pants large enough to fit over all of your other bottom layers, and preferably waterproof and breathable is ideal, but this can depend on the activity...

These are only winter clothing suggestions. Keep in mind that you are your best temperature regulator and everyone's personal micro-climate needs are different. What's comfortable for me, does not necessarily work for everyone. For some people, one bottom layer and two top layers may be sufficient, whereas some other people may need four or five upper body layers to stay warm and comfortable.

Both wool and synthetic materials are great when snow camping.

<b>Material</b>	<b>Wool</b>	<b>Polypropylene or other synthetic fibres</b>	<b>Down</b>	<b>Synthetic Fill</b>
<b>PROS</b>	<ul style="list-style-type: none"><li>• natural fiber</li><li>• great insulator</li><li>• has natural anti-bacterial properties, so it does a good job of managing odours</li><li>• if it gets wet, it still insulates</li></ul>	<ul style="list-style-type: none"><li>• great insulator</li><li>• very lightweight</li><li>• if it gets wet, it still insulates</li><li>• more durable</li><li>• less expensive</li></ul>	<ul style="list-style-type: none"><li>• natural fiber</li><li>• excellent insulator</li><li>• lightweight</li></ul>	<ul style="list-style-type: none"><li>• excellent insulator</li><li>• lightweight</li><li>• if it gets wet, it still insulates</li><li>• more durable</li></ul>
<b>CONS</b>	<ul style="list-style-type: none"><li>• tends to be a little heavier</li><li>• not as durable</li><li>• more expensive</li></ul>	<ul style="list-style-type: none"><li>• some of these fabrics tend to retain odours</li></ul>	<ul style="list-style-type: none"><li>• when it gets wet, it no longer insulates</li><li>• not as durable</li><li>• more expensive</li></ul>	<ul style="list-style-type: none"><li>• heavier</li><li>• bulkier</li><li>• less expensive than down</li></ul>

Clothing should be loose fitting, with plenty of air space. Tight fitting clothing does not allow sufficient air space. There should be air space between garments. Clothing doesn't *make* you warm. It only keeps you warm by trapping heat generated by your body. If you wear layers of clothing (for example, two or three layers instead of one bulky one, or two pairs of sock instead of one heavy pair, etc.), air trapped in spaces between the layers will insulate almost as well as the clothing itself. This helps keep the heat in. Space between layers also allows normal perspiration to move away from your body where it can evaporate.

***Cotton is the one material you don't want to bring snow camping. COTTON KILLS. If cotton gets wet, it takes a long time to dry, and if you have a wet layer of fabric against your skin, that's going to pull heat away from your body.***

Cotton does not transfer or wick moisture well. You are better off going naked in cold, wet weather than wearing wet cotton. You risk hypothermia if you wear **cotton**. Wet **cotton** robs your body of heat. Cotton can become abrasive when wet and can cause blisters and pack sores and also gets heavy when wet.

Clothing keeps you warm by trapping warm air near your skin. When cotton gets wet, it ceases to insulate you because all of the air pockets in the fabric fill up with water. When you hike, you perspire, and any cotton clothing touching your skin will absorb your sweat like a sponge. If the air is colder than your body temperature, you'll feel cold because your cotton clothing is saturated and no longer providing any insulation.

It doesn't have to be expensive to outfit yourself for snow camp. Costco has reasonably priced technical clothing and great "new to you" outdoor clothing can be found at places such as Value Village. Also check out websites; such as, Sierra Trading Post.

### Demonstration

Items needed for the demonstration:

- Hanger
- Pair of jeans (a lighter coloured pair works better)
- Bucket filled with 1 cm of cold water

When I arrived here today, I placed one leg of this pair of jeans in a bucket of water. With the other leg, I dipped it in 1 cm of water and then took it out of the water right away. That was (length of time) ago. You can see how quickly jean fabric absorbs the water and how quickly you would become wet and cold if you were to wear jeans at snow camp.

### Footwear

**Socks** - one of the best systems for keeping feet warm is using multiple layers. Start with a thin polypropylene liner sock next to the skin to wick moisture away followed by 1-2 pairs of wool or wool/nylon blend socks. Make sure the outer socks are big enough that they can fit comfortably over the inner layers. If your feet are cold, don't put on extra socks if your boots are already snug. Constricted toes are colder than those with room to wiggle. An extra-thick sock will not keep your feet warm if it makes your boots too tight and restricts circulation. If socks are too loose, they can slip or bunch up, creating pressure spots leading to blisters. Ideally, socks should be long enough to pull them well up on the calf.

While putting your socks on – spread your toes out to make sure they can move, and they're not constricted.

If you're someone who has damp feet, you will probably go through more pairs of socks over a camping weekend than someone with dry feet.

Place damp (not wet) socks in the bottom of your sleeping bag at night to dry from your body heat.

Keeping your feet dry is essential to keeping your feet warm you may need to change your socks during the day. Take extra socks. Another way to keep your feet warm is to keep the rest of your body well covered. If your feet are cold, put on a hat.

**Boots** – Boots are probably your most important item at snow camp.

Footwear should be sufficiently roomy to permit comfortably wearing two pairs of wool socks, or, in place of an extra pair of socks, a felt insole or booty. This absorbs a great deal more moisture, and keeps the feet dry.

While it is possible to get by with traditional hiking boots, most snow camping experiences are greatly enhanced by winter boots that are waterproof and insulating. For lower-output activities in colder temperatures, such as snowshoe walking or winter camping, thickly-insulated, calf-high boots with removable liners; such as, Sorel's, are ideal. These boots have a slightly loose fit, are good for circulation and can accommodate lots of sock layers. Removable liners are easier to dry out, and are particularly suited to multi-day trips. You can even bring a spare pair of liners.

If you don't have insulated boots, you can select low-cut boots that have less insulation (some have sewn-in insulation, others have removable liners) in combination with a pair of gaiters. **Gaiters** keep snow from getting into your boots and keep your socks and pant legs free from snow. They even add a bit of warmth.

**Tight boots restrict circulation, and are a direct cause of frozen toes or feet.**

Tightening your boot laces too tightly will constrict the blood flow as well.

Rubber boots are for rain, not for snow, they do not insulate, so you can feel the snow through the boots and your feet will get cold.

Don't go to sleep with your boots on – your boots can freeze to your feet. Put a couple of long-lasting hand warmers into your boots after you take them off. Your boots will dry out during the night.

Spare footwear can be a luxury for changing into as soon as major activities have ceased for the day. It is a treat to put on dry socks and warm footwear. Keeping your feet warm plays an important role in maintaining a comfortable temperature. Down or synthetic fill booties are super lightweight above the ankle booties made with a nylon outer shell fabric, foam sole and an adjustable draw closure.

Keep your hands and feet warm. Your body will always protect the core, so if your hands and feet are warm, your core will also likely be warm. If your hands or feet are cold, put on more layers, and put on a hat!

## Interactive Scenarios

**Scenario 1:** You are snowshoeing up a steep incline with a 50 lb. pack. The air temperature is minus 12 degrees and you are dressed in wool pants and a lightweight polypropylene shirt. As soon as you stop for a rest, your heat production slows. If you stop for more than a couple of minutes, you will begin to chill.

### ***What should you do?***

*Answer:* You need to have an outer layer handy to put on.

**Scenario 2:** You are snowshoeing along flat terrain. The air temp is minus 4 degrees and you are dressed in light polypropylene tops and bottoms, a down vest, and a wind shell. You come to a long steep hill and have to push hard to get up and over. You start to sweat as your heat production

increase with the increased muscle activity. To prevent overheating, you pull off the vest and stick it in your pack.

### ***Why not just have lots of layers on and sweat?***

*Answer:* Heat loss from a wet surface can be up to 25 times greater than a dry surface (due to the higher density of water). If you sweat and get soaked, you will lose heat much more quickly through evaporation of the water. Also you are losing an incredible amount of water through sweating since the air is so dry. Too much water loss leads to dehydration which significantly increases the risk of hypothermia. So you want to control your layers so as to be warm at the activity level you are in but not sweating profusely.

Thus, traveling in the winter is a *constant* process of adjusting your layers to keep comfortable. This means having a number of layers you can add or subtract and allowing for versatility within layers. Convection may account for the greatest amount of heat loss under most conditions. In order to properly insulate, you need to have an outer layer that is windproof.

**Scenario 3:** You are standing on a windblown summit in a wool sweater; the wind will penetrate through the openings in the sweater and quickly carry away the warm layer of air next to the skin.

### ***What should you do?***

*Answer:* Another convective factor is the "bellows action" of clothing. As you move, a bellows action occurs which tends to pump your accumulated warm air out through openings in your clothing and sucks the cooler air in. In some conditions this action can reduce your body's personal insulation by 50% or more. Thus, it is important that *all* layers have effective methods of being "sealed" (i.e. buttons, zippers etc.) Openings in layers allow you to ventilate, to open the "chimney damper" if you are beginning to overheat, without having to actually remove a layer. So opening and closing zippers on a jacket, or armpit zips will allow you to either ventilate if you are getting too hot or seal up if you are getting chilly, all without having to add or take off a layer. With clothes that are too loose, the bellows action pumps warm air out through the openings. You need to have clothes that fit properly but not tightly. Too tight, and the clothes compress and actually reduce dead air space in layers below as well as restricting body movement.

Another general rule is that the efficiency of clothing is proportional to the diameter of the body part it covers. Thus a given thickness of insulation added to your trunk will be more thermally efficient than the same thickness added to your arm or leg. It will also help maintain that body core temperature. This is why vests work well to maintain body heat. There is an optimal thickness of insulation for each body part. Beyond that, the added bulk tends to be more of a hindrance in movement than the added insulation is worth.

### **Drying Wet Layers**

Things will dry out in the winter, believe it or not. It's a process called *sublimation*. The dampness turns to ice and evaporates from ice. So, damp things should be hung on dry surfaces such as tarp lines. The easiest way to dry things out is with your own body heat. Wearing a damp (not soaking wet) article of clothing is the best way to dry it out. Obviously, if you're struggling to keep warm yourself, prioritize being warm and dry, so take off the wet layer and dry that wet layer out later.

Drying out damp socks (not soaking wet) – you can put the socks on your shoulder below long underwear top or on your thighs underneath your long underwear bottoms. In either place, if you leave your socks there overnight and they were just damp, your socks should be dry in the morning.

## Pointers

- Personal organization is very important when snow camping. You must know exactly where each and every single bit of your gear is at all times. Whenever you take off hats and mittens, always stow them in a secure place. When you take off your gloves or mittens, put them inside your coat next to your body
- Carry a small whiskbroom to brush off boots and gaiters, and a sponge to mop up damp spots.
- Keep clothing in stuff sacks so they don't accumulate snow while opening and closing your pack.
- If you can, tie a string to your flashlight and keep around your neck. Headlamps are best as they allow your hands to be free.
- Put on tomorrow's underwear and base layer at bedtime. That way you won't be starting with everything cold next to your skin in the morning.
- Put your next day's clothing in your bag with you.
- Bring a piece of cardboard to stand on when changing clothes. This will keep any snow on your clothes off your sleeping bag, and help keep your feet warmer than standing on the cold ground.

Keep in mind that it's much easier to stay warm than it is to get warm, so as soon as you stop being active, put on an extra layer or two.

1. When you first get up in the morning (and at the end of the day in camp), your activity level will be low as will be the temperature. You will need to have many, if not all, of your layers on at this point until breakfast is over and you have started to become active.
2. When you get ready to be active, you will need to take off layers since you will begin generating heat. A good rule of thumb is to strip down until you feel just cool, not chilled just before activity. Failure to do this will mean overheating, sweating, losing heat and you will have to stop in 10 minutes down the trail anyway to take layers off. Open or closing zippers, rolling sleeves up or down, taking a hat off or putting one on will all help with temperature regulation.
3. If you stop for more than a few minutes, you will need to put on another layer to keep from getting chilled. Keep a layer close at hand.
4. Whenever you get covered with snow, either from a fall or from dislodged snow from a tree, it is essential to brush yourself off to keep your clothing free of snow. Failure to do this often results in the snow melting into your clothing and refreezing as ice.
5. At the end of the day, as activity decreases and temperature drops, you will need to add layers. Once you start to cool down it takes a lot of the body's resources (calories) to heat up again so layer up ASAP before you get chilled. It may be good to put on more than you think you need; it will only get colder. If you are too warm, you can open up layers and ventilate to reach the proper temperature.

## Don't Get Left Out in the C.O.L.D.

Use the **C-O-L-D** method to stay warm. Remember the word "COLD" -

Keep your clothing - **Clean**. Avoid - **Overheating** Wear clothing - **Loose** Keep it - **Dry**

### **- C - Clean**

Since insulation is only effective when heat is trapped by dead air spaces, keep your insulating layers clean and fluffy. Dirt, grime, and perspiration can mat down those air spaces and reduce the warmth of a garment.

### **- O - Overheating**

Avoid overheating by adjusting the layers of your clothing to meet the outside temperature and the exertions of your activities. Stay hydrated by drinking plenty of water, and refrain from drinking caffeinated drinks that act as diuretics.

**- L - Loose Layers**

A steady flow of warm blood is essential to keep all parts of your body heated. Wear several loosely fitting layers of clothing and footgear that will allow maximum insulation without impeding your circulation. Having clothing that is bright colored (orange or red) is also a good idea, so hunters and sportsmen can see you in snowy conditions. Always have a hat and wear it.

**- D - Dry**

Sweaty, damp clothing and skin can cause your body to cool quickly, possibly leading to frost nip and hypothermia. Keep dry by avoiding clothes that absorb moisture. Always brush away snow on your clothes before you enter a heated area. Keep clothing around your neck loosened so that body heat and moisture can escape instead of soaking through your layers.