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The Importance of Layering

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Protective clothing is the most important equipment you will carry into the backcountry. During hostile weather, your attire must create a comfortable and safe personal environment to withstand any number of varying weather conditions. This thin buffer against the elements defends your very survival, so clothing must be chosen and fitted with care.

No all-purpose garment can adapt to varying climates or temperatures, but versatile garments can contribute to a system of layered clothing that can be adjusted to any situation. The key to layering is to have breathable and moisture managing warm layers that can be peeled away or layered on top of one another when necessary. When you over-exert and become sweaty, take a layer off and put it in your pack. When you begin to get chilly, put a layer on. Versatile outdoor clothing adapts to protect you from thermal stress, rain, snow, and wind.



Body Physiology

When conditions are unfavorable, your body adjusts energy production and circulatory priorities to maintain life. Circulation to the extremities is curtailed if core temperatures drop slightly as the brain and central nervous system become top priority.

The key to comfort and survival in winter conditions is to maintain a near constant skin temperature. If the skin temperature drops, you're losing energy and the internal body controls go into high gear to produce more heat. If the skin temperature is too high, sweating starts to function as an evaporative cooling system. Both conditions are not favorable for health or safety in the cold.

To maintain comfort and energy production you also need to pay attention to your body's nutritional requirements for sustained physical effort. Typically, extended activity requires a 4,000 calorie diet containing 50% carbohydrates, 30% proteins, and 20% fats. Carbohydrates are readily converted to usable energy, while proteins and fats require energy for digestion. Try to maintain an intake of carbohydrates throughout the day, "eating your way down the trail," as author Robert Wood put it. Your body will work best regulating itself with the proper intake of nutrients throughout the day. Your body does the best job of digesting food while at rest during cold weather, so it makes sense to eat your heaviest meal in the evening, as opposed to breakfast, on days of high activity (especially when you are camping in the backcountry). The warmth of your sleeping bag is the best environment for renewing your energy supply to prepare for the next day's hike.

Tropical & Desert Climates

Clothing protects from the heat as well as the cold. Clothing for extreme heat must be loose fitting, moisture wicking, and vented to pump the hot air out. It should be light colored to reflect solar heat and rugged enough to resist abrasion from the terrain. Use sunblock on all exposed skin and a wide brimmed hat to prevent sunburn on your scalp and face.

Winter-Weight Attire

Proper clothing for any winter activity consists of three basic layers: the skin layer, insulating layers, and shell outerwear. The skin layer should insulate, but more importantly, wick moisture away from the skin as perspiration is produced. This reduces evaporative heat loss. The insulating layers should be fleece, wool, goose down, or synthetic fibers. Cotton should not be used for winter wilderness dressing as it retains too much moisture. Shell outerwear must be waterproof, breathable, and windproof to protect you from the elements and still let body vapor escape.

The Skin Layer

Winter underwear is not only the first layer in your outdoor wardrobe, it is the most important. Underwear should trap an insulating layer of air next to the skin and also transport any moisture build-up to the outer clothing where it can be vented to the outside.

Synthetics, silks and wool/synthetic blends are particularly good at drawing moisture away from the skin to eliminate evaporative skin cooling, a major cause of heat loss. These fabrics are also quick-drying to keep you warm even if you get wet. Active underwear is available in several different weights and fabrics for different activities. Lightweight underwear is used for aerobic winter sports and Midweight and Heavyweight underwear are utilized by more serious arctic travelers or less active people. There is even a windstopper fabric that you can wear without a shell which makes it ideal for runners, cyclists or skiers. Keep in mind, however, that cotton is not a suitable underwear fabric for outdoor use as it does not dry quickly which can lead to hypothermia.

Mid-Layer Pants

Your legs carry the load and take the greatest abuse while in the backcountry. Rugged leg protection is important. Pants must be constructed from tight-weaved, abrasion-resistant material that is heavily sewn and reinforced at wear points yet styled for movement and utility. Cold weather calls for fleece, wool, or synthetic pants with 'warm when wet' characteristics to prevent hypothermia. Backcountry pants should also be windproof, waterproof, and breathable for snow or wet conditions.



Mid-Layer Tops

Synthetic fleece or wool blend tops are appropriate middle layers for active outdoor adventures. If you wear a shirt under your fleece or wool top, be sure that the shirt does not fit tightly so moisture next to your skin can vent outward. Air flow is very important. (Never wear cotton tops while active because it will trap moisture next to your skin.) There is a tremendous variety of fleece tops available in assorted weights and styles to fit your needs. Fleece is versatile, easy to care for, dries quickly, and insulates even when wet. Wool acts in many of the same ways as fleece in that it insulates even when wet and traps warm air next to your body for insulation. Either choice is a good one for keeping you warm and moving moisture away from the skin while being active outdoors in cold weather.



Insulation Layer

A layering system needs a midweight filled parka, fleece parka, goose down vest, or fleece vest that is lightweight and can pack into a small stuff sack into your backpack. This layer is the one to pull out when you stop for lunch on a ski tour, cycle trip, or hike. Vests work well for active people giving them greater arm mobility and more ventilation. The heat retention of the garment is determined by its loft (thickness) and how well the insulation resists heat loss. A goose down, fleece, or fiber-filled garment will be your best insulation against the cold.

Goose down is the lightest insulator known to man. Goose down is highly compressible, resilient, and gives great mobility. Quality



synthetic fills also work very well and are non-allergenic.

Heavyweight fleece is also non-allergenic and very effective with the added advantage of keeping you warm if it gets wet because it dries very quickly. Whether you choose parkas or vests, fleece or goose down, they will all work well as an insulating layer against cold weather.

Shell Outerwear

The outer shell of your winter attire is your first line of defense against the elements. Gore-Tex® or other waterproof/breathable fabrics are ideal for backcountry shell outerwear. They shed water and pass moisture away from your body to keep you warm and dry. Shell Outerwear for backcountry use must have the following 4 primary characteristics:

- 1) Be waterproof. Wetness is the greatest threat to your safety. Wet clothing loses heat significantly. It could be said that mastering the wilderness is the art of staying dry.
- 2) Block the wind. Wind carries huge caches of heat away and can drop your body temperature down below desirable levels. Protection is needed to stay comfortable and warm.
- 3) Resist abrasion. There is nothing more damaging to clothing than a thorny thicket. If your safety relies on your shell, it must be tough and able to withstand abuse from the trail.
- 4) Fit and be easy to use. In the most severe weather you will notice the difference between easy or not easy to use. It is then that you have mountain boots with gaiters, mittens, a down jacket, a wool hat, and all the vents battened down. You will notice if your shell fits, if it shelters your face from the elements, is easy to unzip with your mittens on, and if you are able to move around while wearing all of it tromping through the wilderness.

As well as the necessary characteristics mentioned previously, you want to look for other features that are useful in your backcountry shell outerwear. When looking for a backcountry shell parka, look for an integral hood with ample visor and a drawcord, draft and rain flaps over all zippers and pockets, ventilation gussets (especially at wrists), ample room for insulating layers, and pit zips to ventilate under your arms. When looking for backcountry shell pants, look for leg zippers with rain flaps for putting on over boots, a drawcord/elastic waist section, and elastic at the ankles. These features will give you that added extra comfort and mobility when you hit the trail.

Winter Accessories

When suiting up for the outdoors, you can not neglect the accessories that will keep your head, hands and feet warm. Footwear, gloves or mittens, and hats are key in keeping your extremities warm in the frigid winter months.

Foot Protection

Your socks should be wool or synthetic but never cotton. Socks must fit into your boots with some breathing room left over for air circulation. Always have a dry pair handy.

When choosing boots, fit comes first, durability second and waterproofness, third. The most high tech boot made is no good to you if it doesn't fit your feet properly. Fortunately, we offer a wide selection from many manufacturers to make sure you can find the perfect fit. Good boots will fend off rocks, ankle bruises, water, and will enhance your agility. Please see our "Feet First" brochure for more detailed boot information.

Lastly, Gaiters over your boots will keep snow, wetness, and brambles off your legs and socks. In deep snow or brush, this is an accessory not to do without.

Hand Protection

The hands transmit heat rapidly and they are the first to get cold out in winter weather. Mittens are the warmest protection and are mandatory for arctic backcountry conditions. Gloves are suitable for



most Mid-Atlantic winters, however, liners under gloves or mittens are a must.

Head and Neck Protection

We radiate 30% of our body heat from our head. In cold conditions, a convertible balaclava is the most versatile and easy to use. Convertible balaclavas can be worn as full head and neck protection, head protection only, or neck protection only. Synthetic facemasks and helmet liners also provide exceptional warmth and keep the head dry. Keeping your head, neck, and face dry and warm is very important for your health and overall body temperature regulation in severe cold weather.

Prevent Thermal Illness

The body works best with an internal temperature of 98.6°F and a skin temperature of 91.4°F. Body core temperature variations of only a few degrees too high or low can cause serious thermal illness, possible permanent injury, and even death.

Hyperthermia

In high temperatures with high humidity the body has difficulty losing heat. It can sweat out up to two quarts of water per hour trying to do so. Prolonged muscular exertion (which produces more heat) can raise the core temperature resulting in hyperthermia. Symptoms are exhaustion, heat stroke, or cramps.

To prevent hyperthermia: Drink plenty of water (special drinks like Gatorade also help replace body salts), dress in loose fitting, light colored hydrophobic clothing with a wide brimmed hat for shade, and do not over-exert yourself. Make sure to take rests in the shade.

Hypothermia

Below 60°F air temperature or 70°F water temperature, the unprotected body loses heat quite rapidly. The colder the conditions, the less the body is able to produce heat. When heat is lost faster than it can be replaced, hypothermia occurs. This is a lowering of the body core temperature past the point of recovery. Symptoms are loss of coordination, disorientation, stupor, and violent shivering. Minor shivering is a pre-hypothermia condition.

To prevent hypothermia: Conserve body heat by wearing proper insulation and layering for your activity level. Hats, gloves, and dry footwear are especially important. Stay dry by controlling sweat build-up through layering wicking fibers, venting your clothing, and wearing proper raingear. Heat loss through evaporation and conduction to water is dramatic. Finally, prevent dehydration by drinking lots of warm fluids. Do not drink alcohol or smoke as these activities will hasten hypothermia.

Please speak to our staff for any questions you may have about the proper attire for any outdoor adventure. A great experience begins by keeping safe and warm.

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