

Layering Basics

When you step outdoors, the ancient art of layering becomes your smart-technology thermostat. This tried-and-true strategy lets you regulate comfort by slipping layers on and off as your activity level or the weather changes.

How to layer: To understand layering your clothing for outdoor activities, you need to know the function of each layer:

1. **Base layer** (underwear layer): wicks sweat off your skin
2. **Middle layer** (insulating layer): retains body heat to protect you from the cold
3. **Outer layer** (shell layer): shields you from wind and rain

Even if you don't wear all three layers at the outset, it's a good idea to take all layers on every outing: You can peel off layers if things heat up, but you can't put on layers that you didn't bring along.

We're often asked about how to layer for certain weather. Any suggestions based solely on weather, though, overlook key considerations, like exertion level and personal metabolism. All recommendations are for someone who doesn't run particularly hot or cold, who is going on an intermediate-level half-day hike:

Cold-weather layers:

Midweight polyester long underwear top and bottom; a jacket with synthetic insulation; midweight fleece pants; waterproof/breathable rain jacket and pants.





Base Layer: Moisture Management

As the next-to-skin layer, a base layer's job is moving perspiration away from your skin, aka "wicking." In cool or cold conditions, wicking long-underwear-style base layers are needed to keep your skin dry. That's essential because it helps to keep you from becoming chilled or worse—hypothermic.



Base layer materials: You have a wide range of fabric options, including synthetics like polyester and nylon, or natural fibers like merino wool and silk. Though there are subtle differences in wicking and drying for each material, and in odor retention and durability, a lot of people simply go with their personal fabric preference. For a detailed discussion of base layer materials, read [How to Choose Base Layers](#).

Base layer weights: Your options are straightforward—lightweight, midweight and heavyweight—though you might also see terms like “ultralightweight” on one end of the spectrum or “expedition weight” at the other. Generally, heavier (thicker) fabrics keep you warmer, though that’s not really the primary purpose of a base layer (wicking is).

Warm-weather base layers: Long underwear might not be appealing when temperatures soar, but having dry skin generally makes you more comfortable in all conditions. (No one likes having clammy, drippy skin.) Here are some other warm-weather base-layer considerations:

- Any summer shirt is really a base layer, so look for ones that offer wicking.
- Some shirts designed for warm weather spread the moisture out through the fabric, where evaporation helps with cooling. They won't really be marketed as a base layer, but as your next-to-skin layer they can increase your comfort in hot conditions.
- Underwear like briefs, boxers and bras should also wick (the same is true when you wear it under your long underwear in winter).

- UPF-rated base layers give you added sun protection. Read [How to Choose Sun Protection \(UPF\) Clothing](#) for more details.
- Cotton, considered a no-no in winter because it sponges up water and can chill you, can be okay if you're outside on a super-dry, scorching summer day.
- Emerging fabric technologies, like wool infused with ceramic particles, will offer base layers that literally cool your skin for greater comfort.

Middle Layer: Insulation

The insulating layer helps you retain the heat that's radiated by your body. The more efficiently this layer traps that heat, the warmer you'll be.



Middle layer materials: Just as with base layers, you have a broad range of options, both synthetic and natural. In general, thicker (or puffier) equals warmer, though the efficiency of the insulating material is also important. Below are some common middle layer materials, though other options, like wool and wool-blend tops, are also available.

Here are some of your primary choices for middle layers:

Polyester fleece: Available in lightweight, midweight and heavyweight fabrics (sometimes marketed as 100, 200 and 300 weight), fleece stays warm even if gets damp, and it dries fast. Fleece also breathes well, so you're less likely to overheat in it.

The flipside of breathability, though, is that wind blows right through, which can steal warmth. That's why you need to have a shell layer with you if you're going with a fleece middle layer. (Another option is to wear wind fleece, which includes an inner wind-blocking membrane.)

Down insulated jackets: Highly compressible for easy packing, down offers more warmth for its weight than any other insulating material. The efficiency of down is measured in fill power—from 450 to 900. Because down is always inside a shell material, down jackets also offer some water and wind resistance. The drawback to down is that it loses insulating efficiency when damp.

Synthetic insulated jackets: Synthetic insulations have long tried to mimic down's efficiency, coming closer to that standard every year. And, while synthetics don't compress as well as down, they're a popular option for rainy conditions because they retain insulating ability when they get damp. And, like down, synthetic insulation is always inside a shell material that offers added water- and wind resistance.

Outer Layer: Rain and Wind Protection

The outer layer (or shell layer) protects you from wind, rain and snow. Shells range from pricey mountaineering jackets to simple wind-resistant jackets. Most allow at least some perspiration to escape; virtually all are treated with a durable water repellent (DWR) finish to make water bead up and roll off the fabric.

Your outer shell is an important piece in stormy weather, because if wind and water are allowed to penetrate to inner layers, you can get seriously chilled.



Shells can be lumped into the following categories:

Waterproof/breathable shells: Your most functional (and expensive) choice, this type of shell is your best option for full-on squall conditions. Generally, pricier equals drier, though higher priced shells are often more durable as well.

Water-resistant/breathable shells: These are more suited to drizzly, breezy conditions and high activity levels. More affordable than waterproof/breathable shells, they're typically made of tightly woven nylon or polyester fabrics that block light wind and light rain.

Soft shells: These emphasize breathability. Most feature stretch fabric or fabric panels for added comfort during aerobic activities. Many combine light rain and wind protection with light insulation, so they in effect combine two layers into a single jacket.

Waterproof/nonbreathable shells: These bare-bones shells are okay for rainy days with light to no activity (e.g., fishing, spectating). They are typically made of a coated nylon, which is water- and windproof. If you exert yourself while wearing one, you'll probably end up saturating your underneath layers with perspiration.

You might have your normal undershirt and button-down that you wear to work, then an insulating layer, and lastly the shell. Daily undershirts are usually cotton, which is bad for cold emergencies, so think about what you'll normally be wearing when you pick the right base layers to keep in your Get Home Bag and Vehicle EDC kit.

The point is to keep your body's heat in, not so much keeping cold out.

This works both ways: if you're going to be physically active, like digging your stuck car out of the snow, remove layers first to keep from overheating and sweating. Overdressing is a thing. It's OK to be a little cold when you first go outside. You'll warm up as those insulating air layers do, too.

It's a common misunderstanding that the value of multiple layers is simply in the added total thickness of the materials. That helps, but an equally important value is that the air in between each layer warms up, creating insulation. The basic layering system: base layer, insulation layer, outer shell layer.

This is similar to double-paned windows or wetsuits for water. A wetsuit doesn't keep you warm simply because of the 5 millimeters of neoprene — it's actually the water trapped between the suit and your body that warms up. Like your own personal, portable hot tub.

The notion of having one thick, waterproof, do-it-all down jacket is misguided. Some people spend upwards of [\\$1,000 on a Canada Goose down jacket](#) that's suited for fashion, not function. What happens if your car gets stuck and you have to push? You'll overheat, sweat, and wish you could take it off.

You don't need to spend a lot on one garment and expect it to perform in every imaginable condition. It's better to buy a combination of layers that each do the thing they're designed for very well.

Pay attention to sizing. Some brands, especially the more well-known quality companies, make it easy by standardizing each layer on the same S/M/L/XL sizing — so the L base layer is designed to fit well inside the L middle layer. Read reviews to see what people say about sizing. Many of the cheaper options typically run small, and you may need to buy larger sizes for the outer layers.

Your base layers shouldn't be too tight, which can cut off circulation of that all-important warm blood. The closest layer to your skin should be just close enough to wick moisture away. Layers on top can be looser.

Ideal materials for winter clothing

There's a common saying in the outdoor clothing market: Cotton kills.

Cotton is bad as a baselayer. When cotton gets wet, whether from sweat or outside moisture, it loses its ability to insulate you. It's not a moisture-wicking material to begin with. It can leave you cold, clammy, and work against your body's ability to produce heat.

Shy away from corduroy, denim, flannel, or duck. These are also made with cotton.

A recent trend is cotton-synthetic blends. It does help compared to plain cotton, but the synthetics are doing all of the work. So you may as well just skip the cotton altogether.

Wool is a classic natural fiber that's excellent for these situations.

As of 2017, the US Antarctic Research Center at McMurdo Station's required [packing list for extremely cold weather \(ECW\)](#) breaks down materials by layers:

Lightweight base layer requirements:

- Synthetics (polypropylene, polyester, branded materials) or natural fibers (silk or merino wool)
- Density: about 140-200 grams per square meter (the label might list this as "140 weight" or a number in this range)

Midweight base layer requirements:

- Synthetics (polyester, nylon, non-bulky fleece, branded materials such as PolarTec) and natural fibers (merino wool, down)
- Density: about 260-320 grams per square meter (the label might list this as "260 weight" or a number in this range)

Outer shell (parka) requirements:

- 800+ cubic inches of synthetic or down fill (loft of the insulation = puffiness)
- 250+ grams of insulation (weight of the insulation itself)
- Windproof outer shell
- Attached hood
- Fitted closures at cuffs and bottom
- Covers waistline when bending over
- Must keep you warm when inactive for 12 hours

Below are some ideas to get you thinking about gaps in your wardrobe, which we've compiled based on product research, reviews, and guides; the McMurdo Station ECW packing list, and the Army's FM 31-70 cold weather guide.

Core

Popular synthetic base layers include [Smartwool merino wool](#) or [Patagonia Capilene](#).

Head and face

It's a myth that the body loses the majority of its heat through the head.

According to WebMD, our head represents about 10% of the body's total surface area. For the head to lose 75% of the body's heat, it would have to lose about 40 times as much heat per square inch as every other part of your body. The body doesn't work that way.

Find a hat with synthetic fibers like Windstopper polyester and acrylic, which wicks moisture and dries fast. Wool is another warm, wicking material for winter headwear. An example is the [Mountain Hardwear Unisex Dome Perignon II Hat](#). For full head coverage, a balaclava like the [N-Ferno 6823 Thermal Fleece](#) is a good addition. For added neck protection, check out [Smartwool's simple gaiter](#). Depending on your jacket or scarf, some of these items might be redundant.

Legs

Since your bottom half can get just as sweaty as your core, the underwear base layer should be made of synthetic fabric, merino wool, or silk.

[Under Armour](#) and [ExOfficio](#) make popular men's and women's synthetic underwear, and the experts at The Prepared use both every day.

Hands

There are four types of gloves, giving you varying levels of dexterity:

- Gloves: Each finger is separate, so it's easy to work with your hands.
- Mittens: Best for warmth as all your fingers are inside together, but you can still grab a pole, rope, or strap.
- Lobsters: Hybrid of glove and mitten, where your pinky and ring fingers are separated from your middle and index fingers. Good if you've found gloves aren't warm enough and mittens too limiting.
- 3-in-1: Some systems sell a liner, glove, and flip-over mitten all in one.

You can layer gloves, too. We like using flexible gloves with touch-screen capability during normal daily use. But we also keep [thicker, waterproof mittens](#) in our BOB/GHB/VEDC that slide right over the base layer.

Feet

The right boot for someone in Duluth, Minnesota, where the average low temperature in January is a balmy 2 F, might be overkill for someone in Asheville, North Carolina, where it occasionally snows and the average January low is a more manageable 28 F.

Proper winter boots are waterproof, insulated, and have great traction. The popular and well-reviewed [Columbia Bugaboot Plus III](#) and [North Face Chilkat 400](#) are great options for both men and women.

For extreme cold that you'd encounter in the upper Midwest, Canada, and Arctic, check out the [Baffin Apex](#) or [Sorel Caribou](#).

If you might be stomping around in deeper snow or even snowshoeing, consider using waterproof gaiters that slip over your existing boots, rather than keeping an separate set of massive boots around.

For socks, look for labels that describe them as winter weight, or mountaineering use. Mountaineering socks are the thickest, heaviest option for rugged winter conditions. Look for fabrics like merino wool or nylon/lycra blend.

Our favorites are [Darn Tough socks](#) or [Smartwool Mountaineering socks](#).

To add a sweat-wicking layer to your feet, look for a liner sock made from merino wool or polypropylene. Smartwool's hiking liners do the job well.