



PREVENT BINDING BLOWOUTS:  
CHECK SCREWS AND CABLES  
BEFORE HITTING THE SLOPES.

# Backcountry Skiing **101**

How do you take winter adventure to the next level? Add skis. If you've carved resort terrain, you'll find the transition to the backcountry surprisingly easy, thanks to lighter, more user-friendly gear. Start earning your turns—safely—with this primer on equipment, route planning, reading conditions, and more.

Text by Evelyn Spence • Illustrations by Supercorn

PHOTO BY JULIA WANDENDEVER

# Prep Your Gear

On any wilderness trip, smart preparation is key. But it's even more important when you're backcountry skiing, due to the technical gear, low temperatures, potential for severe weather, avalanche risk, and tricky routefinding. Here's how to start smart—before you leave home.

## FIT BOOTS PERFECTLY

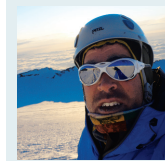
Get more comfort going up and more power and control going down.

>> **Prioritize touring or downhill performance.** You'll hike faster in light, flexible boots, but they're less supportive for aggressive skiing. Want to carve the steeps? Opt for stiff boots with a high cuff. They'll slow your uphill hike, but provide better edge control and power transfer. Exception: Check out the all-purpose Dynafit TLT5 Mountain on page 84.

>> **Size right.** According to Boulder, Colorado, boot-fitting expert Larry Houchen, buying too-big boots is the most common fit mistake. Try his simple fit test: Stand up straight, then lean back slightly. Your toes should lightly tap the boot's front. If you have chronically hard-to-fit feet, most specialty ski shops have fitters like Houchen who can melt or grind the plastic shell for a permanent, custom fix.

>> **Mold liners.** Most new boots come with heat-moldable liners—a pro at the store “cooks” them in a special oven, then conforms the liner to your foot. Heating and fitting costs \$25 to \$50, and after treatment, the lightweight liners cradle your feet, and are less apt to compress with use.

>> **Add a footbed.** Reinforce your boot's interior base with a semi-custom sole like those from Superfeet (\$40 to \$50; superfeet.com). “A stiffer insole transfers power to the ski more efficiently,” says Houchen. “And it keeps your foot from slipping while you hike.”



[PRO TIPS]

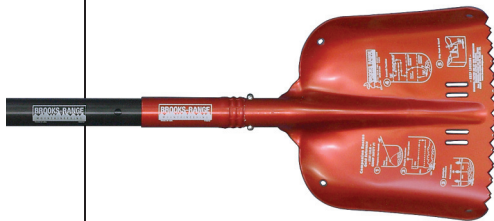
**Matt Schonwald**

“Plan like a guide,” says Schonwald, a professional ski

mountaineering guide. He offers these tips for successful trip prep:

>> **Pick a zone.** Map several tours in one area and revisit that terrain all season. You'll develop routes you can ski in almost all snow conditions.

>> **Build in a buffer.** Tack two hours onto your plan so you won't need your headlamp if something goes wrong.



## Outfit for Survival

Equip yourself with safety gear and practice proper techniques.

>> **Avalanche beacon** This GPS-size transmitter sends a signal that other transceivers can detect. If a skier is buried by a slide, his companions switch their beacons to “receive” and zero in on the victim. Wear the beacon near your body (beneath insulating layers). Need to brush up on your skills? Many ski areas have hide-and-seek-style parks where you can practice homing in on the signal.




>> **Shovel** Use a metal-edged shovel—aluminum is sturdy and lightweight—with an extendable shaft (go long for leverage, short for tight spaces). Try Brooks-Range's serrated-edge Sharktooth Longneck Mini Pro (above; \$55; brooks-range.com).

>> **Telescoping probe** Poke these 80- to 128-inch-long poles into debris to pinpoint an avy victim. One cubic meter of snow can weigh more than 880 pounds, so the more precisely you can locate a victim, the better.

>> **Inclinometer** Most people misjudge angles, but a precise slope estimate may indicate increased (or decreased) avy risk. Measure steepness by aligning this compass-like tool with the hillside.

## GET PACKING

Use this matrix to hone your backcountry layers for any trip length or conditions.

	MODERATE (>30°F)		COLD (<30°F)	
	Day Trip	Multiday	Day Trip	Multiday
<b>Baselayer</b> (pages 38-40)	 Wear silkweight materials with sweat-wicking power like <b>Craft's Concept Piece</b> .	Try a midweight layer with enhanced insulation, like <b>Columbia's Omni-Heat Half-Zip</b> . It will provide sufficient warmth with just a shell, but you can layer it without bulk.		
<b>Insulation</b> (pages 50-52)	It'll spend most of the day in your pack, so go with an ultralight puffy like <b>L.L. Bean's Ascent Packaway Pullover</b> .	A vest/jacket combo offers versatility. Opt for a synthetic, like <b>REI's Spruce Peak</b> in case of damp snow.	 Opt for high-quality down and performance details like a hood and cinchable hem. Good choice: <b>Mountain Hardwear's Kelvinator</b> .	
<b>Pack</b> (pages 66-68)	For alpine-style days you need low weight and volume, with a slim profile. Try <b>Black Diamond's 18-liter Agent</b> .	A mid-size overnighter like <b>Sierra Designs Sorcery 55</b> has essential-toting capacity and ski-safe stability.	<b>Pieps's Plecotus</b> has an exterior avy-gear pocket and 36-liters of interior space—perfect for cold-weather gear.	Large capacity, adjustable fit, and lightweight, rigid support are keys to hauling big winter loads. Try <b>GoLite's Terrono 90</b> .
<b>Shell</b> (pages 42-48)	Blend lightweight breathability with protection. <b>Rab's Fusion</b> (1 lb. 1 oz.) uses Polartec's NeoShell where rain hits, and a no-membrane poly where you sweat.	You may never need to wear it, so prioritize packability. <b>Patagonia's Super Pluma</b> is low-bulk, lightweight, and has pack-friendly pit-zips and pockets.	Pack a heavy-duty weatherproof outerlayer like <b>Mammut's Eiger Extreme Nordwand</b> . Pair it with just your baselayer, or your insulating puffy for versatility at camp and on the slope.	

# Select a Safe Route

Caused by variable weather, unstable snowpack, and steep terrain, backcountry avalanches claim an average of 25 lives a year in the United States. Your first safety step: Brush up on the basics below. Next, take a course accredited by the American Institute for Avalanche Research and Education ([avtraining.org](http://avtraining.org)).



## Watch the Weather

All conditions affect avy potential. Check forecasts ([avalanche.org](http://avalanche.org)) and assess risk.

>> **Snow** Avalanches are most common during the 24 hours following a 12-plus-inch snowfall, and the more it dumps, the higher the risk. Be especially wary of heavy, wet snow on top of a powdery layer (sometimes called an upside-down storm).

>> **Rain** Wait at least a day before hitting new snow after a shower. The 24 hours immediately following rain are especially dangerous. Tiny-grained fresh flakes soak up water, reducing stability. Older snow has better drainage—thanks to regular freeze-thaw cycles—so rain percolates through, making the snowpack less likely to shift.

>> **Temperature** Freeze-thaw patterns are more important than the current temperature. When it's above freezing for more than 24 hours, or the mercury never dips below 15°F, slides are more likely. Also, quick shifts (a rise of more than 15 degrees in 12 hours) destabilize snow, while a slow rise is generally stabilizing.

>> **Wind** Steady winds load existing snowpack with extra weight; wind alone can deposit snow as much as 10 times faster than snowfall. The leeward side of peaks and ridges collect slabby drifts, making them more avalanche-prone. Scoured and scalloped terrain—which indicates that snow has been blown away—is safer than rounded, airy-looking pillows of snow.

## STUDY THE SNOWPACK

Hidden layers are the key to stable—or slide-ready—slopes.



**SURFACE HOAR** These flat crystals (pictured, left) form at the surface when it's humid and calm, but their structure is weak. Surface hoar creates common, hazardous layers in the backcountry.

**CRUST** A glinting surface means ice, but a shiny crust presents little danger until it's buried by new snow—where it becomes a slide surface for future avalanches.

**POWDER** Large quantities of powder can set off some of the most destructive slides. It can stabilize within days if temps rise, but if it doesn't settle, it often becomes a weak layer.

**ROUNDED** Pellet-like crystals of old snow tend to form a strong, bonded layer, which creates a dangerous slab if it sits on top of weaker layers. If it's deep in the snowpack, rounded snow forms a solid base.

**FACETED** Temperature shifts in the snowpack cause diamond-shaped crystals, often called sugar snow, to form brittle, avy-prone layers.

**WET** Taking many forms—from hard kernels to gloppy balls—wet snow coalesces into heavy slabs that, especially in spring, may slide unprovoked.

**DEPTH HOAR** Large-grained crystals close to the ground form a hidden weak layer that may slide when disturbed from the base or side.



### [PRO TIPS]

#### Lel Tone

The 17-year Squaw Valley ski patroller and avy forecaster suggests three backcountry safety tips:

- >> **Communicate.** Each group member will notice—and call attention to—different risks.
- >> **Make small groups.** Cap crews at five, and split big groups according to skill level and goals.
- >> **Be flexible.** Have several alternate route plans to avoid taking single-minded risks.

## Travel Safe in Avy Terrain

Recognize these avalanche-risk signs and learn how to choose routes that avoid them.

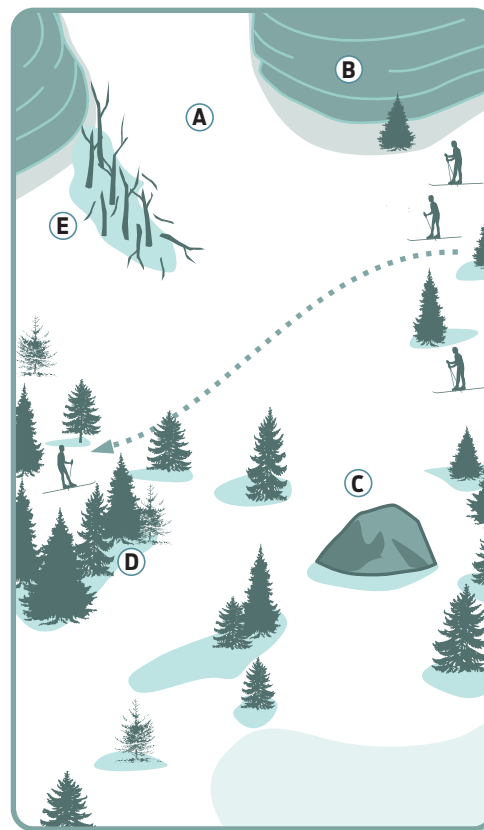
>> **Steep slopes** Large slides typically start on slopes between 30 and 45 degrees (A). Shallower angles usually don't initiate slides, and sheer steeps (B) don't hold much snow, so huge movement is less likely. Most people overestimate slope angle: Measure it accurately (see "Outfit for Survival," left). On steep angles, move quickly, traverse the slope's upper part, travel gently (don't stomp), spread groups out, and be aware of obstacles and terrain traps below you (C), which may block your escape route.

>> **Bowls and gullies** Steep, open slopes and bowls, as well as ravines, are likely avalanche zones. Safer areas include ridge crests, thick forests (D), wide valleys, and windward slopes (that don't have big snow deposits hanging above). When crossing danger zones is unavoidable, have the entire group watch the active skier until he reaches a safe zone. Don't assume terrain is stable if one skier crosses safely.

>> **North-facing aspects** In winter, generally opt for south-facing slopes. Because the sun melts and condenses snow, they're more stable. North-facing slopes tend to be more powdery, but often have unstable layers. The opposite is true in spring, when temperatures rise: South-facing slopes warm, resulting in heavy, wet slides. And north aspects—now undergoing slower, stabilizing freeze-thaw cycles—may be safer.

>> **Cracking snow** Be on alert if you see cracks in the surface, you hear a *whumph* sound, the surface feels hollow, or you see snowballs rolling downhill. These are all avy indicators.

>> **Previous paths** If there's old slide evidence—like a big, open chute through a forest, broken trees (E), or a debris pile, avoid the trap and move quickly out of the danger zone.



PHOTOS BY (FROM LEFT) COURTESY (4); MATT SCHONWALD; LYNSEY DYER; IAN HEY; JACKIE MCCAFFREY; TOMMY CHANDLER

# Ski Strong and Smart

You don't need pro-level skills to ski off-piste, but honing your kick-turn technique and avoiding rookie mistakes will ease your transition to backcountry terrain. Here's how to master the ups and downs when lifts and groomers are miles away. Plus: Prevent blisters, stay energized, and negotiate steeps.



## Going Up

### Master the art of skinning.

- >> **Fit** Shaped skins offer more climbing efficiency, while straight skins are lighter and easier to maintain. Buy shaped skins to match the ski's fattest section (about 10 inches behind the tip) and trim them one to two millimeters narrower than the base. Both ski edges should be exposed. For straight skins, match the width to your ski's narrowest point.
- >> **Climb smart.** Breaking trail? Zigzag to create consistent switchbacks; don't beeline to the top. Compacted snow is slick, so if a leader's ascent is steeper than 15 degrees, the rest of the party won't be able to follow his tracks.
- >> **Adjust on the move.** Change direction with maximum control by making rounded turns on flat benches. Slipping? Stomp into the snow, take short steps, and keep your waist and back straight to center your weight.
- >> **Prevent buildup.** Snow may stick to skins' fibers and weigh you down—especially in variable temps. Rub the hairs with Glop Stopper (\$13; blackdiamondequipment.com).
- >> **Remove** With no wind, try this: Kick back one ski into a vertical, tip-down position behind you; reach back, remove the tail clip, and pull the skin halfway off; kick the ski's tip forward and yank the skin entirely off. If it's windy, remove skis, then unstuck and fold all at once to keep them snow-free (see below).
- >> **Fold** Keep glue surfaces dry when snow exposure is likely: Peel the skin's tail half and fold it glue-to-glue while the tip is stuck to the ski. As you remove the tip half, fold it together.

## BEAT BLISTERS

Outsmart stiff boots and constant heel lifting with these anti-friction tips.

- >> **Keep feet dry.** Moisture means hot spot-producing slippage and friction. Always start your day with dry liners. On multiday trips, dry them every night: Take them out of your boots and air drying in a warm (not hot) place, or in your sleeping bag footbox.
- >> **Swap socks.** There's no need to wear two pairs—with today's fit and boot-liner technology, you'll get just as much warmth with one. But bring extras, says bootfitter Larry Houchen. He changes socks every four hours to combat moisture and preempt repetitive-motion hot spots.
- >> **Pre-tape.** Have problem areas? If you don't already have a blister, apply a few layers of duct or athletic tape to the skin. If a blister has already formed, apply moleskin or a blister cushion such as Nexcare's active waterproof bandages (\$5; nexcare.com). Reinforce it with duct or athletic tape.
- >> **Use absorbent powder.** Sprinkle talcum, Gold Bond, or even cornstarch into your socks to help sop up moisture. Apply to your bare feet and dust off excess before pulling on socks.
- >> **Buckle up.** If you feel hot spots, "tighten your boot's second-highest buckle," says Houchen. You'll walk and climb slightly slower, but securing your foot in your boot helps prevent friction.



[PRO TIPS]

### Greg Hill

"Figure out your pace so you're not sweating," says Hill. "That will kill you." Hill set a record by skinning up (and skiing down) more than 2 million vertical feet in 2010. Heed his moisture-management tips:

- >> **Stay consistent.** Hold a sustainable effort, but snack often and break for at least 10 minutes every hour. Strong skiers may climb 1,000 feet per hour and ski up to 2.5 mph across flats.
- >> **Swap layers.** Add warmth when resting and shed layers to climb.

## Stay Fueled

Conquer cold with proactive hydration and calorie-packed nutrition.

### DRINK

- >> Altitude accelerates dehydration because it's desert-dry, so you breathe harder (and if you're taking Diamox, you pee more). In fact, water loss through respiration alone can occur twice as fast at altitude than at sea level. Try to down three to four liters of water per day.
- >> Hydration bladder tubes may freeze, and as temps drop, even insulated hoses and bite valves may ice up. Fill your reservoir with warm water and route the hose close to your body. After drinking, blow into the bite valve to push the water down the tube and back into the reservoir.
- >> Really cold? If it's below 15°F, ditch the bladder for double-walled or wide-mouth bottles (tucked into an insulated sleeve or deep in your pack). Water will stay liquid longer in a wide bottle. Tip: Add electrolytes (and comfort) by packing at least one bottle of hot, sweet tea.

### EAT

- >> If you're day-touring at moderate altitudes (below 8,000 feet), try for a ratio of 50 percent carbs, 30 percent fat, and 20 percent protein. Going higher? Change the ratio to 65:25:10. Burning fat requires more oxygen than burning carbs, so a lower-fat fuel mix is less taxing to exploit.
- >> Plan to consume 3,000 to 3,500 calories per full day. Exertion at high altitude (usually above 8,000 feet) can cause low oxygen levels in the blood (hypoxia). As a result, your body shunts oxygen from your digestive system to critical organs like your heart, lungs, and brain—which will dampen your appetite. Plan to eat at scheduled times or at specific landmarks, to ensure you're consuming enough calories. Shivering? Up your intake even more. Shivering can burn up to 400 calories an hour.
- >> Nutrient absorption can drop 15 percent at altitude, as a result of hypoxia. Stay energized by eating whatever tastes best. Bring both salty and sweet snacks so that if your appetite flounders, you have tempting options. If your energy is flagging, it's more important to get calories in any form than to worry about where they come from or their fat-carb ratio.
- >> Need a boost? Pure sugar is absorbed quickly. Carry a handful of jellybeans or hard candies (they'll be edible at any temp) for your summit push. Energy gels can freeze.

## SKI ANY SNOW

Change your technique and style to manage any snow conditions.

- >> **Powder** For control in light, deep snow: Center your weight, balance evenly on both skis, keep skis shoulder width apart, and aim your upper body downhill. Initiate turns by rotating your lower body only, and lift weight off your skis after every turn to stay atop the surface.
- >> **Corn** Take advantage of your skis' shape to avoid fatigue in this pellet-like snow: Roll your edges to carve controlled turns. Expect bumpy, hard morning crusts and wet afternoons. A ski tune (base grind and soft wax) will help your skis glide if afternoon corn gets grippy.
- >> **Heavy and wet** Snow with a high water content gains weight—and resistance. When temps rise, snow may be slushy and slick: Aim for rounded turns and expect to slide a little. When it's thick and deep: Aggressively exaggerate leg extensions and turns to power through it.
- >> **Ice** Keep skis close together to reduce the likelihood of doing a split. If you have solid basic skills, you may choose to aggressively depend on your downhill edge to prevent skidding. Expect some sliding and skidding, but sharpen your edges to mitigate it. Beginners: Combine side slipping on both edges with downhill kick turns (see below).

## Adjust Your Poles

Use telescoping shafts for stability on any angle.

- >> **Ascending** Shorten poles so that you don't have to overextend your arms or overreach with each step. You'll conserve energy, prevent triceps fatigue, and improve balance and stability.
- >> **Flats** Lengthen your poles to approximately armpit height so you can push off with each step, extending your arms behind you. (Think of Nordic skiers with opposite arms and legs moving together.) If the snow is slick and your skins are off, poling may allow you to glide and gain more speed than on typical hiking-style tours.
- >> **Traversing** Shorten your uphill pole by as much as a foot (when on steep slopes). If your poles aren't adjustable, create a handle at the shaft's mid-point by wrapping it with cork grip tape (find it at bike shops). Tip: On steep or slick sidehills, plant the basket of your downhill pole an inch or two downhill of your intended track. Ski over the basket (on the pole's uphill side), making contact between your ski edge and the pole itself. The tip provides purchase and acts as an anchor against slipping.
- >> **Descending** Lengthen your poles. Your arms should be at 90-degree angles when you're holding the grips and the tips are planted.

## Descend with Control

Stay safe with these six ski-down tips.

- >> **Expect inconsistency.** Ungroomed wilderness snow can change with every turn. Look for clues to surface consistency (like glinting ice or swirling drift patterns) and continually adjust your technique (see above). Also, watch for bulges that indicate subsurface hazards such as logs and rocks; give them a wide berth.
- >> **Stay centered.** Use a neutral, athletic stance: shoulders square, hands up, legs flexed at the ankle and knee. Variable snow—especially if it's deep and heavy—can throw you forward and back, so stay ready and light on your feet.
- >> **Bust the crust.** If you're punching through a thin snow layer to softer stuff below, try to distribute your weight evenly on your skis and stay on top. If that's not possible, use short jump turns to power through, and keep your shins pressed against your boot to get better purchase with your skis' edges.
- >> **Drop your ego.** Stop often to evaluate terrain, descend slowly, and don't be afraid to use beginner techniques like snowplowing or sidestepping. Groomed-hill skills don't necessarily translate off-piste, and hazards aren't marked. "Realize that you won't be as gnarly or as fast a skier in the backcountry as you are at a resort," says Mike Hattrup, a one-time U.S. Ski Team mogul champ turned backcountry king.
- >> **Know how to self-arrest.** Before going out, practice stopping techniques. With poles: Use your armpit as a fulcrum and gradually lever the pole's tip into the snow. Without poles: Flip onto your stomach with your head uphill and dig your boot tips in.
- >> **Manage your pack.** You'll be skiing with 10 to 50 pounds of weight, which shifts your center of gravity higher and makes turns more difficult. Counter the effects: Add a slight forward lean to your athletic stance and prep preseason with core- and balance-building moves like planks, crunches, squats, and lunges. Don't like skiing with a load? Opt for a basecamp and day-tripping setup.



## KICK-TURN LIKE A PRO

Perfect this move for on-a-dime turns in steep, rugged terrain.

### GOING UP (ABOVE LEFT)

1. Stop at a switchback's apex and point both skis in the same direction.
2. With your uphill pole planted wide, raise your uphill ski, swing it around, and plant it in the direction you want to go; try to swing the ski at least 90 degrees from your downhill ski, but aim for a hip-bending 180. A wider angle reduces your chances of slipping.
3. Keep your weight on your downhill ski while you move your feet close together, scooting your opposite-facing skis to a near-parallel position. If you can't twist your uphill ski past 120 degrees, try to slide its tail underneath the downhill one to catch an edge.
4. Transfer your weight to the uphill ski, making sure you—and it—are stable. Re-plant your poles wide (and uphill from you), so there's enough room to kick your second ski around.
5. Lift your downhill ski a few inches above the snow, keeping it parallel to the surface.
6. In one motion, kick your downhill heel against the ski to bounce the tip up and pivot the ski into the new direction, on the uphill side of the first ski.

### GOING DOWN (ABOVE RIGHT)

1. Position your skis perpendicular to the fall line (the slope's downhill angle) and stomp yourself a stable platform, about as wide as your shoulders.
2. Plant both poles on your uphill side, about a foot above you and wide enough (plant one in front of your torso, one behind) to provide stability as you shift your weight.
3. Transferring your weight to your uphill ski, lift your downhill ski and swing it (tip out) so that its tail hits the snow near the tip of your uphill ski. Gently rotate your raised foot and knee toward the downhill slope. Once you initiate the motion, your ski should float down and rest on the snow with your feet pointing in opposite directions. Be careful not to catch the tail on the slope.
4. Weight your downhill ski, lift your uphill ski, and while bringing it around, turn your torso.

>> See a step-by-step slideshow on downhill turn technique at [backpacker.com/kickturn](http://backpacker.com/kickturn).