

How to Choose Downhill Skis (Alpine, Randonee, Telemark)



Choosing the right skis primarily involves matching your terrain preferences (Groomed slopes? Off-piste? Park-and-pipe?) with the appropriate ski (All-mountain? Backcountry? Twin tip?). This article is designed to help you connect those dots.

All variations of downhill skiing are addressed here:

Alpine: Groomed runs with varying levels of difficulty at lift-served areas; traditional skiing.

Backcountry: Untracked, potentially unstable terrain that involves no lifts, no patrols, no snowcats, no warming huts—just you, your skills and the mountain. The unmarked backcountry and sidecountry are also known as off-piste terrain. In French, the word for a marked trail is *piste* (pronounced PEACED).

Sidecountry: Lift-accessible backcountry terrain that lies just beyond resort boundaries. Should be approached through marked gates. Skiers often must hike back to a lift.

Much crossover has occurred between these styles in recent years, and skiers now regularly migrate between groomed slopes and riskier, obstacle-dotted off-piste terrain. Many modern skis are engineered to perform well in either environment.

Comparing Skiing Styles

Here's a quick way to begin narrowing your choices: Choose the kind of terrain you most commonly ski and locate what types of skis could work for you:

Alpine: Takes place at lift-served ski areas; skiers' heels remain locked into bindings at all times.

Backcountry (off-piste): Takes place in wilderness zones outside of patrolled commercial ski areas. If no lifts are available, skiers climb to high points on their own power (often aided by climbing skins attached to their skis), then descend through trees, drops or whatever the mountain presents. Heels are not always locked into bindings. Backcountry skiing is divided into 2 main styles:

- **Randonee** (also called alpine touring or AT): During downhill runs, randonee boot heels lock into bindings, but during climbs they float free for efficient uphill movement. When descending, randonee and alpine skiers execute turns using identical technique. Randonee gear resembles alpine equipment and performs the same, but it usually weighs less.
- **Telemark:** Heels never lock into bindings. Whether climbing or descending, telemark skiers use a free-heel technique similar to cross-country. Tele skiers make short- and long-radius turns with 1 heel up while keeping their downhill leg in a flexed-forward position.

Note: Randonee skiers sometimes visit lift-served slopes, but their primary habitat is the backcountry. Telemark skiers also feel at home on untracked snow, though in recent years more tele skiers are opting to make turns in-bounds at resorts. Both are more advanced skiers who possess such mountaineering skills as avalanche assessment, route-finding and navigation.

Important: All backcountry and sidecountry skiers should avoid traveling solo and must always carry vital emergency items—an avalanche transceiver, shovel and probe.

Park-and-pipe: Constructed terrain parks (with jumps, pipes, rails and other obstacles) where skiers perform tricks and aerial acrobatics.

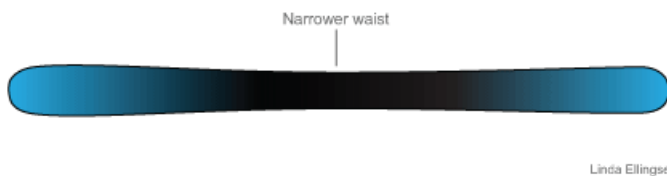
Freeride (sometimes called "big mountain" skiing): When a mountain's natural features (particularly very steep, off-piste slopes) are used as a terrain park for jumps and stunts.

Freestyle: This term's usage can vary among skiers. Many equate it with mogul skiing combined with aeriels, often performed in a competitive environment. Others use it more generally to describe tricks performed in a terrain park or on powder.

Comparing Ski Types

REI sorts its ski selection as follows:

All-Mountain



1. Best for: 1) Groomed runs (all levels, including moguls); 2) a mix of groomed runs and powder.
2. Waist width: Up to 85mm. Sometimes also called carvers. Narrower waist gives skis an hourglass shape, which makes them easy to turn.
3. Pros: Excellent edge-hold on groomed routes or hard snow. Nearly every skier, novices and up, can have fun on easy-turning all-mountain skis.
4. Cons: May not fulfill every high-performance demand of skiers with specialized interests (such as deep powder, park-and-pipe).
5. Bindings: Most are available with integrated (custom-matched) "systems" that flex naturally with the ski and accommodate easy turning. Some are available flat (without bindings) for skiers seeking customization.
6. Summary: Suited for all age groups, both genders and any experience level. The most popular ski type on the market. High-end models can satisfy performance expectations of expert-class skiers.

Shop REI's selection of [all-mountain skis](#).

All-Mountain Wide

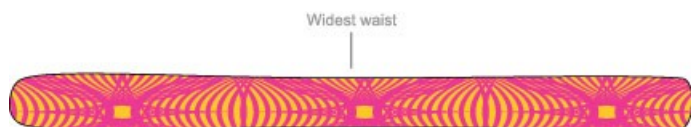


1. Best for: The skier who wants to ski all over a mountain, both on groomed runs and off-piste, and wants a single ski to handle it all.
2. Waist width: 84mm-101mm. Sometimes also called mid-fats or fats. Skiers get enhanced floatation in soft snow without sacrificing too much agility on groomed slopes. Wides can bust through crud (chopped-up snow) and slush with greater ease than narrower all-mountain skis.
3. Pros: Wider waist adapts easily to powder, efficiently cuts through sloppy snow.

4. Cons: Not quite as nimble in turns as narrow-waisted all-mountain skis.
5. Bindings: Most are sold flat (nonintegrated), but a few come integrated.
6. Summary: Aimed primarily at fans of powder who also ski the groomers. Twin tip skis in this category are constructed primarily for directional skiing (mostly forward, sometimes switch); the design of the twin tip tail allows skiers to adjust their turn shape more freely.

Shop REI's selection of [all-mountain wide skis](#).

Powder



1. Best for: 1) Deep, light snow; 2) powder fans who sometimes end up on groomed runs; 3) sidecountry or backcountry.
2. Waist width: 101mm and higher. Sometimes called super-fats. Powder skis are all about creating lots of surface area to maintain flotation in the steep and deep.
3. Pros: Virtually unsinkable in bottomless fluff. Most include "rocker" technology that creates an early upward arc (or rise) at tip and/or tail sections to further boost flotation and keep edges from catching.
4. Cons: Not built for precise maneuverability on groomed runs.
5. Bindings: Most, but not all, are sold flat (nonintegrated).
6. Summary: As the name implies, powder skis perform best in powder, though advanced skiers can use them anywhere on a mountain. For most skiers, powder skis occupy a secondary, specialized place in their quiver of skis.

Shop REI's selection of [powder skis](#).

Backcountry (Randonee or Telemark)

1. Best for: 1) Off-piste (untracked wilderness) terrain; 2) powder; 3) groomed runs.
2. Waist width: 78mm-102mm. Narrower waists make turning easier when skiing hard snow; wider waists work better in powder.
3. Pros: Best overall for backcountry excursions. Skis are lighter than alpine gear, which is advantageous when climbing.
4. Cons: If you never go off-piste, consider other alpine ski types.
5. Bindings: A growing number of skis are suited for multiple disciplines, and the choice of the binding is up to the owner.
6. Summary: Opens the wild, untracked areas of a mountain to you. With this freedom comes the responsibility of acquiring the mountaineering skills necessary for ensuring your own safety.

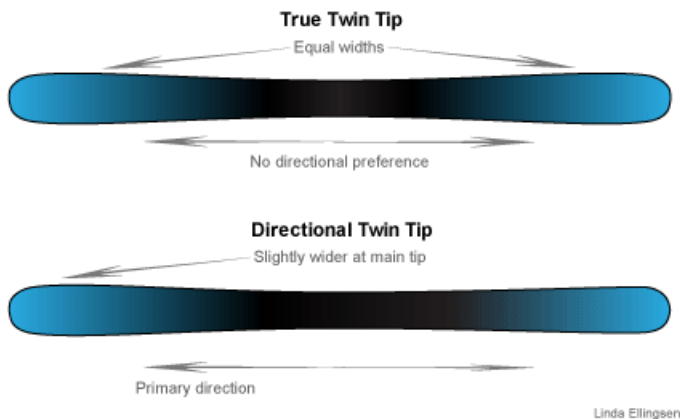
Shop REI's selection of [randonee skis](#) or [telemark skis](#).

Twin Tip/Freestyle

1. Best for: 1) Park-and-pipe; 2) groomed runs; 3) powder.
2. Waist width: 80mm-122mm. A few wide-waisted models are targeted at skiers who devote time to powder play in addition to their park-and-pipe activity.
3. Pros: Designed to hold an edge in a pipe, handle well in powder, provide stability when skiing in reverse (i.e., riding switch) and soften impacts when landing jumps. In most cases, their performance compares favorably to all-mountain skis.
4. Cons: Designed to be skied while centered on the ski, which traditional skiers might find

- odd. Graphics are skewed young, which may be a factor to some skiers.
5. Bindings: Most are sold flat (nonintegrated), but some could be integrated.
 6. For tricks: Uprturned tips front and back simplify tricks. Tail rise makes it easier to ski backwards.
 7. Summary: Skis designed for ambitious fun-seekers who ski fast, do tricks and enjoy pushing the limits. They have a unique look, yet offer a variety of shapes and sizes that deliver performance in a terrain park or anywhere on the mountain.

Shop REI's selection of [twin tip/freestyle skis](#).



Note: Racing skis also exist, but due to their limited audience REI does not carry any models.

[View a list of REI's 2009-10 downhill ski assortment](#)

Shop for skis in person at your [nearest REI store](#).

Skier Ability Levels

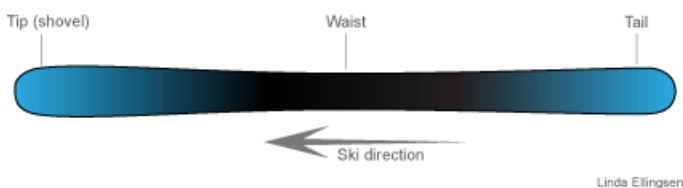
When evaluating skis, we suggest you don't spend too much time sweating the traditional classifications—beginner (Type I), intermediate (Type II) or advanced (Type III)—that have long influenced the ski-selection process.

Ski technology has progressed to a point where nearly any novice can hop on nearly any ski and have fun, particularly on easy-to-turn all-mountain skis. Expert-level skiers can fine-tune their performance by paying attention to subtle differences in flex or sidecut. For most skiers, though, it's more important to match your ski to the conditions you ordinarily seek out.

The following 3 factors—dimensions, sidecut and length—are most likely to influence your selection.

Ski Profile Dimensions

A ski's dimensions are determined by measuring (in millimeters) its width in 3 places: at its 2 widest points, the tip and tail, and at its narrowest, the waist. They indicate how skis will react to your movements and identify their most appropriate use.



Tip: Also called the "shovel," the tip initiates turns. A wide tip (roughly 120mm and higher) floats more easily on soft snow. On hard snow, wider tips matched with narrower waists create a ski with

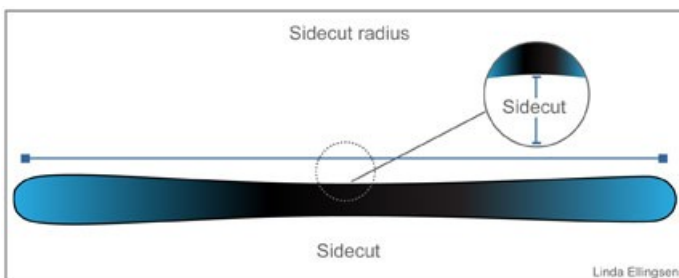
a preference for short-radius carved turns.

Waist: Of the 3 dimensions, waist width is the most critical measurement. Narrow waists allow you to establish an edge sooner, resulting in speedy, usually nimble skis that are well-suited to groomed runs. They can also shift from edge to edge more quickly. Wide waists deliver more surface area (more area to make contact with snow), which makes them preferable in soft snow and powder.

Tail: The back end of a ski helps sustain turns and usually matters more to fast-turning experienced skiers. (Their usual preference: wider tails.) When carving tight, rapid turns, a wider tail resists sideways skids and sustains speed. Novices and cruisers usually prefer narrower tails, better for wide, sweeping turns.

Tip/waist/tail measurements are usually separated by slashes and displayed as, for example, 131/98/119.

Sidecut Radius (Turning Radius)



This ski spec, known interchangeably as sidecut, sidecut radius or turning radius, indicates a ski's turning ability. Bottom line: The smaller the number (a measurement shown in meters), the quicker a ski will turn.

Sidecut is the arc or curve created by the edge of a ski. Imagine if that arc was extended until it formed a circle. A line drawn from the center of that circle back to the edge of the ski determines a ski's sidecut radius (or turning radius).

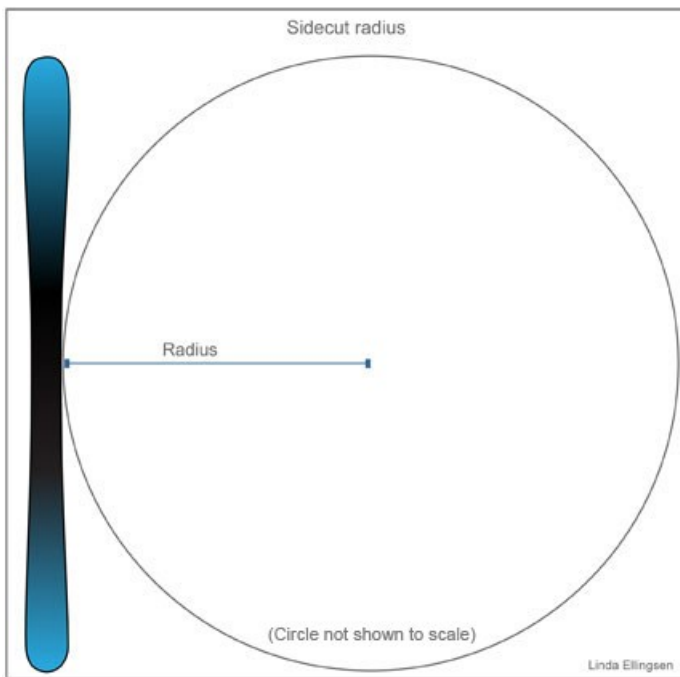
Skis with low turning radius numbers (low to mid teens) exhibit a preference for tight short-radius turns, though they can also accommodate broad, arcing turns.

Skis with higher turning radius numbers (upper teens and beyond) indicate skis better suited for long-radius turns. Such skis are usually carry speed more efficiently and make it easier for a skier to slide a turn instead of always carving.

Sidecut radius numbers can help you locate skis that match your style. For example:

Many all-mountain skis offer a deep sidecut that forms an easy-turning hourglass shape. The curvy sidecut on such skis would form a small circle, resulting in a low sidecut radius number. All-mountain skis with wider waists (and a less curvy sidecut) create a higher sidecut radius number. These skis are more likely to excel during speedy descents where turns are more gradual.

Powder skis, meanwhile, have very wide waists. Their shallow sidecuts result in even higher sidecut radius numbers. So they may be less nimble in turns, but those wider waists float well on powder.



Ski Length

A number of factors can influence your choice of ski length:

Height: In general, with ski tails on the ground, tips should touch you somewhere between your nose and eyebrows. Big-mountain skiers sometimes prefer longer skis and may choose skis that extend above head height. Kids? For the very young (under 6), tips should not quite reach their chins. For youth (under 12), tips should touch a part of their face.

Weight: Skiers with larger frames often are good candidates for either longer skis or fatter skis. Extra mass provides leverage for turning longer skis; extra surface area can also help distribute weight.

Experience: Shorter skis appeal more to novices because they're easy to turn. Veteran skiers will often choose their size based on the type of turn they want to make. Shorter skis usually have a smaller radius or quicker turn. A longer ski will have a longer radius or wider turn.

Terrain: If your favorite hill is dominated by narrow, twisty trails, look at shorter skis. They're better at quickly maneuvering into tight turns.

By evaluating these specs (dimensions, turning radius, length), you can potentially identify a ski type well-suited to your preferences. If you are an avid skier who enjoys a variety of experiences, you might want 2 or 3 skis targeted at specific terrain.

Summing up: The 3 factors just described are typically the most important pre-purchase considerations most ski shoppers ponder. The attributes described below are more subtle details, often of interest only to very demanding skiers. Nevertheless, it's all good info to know.

Ski Flex

Flex can refer to 2 regions of a ski:

Longitudinal flex: How much bend a ski permits lengthwise (from tip to tail).

Torsional flex: How much twist a ski permits (essentially side to side).

Some skiers will argue that flex is an important consideration, as important as profile dimensions, sidecut or length. Regrettably, it is a specification not provided by all ski manufacturers and can be

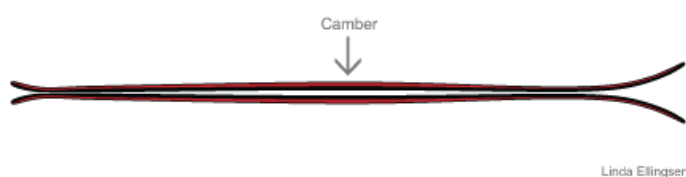
difficult to locate during research. Because ski-makers do not consistently calculate and report ski flex, REI.com does not include flex in its online ski specs.

Years ago, a ski's longitudinal flex could be estimated by flexing the ski by hand in a store. Today, new materials and construction technology has made it difficult to accurately evaluate flex in this manner.

Accordingly, REI advises skiers to not fret much over flex. As a general rule, a high-performance ski will exhibit more torsional stiffness, allowing it to better hold an edge at speed. Various materials are sometimes added to a ski also help reduce (dampen) vibrations, providing a smoother ride at high speeds.

Ski Camber and Rocker

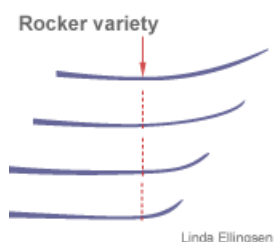
Camber



Nearly all skis offer a continuous, downturned arc (or bow) that runs the length of the ski. When a skier stands on a ski their weight flattens it. At that point the entire length of the base can provide stability and the ski's metal edge can initiate turns. During turns and descents, when skiers press their weight into a ski the camber bends and arcs. As a skier moves from turn to turn, camber provides the energy for a ski to snap back from turns, creating a sensation of "liveliness." In other words, camber is the built-in spring that makes a ski lively.

For the record, only cross-country skis offer "double camber," which accommodates the kick-and-glide cadence of XC skiing.

Rocker



This is a recent innovation in powder skis, where the tip and/or tail of skis are shaped with an early upward curve that resembles the arc at the base of a rocking chair. Some advantages: In powdery soft snow, rocker helps tips and tails avoid sinking into bottomless fluff. This means skiers catch edges less often, turning is easier and balance is improved. Essentially, rocker serves to pre-bend a ski into an ideal shape for soft and variable snow, giving the skier a more predictable platform.

Thomas Laakso, Ski Category Director at Black Diamond, sees substantial merit in today's rocker-equipped powder skis. "Powder skis these days aren't the soft noodles we used to have," he tells REI.com. "With the advent of rocker you don't have to have a soft ski. A soft ski used to be needed in order to flex the tip into a bend that allows float through the powder. But with rocker, you essentially pre-flex that shape into the ski and you can enjoy the benefits, stability and versatility of a stiffer ski in the powder."

Camber and rocker are distinctly different features. Even so, in the ski specifications provided at

REI.com, skis equipped with rocker at the tip and/or tail will be noted in the camber section.

A note on camber ranges: In online ski specs, REI.com identifies any camber used in skis as "standard." Because not all manufacturers provide the amount of camber available on each ski, REI.com does not list specific measurements.

Typically, camber falls within 2 ranges:

- Regular (8mm-12mm): Springy; preferred by skiers looking for a traditional and predictable feel in all conditions, especially hard snow.
- Minimal (0mm-5mm): Less lively; used in powder specialty skis to achieve a loose feel that mimics the sensation of surfing.

Ski Construction

Ski makers use a variety of constructions to make skis durable and lightweight. The various constructions, including hybrids of 2 or 3 construction designs, result in performance variations so subtle that only the most discerning skiers can detect any difference.

The pros and cons of construction methods have been debated for years without clear consensus ever being reached. Manufacturer claims regarding the benefits of particular construction types can be contradictory, leaving shoppers puzzled. For the great majority of skiers, the type of construction used in skis should rarely influence a purchasing decision.

Construction Types

Here is a brief overview of the options:

Torsion box: A core (usually wood, sometimes foam) encased in a seamless fiberglass wrap or sleeve, then impregnated with epoxy. In general, it resists twisting, creates a more rigid ski and is believed to provide good edge-hold. It is sometimes preferred by more aggressive skiers, though it may create a fractionally heavier ski.

Cap: The top layer, usually fiberglass, spans the core and reaches from one edge to the other. Unlike other construction types, cap construction creates a rounded ski top. In general, cap offers a more forgiving feel and results in lighter skis.

Laminate (sometimes also called a sandwich): Horizontal layers of various materials are stacked atop one another and glued together, usually starting with a base, then fiberglass (for reinforcement), metal, the core (wood or foam), more fiberglass, then a topsheet. It often appeals to fast skiers who stick to groomed slopes. Skiing on hard snow at high speeds often benefits from metal, and metal (which in general yields a stiffer ski) is most easily applied in a laminate construction with sidewalls.

Sidewall: The surface (usually plastic) found on skis using laminate construction. Vertical sidewalls are believed to provide more direct transfer of energy, thus accommodating more precise turns and more ambitious skiing. Slanted sidewalls are more forgiving.

Core Material

A ski's core sits atop a base, beneath a topsheet and between 2 metal edges. The base is the foundation, the spine, of a ski. It influences the degree of stiffness a ski exhibits and the type of "feel" a skier experiences. All modern-day materials perform well; infrequently is one core strongly recommended over another.

Common core materials:

Wood: Durable. Usually more expensive. Exhibits a responsiveness and sound that many skiers find

attractive.

Foam: Low weight, consistent flex.

Composite: Combines various woods or foams to achieve a desirable balance of weight and feel.

One ski-maker executive advises most skiers to avoid fretting much over core and construction. "If you think of a ski as a cake, it's not just the flour or any one ingredient that makes it taste good," Ron Steele of Rossignol tells REI.com. "It's how all the ingredients are blended together. That's what makes a good ski."

Base

Base is the material on the underside of a ski which allows it to slide when waxed. A common material used is ultrahigh molecular weight polyethylene (PE) or UHMWPE. One reason: PE with a higher molecular weight results in a harder base. Admittedly, a harder base permits less wax absorption, but this downside is offset by its high damage tolerance.

Bases offer 1 of these 2 designs:

Extruded: Less expensive; easy to repair; low-maintenance. On the down side: May underperform in very cold or wet conditions; does not hold wax for long stretches.

Sintered: Strong; dependably holds wax; preferred by fast skiers. However, it's expensive, tougher to repair and requires frequent waxing to avoid signs of oxidation.

Twin Tip Tapers

Taper matters if you are interested in skiing backwards while on twin tip skis. Here's how tapers differ:

Standard taper: The tip is a bit wider than the tail, resulting in the ski initiating more naturally in the forward direction.

Bidirectional taper: The tip is still wider than the tail, but the difference between the 2 is less than on a directional ski. This allows the skier to easily move in the forward direction, while also gaining a more consistent switch ride.

Symmetrical taper: Tip and tail are equal width, thus lending equal potential and ease to both forward and switch skiing. To maximize performance, mount bindings in the absolute center of the ski.

Women's Skis

Women-specific models are typically lighter, softer and/or shorter, making them easier to maneuver than comparable men's skis due to less energy being required to flex a ski a given distance. This minimizes fatigue without compromising performance.

Black Diamond's Laakso suggests picturing a man and woman of equal weight. Because a woman's frame ordinarily carries its center of gravity (Cg) lower than a man's, the distance between a woman's Cg and the ski (the equation is mass times distance) is smaller. Therefore a smaller load, or force, is exerted on a woman's ski.

"So to get a ski to flex a given distance to create the appropriate arc that mates up well with the particular sidecut radius, you just need to have a softer and often lighter ski," says Laakso. "Men have a higher center of gravity. That means they carry their weight farther from the ski. More distance equates to a higher force acting on the ski. So the man and the woman could be skiing on skis with similar end-designs, but the man's ski will likely be stiffer and probably a little heavier."

Bindings on women's ski are usually mounted a little further forward on skis than men's bindings, another adjustment to accommodate a women's lower center of gravity. This enhances a female skier's balance, stability and responsiveness.

Kids' Skis

It may make sense to buy clothes that kids can "grow into," but that strategy does not pay off for aspiring young skiers. Equip them with skis that are a good fit for their current size.

As stated earlier in the section on length, for the very young (under 6), tips in general should not quite reach their chins (or be 6 to 8 inches below the tops of their heads). For youth (under 12), tips should touch a part of their middle or upper face. Guidelines in this area often vary. Perhaps the most informed experts on the topic are those parents who have observed their child's abilities in snow.

Kids today have the advantage of learning on shorter, easy-to-turn shaped skis. Such skis can boost a child's confidence and build their enthusiasm for repeat visits to the slopes.

Kids can always ski a shorter ski but may have problems with a long ski. When in doubt, go short.

Shop REI's selection of [kids' skis](#).

When to Replace Skis

Two factors can influence this decision, says Mark Swindel, devoted skier and manager of REI's Salt Lake City store.

Technology

"Are your skis 7 years old or older?" Swindel asks. "If so, it's pretty likely technology has passed you by. With all the new designs, shapes and materials being used in skis today, newer skis are easier to ski and just a lot more fun. There's no reason not to ski on older skis, but you might find the experience to be more enjoyable on newer designs."

Feel as though your skills have peaked on a particular model? A new ski may snap you out of stagnation mode and kick you up another level.

Wear

"For a recreational skier who skis about 5 times a year, that person's skis could last forever, although ski technology will inevitably change," Swindel says. "On the other hand, a hardcore skier who's skiing 30 times or more per year may change skis every 1 or 2 years.

"At some point the edges on a heavily used ski can no longer be kept sharp, or it has taken too many whacks from rocks, or the base has been filed and stone-ground so many times that there's just not enough material left to tune," Swindel says. "If you want a responsive ski, you probably need a new one at that point."

Another sign a ski is past its prime: Its camber will diminish and the ski, unweighted, looks flat or near-flat when lying on the ground.

Ski Bindings

This is the performance link between your boots and your skis, the device that makes you "at one with the ski." For your safety, they release you from the ski when pressure exerted on them exceeds their release settings. They are discussed in detail in our Expert Advice [How to Choose Alpine Ski](#)

[Bindings](#) article.

The first rule of bindings: They must be compatible with your chosen boots. The second rule, explained a bit more later in this article: Never adjust your binding settings yourself. Enlist a professional.

A few binding components:

- Brakes: Twin prongs that straddle the ski, flip down when you fall and dig into the snow so your skis don't slide too far from your landing spot.
- Anti-friction device (AFD): Pad located under each binding's forefoot area; minimizes friction between the binding and the boot and helps boots slip out when the toe piece releases.
- Lifter: Material under the binding and ski, designed to boost edge-hold. It's more of a race feature these days, enabling more acute edge angles before a skier "boots out" or has boot sides touching snow. It's mostly an issue on narrower race skis.

Choices include:

Integrated Bindings

These are designed for a specific pair skis and packaged as a system. Integrated bindings are primarily available on all-mountain and all-mountain wide skis. Integrated bindings are often desirable because they tend to flex more naturally, facilitate better edge-hold and allow easy turning.

Nonintegrated Bindings

These are offered in 2 categories:

1. Intermediate: For value-minded skiers who put a priority on ease of entry.
2. Advanced: Usually higher in price, with added features typically important only to sophisticated skiers, such as longer retention and travel before release. Wider bindings usually fall into this category. Often with higher DIN (release settings; see below) and beefier construction due to the higher forces exerted on them.

Backcountry Bindings

Also available in 2 categories:

1. Randonee: Free-heel movement for climbing; locked setting for descents. Can release at toe and heel. (Some are DIN certified and some are not.)
2. Telemark: For full-time free-heel movement, on climbs and descents. The binding usually does not release.

DIN Settings

DIN is the standard for the release settings on your ski bindings. The setting is determined by a combination of a skier's height, weight, boot length, ability and age. The system was created in Germany; DIN is the acronym for Deutsche Industrie Norm.

Many words could be used to explain the rationale and complexities of DIN settings. The smartest, briefest guidance we can offer on the topic is this: Never attempt to adjust your bindings or your DIN on your own. Leave the task to a professional, preferably an REI ski specialist.

[View a list of REI's 2009-10 downhill ski assortment](#)

Shop for skis in person at your [nearest REI store](#).

Contributors to this article: Snowsport specialists Rob Yushack, Jon Iltis and Mark Swindel of REI Salt Lake City; REI snowsport product information specialists Joel Oerter and Joe Pasteris; Thomas Laakso, Ski Category Director, Black Diamond; Ben Wallace, U.S. Sales Manager, K2 Skis; Ron Steele, VP of Sales/Hardgoods, Rossignol.

- [Comparing Skiing Styles](#)
- [Comparing Ski Types](#)
- [Skier Ability Levels](#)
- [Ski Profile Dimensions](#)
- [Sidecut Radius \(Turning Radius\)](#)
- [Ski Length](#)
- [Ski Flex](#)
- [Ski Camber and Rocker](#)
- [Ski Construction](#)
- [Women's Skis](#)
- [Kids' Skis](#)
- [When to Replace Skis](#)
- [Ski Bindings](#)