

While some Australians will probably never see snow in their lifetimes most people would recognise snow if they saw it. Only a few areas of Australia are covered by snow in winter but we are exposed to images of it all the time on TV, in films and in books. But snow means many different things to different people. For some it means fun while for others it can mean cold and misery.

What is snow?

Snow is like frozen rain. Snow begins as ice crystals in clouds which form around dust particles or other pollutants in the air. Ice crystals are almost always six sided (exceptions are rare). These clump together until they are too heavy to be suspended in the air. If the weather is too warm the ice will melt on the way down and become rain, if the air is cold enough it falls in the form of snow.



Did you know?

It is often said that no two snow flakes are alike. However this belief is hard to test because snow flakes melt so quickly and it is impossible to compare every snow flake that falls.



Perisher

Snow in Australia

Snow mostly only falls regularly in Australia in certain regions of south west of the continent down to Tasmania. Areas of the highest elevation get the most regular falls, such as the aptly named Snowy Mountains in the south of NSW. The Blue Mountains west of Sydney has occasional winter snowfalls but the snow usually melts very quickly. But sometimes weather conditions have been cold enough to snow on even lower lying areas. On June 28, 1836 snowfalls were reported in Sydney across the city as far as some beaches. Most of the snow melted as soon as it hit the ground but some collected on roofs up to a depth of more than two centimetres. Snow falls very rarely in Western Australia in the Stirling Ranges and in South Australia in the Mount Lofty and Flinders Ranges.



Where snow never melts

There are some places where the snow falls and stays on the ground. On high mountains where the temperature remains lower than zero degrees celsius or colder, snow can fall throughout the year. Because it is not warm enough for the snow to melt it stays on the mountain until it falls in an avalanche or gets pushed down the mountain in the form of a glacier. In the Antarctic (right) layers of snow fall every year and because they do not melt they compress into ice sheets that push outwards where icebergs are "calved" or break off from the edges. The Arctic is covered by pack ice formed from snowfalls throughout the year.



Snowboards

Snowboards are a more recent invention than skis. In 1965 an American man Sherman Poppen watched his daughter try to stand up on her sled, trying to ride it down a hill. He decided to make a kind of snow surfboard for his daughter out of two children's skis fixed together, which his wife named a "snurfer". They became popular as children's toys. In the 1970s the idea was refined into the more controllable snowboard. At first it was banned from ski slopes as too dangerous but eventually, with many technical refinements, it became accepted and in 1998 it became an event at the Nagano Winter Olympics.



Making snow

Sometimes the existing snowfalls just aren't enough to satisfy skiers and other people enjoying snowsports at ski resorts and winter sports events. That is when people turn to snowmakers also known as snow guns or snow cannons. Snowmakers basically shoot out fine droplets of water using compressed air or a fan. The droplets freeze in the cold mountain air and fall like natural snow. Sometimes chemicals are combined with the water to help crystals form. This allows ski slope operators to control where the snow is distributed and how much "powder" (fine dry snow) is on the slope. Some environmental concerns have recently been raised about the amount of electricity, local water (usually tapped from lakes or rivers), erosion and other problems caused by snowmakers.

Did you know?

Snow falls over only 23 per cent of the Earth's surface. It falls at sea level between the North pole and latitude 35 N and the South Pole and 35 S. However on the west coast of continents it generally falls only at higher latitudes. Close to the equator, snow only falls on mountains of about 4900m or higher.

Source: Encyclopaedia Britannica.

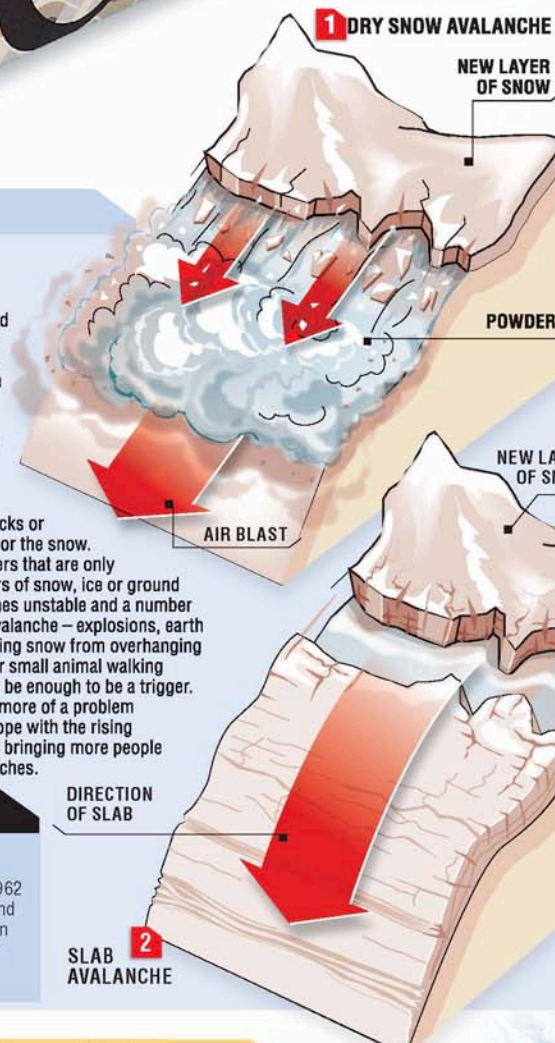
The glare of sunlight reflected from snow can bring on a painful condition known as snowblindness. It can damage the eyes but does not usually cause permanent blindness. People afflicted by it need to cover their eyes or rest for several hours or sometimes days in a darkened room. Skiers wear tinted snow goggles to prevent snow blindness.

Avalanches

When large amounts of snow build up on a steep mountainside they can often become unstable and break loose creating what is known as an avalanche. Avalanches can be a loose dry snow (1) shifting, wet snow melting and coming loose or the snow can break away in large slabs (2). They happen mostly on slopes where there are a few or no trees, rocks or other objects to help anchor the snow. The snow builds up in layers that are only loosely connected to layers of snow, ice or ground beneath. The snow becomes unstable and a number of things can trigger an avalanche - explosions, earth tremors, falling rocks, falling snow from overhanging cornices. Even a person or small animal walking across unstable snow can be enough to be a trigger. Avalanches have become more of a problem in North America and Europe with the rising popularity of snowsports, bringing more people into areas prone to avalanches.

Did you know

Avalanches can move at speeds of 130km/h. An avalanche in Peru in 1962 destroyed eight villages and towns and killed more than 3500 people in just seven minutes.



Snow mobility

Because human feet tend to sink deeply into snow, or slide on icy snow, it can be difficult to walk on. Humans have invented several ways to make getting around on snow much easier. Many have become used in recreational activities or even elite sports.



Snow shoes

Snow shoes redistribute the downward pressure of the body's weight over a larger area preventing a person from sinking as deeply into the snow. Snow shoes were probably an early invention by prehistoric humans.



Sledges, sleighs and toboggans

Along with snowshoes and skis, sledges are one of the oldest forms of mobility on snow dating back to prehistoric times. Sledges generally use either a smooth underside or ski-like runners to help them glide across snow. They are either powered by gravity down a hill, pulled by animals such as horses or dogs or pushed or dragged by humans. There are many variations on the basic sledge including the bobsledge, the luge and the skeleton.



Skiing



Skis can be seen in cave paintings dating back to at least 7000 BC. They were used as a means of mobility, and recreation, for centuries but it was only at the end of the 19th century that skiing became a sport. It is now one of the most popular forms of getting around on snow and a huge tourism industry in areas where snow falls regularly.

More experience, more knowledge might perhaps have warned us not to go there [the south face of Everest]. One can never know enough about snow

GEORGE MALLORY - MOUNTAINEER

Snowmobiles

The invention of the internal combustion engine enabled inventors to come up with some basic designs for petrol-powered snow vehicles or snowmobiles. Some of the earliest snowmobiles were just modified automobiles with tracks around the wheels. The first patents for snowmobiles were taken out by people living in some of the coldest parts of Canada and the United States in the 30s and 40s. In 1958 smaller one-person vehicles first came on the market with tracks in the rear and steerable skis on the front. These began to replace traditional sledges and became a popular recreational vehicle.



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SOURCES AND FURTHER STUDY:

- WEBSITES: **PBS Online Avalanche** <http://www.pbs.org/wgbh/nova/avalanche/elements.html>
- How Stuff Works Snowmaker** <http://science.howstuffworks.com/snow-maker2.htm>
- A Guide to Snowflakes** <http://www.its.caltech.edu/~atomic/snowcrystals/class/class.htm>
- BOOKS: **Avalanches and Landslides** by Jane Walker (Franklin Watts)
- Bullet Points: Weather and Snow** by John Fardon (Miles Kelly)
- Extreme Sports: Snow** by Garry Chapman (Macmillan)
- Turbulent Planet: White-Out Blizzards** by Claire Watts (Raintree/Harcourt)
- Your World Explained: Weather** by Derek Elsom (Ken Fin)
- TO SEE: **Wild Weather** (ABC DVD); **Michael Palin's Pole to Pole** (BBC DVD); Reference - Encyclopaedia Britannica

Class activities

Art

Study images of snow crystal formations and snowflakes. Use these patterns as stimulus for your own artwork. Try cutting patterns from newspaper and coloured paper to produce a pleasing design. Develop a sample of snow crystal wallpaper.

Art and Technology

Download the instructions to make a snow globe from www.billybear4kids.com (select Holidays, then select Winter Fun). Produce a mini scene inside your globe that describes winter for you.

Science and SOSE

Where can you find snow in Australia? List the conditions required to produce snow and identify possible snowy sites on a map of Australia. You might like to develop a colour key to differentiate sites that regularly receive winter snow and those that only occasionally experience it.

Health and PE

Write a list of snow activities and sports from the simplest activity to the most technical sport. Make up a safety pack for a downhill skier. Would their safety equipment differ from that of cross-country skier? What preparations should you take for extreme cold conditions? You'll find helpful hints on the internet. America's National Snow and Ice Data Centre site is useful: <http://nsidc.org/snow/>

Science

Use the weather section in your copy of the Mercury to find out where it is snowing now. Describe the conditions necessary for a snowfall. What does the term seeding a cloud mean? Firefighters recently used this technology in China to fight a forest fire - would it work here?

Put distilled water in an ice cube tray and freeze in your freezer to make ice spikes. Use your knowledge of physics to account for this phenomenon.

Science and Technology

How do Arctic and Antarctic animals survive? Make a table listing the animals found in these snowy environments and describe how they cope with the snow and ice. Identify some skills, tools and techniques humans have adapted from these animals to help them survive in these places.

Technology

Use your internet access to find out how to build an Inuit snow dome or igloo. Make annotated drawing plans.

English

Write the instructions to make a snowman or snowangel.

As a class brainstorm as many words as you can to describe snow, ice and the weather that produces them. Use a selection of these words to right a class poem about a snowy sight.