



Earth Gauge

A National Environmental Education Foundation Program

## All about Snow

*Snow.* Some delight at the sight of it, while others cringe at the thought of it. Kids' excitement builds at the mere chance that school will be canceled. Snow is the source of the beloved white Christmas and countless hours of winter sledding, snowshoeing and skiing. But it's not just about fun – snow also provides important services. About 75 percent of year-round water resources for the western United States come from snow pack. Without snow, there wouldn't be a ski industry that supports close to 600,000 jobs. And, the insulating properties of snow help many wild animals survive winter.

Here, learn more about snowfall in the U.S. – and why the white stuff is so amazing.



NOAA

### ***Snow in the United States*** <sup>1,2</sup>

About half of the world's population has never seen snow, but almost every location in the U.S. has seen it at some point – even southern Florida. In fact, several locations in the U.S. have set impressive records:

- Homestead, Fla. holds the distinction of being the southernmost U.S. location where snow has fallen at sea-level, which occurred in 1977.
- The most snowfall ever recorded in a single season was at Mt. Baker, Wash. From 1998 to 1999, a whopping 1,140 inches of snow fell!
- The most snow ever recorded in a 24-hour period was 75.8 inches in Silver Lake, Colo. The record was set April 14-15, 1921.
- Georgetown, Colo. holds the record for the largest single calendar day snowfall – 63 inches fell on December 4, 1913.
- On March 11, 1911, measurements taken at Tamarack, Calif. revealed a record snow depth of 451 inches!



Of course, many areas of the country are used to heavy snowfall. The snowiest parts of the U.S. include Mt. Rainier, Wash. (680 inches of snow each year); Truckee, Calif. (203 inches per year); Marquette, Mich. (180 inches per year) and Syracuse, N.Y. (120 inches per year). This year, the Northeast, including portions of Maine, N.H., Mass., R.I., Conn., N.J., N.Y. and Pa., received snowfall from October 15 to 18. For some towns, this was the earliest recorded snowfall.

*Left: Paradise Inn looking north toward the summit of Mount Rainier. In the winter of 1916-1917, 789.5 inches of snow fell at Paradise Inn. Photo: NOAA/Department of Commerce.*

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Knowledge to live by

## **Anatomy of a Snowflake**<sup>3,4</sup>

Snowflakes are artistic and scientific wonders of winter weather. Wilson "Snowflake" Bentley, a farmer and photographer from Vermont, was the first person to successfully photograph snowflakes. He captured his first snowflake photograph on January 15, 1885. Using a unique technique with a microscope outdoors, he took over 5,000 photographs of snowflakes during his lifetime. Thanks to Bentley, we know that no two snowflakes are alike.

How do snowflakes form? Atmospheric conditions such as temperature, humidity and wind must be just right. Snowflakes form when supercooled water droplets freeze onto dust or pollen particles, becoming ice crystals. Over time, water vapor freezes onto these crystals, gradually forming snowflakes. Snowflakes fall thousands of feet toward the ground. If air temperatures remain below freezing, the snowflakes keep their shape as they touch the ground. However, they can also change into sleet or rain if they fall through warm temperatures or varying humidity on their way down.

The shape of snowflakes is determined by temperature and humidity. When water molecules freeze, they form a hexagonal lattice structure, which is responsible for the six-sided symmetry of many types of snowflakes. There are an infinite number of shapes snowflakes may take, but some are more common than others. Cold, dry air usually leads to plate and column-shaped snowflakes; moist air with temperatures just below freezing usually forms dendrites or needles. In general, the drier the air, the simpler the snowflake shape.

*Right: Some of Wilson "Snowflake" Bentley's photographs, taken in 1902. Photos: NOAA/Department of Commerce.*



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## **A Blanket of Snow – Warm as a Blanket?**<sup>5,6,7</sup>

To the average human, snow means extra layers, a warm winter coat, and hat and gloves. But to your backyard wildlife, snow means survival. Loosely packed snow has air spaces between snow crystals, which insulate plants and animals like a thick blanket. Under a deep layer of snow, even in below-zero weather, the ground temperature can remain around freezing (32 degrees Fahrenheit). A few extra degrees can mean life or death for wildlife.



Small mammals like mice build tunnels under the snow to connect their burrows to places where they stored food in fall. The tunnels not only protect mice from the cold, but also from predators.

Some birds, like the Ruffed Grouse, burrow into snow banks for warmth when temperatures drop and chilling winds are severe. Even birds that do not normally live on the ground, like sparrows, sometimes burrow into the snow for shelter.

It's the insulating properties of snow that keep an igloo warm, too. The igloo structure blocks wind and keeps body heat inside the building space. The inside walls of an igloo melt and refreeze, building another protective layer.

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## **Sources**

- <sup>1</sup> National Snow and Ice Data Center. "Education Center: All About Snow." <http://nsidc.org/snow/>
- <sup>2</sup> USA Today. "Answers archive: Winter, snow, ice." <http://www.usatoday.com/weather/resources/askjack/wasnow.htm>
- <sup>3</sup> "Wilson A. Bentley: The Snowflake Man." <http://snowflakebentley.com/>
- <sup>4</sup> Kenneth G. Libbrecht, California Institute of Technology: <http://www.its.caltech.edu/~atomic/snowcrystals/>.
- <sup>5</sup> The Weather Notebook. "Life Under Snow." <http://www.weathernotebook.org/transcripts/2002/03/04.html>
- <sup>6</sup> The Georgia Wildlife Federation. [www.gwf.org](http://www.gwf.org)
- <sup>7</sup> Stephanie Chasteen. "Cool Facts about Heat." Beyond Penguins and Polar Bears, National Science Digital Library (NSDL). <http://beyondpenguins.nsd.org>