



Simply Stellar Snowflakes

By themselves, they are tiny and fragile works of art. Together, they are a force of nature with the power to cover mountains, and close school!

Have you ever looked at just one snowflake, up close? Read on to discover how nature makes these crystal wonders.



The Makings of a Snowflake

A snowflake is a crystal of ice that forms when water vapor in a cloud condenses directly into ice. As it falls through the cloud and drifts down to earth, the snowflake may remain a single snow crystal, or clump together with other crystals to form a puff of snow.

Each snow crystal starts out with a simple *hexagon* shape (six equal sides). Some of these simple shapes will fall out of the cloud right away, just as they first formed. Some may appear to be almost flat, while others are long and thin, like six-sided columns or needles.

Other snow crystals drift around inside the cloud for a while, and grow into more complex shapes as they attract more water vapor droplets. These tiny water molecules line up in a regular pattern, called a *lattice*, and begin to branch out from the six sides of the original hexagon shape. Because the crystal grows in a lattice, each of the six sides will be exactly alike.

The most familiar snow crystal shape is the *stellar* snowflake that resembles a six-sided star. Some stellar snowflakes have six simple arms, while others have very fancy arms that branch off many times, giving the snowflake a very lacy look. The number of frilly branches off the arms depends on the temperature and humidity in the cloud, and the length of time the snowflake has to grow before falling out of the cloud.

Tip of the Iceberg

It's hard to believe, but true - no two snowflakes are exactly the same. Although snow crystals start out with the same basic shape, no two snowflakes take exactly the same path on their journey inside the cloud.

Another amazing feature of snowflakes is their symmetry. If you could fold a snowflake in half, or draw an imaginary *vertical* line through the middle of the snowflake (from top to bottom) you would see that both halves are exactly alike. If you draw another imaginary *horizontal* line (from side to side), or fold the half in half again, you will have four fourths that are exactly alike. The snowflake also has symmetry along *diagonal* lines (on an angle from top to bottom or side to side). Those imaginary lines (vertical, horizontal and diagonal) are part of the lattice that gives the snow crystal its shape.

Although many snowflakes fall from the clouds with perfect symmetry, few of them still have perfect symmetry when they start to melt or crash against other snowflakes on their way to the ground.

Many other beautiful things in nature have symmetry, like the two wings of a butterfly, the two sides of a leaf, or the petals of a flower. Can you find some examples of things with symmetry in your backyard, or around your house?

Snow White?

When you catch a snowflake on your hand or look at it through a magnifying glass, you'll see that it is clear, like glass. The flat, smooth surfaces called *facets* catch and reflect light, making the snowflake sparkle.

When many snowflakes are clustered together or cover the ground, the snow looks white. This is because light is reflected and scattered by the countless tiny facets and edges of each of the millions of individual snowflakes. The individual snowflakes quickly lose their unique and beautiful shapes, but many snowflakes together make for lots of snow day fun, sledding, building snowmen, and skiing.

Next time the flakes start to fall, spend a few minutes to look at them closely as they drift through the sky. By themselves, snowflakes are simply stellar – and together they are simply wonderful!

Photos from left to right: Hollow columns snowflake • Bullet-rosette snowflake • Rimmed crystals snowflake • 12-sided snowflake • Needle shaped snowflake • Triangular snowflake • Capped column snowflake • These photos are all examples of how snowflakes come in different shapes • *All photos on this page are courtesy of photographer Kenneth Libbrecht of snowcrystals.com.*

