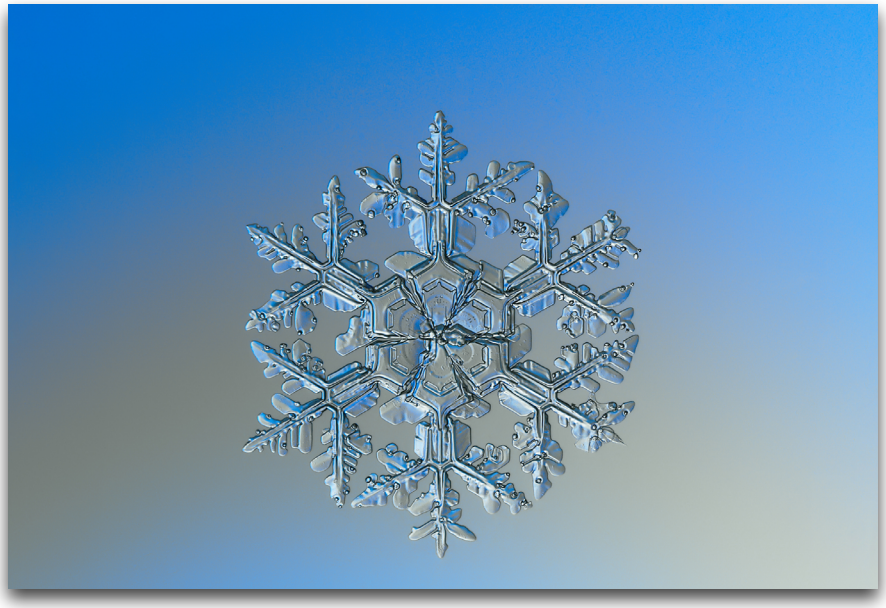
# Snowflakes

## How do we get snowflakes?

Snow forms when it is really cold and the raindrops in clouds start to freeze. These don't look like snowflakes yet and are just ice crystals. When the ice crystals fall more water freezes to the crystal making the branching arms of the snowflake.

Because snowflakes all take a slightly different path from a cloud to the ground the water freezes slightly differently which means every single snowflake is different. Even though they are all different they follow one important rule, they always have 6 lines of symmetry. This also means that they will only have 6 or very rarely 12 branches or points.

Snowflakes always follow this rule because of the shape of the ice crystals making them always stick together in the same way so it's physically impossible for them to be any other shape!

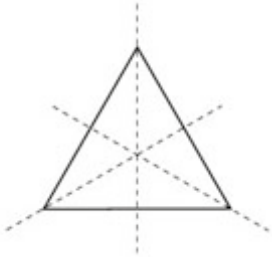


*Left: Freshly fallen snowflakes. Right: macro photography of a natural snowflake*
*Image Credit: left - Thomas Bresson, right - Alexey Kljatov*

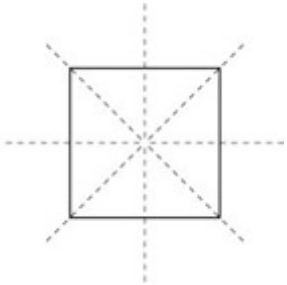
# What is a line of symmetry?

One type of symmetry is reflectional symmetry; if you put a mirror on a line through the image, its reflection would look exactly the same as the original, like the rectangle below. Another type is rotational symmetry, where if you traced a copy of the shape and rotated it about the middle point, it would still line up, just like the five-pointed star below. Lots of shapes can be symmetrical in both reflection AND rotation (all three of the triangle, square, and star below have both reflectional and rotational symmetry! Draw your own shapes and try it out!)

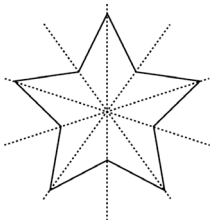
*Rectangle*



*Equilateral Triangle*



*Square*



*Five-pointed star*

## Activity

Have a look at the pictures snowflakes below and see if you can find the lines of symmetry.

One of them is a **snowfake** instead of a snowflake, can you spot it?

**Answer on the next page!**

Now design your own snowflake! They come in infinitely many shapes so be creative but remember they always have to have 6 lines of symmetry.

**Answer**

This one is the snow fake! It has 8 lines of symmetry and 8 branches so would never form in nature!