

# The Snowflake Question

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One of the most inspiring things I was ever told as a child is that every person is like a snowflake: each different from the next, but always beautiful. However, as I grew older I began to question the accuracy of the statement. I appreciate diversity in people and I never argue that each person is different from the next. But can we really say that every single snowflake that has ever fallen is different from every other one. Is it true that each snowflake is unique?

In 1885 Wilson Bentley began to photograph snowflakes under a microscope. He liked what he found; he saw snowflakes as beautiful, eternally infinite, and always different. Throughout the course of his life, he photographed over 5000 snowflakes, more than 2400 of them he published in a book in 1931. Beautiful as his work is, he is the person who first introduced the idea that each snowflake is unique.

Since then scientists have tried to prove Bentley's theory or defeat it. The ultimate truth is that we can never know if each snowflake is different because it's impossible to check every snowflake that falls this year, let alone in the history of the planet. Also, some intricacies of snowflakes are so small that we could assume two snowflakes to be the same and miss a minute detail that separates them.

However, theological science has a few answers to the question. Snowflakes come in two varieties: snow crystals and snowflakes. Snow crystals are exactly identical. They come in only 6 different shapes and therefore there are millions that are exactly the same. Snowflakes are made up of anywhere between 2 and 200 snow crystals. How the crystals are arranged and what types of crystal are present to make a snowflake is dependent on the temperature.

However, in combining these crystals, we can see structural differences. This is because sometimes (about 1 in 500) H<sub>2</sub>O molecules (which snow crystals are made up of because they're just frozen water) are slightly different. They contain a different form of oxygen and therefore need to be put together a little differently. It's the scattered patterns of these molecules that create the unique shape of the snowflake. This is what creates differences in snowflakes. The larger the snowflake the more likely it is to be completely different from all other snowflakes because the more molecules there are, the more likely it is to have odd H<sub>2</sub>O molecules. The ways of arranging molecules grows as the size of the snowflake (and therefore number of molecules) does. Think of factorials from math class if you can remember them. With 70 different possible combinations of 80 items, you start to see how many different ways there are to arrange these molecules. That's why each snowflake has the possibility to be different.

Although it's impossible to prove, there is a large chance that each individual complex snowflake to ever have fallen on this earth is different from every other. This is because of the many ways to combine molecules. Just maybe snowflakes are as unique as people.