mystery science

Grades K-5
Mini-Lesson: “Is every snowflake different?”

VIDEO TRANSCRIPT

VIDEO 1

Hi, it's Danni. Do you live in a place that gets snow? As a kid, I dreamed of seeing snow, but the place I lived never got any. Then, when I was thirteen years old, my family went on a vacation to a cabin someplace cold. And one night, I looked out the window and—woah—it was snowing!

I put on my coat and ran outside. It wasn't snowing very hard, but I could see a tiny sheen of glittering white snowflakes on the ground and more clumps of snowflakes falling down from the sky all around us. I tried to catch a snowflake to look at it up close, but as soon as I got one in my hand, it melted.

Someone named Damien has a question about snowflakes. Let's call Damien now.

[Video Call]

- Hi, Danni.
- Hi, Damien.
- I’ve got a question for you. Is every snowflake different?
- That's a great question.

Getting a good, long look at a snowflake is not easy. Let me introduce you to someone who thought a lot about snowflakes. This is Wilson Bentley. If you've read the book *Snowflake Bentley*, you may already know him. Wilson Bentley lived in the US state of Vermont a long time

ago. Vermont gets lots of snow in the winter. And as a teenager, Wilson Bentley became obsessed with snowflakes.

His mom saw how interested he was and gave him an important gift: a microscope.
A microscope is a tool that helps you see tiny things up close. Wilson Bentley discovered that if he carefully scooped one snowflake under the lens of his microscope…wow! Each tiny snowflake had so much detail!

At first, he tried to draw what he saw under his microscope, but the snowflakes always melted before he was done. So he figured out something better. He connected a camera to his microscope. Wilson Bentley photographed over 5,000 snowflakes during his lifetime, and what he captured was amazing. Take a look.

They all look so different from each other. Being able to look at these up close helps us appreciate how incredibly unique they are, and it also helps us notice something else: how they are similar. Take a look for yourself. What about these snowflakes look similar?

VIDEO 2

As special as each snowflake is, all snowflakes do have things in common. Many snowflakes have parts that stick out from the center; let's call these branches. The branches on a single snowflake often look like they match each other. Like this branch on this side is almost identical to the branch over here. And here's another thing. Count how many branches this snowflake has: one, two, three, four, five, six. Now count how many branches this snowflake has: six.

This one doesn't really have branches that stick out, but count how many flat sides it has: one, two, three, four, five, six. All of these snowflakes have six sides, or six branches. And there's

one more thing. If you look at the center of this snowflake, you can see a shape with six sides and six points—that's called a hexagon. This one has a hexagon in the middle, and so does this one, and this one. So many of these have a hexagon in the center.

The details that are similar about all snowflakes are a clue to how snowflakes form. Now, you might not think of a snowflake as something that forms or grows, but they do. A snowflake doesn't start out looking like the lacy, detailed thing we see here.

Snowflakes begin as one tiny speck of frozen water in a cloud, a tiny hexagon. That tiny hexagon is so small, it's almost impossible to see, but the snowflake isn't done forming yet. Next, those six points of the hexagon collect more tiny droplets of frozen water, and more, and more. Eventually, it forms those six branches.

Because all six branches form at the same time, they end up looking similar. However, each spot where a snowflake forms is unique, like this spot in the cloud that might be a little colder, and this spot might be a little warmer. This spot here might get a little more wind than this spot over here. Differences like these determine what the snowflakes look like. That's why they each end up looking so different.

It might be hard to believe that a tiny change in the wind or cold really could change a snowflake that much, but check this out. When the weather conditions in a cloud are just the right mix, snowflakes can turn out like this: bumpy tubes. These are still snowflakes. They still have a hexagon in the center and six flat sides, but they are so different from the snowflakes like these.

So, in summary, every snowflake is different, and they all have similarities. We know this because we can use tools, such as microscopes, to observe them closely. We can see that

each snowflake has a hexagon in the center and six branches, or sides, that match. Those branches are shaped by the conditions in the cloud where the snowflake forms. Because conditions are different for every snowflake, every snowflake is different.

Snowflakes are all unique, just like everything else in nature. No two snowflakes are exactly the same. But also, no two trees are exactly the same. No two mountains are exactly the same. No two *people* are exactly the same. The closer we look at anything in nature, the more we notice what makes it similar to others of its kind and what makes it unique.

That's all for this week's question. Thanks for asking, Damien.

We have something special for this week's lesson. My friends and I here at Mystery Science have created a step-by-step activity that's all about snowflakes. I hope you'll try it.