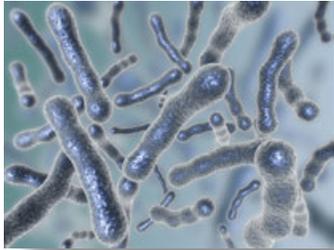


What is it? It's R _____. A Puzzle Story

This is a very hard puzzle. Read the clues and try to guess. What is it?



Bacteria has it.



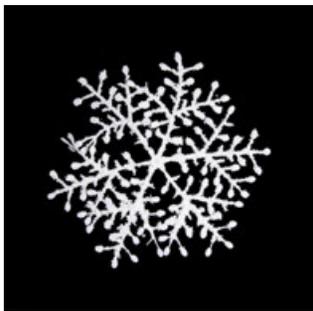
Emperor Penguins have it.



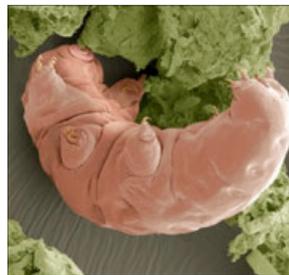
Cockroaches have it.



Train tracks have it (though we are working to give them more of it).



A snowflake is fragile, and doesn't have much of it at all.



Tardigrades may have more of it than any other being on Earth.

It is a word with 10 letters that begins with an *r* and ends with an *e*.

What is it? R _____. Answer on next page.

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Bacteria, Emperor Penguins, cockroaches, train tracks, and tardigrades all have...



Resilience.

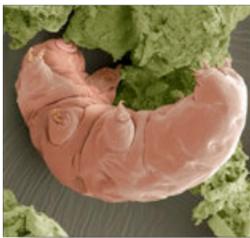
For people, plants, or animals, resilience is the ability to recover quickly after a setback, like an accident, obstacle, illness, or mistake. Resilient people keep moving towards a goal. The girl at left has several challenges between the ground and reaching the bell at the top. She keeps going. That's resilience.



Resilience can mean other things, too. Anything that quickly returns to its original shape after being stressed (for example, hit, bent, or subjected to heat or cold) may be described as resilient. The red steel coil (left) is resilient because it is very strong and flexible.

Why are bacteria, penguins, cockroaches, and train tracks resilient? Because...

- bacteria can quickly make copies of themselves, and resist many antibiotics;
- Emperor Penguins withstand some of the coldest temperatures on earth, and can go without food or water for up to 100 days;
- cockroaches are difficult to get rid of or *exterminate*, and
- train tracks stay strong and straight, even through cold, heat, and tons of trains.



Microscopic tardigrades are the “super heroes” of resilience in the animal kingdom. Sometimes called Water Bears, they live in wet, mossy areas. They can tolerate extreme cold and heat, the vacuum of outer space, and the pressure at the bottom of the ocean. Water Bears can also go without food and water for up to 10 years. They're very small, strong, and resilient.

The puzzle on the first page asked, “What is it?” The answer is *resilience*. The following Story explores what resilience meant to Wilson Bentley, a person who lived about 100 years ago.

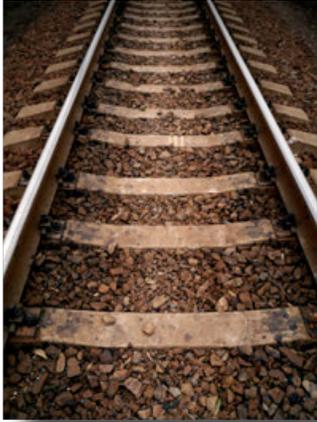
What Resilience Meant to Wilson Bentley, 1865 – 1931

Wilson Bentley lived in Vermont in the late 1800s and early 1900s. Wilson loved snowflakes. When he was a boy, Wilson's mother gave him a microscope. Looking at snowflakes through the microscope, Wilson could see their delicate designs. He was fascinated; no two were alike. Though Wilson didn't know it as a young boy, snowflakes and resilience were going to be an important part of his life.



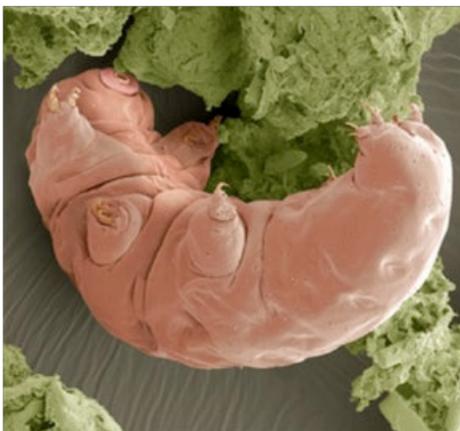
Wilson had a dream to share the beautiful patterns of snowflakes with others. He tried to make sketches of what he saw through the microscope. It was very hard work. Snowflakes are fragile. They quickly melt into drops of water. Wilson decided that taking photographs of snowflakes would be faster and more accurate. But in the late 1800s no one knew how to do that. Wilson's dream became a goal: to figure out how to photograph snowflakes so that he could share them with others. Setting a safe and worthwhile goal is an important part of resilience.

Photographing snowflakes is difficult. Wilson was trying to do what no one had done before. There were no directions to follow. He tried and failed many times. Whenever Wilson made a mistake, he would stop, think, and try again. Staying calm when frustrated is a big part of resilience.



There were disappointments that Wilson didn't expect, too. Some people thought it was odd for a person to spend so much time with snowflakes. They teased and bullied Wilson. Like the strong railroad tracks from our puzzle that lead to a destination, Wilson stayed "on track". Like the red spring he "bounced back" and kept taking pictures of snowflakes. Wilson didn't let the unkind mistakes of others "derail" his dream. Keeping focused on a goal, even when others are unkind or cruel, is resilience.

Wilson successfully took the world's first photograph of a snowflake on January 15, 1855. One success led to another. He was asked to give lectures. People began ordering his snowflake photos for art galleries, fabrics and china patterns, and of course, schools. Wilson's favorite activity was to share his snowflakes with school children.



Resilience is setting a safe and worthwhile goal. That's Wilson Bentley. Resilience is staying calm when frustrated. That's Wilson Bentley. Resilience is staying focused, even when others are unkind or cruel. That's Wilson Bentley. It's been said that the microscopic tardigrade may be the most resilient creature on earth. Guess who is second on that list? Humans. People like Wilson Bentley.

