mystery science

Grades K-5
Mini-Lesson: “How were bicycles invented?”

VIDEO TRANSCRIPT

VIDEO 1

Hi, it's Jay! I love my bicycle, but I've never ridden a bicycle like this. These are Olympic athletes competing in the Women's BMX Freestyle Event, where riders perform incredible tricks on bicycles. It's dangerous, only for experts, but watch what these bicycles can do. Amazing, right? Someone named Brooklyn has a question about bicycles. Let's give Brooklyn a call now.

[Video Call]

- Hi, Jay!

- Hi, Brooklyn!

- I have a question for you. How are bicycles invented?

- That's a great question.

When I want to learn more about an invention, I start up by thinking about its purpose, what the invention helps people do. I wonder if you have any ideas about the purpose of a bicycle. Why do people use bicycles?

VIDEO 2

Great inventions often help us do more than one thing. When I was a kid, I learned to ride a bicycle mostly because it was fun. But when I got older and went to college, I started using my bicycle for a different purpose. It started with a problem. I didn't like how long it took to walk to my engineering classes, but I didn't have a car. My bicycle solved my problem. I rode my bike to get to class fast. And maybe you thought of other things bikes can help people do, like delivering things or exercising. But what if I told you that the bicycle wasn't invented to help people exercise, or have fun, or even get places without cars? What if I told you that one of the earliest bicycles might have been invented because of a volcano? This is a volcano in the country of Indonesia called Mount Tambora. More than 200 years ago in 1815, Mount Tambora erupted. The explosion was enormous. The ground rumbled and shook, lava rolled down the sides of the mountains, and a huge cloud of dust, ash, and gas shot up into the sky. The cloud grew so big, it started to block light and heat from the sun. From China to Vermont, the sky darkened, the air grew colder, and it stayed that way for months and months and months. A lot of people had no idea why the weather had changed or if it would ever go back to normal. They started calling it the year without summer. The cooling weather caused real problems. Farmers had a hard time growing food, many people had very little to eat and very little money. So this is awful, right? But you might be wondering, what does any of this have to do with bicycles? The year without summer was a sad and scary time for a lot of people, but many people also responded to those sad and

scary times by coming up with new ideas—new ways of doing things to solve the many new problems. For example, in the country of Germany, there was a problem with horses. In those days, horses were really important. There were no cars, or buses, or subways yet, so people used horses to travel long distances. But during the year without summer, a lot of people didn't have enough money to buy and care for a horse. And if you didn't have a horse, you had to walk everywhere you went, even if you were traveling a long, long way. That was exhausting. Seeing this problem, an inventor in Germany named Karl von Drais came up with an idea. The problem he knew wasn't really about horses. It was what the horses helped people do—travel long distances that were tiring to walk. Inventions that help people move their bodies weren't new. Early wheelchairs, for example, already did that. But Karl von Drais adapted this idea to create something that would help people without horses go long distances without getting tired. He invented the laufmaschine, which means running machine in German. The laufmaschine looked a lot like a bicycle, but there were still a few things missing. Take a look. You might be able to notice what's different. Over time, as more people used Karl's laufmaschine, they encountered new problems. Some people thought it took too much energy to push the laufmaschine with their feet. New inventors solved this problem by adding pedals, which made it easier to go faster. The faster the machine went, the more riders crashed into things. New inventors solved this problem by adding breaks, which made it easier to stop. Some ideas were better than others. This version called the penny-farthing had one big wheel and one tiny wheel. It looks fun. But imagine what it would feel like to ride, really tippy and hard to use. Still, through years

and years and tons of new ideas and changes, the laufmaschine slowly became something even better. It became a bicycle, and bicycles led to other changes too. Around the year 1900, bicycles started becoming popular in the United States. At that time, American women had to deal with a lot of unfair treatment. Men often had more power and more money. Because horses and carriages were expensive, they were mostly owned by men. So if a woman wanted to go somewhere, she often had to ask her father or husband or brother to lend her money or lend her his horse. If he didn't want to give it to her, she might just have to stay home. That wasn't fair. But because bicycles were cheaper than horses, a woman could afford them. Lots of women started buying bikes. Owning a bicycle meant a woman could go where she wanted when she wanted. She could ride her bicycle to the movies, even to a movie her husband didn't want to see. She could ride her bike to a job, even if her father didn't think girls should have jobs. Riding bikes gave women more freedom to decide how to live their lives. So in summary, inventions like the bicycle help us do things in new ways when the old ways don't work. When Mount Tambora's eruption meant many people couldn't travel by horse Karl von Drais invented a machine to help them get around in a new way, on wheels. Over time, people changed the invention, and the invention helped people change their lives too. And this process continues. Just as the bicycle was invented during the dark times of the year without summer, inventors today are adapting bicycles to meet tough modern challenges, like pollution and the COVID-19 pandemic. What do

you wish a bicycle could help you do today? Maybe your ideas will shape the inventions of the future. That's all for this week's question. Thanks, Brooklyn, for asking it!