mystery science

Grades K-5
Mini-Lesson: “Could a kid win a race against a penguin?”

VIDEO TRANSCRIPT

VIDEO 1

Hey, it's Esther! Where I live, winter brings lots of snow. It can be harder getting around, but the snow also creates some new ways to get moving. There's a state park near me with a steep hill of sand. When there's snow, it becomes an amazing spot for sledding. Someone named Benjamin has a question about an animal that lives somewhere snowy. Let's call Benjamin now.

[Video Call]

- Hi, Esther!

- Hi, Benjamin!

- I have a question for you. Could a kid win a race against a penguin?

- That's such a great question that it makes me think of more questions.

First, which kind of penguin would you race? There are Big King penguins, little Galapagos penguins, and more than a dozen other kinds. Second, where would you race? If you race in the water, well, you'd probably lose. Penguins are really fast swimmers, but if you race in your school gym, you'd probably win. Penguins waddle along much more slowly on land. So let's say you race on a penguin's home turf, like Antarctica, where there's snow on the ground all year round. Antarctica is home to Emperor penguins, the Earth's largest penguins. They can grow to about the size of a six or seven-year-old kid. Imagine this, you and the Emperor penguin are at

the starting line. Just as you hear go, you look over and see this. It's not waddling, it's scooting on its belly and it's surprisingly speedy. Meanwhile, you charge ahead and sink into the soft snow. You try to speed up but moving through the snow really slows you down. I can't say for sure who's gonna win, but chances are it's the Emperor penguin. Now, maybe you already knew that penguins sometimes move on their bellies. It's only a little faster than waddling but it's an easier way to get around. See how they stretch out and paddle with their feet. It's almost like they're swimming on top of the snow but why did you sink in the snow and the penguin didn't? I'm curious, how do you think the penguin stays on top of the snow instead of sinking?

VIDEO 2

Now, I don't know how you answered, but maybe you guessed it has something to do with how heavy or how light penguins are. That makes sense. If you put a heavy bowling ball and a light balloon on the snow, the bowling ball would sink deeper. So maybe the penguin didn't sink because it weighed less. But there's something else going on here. If you watched Emperor penguins for a while, you'd notice that sometimes a penguin will be waddling along when it starts to sink down in soft snow. So it switches to his belly and starts scooting. Only now it's not sinking. Why does the penguin sink on its feet and not on its belly? It's the same penguin with the same weight, and this weight is always pressing down on the snow whether it walks or scoots. Well, take a look at how much snow is under its feet and how much is under its belly. See how its belly spreads out over more snow? Imagine if we could see all the tiny snowflakes there. We'd see more snowflakes under its belly and fewer snowflakes under its feet. Think about this. If you had to hold up something heavy, it would be easier to do with the help of a friend and it would be much easier with a group of friends. The more people there are, the less

weight each friend has to hold. That's what's going on with the snowflakes. There are fewer snowflakes holding up the penguin as it walks. The weight pressing down is too much to hold up so they get squished down and the penguin sinks. But when the penguin scoots on its belly, there are more snowflakes to hold it up. The weight pressing down is spread out over all the snowflakes, and each one has less to hold up. So the penguin stays on top of the snow. Now, let's say you were going to race the penguin again. And this time, instead of sinking, you wanna race on top of the snow. How would you do it? Well, there are inventions that could help you. People have created ways to move on snow without sinking down. Maybe you can think of some, like sleds or skis or these. These are snowshoes. Watch what happens when you attach them to boots. Here's someone with snowshoe and here they are without. See how deep they sink? It looks much easier to walk with snowshoes. And maybe you've already guessed why. Did you notice how the snowshoe spread out over more snowflakes? They spread out weight so the snow can hold you up. You sink less, just like the penguin on its belly. And check out this wheelchair designed for snow, and this truck used in Antarctica. Those are some massive tires. Extra big tires are another way to spread out weight so people sink less and can move more easily on snow. So for your next penguin race, you could use snowshoes or a sled or maybe a new invention you create for moving on top of snow. That's all for this week's question. Thanks, Benjamin, for asking it!