mystery science

Grades K-5
Mini-Lesson: “Why do icebergs float?”

VIDEO TRANSCRIPT

VIDEO 1

Hey, it's Esther! Check out this iceberg. An iceberg is a huge piece of ice floating in the ocean. Icebergs can be enormous. A few are even bigger than some cities. Someone named Chance has a question about icebergs. Let's call Chance now.

[Video Call]

- Hi, Esther.
- Hey, Chance.
- I have a question. Why do icebergs float?
- That's a great question.

If you look at an iceberg from a boat, it might look like an icy island in the ocean. But what you're seeing here is only part of it. If we could see the bottom of the iceberg, we would see that this massive hunk of ice isn't connected to the sea floor. It's just floating. You know when you have ice in a drink and the ice cubes float all the way to the top? Icebergs are sort of like that. Giant ice cubes floating in the ocean. Icebergs are huge and heavy. So why do they float? When I throw a penny into a fountain, it sinks. These icebergs are way bigger and heavier than a penny. So why don't they sink? Why do you think icebergs float?

VIDEO 2

You've probably seen a lot of things float in water in your everyday life, like rubber ducks, leaves, ice cubes, actual ducks, and more. Maybe you've wondered if whether an object floats or sinks has something to do with the material it's made of, like rubber, wood, or feathers. And that's true. In this case, the floating iceberg is made of ice. Lots and lots of ice. I'm gonna guess that you probably already know how to make ice. You freeze water. Water changes to ice when it gets really, really cold. Let's take a closer look at how this change works. To start, we'll put some water into a bottle like this. Next, we'll weigh the bottle. It looks like it weighs about three ninety nine grams. Now, we'll put that bottle of water in the freezer. After a few hours, it changes. It goes from this to this, from a drippy, wet, sloshy liquid to a hard solid. That ice is still water, just in a different form. But something else changed too. Do you notice how the top of the bottle popped off? Funny, the water fit inside just fine before I put it in the freezer. Let's try weighing the bottle again. That's really weird. It weighs the exact same as it did before we put it in the freezer. So, when water freezes, it gets bigger, but it doesn't get heavier. How is this possible? Let's zoom in even further. The water in this bottle is made up of billions of teeny tiny droplets of water. So insanely super small it's impossible to see with your eyes. When water is liquid, all of these droplets are bunched up together. When water freezes, something happens to these droplets. They move further apart from each other. It's the same number of droplets as before, but now each one has a little more space around it. To describe this in a more scientific way, you'd say that the density of the water has changed. When the droplets were closer together, the water was more dense. Now that the droplets have spread out, the water is less dense. So when water freezes, it becomes less dense. But what does that have to do with sinking and floating? Well, density has a big impact on whether something sinks or floats in

water. When something is more dense than water, it sinks. This penny is more dense than water. So when you throw it into water, it sinks. But ice is less dense than liquid water. So even an iceberg the size of a city floats. So in summary, icebergs float because they are less dense than the liquid water of the ocean. Water is made of many teeny tiny droplets. And when they freeze into a solid, those droplets spread out, making the ice less dense. When something is less dense than water, it floats in water. So because icebergs are made of ice, they float. It's incredible to think that billions of tiny water droplets moving just a tiny bit further apart could make something the size of a city float. That's all for this week's question. Thanks for asking, Chance.