mystery science

Grades K-5
Mini-Lesson: “How do optical illusions trick us?”

VIDEO TRANSCRIPT

VIDEO 1

Hi, it's Jay! Have you ever seen a picture of outer space? These are real photographs of far-away stars captured by scientists using telescopes. A few years ago, someone posted this picture online and said it was a photo of a star, but they were playing a trick. Later, they revealed the picture wasn't a star. It was really a slice of meat. This fake star photo fooled a lot of people. Could you tell it wasn't real? Someone named Jason has a question about tricky pictures. Let's give Jason a call now.

[Video Call]

- Hi, Jay!

- Hi, Jason!

- I have a question for you. How do optical illusions trick us?

- That's a great question.

Just like Jason said, optical illusions are images designed to trick or confuse us. In a second, I'm going to show you an optical illusion. It's a drawing. I'm curious what animal you see. But don't say it out loud, just think it. Here it is. Think, but don't say what animal you see. Got your animal? Okay, I wonder if some of you see a dog. Here's the dog's nose and its ear over here. It looks kind of like this photo. Then again, maybe you see a different animal. Do some of you see

a bird? Its beak is here and it's sitting on a branch, like this photo. So which is it, a dog or a bird? Well, I guess it's both. Why is it that people can look at the same drawing and see two different animals? Before I go on, I'm curious, did you see one animal first? Why do you think you saw that?

VIDEO 2

Now the truth is we don't know for sure why some people see a dog and others see a bird, but we do know why the same drawing can look like different animals, and it has to do with how we see. Take a look. This is an artist drawing the picture I just showed, they sketch a few simple lines. You use your eyes to see those lines, and they send that information to your brain, then your brain needs to make sense of what you're seeing. Now, I asked you what animal you see, but there aren't a lot of details here, it's only a few lines and a little color. Your brain tries to match that to an animal and then it makes a guess. It's a good guess, but it turns out there's more than one good guess for this drawing. If this drawing had more details maybe we'd end up guessing the same animal. Like what if it had a tree background? You might be more likely to see a bird now. It reminds me of that fake star picture. One of the reasons people were fooled is that the photo's background is plain black. If they saw it with this background, I doubt they would've been tricked. I want to show you another optical illusion. This one has more detail so I think we can agree on what animal it is, an elephant. I wonder if you notice something strange though. Check out the elephant's legs. If I count the feet, it has 1, 2, 3, 4, 5 feet, that can't be right. Let's count the legs. If I start up here, I count one, and here's two, but wait there's no foot on this leg. And look at this leg, no foot here either. How do all these feet connect to the body? Your eyes may see the parts of this elephant, but your brain has a hard time making sense of them. You've probably seen an elephant's legs before and lots of other things with legs, but

these legs are confusing. They can exist in a drawing, but they're impossible in real life. I have one last optical illusion for you and this one is a photograph. Even though it's upside down, you may be able to tell that it's a picture of me. Let's turn it over. Whoa, look at that! Could you tell the mouth and the eyes were flipped around? Your brain may not have noticed at first, even though your eyes could see those flipped-over parts the entire time. What you think you see turns out to be different from what's really there. So in summary, optical illusions are able to trick us because you don't just see with your eyes, you need your brain to make sense of what you see, and when your brain tries to make sense of an optical illusion, it ends up confused, or makes a guess or sometimes gets things wrong. There are many more optical illusions to explore and lots of cool science to uncover about how they trick us. You may even discover that some optical illusions don't trick you and that's what makes them so interesting to scientists. By exploring how different people experience optical illusions, scientists can better understand all the ways that eyes and brains work together and how brains make sense of the world. That's all for this week's question. Thanks, Jason, for asking!