mystery science

Grades K-5
Mini-Lesson: “Why is the sky blue?”

VIDEO TRANSCRIPT

Hi, it's Doug! I've got a plastic sandwich bag and I was noticing how if you look through one plastic sandwich bag, it's clear, but if you get a whole bunch of them—check this out—now, it's not clear. It looks kind of blue. You see that? The reason I have these plastic sandwich bags with me is because I heard there's an interesting question this week from someone named Celine. Let's give her a call now.

[Video Call]
- Hi, Doug!
- Hi, Celine! Good to see you.
- Our class has a question for you. Why is the sky blue?
- That's a great question.

Before I say anything, I want you to stop and think about it. What do you think? Could you come up with any ideas for why you think the sky is blue? Now would be a good time to pause the video, so that you can think and discuss this with someone near you.

Okay. You ready?

There are a lot of different ideas you could've come up with. I can't guess all of the ideas you might've had, but I'll bet at least one of you thought—maybe the sky is blue because our oceans

are blue. Like, maybe the sky reflects the color of our oceans. That's a really interesting idea. There's actually a way to figure out if that's the reason.

Think about it. If the color of the sky had to do with the color of Earth's surface, then if you were in the middle of a continent surrounded by thousands of miles of land, like this, then the sky shouldn't look blue at all, right? It should actually look green, reflecting the color of all the land. But that's not the case. Even people who live in the middle of a whole bunch of land, still see blue sky.

Why is the sky blue then? This is a hard question to solve. Scientists themselves didn't know for a long time. Here is an interesting clue I can point out though. We've sent spacecraft up to the moon and to other planets and it turns out the sky in those places isn't blue.

Have a look at the sky as seen from the moon. Whoa! It's a black sky. Okay. Now let's check out what the sky looks like from Mars. You ready? Here it is.

Weird. It's kind of a yellowish sky. So, the moon’s sky and Mars's sky are somehow different from Earth's sky. What's going on here?

Well, keep in mind, our own sky is made out of air. It turns out the moon has no air at all, so the sky just looks like outer space even when you're on the surface of the moon. Now, Mars' sky has air, but it's a different kind of air than what's found on Earth. It's mostly made of a gas called carbon dioxide.

So, the blue color of Earth's sky—this is a view from space—it has something to do with the kind of air that Earth has. Our air is made of two gases. It's got some oxygen. That's the part of air

that our bodies need to breathe in. And Earth's air has a whole bunch of another gas too, called nitrogen. When the sunlight shines on all that oxygen and nitrogen, it looks blue to our eyes.

And the reason Mars' sky looks yellow is because of the gas that its sky is made of. When sunlight shines on carbon dioxide, it looks yellow.

Now, I have to point something out. This is not the full story. There's more to this question. It's complicated. The reason that our planet's air looks blue also has something to do with how light works.

Look around you. You're surrounded by Earth's air. It's the same stuff that's in our sky, but it doesn't look blue does it? No, it's clear. You see, it matters how much air you're looking at. When you look up at the sky, you're looking at a lot more air than just the air in the room around you.

Sometimes, when you have a lot of something—like this water in a swimming pool—it can look different than when you just have a little bit of something, like this water in a glass of water. It's also kind of like those plastic sandwich bags I was playing with earlier. Just one of them looks clear, but when you have a whole bunch of them, the color looks different, doesn't it? It's interesting.

Here's another thing to notice. Our sky isn't always blue, is it? At the time around sunrise or sunset, you can see lots of different colors, especially a reddish-orange color. All of this is something we can explore in a future episode.

But, as a first step toward understanding why our sky is blue, you can just notice that our sky is blue because of the type of air we have in our sky. We can see for ourselves by comparing the color of our sky, with the color of the sky on other planets and the moon. The way that light works, when you have a whole bunch of our type of air, it looks blue to our eyes.

That's all for this week's question. Thanks, Celine, for asking it!