mystery science

Grades K-5
Mini-Lesson: “Why do leaves change color in the fall?”

VIDEO TRANSCRIPT

Woo, fall! I love fall! One of my favorite things to do is to rake up a big pile of leaves and then run and jump in them.

Someone named Nikhil has a question about leaves. Let's give him a call now.

[Video Call]
- Hi, Doug!
- Hi, Nikhil!
- I have a question for you. Why do leaves change color in the fall?
- That's a great question.

You've probably noticed leaves changing color in the fall, and they can be so pretty with all those different colors. Yellow, orange, red—but why do they do this? Leaves start out green and then in the fall, or autumn, they turn different colors. What do you think?

I don't know what ideas you might've come up with, but think about this. If you've ever forgotten to water a plant, you might've seen its leaves turn kind of yellow or brown. The plant is dying. Could it be that the tree's leaves are changing color because the trees are dying? Well, it might look like the trees are dying. In fact, by the end of fall, the leaves actually fall off the tree. We think that might even be why we call the season fall. But think about it. A few months later, after

winter has passed, springtime comes around, right? In spring, trees grow back new leaves and they look healthy again. So when a tree's leaves change color, that probably doesn't mean it's dying or sick. Why would leaves change color in the fall then? Now, I have to tell you, this is a question that is not easy to answer. It took scientists hundreds of years to figure it out. It was a real puzzle. First, using microscopes and other tools, scientists discovered that leaves contain a green-colored substance called chlorophyll. This is actually why leaves look green. It's because they're filled with chlorophyll. But now, here was the really hard part to figure out. Why do leaves stop looking green in the fall? One clue scientists discovered is that in the springtime, when a tree is growing new leaves, it has to do a lot of hard work to make chlorophyll. Chlorophyll contains special nutrients that the tree pulls from the soil around it. That's when scientists realized, every fall, if a tree were to drop its leaves while they're still green, it would lose all the special nutrients that it used to make the chlorophyll. So instead of losing the leaves when they're green, trees have a way of saving some of those special nutrients. Here's what they do. Before its leaves fall off, trees pull some of the nutrients from the green chlorophyll into their branches and trunks. Places where the nutrients can be stored safely during the cold winter. So you see, that's why the leaves stop looking green in the fall. The green stuff, chlorophyll, is getting taken apart and moved out of the leaves. Now, that might make you think that in the fall the leaves should look clear-colored then once there's chlorophyll left in them. But it turns out that chlorophyll isn't the only colored substance in the leaves. Leaves also have substances inside them that can be yellow-colored, or in some leaves, orange-colored, or brown-colored, or in special cases, even red-colored. So when trees pull some of the chlorophyll nutrients into their trunks and branches each fall, we begin to see some of the other colored substances in the leaves—browns, yellows, oranges, or reds that are left behind. That's why leaves change color in the fall.

So in summary, when leaves change color in the fall, it doesn't mean trees are dying or sick. It took scientists a long time to figure it out. But they discovered that in fall, trees are pulling nutrients from the green chlorophyll in their leaves to store them for winter. Then in the springtime, trees reuse those nutrients to grow a new set of green leaves.

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