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

VIDEO TRANSCRIPT

MINI-LESSON VIDEO 1

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?

MINI-LESSON VIDEO 2

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. Now after this video is done playing, my friends and I here at Mystery Science have created a step by step activity that combines science with art. I hope you'll try it. Have fun and stay curious!

ACTIVITY: GRADES K-2

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to take a closer look at leaves that you can find in your own neighborhood. You'll use these leaves to decorate a card using something called a leaf rubbing. Then you'll look closely at the shape of your leaf rubbing and talk with a partner to find out what's similar and what's different between different kinds of leaves. I'll show you how to get started, step by step.

ACTIVITY STEP 1

Find a partner. If you're working alone, that's okay, too. When you're done with this step, click the arrow on the right.

ACTIVITY STEP 2

Get your supplies.

ACTIVITY STEP 3

Take your ruler and line it up with the thick lines on the top and bottom of your card, like this. Then fold your card in half. Press down on the edge to make a good crease. Now it's a card.

ACTIVITY STEP 4

Now open your card and put your leaf inside like this. Then close the card. If you have a really big leaf, it's okay if it sticks out a little bit. Then you'll put another piece of paper under your card so you don't accidentally color on the table.

ACTIVITY STEP 5

Okay, choose a crayon color that you want to use for your leaf rubbing. Then, start to color over the place where the leaf is within your card. You want to try to make sure your leaf stays in the exact same spot as you color over it. When you do this, you'll start to see the outline of the leaf. Keep coloring until you see the entire leaf.

ACTIVITY STEP 6

Look closely at your leaf rubbing. Compare it with your partner's.

ACTIVITY STEP 7

Okay, now, take a look at your Leaf Shape worksheet. Go ahead and circle all of the things you notice about your leaf. For example, is your leaf big or small? Is it smooth or pointy? And what shape does it look like? You might have different answers from your partner because you might have different leaves. That's okay.

ACTIVITY STEP 8

Okay, let's finish making your card. Move your leaf to another place inside your card and choose a different crayon color. What you'll do is color over your leaf again in this new spot. It's okay if the leaves overlap. You can continue doing this until the entire page is filled up. Here are some more pictures of cards to inspire you. If you have time you can also turn the card over and color the other side.

ACTIVITY STEP 9

Now that your card is decorated, open it back up and write one thing you're thankful for this year. You can take your card home and give it to someone special. You can also find more leaves in your neighborhood and do more leaf rubbings. Have fun and stay curious!

ACTIVITY: GRADES 3-5

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to take a closer look at leaves that you can find around your neighborhood. You'll use these leaves to create something called a leaf rubbing. You'll look closely at it to find similarities and differences between different types of leaves. Then, you'll use that information to figure out what kind of tree your leaf might have come from. If you're in a class, afterward, you and your classmates can even make a community tree that contains the different types of leaves found in your neighborhood. I'll show you how to get started, step by step.

ACTIVITY STEP 1

Find a partner. If you're working alone, that's okay too. When you're done with this step click the arrow on the right.

ACTIVITY STEP 2

Get your supplies. You'll get more supplies later.

ACTIVITY STEP 3

Lay your leaf flat on your desk and cover it with a piece of paper, like this. Try to cover it so that the leaf is at the top of the page. This will give you more room on your paper in the next few steps. If you have a small leaf, try to put it so that it's in the top corner, like this.

ACTIVITY STEP 4

Now what you'll do is take one of your crayons and color over the spot where the leaf is under your paper. As you color, hold down the paper to keep your leaf in the same spot. You should start to see the outline of the leaf show up. You'll want to keep coloring until you see the entire outline of the leaf.

ACTIVITY STEP 5

Now you're going to make three more leaf rubbings with the same leaf. For each one make sure you move your leaf to another spot under the paper so that the leaves don't overlap. You can use different colors if you want. If you have a really big leaf, you might need your second sheet of paper.

ACTIVITY STEP 6

Look closely at your leaf rubbings. Compare them with your partner's. Looking at details will help you find clues about what type of tree your leaf came from.

ACTIVITY STEP 7

One thing you might have noticed is the thick lines on the inside of your leaf, which scientists call leaf veins. To help you see them better, I suggest you choose a crayon in a dark color and trace over the veins. You can trace the outline of the leaf too. Be sure to do this for all four leaf rubbings.

ACTIVITY STEP 8

Now, get the rest of your supplies. Some branches point left and some point right. You'll just need one of these.

ACTIVITY STEP 9

Cut out each of your leaf rubbings. It's okay if you don't do it perfectly. Once you've cut all four out, then you'll glue them onto your Community Tree branch. Try not to cover the words on the page, since you'll write there later. If you have really big leaves, some of them might go over the edge of the page. That's okay.

ACTIVITY STEP 10

Once you've found a match, write the name of the tree on your worksheet. If you don't find an exact leaf match, that's okay. It might mean you have a rare leaf. Write that you have a mystery leaf, and add a drawing to your guide. There are thousands of different types of leaves, so not all of them are on the guide.

ACTIVITY STEP 11

Your teacher might have set up a tree trunk in your classroom. If so, you can add your tree branch to make a Community Tree. You can also take your Leaf Identification guide home with you and use it to figure out what trees grow in the neighborhood where you live. Have fun and stay curious!