mystery science

Lesson: “Could a plant survive without light?”

VIDEO TRANSCRIPT

EXPLORATION VIDEO 1

If you've ever planted a garden, you probably know that you put the seeds in the dirt, you water them and then they grow. Simple as that. Why do you think we water them and put them in dirt? The plants are probably drinking the water, right? But what about the dirt? Do plants eat the dirt? You know that animals and human beings need both water and food. So, are plants the same in that way? First, let's talk about water. What would happen if you didn't water the seeds? Do you think they would still grow? Let's do a quick experiment to see for ourselves. We'll take two seeds and put them each in their own cup of dirt. But one seed we add water, and the other we never add water. Then we wait a few days. What's going to happen? Here you go—that's what we thought! Plants need water in order to grow and plants need dirt too, right? What do you think? Do plants need dirt? How could you find out?

EXPLORATION VIDEO 2

Here's what we did at Mystery Science. When we wanted to know if a plant needed water, we planted two seeds in dirt and gave one of them water. Now we'll experiment again, but this time, instead of testing what happens without water, we'll test what happens without dirt. We'll put one seed in dirt and leave one seed sitting in a cup, but both seeds will get watered. Now we don't want the seed without dirt to drown in water. So we placed it on a paper towel, but we'll keep it

nice and moist. So go ahead, make your prediction. Tell me what you think is going to happen when we water both of these seeds.

EXPLORATION VIDEO 3

Okay, let's see what happens. Here's the seed we gave water and dirt. Let's see what happened to it a few days later. And yes, here it is a few days later—it's sprouted! Okay, and what about the seed that we watered, but without ever putting it in dirt? A few days later—whoa! Wait, really? How is that possible? It started growing with just water, no dirt. Wow, I did not expect that that would happen! Huh, so it seems water might be all that matters for plants then? Water is very important. Let's look more closely at what happens when you water seeds. These seeds have been watered. Notice how they soak it up and this makes them swell. And then within a day or two, something starts to break out of this protective coating the seed is in. So it seems like water kind of wakes up the seed and makes it start growing. Notice what this thing is that's broken out of the seed—it's a root. One of the very first things a seed does after being watered is to grow a root. Now, watch in this video, all of these seeds will start growing roots. And why do you think they do this? It's because water is so important to these young plants that each of them wants to find more water right away. And they're growing roots to soak up more water. They send the roots down because this is where there probably will be more water. If we look more carefully at the roots, we can see every root grows lots of little root branches off the sides. And each of these, if we zoom in on them, we can see they have these tiny hairs, which can soak up water like a sponge. So water makes the seed sprout and makes the plant grow. But now, wait a second—what about dirt? Does that mean plants don't need dirt at all?

EXPLORATION VIDEO 4

Here we see two different tomato plants after a few weeks. One was grown in dirt and seems to be doing just fine. The other one has just been growing in water with no dirt, yikes. Do you notice, its leaves are yellowed? It's not nearly as tall as the other plant either. It hasn't grown as much. We say that its growth has been stunted. This plant is unhealthy and sick. So, it seems like plants do need dirt, or at least they grow better in dirt.

ACTIVITY INTRODUCTION VIDEO 1

In today's activity, you're going to do an experiment to learn about what plants need to grow. You'll do it by growing plant seeds in a paper cup. Each of these little seeds grew up to become radish plants. A radish is a plant that grows like a carrot. The parts you eat grow underground. Today, your job is to find out whether a plant can grow without sunlight. What do you think will happen? I'll walk you through how to get started, step by step.

ACTIVITY PART 1 STEP 1

Before we get started, discuss this question. When you're done with this step, click the arrow on the right.

ACTIVITY PART 1 STEP 2

Here's our idea. We can make two cups of seeds, and put one cup next to a sunny window, so that it gets lots of light, and put the other cup in the dark, like wrapped up in aluminum foil, so that no light can get in. Then after a few days, we can look at them side by side and see what happens. Let's try that out, go to the next step and we'll get started.

ACTIVITY PART 1 STEP 3

If you're in a group, find a partner. If you aren't in a group, you can work alone. You'll need to do a little more work if you're by yourself, but you'll get to grow two sets of radishes.

ACTIVITY PART 1 STEP 4

Get your supplies.

ACTIVITY PART 1 STEP 5

Write your name on your label.

ACTIVITY PART 1 STEP 6

One partner needs to put a big X on their label. Decide who will do that. Remember, only one of you needs to write an X.

ACTIVITY PART 1 STEP 7

Put your label on your cup.

ACTIVITY PART 1 STEP 8

Pour the radish seeds on the plate, like this. Each person count out five seeds. One, two, three, four, five.

ACTIVITY PART 1 STEP 9

Sprinkle your five seeds on top of the soil in your cup, like this. Then spray the soil and the seeds with water.

ACTIVITY PART 1 STEP 10

Put the cup that is not marked with the X next to a window in the sunlight.

ACTIVITY PART 1 STEP 11

Cover the cup that is marked with an X in aluminum foil so that it's nice and dark. If you have more than one cup marked with an X, you can put all of them in a box or a pan and then cover them.

ACTIVITY PART 1 STEP 12

Discuss. Who do you agree with? Why do you think that?

ACTIVITY PART 1 STEP 13

Spray your seeds with water every day until they sprout. Put the seeds marked with an X back in the dark after spraying them.

ACTIVITY INTRODUCTION VIDEO 2

Hi, it's Doug! A few days ago, you planted some radish seeds in two different cups of soil. You've been watering the seeds. Seeds need water to sprout and become plants. You've been

keeping one cup of seeds somewhere sunny, and one cup in the dark where it got no sunlight. Now it's time to look at your two cups side by side and see what happened. I'll show you how to get started, step by step.

ACTIVITY PART 2 STEP 1

Get a Draw the Radishes worksheet, a pencil, and some crayons or markers.

ACTIVITY PART 2 STEP 2

With your partner, get the cup that was in the dark and the cup that was in the light and find out what happened.

ACTIVITY PART 2 STEP 3

Look at the cups side by side on the worksheet. Draw and color what you see in each cup. Afterward, go to the next slide to watch the final two videos.

WRAP-UP VIDEO 1

There are lots of interesting plants—plants with colorful flowers, plants that grow the food we eat, plants that we can find in the forest, plants that we can grow in our homes. And plants are living things—they're alive, just like animals. Now they don't have legs, so you won't see them walking around, and they don't have mouths or eat food the way we do, but they do grow and they move. They have needs—like they need water. Do plants need sunlight to help them grow? We all just did an investigation to find out. Here's what happened in our investigation. We found out that the seeds in the light sprouted and grew, now they're little baby plants. And each day they grow a little bit more. One day soon, they'll be full grown. They're green, and they even

have little leaves starting to grow. What about the seeds in the dark? Well, surprisingly, they grew too actually, here's what they looked like. Oh, look at them! Now you might've been surprised to find out that the seeds in the dark did grow. They don't look too different from the ones in the light. They have little leaves too, and they grew just as tall as the seeds in the light. So, wow, does this mean that plants don't need sunlight? Well, let's look closely at them both side by side. Which of these two plants do you think is healthier? The one that grew in the light or the one that grew in the dark? Why do you think that?

WRAP-UP VIDEO 2

If you've heard that plants need sunlight to grow, it might have surprised you that the seeds in the dark grew. What is going on here? Well, you could find out if you kept trying to grow the plants in the dark. If you want to do that and find out without me telling you what happens, you can stop this video. But if you want to find out now, I'll go ahead and show you. This is a sped-up video taken by scientists that shows what happened to some of the seeds that are left in the dark. If we keep a plant in the dark for a few weeks, pretty soon it will begin to die. But what if we let the radish seeds keep growing in the sunlight? Well, this is what we get. You can see that these grew up to become healthy plants. So plants definitely need sunlight in order to grow. Sunlight and water are both needs that plants have. You might've noticed that the plants in the dark weren't turning green like the ones in the light were. That's a sign that they're not healthy. Almost all plants have some parts that are green, usually their leaves. In fact, next time you're walking around and looking at plants, that's a sign you can look for to guess if the plant is growing well. If you have any plants at home and you notice they start to lose their green color, it might mean they're not staying healthy. Maybe they're not getting enough water or not getting enough sunlight. Hey, that gives me an idea. What do you think will happen to the radish seeds

that were growing in the dark if we now put them in the sunlight? Try this out when the video is over. Keep them watered and you'll find out what happens after they've been in the sun for a day. You can even draw a picture on a new worksheet to show what happened. If you like growing plants, I hope you'll become a plant keeper. There are so many interesting plants. Have fun and stay curious!