Grades K-5
Mini-Lesson + Activity: “What does a scientist do?”

VIDEO TRANSCRIPT

MINI-LESSON VIDEO 1

Hi, it's Jay! I love being a scientist, but I didn't always know that I wanted to be a scientist or even that I liked science. When I was a kid, I knew I loved exploring and building things, but I didn't know if the things I liked to do had anything in common with what scientists do. Someone named Leela has a question about scientists. Let's give Leela a call now.

[Video Call]

- Hi, Jay!

- Hi, Leela!

- I have a question for you. What does a scientist do?

- That is a great question.

There are lots of different kinds of science and lots of different kinds of scientists. There are scientists who explore what lives at the deep, dark bottom of the ocean, and scientists who look for lovely new scents for perfume, scientists who launch rockets into outer space, and scientists who study volcano explosions. But whether they're working in a laboratory, in a forest, or on the moon, all scientists do a lot of the same things. But what are those things? What do scientists actually do? I wonder what you think.

MINI-LESSON VIDEO 2

It's funny. There's not really a perfect word for what scientists do. Think about it. A runner is someone who runs, right? And a singer is someone who sings. And a teacher, teaches. And a scientist—*sciences*? That's not really a word. But what if it was? What if we call what scientists do *sciencing*? What would it mean to science? You've probably seen pretend scientists in movies or TV shows. Maybe you've even seen a scientist in real life. But no matter what you've seen, you've also done many of the things scientists do. In fact, I bet you've already *scienced* today. Let's think about your day so far. What have you done? Well, you woke up for starters. Maybe the first time you opened your eyes, you noticed light coming in through a window and wondered why it was so bright. Maybe you heard a noise outside and wondered what was going on out there. Maybe you smelled something cooking, and wondered if you could pick out the ingredients just from the smell. Maybe you felt a warm breeze from the window and wondered if it would be as hot today as it was yesterday. In science, the things we notice about the world around us are called observations. Making observations and asking questions are two things all scientists do. Every time you notice something or wonder about something, you are *sciencing*. By noting and wondering about the things you could see, hear, smell, touch, and taste when you first woke up, you were *sciencing* before you even got out of bed. And you'll keep *sciencing* throughout your day. Let's say later you go to the playground. Maybe today you see a classmate sliding really fast down the slide. You wonder, how can I slide faster too? Maybe you don't stop there. Maybe you start trying different things to see if they make you go faster. You try once with your arms and legs stretched out. You try again laying down. You try again with your feet in the air. Each time you pay attention to how fast you go. Or say they're serving pizza at the cafeteria today. Maybe you usually eat pizza the same way. Cheesy end first, then crust. But today you

wonder, would pizza still taste the same if I ate it another way? Maybe you try taking a bite of the crust first. Then, the cheesy part. Maybe you try folding the pizza in half before you bite into it. Maybe you try cutting it with a knife and a fork. As you take each bite, you notice what's different. You already know that you're *sciencing* by wondering and noticing, but scientists don't just observe and ask questions, we also search for answers. When you try or test different things to see if anything changes, that's called doing an experiment. Experiments are one way scientists search for the answers to their questions. Just like you might test different ways of going down a slide to see which one will get you to the bottom fastest, scientists test different shaped rockets to see which will fly to Mars the fastest. Eating pizza backward might seem silly, but trying unusual experiments is exactly how scientists answer unusual questions. Like, do dolphins recognize themselves in a mirror? What do far-off planets smell like? And will people try harder if they dress up like Batman while they work? Experimenting is one way scientists make discoveries—whether it's discovering how fast a dinosaur could run, or when a volcano will explode, or what pizza tastes like off a fork. So you've had a busy day *sciencing* already. But there's more. While you were getting ready for school, playing on the playground, or eating lunch, you probably weren't alone. Maybe this morning you asked a family member what they thought the weather would be like. Maybe you told a classmate what you learned about the slide, so they could slide faster. Maybe you and a friend both decided to eat your pizza backward. When you share what you're curious about with others, you're *sciencing*. All scientists share their discoveries and questions. By sharing what they know, they help others learn, and by sharing what they still don't know, scientists inspire others to search for answers. So, what do scientists do? Well, we make observations and ask questions. We search for answers to our questions by doing experiments, and we share our discoveries and our questions with others. In other words, all you have to do to be a scientist is be curious. Have

you *scienced* today? How will you *science* tomorrow? That's all for this week's question. Thanks, Leela, for asking it. Now, after this video's done playing, my friends and I here at Mystery Science have created a step-by-step activity where you can do what scientists do: make observations, ask questions, and then experiment. You'll observe some tiny creatures and the experiments will help you figure out the answers to your questions. 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 practice being a scientist by making observations, asking questions, and doing experiments. You'll observe some teeny tiny creatures that you probably haven't thought about before—termites. Maybe you've heard of termites—small bugs that eat wood. But there's so much more to learn about them. They might be tiny, but termites do some fascinating things. Because termites are so small, they can be hard to find. But did you know you can order them through the mail? A mail carrier actually delivered some right here to the Mystery Science Labs so we could observe them up close. And today you'll get to observe them with us and think of questions that you're curious about. Then, we're going to experiment. In each experiment, we'll change one thing to see if it changes what the termites do. You'll work with a partner, and record your observations for each experiment. What will the results of each experiment tell us? Can experiments help us figure out the answers to our questions? We'll show you how to get started, step by step.

ACTIVITY STEP 1

In this activity, you'll work with a partner so that you can discuss and share your ideas. 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. Each person needs a Termite Tracker.

ACTIVITY STEP 3

We brought some termites into the Mystery Science Lab to observe them up close. We watched them in the sunlight and in the shade, when the room was cold, and when the room was warm. We also wanted to see how they moved around outside of the container, so we put some on a piece of paper and drew a circle on the paper to see what would happen. Termites are tiny, so you'll have to watch the video closely. We sped up the videos to make it take less time. As you watch, talk with your partner and discuss as a class. What do you notice? What do you wonder?

ACTIVITY STEP 4

You probably noticed and wondered about lots of different things, and that's great. One of the things we wondered about was why the termites sometimes seem to walk along the line we drew. What's going on here? Are the termite seeing the line and following it? Are they smelling the ink from the pen and following that? Maybe they're feeling the tiny groove that the pen made on the paper. Maybe termites just really like walking in circles. Will termites follow any kind of line that we draw? We thought it would be fun to try and figure it out. We want to do an

experiment. Talk with your partner and discuss: What could we change to test if termites will follow any kind of line that we draw? Discuss your ideas as a class.

ACTIVITY STEP 5

There are so many things we could change in our experiment. Some ideas we had were changing the shape of the line, changing the color of the line, changing how thick or thin the line is, drawing the line with a crayon instead of a pen, or changing the type of paper. All of these would make good experiments, but a great experiment only tests one thing at a time. I'm really curious about the shape of the line. I wonder, do termites only follow circles? Will they follow any shape? So let's test it together in the next step.

ACTIVITY STEP 6

For our shape experiment we used the same black pen and drew three different shapes: a circle, a square, and a triangle. We want to find out if termites will follow any of these shapes. We put a termite next to each shape and watched what the termite did. We sped up the videos to make it take less time. Here's the circle. Here's what happened when we tried the square, and here's the triangle. Now go to the next step to record what you observe.

ACTIVITY STEP 7

Okay, it's time to record the results of your experiment. Find the shape experiment in your Termite Tracker. You'll draw a line on your Termite Tracker with your pencil, to show the path that each termite took in the experiment, like this. Draw the termite's path on the circle. The termite might walk in a wiggly line and that's okay. The line that you draw can also be wiggly—it doesn't have to be perfect. Now draw the termite's path on the square, and then on the triangle.

Drawing what you see will help you remember the results of each experiment, and it will help you share those results with other people. When you're done drawing the path of the termite for all three shapes, go to the next step.

ACTIVITY STEP 8

So did the experiment work? If we learned something from an experiment, then it worked. Discuss with your partner: What did we learn from our shape experiment?

ACTIVITY STEP 9

Here's what we think. We wanted to know: Do termites only follow circles? Will they follow any shape? In our experiment, the termites followed all the shapes that we drew with the pen. We even tested out more shapes like squiggles and spirals. The termites followed all of them. So we learned that shape doesn't seem to matter for a termite—the termite will follow any shape. So we figured out one answer, but we still have more questions. Go to the next step to see what we tested in our next experiment.

ACTIVITY STEP 10

Okay, we have time for one more experiment. I'm really curious about what we draw the line with. I wonder, do termites only follow pen lines? Will they follow marker lines, and crayon lines, too? So, let's test the kind of writing tool in this experiment. We'll draw the same shape, but this time, we'll use a pen, a marker, and a crayon. Go to the next step, and we'll do the experiment.

ACTIVITY STEP 11

Now, let's see what the termites do in our writing tool experiment. We drew the same shape, but this time we used a pen, a marker, and a crayon. Then we added a termite next to each circle to

see what they would do. Watch closely to see what each termite does. Here's the pen, here's the marker, and here's the crayon. Go to the next step to record your observations on your Termite Tracker.

ACTIVITY STEP 12

Now, find the Writing Tool Experiment on your Termite Tracker. Draw a line with your pencil to show the path that each termite took. Draw a path for the pen, the marker, and the crayon. Remember, the path may be wiggly, and it might not be exactly perfect, but that's okay.

ACTIVITY STEP 13

What did we learn from the writing tool experiment? Discuss with your partner. What did we learn from our writing tool experiment?

ACTIVITY STEP 14

Here's what we think. We wanted to know, do termites only follow pen lines? Will they also follow markers or crayons? In our experiment, the termites only followed the line we drew with a pen. The termites didn't really follow the marker or the crayon. So we learned that the kind of writing tool does matter to the termite. They'll only follow pen lines. So did we figure out the answer to our question? Go to the next step to find out.

ACTIVITY STEP 15

When we first observed the termites, we wondered, "Will termites follow any kind of line that we draw?" Well, let's look at the results of our experiments. We saw that termites will follow any shape, but only if that line is drawn in pen. I don't know about you, but now I have even more

questions. Like, do all termites do this? Are there any other bugs that do this? And what's so special about the pens? That's one of the best things about being a scientist. Finding answers often means you'll come up with even more questions. Talk with your partner, and discuss: What other questions do you have? What other experiments could you do?

ACTIVITY STEP 16

Congratulations, you've done a great job practicing being a scientist today! There are so many other experiments that we could try. I have a challenge for you this school year. Whenever you're curious and wonder about something, take a moment, and see if you can come up with an experiment. There are lots of experiments you can try, and those experiments can help you figure out the answers to your questions. In fact, you might want to try today's experiment with different kinds of bugs, like ants or ladybugs, to see if they do the same thing. Every time you're curious—you ask a question and you do an experiment—you're being a scientist. Have fun and stay curious!

ACTIVITY: GRADES 3-5

ACTIVITY INTRODUCTION VIDEO

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you can order them through the mail? A mail carrier actually delivered some right here to the Mystery Science Labs so we could observe them up close. And today you'll get to observe them with us and think of questions that you're curious about. Then, we're going to experiment. In each experiment, we'll change one thing to see if it changes what the termites do. You'll work with a partner, and record your observations for each experiment. What will the results of each experiment tell us? Can experiments help us figure out the answers to our questions? We'll show you how to get started, step by step.

ACTIVITY STEP 1

In this activity, you'll work with a partner so that you can discuss and share your ideas. 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. Each person needs a Termite Tracker.

ACTIVITY STEP 3

Before we get started with our experiments. Let's get your Termite Tracker ready, first, flip your paper over so that it's face down, then turn the paper so it's longer from side to side and line up the corners of the paper and fold it in half. Use your fingernail to make a good crease. Now you'll fold it again, along this thin black line so that the words Termite Tracker end up on the outside. Line up the corners again and use your fingernail to make a good crease. When you're done, your tracker should look like this.

ACTIVITY STEP 4

We brought some termites into the Mystery Science Lab to observe them up close. We watched them in the sunlight and in the shade, when the room was cold, and when the room was warm. We also wanted to see how they moved around outside of the container, so we put some on a piece of paper and drew a circle on the paper to see what would happen. Termites are tiny, so you'll have to watch the video closely. We sped up the videos to make it take less time. As you watch, talk with your partner and discuss as a class. What do you notice? What do you wonder?

ACTIVITY STEP 5

You probably noticed and wondered about lots of different things, and that's great. One of the things we wondered about was why the termites sometimes seem to walk along the line we drew. What's going on here? Are the termite seeing the line and following it? Are they smelling the ink from the pen and following that? Maybe they're feeling the tiny groove that the pen made on the paper. Maybe termites just really like walking in circles. Will termites follow any kind of line that we draw? We thought it would be fun to try and figure it out. We want to do an experiment. Talk with your partner and discuss: What could we change to test if termites will follow any kind of line that we draw? Discuss your ideas as a class.

ACTIVITY STEP 6

There are so many things we could change in our experiment. Some ideas we had were changing the shape of the line, changing the color of the line, changing how thick or thin the line is, drawing the line with a crayon instead of a pen, or changing the type of paper. All of these would make good experiments, but a great experiment only tests one thing at a time. I'm really

curious about the shape of the line. I wonder, do termites only follow circles? Will they follow any shape? So let's test it together in the next step.

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ACTIVITY STEP 8

Okay, it's time to record the results of your experiment. Find the shape experiment in your Termite Tracker. You'll draw a line on your Termite Tracker with your pencil, to show the path that each termite took in the experiment, like this. Draw the termite's path on the circle. The termite might walk in a wiggly line and that's okay. The line that you draw can also be wiggly—it doesn't have to be perfect. Now draw the termite's path on the square, and then on the triangle. Drawing what you see will help you remember the results of each experiment, and it will help you share those results with other people. When you're done drawing the path of the termite for all three shapes, go to the next step.

ACTIVITY STEP 9

So did the experiment work? If we learned something from an experiment, then it worked. Discuss with your partner: What did we learn from our shape experiment?

ACTIVITY STEP 10

Here's what we think. We wanted to know: Do termites only follow circles? Will they follow any shape? In our experiment, the termites followed all the shapes that we drew with the pen. We even tested out more shapes like squiggles and spirals. The termites followed all of them. So we learned that shape doesn't seem to matter for a termite—the termite will follow any shape. So we figured out one answer, but we still have more questions. Go to the next step to see what we tested in our next experiment.

ACTIVITY STEP 11

Okay, it's time for our next experiment. What about the color of the pen? I wonder, do termites just really like the color black? Will they follow any pen color? So let's test the color of the pen in our next experiment. Find the color experiment in your Termite Tracker. We'll test the termites with the colors black, blue, and red. To help you remember which pen colors we tested, go ahead and color in each pen on your Termite Tracker. If you have colored pens, that's great, but it's okay to use whatever you have around, like crayons or colored pencils.

ACTIVITY STEP 12

Now, let's see what the termites do in our color experiment. This time we drew three circles, but each circle was drawn with a different pen color. Then we added a termite next to each circle to see what they would do. Watch closely to see what each termite does. Here's black, here's blue, and here's red. Now, draw a line on your Termite Tracker in pencil to show the path that each termite took. Remember, it's okay if the line is wiggly. When you're done, then go to the next step.

ACTIVITY STEP 13

What did we learn from our color experiment? Discuss with your partner: What did we learn from our color experiment?

ACTIVITY STEP 14

Here's what we think. We wanted to know, do termites just really like the color black? Will they follow any pen color? Well, in our experiment, the termites followed all the different pen colors. We even tested out more colors and the termites followed all of them. So we learned that color doesn't seem to matter for a termite. The termite will follow any pen color. Go to the next step to see what else we can test.

ACTIVITY STEP 15

Okay. We have time for one more experiment. I'm really curious about what we draw the line with. I wonder, do termites only follow pen lines? Will they follow marker lines and crayon lines too? So let's test the kind of writing tool in this experiment. We'll draw the same shape but this time we'll use a pen, a marker, and a crayon. Go to the next step and we'll do the experiment.

ACTIVITY STEP 16

Now, let's see what the termites do in our writing tool experiment. We drew the same shape, but this time we used a pen, a marker, and a crayon. Then we added a termite next to each circle to see what they would do. Watch closely to see what each termite does. Here's the pen. Here's the marker. And here's the crayon. Now draw a line with your pencil to show the path that each termite took. Remember, the path may be wiggly, and that's okay.

ACTIVITY STEP 17

What did we learn from the writing tool experiment? Discuss with your partner: What did we learn from our writing tool experiment?

ACTIVITY STEP 18

Here's what we think. We wanted to know, do termites only follow pen lines? Will they also follow markers or crayons? In our experiment, the termites only followed the line we drew with a pen. The termites didn't really follow the marker or the crayon. So we learned that the kind of writing tool does matter to the termite. They'll only follow pen lines. So, did we figure out the answer to our question? Go to the next step to find out.

ACTIVITY STEP 19

When we first observed the termites, we wondered, will termites follow any kind of line that we draw? Well, let's look at the results of our experiments. We saw that termites will follow any shape and they'll follow any color, but only if that line is drawn in pen. I don't know about you, but now I have even more questions. Like, do all termites do this? Are there any other bugs that do this? And what's so special about the pens? That's one of the best things about being a scientist, finding answers often means you'll come up with even more questions. Talk with your partner and discuss: What other questions do you have? What other experiments could you do?

ACTIVITY STEP 20

Congratulations! You've done a great job practicing being a scientist today. There are so many other experiments that we could try. I have a challenge for you this school year. Whenever you're curious and wonder about something, take a moment and see if you can come up with an

experiment. There are lots of experiments you can try, and those experiments can help you figure out the answers to your questions. In fact, you might want to try today's experiment with different kinds of bugs, like ants or lady bugs to see if they do the same thing. Every time you're curious, you ask a question and you do an experiment, you're being a scientist. Have fun and stay curious!