mystery science

Grades K-5
Mini-Lesson + Activity: “Is it possible to become invisible?”

VIDEO TRANSCRIPT

MINI-LESSON VIDEO 1

Hi, it's Doug! When I was growing up, one of my favorite all-time TV shows was a show called "Star Trek." It's a show about the future and I loved how it was full of inventions that don't exist in real life—at least not yet. This is one of my favorite ideas—it's called a cloaking device. Watch what it does. A cloaking device can make things like an entire spaceship, completely invisible. So cool! Someone named Brenin has a question about invisibility. Let's give Brenin a call now.

[Video Call]

- Hi, Doug!

- Hi, Brenin!

- I have a question for you. Is it impossible to be invisible?

- That's a great question.

People have imagined the idea of invisibility for a long time. Like the movie makers who gave Harry Potter his cloak of invisibility or Bilbo Baggins' magic ring in "The Hobbit." Even Lego Batman uses the power of invisibility to sneak up on bad guys. Being invisible would be so fun! Just think about it. You could play pranks on your friends. You could always win games of

hide-and-seek. And you'd totally be able to surprise people at surprise birthday parties. Before I say anything more, I'm curious: What fun things would you do if you could be invisible?

MINI-LESSON VIDEO 2

I wish I could hear all of your answers. You probably thought of lots of fun things you could do if you could make yourself invisible. I mean, just imagine being able to have the type of invisibility where someone standing right in front of you can't see you. That'd be pretty amazing. Like, imagine you could just press a button or put on a cloak and—puff—disappear. But what kind of technology could make that possible? Is there even such a thing? It seems like if there were, that would be a really hard thing to invent. One thing we can do, that's a lot easier is something more like this—we could use camouflage. This is more like a way of tricking someone or something into thinking that we're invisible. Like, look closely at how this wildlife photographer is dressed. You see how he's wearing white clothes to match the snow? Now, up close he's definitely not invisible like Harry Potter, but to animals who aren't paying close attention, he seems invisible because he's blending in with the snow around him. That's what camouflage is. It's looking like the background, the land, or the plants around you to blend in. It works really well. The animals he's trying to take pictures of won't even know he's there and wearing different colored clothes to look like the things around you isn't even the only way to seem invisible. You see these emperor penguins? They're scared of people. Like really scared. So when scientists in Antarctica wanted to study them, they could never get up close without sending them into a panic. Scientists would have loved to be invisible, but instead, they decided to trick the penguins into not seeing them. How? Meet the robopenguin! By using this robot to blend in scientists were able to sneak into this huge colony of penguins without ever being seen.

And the pictures and videos they got were amazing. They even got videos of penguins laying eggs. And it's not only humans who use camouflage to become invisible and sneak up on something. Animals use this trick, too. Check out this orchid mantis. Wait, where is it? Ah! There it is. An orchid mantis looks just like all the orchid flowers growing where it lives. Unless you look really closely, you can't even tell it's there. When a butterfly or moth lands nearby, the orchid mantis can sneak up and snatch it without ever being seen. Now, not all animals try to become invisible to sneak up on other hands. Some try to become invisible because they just want to be left alone. Like this cuddle fish, a relative of the octopus. Notice how its skin just changed? Cuttlefish are masters of invisibility tricks. Not only are they able to change the color of their skin to blend in where they're swimming, they can actually change the patterns on their skin. And that's not all - they can even change how bumpy their skin is. Like if they're swimming around bumpy rocks. Doesn't it look just like these rocks? Invisibility tricks like these work really well, but they're still just tricks that fool animals who aren't paying close attention.

So what about real invisibility? You know, like the kind of invisibility where you're standing right in front of someone and they can't see you? Is that kind of invisibility possible? Well, even though it is hard, scientists have made some interesting new discoveries and it all has to do with light. We're able to see things like toys and tables and books because light is shining on them. And when there's no light, you can't see them anymore. Part of what's so hard about making something invisible is that actual invisibility would mean light would be able to pass right through you. That may never be possible. But what if we invent something that stops light from shining on objects something that makes light go around them? Then, those objects would become invisible, right? Up until now, no one's figured out how to do this with everyday light. They've only been able to bend a special light in a lab and only on a pretty small level. But at least one

inventor has figured out a trick that's kind of like getting light to bend around you. He invented panels of material made of tiny lenses that bring in light from the left and right sides of an object. It's almost like camouflage, but using light. Watch this object disappear behind the material. It's pretty cool, right? Now, you can't really wear this material like an invisibility cloak yet. You would have to hold it up in front of you and stand really still. But it's the closest thing we might have to real invisibility.

So in summary, real invisibility like you see in the movies hasn't been invented yet, but we can use tricks like using camouflage or bending light with lenses to make ourselves blend in with our surroundings. That's all for this week's question. Thanks, Brennan, for asking it. Now, after this video is done playing, my friends and I here at Mystery Science have created a special activity where you'll observe different ways animals make themselves seem invisible. Then, you'll use what you learned to help you hide messages and challenge friends and family to try and find them. You can do this activity in a group or all by yourself. I hope you'll try it. Have fun and stay curious!

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to play hide and seek. Animals are hiding. It's your job to find them. When you find the animals, you'll also learn the tricks that let these animals become almost invisible even when you're looking right at them. You'll use those same tricks to hide secret messages in your room. Then, you can challenge someone to find the secret messages you've hidden. We'll show you how to get started, step by step.

ACTIVITY STEP 1a

Many animals hide from bigger animals that want to eat them and smaller animals that they want to eat. Can you find the animal who is hiding here?

ACTIVITY STEP 1b

Did you find the frog? This frog hides by blending in. Its color matches the moss where it lives. Its bumpy skin looks like moss. The frog's disguise helps it hide from snakes that want to eat it.

ACTIVITY STEP 2a

Take a look at this tree trunk. Do you notice anything strange about it? Can you find an animal hiding here?

ACTIVITY STEP 2b

Look closely. You'll see a lizard. Look for its eye. Here's its eye. Now look for its toes. Here they are. This lizard hides by looking like tree bark and by lying very flat against the tree.

ACTIVITY STEP 2c

Here's that lizard standing up. It's much easier to see now. Lying flat against a tree helps the lizard hide, but sometimes it has to move, and that can give its hiding place away.

ACTIVITY STEP 3a

Here's a very tricky one. There's a caterpillar on this mango leaf. Can you find it? If you can't, there's a hint on the next slide.

ACTIVITY STEP 3b

Sometimes it helps to know what you're looking for. Here's what the caterpillar looks like. Now can you find it on the leaf? The caterpillar's colors match the colors of the leaf, and the line on the caterpillar's back lines up with the line on the leaf, making the caterpillar look like it must be part of the leaf.

ACTIVITY STEP 4a

It's not just little animals like lizards and insects that play hide and seek. There's a much bigger animal hiding in the picture. Can you find it?

ACTIVITY STEP 4b

Up close, it's easier to see the great horned owl, even though its color matches the tree. Let's go back to the first picture. See if you can find the owl now. Watch for when the owl moves.

ACTIVITY STEP 5a

Now that you know how sneaky animals can be, take a look at this. Can you find an animal in this picture?

ACTIVITY STEP 5b

Watch what happens when someone touches that leaf. It's not a dead leaf after all. Let's watch that again. It's a butterfly that looks like a dead leaf.

ACTIVITY STEP 5c

Here's another look at that dead-leaf butterfly. On one side, its wings look like leaves. What do you see when it opens its wings? If you are a hungry bird ready to peck the butterfly, that sudden flash of color might make you stop long enough for the butterfly to get away.

ACTIVITY STEP 6a

Some animals pretend to be something that nobody wants anything to do with, something kind of gross. These splotches all look like bird poop, but one is an animal that's pretending to be poop. Which one do you think it is?

ACTIVITY STEP 6b

This one is the pretender. What kind of animal could it be? Do you have any ideas? You'll find out on the next slide.

ACTIVITY STEP 6c

Watch what happens when someone tickles that bird poop pretender with a leaf. Wait for it. It flaps its wings and flies away. It's a moth, like this one.

ACTIVITY STEP 6d

Here's another animal that looks like bird poop. This caterpillar smells like bird poop too. No bird would want to eat that.

ACTIVITY STEP 7

You've seen how animals hide and the tricks they use. Now it's your turn to use those tricks. You're going to hide a secret message in your room. Get a piece of paper, a pencil, and something to color with. You can use crayons or markers—or colored pencils.

ACTIVITY STEP 8

Draw a picture or write a secret message on one side of the paper. Then, fold the paper in half to hide your message.

ACTIVITY STEP 9a

Think about all the tricks that help animals hide. They blend in, matching the colors and patterns of the place they're hiding. They flatten out to look like part of whatever they're lying on. They look like something they're not, maybe something that no one would want. Think about how you could use these tricks to hide your message. For some ideas, go to the next slide. You can hide your message now, or go to the next slide to see some ways that we hid messages.

ACTIVITY STEP 9b

Think about ways you could use these tricks to hide your message. You can color your message. Fold it. Flatten it out. Experiment, and try different ways to hide your message. What works best? You can hide your message now. If you want to see what we did before you hide your message, go to the next slide.

ACTIVITY STEP 10

There are five secret messages hidden in this bookshelf. Can you find them all? Here's a hint: remember the tricks you learned—blend in, flatten out, look like something else. Go to the next slide if you want to see close-ups of the shelves.

ACTIVITY STEP 11a

Here's a closer look at part of one shelf. There are two messages hidden here. Can you find them? Look carefully. On the next slide, we'll show you where one is hiding.

ACTIVITY STEP 11b

Do you notice anything strange about that water bottle at the end? Aha—there's a message! But that's not the only hidden message. Can you find another? We'll show you another in the next slide.

ACTIVITY STEP 11c

What about those books? Could a message be hiding there? Sure enough. Here it is, pretending to be part of a book.

ACTIVITY STEP 12a

Here's the other end of that shelf. There are three messages in this picture. Can you find them? Look carefully. On the next slide, we'll show you where they are.

ACTIVITY STEP 12b

Do you think that paper airplane is built to fly? Nope. It's a message in disguise. Do you think that's just a to-do list? Nope. It's another message.

ACTIVITY STEP 12c

The last one is tricky. This message is pretending to be a piece of trash.

ACTIVITY STEP 13

Now it's your turn to hide a message in your room. If you like, hide more than one and invite someone to look for them. See how many different ways you can hide messages in your room. Have fun and stay curious!