mystery science

Lesson: “How many different kinds of animals are there?”

VIDEO TRANSCRIPT

EXPLORATION VIDEO 1

Hi, it's Doug! I want you to imagine something. Imagine that you go on a trip far away from home. You go outside one day, exploring, and you happen to see a really strange animal. It's unlike any animal you've seen before. You don't know what kind of animal it even is. But you observe it closely. Now, you don't have a camera with you, so you take notes and draw pictures and try to describe in words all the things you notice about it. When you get back home, you describe to your friends what the animal looked like. "You see, it had spots like a leopard, but it was tall like a camel. Really tall, maybe taller than that, with long legs and a long neck." But your friends just say, "Sure, I bet you were just imagining it. There's no animal that exists like that." You really had seen it, though. "No, really," you say. "It was the most amazing animal." Your friends don't believe you. How could you convince them that your animal was real?

EXPLORATION VIDEO 2

Now, you might be thinking, it should be easy to convince your friends that you really saw this strange animal. You could look for pictures of the animal on the internet and just show those to your friends. Today, the idea of not knowing what kinds of animals there are in the world seems silly. We have cameras and the internet, and you can even hop on a plane to travel places in just a few hours. But there was a time when people hadn't traveled to different places around

the world. For example, a few hundred years ago, most people from the continent of Europe had never been to the continent of Africa, and people from Africa had never been to the continent of Europe. When some Europeans eventually traveled from Europe to Africa, they saw animals they weren't familiar with. They really did see a tall animal with spots that they'd never seen before. They called it a *camelopard* because it had long legs and a long neck like a camel, but spots like a leopard. They came back to Europe and described the animal to other people at home, just like the story I told you in the last video. It turns out that this camelopard is an animal that I think you're familiar with. What do you think it is?

EXPLORATION VIDEO 3

Did you figure out what familiar animal the camelopard is? Maybe you got it. Are you ready for a real photo of one? Here it is. That's right, it's a giraffe. Camelopards is what some people actually used to call giraffes. For people who hadn't seen them before, they thought they looked like a camel with leopard spots. Now, it might seem hard to imagine never having seen a giraffe before. I mean, today we live in a world where we can see animals like this in zoos, in books, or on TV shows. So even if you never travel or leave your town, you know about all kinds of different animals that live all over the world. But a long time ago, before people had explored and visited each other's continents, people only knew about the animals where they grew up. They never got to see animals that lived far away. So, if you were from Africa, giraffes might be common to you. You might see them all the time. But to people in the rest of the world, giraffes were totally new. Early scientists realized that they could learn a lot by traveling, so they started sailing on ships, exploring places far away from where they grew up, sometimes exploring for years at a time. They found all kinds of new and interesting animals that they hadn't seen before. It's just they didn't have cameras to take pictures of them. Instead, they had to describe

things by drawing them as best they could and by writing about them. But, as you can see with the camelopard, sometimes drawings aren't perfect. Without a camera to really know exactly what something looked like, some of these scientists thought even better would be to bring back the animals themselves. So, some of those early scientists started creating collections of animals in museums and in zoos. It was even popular at the time to have entire rooms full of collections at your house, which people called a curiosity cabinet or room of wonder. Some of those collections were huge! And sometimes they'd be all jumbled up with all kinds of different things in them. It's easy to just collect things without being organized about it, without thinking about how to group things together. Some scientists started wondering: What kinds of animals are all of these, and how are these animals related to one another? You actually might have thought about questions like this before. For example, have you ever thought about this: Dolphins and sharks are both animals that swim in the ocean, and they have some things in common. They kind of look alike in some ways. It's tempting to say they're both fish. But are they the same kind of animal? Scientists got interested in questions like these. Questions about how to group animals based on what kinds of animals they are. But how should you group them? People naturally like to group things in order to keep track of them, like grouping the kinds of fruits together at the grocery store or grouping the same kinds of books together in the library. Tools in a toolbox grouped by what kind of tools they are, or clothes in your dresser drawers grouped by what kinds of clothes they are. Early scientists wanted to do the same thing with animals, and group them into kinds of animals. But how should they group them? What do you think? If you discovered these animals, how would you group them?

EXPLORATION VIDEO 4

You looked at six animals and found different ways to group them based on things they had in common. You might have grouped this frog, zebra, and beetle together because they all have stripes. Or maybe you grouped together all the animals that are brown. But these groups don't tell you a whole lot about what kinds of animals these are. Except for one thing they have in common, their colors or patterns, these animals hardly have anything in common at all. Think about this: A beetle, a frog, and a horse—are they really that similar to one another? They're all brown, but besides that, they are such different animals. A beetle crawls on six legs and has wings. A frog hops on four legs and starts out as a tadpole. And a horse walks on four legs, has hair, and eats grass. Scientists needed to figure out better ways of grouping animals together, rather than just looking for animals of the same color. In today's activity, you'll investigate ways of grouping animals based on their *characteristics*, which means their different parts and how they look. For example, a giraffe has characteristics of being furry, of being tall, of having four legs. These are just some of the characteristics of giraffes. Here are two more animals. Take a moment now and practice identifying their different characteristics.

ACTIVITY INTRODUCTION VIDEO 1

In today's activity, you're going to pretend you're an explorer. You've found an animal that no one in your country has ever seen before. You wrote down all of the animal's characteristics. Now, you want to figure out what kind of animal your new animal is. To do that, you're going to look at familiar animals, like pigeons and horses and spiders. You'll figure out how to group animals together by thinking about how these animals are alike, and how they're different. Then,

you'll get cards that show new mystery animals, and you'll have to figure out where each one of them belongs. I'll show you how to get started, step by step.

ACTIVITY PART 1 STEP 1

If you're in a class, 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 PART 1 STEP 2

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

ACTIVITY PART 1 STEP 3

Cut along the dotted lines to cut out the 16 animal cards. If you're working with a partner, each person cut one page.

ACTIVITY PART 1 STEP 4

Spread all your cards out on the table. With your partner, look at the cards. Think about what you know about each animal. Then, put the cards in groups with similar animals together. It's okay if you have some animals that don't seem to fit any of your groups—put them to the side for now. After two minutes, your teacher will check-in and see how you're doing. I'll let you know when the two minutes are up. Okay, two minutes have passed now. Whenever you're ready, go to the next slide.

ACTIVITY PART 1 STEP 5

Discuss.

ACTIVITY PART 1 STEP 6

Discuss, then watch the next video.

ACTIVITY INTRODUCTION VIDEO 2

When scientists are figuring out which animals to group together, they do look at the outside of an animal for clues about how to group them. For example, they might put animals that are furry and animals that are not furry into different groups. But they don't just think about what an animal looks like on the outside. Scientists also think about where the young animals come from. Do they hatch from an egg, like chicks and ducklings? Or are they born like kittens and puppies? Those don't hatch from eggs. Scientists also think about what's inside an animal's body. For example, some animals have bones or skeletons inside their bodies, while other animals don't have any bones at all. For scientists, these differences can be really helpful in deciding whether to group animals together or not. With this knowledge in mind, let's go back to the activity and try grouping animals again.

ACTIVITY PART 2 STEP 1

Discuss these questions.

ACTIVITY PART 2 STEP 2

Now, using your animal cards, find all the animals that have no bones. Put those animal cards near each other into one group.

ACTIVITY PART 2 STEP 3

Take the cards of the animals with no bones and place them on top of a piece of paper. At the top of the piece of paper, write “Animals without bones.” Once you've done that, find out other ways that these animals are alike by reading the other characteristics written on the cards.

ACTIVITY PART 2 STEP 4

On your animal cards, you'll notice that all of the cards say something about how the animals are born. Some animals lay eggs, while other animals give birth to their young. Find all the animals that give birth to their young rather than laying eggs. Make a group of all the animals that give birth.

ACTIVITY PART 2 STEP 5

Scientists have noticed that animals that give birth instead of laying eggs have a lot of other characteristics in common too. In fact, you might already know what this group of animals is called: Scientists call them *mammals*. Write “Mammals” on a piece of paper, like this. Put this group of cards on it, then read the cards. In what other ways are mammals alike? And can you think of anything else that's a mammal?

ACTIVITY PART 2 STEP 6

Birds are a group of animals everyone knows. They have a lot of characteristics in common, such as having feathers. Write “Birds” on a piece of paper and put that group of cards on there, then read the cards. In what other ways are birds alike?

ACTIVITY PART 2 STEP 7

Okay, these are the cards that are left. Have a look at them and talk with your partner about what makes these animals different from the other animals you've seen today.

ACTIVITY PART 2 STEP 8

These animals have some characteristics in common, don't they? They all lay eggs and have bones, but they also have scales. Maybe you know what this group is called. They're *reptiles*. Write “Reptiles” on a sheet of paper. Put these cards on there, and then think about this: Given the characteristics they have in common, can you think of anything else that's a reptile?

ACTIVITY PART 2 STEP 9

Now, it's time for some challenges. Get these challenge cards and cut them apart. These animals are more tricky to put in groups. When you're done cutting them, go to the next slide.

ACTIVITY PART 2 STEP 10

Now, imagine you're the first person to ever see this animal. I'm sure you know what this animal is called, but how could you figure out which group it belongs in? What questions would you ask

to figure out what group this animal belongs in? When you're ready for some clues, go to the next slide.

ACTIVITY PART 2 STEP 11

All right, here are some clues. Now, what group do you think this animal belongs in? On your card, circle what you notice. Do these pictures help answer your questions? We'll discuss what we noticed in the last video.

ACTIVITY PART 2 STEP 12

Imagine that you're the first person to ever see this animal. Now, you might already know what this animal is called, but how could you figure out which group it belongs in? What questions would you ask to figure out what group this animal belongs in? When you're ready for some clues, go to the next slide.

ACTIVITY PART 2 STEP 13

All right, here are some clues. Now, what group do you think this animal belongs in? On your card, circle what you notice. Do these clues help answer your questions? Don't worry if you have trouble with this. We'll discuss this one in the last video.

ACTIVITY PART 2 STEP 14

Imagine that you're the first person to ever see this animal. How could you figure out which group it belongs in? What questions would you ask to figure it out?

ACTIVITY PART 2 STEP 15

All right, here are some clues. Do these pictures help you answer your questions? Now, what group do you think it belongs in? On your card, circle what you notice. Once you're done discussing, watch the next video.

WRAP-UP VIDEO

In today's activity, you grouped animals into four groups: mammals, reptiles, birds, and animals without bones. Scientists call this last group of animals *invertebrates*. Then, you got three challenge animals, and you tried to figure out which group each animal fits in. Now, you might have recognized the first challenge animal as a *hippopotamus* or *hippo*. You probably figured out that a hippopotamus is a mammal because it has bones, it gives birth rather than laying eggs, and it has hair, just not a lot of it. The second challenge animal was a *tarantula*. Maybe you had a little bit more difficulty with this one. I'm hoping it threw you off because it's so hairy, and usually animals with hair are mammals. But tarantulas don't have bones. They also lay eggs, just like the other animals without bones. So you can see, tarantulas aren't mammals, they go in the group of animals without bones, the invertebrates. The third challenge was meant to be really hard. This animal is called a *pangolin*. Pangolins have scales, so you might've thought that they were reptiles. But you might have also noticed that they have hair too. And scientists who study their scales have discovered that these scales are actually made of the same stuff as hair, so they're really not like reptile scales. Pangolins also give birth. They're not reptiles—pangolins are mammals. So, that's the three challenges. Now, one of the things I hope you noticed today is that scientists don't group animals based on just one characteristic. For example, it's not enough to just know that an animal lays eggs. Many animals lay eggs. We

would need to know more about an animal than just that one thing. Instead, scientists look for patterns. They look for a bunch of characteristics that a group of animals might have in common. They look for what an animal looks like on the outside. They look at what it's like when it's born, and what it looks like on the inside too. Sometimes there are animals that don't seem to share all of the characteristics of the group that they're in. They don't exactly fit the pattern for that group, like pangolins. Even though they're mammals, they have parts that look like scales. There are other animals that are even harder to figure out which group they fit into, like this furry animal that lays eggs. You can check the Extras for even more animal challenges. This might surprise you, but we still don't know all the animals that live on the Earth. Every year, scientists keep discovering new animals that they've never seen before. Here are just a few of the thousands of animals seen for the first time in recent years. Each time scientists find a new animal, they look at its characteristics to try to figure out which group of animals it fits in. Just like you did in the activity today, maybe you'll be a scientist one day who groups an animal for the very first time. Have fun and stay curious!