mystery science

Grades K-5
Mini-Lesson: “Why can’t fish breathe on land?”

VIDEO TRANSCRIPT

VIDEO 1

Hi, it's Doug! Near my house is this statue of a fish. Now, it always makes me smile when I walk by it. I don't know why, but there's just something silly to me about seeing a statue of a fish. It's probably the only time you're going to see a fish on land. Or is it?

Someone named Lamar has a question about fish. Let's give him a call now.

[Video Call]
- Hello!
- Hi, Lamar!
- I have a question for you. Why can't fish breathe on land?
- That's a great question.

Here's something you have to check out next time you see fish, like in a pond you find at a park. Every once in a while, you can see certain fish doing this. Do you see this? They're coming up to the surface and opening their mouths. But why would a fish come up to the surface and open its mouth like this? What do you think?

VIDEO 2

Well, there are a few different reasons a fish might do this. Now, if you didn't know better, you might even think that the fish are coming up for air. And it's true, every animal has to breathe. Even fish. But you might have heard that fish don't breathe the same way that land animals do.

In order to breathe, fish use these—their *gills.* Surprisingly, there are tiny bubbles of air in the water. And gills help fish to collect up those tiny air bubbles. Most fish actually can't breathe using their mouth. They have to use their gills. The gills need to be in the water in order to work, which is why fish die when they're out of water for too long.

So why do these fish look like they're coming up to the surface and gulping air?

Well, if you've ever caught a fish to eat you might have seen inside of one. Inside a fish are many of the same organs that most animals have. A stomach, a heart, but you'll also find this strange thing here. Fish seem to have this inner body part that we don't have. It's these two little things that look like pillows or pouches. And they're connected to a long tube that connects to the fish's mouth. This organ is what's called the fish's swim bladder.

Now, that might sound like a strange name for a body part. A swim bladder? But you know if you're a fish, few things are more important than being good at swimming. Scientists were able to figure out that when certain fish come up to the surface like this and gulp air, some of that air goes into their swim bladder. They fill their swim bladder up with air—kind of like when you fill up a pool floatie with air.

If you're a fish and you want to swim near the water's surface without working too hard—okay, just gulp a bunch of air and it will help you stay near the top layer of water without having to constantly swim. Want to sink down toward the bottom? No problem. Burp the air out, and you sink down lower to the bottom. Isn't that convenient?

But some fish do something really surprising. Watch what these fish do. Whoa! You see that? These fish actually come up onto the land and spend time on land. How is this possible? Don't fish die if they're out of water for very long?

Most fish do. But fish like these are special. These fish are called mudskippers. And there are a few other kinds of fish that can do this as well. Fish like these can actually come up out of the water and survive on land. It turns out some of these fish, like this catfish, are able to breathe on land by using their swim bladder the same way that people and land animals use our lungs. They breathe air directly into their body. They don't need to use their gills.

Now, think about this for a second. That means if these fish can use their swim bladders the same way that you or I use our lungs, does that mean you or I could use our lungs the same way fish use their swim bladders?

Actually, we can. As long as you're a good swimmer, and you've got adult supervision, give this a try next time you go swimming at a pool. If you empty all the air out of your lungs, watch as you sink down to the bottom. But if you come up and fill your lungs with air, watch as it helps you stay closer to the top of the pool.

So in summary, most fish can't breathe on land because they use their gills to breathe. And gills only work in the water. But some fish actually can breathe on land for small amounts of time, such as by using their swim bladder to act like a lung.

That's all for this week's question. Thanks, Lamar, for asking it!