Science Questions Samples

If fish have ears, where are they?

Anne Hay, Age 9
Connecticut

The ears of fish are inside their skulls. That may seem strange, but since fish live in water, they do not need ears on the outside.

Sound is made up of energy waves moving through air, water, wood, or some other medium. The waves travel better through dense things, such as water and wood, than they do through air.

We have ear canals—openings that allow sound waves in the air to get into the ear. If we did not have ear canals, many sounds would be muffled and lost. You can hear this muffling effect by covering your ears.

But a fish doesn't have to pick up sound waves from the air. A fish's body is about as dense as water, so sound waves go right through the fish's body, where they reach the inner ear.

Ask a science question! Include your name, age, and complete address, and mail to Highlights Science Letters 803 Church Street Honesdale, PA 18431

Why do mice like cheese?

Portia Bailey, Age 6
Maine

A lot of cartoon mice seem to love cheese, but there's no reason to think that real mice would like it. Mice survive by eating seeds and other plant materials. They probably could not digest cheese very well.

Scientists at Manchester Metropolitan University in England did experiments to see which foods were the favorites of several kinds of animals. When mice had a choice, they didn't pick cheese. They chose chocolate and other foods that have a lot of sugar. Eating a lot of sugar would not be healthy for us, or even for mice. But sugar is food energy and hard to find outside of a kitchen or grocery store. In the wild, most mice can eat all the sugar they can find and burn it all just in their daily activities.

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How come when a candle is burning an orange tip is on it?

James Grunz, Age 7
Pennsylvania

The orange flame is made up of gases so hot that they glow.

When a candle burns, heat melts wax at the top of the candle. The liquid wax flows up the wick and rises into the air as a hot gas. Then the gas burns. That means it reacts with oxygen and gives off carbon dioxide, water, and heat.

This burning is a two-step process. First, the wax molecules break down into other molecules that we call soot. This happens in the center of the flame, where the soot cannot burn because there is very little oxygen. This part of the flame does not give off much light.

Second, as the hot soot rises, it reacts with oxygen. (It burns.) The heat makes surrounding gases glow. These glowing gases are the orange tip at the top of the flame. As they rise, they cool down and stop glowing.

—*Dr. Brian Anderson*
University of Texas at Austin

Why do whales jump out of the water?

Sarah Markosky, Age 8
Pennsylvania

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What makes you blush?
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We asked Greg Early, Ph.D., who is a marine biologist. He wrote:

"There are two basic ways for a whale to jump out of the water, or *breach*. The first kind of breach is the 'Whoops, I was chasing something so fast that I fell out of the water' type. Most kinds of whales breach in this way. They usually hit the surface at a shallow angle and pop only partway out of the water.

"The second kind is the 'I'm going to launch' breach, which takes the whale much farther out of the water. Only a few species do this type, mainly right whales, sperm whales, and humpbacks.

"No one knows why whales do this second kind of breach. Some scientists think breaching might wash parasites off the whale's skin. Another idea is that breaching might be a way to stun or scare fish, making them easier to catch. Finally, a whale might breach to communicate some message to another whale.

"The last of those ideas is based on the fact that whales seem to breach more when they are in or near groups. The breaches might mean 'Hey, look!' or 'Back off!' Or they might not mean much of anything. In other words, the whales might just be playing."

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Why do wheels spin so fast when a car moves?

Sawyer Roberts, Age 9
Texas

With a little math, we can see how quickly the wheels must turn.

On a typical car, a tire is about 6½ (6.5) feet around the outside edge. Each time the tires complete a turn, the car has moved 6.5 feet.

How many times must the wheels turn to go one mile? There are 5,280 feet in a mile. When we divide 5,280 by 6.5, we see that the wheels must turn 812 times to cover the distance.

Now, how fast do the wheels turn when the car goes at a typical highway speed—about 60 miles per hour? There are 60 minutes in an hour, so at that speed the car is also going about one mile per minute, and every minute the wheels turn 812 times. Since there are 60 seconds in a minute, we can divide 812 by 60 to find that the wheels spin about 13.5 times a second. You're right: that's fast!

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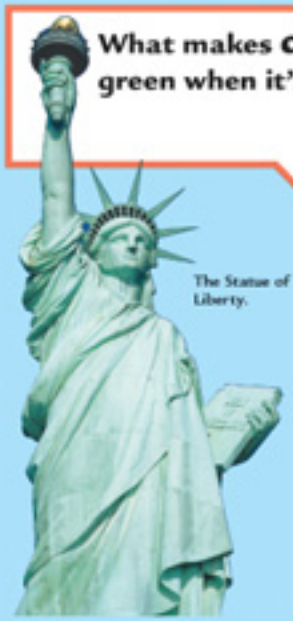
What makes copper turn green when it's put in air?

Madeleine Atwood, Age 7
North Carolina



The Statue of Liberty.

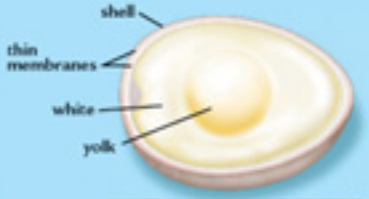
We asked Dr. Brian Anderson, a chemist at The University of Texas at Austin. He wrote:

"Air is a mixture of gases made up almost entirely of nitrogen, oxygen, and argon. But air also contains other kinds of molecules in small amounts.

"When copper is exposed to air, water vapor and sulfur dioxide combine with the copper and form a pale greenish compound on the copper surface. Unlike rust, however, which weakens iron and leads to further corrosion, the green compound that forms on copper shields the metal and protects it from further harm."

How do hens lay eggs?

Natalie Foong, Age 7
California



Inside a hen there is a sac-like structure called the ovary. This structure opens into a tube called the oviduct, which extends to an opening to the outside. An egg begins in the ovary as a single cell. Other layers of cells develop around it. Yolk granules are added until the yolk becomes just as large as you would see it in the egg. Then the yolk breaks free and starts a slow journey through the oviduct. As it goes, other layers are added—first the thick white layer, then two thin membranes, and the outer shell. Finally, the hen lays the egg by squeezing it out of the end of the oviduct.

Which planet circles the Sun the fastest?

Scott Lamb, Age 9
Wyoming

The fastest planet has the same name as the messenger-god in Roman mythology.

Mercury, the planet closest to the Sun, has the fastest orbit of all the planets. It circles the Sun every 88 days. In fact, in any solar system, the closest planet must always be the fastest. A star's pull is stronger close to the star than it is farther away. So only planets that are orbiting fast enough to resist this stronger pull of gravity will stay in orbit and not fall into the star.

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