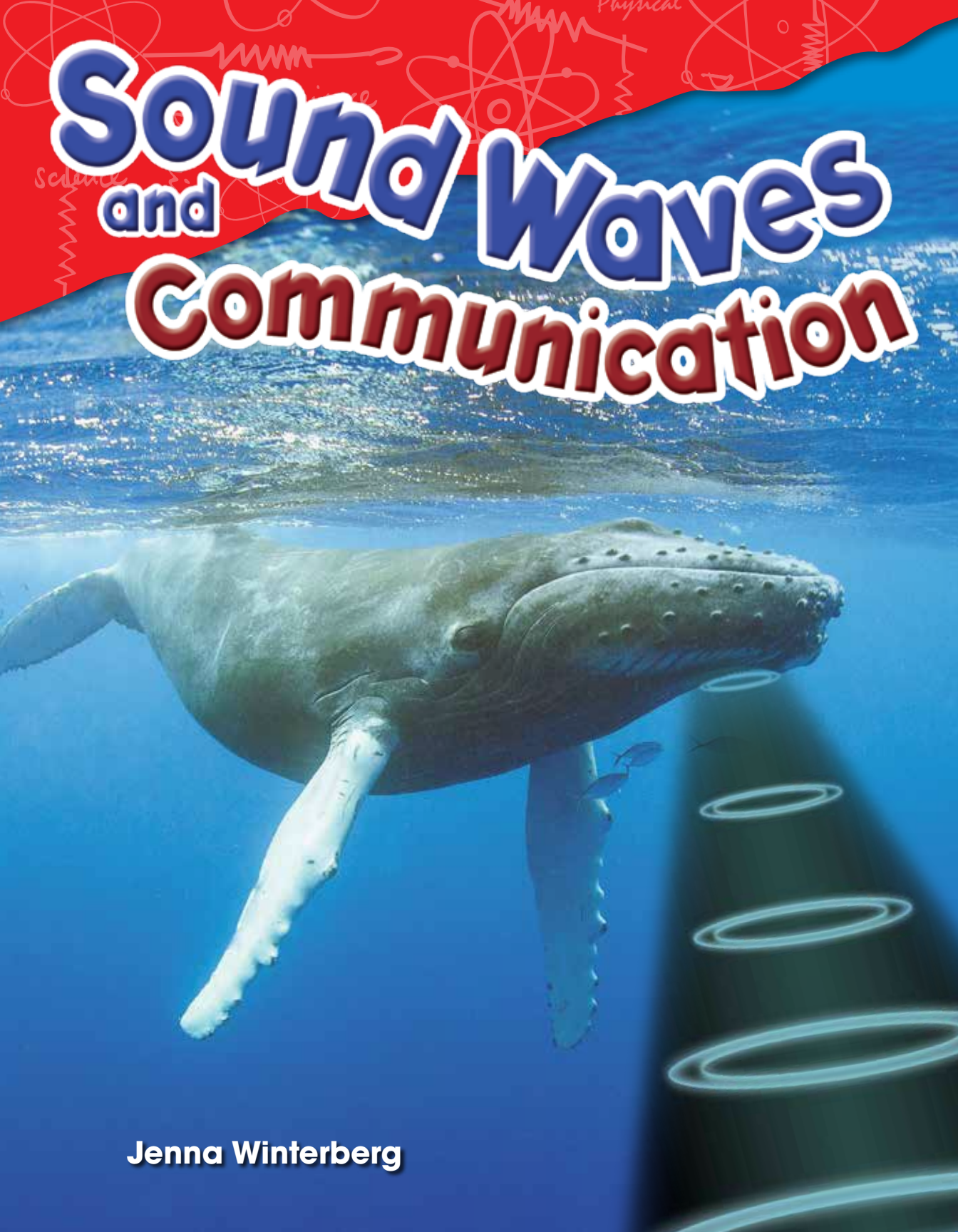
Sound and Waves Communication



Jenna Winterberg

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Power of Sound

Sound helps us to communicate. We use it to chat with our parents. We depend on it when we call a friend. It's an important part of watching our "can't miss" shows on TV. And it's the most important thing when we put on our headphones.

Humans aren't the only ones using sound. The animal kingdom is alive with noise. From chirping and buzzing to mewing and howling, bugs, birds, and critters use sound to share information and even to find their way.





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Sometimes, sound prevents communication. It's hard to hear someone else talk over loud music. And the roar of a crowd can make it hard for football players to hear a quarterback's calls. Construction, airplanes, and trucks all make enough noise to drown out other sounds, too.

Good or bad, sound surrounds us. Science can tell us a lot about sounds soft and loud, pleasing and annoying. It even allows us to detect and measure sounds we can't hear.



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Waves of Sound

Sound is a type of energy that travels in waves. The word *wave* typically brings to mind ocean waves and surfers that ride them, or the way a rope curls up and down with a flick of a wrist. These kinds of up-and-down wave patterns are made up of **transverse waves**. Transverse waves, like light waves, travel in only one direction. Sound waves work differently.

Sound waves act more like the ripples you might see in a pond when skipping stones. Instead of traveling up and down in one direction, sound waves move out in all directions. This type of wave is referred to as a **longitudinal** (lon-ji-TOOD-n-l) wave. A ripple starts out strong but then gradually disappears. In the same way, sound waves are strongest at the point at which they started. They lose energy the farther they get from the source. Then, they too, disappear.

Sound waves can travel through water like ripples. They also travel through solids. But most often, we experience sound as it travels through the air.

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Acousticophobia (uh-KOO-stik-oh-FOH-bee-uh) is the fear of sound or noise.

Space Observers?

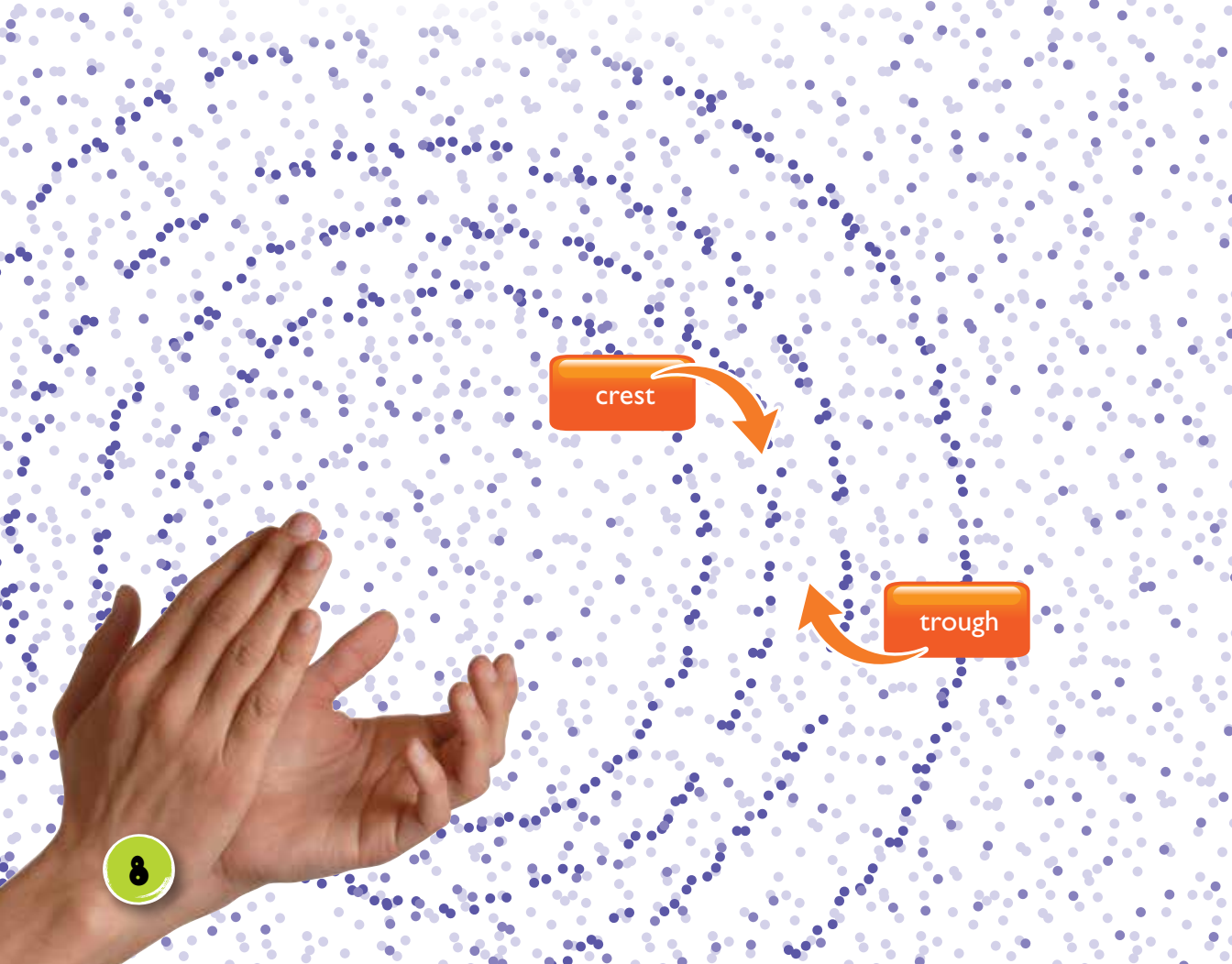
While sound waves can't travel through space, radio waves can. It takes time for the waves to travel through space. If any space aliens were to pick up on our radio waves, they would end up watching old TV shows. Way out at the star Regalus, they would be watching the first-ever baseball game on TV!



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Clap your hands. The action creates a vibration in the air, which pushes **particles** of air together. When air **molecules** are pressed together, the air becomes **compressed**. A pressure wave is created.

That area where the air is under high pressure makes up the **crest**, or peak, of the sound wave. The molecules that moved into that area had to come from somewhere. They moved into that space from the air nearby. As a result, a pocket forms next to the high-pressure area where the molecules are more spread out. This area of low pressure is the sound wave's **trough**.



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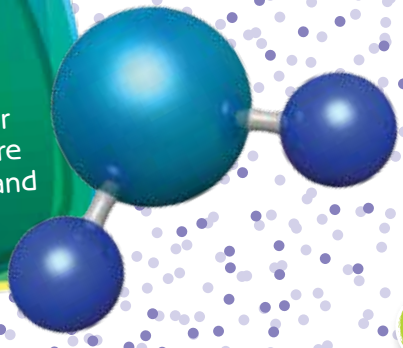
Echoes All Around

When sound waves strike a hard, smooth surface, they bounce off. This creates an echo. Most of the sounds we hear are really a combination of the original sound and the echo from walls, floors, and other surfaces nearby.

This high-and-low wave pattern continues. As it ripples out, it pushes the vibration of your clap forward. The molecules don't travel. But the sound travels because the vibrating molecules bump into one another. This causes a chain reaction, pushing the wave on. The wave carries the sound away from the source. In time, it will lose energy and flatten.

More About Molecules

Molecules are the particles that make up matter. There are many types of molecules and they can be combined to make anything and everything in our universe. A few types of molecules are water molecules, oxygen molecules, and aluminum molecules.



Think Like a Scientist

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What type of surface best reflects sound waves? Experiment and find out!

What to Get

- an object that makes constant noise, such as a ticking clock or a radio
- objects of different materials and thicknesses, such as a glass plate, a plastic plate, foil wrap, and plastic wrap
- two long cardboard tubes

