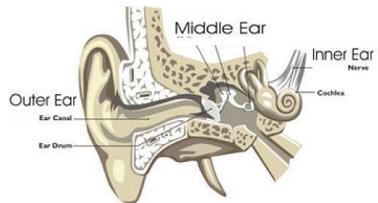
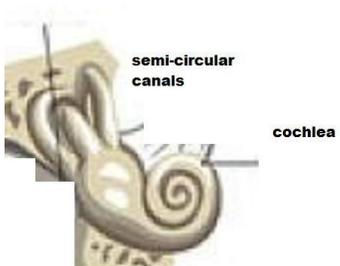
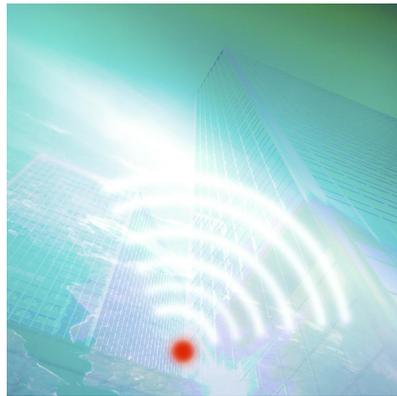


Name \_\_\_\_\_



# How We Hear Sounds

by Cindy Grigg



Answer the following questions **BEFORE** you read this book. It is okay if you do not know as much as you thought. Do the best you can!

### 1. How do our ears work?

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### 2. What parts are inside our ears?

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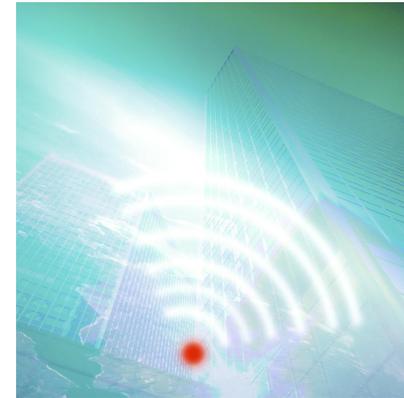
### 3. How do sounds move?

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If you've ever thrown a rock into a pond or lake, you have seen waves. Waves ripple out in all directions from where the rock disturbed the water.



Sound travels in waves, too. Sound waves are vibrations (movements back and forth). We can't see sound waves. But they move through air just like ripples move through water.



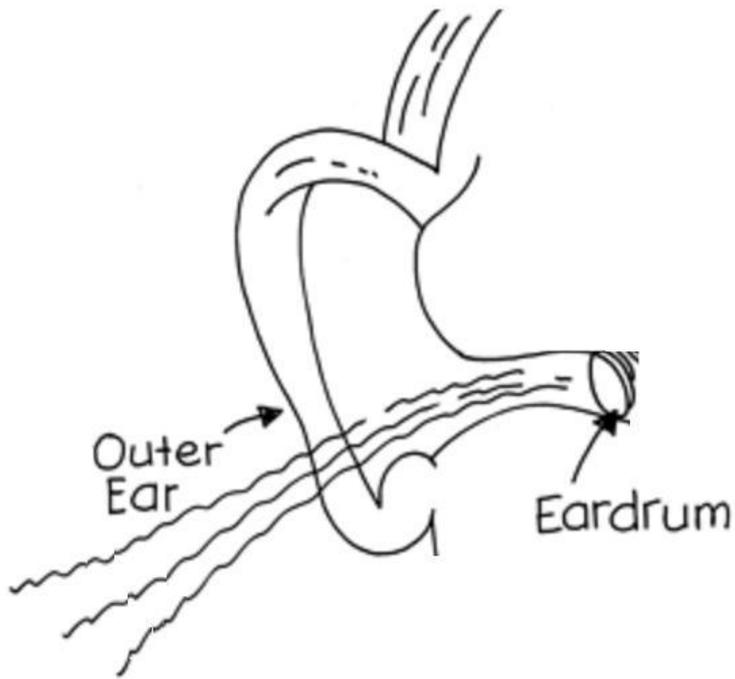
A sound makes the particles of air vibrate. The sound waves travel out from the source of the sound. A bell vibrates when it rings. Then the air particles next to the bell begin to vibrate. The vibration moves through the air in waves in all directions.

When the bells on your alarm clock ring, vibrations move from the bells through the air to your ears.

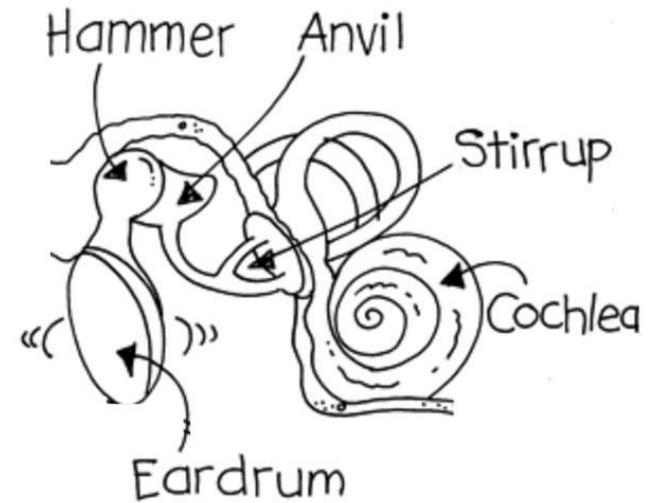


You can only hear sound when there is some kind of matter for the sound to travel through. The matter can be a solid like a wall, a liquid like water, or a gas like air.

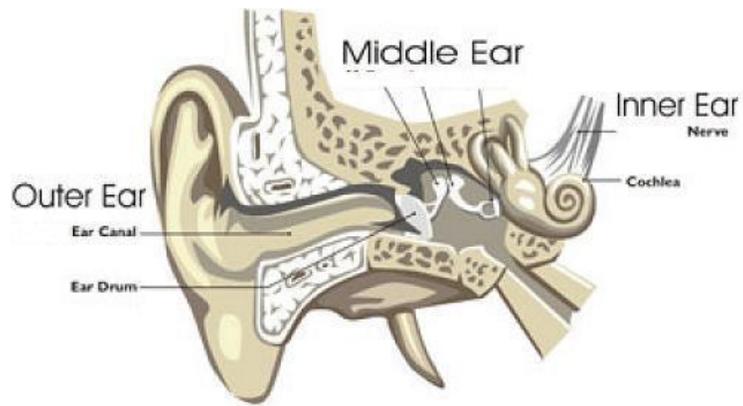
As sound travels away from the source, it gets weaker as it spreads out. The farther away the sound travels, the softer the sound becomes.



Here's what happens when sound waves get to you. The outer ear, called the auricle, is the part that sticks out from your head. It funnels the sound waves inside your ears to your eardrum through an opening called the auditory canal.



The eardrum vibrates when the sound waves push against it. Then the tiny bones in the middle ear begin to vibrate. They are called the hammer, the anvil, and the stirrup. These tiny bones amplify, or increase, the vibrations, which then travel into the inner ear.

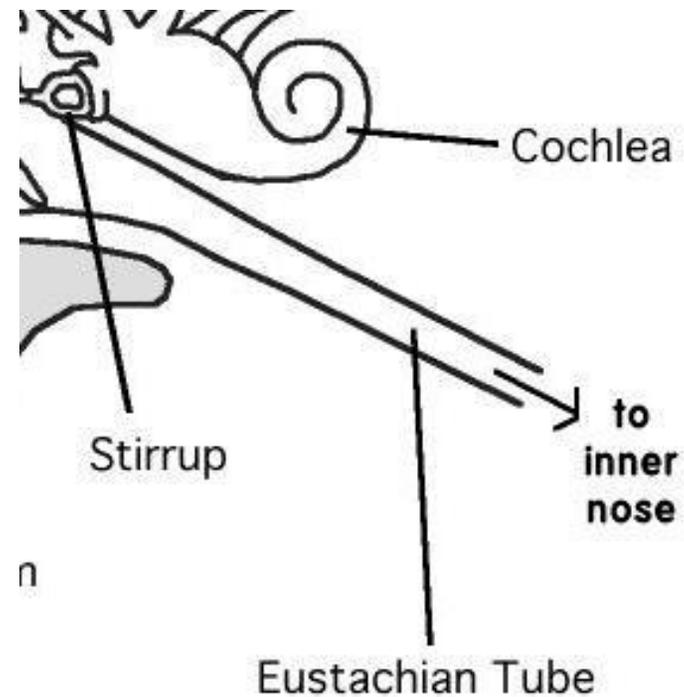
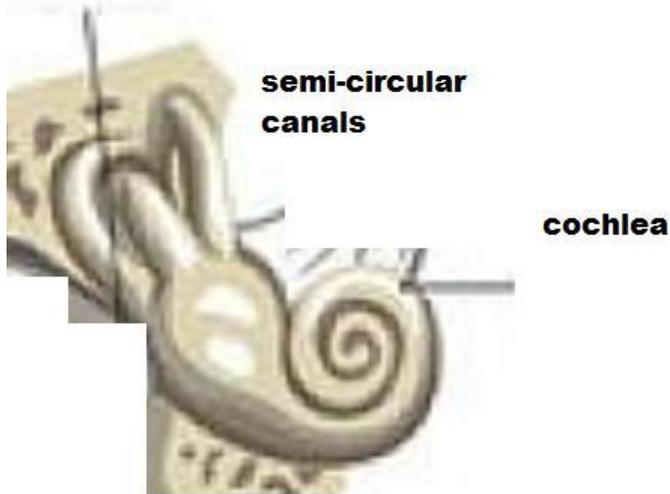


In the inner ear, there is a part that looks like a snail shell. It is called the cochlea (KO-klee-uh). The cochlea is a small, coiled tube that is filled with liquid. When the vibrations reach the cochlea, the liquid inside is set into motion, just like when a rock causes ripples in a pond.

A wave moves through the liquid, and sensitive hair cells are moved by the wave. The hair cells change the vibrations into electrical signals, which are sent through the auditory nerve to the brain.



Your brain sorts out the signals as a certain sound.



Take another look inside the ear. Near the top of the cochlea are three loops called the semi-circular canals. They are full of liquid, too. The liquid moves when you move. The liquid pushes up against the tiny hairs inside the three canals. These tiny hairs send messages to your brain that tells it what position your body is in. In the same way, the hairs on your arm let you feel wind blowing against your skin.

The fluid in the semi-circular canals helps you keep your balance.

The Eustachian tube connects the middle ear to the back of the nose. The tube is usually closed. It can be opened by coughing, yawning, or swallowing. When it is open, air is allowed into the middle ear. The tube's job is to keep the air pressure the same on both sides of the eardrum. Sometimes our ears feel "plugged." When we have a cold, the Eustachian tube won't open. When air pressure is not the same on both sides of the eardrum, our ears can hurt.



song, a dog's bark, or a lion's roar. Just imagine what it would be like to live in a silent world!

Sound is a form of energy. The energy travels in waves to our ears. Our ears have parts that vibrate, too. Vibrations are changed into electrical signals that are sent to our brains.

Our brains can tell us what we hear and from which direction a sound is coming. This is important so we can run away from danger or run to meet our best friend. Our ears help us keep our balance, too.

Without our ears, we couldn't hear a bird's

Answer the following questions **AFTER** you have completed this book.

1. Sound is a form of what?

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2. Sound travels to our ears in what?

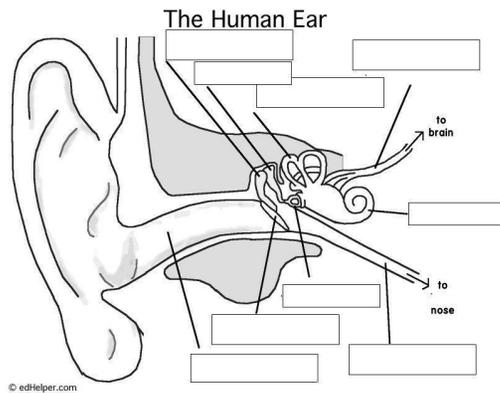
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3. Which part of the ear looks like a snail shell? Circle the correct answer.

semi-circular canals      auricle  
eardrum                      cochlea

4. Inside our ears, a wave moves through the liquid inside which of these? Circle the correct answer.

eardrum                      cochlea  
auditory nerve              auricle



Label the parts of the ear.

