

# I'm all ears...



## Primary Objectives:

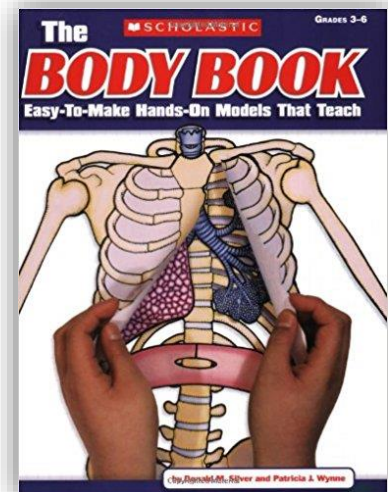
Students will:

- Identify the parts of the ear
- Know how the parts work together and their individual jobs (ex. The main job of the outer ear is to collect sounds and funnel sounds into your ear canal.)
- Be able to identify each part by and use the scientific terms for the parts of the ear.
- Understand the term idiom, be able to share examples, and know why and how they are used.

## Suggested Helpful Resources:

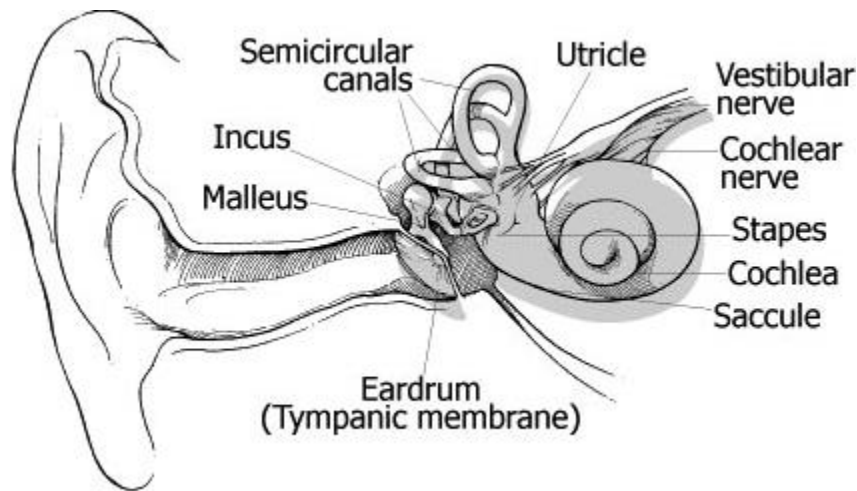
*The Body Book: Easy-to-Make Hands-on Models That Teach* by Donald M. Silver and Patricia J. Wynne

Easy-to-make manipulatives help students understand the inner workings of the human body. Reproducible patterns and easy step-by-step instructions help students construct bone and stomach books, a spinal column out of cardboard and string, paper models of the major organs and systems of the human body, and more!



## Background & Instruction:

Did you hear something? Maybe the sound you heard was quiet, like the click of a pencil. Or maybe it was loud, like a siren going by. Sounds are everywhere, and you have two cool parts on your body that let you hear them all: your ears!



Your ears are in charge of collecting sounds, processing them, and sending sound signals to your brain. And that's not all — your ears also help you keep your balance. So if you bend over to pick up your cat, you won't fall

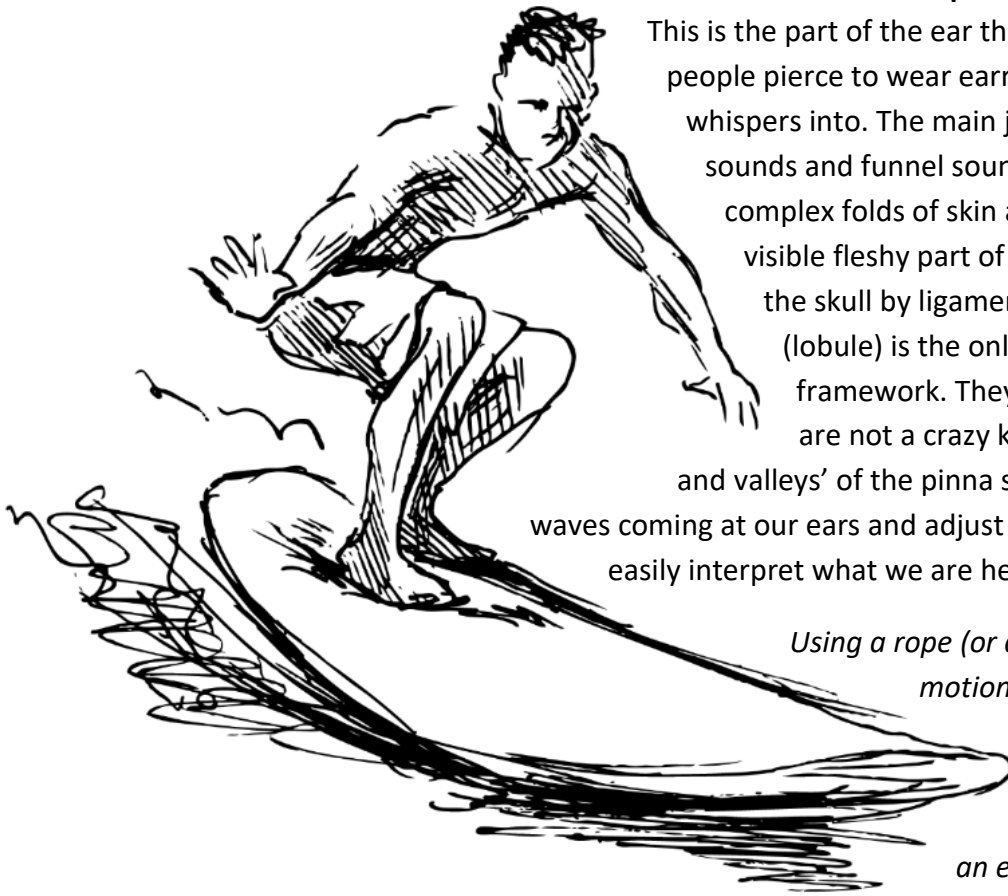
down — or even worse — fall on your cat. Ouch!

The ear is made up of three different sections: the outer ear, the middle ear, and the inner ear. These parts all work together so you can hear and send what you hear to your brain for processing.

Constructing a Model: If you have *The Scholastic Body Book* for Grades 3-6 use pages 32-38. Otherwise students can also make a model out of modeling clay or dough following a diagram.

Option: If you wish have students make an “ear canal” by rolling cardstock into a short tube with spread ends (cut small slices into the ends of the taped tube and spread them flat to enable taping) and attaching it with tape to the outer ear and the opening at the end of the ear canal.

## The Outer Ear: Catch the Wave



The outer ear is called the **pinna** or auricle (say: **or-ih-kul**). This is the part of the ear that people can see. It's what people pierce to wear earrings and what your friend whispers into. The main job of the outer ear is to collect sounds and funnel sounds into your ear canal. The complex folds of skin and cartilage of the pinna, the visible fleshy part of the outer ear, are attached to the skull by ligaments and muscles. The earlobe (lobule) is the only part not supported by the framework. They may look like it, but the folds are not a crazy kind of decoration. The 'hills' and valleys' of the pinna slow down the many sound waves coming at our ears and adjust them so our brain can more easily interpret what we are hearing.

*Using a rope (or a slinky) demonstrate the motion of sound waves as they enter into the ear. This may be done by having two students volunteer to hold an end of the rope. Have them begin a wave-like motion with the rope.*

One may also describe the pinna as a kind of audio filter, it keeps too many sounds from coming in all at once and overwhelming our brains. The funnel-like shape gives away another important function, the amplification of sound.

So, our outer ears adjust the sounds for us, focus them, and make them louder? How can we be sure they do all of that?

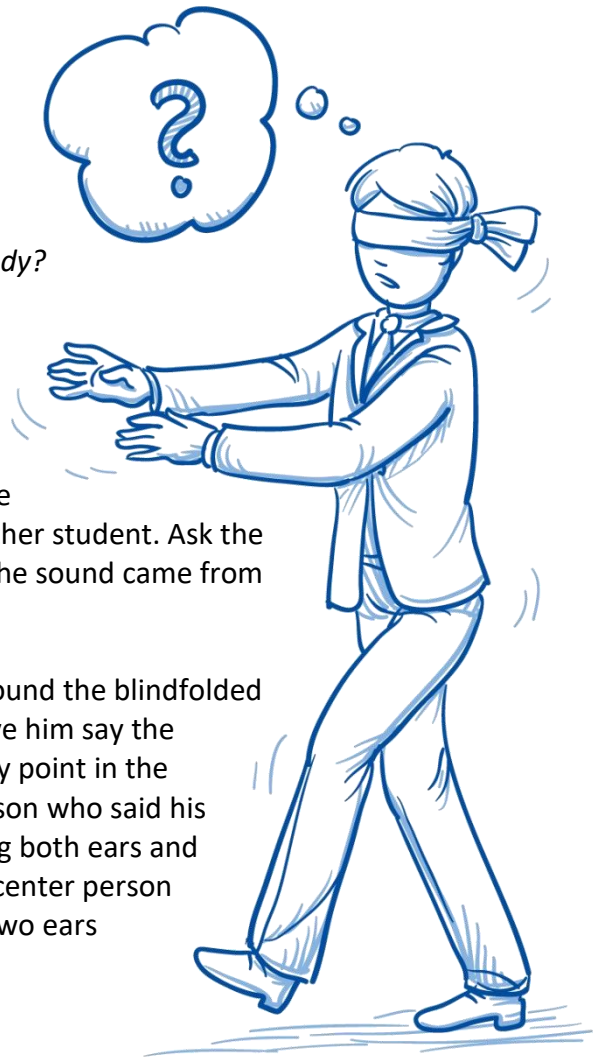
In order for students to get a better idea of how their outer ear works have the students perform the following experiments:

## Two Ears. One Ear. One, Two, You?

*Ask students to make predictions: If people in a circle around a blindfolded listener create noises, how accurately can the listener point to each sound source, without turning head or body? With turning head or body?*

Ask a student to stand in the middle of the room and close his or her eyes. Point to a seated student and ask that student to clap once. Ask the first student to open his or her eyes and guess who clapped. Now ask the guesser to again close his or her eyes and cover one ear. Repeat the clapping by pointing to or tapping another student. Ask the guesser if it was easier or harder to determine where the sound came from with both ears open or with just one open.

Variation: Have the other people form a large circle around the blindfolded person. Point to one of the people in the circle and have him say the seated person's name. The seated person must then try point in the direction of the voice and identify the name of the person who said his name. Try this experiment with the seated person using both ears and then again with one ear closed. How accurate can the center person identify the caller and where the call came from? Are two ears better than one?



## Catching Sounds

### Materials Needed:

Each group of four or five students will need:

- a megaphone/ear trumpet (roll and staple poster paper into a conical shape)
- a ticking device (clock or timer).

### Strategy:

1. Participants speak to one another--first normally, then with hands cupped around their mouths, and finally through a megaphone. They talk about any differences they notice.
2. Participants listen to one another--first normally, then with hands cupped behind their ears, and finally through an ear trumpet. They talk about differences they notice.

3. Each member of the group counts how many paces away he can hear a ticking device--first with the unaided ear, then with an ear trumpet. The group will compare the distances and draw a conclusion.

Sample Conclusion: Sound waves can be collected and directed into our ear and increase our ability to hear.



## What's that Noise?

Jiggling coins, clinking glasses, clapping hands...think you know what these sound like? Test the ability of people to identify several sounds with this game. People should close their eyes or turn away from the "sound maker." Make each sound and see if everyone knows what it is.

Example sounds:

- Shake pennies or other coins
- Clap hands
- Clap chalkboard erasers
- Tap a pencil or pen on a desk
- Close a book
- Crumple up paper or foil
- Stomp on the floor
- Tear some paper
- Close a stapler
- Bounce a ball

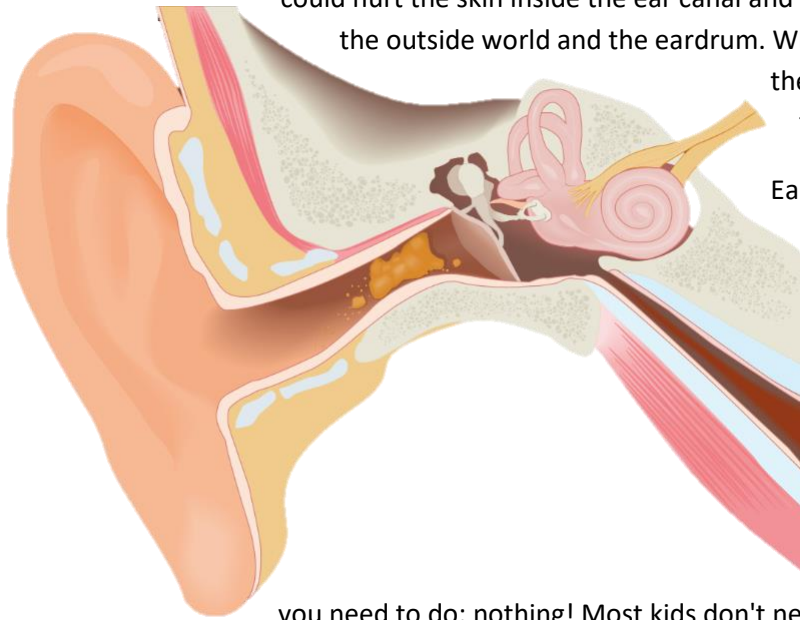
What other sounds can you come up with? Are there any that are difficult to identify without sight?

## It's sticky. It's shiny. But what is earwax, anyway — and where does it come from?

Earwax is made in the outer ear canal. This is the area between the fleshy part of the ear on the outside of your head (the part you can see) and the middle ear. The skin in the outer ear canal has over 2,000 glands (special structures in your skin that, in this case, only make earwax) in your ear with the special job of only making earwax! The fancy name for this waxy stuff is cerumen (say: suh-roo-mun).



So why do we need wax? Earwax has several important jobs. First, it protects and moisturizes the skin of ear canal, preventing dry, itchy ears. Second, it contains special chemicals that fight off infections that could hurt the skin inside the ear canal and kills germs. Finally, it acts as a shield between the outside world and the eardrum. When dust, dirt, and other things enter your ear, the earwax traps them so they can't travel any further.



Earwax isn't just gross. It's gross and useful!

After the wax is produced, it slowly makes its way through the outer ear canal to the opening of the ear. Then it either falls out or is removed when you wash. In most people, the outer ear canal makes earwax all the time, so the canal always has enough wax in it.

If you want to get rid of earwax, here's what you need to do: nothing! Most kids don't need to do anything special to remove earwax. Every time you move your jaw it helps earwax come out, it comes out when you sleep, when you walk, all the time. If you wash your hair regularly, this is enough to keep your ears clean.

You can wipe the outside of your ear with a washcloth but don't use a cotton swab, your finger, or anything else to poke around inside your ear to remove earwax. Your ear canal and eardrum are very delicate, and you may hurt them or cause bleeding by trying to get rid of wax this way. Poking around in your ear may get the very top layer of earwax off, but it just pushes and packs the rest of the wax in farther.

## Fun Wax Facts:

- Many types of whales have a build-up of earwax which increases with time; the size of the deposit is sometimes the only way to determine the age of whales that do not have teeth, whales that have baleen, like blue whales. When cut lengthwise, layers can be seen and counting the growth rings in the ear plug is now the principal method of age determination for baleen whales. In the future scientists hope to use a new type of age measurement that can be done on living whales...using whale dandruff.



- In an episode of the television program *MythBusters*, it was shown that candles can be made of human earwax and those candles can sustain a flame, but they do not burn long or brightly enough to be as practical as paraffin or beeswax candles.



# The Middle Ear: Good Vibrations



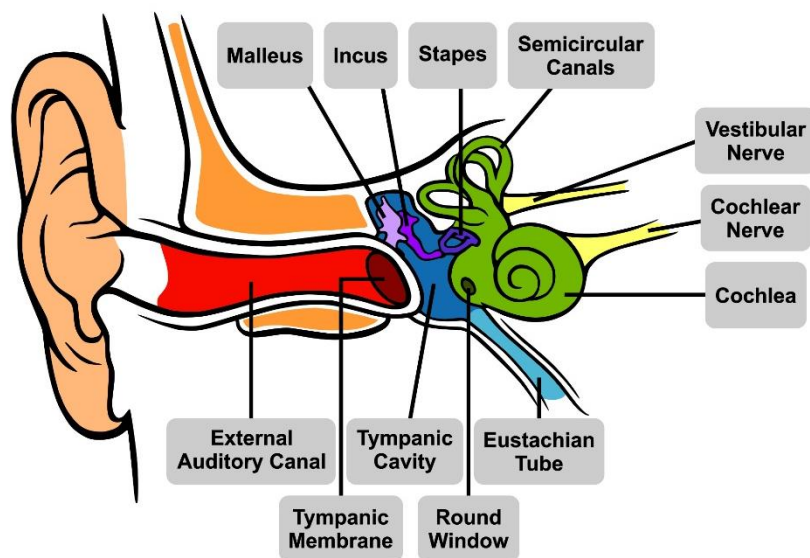
After sound waves enter the outer ear, they travel through the ear canal and make their way to the middle ear. The middle ear's main job is to take those sound waves and turn them into vibrations that are delivered to the inner ear. To do this, it needs the eardrum, which is a thin piece of skin stretched tight like a drum.

The eardrum separates the outer ear from the middle ear and the **ossicles** (say: **ah-sih-kulz**). What are ossicles? They are the three tiniest, most delicate bones in your body. They include:

Hammer: the **malleus** (say: **mah-lee-us**), which is attached to the eardrum and means "hammer" in Latin

Anvil: the **incus** (say: **in-kus**), which is attached to the malleus and means "anvil" in Latin

Stirrup: the **stapes** (say: **stay-pee-z**), the smallest bone in the body, which is attached to the incus and means "stirrup" in Latin





When sound waves reach the eardrum, they cause the eardrum to vibrate. When the eardrum vibrates, it moves the tiny ossicles — from the hammer to the anvil and then to the stirrup. These bones help sound move along on its journey into the inner ear.

## Model Behavior

Demonstrate the behavior of the eardrum.

Materials:

- A funnel
- Clear tubing
- Balloon
- Salt
- Rubber band
- Straws

A balloon should be placed over the large end of the funnel (held taut by using a rubber band). On the small end of the funnel a piece of clear rubber tubing should be attached (straws may be attached to the tubing for hygiene purposes). Grains of salt are then placed on the top of the balloon. Into the rubber tubing, high and low pitched sounds should be made. This demonstrates the vibration of the eardrum by a range of frequencies.

- Do any other sounds make the salt move – yelling, clapping, stomping, loud music, playing a drum?
- Do low or high sounds work better?
- Replace the salt with something else – maybe rice, dry beans, sugar, or paper circles from a hole punch. Is your new item harder or easier to move with sound vibrations? Why do you think?

**Variation:** It's easy to make a model of the eardrum (also called the "tympanic membrane") and see how sound travels through the air.

Materials:

- Plastic wrap
- Container with wide opening
- Uncooked rice (any other small grain will work)

Have your ears ever popped when you were riding in a plane or driving up a mountainside? Here's why: Changing altitude (going up or down) affects the pressure of the air (gas) in your ears. Luckily, your middle ear is connected to the back of your nose by a narrow tube called the **eustachian** (say: yoo-stay-she-un) tube. The eustachian tube acts like a pressure valve and opens to make sure the air pressure is the same on both sides of your eardrum. When it opens, you feel a pop.



- Tin cookie sheet (or other noise maker)

Just stretch a piece of plastic wrap over a large bowl or pot (any container with a wide opening will work). Make sure the plastic wrap is stretched tightly over the container. The plastic represents the eardrum. Place about 20-30 grains of uncooked rice on the top of the plastic wrap. Now you need a noise maker. A tin cookie sheet or baking tray works well. Hold the cookie sheet close to the plastic wrap. Hit the cookie sheet to create a "big bang" noise and watch the rice grains jump.

The "big bang" produces sound waves (changes in air pressure) that cause the plastic sheet to vibrate which causes the rice grains to move. Sound waves vibrate the eardrum in much the same way.

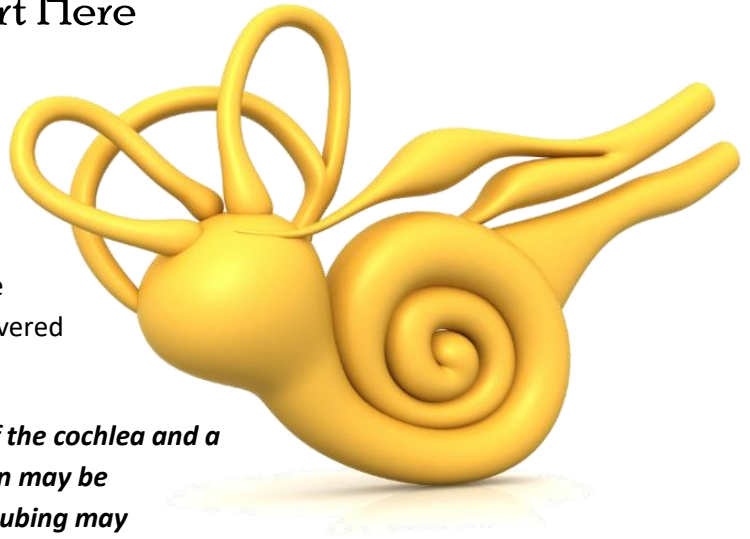
- Do any other sounds make the rice move – yelling, clapping, stomping, loud music, playing a drum?
- Do low or high sounds work better?
- Replace the rice with something else – maybe dry beans, sugar, or paper circles from a hole punch.

Is your new item harder or easier to move with sound vibrations? Why do you think?

## The Inner Ear: Nerve Signals Start Here

Sound comes into the inner ear as vibrations and enters the **cochlea** (say: ko-klee-uh), a small, curled tube in the inner ear that coils around a core of bone. The cochlea is filled with liquid, which is set into motion, like a wave, when the ossicles vibrate. As the fluid moves it ripples from the oval window to the round window, which are also covered with thin skins of tissue, membranes.

***A spiral shell may be displayed to show the shape of the cochlea and a hanger molded into a circle and covered with a nylon may be used to demonstrate the oval window. The rubber tubing may then be used again to represent the auditory nerve which leads to the brain.***



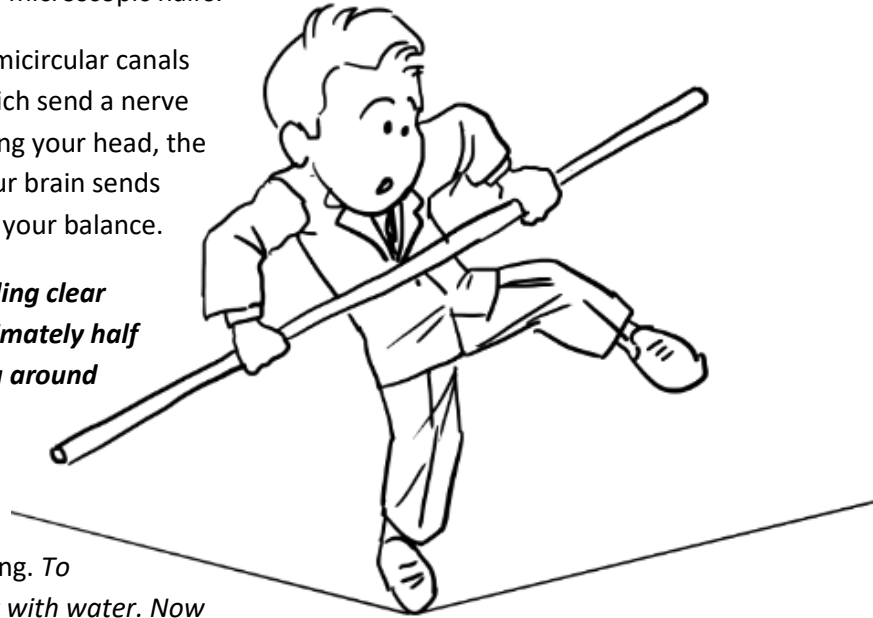
The cochlea is also lined with tiny cells covered in tiny hairs that are so small you would need a microscope to see them. They may be small, but they're awfully important. When sound reaches the cochlea, the vibrations (sounds) cause the hairs on the cells to move, creating nerve signals that the brain understands as sound. The brain puts it together and hooray! You hear your favorite song on the radio.

## Day or Night, Ears Keep You Upright

Ears do more than hear. They keep you balanced, too. In the inner ear there are three small loops above the cochlea called semicircular canals, they kind of look like a three loop pretzel. Like the cochlea, they are also filled with liquid and have thousands of microscopic hairs.

When you move your head, the liquid in the semicircular canals moves, too. The liquid moves the tiny hairs, which send a nerve message to your brain about how you are holding your head, the position of your head. In less than a second, your brain sends messages to the right muscles so that you keep your balance.

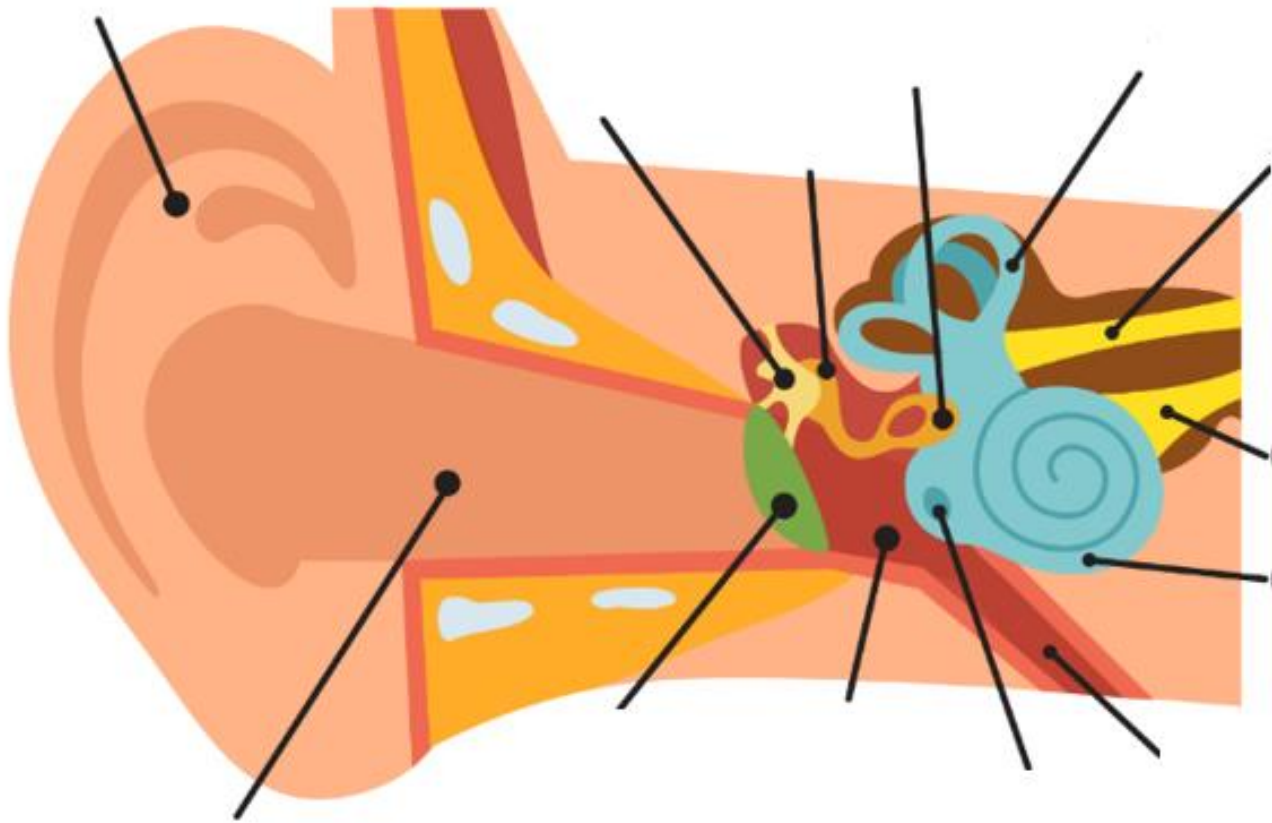
***The semicircular canals may be shown by molding clear rubber tubing into a circle and filling it approximately half way with colored water. By moving the tubing around the students can be shown the way the semicircular canals are able to balance.***



Sometimes the liquid in your semicircular canals keeps moving after you've stopped moving. *To help students understand this, fill a cup halfway with water. Now move the cup around in a circle in front of you and then stop. Did they notice how the water keeps swishing around, even after the cup is still?* That's what happens in your semicircular canals when you spin in circles or go on the Tilt-A-Whirl at the amusement park. *How do students think that affects them?*

When you stop spinning or step off the ride, the fluid in your semicircular canals is still moving. The hairs inside the canals are sensing movement even though you're standing still. That's why you might feel dizzy — your brain is getting two different messages and is confused about the position of your head, is it up, down, or sideways? Once the fluid in the semicircular canals stops moving, your brain gets the right message, you regain your balance, and you aren't dizzy anymore.

# Label the Diagram of the Human Ear



## Word Bank:

- Outer ear
- Incus (Anvil)
- Vestibular Nerve
- Stapes (Stirrup)
- Malleus (Hammer)
- Tympanic Membrane (ear drum)
- Round Window
- Cochlear Nerve
- External Auditory Canal
- Semicircular Canals
- Eustachian Tube
- Cochlea
- Tympanic cavity

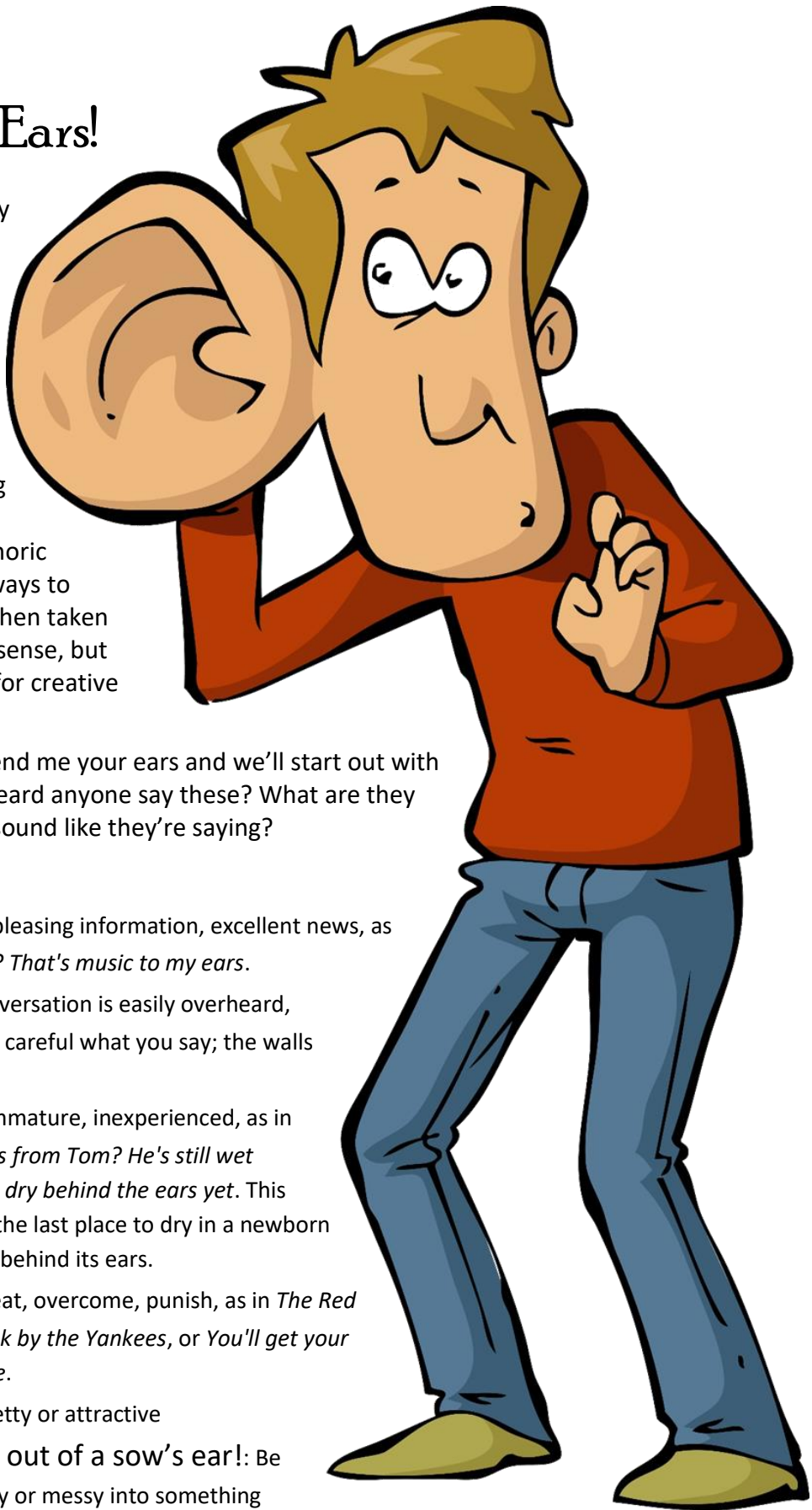
# Lend Me Your Ears!

Sometimes people say some pretty crazy things that I'm pretty sure they don't mean, well they don't them literally, I hope! Like that you should be all ears. Does your teacher really want your whole body to be made out of ears?

Probably not. Your teacher is using an idiom. Idioms are common, everyday expressions with metaphoric meanings. They're using colorful ways to describe what they really want. When taken literally, idioms don't make much sense, but they do offer great opportunities for creative thinking and a lot of laughs.

Since we're learning about ears, lend me your ears and we'll start out with some ear idioms. Have you ever heard anyone say these? What are they really trying to say? What does it sound like they're saying?

- **Music to my ears!** Very pleasing information, excellent news, as in *So they're getting married? That's music to my ears.*
- **Walls have ears:** The conversation is easily overheard, someone is listening, as in *Be careful what you say; the walls have ears.*
- **Wet behind the ears:** Immature, inexperienced, as in *How can you take instructions from Tom? He's still wet behind the ears,* or *Jane's not dry behind the ears yet.* This term alludes to the fact that the last place to dry in a newborn colt or calf is the indentation behind its ears.
- **Pin your ears back:** Defeat, overcome, punish, as in *The Red Sox had their ears pinned back by the Yankees,* or *You'll get your ears pinned back if you're late.*
- **Cute as a bug's ear!:** Pretty or attractive
- **Can't make a silk purse out of a sow's ear!:** Be unable to turn something ugly or messy into something

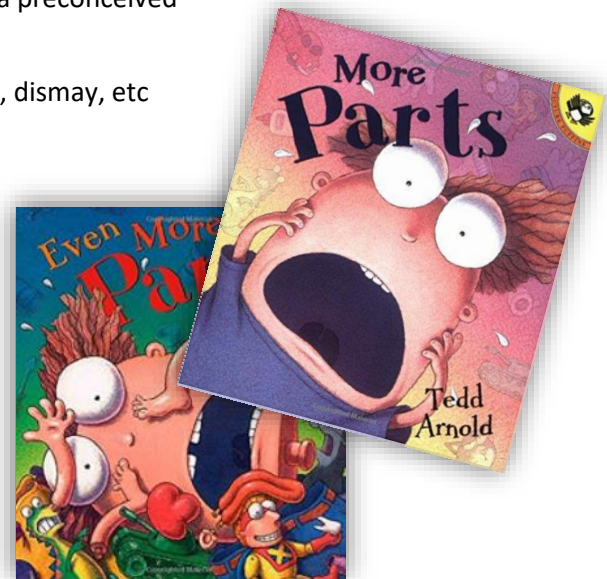


attractive or of value, as in *No matter how expensive his clothes, he still looks sloppy—you can't make a silk purse out of a sow's ear.*

- **Flea in his ear:** You will give someone an annoying hint or a stinging rebuke, as in *If he doesn't bring the right equipment, I'll put a flea in his ear.*
- **Bug in his ear:** Give someone a hint about something, as in *Janet put a bug in her husband's ear about getting the children a dog for Christmas.*
- **I'm all ears--**to be listening attentively or eagerly
- **Bend someone's ear:** to talk excessively to someone, talk about a matter at tedious length; monopolize someone's attention. For example, *Aunt Mary is always bending his ear about her financial problems.*
- **Fall on deaf ears:** what you say is ignored
- **Out on his ear:** Dismissed, thrown out in disgrace, as in *In this company you get only one chance, and if you fail you're out on your ear.* This term alludes to being physically thrown out head first.
- **Give ear or lend ears:** to give attention, esp. favorable attention; listen; heed
- **Have an ear to the ground or Keep an ear to the ground:** to pay careful attention to what is going on around them.
- **Have the ear of--**to be able to influence someone who will listen to them, ex. *Tom has the ear of the president.*
- **In one ear and out the other--**heard but without effect, didn't pay attention to what was said
- **Play by ear--**to play (a musical instrument or piece) without reading music
- **Play it by ear--**to act as the situation demands, without a preconceived plan; improvise
- **Set on its ear--**to cause excitement, mayhem, confusion, dismay, etc
- **Turn a deaf ear--**to be unwilling to listen

## Fun Resources for idioms about the human body:

People say the strangest things: Give me a hand. . . . Hold your tongue. . . . Scream your lungs out. . . . In *More Parts* and its wildly popular sequel, *Even More Parts*, by Ted Arnold a young boy takes idioms about the human body literally--to comic effect. Phrases like "give him a hand" and "jump out of his skin" have the boy petrified! But be careful, readers: This clever book just might make you laugh your heads off!





## What other idioms have students heard? Do they know any in another language?

Idioms come in every language. For example, there are idioms in English and there are idioms in Spanish that are saying the same thing but using different ideas to get there!

No tiene dos dedos de frente.

Literally means: He doesn't have two fingers of forehead.

The English equivalent is: He's not the sharpest tool in the shed.

Tiene más lana que un borrego.

Literally means: He has more wool than a lamb.

The English equivalent is: He's loaded with cash.

A otro perro con ese hueso.

Literally means: To another dog with that bone.

The English equivalent is: You're pulling my leg.

La carne de burro no es transparente.

Literally means: The flesh of the donkey is not transparent.

The English equivalent is: I can't see through you.

Cada quien tiene su manera de matar pulgas.

Literally means: Each has his way to kill fleas.

The English equivalent is: There's more than one way to skin a cat.

Da un beso a la botella.

Literally means: Give the bottle a kiss.

The English equivalent is: Take a swig.

El hijo de la gato, ratones mata.

Literally means: The son of a cat kills mice.

The English equivalent is: Like father like son.

Antes que te cases mira lo que haces.

Literally means: Before you marry look what you are doing.

The English equivalent is: Look before you leap.

Más vale pájaro en mano que cien volando.

Literally means: A bird in the hand is worth more than 100 flying.

The English equivalent is: A bird in the hand is worth two in the bush.

Mientras que en mi casa estoy, rey soy.

Literally means: While in my house, I am king.  
The English equivalent is: A man's home is his castle.

Yo tengo una tía que toca la guitarra.

Literally means: I have an aunt who plays the guitar.  
The English equivalent is: What does that have to do with the price of tea in China?

## Idiom Times!

Invite individual students or small groups of students to write hilarious and quick newspaper-style stories that play on the literal meaning of idioms.

Here's an example: "Students Buckle Down! Several students were found buckled to their chairs in the library. Teachers are attempting to solve this problem...."

"He Has His Ear! Local police are baffled by a recent crime spree. All the thief seems to have taken are his victim's ears."

Collect articles and combine them into a class newsletter, issue of The Idiom Times, or post the stories on a bulletin board.

Students may wish to create illustrations to accompany their articles.



## Idiom Pictionary = Ictionary!

Each student takes one pre-prepared idiom card.

If the idiom is not well-known, the student can check the meaning with the teacher.

Then, he or she draws a quick picture of the literal meaning and invites the group to guess the idiom.

Once they guess correctly, discuss the figurative meaning of the idiom and have them use it in a sentence.

Option: Make it a competition, the team that guesses first, gets the point.

For sample printable lists click [here](#) and [here](#).

## Idiom Bluffs:

Each group writes the real definition and two false definitions on the back of each idiom card. Later, give the group a chance to read its cards and have the rest of the class guess the true definition.

Pictionary Words: Idioms

out of the frying pan and into the fire	one leg in the door	why the long face?
in the same boat	up a creek without a paddle	raising oats and dogs
feeling under the weather	green with envy	frog in your throat
head over heels in love	a wolf in sheep's clothing	grab the bull by the horns
out of this world	water under the bridge	put your foot in your mouth
built in a china closet	have a cow	tie the knot
have two left feet	get cold feet	bouncing off the walls
a flat wheel	kick the bucket	when in Rome
rise above the blues	scared stiff	one smart cookie
ought and banded	the squeaky wheel gets the grease	a fly on the wall
jump the gun	throw a fit	take a hike
friday out	carry a tune	eat my words
apple of my eye	hit the road	a blessing in disguise
piece of cake	all bark and no bite	when pigs fly
out an arm and a leg	hold your horses	the whole nine yards
everything but the kitchen sink	close, but no cigar	back to the drawing board
go out on a limb	wake up on the wrong side of the bed	steal my thunder
come to a blue moon	let the cat out of the bag	hit the sack
let bygones be bygones	grab the bull by the horns	make a mountain out of a molehill
dying on the wheel	man's keep a good dog down	pull the wool over your eyes

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## **Examples of TN State Standards this lesson aligns with:**

### **Kindergarten:**

- 7.2.2 Know that people interact with their environment through their senses.
- 7.1.1 Recognize that many things are made of parts.

### **1<sup>st</sup> Grade:**

- T/E.1 Recognize that both natural materials and human-made tools have specific characteristics that determine their use.
- 7.1.1 Recognize that living things have parts that work together.

### **2<sup>nd</sup> Grade:**

- 7.9.1 Use tools to observe the physical properties of objects.
- 7.11.1 Investigate how vibrating objects produce sound.

### **3<sup>rd</sup> Grade:**

- 7.11.3 Investigate how the pitch and volume of a sound can be changed.
- 7.11.2 Use a variety of materials to produce sounds of different pitch and volume.
- 1.8.4 Explore basic literary terms (e.g., setting, point of view, simile, metaphor, idiom, rhythm).
- 1.8.9 Compare and contrast different versions/representations of similar stories, legends, [phrases], or events reflecting different cultures.

### **4<sup>th</sup> Grade:**

- Inq.2 Select and use appropriate tools and simple equipment to conduct an investigation.
- Inq.4 Identify and interpret simple patterns of evidence to communicate the findings of multiple investigations.
- 1.8.15 Recognize and interpret basic literary devices (e.g., imagery, simile, metaphor, personification, hyperbole, figurative language).
- 1.8.11 Compare and contrast different versions/representations of the same stories/events/phrases that reflect different cultures.

### **5<sup>th</sup> Grade:**

- 7.5.1 Investigate physical characteristics associated with different groups of animals.
- Inq.1 Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data.
- 2.3.16 Use precise language, including vivid words and figurative language.

### **6<sup>th</sup> Grade:**

- Inq.3 Use evidence from a dataset to determine cause and effect relationships that explain a phenomenon.
- Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.
- 1.8.18 Determine the appropriate meaning of figurative words and phrases (e.g., idioms, metaphors, similes) in passages.

## 7<sup>th</sup> Grade:

- 7.1.3 Describe the function of different organ systems and how collectively they enable complex multicellular organisms to survive.
- 7.1.8 Apply the idea of the division of labor to explain why living things are organized into cells, tissues, organs, and organ systems.
- 1.1.19 Determine the appropriate meaning of figurative words and phrases (e.g., idiom, metaphor, simile, personification, pun) in passages.

## 8<sup>th</sup> Grade:

- Inq.3 Use evidence from a dataset to determine cause and effect relationships that explain a phenomenon.
- Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.
- 1. 8.13 Comprehend and use figurative language (e.g., idioms, metaphors, similes, personification, hyperbole, pun).
- 1.8.8 Analyze figurative language (i.e., idiom, metaphor, simile, personification, hyperbole, pun) within context.

## High School: Anatomy and Physiology

- 3251.1.2 Investigate the interrelationship between the structures and functions of the body systems.
- CLE 3251.1.3 Investigate the body cavities, the subdivisions of each cavity, and the organs within each area.
- 3251.1.4 Use correct anatomical terminology when discussing body structures, sections, and regions.
- 1.2.4 Distinguish between the different types of bones.

## High School: English I

- 3001.8.18 Comprehend and use figurative language (e.g., idioms, metaphors, similes, personification, hyperbole, pun).
- 1.8.1 Identify and analyze examples of idiom, metaphor, simile, personification, hyperbole, or puns

## High School: English II

- 8.18 Comprehend and use figurative language (e.g., idioms, metaphors, similes, personification, hyperbole, pun).
- 2.8.1 Identify and analyze examples of idiom, metaphor, simile, personification, hyperbole, or puns

## High School: English III

- 3.8.17 Comprehend and use figurative language (e.g., idioms, metaphors, similes, personification, hyperbole).

- 3.8.1 Identify and analyze examples of idiom, metaphor, simile, personification, hyperbole, or pun in poetry or prose.

### High School English IV

- 5.8.17 Comprehend and use figurative language (e.g., idioms, metaphors, similes, personification, hyperbole).
- 5.1.7 Use the origins, history, and evolution of words and concepts to enhance understanding.

### Examples of Academic Vocabulary to Incorporate:

**Kindergarten:** parts, shape, size, growth, color, retell, word, read, classify, compare, difference, location, order, pattern, position, shapes, human, senses, animal

**1st Grade:** adult, balance, classify, living/non-living, question, statement, information, vocabulary, predict, illustrate, sequence,

**2nd Grade:** similarities/differences, infer, observation, compare/contrast, discussion, edit, dictionary, main idea, punctuation, symmetry, extend, foot, likely/unlikely, rotate, growth, location, depend, sound

**3rd Grade:** cross section, heredity, cause, effect, opinion, organization, change, conclusion, conjecture, factor

**4th Grade:** physical adaptation, predict, making inferences, compare, contrast, drawing conclusions, metaphor, simile, proofread, edit, chance

**5th Grade:** core, inherited traits, visual image, simile, metaphor, point of view, punctuation marks, data collection methods, model, view

**6<sup>th</sup> Grade:** cause and effect, control, inference, rhythm, point of view, relevant, sequential order, similarity, simulation

**7<sup>th</sup> Grade:** tissue, semi-permeable, organ system, inferences, juncture, stress, paraphrase, summarize, function, property, pitch, tone

**8th Grade:** species, variation, debate, jargon, deductive and inductive reasoning, sensory detail, tension, sequence, tone

**9<sup>th</sup> Grade:** discourse, questioning, research, probability, convex and concave, property

**10<sup>th</sup> Grade:** research, reasoning, personal, construction, deductive and inductive reasoning, waves

**High School:** Instructors, please note that though there are no specific Academic Vocabulary lists for upper grade high school students, they will be expected to be familiar with and understand the key scientific terms and concepts covered within the following lesson. Familiarize yourself with the proper terms for all of the following concepts and make sure that you use them with and explain them to your students.