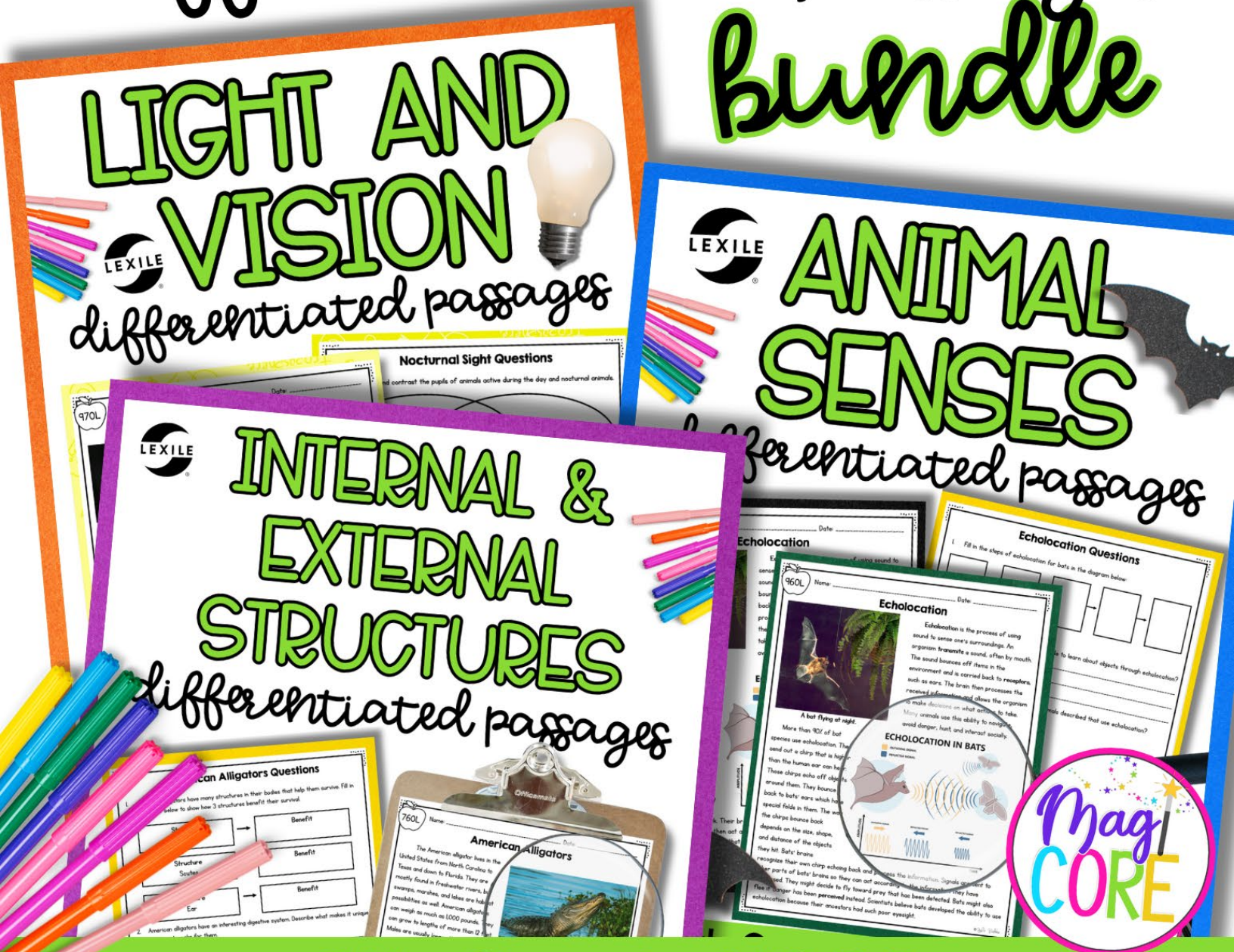
# STRUCTURES & SENSES

## differentiated passages bundle




4th Grade NGSS

# ABOUT LEXILE LEVELS

MagiCore Learning, LLC is a certified Lexile® Partner. These texts are officially measured and approved by Lexile and MetaMetrics® to ensure appropriate rigor and differentiation for students.

The Lexile Framework® for Reading measures are scientific, quantitative text levels. When the Lexile of a text is measured, specific, measurable attributes of the text are considered, including, but not limited to, word frequency, sentence length, and text cohesion. These are difficult attributes for humans to evaluate, so a computer measures them.

Common Core State Standards uses Lexile level bands as one measure of text complexity. Text complexity ranges ensure students are college and career ready by the end of 12th grade. Lexile measures help educators scaffold and differentiate instruction as well as monitor reading growth.

| Grade Band | Lexile® Bands Aligned to Common Core Expectations |
|---|---|
| K-1 | N/A |
| 2-3 | 420L-820L |
| 4-5 | 740L-1010L |
| 6-8 | 1185L-1385L |

Keep in mind when using any leveled text that many students will need scaffolding and support to reach text at the high end of their grade band. According to Appendix A of the Common Core Standards, "It is important to recognize that scaffolding often is entirely appropriate. The expectation that scaffolding will occur with particularly challenging texts is built into the Standards' grade-by-grade text complexity expectations, for example. The general movement, however, should be toward decreasing scaffolding and increasing independence both within and across the text complexity bands defined in the Standards."

# Internal and External Structures

4th grade

## Table of Contents


1. How to Use This Resource
2. Black Bears (740L, 970L)
3. Roses (750, 950L)
4. American Alligators (760L, 910L)
5. Sunflowers (740L, 950L)
6. Whales (760L, 950L)
7. Water Lilies (760L, 940L)


Each passage set includes two differentiated passages on a third-grade level (one at the beginning of the band, one towards the end) and a question set geared towards comprehension and science mastery. The first question is differentiated to include a fill-in-the-blank diagram (lower complexity) or an open-ended diagram (higher complexity).

# Light and Vision

## 4th grade

# Table of Contents


1. How to Use This Resource
2. Parts of the Eye (760L, 960L)
3. Nocturnal Sight (780, 970L)
4. Seeing is Believing (750L, 910L)
5. Sunglasses Situations (760L, 950L)
6. Mirror, Mirror (760L, 970L)
7. Moongazing (760L, 970L)


Each passage set includes two differentiated passages on a fourth-grade level (one at the beginning of the band, one towards the end) and a question set geared towards comprehension and science mastery. The first question is differentiated to include a fill-in-the-blank diagram (lower complexity) or an open-ended diagram (higher complexity).

# Sensation, Processing, and Response

## 4th grade

# Table of Contents


1. How to Use This Resource
2. Supertasters (760L, 950L)
3. Echolocation (760L, 960L)
4. Electroreception (760L, 950L)
5. Thermoreception (760L, 960L)
6. Hypersensitive Whiskers (760L, 960L)
7. Super Smellers (760L, 950L)


Each passage set includes two differentiated passages on a fourth-grade level (one at the beginning of the band, one towards the end) and a question set geared towards comprehension and science mastery. The first question is differentiated to include a fill-in-the-blank diagram (lower complexity) or an open-ended diagram (higher complexity).

# How to Use This Resource

This resource was created with the NGSS Science Standards in mind. It includes six differentiated passages aligned to the following standard:

***4-LS1-1: Internal and External Structures***

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. (Systems and System Models)

**Clarification Statement:** Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.

**Assessment Boundary:** Assessment is limited to macroscopic structures within plant and animal systems.

**Here are some suggestions for using these passages:**

- Use as independent work after you have taught an overview of this standard. Assign the different levels based on the passage students can read and comprehend independently.
- Use as a reading center to reinforce key comprehension and science concepts at the same time!
- Use as a homework or review packet.
- Use as an intervention for students who need to revisit science concepts.

740L

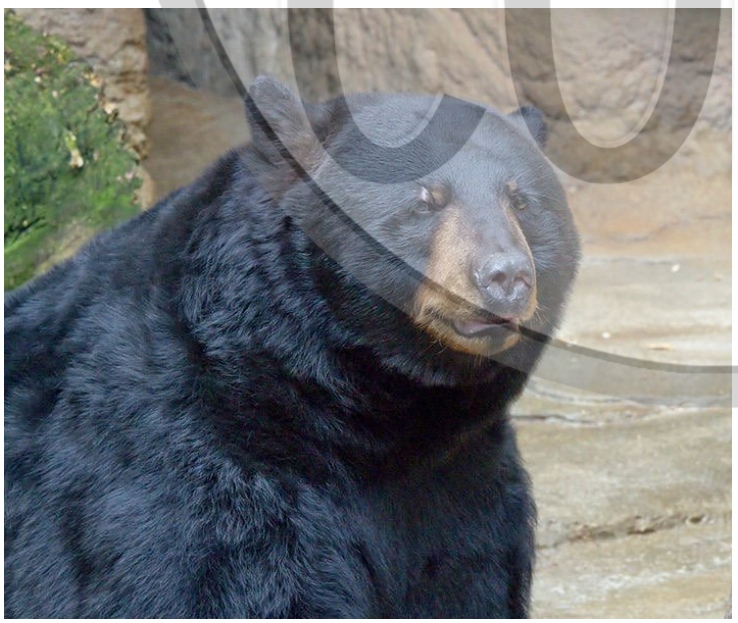
Name: _____ Date: _____

# Black Bears



One of the most common bears in North America is the black bear. They are mostly found in Canada and the United States. They have been known to live in Mexico as well. Adult black bears are about 5-6 feet tall. They weigh about 200-600 pounds. They are smaller than grizzly bears and are capable of eating both meat and plants.

Black bears have many **structures** that help them succeed. Their fur is usually black but can be other colors. It is made of shaggy layers. These layers keep black bears warm during cold winters. Lighter-colored fur is usually found in sunnier locations. Less heat is absorbed when the fur is not dark. This allows the bears to feed longer in sunlight. Fur also protects the skin under the fur from getting scratched on the brush in the forest.



Another structure that black bears have is their eyes. They are small and positioned toward the front of the head. This gives black bears greater depth perception. Black bear eyes can also move freely. They don't have to move their entire head to see in different directions. It was believed bears had poor eyesight. Black bears actually see about as well as humans do. They can see in color, and their night vision is very sharp. Sensing movement in the forest is easy for them. It helps to track both prey and predators.

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One of the reasons it was thought bears had poor eyesight is because of another structure – the nose. Black bears' strongest sense is their smell. A scent can be picked up from over a mile away. Black bears don't have to rely so much on their vision. Their noses do a better job than their eyes in helping them find food in the forest. They can better avoid predators and navigate more easily through their habitat.



Teeth and claws are two structures of black bears that have many **functions**. Both are used for defense. Teeth and claws also aid in growth. They play roles in getting and eating food. Biting and clawing trees also involve black bears' teeth and claws. Scientists believe black bears mark trees to establish territories. The marks also guide them in new stretches of forest and send signals about breeding.

Black bears also have many body **systems** that have important jobs. The **circulatory system**, for example, includes **internal** structures. These structures include the heart, blood, blood vessels, and arteries. These all work together to move nutrients, waste, white blood cells, and oxygen around the black bear's body. A black bear's circulatory system has more red blood cells that can hold more oxygen than humans. This lets black bears stay underwater longer. They can better hunt prey in this manner.

Structures that are found outside and inside black bear bodies allow them to survive on planet Earth. Without them, black bears would not be as well suited to their environment.

©Julia Bacheso

# Black Bears Questions

1. Black bears have many structures in their bodies that help them survive. Fill in the chart below to show how 3 structures benefit their survival.

| Structure | → | Benefit |
|---|---|---|
| Fur | | |
| Eyes | | |
| Nose | | |

2. Black bears also have internal structures that help them survive. Explain an internal structure of black bears and how it works.

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3. An animal's senses work together to help them survive. Stronger senses help balance out weaker senses. Black bears have good eyesight. What if they didn't? How would this affect the bears? What other senses might help them if they had poor eyesight?

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760L

Name: _____ Date: _____

# American Alligators

The American alligator lives in the United States from North Carolina to Texas and down to Florida. They are mostly found in freshwater rivers, but swamps, marshes, and lakes are habitat possibilities as well. American alligators can weigh as much as 1,000 pounds. They can grow to lengths of more than 12 feet. Males are usually larger than females.



These large **crocodilians** have many unique features. One **structure** that helps them is their long, powerful tail. These muscular tails are used for moving and steering in water. American alligators also use their tails to **hydroplane** on the water's surface. They can raise themselves up to 5 feet out of the water. Fat is stored in the base of an alligator's tail as well. A wide tail is a signal that an alligator is healthy. Another **function** of an alligator's tail is for defense if it feels threatened.



American alligators have dark skin that benefits them. Their bodies are covered with **scutes**. These are small, bony plates. Scutes are not attached to alligators' skeletons. This allows alligators to be flexible. The scutes are largest on alligators' backs because that is the side exposed to sunlight. These plates act like armor. They protect the alligator by preventing water loss. In hot climates, avoiding **dehydration** is important for survival. Scutes also rest on nerve endings. This lets alligators detect temperature and change their behavior. They can decide whether it's time to sunbathe or cool off in the water.

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Another structure that aids in American alligator survival is the ear. Located on the head behind the eyes, alligator ears are able to hear both in and out of water. Alligators have a well-developed inner ear. It is sensitive to vibrations in the water. Mother alligators are actually capable of hearing hatchling calls while they are still inside the eggs. Having a good sense of hearing allows American alligators to stay aware of what is nearby. This allows them to protect themselves and their eggs. It also helps them find prey.



Alligator eating a crab.

The **digestive system** of American alligators includes the stomach – *two* of them, actually. Alligators are carnivores. They eat other animals such as fish, frogs, and mammals. Sharp teeth and strong jaws make capturing prey easy. Two stomachs do important work, too. The first stomach grinds up the meal. The second stomach contains acid that further breaks down the food so alligators can digest it. An alligator can digest anything it swallows, including the muscles and bones of its prey. Eating once a week is typical for the American alligator.

Humans and other alligators are the only real predators alligators face. Living for about 50 years in the wild is possible for American alligators because of their many useful structures.

©Julia Bachosa

# American Alligators Questions

1. American alligators have many structures in their bodies that help them survive. Fill in the chart below to show how 3 structures benefit their survival.

| Structure | → | Benefit |
|---|---|---|
| Tail | | |
| Scutes | | |
| Ear | | |

2. American alligators have an interesting digestive system. Describe what makes it unique and how it works for them.

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3. An animal's senses work together to help them survive. Stronger senses help balance out weaker senses. American alligators have good hearing. What if they didn't? How would this affect the alligators? What other senses might help them if they had poor hearing?

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Name: _____ Date: _____

# Whales



Whales look like fish, but they are mammals. They live in all the oceans in the world from the Arctic to tropical areas. They are generally longer than 10 feet and are torpedo-shaped to move easily through the water. Whales are entirely **aquatic**, meaning they live their lives in water. They only surface regularly to breathe. Food supplies, the whales' sizes, and mating are all factors that affect whale **migration**. Whales give birth to live young and nurse their babies.

The rear flippers on a whale's tail are called **flukes**. They extend out to either side of the tail. These **structures** are made of a tough tissue. They have no bones at all. Long muscles running above and below a whale's backbone move the flukes up and down like a paddle. Flukes **propel** whales through the water. Flippers at the sides of whales are used for steering and braking. Whales may also use their flukes to feed. They direct a wave of small animals toward their mouths. The arteries and veins in flukes adjust blood flow to control body temperature as well.

**Blubber** is an important structure for whales. This layer of fat is under the skin. It covers the entire whale's body. Blubber **insulates** whales. This protects them from cold ocean temperatures. It also stores energy that can be used when food is scarce. Blubber layers offer an additional level of protection from predators. It increases **buoyancy** which allows whales to float better.



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Whales have large brains that are similar to human brains. They can process information at fast speeds. They have also shown remarkable intelligence. Unlike humans, whales have areas in their brains dedicated to **echolocation**. This allows them to use sound to hunt and navigate in dark water. Their brains also contain special cells that give them abilities such as recognizing, communicating, and adapting to change. There is even some scientific evidence supporting the idea that whale brains are capable of emotions.



**Whale exhaling through blowhole.**

The **respiratory system** of a whale includes structures for breathing. One of these structures is the **blowhole**. A blowhole is like a human nose. Oxygen enters the body through the blowhole. Whales can't breathe underwater like fish. They come up to the surface of the water instead. This exposes the blowhole located on top of their heads. They exhale first then inhale a breath of fresh air to fill their lungs. This process happens very quickly. It only lasts less than a second. Strong muscles surrounding the blowhole close it, so water doesn't get inside the whale's lungs. Whales may take a few breaths before diving underwater again. They stay underwater for 5-15 minutes before surfacing again. Those species of whales that dive into deep waters, however, can go well over an hour between breaths.

Whales generally live from 20-100 years depending on the species. Their special structures help them enjoy long lifespans while swimming in Earth's oceans.

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# Whales Questions

1. Whales have many structures in their bodies that help them survive. Fill in the chart below to show how 3 structures benefit their survival.

| Structure | → | Benefit |
|---|---|---|
| Flukes | | |
| Blubber | | |
| Echolocation | | |

2. What is a blowhole? Describe what they are and what they are used for.

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3. An animal's senses work together to help them survive. Stronger senses help balance out weaker senses. Whales use echolocation. What if they didn't? How would this affect the whales? What other senses might they need if they couldn't echolocate?

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Name: _____ Date: _____

# Parts of the Eye

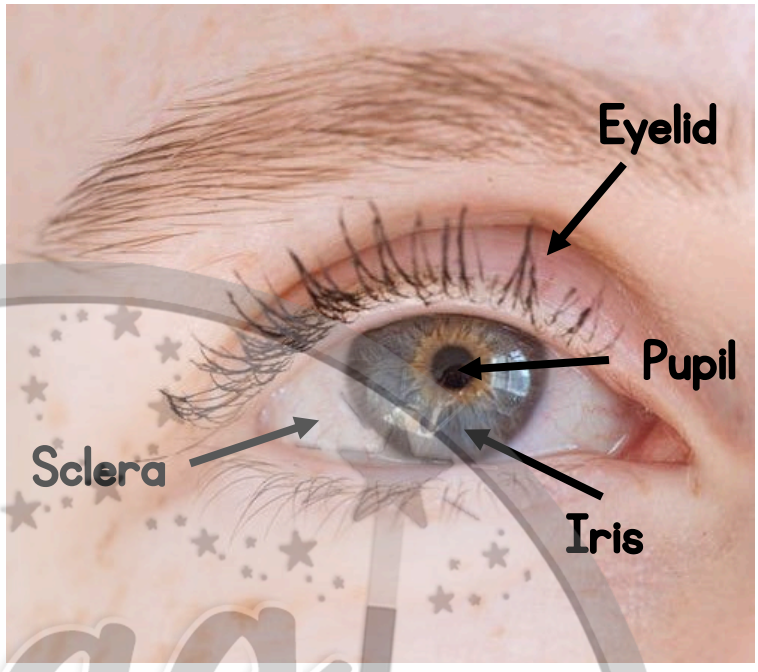


Diagram of the Eye

Your eyes are responsible for taking in information around you. They see shapes, colors, movements, and more. They send that information to your brain for processing. Humans have two eyes that are about the size of ping-pong balls. They are positioned in hollow areas of the skull called **eye sockets**. Each eye is protected by the **eyelid** which slides over the eye. The eyelid, along with tears, keeps the eye moist. Eyelids also keep the eyes clean by blinking every few seconds. Blinking is **voluntary**, meaning you can control when you blink and how fast. It is also **involuntary**, meaning your eyelids will blink without you having to remind them all the time. Eyelids shut in bright light or if something is coming toward them as a **reflex**, so your eyes don't get damaged. Eyelashes help act as a filter. They keep dust and other unwanted particles out of the eyes.

The **sclera** is the white part of your eye. It is a tough material that covers the eye and has blood vessels in it. The **cornea** is like a window that allows light into the eye. The **iris** is the colored part of the eye. The black part in the center of the iris is the **pupil**. The iris also has muscles that can **contract**. It controls the amount of light that enters the pupil. Pupils are wide in darkness as they try to let light in. They are small in bright light to protect the eye. The space between the cornea and the iris is called the **anterior chamber**. It's filled with a fluid that keeps the eye healthy. The biggest part of the eye is the **vitreous body**. It is a clear, jelly-like material located behind the **lens** that gives the eye its shape.

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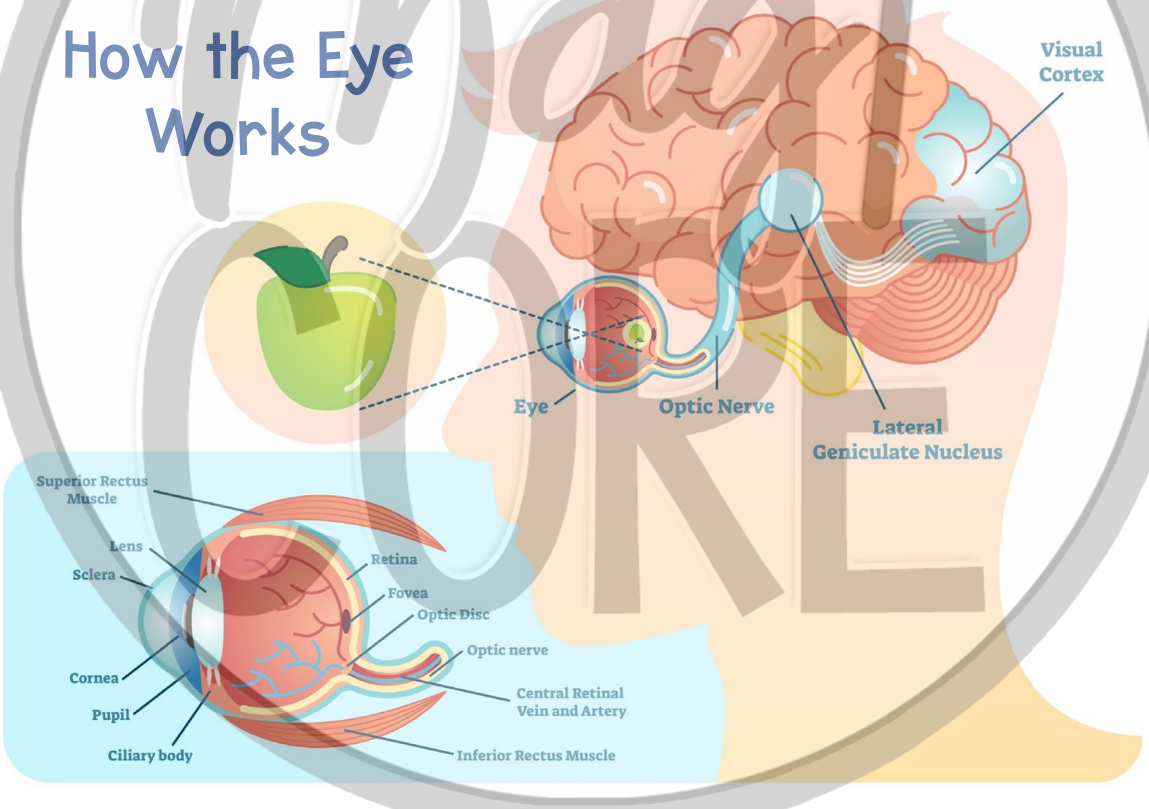
The magic of vision happens because of light. Light enters the pupil. The iris controls how much light comes in. Then the lens, located behind the iris, focuses the light. The lens thickens if your eyes focus on something close. It flattens if the object you're looking at is far away. It can do this because of the **ciliary body**, a muscle connected to fibers attached to the lens. The lens focuses the light on the **retina** at the back of the eyeball. The retina has millions of light-sensitive cells called **rods** and **cones**. Rods see in black, white, and gray and give us information about shape. Cones, on the other hand, sense color. Light is collected by these rods and cones, and they trigger electrical signals which travel through the **optic nerve** to the brain. The brain then figures out what your eyes are seeing and helps you make decisions about what to do.




Your eyes are an important source of information about the world around you. They work with your other senses to help you process your surroundings.

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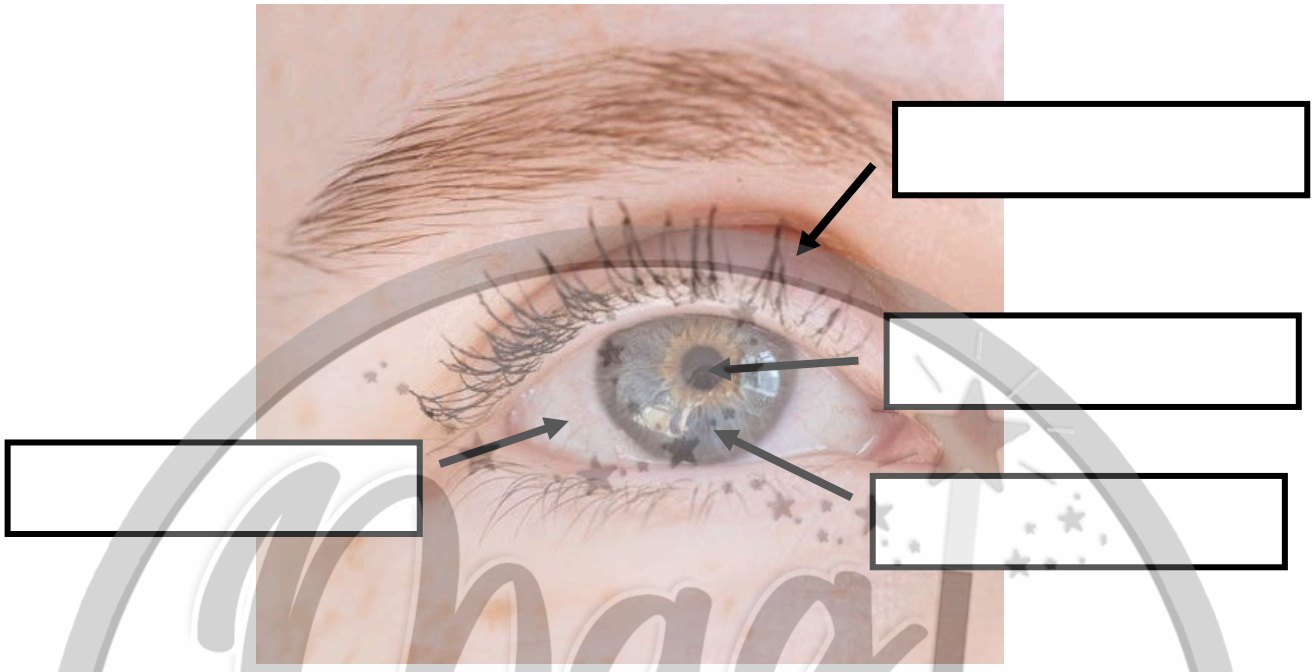
# Parts of the Eye Questions

1. Label the parts of the eye on the diagram below:



2. Explain the purpose of eyelids.

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3. How does the pupil work to let light in?

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4. Which part of the eye sees black and white? _____

   Which part of the eye sees colors? _____

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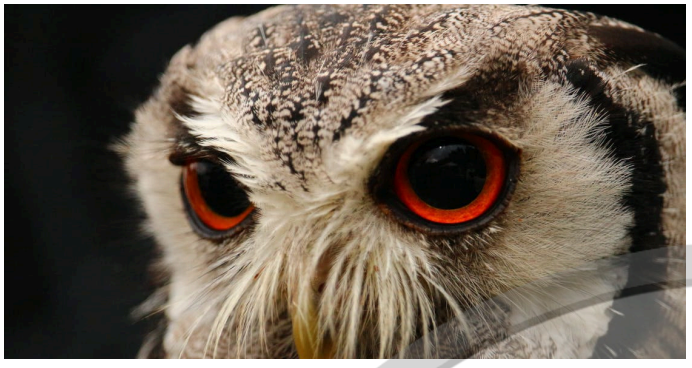
780L

Name: _____ Date: _____

# Nocturnal Sight



**Nocturnal** animals are creatures that are active at night. These animals need to see without bright light in order to get around during the dark hours. Nocturnal animals' eyes are built for night vision.

Overall, nocturnal animals have larger eyes than animals that are active during the day. The **pupil** has more room to open. More light is let in when the eyeball itself is bigger. Many nighttime critters have eyes that are so large they don't have enough muscles in their eyes to move them in their sockets. Some of these nocturnal animals, such as owls, can turn their necks a surprising amount instead. This allows them to better take in the area around them.

Pupil size and shape help nocturnal animals live in the dark as well. Bright light causes pupils to get smaller. This protects the **retina**. Darkness makes pupils relax and open. The pupils of nocturnal animals open wider in low light. More light is let in, and they can see better. Circular pupils are not good at opening and closing quickly. Slit pupils, on the other hand, close like two sliding doors. This movement is faster and more complete. This allows for better control in changing light. Most nocturnal animals have slit pupils.



**A cat's eyes with slit pupils.**

©Julia Bochoso

The **lens** focuses light entering through the pupil on the retina at the back of the eye. The retina has light-sensitive cells called **rods** and **cones**. Cones work well in bright light. They pick up color and details. Rods, however, work in low light. They sense movement and shape. Nocturnal animals have special rods in their retinas that help them see better in the darkness. Some animals such as nocturnal snakes have no cones in their eyes at all.

Many nocturnal animals also have an added eye part called a **tapetum**. The tapetum is a mirror-like membrane. It reflects light that has already passed to the retina back to the retina a second time. This gives the light another chance to hit the rods. The animal picks up more information this way. That information is then sent to the brain by the **optic nerve** connected to the retina.

Sight is an important sense for nocturnal animals. Their eyes have been designed to help them see in low light. They are able to hunt prey, avoid predators, and get around with this nighttime vision.

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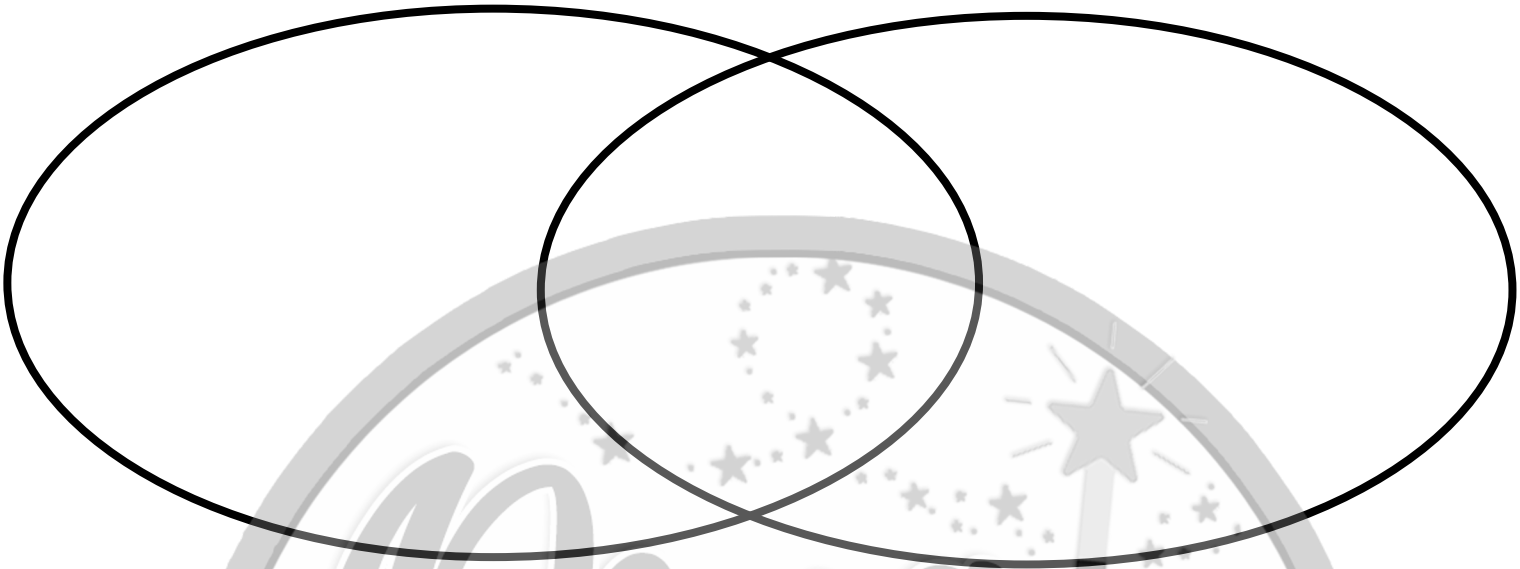
# Nocturnal Sight Questions

1. Compare and contrast the pupils of animals active during the day and nocturnal animals.



2. What special cells do nocturnal animals have in their eyes? How do they help them at night?

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3. Explain the purpose of the tapetum.

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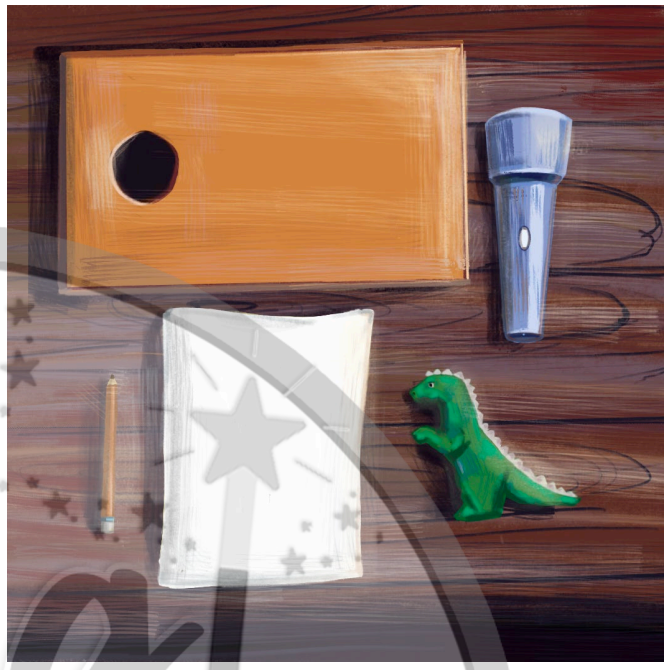
Name: _____ Date: _____

# Seeing is Believing



Seeing involves three basic things: an object to view, a source of light, and a functional eye. Light reflects off objects and enters our eyes through the pupil. Specialized parts of the eye work together to process that light and send signals to the brain so you know what you are seeing.

You can test that light is needed for vision to work by performing a simple experiment. First, take a deep shoe box and cut a hole in the lid large enough for you to peek through.

Set the box on a table and gather a small object that will fit in the box, such as a toy of some kind. Have a flashlight handy along with a piece of paper and something to write with to record observations.



Place the toy on the table and spend a few minutes examining it in the regular light of the room. Record the details you see, such as color, size, shape, and texture. Use the flashlight to illuminate the object better and survey your list of details. Can you add anything to your description now that *more* light has been used to inspect the object? Do you perhaps see scratches or variations in color, for example?

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Next, observe the shoe box, first with the lid off in the regular light of the room. Record your observations, then inspect the box more closely with the flashlight and add any details you didn't notice the first time to your list. Place the lid onto the shoe box and peer inside the hole. What do you see now? How does the box look the same, and how does it look different? Shine the flashlight inside the hole and describe what you see. Can you see the *entire* inside of the box or only a part of the interior?

Now remove the box's lid and put the toy inside. Secure the lid back on the box and without using the flashlight, record your observations. How hard is it to see the toy? Why do you think it's more difficult to see the toy now? Turn off the lights in the room and look in the box. Can you make out as many details of the toy as you did when you first observed it at the start of this experiment? What happens if you completely close your eyes?

Open your eyes again, flick on the flashlight, and shine it into the box. With the reappearance of a light source and your opened eyes, what do you see now? This activity should illustrate to you that in order to see an object, a light source and your working eyes are necessary.

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# Seeing is Believing Questions

1. List the materials needed for this experiment:
    1. _____
    2. _____
    3. _____

2. Describe the toy under bright light in detail. Be sure to include size, shape, color, and texture.

_____

_____

3. Describe the shoebox with the lid off and with the lid on. What do you see?

_____

_____

4. Describe how well you can see the toy when it is inside the shoebox with the lid closed. What about with the lights off?

_____

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5. Describe how well you can see the toy in the shoebox when you shine the flashlight on it.

_____

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760L

Name: _____ Date: _____

# Supertasters



Humans have taste buds on their tongues. These taste buds help us detect foods that are sweet, bitter, sour, salty, and savory. Taste buds tell us which foods we enjoy. They also help identify things that are safe to eat. Animals with backbones have taste buds similar to humans. Some animals, however, are **supertasters**. Supertasters have more taste buds. Some even have taste buds in places on their bodies other than the tongue. This gives such creatures a superior sense of taste. This is important to their survival.

Catfish have the most amazing sense of taste. They have about 100,000 taste **receptors** all over their bodies. Even the fins, back, and tail have these receptors. Most of the taste receptors are located on the whiskers. Catfish tend to swim in muddy waters at the murky bottom. It's hard to see in these dark waters. The large supply of taste buds on the catfish's body helps it locate food in its surroundings. Their prey naturally releases chemicals into the water. Catfish can pick up these chemicals with their taste receptors. That information then goes to a catfish's brain. It is **processed** and identified. The catfish recognizes the taste as prey. It then takes the necessary action to swim toward the prey to feed. Without being a supertaster, catfish might not survive as well.



©Julia Bochoso

Butterflies are also supertasters. They have taste receptors on their feet. These receptors help butterflies both feed and lay eggs. The butterfly's taste receptors take in information about the plant after landing on it. That information is sent to their brains. They then process that information. They decide whether or not the plant is a good source of food. If it is good food, the butterfly releases an **enzyme** to dissolve the food. It takes the nutrients. These well-developed taste receptors also help a butterfly pick plants with the right chemicals in them for laying eggs. Butterfly growth and survival depend on these supertaster abilities.

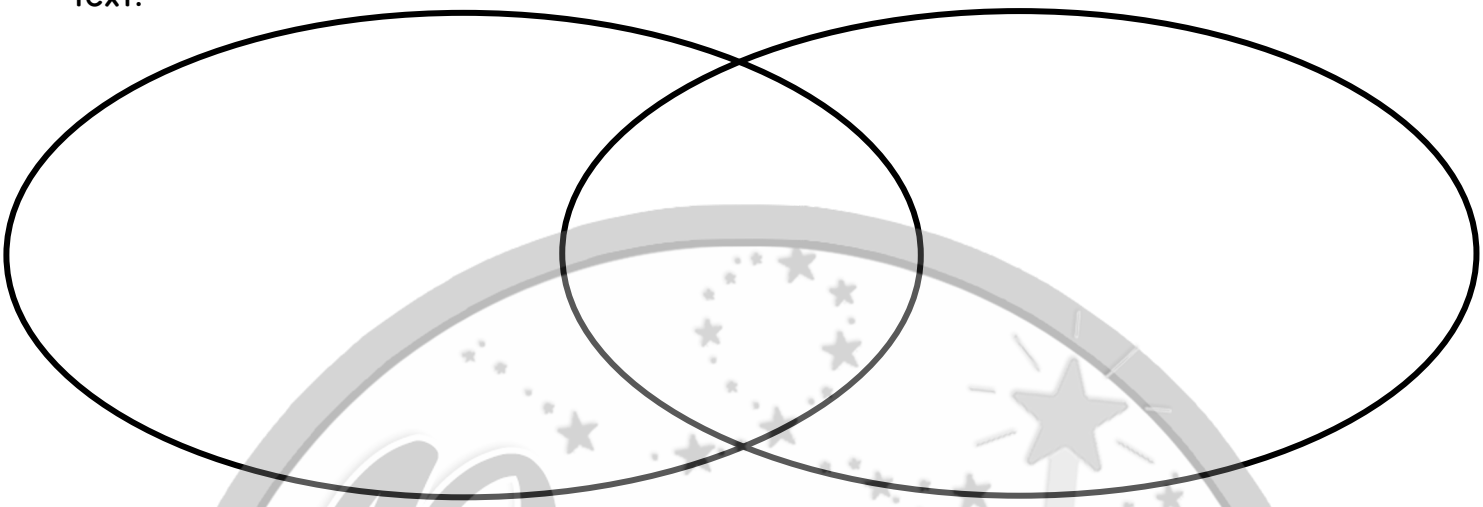
Another supertaster is the octopus. Each sucker on each **tentacle** has about 10,000 taste receptors. With almost 200 suckers on each of an octopus' eight arms, that adds up to a taste **sensitivity** that is much better than human taste buds. Octopuses use these taste receptors along with their sense of touch. They pick up chemicals produced by other sea creatures and find food in the ocean. These taste receptors can tell the difference between food, rocks, or something that might be poisonous to the octopus. An octopus will eat the food, travel over the rocks, and avoid the poison. The octopus' brain is also developed enough to remember the tastes of foods it eats. This makes it choosy when it comes to the menu.

Taste is an important sense for these creatures. Their extra taste receptors give them special talents that benefit them. They allow them to survive in their environments.

©Julia Bacharo

# Super Tasters Questions

1. Compare and contrast the taste buds and taste abilities of 2 of the animals from the text.



2. Describe why it is important for catfish survival to have extra taste buds all over their bodies.

3. What is unique about butterfly taste buds?

4. How do taste receptors help animals survive?

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960L

Name: _____ Date: _____

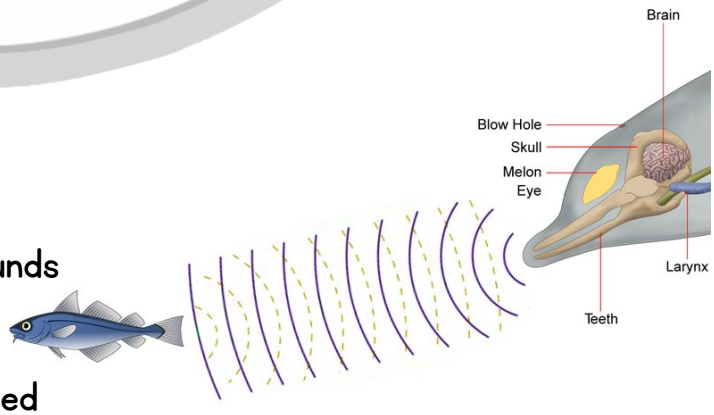
# Echolocation



**Echolocation** is the process of using sound to sense one's surroundings. An organism **transmits** a sound, often by mouth. The sound bounces off items in the environment and is carried back to **receptors**, such as ears. The brain then processes the received information and allows the organism to make decisions on what actions to take. Many animals use this ability to navigate, avoid danger, hunt, and interact socially.

More than 90% of bat species use echolocation. They send out a chirp that is higher than the human ear can hear. Those chirps echo off objects around them. They bounce back to bats' ears which have special folds in them. The way the chirps bounce back depends on the size, shape, and distance of the objects they hit. Bats' brains recognize their own chirp echoing back and process the information. Signals are sent to other parts of bats' brains so they can act according to the information they have processed. They might decide to fly toward prey that has been detected. Bats might also flee if danger has been **perceived** instead. Scientists believe bats developed the ability to use echolocation because their ancestors had such poor eyesight.

Another animal that uses echolocation is the dolphin. Dolphins are known for being vocal with different chirps, whistles, and clicks. Some sounds such as whistles are at lower **frequencies** and are used for interacting with other dolphins. Other sounds such as high-frequency clicks are sent out from dolphins' foreheads. These clicks aren't just received



by dolphins' ears, though. Receptors in their jawbones pick up the vibrations. Those vibrations then pass on to the ears. Dolphin brains process the reflected sounds to determine the distance, size, shape, speed, and even texture of objects in their environment. This ability is important to dolphins because they only see about 150 feet in front of them. Echolocation makes up for what their vision lacks.

Chinese pygmy dormice are rodents who use high-pitched squeaking to echolocate. These squeaks are so soft that humans can't hear them. The squeaks don't need to be loud because dormice aren't trying to locate objects that are far away like bats are. What's really impressive is that these dormice are **arboreal**, meaning they live in trees, but they are basically blind. Navigating tree branches is tricky but done at a fast pace through echolocation. With such limited vision, the dormouse depends on this unique ability to survive.

Echolocation helps some creatures make sense of their environments. They have special body structures that allow them to use this talent to gather information. Their brains use that information to help them make wise decisions about how to behave.

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# Echolocation Questions

1. What is echolocation?

2. What type of information are animals able to learn about objects through echolocation?

3. Choose one of the animals you read about and describe specifically how they use echolocation.

4. How does echolocation help animals survive? What would happen if they couldn't echolocate?

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# Electroreception



Some animals have the ability to detect electrical currents. This skill is called **electroreception**. Sensitive organs in the skin of certain organisms make this possible. The ability is most often found in **aquatic** or **amphibious** animals. Water is a much better conductor of electricity than air. Animals in water-based environments can make the most use of the ability. Electroreception is used to find prey and other objects. It is also used as a form of social communication.

Sharks are the most well-known users of electroreception. They have pores on their heads near the snout and lower jaw. These pores have cells filled with a jelly-like material. This material is sensitive to electrical currents. The cells are called **ampullae of Lorenzini**. Each of the cells is lined with hair cells, called **cilia**. The cilia can sense electricity. They signal the shark's brain to figure out the source of the currents they pick up. Information collected through a shark's electroreceptors helps it navigate through the water. The information also indicates other living things in the area. Electroreception makes sharks skilled hunters. Great white sharks actually roll their eyes back into their heads for protection when they get close to prey. They then rely on electroreception to travel the rest of the way and attack.



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Another animal that uses electroreception is the platypus. The platypus closes its eyes, nose, and ears while hunting. Its bill is the tool it uses instead. The platypus bill is covered with about 40,000 special receptor cells. They pick up movement and electrical fields made by prey. These receptors sense changes in pressure and motion. Information about the direction and distance of prey is sent through these receptors to the brain. The platypus can then make decisions about the best approach to catch the prey.

Bees are also capable of electroreception. Bee bodies are positively charged. This happens because air **molecules** hit bees as they fly. Electrons get knocked off bees by the air. Plants, on the other hand, are negatively charged. These opposite charges cause pollen from the flower to jump to the bee and stick to it. Scientists believe bees sense the electrical charge. They then use it to search for pollen. Experiments have also suggested that bees use their antennae to detect electrical patterns from bees that have successfully found pollen. Electroreception is being used to communicate among bees in this way.

Electroreception is like having a sixth sense that organisms use to survive in their environments. This unique ability is a natural superpower that adds to the variety found on planet Earth.

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# Electroreception Questions

1. What is electroreception?

2. How do ampullae of Lorenzini help sharks use electroreception?

3. Explain how bees are capable of electroreception.

4. How does electroreception help animals survive? What would happen if they couldn't use it?

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