

Read About Senses

DEFINITION OF SENSES

We use our senses to gather information about the world around us. *Senses* refer to the ability to see, taste, touch, smell, and hear. Our sense receptors send signals to the brain. The brain analyzes the sensory information and tells the body what to do in response. Animals use sensory information to find food, avoid danger, and find mates.

To better understand how the human brain works to process sensory information....

LET'S BREAK IT DOWN!

Information collected through the senses is processed by the nervous system.

Our eyes, ears, and nose all help us gather sensory information. Each organ has special structures that collect the information and send it to the brain through the nervous system. The brain is also part of the nervous system and tells us how to act and react to sensory information. The nervous system

also includes the spinal cord and miles of nerves spread throughout the body. The nerves are kind of like wires which send electrical signals to and from the brain.



Example: Frogs have an amazing sense of hearing. When a frog's ears hear another frog making noise, the ears send the information to the brain. The brain then processes the information and tells the frog how to respond. That response might be to move away from another frog's area, or to go toward the other frog in hopes of finding a mate. Frogs also hear and respond to many other sounds that help them locate food and avoid predators.

Animals use sensory information to help them survive.

When sensory information is gathered and sent to the brain, the brain tells the animal how to respond. That response could be to run from predators or to find a mate. This information helps the animal survive.

Example: Chameleons have a unique sense of sight. They are able to see in every direction because their eyes move independently. That means one eye can look forward while the other eye looks backward. Chameleons are able to use their amazing eyes to gather important information about their surroundings, such as the location of a predator.



Animals collect sensory information in different ways.

Most animals are able to collect sensory information in the same way as we do, through touch, taste, smell, hearing, and sight. The way they gather this information may be very different. Some animals may have more heightened senses than we have. For example, dogs and cats can hear higher pitched sounds than we can.



Other animals have more developed senses that allow them to gather information in ways we cannot.

Some bats, whales, and dolphins are able to find prey through echolocation. These animals send out noises which echo back and allow them to “see” their prey.

Snakes smell with their tongues and then transfer the smell to special organs on the roof of their

mouths.

Sharks are sensitive to electrical fields made by other animals moving in the water. They use this information to help them find their prey.

Animals respond to sensory information in different ways.

Most animals are born knowing how to use their senses. When fall approaches, certain types of birds sense the changing of the season and fly south for the winter. Other animals choose to hibernate instead.

Both types of animals are gathering information about the changing temperature, amount of daylight, and the different smells in the environment. However, each animal's response to the information is different.

At the beginning of the video, Zoe and Izzy were trying to locate a dog. They choose to use a high-pitched whistle to call it. Bolt was not born knowing that the whistle means dinner time. He was trained to learn that when he hears the whistle, he will get food.



EXAMPLES OF OUR SENSES & HOW THE BRAIN WORKS



This termite is following a scent trail. Termites send signals to other termites through the sense of smell, to lead them to food.



Honeybees detect the Earth's magnetic field. They can use this information for navigation.



Tarantulas gather sensory information through tiny hairs. The hairs allow them to detect chemicals, vibrations, and even wind direction.

HUMAN SENSES & BRAIN PROCESSING VOCABULARY

Senses	Ways that living things can detect what is happening around them.
The Nervous System	Made up of our head, spinal cord and a network of nerves. It tells us how to act and react to things.
Nerves	Send electrical signals to and from the brain.
Sense Receptors	The specific part of the body that experiences one of the senses, like taste buds on our tongue.
Signal	A message to or from the brain.
Taste Buds	Found on our tongue and help us taste.

HUMAN SENSES & BRAIN PROCESSING DISCUSSION QUESTIONS

Do all animals have the same kinds of senses? What are some of the senses you saw in the video?

Animals have many different kinds of senses. Some that are in the video are the tarantula's sense of touch, the snake's sense of smell, the frog's hearing, and the honeybee's ability to detect earth's magnetic field.

Describe the pathway in a living thing's body from sensing something to taking action.

The path starts with one of your senses detecting something. When this happens, a signal is sent through the nervous system to the brain. The brain processes the information and then decides on the action to take. It then sends a signal through the nervous system to the body part to take action. This entire process takes a split second to complete.

Do animals learn to use their senses or are they born knowing how to use them?

Animals learn to use their senses as they grow and develop, but they are also born with instinctual responses to input from their senses.

What do you think can affect an animal's reaction time, and why would that matter to their survival?

An animal's reaction time can be affected by many factors – if it's sick, tired, sleepy, hungry, or scared. It would matter to an animal's survival because if they are too slow they might be eaten by a predator, starve or not be able to find a mate.

How did Izzy's reaction to getting scared in the graveyard help him?

Izzy's reactions were due to the increased adrenaline in his body, which helped to speed up his reaction time so he could either run away faster, or fight strongly against whoever was attacking him. His reaction was a "fight or flight" reaction, which helps him survive threatening situations.

Is it possible to improve your reaction times? Why or why not?

Yes, it is possible! Your brain will create nerve pathways specifically for repetitive actions. It's true that practice can make perfect!
