



Lesson Summary: Often, people use their five basic senses — sight, hearing, touch, taste, and smell — without thinking about them. Students explore the connection between these senses and their brain by exercising each sense in short experiments

Grade Level K-3

Lesson Length
1-2 class periods

Standards Alignment

Next Generation Science Standards

- 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- **Framework for K-12 Science Education:** Science & Engineering Practices 1,2,3,8

National Science Standards – Project 2061: Atlas of Science Literacy reference

- a) Cells: Cells and organs – functions of organs (p.75, Atlas Vol. 1)

Research on student learning: “Preliminary research indicates that it may be easier for students to understand that the cell is the basic unit of structure (which they can observe) than that the cell is the basic unit of function (which has to be inferred from experiments.” (p. 72, Atlas Vol. 1)

Objectives—Students will be able to

- recall and describe the 5 basic senses: sight, sound, touch, taste, and smell.
- briefly talk about how these senses are connected to our brain.

Optional Additional Objective

- experience how our senses are important in figuring out what is going on around us.

Assessment Options

During this activity, review with your students the areas of the brain associated with the different senses by asking them to point to the associated brain area as you name the sense.

Teacher Notes

If not all materials are available, substitute alternative activities. **Please note:** the specific names of brain structures will be too advanced for younger students. They are listed in the activities for reference. However, students should be able to point to the correct brain area. Helpful websites are listed throughout the activities.

Materials

- whiteboard and various whiteboard marker colors
- different materials for each of the senses:



Teacher Guide

Welcome to your Senses

SIGHT

objects or pictures to look at, preferably pictures and/or models of human and animal brains
Optical illusions (see links below and at brainu.org/optical-illusions) and props can be used.

SOUND / HEARING

objects made of different materials: wooden spoon, metal spoon, plastic spoon

TOUCH

tube socks, one sock for each student, containing various small items, e.g. lego blocks, rubber bands, paper clips, string, eraser, etc. -- a different item in each sock

TASTE

cherry or cinnamon jellybeans (Students should not know flavor ahead of time.)

SMELL

film canisters or other sealable small container with cotton balls scented with Cherry, Mint, or other familiar scents that the students would be able to identify

Engage

1. Generate a conversation about what the students already know about the brain, what they've heard or read, what the brain does, etc. List the functions on the board.
2. Guide the conversation to focus on the 5 senses and how the brain gets information from the outside world: sight, sound, taste, touch, and smell. List these on the board.
3. What body parts do we associate with each individual sense? Ask students to name parts of the body and list each with its corresponding sense on the board.

Explore — Let students choose the order of the senses to explore.

SIGHT

1. Look at real brains if available: human, sheep, bird, fish, cow, other animals. If real brains are not available, the Brain Zoo lesson includes a Key document with images of brains from 11 different animals. Images of the human brain are available on the BrainU website under Cool Stuff.
2. Compare human brains to those of other animals. Ask students to describe similarities and differences. What do they see?
3. Ask students to name the parts if they have learned any prior to this lesson.
4. Point to the SEEING part of the brain (occipital lobe) on their own heads, on a brain model, and/or on pictures of the human brain. Our eyes collect information for us but visual processing takes place here in the brain, allowing us to know that we are seeing a brain, or seeing colors, people, etc.
5. Optical illusions may be used in this activity. Explanations of the illusions can usually be found with the images. Some great optical illusions can be found on BrainU.org at Cool Stuff>Optical Illusions and at [NIH Kids Environment: Lots and Lots and Lots of Illusions](#).



SOUND / HEARING

1. Ask students to close their eyes.
2. As you drop various items, let your students guess what the item was made of.
3. Drop the wooden, metal, and plastic spoons one at a time, giving students time to guess.
4. Discuss how they knew what the object was made of.
5. Repeat steps 2-3 while students keep their eyes open. Material identification could result from recall, previous experience, or association with something similar, etc.
6. Point out the HEARING part of the brain (temporal lobe) on the students' heads or on a brain model or image. Auditory processing takes place in the temporal lobe when sound is collected and carried to the brain by the ears.

TOUCH

1. Hand each student a tube sock — each sock should contain a distinct object.
2. Ask the students to feel the object through the sock, touching only outside of the sock, and raise their hands if they think they know what the object is. You could also ask students to share what they think the object is with the class by writing responses on board.
3. Now let students reach into the sock and feel the object, without looking at it. Again ask them to raise their hands if they think they know what it is. Did anyone change their answer from last time? If you've been keeping track of responses on the board, note any changes on the board.
4. Ask students to pull the object out of the sock and look at it.
5. Did students have an easier time identifying the object through touch the first time or the second time? Why?

We have nerves on the ends of our fingers that allow us to feel if something is rough, smooth, soft, etc. With the sock in the way, the textures and contours are less distinct so the nerves send less specific information to the brain than when our fingers directly touch the object. In many cases, even this less detailed information is enough for us to be able to identify the object.

-OR-

1. Direct students to place their left elbow on the palm of their right hand and gently move it around. Can the elbow feel the lines on the right hand?
2. Ask students what they can feel (if anything) with their elbow?
3. What might be a better way to feel the lines on our hands? (using our hands, fingertips)
4. Ask students to feel the lines on their palms using their fingers. Does this work better? Why?

We have more nerve endings in our fingertips than in our elbows; therefore we have a finer sense of touch (and so can better perceive textures) with our fingers.

The top (parietal lobe) of the brain is responsible for touch and pressure perception for the rest of our body. Ask students to point to this area on their heads.



TASTE

1. Hand out a jelly bean to each student. Instruct students that they should NOT eat the jelly bean.
2. Once all students have a jelly bean, instruct them to PINCH their noses so they cannot smell and - at the count of 3 - eat the jelly bean.
3. Count down together and then start to eat jelly beans with noses pinched. Ask students what the jelly bean tastes like. Most will say sugar or sweet which is accurate.
4. Tell them to release their noses while finishing the jelly bean.
5. Ask students what the jelly bean tastes like. After the initial reaction, ask them what happened.
6. Why did their mouth flood with flavor? What did they taste after released their noses?

Explain that taste is closely associated with our sense of smell. Our taste center is not clearly visible but is located deep in the center of the brain. Our tongue recognizes four basic tastes—sweet, salty, bitter, and sour. Smell adds to these to produce the wide variety of combined smell/taste sensations we call “taste.”

Taste is processed throughout the brain – the limbic system and cerebral cortex, often involving the hippocampus and hypothalamus deep in the brain. For more information, visit faculty.washington.edu/chudler/taste.html

SMELL

1. Pass around containers of scented cotton balls. All containers should hold the same scent.
2. Ask students to open the container, take a sniff, and think about what they smell without saying it aloud. Have they smelled this before? Where?
3. Once everyone has had a sniff, ask them to raise their hands if they have smelled this before.
4. Ask students to share what the scent made them think of.

Explain to students that nerves “back behind the nose” (olfactory bulbs) send messages to the brain that help us identify smells. Deeper in the brain, this smell information helps us to recall memories in which similar smells were involved. For more information, visit faculty.washington.edu/chudler/nosek.html

A cool article on smell being influenced by words describing it can be found at news.bbc.co.uk/1/hi/health/4558075.stm

Explain — Discussion

- Discuss individual exploration activities after each activity (sight, sound, touch, taste, smell).
- Optional: End with an overall discussion of how senses are connected to the brain and how we use our senses everyday without thinking about it.

Expand — Extension to Lesson Ideas

- Encourage older students to journal about their favorite activity in their science notebooks.
- Students can write about and illustrate their favorite activity to display on a bulletin board about the senses.