

UNIT OVERVIEW

Humans use five senses to gather information about the world around them: sight, taste, hearing, smell, and touch. The Senses unit helps students explore how and why humans use their five senses. It addresses the body parts used for each sense as well as how these senses communicate with the brain to make meaning of the incoming information. The unit also addresses how each sense keeps us safe.

Certain reading resources are provided at three reading levels within the unit to support differentiated instruction. Other resources are provided as a set, with different titles offered at each reading level. Dots on student resources indicate the reading level as follows:

- low reading level
- middle reading level
- high reading level

THE BIG IDEA

All animals have senses. Some have a very acute sense of vision, hearing, or smell. But what makes humans unique as a species is our ability to make informed, intelligent decisions based upon the information we gather through our senses. We also react emotionally to sensations, such as a pleasant smell, a bothersome noise, or a soothing sound. It is important for students to appreciate and protect their senses so they can learn from the world around them and have a lifetime full of rich experiences.

Other topics

This unit also addresses topics such as: using one's senses for safety, sign language, optical illusions, and animal senses.

SPARK

The spark is designed to get students thinking about the unit's topics and to generate curiosity and discussion.

Materials

- three shoe boxes with lids
- scissors
- marker
- sliced lemons
- popped popcorn
- chocolate



Activity

Before class, prepare each shoe box by cutting a hole in one side just large enough for students to put a hand inside. Place one of the aromatic foods (lemon, popcorn, chocolate) in each box and place the lid on firmly. Label the boxes A, B, and C.

Display the boxes for students with the holes facing away from their eyes. It is recommended that students wash their hands first if the sense of touch or taste will be used.

Challenge students to identify the contents of each box without looking in it. You can allow students to explore the contents with all senses besides vision. Or you might break the class into four groups and allow each group to use just one sense: hearing, tasting, smelling, or touching. Have students announce or record their guesses on paper for boxes A, B, and C.

Discuss student responses and determine whether certain senses were more effective than others at identifying the mystery objects. Then reveal the contents of the boxes. Explain to students that they will be reading and learning more about senses in the weeks to come.

Many of the unit's vocabulary terms are related to the spark activity and can be introduced during the spark. For vocabulary work, see the Vocabulary section in this *Unit Guide*.

PRIOR KNOWLEDGE



Invite students to explain their understanding of human senses.

Probing Questions to Think About

Use these questions to guide a large-group discussion or put students into dialogue groups to discuss their responses.

- What are senses?
- What are your five senses?
- Which of your senses do you think you use most?
- Which of your senses do you enjoy using most?
- Which parts of your body do you use for each sense?
- Which sense can be used by the most parts of the body?
- Do animals have senses?
- Do plants have senses?
- Do you know anyone who has trouble using one of his or her senses? Can you tell us whether he or she does anything differently than you do?
- Do you think there are any other senses besides seeing, smelling, hearing, tasting, and feeling?

Tell students they will learn more about these topics soon.

UNIT MATERIALS

Each unit provides a wide variety of resources related to the unit topic. Students may read books and other passages, work in groups to complete hands-on experiments and investigations, discuss science ideas as a class, watch videos, complete writing tasks, and take assessments.

Resources are available for printing or projecting, and many student resources are also available for students to access digitally on **Kids A-Z**.

Selected unit resources are available in more than one language.

For a complete list of materials provided with the unit, see the Senses unit page on the Science A–Z website.

VOCABULARY

Use the terms below for vocabulary development throughout the unit. They can be found in boldface in the *Nonfiction Book*, the *Quick Reads*, and/or other unit resources. These terms and definitions are available on *Vocabulary Cards* for student practice. Additional vocabulary lists are provided in the teaching tips for *Investigation Packs* and *FOCUS Books*.

Core Science Terms

These terms are crucial to understanding the unit.

ears	the body parts that let a human hear
eyes	the body parts that let a human see
hearing	the sense that lets a human hear sounds
nose	the body part that lets a human smell
senses	sight, hearing, touch, taste, and smell
sight	the sense that lets a human see
skin	the body part that lets a human touch and feel
smell	the sense that lets a human receive odors and scents
taste	the sense that lets a human experience flavors
tongue	the body part in the mouth that lets a human taste
touch	the sense that lets a human feel objects, temperatures, and more

Other Key Science Terms

The following vocabulary is not essential for comprehending the unit but may enrich students' vocabulary.

brain	the body part that runs the body's activities
deaf	able to hear little or nothing at all
feel	to be aware of something by touching it

flavor	the taste of a food or drink
nerves	the parts of the body that send information to the brain
optical illusion	an image that tricks the mind into seeing something differently than it really is
sense organ	a body part that responds to information from the outside world
sounds	noises that can be heard with the ears
taste buds	small bumps on the tongue that give information about taste

Vocabulary Activities

You may choose to introduce all the terms that will be encountered in the unit before assigning any of the reading components. *Vocabulary Cards* with the key science terms and definitions are provided. Dots on the cards indicate the reading levels of the *Nonfiction Book* or the *Quick Reads* in which each term can be found. If all level dots appear, the term may come from another resource in the unit. Students can use these cards to review and practice the terms in small groups or pairs. The cards can also be used for center activity games such as Concentration.

The *Word Work* activity sheets offer fun puzzles and practice with key vocabulary terms from the unit. For further vocabulary practice and reinforcement, you can choose from the vocabulary *Graphic Organizers*. To build customized vocabulary lessons with terms related to the topic, see *Vocabulary A-Z*.

Students can use the *Word Smart* vocabulary *Graphic Organizer* to organize information on the science terms. You may want to assign each student one to three words to share his or her *Word Smart* knowledge with classmates. Students who have the same word should first compare their *Word Smart* sheets with each other and then report to the larger group.

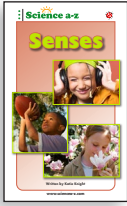
The science terms can be used in oral practice. Have students use each term in a spoken sentence.

As students read, encourage them to create a science dictionary by recording new vocabulary terms and definitions in their *SAZ Journal*.



BACKGROUND AND MISCONCEPTIONS

Use this section as a resource for more background knowledge on unit content and to clarify the content for students if misconceptions arise. Refer to Using the Internet below for more ways to extend the learning.



Q: *Is the sense of touch only experienced with the hands?*

A: No. Although this sense is often depicted by images of hands, we can experience this sense with any part of our skin. We can feel a tickle on our feet, an itch on our leg, or warmth on our face. We can even feel wind blowing through the hair on our scalp.

Q: *Does the nose control the sense of smell?*

A: Like other sense organs, the nose gathers information from the outside world. But in order to make meaning of a smell (or any other sensory information from another organ), signals must be sent via nerves to the brain to interpret what was sensed. No sense is experienced by sensory organs alone.

Q: *How accurate is the “tongue map” showing that distinct areas on the tongue are sensitive to certain tastes?*

A: While the “tongue map” was commonly accepted for decades, recent research indicates that taste receptors throughout the tongue are capable of gathering information about all the major tastes.

Q: *Aren’t there four main tastes—sweet, sour, salty, and bitter?*

A: Western scientists have recently accepted what was discovered by Japanese researcher Kikune Ikeda in 1907, that there is a fifth major taste called *umami*. This term, Japanese for *savory* or *meaty*, is the taste found in meat, cheese, asparagus, and other foods containing a portion of protein called glutamate.

Q: *How are the senses of smell and taste related?*

A: Smell and taste are intertwined. Students may have had a stuffy nose and found that flavors were harder to distinguish. This happens because our taste buds only handle the five tastes—sweet, salty, sour, bitter, and *umami*. The rest of flavor is comprised of scent molecules that stimulate the olfactory (smelling) nerves in our nose. If we have a cold, the excess, thick mucus in the nose blocks these scent molecules from reaching the olfactory nerves.

Q: *Do people who have lost the use of one sense always have enhanced use of their other senses?*

A: This is a generalization based on the fact that people who cannot use a particular sense often rely more on their other, active senses. In a few cases that might make another sense more acute, but it usually does not.

Q: Which of the senses is the strongest memory trigger?

A: Smell is generally the sense that evokes the most intense memories. Odors don't typically help people recall more information, but the memories that odors evoke tend to be more emotionally laden. This might be due in part to the fact that the area of the brain that processes smells (the primary olfactory cortex) links directly to the area of the brain that experiences emotion (the amygdala) and the area that consolidates memories (the hippocampus). No other sense is so closely anatomically linked to the areas of the brain responsible for memory and emotion. However, that does not mean that the other senses can't also produce powerful memories.

Q: Can deaf people read lips?

A: Some can and others cannot. Lip reading is a skill that must be learned and practiced.

Q: Is there such a thing as a sixth sense?

A: Scientists have not found reliable, repeatable evidence of a sixth sense. Perhaps one of your students will one day design an experiment that can prove or disprove the existence of a sixth sense. For now, it remains a theory often depicted in fiction as reality.

Q: Do phrases such as "sense of wonder," "sense of humor," or "sense of direction" refer to actual senses?

A: These phrases use the word *sense* in a different context. The word *sense* can refer to an awareness or a feeling.

Q: Is it true that some people have one or more sense that is very strong?

A: While no human is known to be able to see through walls or have supersonic hearing, as depicted in comic books, there is wide variation in sensory ability among people.

Q: Do males and females experience the senses differently?

A: Every person experiences the senses a little differently from everyone else, which means that sex-based differences in the senses can be difficult to test. However, because the genes for some senses are linked to the genes that determine sex, and because some body processes such as hormonal balance can affect how senses function, there can be some sex-based differences in sensory receptivity. For instance, the majority of people who are red-green color-blind are men because the gene for color blindness is linked to the X-chromosome (women have an extra X-chromosome to correct for any errors on the other). But in the general population, there is much more difference between individuals in terms of sensory perception than between the sexes.

Q: *Do animals have more acute senses than humans?*

A: There are many cases in which this is true. Adaptations have led to certain species developing one or more powerful senses that increase the likelihood that the species will survive. Many predatory animals, for example, have keen eyesight to find prey, while many prey animals have a strong sense of hearing to detect threats.

EXTENSION ACTIVITIES



Using the Internet

Most search engines will yield many results when the term *senses* or *human senses* is entered. You can also search for more information on a specific human sense, such as *human sense of smell*. Be aware that some sites may not be educational or intended for the elementary classroom. More specific inquiries are recommended, such as:

- eyes
- ears
- nose
- tongue
- skin
- flavors
- scents
- eyesight



Projects and Activities

- **Writing:** Have students write or dictate a story about a person with one very strong sense. Have them describe what this powerful sense enables the character to do. See [Writing A-Z](#) for extensive writing lessons.
- **Project:** Invite students to create a senses board game. As playing pieces travel the board, students should encounter different sensory experiences that move them forward or backward. These experiences can be placed on playing cards or on the playing surface.
- **Project:** Have students compare what they sense in the classroom and outdoors. This can also be used as a home project in which students compare what they see, hear, smell, taste, and feel at home with what they sense at school.
- **Literacy Connection:** Read the Indian legend “Blind Men and the Elephant” to students. Discuss how the characters all used the sense of touch to arrive at different conclusions about the elephant. Many good renditions are available online, including John Godfrey Saxe’s poetic version.
- **Arts:** Have students draw or paint a self-portrait and label their sensory organs. They can also add sentences such as “I see _____ with my eyes.” or “I feel _____ on my skin.”

- **Community Service:** Discuss any concerns students have related to something they experience with their senses at school. Examples may include dim lighting, bad smells from garbage, loud noise in the cafeteria, or cold temperatures in the library. Provide students with opportunities to take part in an effort to make suggestions to the responsible party in order to bring about change in this area.
- **Drama:** Discuss the special powers of superheroes from comic strips, cartoons, and movies. Do some have extraordinary senses? Invite small groups of students to plan and act out a scene in which an existing or new superhero of their choice uses a sense to help someone.
- **Research:** Help students research the senses of a favorite animal and compare them to human senses.
- **Research/Home Connection:** Students can conduct research as a family/home project or in the library/media center to extend the learning about a topic in one of the *Quick Reads* or other unit resources.

