

Your Skin Is for Feeling

OBJECTIVES

Students explore the skin as the sense organ responsible for feeling.

The students

- ▶ try to identify objects using just their sense of touch
- ▶ determine which areas of the body are more sensitive to touch than others

SCHEDULE

Session I About 30 minutes

Session II About 40 minutes

VOCABULARY

receptor

MATERIALS

For each student

- 1 Activity Sheet 8, Parts A and B

For each team of two

- 1 bag, paper
- 2 crayons (1 red, 1 blue)*
- 1 glove, latex
- 1 hairpin
- 1 ruler, metric*

For the class

- 1 sheet aluminum foil*
- 1 bag, grocery, plastic*
- 1 piece cloth, felt (2-in. x 4 in.)

- 1 sheet paper, white*
- 1 pair scissors*
- 1 roll tape, masking

*provided by the teacher

PREPARATION

Session I

- 1 Make a copy of Activity Sheet 8, Part A, for each student.
- 2 Before class, cut a plastic grocery bag, a sheet of plain paper, a sheet of aluminum foil, and the felt cloth into 2-in. squares. Place one of each kind of square into a paper bag—one bag per team of two. Students will try to identify the squares by touch and so should not see you prepare them beforehand.
- 3 Each team of two will need one latex glove and a paper bag containing the four different squares.

Session II

- 1 Make a copy of Activity Sheet 8, Part B, for each student.
- 2 Each team of two will need one hairpin, one 2-in. piece of masking tape, a metric ruler, a red crayon, and a blue crayon.

BACKGROUND INFORMATION

The skin is the sense organ responsible for feeling. The average adult human body is covered in approximately 2 square yards of skin, making the skin the largest sense organ in the body.

The skin is made up of two layers. The epidermis is the outer layer. Its old cells continually slough off and are replaced by

new cells from beneath. The dermis is the inner layer and contains sweat glands, hair follicles, blood vessels, and nerve endings.

Within each square inch of skin are dozens of yards of nerve endings, also called **receptors**. These receptors are part of the nervous system. When we touch something, receptors in our skin take in information about the object and send a message via the spinal cord to the brain. Upon receiving the message, the brain sends messages to muscles about how to respond.

There are five different kinds of receptors in the skin. Some detect **touch** (contact) and **pressure**. Others detect **heat** and **cold**. Still others detect **pain**. In some parts of the body, the receptors are very close together, causing those body parts to be more sensitive to stimuli than other parts.

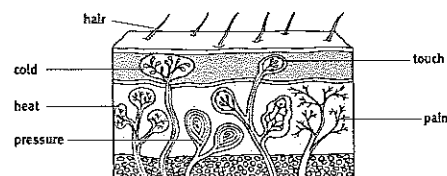
For example, the face, hands, and feet are more sensitive to touch than the arms, back, and legs. Our tongue has more touch receptors per square inch than any other part of our body. Babies know this instinctively. They put objects in their mouths not to eat them but to feel them.

We can “turn off” our other senses by covering our eyes, plugging our ears and nose, or closing our mouth, but we cannot “turn off” our sense of touch. In this activity, students learn how important our sense of touch is and how the distribution of receptors in our skin affects our sensitivity to touch.

▼ Activity Sheet 8, Part A

Your Skin Is for Feeling

1. Put on the glove. Then close your eyes and reach into the bag. Feel each square. Write down what you think each square is made of. Answers will vary. Possible answers:
cloth foil plastic paper
2. Take off the glove. Then feel the squares again. Now what do you think the squares are made of? Students should be better able to identify the squares without the glove.
3. Did wearing the glove make it harder to tell what the squares are made of? Why? yes; because our fingers could not feel the squares

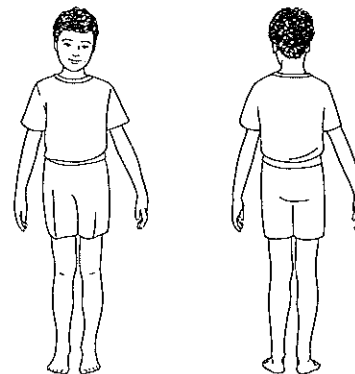


4. Look at the diagram above. What are the five types of receptors?
touch, hot, cold, pain, and pressure
5. Choose one receptor. Why do you need this receptor? What do you think would happen if your skin did not have this receptor? Answers will vary.

▼ Activity Sheet 8, Part B

Your Skin Is for Feeling

6. How many points did you feel at each body part? Write 1 or 2 next to each body part you test. Answers will vary.
back of neck wrist shin
arm above elbow back of hand calf
palm of hand top of foot
arm below elbow fingertip bottom of foot
knee big toe



7. Which body parts are most sensitive? Color those parts red in the drawing above. Answers will vary.
Which parts are less sensitive? Color those parts blue. Answers will vary.

Guiding the Activity

Session I

- 1** Distribute a copy of **Activity Sheet 8, Part A**, to each student. ~~Divide the class into teams of two, and~~ give each team one latex glove and a bag of squares.

Tell students that each bag contains four squares, and each square is made of a different material. Instruct the students to take turns putting on the glove, closing their eyes, and reaching the gloved hand into the bag to see if they can tell what each square is made of, just by feeling it. They can write their answers on their activity sheet.

- 2** When all students have had an opportunity to feel the squares with a gloved hand, ask, **Were you able to tell what the four squares were made of?**

Tell students to repeat the exercise, this time without wearing the glove. Tell them to write down their observations on the activity sheet.

- 3** When students have finished, ask, **Were you able to tell what each square was made of this time? Was it easier without the glove? Why?**

Tell students that the sense organ responsible for touch is the skin. Ask, **Where is your skin located?**

- 4** Bring students' attention to the cross-section diagram of the skin on their activity sheet (see Figure 8-1). In particular, have them note the different-shaped structures that exist in the lower layer of the skin. Ask, **What do you think these are?**

Tell students that these are called receptors. ~~Write the term *receptor* on the board.~~ Explain that **receptors** are special nerves located in our skin. Ask, **How many different kinds of receptors do you see in the diagram?** Have students list them on their activity sheet.

Additional Information

Tell students that they must not look in their bags.

Safety Note: *Students with a latex allergy should not participate in the gloved portion of this activity.*

probably not, although the sound of the squares as they were being handled may have provided clues

Students should respond that they could feel the objects better without the glove. Elicit that the glove prevented their skin from touching the objects.

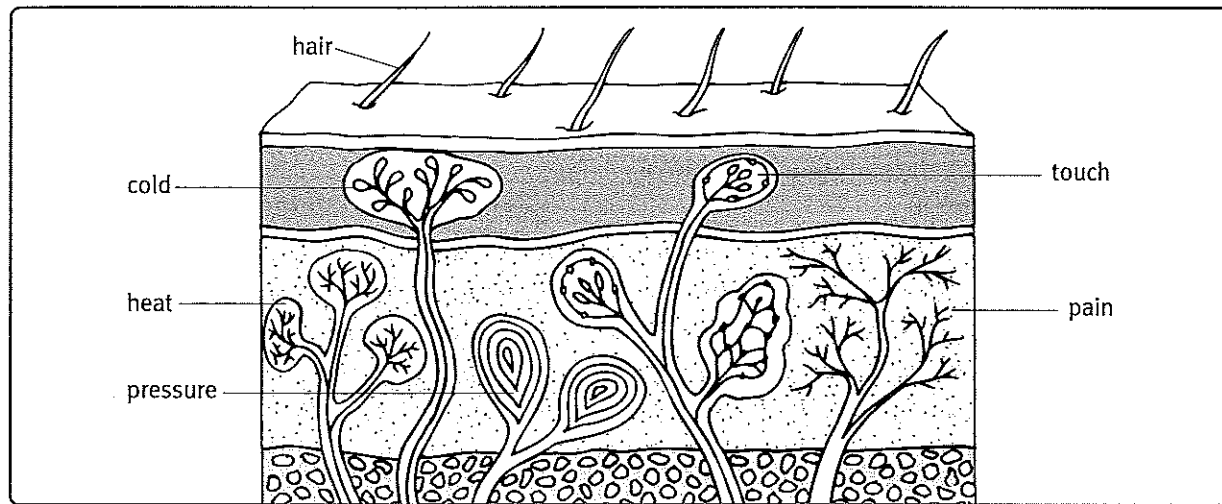
Skin covers the surface of the entire body.

Accept all reasonable answers.

Five. The skin contains receptors for heat, cold, touch, pressure, and pain.

Guiding the Activity

Additional Information



▲ **Figure 8-1.** A cross-section of the skin, the largest sense organ in the human body.

Explain that when we touch something, receptors inside our skin take in information about the object—for example, if it feels hard or soft, liquid or solid, rough or smooth, hot or cold—and send messages to the spinal cord, the nerve highway that runs up and down the middle of our back. The spinal cord transmits the information to the brain, which sorts the messages. The brain determines what we have touched and tells our muscles how to respond.

Have students imagine that their finger has just touched a sharp needle. Ask, **What receptors will be at work sending messages to the brain?**

Ask, **What message might the brain send back to the finger muscles?**

Ask, **What do you think would happen if your skin did not have these receptors?** Ask students to focus on one kind of receptor and to write their thoughts in question 5 of their activity sheet.

Tell students that in the next session they are going to learn why some areas of skin are more sensitive than other areas.

Collect the bags of squares and the gloves, and return them to the kit.

Students will probably suggest touch, pain, and perhaps pressure.

The brain might send a message to move or stop touching the point.

Without receptors for heat, we might burn ourselves. Without receptors for cold, we might freeze. Without receptors for pain, we might cut or scrape ourselves and not even know it. Accept all reasonable answers. Elicit that receptors help keep our bodies safe and comfortable.

Guiding the Activity

Session II

- 5** ~~Distribute a copy of Activity Sheet 8, Part B, to each student. Divide the class into teams of two, and distribute one hairpin, a ruler, a 2-in. piece of tape, a red crayon, and a blue crayon to each team.~~

Done! Have students place the open end of a hairpin next to a ruler. Tell them to separate the points of the hairpin so that they are about 2 cm (a little less than an inch) apart. Then have them wrap a piece of masking tape around the pin to keep it from opening or closing further (see Figure 8-2).

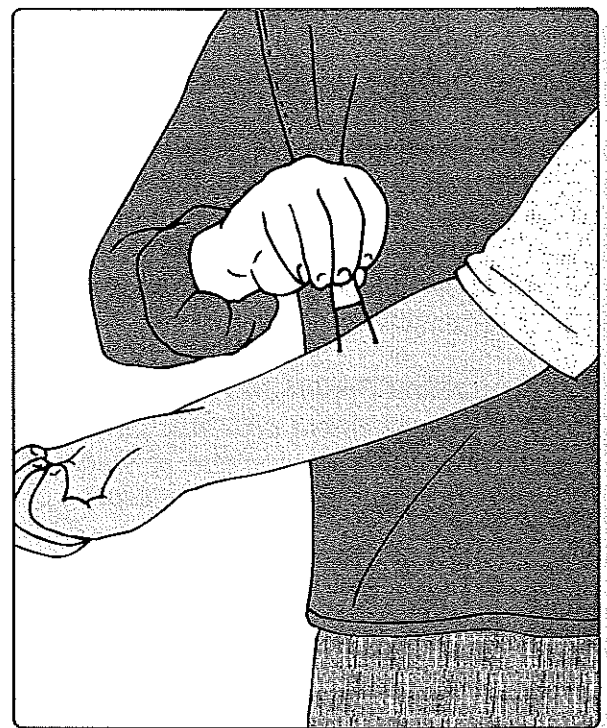
Tell students that they are going to use the hairpin as a "touch tester," to determine which parts of the body are more sensitive to touch.

- 6** With the help of a student volunteer, demonstrate how to conduct the touch test (see Figure 8-2):
- Have the student close or cover his or her eyes.
 - Tell the student where you are going to touch him or her with the touch tester.
 - Touch the student lightly on the arm with both points of the hairpin. Ask the student, **Can you feel one point or two?**
 - Have students record their answer on their activity sheet.
 - Move on to the next body part listed on the activity sheet and repeat.

Remind students that the body parts to be tested are listed on the activity sheet. For safety reasons, they will not be touch-testing areas of the face. Have them start at the neck and work their way to the toes. Students will need to roll up a sleeve and a pant leg and remove a shoe and sock for the tests on the arm, leg, and foot.

***Safety Note:** Caution students to touch the skin lightly and to avoid the face completely.*

Additional Information



▲ Figure 8-2. Taking the "touch test."

Guiding the Activity

7 When both students have finished the touch test, ask, **On which parts of the body were you able to feel two points?**

Ask, **Do you think there are more receptors or fewer receptors in these areas than in areas on which you could feel just one point?**

Ask, **Are body parts with a lot of receptors more sensitive or less sensitive to touch?**

Explain that body areas that could feel both points have a higher concentration of touch receptors and are therefore more sensitive than body parts that could feel only one point. Even though students did not test facial areas, they may know that the face is highly sensitive to touch.

Have students complete the activity sheet by coloring in the more sensitive areas of the body red and the less sensitive areas blue.

Additional Information

Most students will feel two points on their hands and feet.

more receptors

more sensitive

REINFORCEMENT

Have students repeat the touch test experiment, this time with the hairpin prongs nearer together (1 cm) and farther apart (3 cm). Which of the sensitive areas is most sensitive? Which of the less sensitive areas is least sensitive?

Assessment Opportunity

This Reinforcement also may be used as an ongoing assessment of students' understanding of science concepts and skills.

SCIENCE JOURNALS

Have students place their completed activity sheets in their science journals.

CLEANUP

Collect the crayons. Place the hairpins in a reclosable plastic bag, and return them, along with the tape, to the kit.

SCIENCE AT HOME

Braille is a system of printing in which raised dots are arranged in patterns to represent letters and numbers. People "read" Braille by touching the dots with their fingertips.

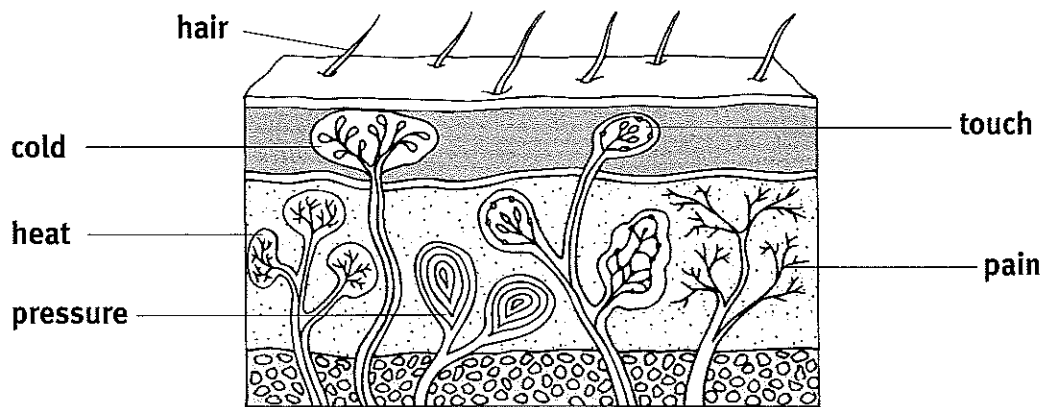
To give students an idea of what it feels like to read Braille, have them ask a parent or older sibling to draw dots in the shape of a letter or number on an index card. Then they should use a pen or pencil to poke holes in that shape from the underside of the card. Tell students to close their eyes and try to identify the letter or number by touching the pattern of the holes.

Your Skin Is for Feeling

1. Put on the glove. Then close your eyes and reach into the bag. Feel each square. Write down what you think each square is made of.

2. Take off the glove. Then feel the squares again. Now what do you think the squares are made of?

3. Did wearing the glove make it harder to tell what the squares are made of? Why? _____



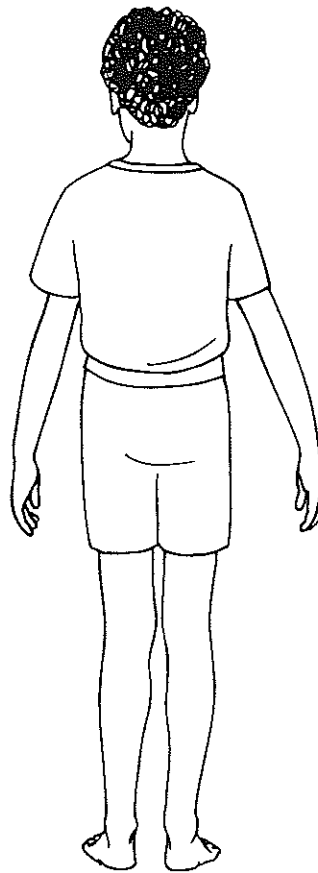
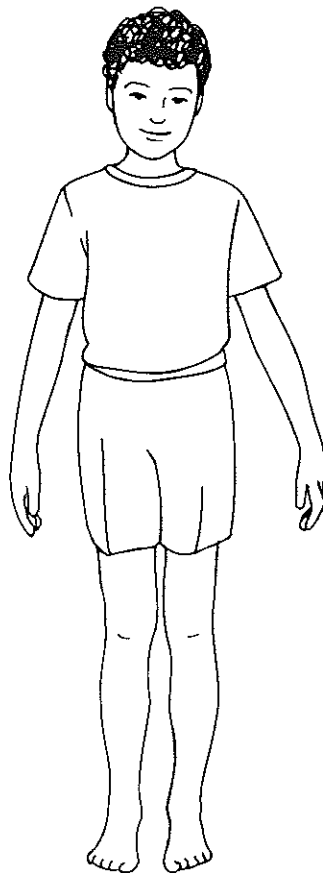
4. Look at the diagram above. What are the five types of receptors?

5. Choose one receptor. Why do you need this receptor? What do you think would happen if your skin did not have this receptor? _____

Your Skin Is for Feeling

6. How many points did you feel at each body part? Write 1 or 2 next to each body part you test.

back of neck _____	wrist _____	shin _____
arm above elbow _____	back of hand _____	calf _____
_____	palm of hand _____	top of foot _____
arm below elbow _____	fingertip _____	bottom of foot _____
_____	knee _____	big toe _____



7. Which body parts are most sensitive? Color those parts red in the drawing above.

Which parts are less sensitive? Color those parts blue.