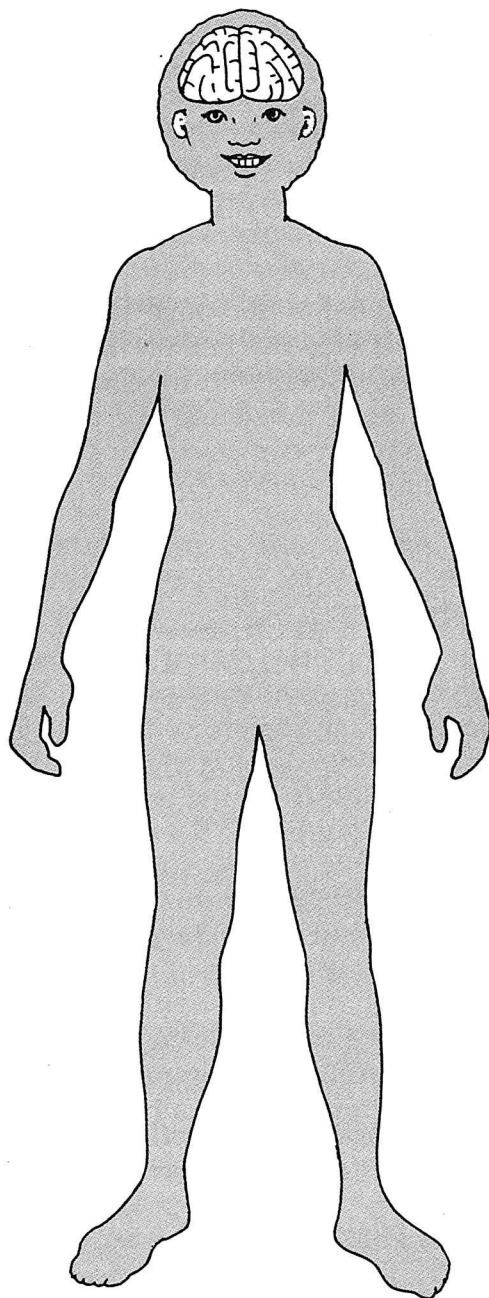


The Five Senses



Objectives

Students will:

- identify the sense organs
- understand how smelling works
- learn that sense organs send signals to the brain

Building Understanding

1. Ask students to brainstorm all of the senses they can think of and list their responses on the blackboard: SEEING, SMELLING, TOUCHING, HEARING, TASTING. *Balance* is often included as a sixth sense.

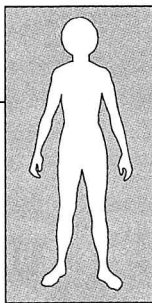
a. Divide students into groups and ask each group to come up with a list of five things they see, hear, taste, smell, and touch just about every day.

b. Ask one student from each group to read the “see” list, another the “hear” list, and so on and compare the responses. For instance, did all of the groups see their teacher or a television show?

2. Discuss with students how each sense helps them learn about the world around them. For example, discuss how the sense of smell helps them know about the food they eat or warns them of a fire. Ask which senses they are using right now.

a. Have students imagine they are at the movies or in a swimming pool or shopping mall. Then ask the class what senses they imagine themselves using in each situation. For example, the answers to “at the movies” might include “seeing the images, hearing the actors, tasting popcorn,” etc.

b. Divide students into groups to play “Where Am I?” Have each group pick a place and then come up with sensing clues that are hints about where the place is. With each clue the rest of the class has to figure out the answer. Sample clues for a *pond*: “I am touching water;” “I hear a frog calling;” “I see water lilies;” etc.



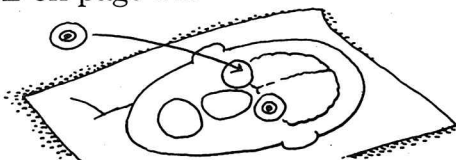
3. Have students brainstorm all the parts of the body they can think of that do the work of sensing. Have them match these parts—the sense organs—to their list of senses; they should match the eyes to seeing, the ears to hearing, and so on.

Making The Model

1. Reproduce a set of pages 11–13 for each student.

2. Have each student find page 11. Point out where parts are to be glued or taped.

3. Have students find page 12 and along the cut line cut out the parts labeled LEFT EYE and RIGHT EYE. Have students use glue to paste these down on the LEFT EYE and the RIGHT EYE on page 11.



You may wish to take a moment to point out that looking at the head on the page is like looking in a mirror: left and right are reversed. Have students pair off and look at each other, then touch their left ears, etc.

4. Have students find the parts labeled RIGHT EAR and LEFT EAR, cut them out, and glue them on the LEFT EAR and the RIGHT EAR on page 11.

5. Have students:

- Cut out the part labeled NOSE and paste it on the NOSE on page 11.
- Cut out the part labeled MOUTH and paste it on the MOUTH on page 11.
- Cut out the part labeled FINGER

SKIN and paste it on the FINGER SKIN on page 11.

- Cut out the part labeled CHEEK SKIN and paste it on the CHEEK SKIN on page 11.

- Cut out the part labeled BRAIN

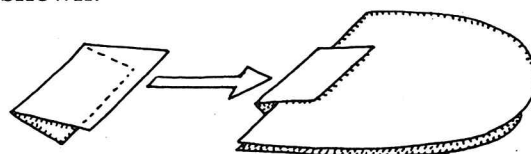
WITH SMELLING BULBS and paste it on the BRAIN WITH SMELLING BULBS on page 11.

6. Have students find page 13 and cut along each solid cut line on the face. Then have students lift up each section and fold along the dotted line to form flaps that open and close. Younger students may need help with this.



When cutting lines do not extend to the edge of the page, it is helpful to fold the page lightly, as shown, so that the fold runs perpendicular to the line to be cut. Then with the tip of the scissors, snip on the cut line to get the cut started. Unfold the page and insert the blade of the scissors into the snip as shown, and cut along the rest of the line.

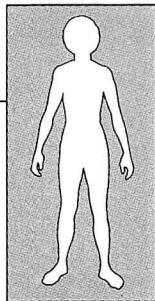
7. Fasten the two TAPE boxes on page 13 to the TAPE boxes on page 11 by folding the tape to form a hinge as shown:



Using The Model

1. Point out that most of the body's sense organs are located in the head. Ask students why they think the skin is the largest sense organ in the body. (because it covers the entire body).

The Five Senses



2. By opening each flap on the model, students can see some parts of the sense organs. Mention that students will learn about smelling using this model and that they will also be making models of the tongue, eye, ear, and skin to learn about the other senses.

3. Ask students to find the nostrils on the front of their model. Explain that when we breathe air into our nostrils we also can breathe in odor molecules.

a. Ask students to lift the NOSE flap and explain that inside the nose odor molecules dissolve in mucus. The mucus layer is indicated by the curved line at the top of the nose.

b. Once dissolved, the odor molecules cause nerves to send signals to the brain. Nerves are indicated by the dark lines in the mucus.

c. Our brain tells us what we smell and what, if anything, we should do, such as eat if we smell food or call for help if we smell something burning. Ask students to open the BRAIN WITH SMELLING BULBS flap, noting how the nerves continue into the brain.

4. You may wish to mention the following to older students:

a. The hollow space inside the nose that is lined with mucus is called the *nasal cavity*.

b. In the upper part of the nasal cavity there are nerve cells with tiny hairs (not the same hairs that grow out of the skin) that extend into the mucus. When odor molecules contact these hairs, the nerve cells send electrical signals along fibers to the olfactory, or smelling, bulbs in the front of the brain. The two bulbs, one for each half of the nasal cavity, are indicated by the semicircles above the

nose.

c. Nerves in the bulbs then send signals along the smelling nerves to the smelling center of the brain (refer to the model of the brain).

d. While the details of smelling are not fully understood, scientists are studying how different smells cause different signals to be sent to the brain.

More To Do And Learn

1. Color the Model

Suggest that students color the facial skin and the parts of the nose including the olfactory (smelling) bulbs.

2. Odor Record

Do students know that people can distinguish over 3,000 different odors? Bring in flowers, foods, and other things for students to smell. Have them close their eyes before smelling. Ask if they can they tell what each item is just by smelling it.

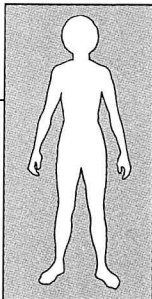
Students may wish to keep a running list of things they can smell, or the class can record smells on a chart. Students may be interested to learn that we cannot smell gases in the air, such as oxygen and nitrogen. Because the natural gas in gas stoves doesn't have an odor, an odor is added so we can detect if there is a leak or if someone forgot to turn off an unlit burner.

3. Taste Testing

Set up the following experiment: Ask students to eat some food while they hold their nostrils shut. Then ask them to take a bite of the food with their nostrils open. Ask students:

- How did the food taste each time?
- Does smelling affect tasting?

The Five Senses



- What can you conclude?

Explain that the flavor of food is a combination of taste plus smell. Indeed, most flavor comes from smell not taste. Ask students how food tastes when they have a cold and why they think the food seems to lack taste. Explain that extra mucus produced during a cold can prevent odors from reaching the nerve cells in the upper part of the nasal cavity. Ask students:

- Does anything happen inside your mouth when you are hungry and smell food?
- Which smells on your list cause saliva to flow in your mouth?
- Are there any smells such as sour milk that make you want to gag or vomit?

Explain that such disagreeable odors are important, for they can stop us from eating things that may be harmful or poisonous or alert us to the presence of toxic chemicals in the air.

Making Connections

Divide students into groups and ask them to prepare the following to present to the class:

- a. A skit in which one member of the group is an odor molecule and the other members are parts of the nose and brain.
- b. A skit in which students trace a disagreeable odor to a factory spewing harmful chemicals into the air or water, and then convince a judge why this pollution must be stopped.
- c. A report on how the sense of smell helps lions hunt.
- d. A report on what role a snake's

forked tongue plays in smelling.

Healthy Choices

1. Explain to students that drugs are chemicals, other than those found in foods, that affect the way parts of the human body work. Some drugs are medicines available over the counter without a prescription while others can only be prescribed by a doctor.

a. Chemicals in glues, paint thinners, and other household products are drugs.

b. Chemicals in cigarettes, especially nicotine, are drugs.

c. Caffeine in coffee, tea, and many soft drinks is a drug as is alcohol in beer, wine, and hard liquor.

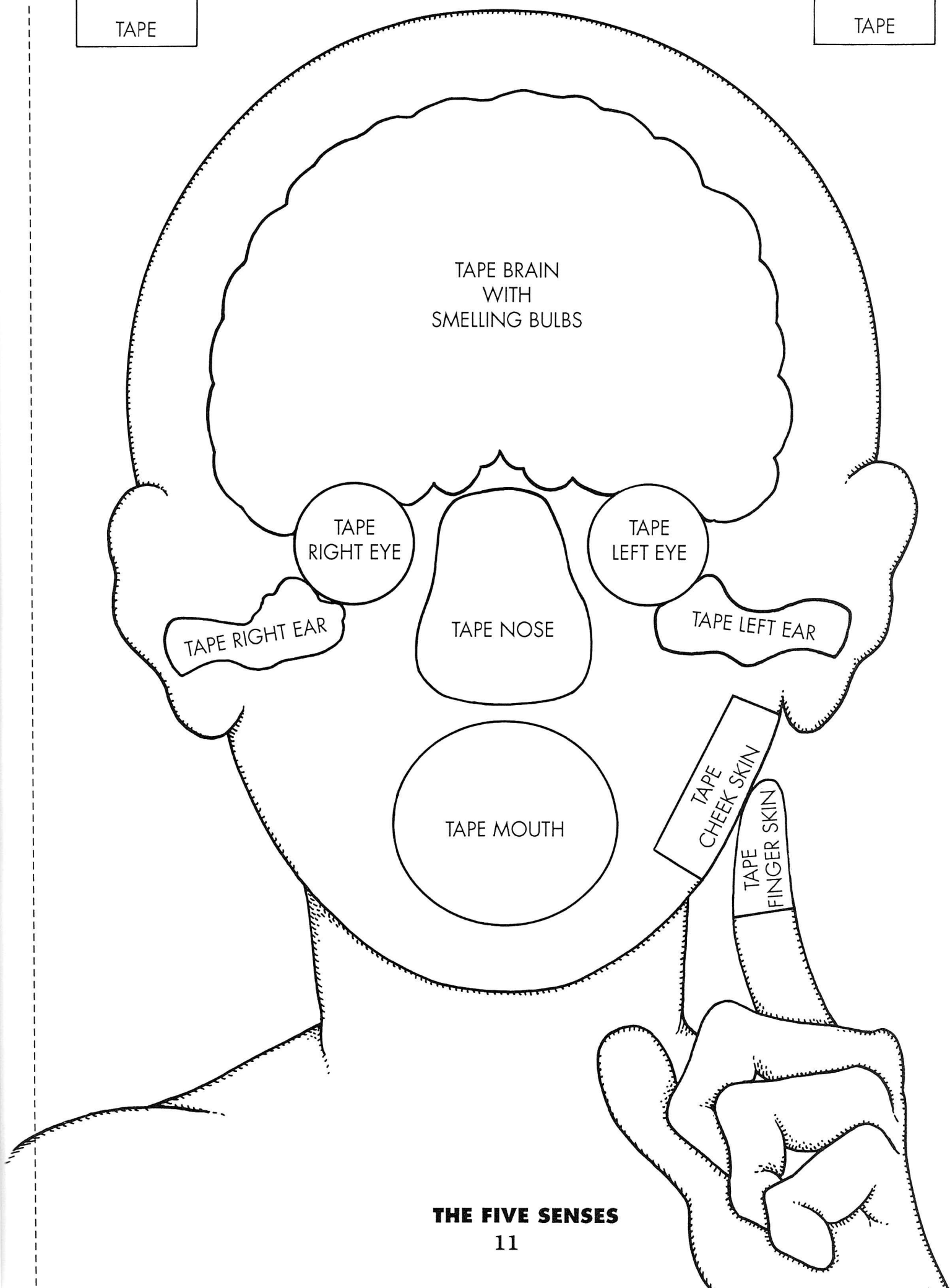
d. Extremely dangerous drugs such as narcotics, uppers, downers, and mind-altering drugs are against the law to use or sell.

2. Ask students if they are aware from television commercials of an unwanted side effect of aspirin on the human body. (It can irritate the lining of the stomach.) Explain that all drugs can cause unwanted side effects, some extremely serious or even fatal.

3. Abusing inhalants (e.g., airplane glue, cleaning fluid) or smoking cigarettes can interfere with the sense of smell. Ask students what might happen to a person who abuses drugs that prevent them from smelling a fire, a gas leak, or food that is rotten.

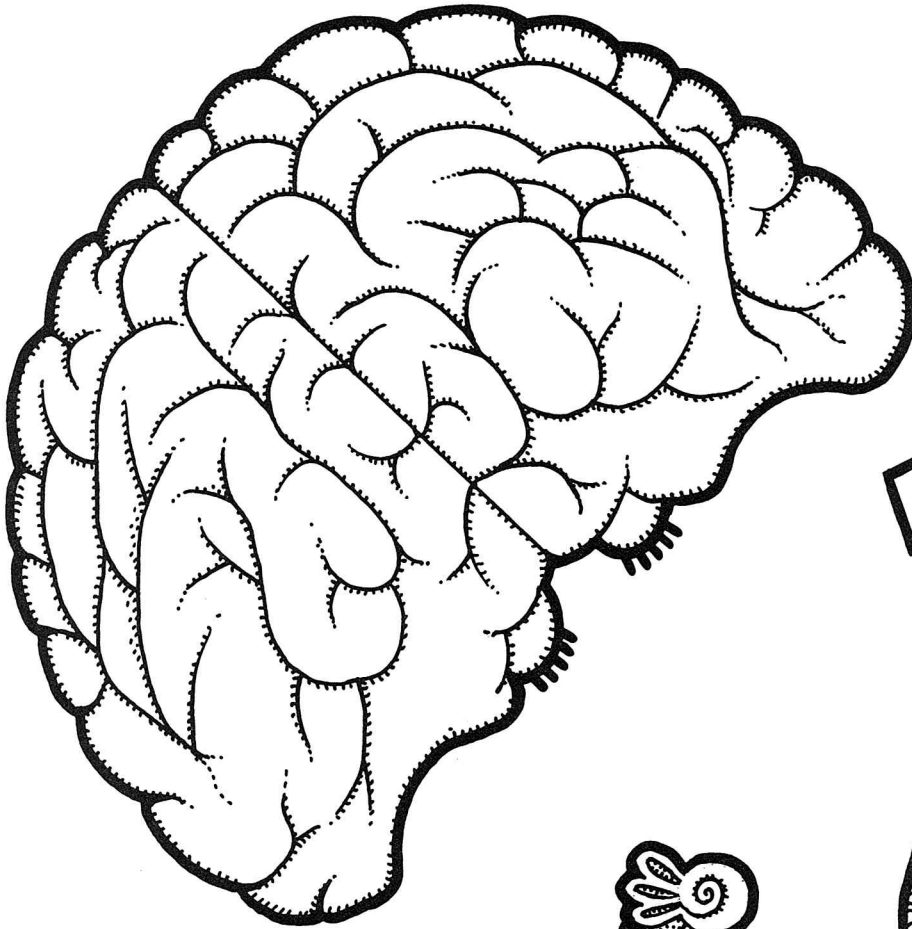
TAPE

TAPE

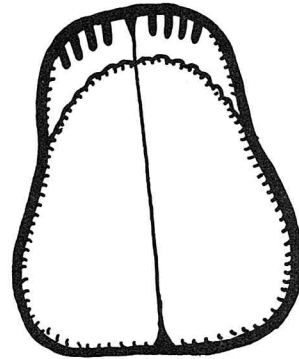


THE FIVE SENSES

BRAIN WITH SMELLING BULBS



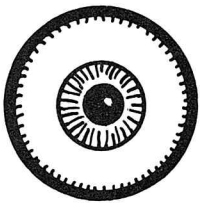
CHEEK SKIN



NOSE



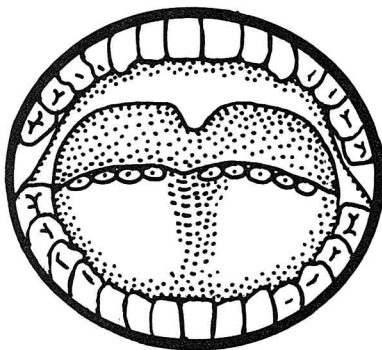
RIGHT EAR



RIGHT EYE



LEFT EYE



MOUTH



FINGER SKIN



LEFT EAR

TAPE

TAPE

