

K-1: The Senses

OUR SENSE OF SMELL

Written by

**Barbara Z. Tharp, MS, Michael T. Vu, MS, Delinda K. Mock, BA,
Christopher Burnett, BA, and Nancy P. Moreno, PhD.**

Activities from the *K-1: The Senses Teacher's Guide* may be used alone or with integrated unit components. The Learning Brain: Senses unit is comprised of the guide, a PowerPoint® slide set, "What Sound Is It?" for use with the activity, "Our Sense of Hearing," and a student storybook, *Making Sense!* (available as a PowerPoint® file and in PDF format). All files are available free-of-charge at BioEd Online (www.bioedonline.org).

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Authors: Barbara Z. Tharp, M.S., Michael T. Vu, M.S., Delinda K. Mock, B.A., Christopher Burnett, B.A., and Nancy P. Moreno, Ph.D.

Editor: James P. Denk, M.A.

Designer: Martha S. Young, B.F.A.

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Center for Educational Outreach
Baylor College of Medicine
One Baylor Plaza, BCM411
Houston, Texas 77030
713-798-8200 | 800-798-8244
edoutreach@bcm.edu
www.bioedonline.org | www.bcm.edu

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OUR SENSE OF SMELL

Guiding Question

How does our sense of smell work?

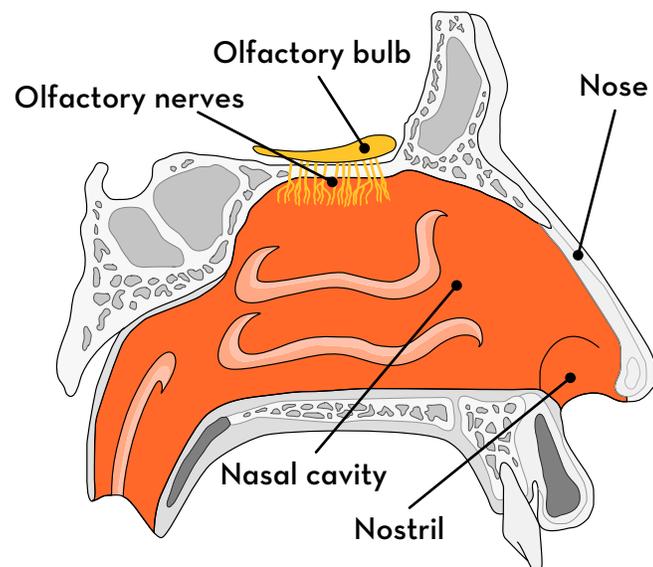
Concepts

- All of the senses are connected to the brain.
- Our senses let us know what is going on inside and outside our bodies.
- One of our senses is smell (olfaction).
- Our noses detect, or smell, very small particles in air.
- Information is sent from the nose to the brain, which helps us to experience, remember and recognize smells.

Time

Setup: 10 minutes

Class: 30 minutes each for Part 1 and Part 2



Much like taste, the sense of smell allows us to detect chemicals in the environment. In fact, smell and taste often work together to gather information about our surroundings. Flavor is a perception that is based on input from taste, smell and even touch.

With the sense of smell, molecules carried through the air and into the nose land on the moist lining (olfactory epithelium) of the nasal passages and bind to olfactory neurons in the lining. The binding process triggers these neurons to send messages directly to the olfactory bulbs in the brain, and on to the olfactory cortex. Information about odors being detected also is sent to the thinking portion of the brain.

The olfactory system enables humans to distinguish among thousands of odors, all of which are classified into six major groups: floral, fruity, spicy, resin, burnt and putrid.

The sense of smell is closely related to memory and emotions. Have you ever smelled something that evoked a childhood memory, a location or an experience? Scientists believe these associations are due to the close proximity of the olfactory cortex to the amygdala and hippocampus. The amygdala is responsible for emotional memory and the hippocampus plays an important role in consolidation of information from short-term memory to long-term memory and spatial navigation.

MATERIALS

Part 1

Per Class

- Classroom human body diagram (see Activity 2, “The Brain: Protection”)



Per Student Group

- 4 re-sealable plastic bags, each containing a different flavor of dry powdered soft drink mix (Kool-Aid® brand preferred: grape, lemonade, orange and cherry; use approximately one envelope per bag)

Per Student

- Small hand mirror
- Science notebook

Part 2

Per Student Group

- 16 cotton swabs (Q-tips® style)
- 7 small paper cups
- 4 plastic spoons
- 4 re-sealable plastic bags with dry powdered soft drink mix used in Part 1
- Set of orange, purple, red and yellow crayons (to match powdered soft drink mix colors)

Per Student

- Copy of “Let’s Get Fruity!” page on cardstock

SETUP

Organize the class into groups of four students. Each group will need four re-sealable plastic bags, each containing a different flavor of soft drink mix (grape, lemonade, orange and cherry work). Each bag should contain the contents of one envelope of soft drink.

Make copies of the “Let’s Get Fruity” page on cardstock.

Fill six paper cups halfway with water.

SAFETY

Have students wash their hands before and after the activity.

PROCEDURE

Part 1

1. Ask students to locate their noses by pointing with their fingers. Ask, *What does your nose enable you to do? Discuss all ideas.*



2. Give each student a mirror and ask him or her to closely examine his/her nose. Point out that our noses have two openings, called nostrils, which allow air to enter the nasal passages. Emphasize that the nose is critical for breathing. Have students inhale and exhale slowly to become aware of how air enters and leaves the nose. Show a diagram of the inside of the nose, or draw one for the class.
3. Ask students if they have ever really looked at his/her nose. Give each student a mirror to closely examine their the nose. Have students draw their noses in their notebooks, and label the outer parts.
4. Give each group of students a set of four flavors of soft drink mix powder in small re-sealable plastic bags. Let each student hold one bag, but instruct students not to open the bags. Ask them to predict what the powder in their bags might smell like, and discuss their predictions with their groups. Ask, *On what did you base your predictions?*
5. Next, instruct students to smell their bags, but not open them. Students should not be able to smell the contents.
6. Ask, *Were you able to check your predictions with the bag closed? Why do you think you can't smell the powders in the bags?* Invite students to share their ideas.
7. Tell students they will try to smell the powders again,



with the bags open. Show students how to carefully open a bag, keeping the powder in the bottom. To demonstrate how to properly smell an unknown substance, gently wave your hand and-forth over the open bag. This is called wafting.

8. Let each student open his/her bag, and waft the scent to his/her nose to identify it. Have students pass their bags around their groups, so that each student can smell all of the substances.
9. Ask, *Can you identify the scents? Have you smelled anything similar before?* If they haven't identified the scents, inform students that they smelled orange-, cherry-, grape- and lemon-flavored soft drink mixes.
10. Tell students that all scents are made of small particles/chemicals that mix with, and float in the air. When these particles enter our nasal passages, they are detected by neurons in the nose, which send a message to the brain. Our brains then help us to recognize, remember and identify scents.
11. Review with students that the scents they smelled are collected inside the nose, and are identified via messages sent to the brain. Have a student add a piece of yarn from the nose to the brain on the classroom human body diagram.
12. If you are not conducting Part 2 immediately, have students reseal the bags to keep the contents fresh for later use.

Part 2

1. Tell students that they will use the powdered soft drink mix to create artwork that smells delicious. Give each group 4 small paper cups, a cup half-filled with water and 4 spoons. Instruct each student to carefully add one spoonful of water to one bag of drink mix. Students should then seal the bags and gently shake them, so that the powder dissolves into the water. They now will have created "Smelly Paint."
2. Instruct students to carefully pour their "paint" into a small paper cup. Alternately, you may pour the "paint" for students.

3. Give each student 4 cotton swabs ("paintbrushes"). Remind students to use each cotton swab with only one color.
4. Hand out copies of the "Let's Get Fruity" page. Direct students to pick a crayon that matches one fruit on the page, and outline the fruit with that crayon. Tell students that they will paint the fruits with the corresponding scented paints. For more fragrant pictures, encourage students to paint two layers on each picture.
5. Allow the paper to dry. Then, demonstrate how to activate the smell, by gently scratching the dry paint.
6. Ask, *What parts of the body enable you to smell?* Have students refer to the body diagram, if needed. They should understand that nerve connections between the nose and the brain are necessary for the sense of smell.
7. Have students write one sentence in their notebooks about what they have learned about smell.

EXTENSIONS

- If students have questions about the taste, "bitter," allow them to sample small pieces of unsweetened (bitter) dark chocolate.
- Have students identify foods or drinks that have a combination of tastes. [For example, sweet and sour sauce, sweet and salty candy, or bittersweet chocolate.] Conduct a tasting session with some of these items.
- Take a class survey of favorite foods and record the answers on a chart. Determine which tastes are most and least popular. Make a class graph of the numbers of students who select each taste.
- Explore the connection between taste and smell by having students conduct a taste test of lemonade while pinching their noses.

RECOMMENDED RESOURCE

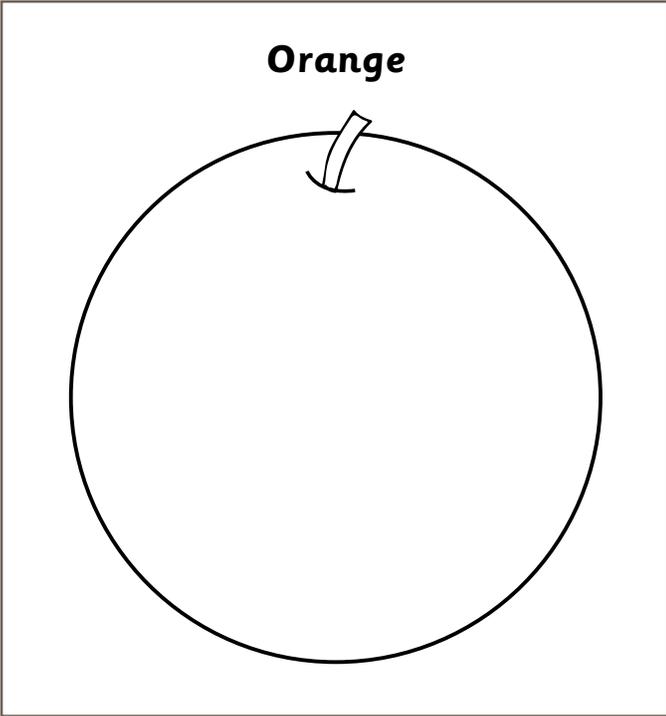
- Rissman, Rebecca. *Smelling (The Five Senses)*. (2010) Heinemann Educational Books. ISBN: 978-1432936877



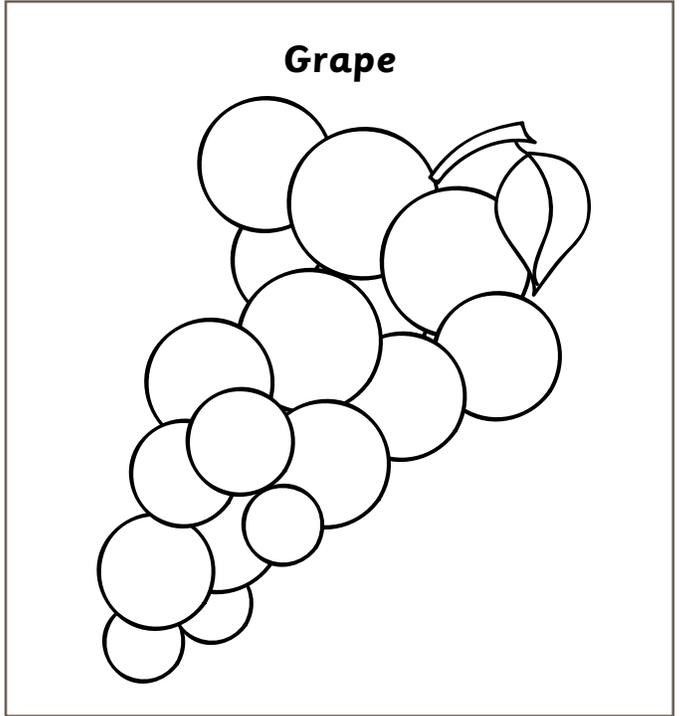
Let's Get Fruity!

Name _____

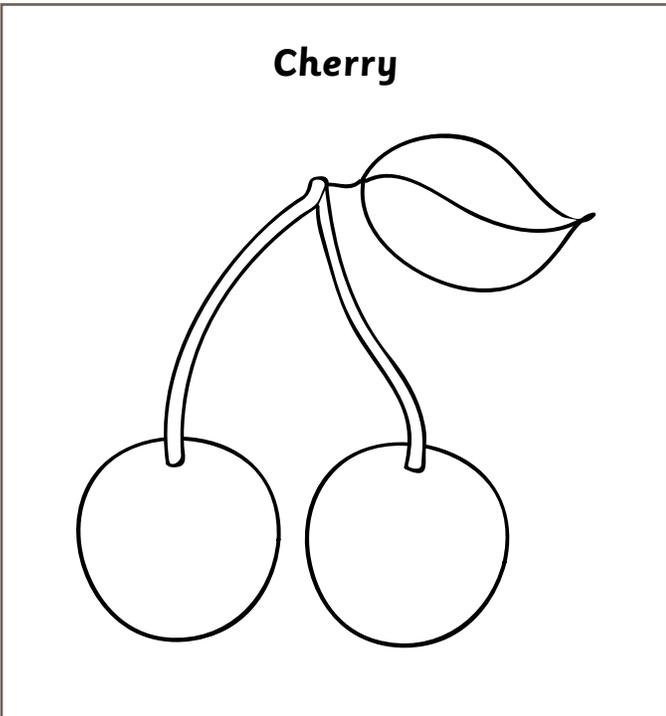
Orange



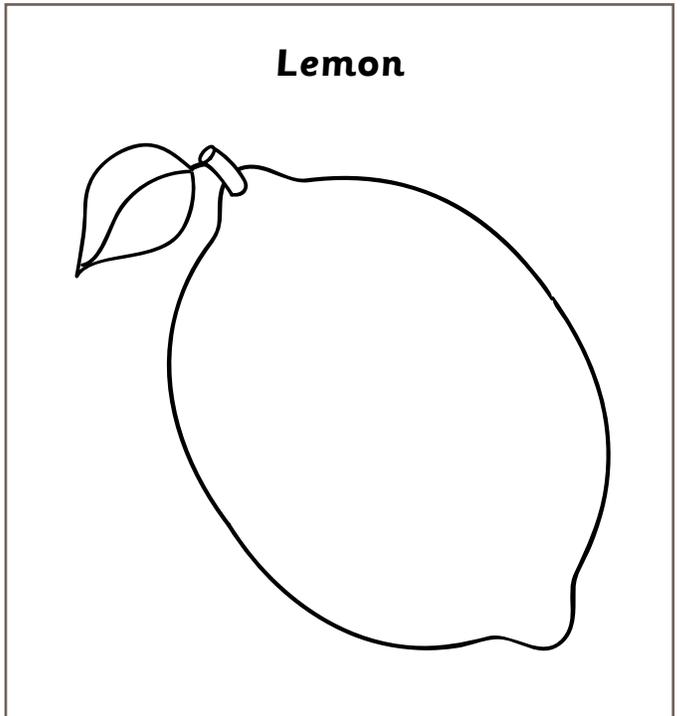
Grape



Cherry



Lemon





My Science Journal

Name _____

Drawing

Key Words to Use

I Observed...
