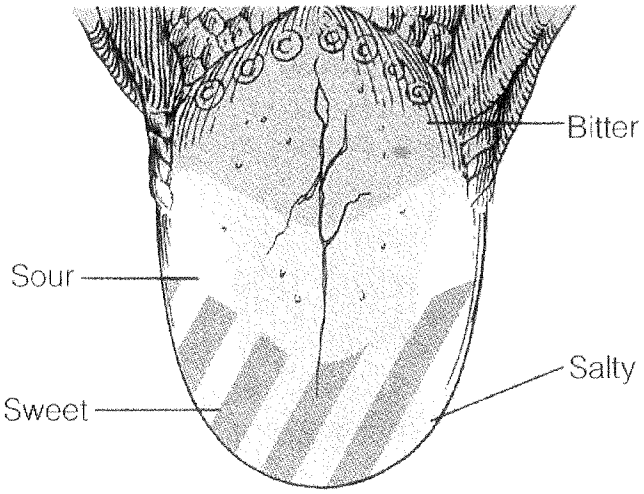
Name _____ Date _____ Period _____

TASTE AND SMELL

INTRODUCTION: Have you ever wondered why food loses its flavor when you have a cold? It's not your taste buds' fault. Blame your stuffed-up nose. Seventy to seventy-five percent of what we perceive as taste actually comes from our sense of smell. *Taste buds* allow us to perceive only *bitter, salty, sweet*, and *sour* flavors. It's the odor molecules from food that give us most of our taste sensation.

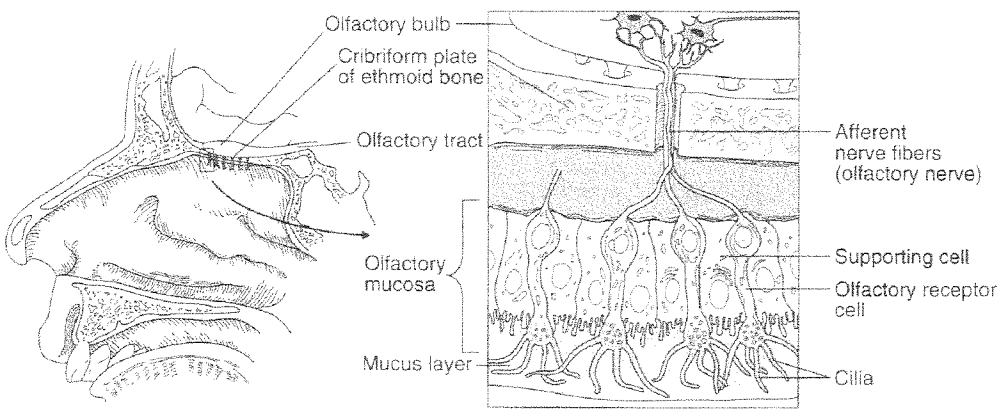
When you put food in your mouth, odor molecules from that food travel through the passage between your nose and mouth to olfactory receptor cells at the top of your nasal cavity, just beneath the brain and behind the bridge of the nose. If mucus in your nasal passages becomes too thick, air and odor molecules can't reach your olfactory receptor cells. Thus, your b rain receives no signal identifying the odor, and everything you eat tastes much the same. You can feel the texture and temperature of the food, but no messengers can tell you brain, "This cool, milky substance is chocolate ice cream." The odor molecules remain trapped in your mouth. The pathway has been blocked off to those powerful perceivers of smell—the olfactory bulbs.



Of all our senses, smell is our most primal. Animals need the sense of smell to survive. Although a blind rat might survive, a rat without its sense of smell can't mate or find food. Watch an animal when it checks a new place. Which sense does it use first? Yes, it samples the smells to decide on safety or danger (or edibles). For humans, the sense of smell communicates many of the pleasures in life – the aroma of a pot roast in the oven, fresh-cut hay, a rose garden. Smells can also signal danger, fear, or dread.

Although our sense of smell is our most primal, it is also very complex. To identify the smell of a rose, the brain analyzes over 300 odor molecules. The average person con discriminate between 4,000 to 10,000 different odor molecules. Much is unknown about exactly how we detect and discriminate between various odors, But researchers have discovered that an odor can only be detected in liquid form. We breathe in airborne molecules that travel to and combine with receptors in nasal cells. The cilia, hair-like receptors that extend from cells inside the nose, are covered with a thin, clear mucus that dissolves odor molecules not already in vapor form. When the mucus becomes too thick, it can no longer dissolve the molecules.

Animals depend on odors secreted from their bodies to communicate. For humans, odors communicate a variety of messages, depending on the odor and the person receiving it. The aroma of a baking apple pie sends one message when someone is hungry and quite another when the person has just finished a six-course meal!



THE TASK:

- Test your classmates' sense of taste and smell to find out which sends the clearest message to the brain
- Recapture a "smell" memory

RESOURCES / MATERIALS:

- 6 small paper bags
- 6 small scoops of mini jelly beans in three different flavors
- Marking pens

ACTIVITIES AND PROCEDURES:

1. With the marking pen, identify the bags as either taste or smell bags. Write "taste #1", "taste #2," and "taste #3" on three of the sacks and "smell #1," "smell #2," and "smell #3" on the other three sacks.

2. Divide jelly beans among the bags so that you have a "taste" bag and a "smell" bag for each of the three flavors. Taste #1 and smell #1 jelly beans should be the same, taste #2 and smell #2 should be the same, and so on. Crush a few of the "smell" jelly beans so the odor molecules can escape into the bag. Close the bags by folding down the top.

3. Working with a partner, take turns tasting and smelling the three different jelly beans. As you do this, record which flavor you think it is. Repeat this for each of the bags (both smell and taste bags, a total of 6) Below are the procedures to follow in each test:

- TASTE TEST: *close your eyes* and *plug your nose*. Have your partner choose one of the taste bags and chew on a sample from this bag. In five seconds, record in the data table what flavor you believe the sample to be. Repeat the procedure for the remaining taste bags. A small sip of water between samples will help clear away the previous flavor and provide a more accurate test. If you cannot tell the flavor, record "unknown".

- SMELL TEST: Choose one of the "smell" sample bags. *Close your eyes*, open the bag, and inhale the aroma for 10 seconds. Remove the bag and close the top tightly. Record the flavor of the sample on the data table. Make sure you each repeat this procedure for the remaining 2 bags.

- SMELL AND TASTE TEST: Use "taste" bags again. Repeat the procedure as detailed in the TASTE TEST (above)- but do not hold your noses shut. Be sure, however, that you have your *eyes closed*. Record your guesses in the appropriate column in the data table

4. Recapture a "smell" memory. Put a number of different, fragrant items in separate paper bags-a pine bough, broken cinnamon sticks, mothballs, a cloth sprinkled with baby powder, lemons. Sniff each bag until one brings a strong memory to mind. Write about this memory in the space provided (last page)

DATA TABLE (flavors detected)

	SMELL ONLY	TASTE ONLY	TASTE AND SMELL
FLAVOR #1			
FLAVOR #2			
FLAVOR #3			

QUESTIONS:

1. Which sense, taste or smell, identified the correct flavor most often? _____

_____

2. How were the "taste" messages your brain received different from the "smell" messages? _____

_____

_____

3. Why do you taste more flavor when you chew a jelly bean than when you suck on it? _____

_____

_____

4. If you took the Smell and Taste Test with your eyes open, do you think you could recognize the flavor of a purple jelly bean that has an orange flavor? What data from your tests support your conclusion?

_____

_____

_____

_____

5. How do you think candy makers simulate fruit flavors? _____

6. Write about your "smell" memory below: _____