

**GED 2002 Teachers' Handbook of Lesson Plans**

<b>Content Area</b> Science	<b>Lesson Title</b> <i>Taste and Smell</i>	<b>Correlation to Framework</b> 03.02/03.04	<b>Lesson Number</b> 38
<b>Objectives/Learner Outcomes</b>  At the end of this lesson, the learner will be able to: <ul style="list-style-type: none"> <li>• Define the basic vocabulary words</li> <li>• Understand how taste and smell are both important in enjoying or not enjoying the flavor of a substance</li> <li>• Identify the different areas of the tongue most responsible for sweet, sour, bitter, and salty tastes</li> </ul>		<b>Materials/Resources/Internet Sites/Handouts/Worksheets</b> <ul style="list-style-type: none"> <li>• Handout – <i>Smell Versus Taste - Experiment I</i></li> <li>• Handout – <i>Smell and Taste Data Table</i></li> <li>• Handout – <i>Smell Versus Taste - Experiment II</i></li> <li>• Materials for Experiment I               <ul style="list-style-type: none"> <li>○ 6 small paper bags</li> <li>○ 6 small scoops of mini jelly beans in three different flavors (lemon, grape, cherry)</li> <li>○ Marking pen</li> </ul> </li> <li>• Materials for Experiment II               <ul style="list-style-type: none"> <li>○ Lemon juice</li> <li>○ Sugar</li> <li>○ Salt</li> <li>○ Powdered instant coffee</li> <li>○ Cups</li> <li>○ Toothpicks</li> <li>○ Pencils</li> </ul> </li> </ul>	
<b>Pre-Requisite Knowledge</b>  The learner should be able to: <ul style="list-style-type: none"> <li>• Complete a basic experiment</li> <li>• Document data in a chart or table</li> </ul>		<b>Key Words</b> <ul style="list-style-type: none"> <li>• Taste</li> <li>• Taste buds</li> <li>• Odor molecules</li> <li>• Olfactory receptor cells</li> <li>• Nasal passages</li> </ul>	

### **Anticipatory Set/Introduction**

**Ask:** Have you ever wondered why food loses its flavor when you have a cold? Is it that your taste buds aren't working? Probably, not. Taste buds are those little organs all over our tongues that interpret or pick up the sense of what flavors are in our foods and liquids. A cold doesn't change our taste buds. However, a cold does result in a stuffed-up nose. Today, we are going to experiment with how important our sense of smell is to our sense of taste or not tasting.

### **Preview Questions for Lesson**

1. Why does food lose its flavor when you have a cold?
2. What are taste buds?
3. What are the types of taste buds?
4. What are odor molecules?
5. Which is most important to taste – taste buds or olfactory receptor cells? Why?

### **Instructional Outline**

**Say:** Of all of our senses, smell is our most primal. It is so important that in the animal world that smell is needed to survive. A rat or mouse uses smell to mate and find food. Without the sense of smell, a rodent would die. In humans, the sense of smell communicates such things as the aroma of good food or a lovely rose. Smells can also signal danger or fear.

Let's go back to why food loses its flavor when you have a cold. Your taste buds are little organs all over your tongue that interpret or pick up the sense of what flavors are in your foods and liquids. There are four basic types of taste buds: bitter, sour, salty, and sweet. If you didn't have taste buds, everything would taste the same. However, we also sense flavors by using our sense of smell. Seventy to seventy-five percent of what we perceive as taste actually comes from our sense of smell. When you put food in your mouth, odor molecules from that food travel through the passage between the 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. It's the odor molecules from food that give us most of our taste sensation. When you have a stuffed-up nose, these odor molecules can't reach your olfactory receptor cells and food just doesn't "taste."

Today, we are going to test our senses of taste and smell to see which sends the clearest message to the brain. We are also going to test which part of our mouth is most sensitive to certain tastes, such as bitter, sweet, sour, and salty.

<b>Teaching to Different Types of Learners</b>			
	<b>Visual</b>	<b>Auditory</b>	<b>Kinesthetic/Tactile</b>
<b>Process/Activities</b>	<p>After introducing the basic information on taste and smell, provide students with copies of the Handout – <b>Smell and Taste Data Table</b>.  <b>Say:</b> Today, we are going to experiment with the senses of taste and smell to see which one does send the clearest message to the brain. Follow the directions on the Handout – <b>Smell Versus Taste - Experiment I</b>. Before beginning the experiment, ask the group to vote on which will be more accurate in identifying the correct taste: smell, taste, or smell and taste. Briefly discuss the scientific method and tell the group that their hypothesis will be checked at the end of the experiment.</p> <p>After <b>Smell Versus Taste – Experiment II</b> is completed and debriefed, have students complete <b>Smell Versus Taste - Experiment II</b>. Follow the directions on Handout – <b>Smell Versus Taste -Experiment II</b>. You may wish to have the students graph the results of <i>Experiment II</i>.</p> <p>Debrief the activity by having the students summarize in a short paragraph what they learned about smell and taste.</p>		
<b>Product/Evaluation/Summary</b>	<p>When students have completed this lesson, they will provide the teacher with a:</p> <ul style="list-style-type: none"> <li>• copy of the completed charts;</li> <li>• answers to the debriefing questions; and</li> <li>• a short paragraph summarizing what they learned about smell and taste.</li> </ul>		
<b>Learning Activity</b>	Write the instructions for the experiments on the board or provide them as a handout for students so that they can easily follow the steps.	Review the instructions orally with students so that they can both see and hear all directions.  Have students work in groups where they can give their results orally.	Experiments are the types of hands-on activities that assist the kinesthetic/tactile learner in better understanding written information. Additional experiments can be added for more involved learning.
<b>Special Differentiation Strategies</b>	Use transparencies or a whiteboard to write directions for the experiments.	Pair students with visual learners who can read the directions to the experiments aloud.	Provide additional hands-on types of experiments to explain the different concepts. Use models or pictures to assist students in better visualizing where the different taste sensations are the most strong.

<p><b>Evaluation</b></p>	<p>Have students write their results and draw a chart or graph to visually depict what they found.</p>	<p>Have students orally report the findings of their experiments.</p>	<p>Have students demonstrate how each part of the experiment should be conducted.</p>
<p><b>The Family and Adult Literacy Connection</b></p> <p>Experiments can be a fun activity for parents to do with their children. Students with children may wish to replicate the experiments done in class at home. They can also simplify the experiment dependent on the age of the child. An example would be to have their children see whether they can tell the difference between an apple and a potato by only using their sense of smell. Have students cut a piece of apple and a potato into the same size pieces. Have them tell their children to close their eyes, plug their nose, and lick one of the pieces. Once their children guess what they have just licked, they should unplug their nose and eat the piece. Children will readily identify what they are eating. Parents can then talk about how the sense of smell and taste is important and how we should take care of these important senses.</p>		<p><b>ESE/ESOL Accommodations</b></p> <ul style="list-style-type: none"> <li>• Pair stronger readers with those who may have more limited reading skills to assist in reading directions and completing the charts.</li> <li>• Provide only one step of an experiment at a time to students who have difficulty in multi-tasking.</li> <li>• Provide students with different examples of sweet, sour, bitter, and salty so that they understand how the word relates to the taste.</li> </ul>	

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### Smell Versus Taste – Experiment I

#### Materials

- 6 small paper bags
- 6 scoops of mini jelly beans in different flavors (lemon, grape, cherry)
- Marking pen
- Data sheet
- Paper cups and water

Objective: Have the students hypothesize which of the following – taste or smell – will send the clearest message to the brain.

1. With the marking pen, identify the bags as either taste or smell. 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 the 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 that the odor molecules can escape into the bag. Close the bags by folding down the top.
3. Before the test, choose three students as testers and provide them with the data sheet on the following page.
4. Taste Test: Instruct the testers to close their eyes and plug their noses. Choose one of the taste bags and instruct each tester to chew on a sample from this bag. In five seconds, ask each tester to record on their data table what flavor they 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 students cannot tell the flavor, have them record “unknown.”
5. Smell Test: Choose one of the “smell” sample bags. Have testers close their eyes, open the bag, and inhale the aroma for 10 seconds. Remove the bag and close the top tightly. Have the testers record the flavor of the sample on the data table. Make sure that each student repeats this procedure for the other two samples.
6. Smell and Taste Test: Use the “taste” bags again. Repeat the procedure as in step #4, “Taste Test,” but do not have the testers hold their noses shut. Be sure, however, that they have their eyes closed. Ask each student to record their guesses in the appropriate column on the data table.

#### Debriefing 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. How do you think candy makers simulate fruit flavors?
4. Why do you taste more flavor when you chew a jelly bean than when you suck on it?
5. 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?

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**Smell and Taste Data Table**

	<b>Smell Only</b>	<b>Taste Only</b>	<b>Smell and Taste</b>
<b>Flavor 1</b>			
<b>Flavor 2</b>			
<b>Flavor 3</b>			

*Where's the Flavor?* Newton's Apple. Retrieved from the World Wide Web on 05/14/04  
at:  
<http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/newton/tstesml.html>.

## GED 2002 Teachers' Handbook of Lesson Plans

### Smell Versus Taste – Experiment II

#### Materials

- 4 cups labeled and containing salt, sugar, lemon juice, and instant coffee
- Toothpicks
- Pencil

Objective: Have the students taste the different foods and identify on which part of the tongue the food is tasted.

1. Have students use a toothpick and dip it into a cup of one of the substances: salt, sugar, lemon juice, or instant coffee. Have them place the toothpick on the different areas of the tongue to see where the strongest sensation of taste for a particular substance exists. Have the students put a check in the selected box on the chart for each taste.
2. Have the students repeat the process for each substance. Make sure that they use new toothpicks each time.
3. Discuss how certain tastes are experienced more intensely than others on different parts of the tongue.

#### Taste Chart – Which Part of the Tongue Is It?

	Tip	Back	Edges
Lemon Juice (Sour)			
Coffee (Bitter)			
Sugar (Sweet)			
Salt (Salty)			

*Reach Out Michigan*. State of Michigan. Retrieved from the World Wide Web on 05/14/04 at:  
<http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/tastebud.html>