

Grade 2: Nutrition

Lesson 3: Using Your Sense of Taste

Objectives:

- ✓ Students will identify the following tastes: **sweet, salty, sour, and bitter** (optional—**pungent**).
- ✓ Students will create snacks that include a variety of tastes.
- ✓ Students will report food eaten during one day and list the tastes.
- ✓ Students will recognize that the various tastes begin the digestive process by stimulating salivation.
- ✓ Students will identify the basic food groups.

Materials:

- Sugar, salt, lemon juice, and parsley
- A selection of foods that taste sweet (raisins), salty (saltine cracker), sour (green apple), and bitter (romaine lettuce.) (Refer to the chart in the Background Information section.)
- Plastic spoons (three per student)
- Plastic cups (four per group)
- Food Chart (**See Figure 1**)
- Evaluation (**See Figure 2**)
- Optional Enrichment Activity (**See Figure 3**)

Activity Summary:

In this lesson students will taste a variety of foods and classify them into categories based on tastes: **sweet, salty, sour, and bitter**.

Background information for the teacher:

The **sense of taste** is an important part of the **digestive process**. The basic tastes stimulate different **salivary glands** and begin the process of digestion in the mouth. The act of chewing mixes the food with the saliva and gets the body ready to receive the food.

The tongue has **taste buds** that respond to food, working in combination with the sense of smell. Different parts of the tongue respond to the different tastes. The **front and sides** of the tongue react to the **sweet** taste, while the **back** of the tongue reacts to the **bitter** taste. The sense of taste and smell work together. In fact, when you smell food cooking your digestive system is already starting to work—the digestive juices flow and your mouth often begins to salivate. (This is why food that is cooked in the microwave may not seem as appetizing as food that has been cooked on the stove or in the oven—the smells of cooking are minimal and the digestive juices haven't been stimulated.)

The sense of taste (along with the sense of smell) is also how our bodies evaluate if a food will be good for us. Often, food that is spoiled will have a smell and taste that we reject. However, we also become accustomed to certain tastes and tend to reject anything that seems new or different.

For example, if our diet consists largely of foods that are sweet and salty, we can reject anything that tastes sour or bitter. This is not in our best interests, however, as many fruits and vegetables taste bitter and sour to a greater or lesser degree.

That makes it important to introduce children to a wide range of tastes early and let them experiment. Children don't have to like all foods initially, nor should they be forced to eat foods they truly dislike (this can sometimes—but not always—indicate an allergy). However, it is healthy and helpful to provide children with a wide range of tastes to choose from. If children gravitate toward the sweet and salty tastes exclusively, at least provide them with healthy choices from those tastes.

Anyone who eats a diet of mainly processed and packaged food is eating predominantly salty and sweet tastes. The amount of salt and sugar that is added to packaged food is appalling. One way to help students retrain their taste buds is to focus on the sweet and salty tastes as they occur in nature. For example, have them sample sweet fruits such as raisins, dates, and bananas. Or have them taste honey and real maple syrup. For salty tastes, have them nibble on some dried kelp or taste natural soy sauce.

An important thing for students to understand is that all the tastes are important, and none should be left out. In fact, a meal that includes all four tastes—sweet, salty, sour, and bitter (or five, if you include pungent)—is more digestible because it causes the digestive system to work more effectively.

There are traditional diets such as some Chinese and East Indian cooking that center around creating meals that include the five tastes. Many **ethnic cuisines** automatically include the five tastes, including Italian, Mexican, Greek, Thai, Vietnamese, and the already mentioned Chinese and Indian.

The sour flavor is used in many cuisines to make the meal more digestible. For example, German and Korean cooking both used pickled vegetables (sauerkraut and kimchee) to help stimulate digestive juices and make the meat course more digestible. Pickled foods and sour foods such as yogurt contain good bacteria that help the digestive system break down food.

Cuisines from hot countries often include the pungent taste in the form of chili peppers or strong spices such as cinnamon, cloves, and nutmeg. In this case, the pungent spices serve to warm the digestion, which has the ultimate effect of cooling the body. When the digestion is warmed, sweat glands open up and the

body releases a certain amount of heat. After releasing the heat, the body is able to cool down.

In this lesson students will be encouraged to taste different kinds of food. Often the sour and bitter tastes aren't popular with children. However the bitter taste is present in many vegetables. Cultivating an appreciation for a certain amount of bitter flavor will help children eat vegetables.

One way to encourage children who don't like the bitter taste is to combine it with sweet and salty in a snack or a meal. For example, celery (bitter) with peanut butter (sweet and salty) makes a good snack. Another example is broccoli (bitter) with melted cheese (sweet and salty). Experiment with these kinds of combinations in this lesson and encourage students to experiment at home. In addition to making the bitter taste more palatable, the combination of sweet, salty, and bitter is more digestible than any one taste on its own.

Have students investigate the different food groups and how they relate to the tastes. The new Choose My Plate guide from the Department of Agriculture (www.choosemyplate.gov) illustrates the basic food groups—grains, vegetables, fruits, dairy, and meat & beans. It also includes guidelines for the number of servings a person should eat each day from each group.

Some samples from the food groups and their associated tastes are given below:

FOOD TASTES CHART

| | Sweet | Salty | Sour | Bitter | Pungent |
|---|--|---|--|---|----------------|
| Grains | Wheat Rice Oats | | | Quinoa Amaranth | |
| Vegetables | Yams Sweet potatoes | | Pickles Sauerkraut (any pickled vegetables) | Celery Broccoli Lettuce Most dark green vegetables | |
| Fruits (Most fruits can be categorized as a combination of sweet and sour.) | Apples Oranges Tangerines Pears Peaches Plums Nectarines | | Lemons Limes Apples Oranges Tangerines | Grapefruit | |
| Dairy | Milk Cheese | Cheese (cheese is also salty because | Yogurt Sour milk Buttermilk | | |

| | | | | | |
|-------------------------|---|---------------------------|-----------------|--|---|
| | | salt is added) | | | |
| Meat & Beans | (Without additional seasoning most meat is considered sweet by traditional cuisines such as the Chinese Five Flavors. Beans can be sweet or a combination of sweet and bitter.) | | | | |
| Spices and Herbs | Sugar Honey Maple syrup | Salt Soy sauce Miso | Vinegar Dill | Oregano Tarragon Marjoram Thyme | Chili pepper Garlic Onions Mustard Cinnamon Nutmeg Allspice Cloves Cardamom |

- **SPECIAL NOTE:** If you have children in your class who bring a knowledge of different ethnic cuisines, take advantage of this opportunity to find out more about what they eat at home. If families are recent arrivals to this country, they may feel pressured to adopt “American” cuisine, but cuisines of different cultures often do a better job of including all the tastes and food groups than our typical American fare (which often emphasizes sugar, fat, and salt—especially in fast foods). Take this opportunity to introduce different cuisines to the entire class.

Vocabulary:

Taste – to distinguish the flavor of something by taking into the mouth

Taste buds – receptor cells on the tongue

Tongue – the principal organ of taste

Sweet – having the taste of sugar

Salty – having the taste of salt (sodium chloride)

Sour – having a taste characteristic of that produced by acids (sharp, tart)

Bitter – a taste that is sharp, acrid and unpleasant

Pungent – sharp acrid sensation affecting the organs of taste or smell

Engage:

1. Organize the class into four or five teams of four students each. Assign roles to each student: 1) Reporter; 2) Recorder; 3) Materials Manager; 4) Cleaner.
2. Prepare four plastic cups for each group. One will contain a small amount of sugar, one of salt, one of lemon (about 1/8 cup) and one a few sprigs of parsley. (Prepare the cups where students can't see you so the prediction exercise is more effective.) Don't hand the cups out yet—you will ask students to **predict** before they taste each substance. Give each “materials manager” enough plastic spoons so that there are three spoons for each child.

3. Have the teams sit together at tables or on the floor. Tell students they will be exploring different tastes today. But first they must test their taste buds.
4. Hold up the cup containing **sugar** and ask students to guess what it is and how it might taste. Next, have the materials manager from each team take a cup back to his teammates and have each student **smell** the contents, guessing what it is simply by the smell. Next, have each student take a few grains of the sugar on a spoon and taste it, and have the team's recorder write down the group's guesses after they **smell** and after they **taste** the sugar. Let the group discuss/record for a minute, then ask the reporter what their group thinks that taste is. When someone volunteers the word "**sweet**" write that on the board.
5. Next, hold up a cup with **salt**, going through the same process as with the sugar. (You'll be trying to get them to describe it as "salty.")
6. Now hold up a cup with **lemon juice** (may be slightly diluted) and go through the process once again. (This time you're looking for the term "sour.")
7. Finally, tell students they will be trying **one more** taste and go through the process one last time, this time with sprigs of parsley in the cup. After asking if they know what it is and having them predict how it will taste, have the materials manager have each student smell and taste the parsley, while the recorder writes down their reactions. Ask students if they know what it is. Have them predict what it is and how it will taste. Have the materials manager get a cup to take back to their table and have each student take a sprig. After each student smells it and guesses what they think it is based on the smell, have them taste it and write down their reactions. If no one volunteers the word "**bitter**," supply that word as a description and tell students that some foods are bitter and that perhaps *enjoying* them may be an *acquired* taste.
8. Now that students have been introduced to the four basic taste sensations (**sweet, salty, sour, and bitter**) explain that they will be exploring those tastes in this lesson.

Explore:

Using the **Food Chart** (located in the Background Information section of this lesson), select a number of different foods that taste **sweet, salty, sour, and bitter**, making them available for tasting. (If it is impossible to use actual food, then use *pictures* of food items and have students *imagine* the tastes.)

Have students look at the categories on the board and draw a table with those category headings. Tell them they will be **making lists of foods for each category**, but **first** they will **taste some foods** you've brought and put them into the appropriate category. Have the materials manager get food items (one at a time) for their group and have students taste these foods one at a time, deciding whether the food tastes sweet, salty, sour, or bitter. (Some foods may have a combination of tastes, so ask students which taste is **dominant**.)

Explain:

1. Have the students share their results, using the discussion to present information about the tastes. (Note: You may want to give students the **Tastes Chart** in the Background Information section as a handout. (See **Figure 1**)
2. After the discussion, have students try to think of *more* foods that belong in the four categories. Once you have a variety of foods on the board, ask students if they can **create a snack that includes at least THREE tastes**. Create one snack as an example: for instance, celery (bitter) with peanut butter (sweet and salty.)
3. Ask: ***“What is a food that you really like?”*** (Pizza.) Ask: ***“Which Body System helps you use the pizza or other food you eat?”*** (The Digestive System.) ***“If I brought in a hot, cheesy, scrumptious pizza and placed it right in front of you but wouldn’t let you eat it, what would happen within your Digestive System?”*** (The mouth would start producing saliva.) ***“What CAUSES your mouth to begin producing saliva?”*** (The smell of the pizza.)
4. Ask: ***“What food do you really DISLIKE?”*** (Possible answer: Liver.) ***“If you had to smell that food would your mouth begin producing saliva?”***
5. ***“When you see the delicious pizza and smell the aroma, what does your stomach start doing? What does your esophagus start doing?”*** (Review this information and connect it to the first lesson.)
6. Ask: ***“What do we use to TASTE food?”*** (The tongue.) ***“What is in the tongue that helps us detect different tastes?”*** (Our taste buds.)
7. Introduce the idea that different parts of the tongue detect different “tastes.” Draw a large tongue on the board, then label each part of the tongue:

BITTER – back of the tongue
SOUR – side back of the tongue

SALT – side front of the tongue
SWEET – front tip of the tongue

Extend:

- Have the students work in groups and create two or three snacks that include three of the tastes. (Another possible activity is to have each group design a pizza that has all four tastes.)
- Have the students use the chart on the board for ideas. One student in each group should be the recorder and write down the components of the snack.
- Have the reporter from each group come up to the board and share their snack. Write the different snacks on the board.
- As each group shares their snack ideas, have the group as a whole **identify** the food groups each part of the snack comes from. Write that food under the appropriate food group listed on the board, drawing conclusions and looking for patterns. (See if different tastes in one snack indicates that the snack includes food from the different food groups.)

(Note: If possible, this could also be extended into a **home activity** in which the student and parent create a snack that includes the four tastes. The student would need to write down the snack's ingredients and bring it back to class.)

Evaluate:

Give the students a diagram of the tongue without the taste areas indicated (**see Figure 2**) preferably on pink or red paper. Have students divide the tongue into sections, labeling the sections according to taste, and naming two foods for each taste. Have the students draw a picture of that food or cut one from a magazine, label it and place it in the appropriate portion of the tongue diagram. Have the students indicate which food group each food belongs.

Optional Enrichment Activity:

Have students report for one day the tastes they ate the day before. Begin the day by having each student record one meal or snack that included at least three tastes. Post these on the board as examples.

The following activity may be assigned as homework **or** done at school after lunch: for each meal of the day, pick one food, write it down, taste it, and think about what taste it is. Then color in the appropriate part of the tongue that detected that taste. Have students choose one taste for breakfast, lunch and dinner, then bring the paper back to school. (**See Figure 3**) As a large group have students report and graph their data, drawing conclusions and considering the following questions: What do we taste **MOST** often? What do we taste or eat **LEAST** often?

Missouri Standards:

Frameworks: Health and Physical Education

II. Health Maintenance and Enhancement

B. Nutrition Principles and Practices

What all Students Should Know:

1. Basic nutrition and principles of nutrition (food sources, Choose My Plate, and essential nutrients) are necessary for an understanding of how nutrition and health are interrelated.

What All Students Should Be Able To Do:

- b. Categorize foods into the appropriate food group on the Choose My Plate visual diet on primary nutrient content.

What All Students Should Know:

2. Balance, variety, and moderation in diet will enhance and promote health.

What All Students Should Be Able To Do:

- a. Make informed decisions regarding food choices based on the understanding of balance, moderation and variety.

Figure 1: Food Tastes Chart

FOOD TASTES CHART

| | Sweet | Salty | Sour | Bitter | Pungent |
|---|---|---|--|---|---|
| Grains | Wheat Rice Oats | | | Quinoa Amaranth | |
| Vegetables | Yams Sweet potatoes | | Pickles Sauerkraut (any pickled vegetables) | Celery Broccoli Lettuce Most dark green vegetables | |
| Fruits (Most fruits can be categorized as a combination of sweet and sour.) | Apples Oranges Tangerines Pears Peaches Plums Nectarines | | Lemons Limes Apples Oranges Tangerines | Grapefruit | |
| Dairy | Milk Cheese | Cheese (Cheese is also salty because salt is added.) | Yogurt Sour milk Buttermilk | | |
| Meat & Beans | (Without additional seasoning most meat is considered sweet by traditional cuisines such as the Chinese Five Flavors. Beans can be sweet or a combination of sweet and bitter.) | | | | |
| Spices and Herbs | Sugar Honey Maple syrup | Salt Soy sauce Miso | Vinegar Dill | Oregano Tarragon Marjoram Thyme | Chili pepper Garlic Onions Mustard Cinnamon Nutmeg Allspice Cloves Cardamom |

Figure 2: Large – full sheet tongue with the different areas of taste divided.
Tongue with lines of division between the different areas of taste.

Figure 3: On the right side of the paper we need three small tongue pictures.

Nutrition

Name: _____

Breakfast

Food: _____

Taste: _____

Lunch:

Food: _____

Taste: _____

Dinner:

Food: _____

Taste: _____