Sensory Perception

Unit: Culinary Science

Problem Area: Food Science

Lesson: Sensory Perception

Student Learning Objectives.

Instruction in this lesson should result in students achieving the following objectives:

1. **Review the five senses and the five taste senses.**
2. **Analyze the sensory evaluation panel process.**
3. **Summarize sensory food combinations.**

Resources.

The following resources may be useful in teaching this lesson:

E-unit(s) corresponding to this lesson plan. CAERT, Inc. http://www.mycaert.com.

"Food Sensory Testing," *YouTube.* Accessed Nov. 12, 2014. http://www.youtube.com/watch?v=sVsglhn-h3M.

Hashmi, Irfan. "Sensory Evaluation Technique," *18th Annual IAOM Conference.* Accessed Nov. 12, 2014. http://www.iaom-mea.com/EduMat/Dec11/Session5/Tech10-AGF-IAOM-Muscat-07.pdf.

"It Seemed Like a Good Idea at the Time," *NBC News.com.* Accessed Nov. 12, 2014. http://www.nbcnews.com/id/7209828/ns/us_news/t/it-seemed-good-idea-time/.

Oliveira, Alexandra. "Sensory Evaluation of Foods," *University of Alaska*. Accessed Nov. 12, 2014. http://www.sfos.uaf.edu/fitc/teaching/courses/FSN261/lectures/261_Lecture_18_Sensory_evaluation_(white)_3-2-2011.pdf.

"Sensory Evaluation: Teachers' Guide," *Food: A Fact of Life.* Accessed Nov. 12, 2014. http://www.foodafactoflife.org.uk/attachments/276dbf05-695c-44942bb55825.pdf.

Equipment, Tools, Supplies, and Facilities

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

Key Terms.

The following terms are presented in this lesson (shown in bold italics):

- astringent
- cilia
- flavor
- glutamates
- gustation
- hedonic
- mouthfeel
- palate
- papilla
- pungent
- saccharide
- savory food
- sensory evaluation
- sensory perception
- sensory science
- umami
- volatile

Interest Approach.

Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

> *Lead a discussion on this topic: "What Is Sensory Science?" Use VM–A to guide an initial discussion of sensory perception and sensory science. Then add more questions.*

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Review the five senses and the five taste senses.

Anticipated Problem: What are the five human senses, and what are the five taste senses?

I. Sensory perception in food preparation

A. ***Sensory perception*** is an understanding gained through the use of one or more of the senses. The senses of taste, smell, touch, sound, and sight impact and solidify one's perception of food and beverages. Naming a fruit after tasting it (while blindfolded) and knowing which song is playing are examples of sensory perception.

1. ***Sensory science*** is the study of the reactions of the five senses to the characteristics of physical matter; physical matter includes foods and beverages. A related and specialized field—psychophysics—measures, analyzes, and interprets psychological stimuli. The goal of sensory science is to determine which characteristics and qualities in a food product matter most to the end-consumer.
2. ***Sensory evaluation*** is a scientific method used to analyze and measure human responses to the composition of food and beverages—appearance, taste, odor, touch, texture, and temperature. It is a structured way to collect and evaluate feedback on products and dishes; researchers follow a strict tasting panel protocol. Tasting panels are an example of a scientific sensory evaluation process.

B. Taste categories

1. Bitter—Bitterness is an unpleasant or sharp taste. It is the least desirable taste. Bitterness is the part of the tongue that detects bases.
2. Salty—Saltiness is a flavor from sodium ions, such as sodium chloride (table salt) and potassium chloride (a salt substitute).
3. Sour—Sourness is the detection of acidity in foods.
4. Sweet—Sweetness is the most desired taste and is produced by sugars, some proteins, and a few other substances. A ***saccharide*** is any sugar or other carbohydrate. Sweet does not necessarily mean "sugary." For instance, beets, tarragon, and onions are all sweet in flavor, but they are not sugary.
5. Savory—Savory literally means "full of flavor" and is a taste commonly found in fermented and aged foods as well as in most meats and appetizers. ***Savory food*** is "meaty" tasting and is the opposite of sweet. This savory, meaty taste indicates the presence of glutamates, which are found in meats, cheeses, and other protein-heavy foods. For example, Parmesan and Roquefort cheeses are

fermented foods that contain free glutamates (resulting in a savory flavor). Glutamates also are present in unfermented foods (e.g., walnuts, broccoli, grapes, and some meat).

a. ***Glutamates*** are the carboxylate anions and salts of the amino acid glutamic acid. Glutamate detection is a relatively recent discovery. For instance, a Japanese scientist isolated monosodium glutamate (MSG)—a food additive often associated with Asian cooking—while conducting research on seaweed broth.

b. ***Umami*** is the Japanese term for "delicious" and is an indication of a savory taste from glutamates. Examples of food containing glutamates are MSG, ripe tomatoes, mushrooms, cured meats, fish, soy sauce, and cheese. It was discovered in 1908 and added as a scientific term in 1985.

6. Other flavors scientists describe are astringent (e.g., saffron) and pungent (e.g., chilies).

a. Saffron, tannins in teas, and other tart foods are called astringent. Saffron is collected from crocus stigma. Astringent foods—lemons, pomegranates, and persimmons—cause the mouth to pucker. In addition, these foods absorb water, tighten tissues, and dry fats. The mouth may feel "dry" when eating astringent foods. An ***astringent*** is any substance that causes tissue to contract, bind, or shrink.

b. Chilies are pungent. The heat and pungency is from the capsaicin (the chemical in chili peppers that makes them spicy) contained in the seeds. Pungent foods stimulate digestion and metabolism. Some of the hottest chilies are Habanero, Scotch Bonnet, South American chinenses, African birdseye, and Indian Tezpur. ***Pungent*** is having a strong taste or smell.

C. Anatomy of sensory perceptions

1. Taste—***Gustation*** is the act of tasting; tasting is detected by taste buds on the tongue. ***Papillae*** are the bumps found on the tongue that enclose hundreds of taste buds each. ***Taste blindness*** is a reduced ability to detect bitter tastes as a result of having fewer taste buds or a lack of gustatory stimuli. Phenylthiocarbamide (PTC paper) can be used to test this genetically recessive trait. People with a cold may experience temporary taste blindness, and a person of advanced age may experience taste blindness.

2. Smell—Odor or smell uses the olfactory organs that connect olfactory cells to the brain. The body responds to odors in the form of a gas. Odors are ***volatile*** (unstable), and volatile odors quickly evaporate at low temperatures. Odors are collected by the ***cilia***—hairs found in the nasal cavity that collect odors and sweep away foreign objects.

3. Sight—Vision is the brain's ability to detect electromagnet waves. The eye lens focuses the rays onto the retina in an upside down manner, and the brain reverses the image in the correct way.

4. Sound—Sound occurs from vibratory changes in air pressure on the eardrums. Foods that make sounds include crisp apples, chips, and crackers. Soft foods have little sound.

5. Touch—Touch is the perception of pressure on the skin or mouth. ***Mouthfeel*** is the physical sensation made by a food or beverage in the mouth or how the food "feels" in the mouth. Mouthfeel is affected by food and beverage temperature and texture. Food texture descriptors include chewy, grainy, crunchy, brittle, and tender.

Teaching Strategy: *Many techniques can be used to help students master this objective. Use VM–B through VM–H. To help students identify the Umami taste of savory, use samples of ripe tomatoes and cheese. The sensory evaluation could be expanded with bitter, sour, sweet, and salty samples.*

Lead a class discussion about the sensory qualities of a favorite food. Design a data table on the board to identify the food qualities. Do the activity in a "Think, Pair, Share" process. Have each student think of the sensory qualities of favorite foods, pair with another student, and discuss their favorite foods. The student pairs share by placing their answers on the board's data table. A food should be placed on the data table once, but different descriptors may be used. A sample data table with more than one student's data added is shown for your use.

DATA TABLE: Sensory Qualities of My Favorite Food

Food Name	*Taste*	*Smell*	*Sight*	*Sound*	*Touch*
Apple	*Sweet* *Tart*	*Fruity* *Sweet* *Sour*	*Red* *Yellow* *Green*	*Crunchy* *Mushy*	• *Firm in hand* • *Crunchy in mouth* • *Grainy in mouth near seeds*

Conduct a taste blindness experiment. Check with the biology department for access to PTC paper, or purchase it from a science catalogue, such as Frey Scientific. Nontasters, those with taste blindness, make up about 25 percent of the U.S. population. Many of us are medium tasters (50 percent), and 25 percent are supertasters. The PTC and the Tongue Test are described at http://discovertheodds.com/taste-blindness/. The Podcasts (three in all) are available free from iTunes at https://itunes.apple.com/us/podcast/what-are-the-odds/id574929324.

Objective 2: Analyze the sensory evaluation panel process.

Anticipated Problem: What is the sensory evaluation panel process?

II. Sensory evaluation panels

A. Panel types

1. Sensory evaluation is a scientific method used to analyze and measure human responses to the composition of food and beverages—appearance, taste, odor, touch, texture, and temperature. It is a structured way to collect and

evaluate feedback on products and dishes. Researchers follow a strict tasting panel protocol. Tasting panels are an example of a scientific sensory evaluation process.

a. A ***blind taste test*** is a method to gather information about the taste of a food or beverage without revealing the brand name. In a blind taste test, the testers do not know what they are tasting. For example, different types of orange juice are presented to the panelists in identical cups (the same plastic cup for all samples), and panelists are asked to taste and profile each sample. In a double blind taste test, the administrator of the sample products does not know the brands.

b. Tasters are typically asked to wear no scent (perfume or cologne as well as lotion), their clothing should be laundered in a neutral detergent, and each tester is isolated in a cubicle. These protocols (procedures) minimize any interference with product testing. Tasters determine the formulation of the final product.

2. Highly trained experts are used to judge the quality of foods (e.g., coffee and wine). They use scientific standards set up by the food company for the evaluation.
3. Laboratory panels are small groups that work at a company. *Cook's Country* food magazine is an example of a company that conducts panel testing of consumer products. Examples of food testing can be found at http://www.cookscountry.com/taste_tests/browse/tv.
4. Consumer panels are often set up at a grocery store or shopping mall to interview and receive feedback from a large number of people. This is a less scientific process and often asks which sample(s) people like or dislike (e.g., yes or no feedback versus descriptors).
5. Panel selection is important to the scientific process. Panelists to avoid include:
   a. Those who have taste or odor disorders
   b. Those who suffer from colorblindness
   c. Those with denture defects
   d. Those affected by allergies, medications, or infections
   e. Those without the sense of taste or smell (sometimes due to advanced age or illness)
   f. Those unable to concentrate on the differences in food

B. Sensory test types

1. Preference tests use descriptors, such as "like and dislike."
   a. ***Hedonic*** (concerned with pleasure) preference tests are used to determine which samples are liked or disliked. A "smiley face" ranking often is used to do sensory testing with children who do not yet read.
   b. Paired preference comparison tests use two samples, and panelists decide which they "like."

c. Scoring may be captured in a 1 to 5 range.
   (1) 1—Dislike very much
   (2) 2—Dislike
   (3) 3—Neither dislike nor like
   (4) 4—Like
   (5) 5—Like very much

2. Discrimination tests are used to evaluate attributes (e.g., sweetness, sourness, crunchiness, and others). Discrimination tests include triangle tests, duo trio tests, and ranking tests.
   a. Triangle tests use three samples. Two samples are the same food product or have the same attributes. A panelist is asked to determine which sample is different. For example, three types of tea are brewed for the same time and at the same strength and temperature. All three samples are of the same size. Two samples contain four teaspoons of sugar, and one sample contains one teaspoon of sugar.
   b. Duo trio tests use three samples with one as the control (a comparative standard in an experiment). One of the two is alike or similar to the control. The tester identifies which sample is the same or similar to the control sample.
   c. Ranking tests are used to compare one attribute, such as sweetness. To rank sweetness, three samples with varied amounts of sugar are prepared. The samples are ranked first, second, and third. This test can be conducted with five food samples.
3. Descriptive tests ask panelists to write descriptions of the food products using vivid and colorful words. For example, star charts/diagrams analyze one food sample by looking at eight attributes. The star shape has eight lines that intersect in the center. Each attribute line is divided into 10 increments. Examples of attributes are crunchy, smooth, spicy, and sweet. The food is ranked for each attribute by placing a dot on the line's increment number.

C. Obtaining valid panel results
1. Eliminating bias (prejudice)
   a. Colored lights can be used to disguise the differences in the color of food items.
   b. The order of the samples can be varied. A contrast effect (giving higher or lower scores) will happen when a higher quality sample is offered just before a lower quality sample.
   c. Three-digit numbers should be used to identify samples. The use of 1, 2, 3 or A, B, C to identify samples has a psychological bias.
   d. Between samples, the palate should be cleansed to remove food residue in the mouth and to neutralize the taste buds. Often warm water is served between fatty samples or a bland food (e.g., an oyster cracker) is served between samples. The ***palate*** is the roof of the mouth. When a person touches the top of his or her mouth with the tongue, he or she is touching the palate.

2. All samples should be served in the same size and at the same temperature.
3. The number of samples should be limited to three. Larger numbers of samples make it difficult for testers to make comparisons.
4. Sensory evaluations should be conducted in late mornings or mid-afternoon when panelists tend to be more alert.
5. One food that comes in a variety of types should be evaluated. For example, people may compare baked, fried, and reduced-fat chips or cooked fresh, frozen, and canned corn.

D. Sensory evaluations in product development and marketing

1. The food industry uses sensory evaluation to conduct Research and Development (R&D). They may be looking for the following reactions:
   a. Consumer preferences
   b. Relationship to competitors
   c. Gaps in existing market
   d. Consumer reaction
2. New Coke vs. Coke Classic (When sensory evaluation did not work)
   a. After two years of taste tests and research, the New Coke formula was marketed on April 23, 1985. In all the taste tests, the New Coke product was preferred over original Coke. The company planned to use the new formula in Coke production.
   b. The company did not take into consideration the emotional attachment people had to the original Coke. People began to hoard original Coke. The public's reaction caused a change in plans. Original Coke was renamed "Coke Classic" and remains in groceries today. In 2009, "Classic" was removed from that label.
   c. In 1992, the "New Coke" name was changed to "Coca-Cola II." In 2009, this product was removed from market shelves in the United States.

Teaching Strategy: *Many techniques can be used to help students master this objective. Use the video "Food Sensory Testing" to introduce sensory evaluation techniques at http://www.youtube.com/watch?v=sVsglhn-h3M. Use VM–I to VM–L to facilitate a discussion. Assign LS–A. The simulated sensory evaluation could divide the class into two teams, each preparing a sensory evaluation for the other half, designing the sensory evaluation for the child care lab, or for use with other classroom students. For examples of sensory tests, access http://www.foodafactoflife.org.uk/attachments/276dbf05-695c-44942bb55825.pdf. For additional information on cola sensory evaluations, research the cola wars of Pepsi and Coke to identify how consumer panels were and are used today.*

Objective 3: Summarize sensory food combinations.

Anticipated Problem: What are sensory food combinations?

III. Sensory food combinations

A. Flavor: genuine and artificial

1. ***Flavor*** is the sensory impression of a food or beverage; it is primarily determined by the senses of taste and smell. Smell is the determining factor of a food's flavor. Taste is limited to bitter, salty, sour, sweet, and savory. Food smell, however, is almost unlimited.
   a. The power of artificial flavors must be considered. For example, most jams and jellies are made of nearly the same type of base ingredients—water, pectin, and sugar. Then flavors—genuine or artificial—are added. Consumer noses detect the aroma.
   b. Flavors and flavorings are edible chemicals—fragrances—that alter the flavor of foods and beverages through the sense of smell.
2. When a person is blindfolded or when his or her nose is plugged, it is difficult to determine the taste of food.

B. Garnishes are used to enhance the plated food. Contrasting colors add appeal. Some examples are:

1. A green parsley sprig on a plate of steak and potatoes
2. Red paprika sprinkled on a meat or vegetable
3. Whipped cream topping on a dessert
4. Chocolate shavings on a dessert
5. Raspberry coulis sauce around chocolate cake
6. A lemon wedge in cola

C. Sensory food combinations

1. Sweet/sour combinations
   a. Sweet and sour pork
   b. Orange chicken
2. Sweet/salty combinations
   a. Caramels with sea salt
   b. Salted watermelon
   c. Chocolate-covered bacon
3. Sweet/savory combinations
   a. Tomato soup served with grilled cheese
   b. Watermelon and feta cheese salad
4. Cold/hot combinations
   a. Hot taco meat salad
   b. Hot fudge sundae

5. Savory/bitter combinations
    a. Indian chicken curry dishes
    b. Beef chili with hot peppers
6. Other combinations
    a. Fat/lean combination in spare ribs
    b. Bitter/salty combination in mustard greens and bacon
    c. Bitter/sour combination in cranberries and grapefruit

> **Teaching Strategy:** *Use VM–M and VM–N to facilitate a discussion. Then have teams or individuals select two slips of paper on which sensory descriptors are written (e.g., sweet, salty, savory, cold, hot, bitter, fat, lean, sour, tangy, spicy, and pungent). No combinations should be alike. Students should design a recipe that combines the selected sensory descriptors. Conduct class presentations of the recipe designs. If time permits, extend the activity by having students prepare the designed recipe and perform a sensory evaluation with a panel.*

Review/Summary.

Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. If a textbook is being used, questions at the ends of chapters may be included in the Review/Summary.

Application.

Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

Evaluation.

Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Matching

1. c
2. f
3. e
4. d
5. h
6. g
7. b
8. a
9. i
10. j

Part Two: True/False

1. T
2. F
3. F
4. T
5. F
6. T
7. F
8. T
9. F
10. T

Part Three: Short Answer

1. Answers will vary but should be similar to the following:
   a. Taste—Gustation is the act of tasting; tasting is detected by taste buds on the tongue. Papillae are the bumps found on the tongue that enclose hundreds of taste buds each.
   b. Smell—Odor or smell uses the olfactory organs that connect olfactory cells to the brain. The body responds to odors in the form of a gas. Cilia are hairs found in the nasal cavity that collect odors and sweep away foreign objects.
   c. Sight—Vision is the brain's ability to detect electromagnet waves. The eye lens focuses the rays onto the retina in an upside down manner, and the brain reverses the image in the correct way.
   d. Sound—Sound occurs from vibratory changes in air pressure on the eardrums. Foods that make sounds include crisp apples, chips, and crackers.
   e. Touch—Touch is the perception of pressure on the skin or mouth. Mouthfeel is the physical sensation made by a food or beverage in the mouth or how the food "feels" in the mouth.
2. The five taste categories and a brief description are:
   a. Bitter—Bitterness is an unpleasant or sharp taste and is the least desirable; it is the part of the tongue that detects bases.
   b. Salty—Saltiness is flavor from sodium ions, such as sodium chloride (table salt) and potassium chloride (a salt substitute).
   c. Sour—Sourness is the detection of acidity in foods.
   d. Sweet—Sweetness is the most desired taste and is produced by sugars, some proteins, and a few other substances.
   e. Savory (or Umami)—Savory literally means "full of flavor" and is a taste commonly found in fermented and aged foods as well as in most meats and appetizers. Savory food is "meaty" tasting and is the opposite of sweet. This savory, meaty taste indicates the presence of glutamates found in meats, cheeses, and other protein-heavy foods.

Sample Test

Name _____

Sensory Perception

Part One: Matching

Instructions: **Match the term with the correct definition.**

a. cilia
b. hedonic
c. gustation
d. palate
e. papillae
f. saccharide
g. umami
h. volatile
i. sensory perception
j. sensory science

_____1. The act of tasting

_____2. Any sugar or other carbohydrate

_____3. The bumps found on the tongue that enclose hundreds of taste buds each

_____4. The roof of the mouth

_____5. Unstable

_____6. The Japanese term for "delicious;" an indication of savory taste from glutamates

_____7. Concerned with pleasure

_____8. Hairs found in the nasal cavity that collect odors and sweep away foreign objects

_____9. An understanding gained through the use of one or more of the senses

____10. The study of the reactions of the five senses to the characteristics of physical matter

Part Two: True/False

Instructions: **Write *T* for true or *F* for false.**

_____1. The eye lens focuses the rays onto the retina in an upside down manner.

_____2. The body responds to odors from solid sources.

_____3. Sound is heard from the vibratory changes in air pressure on the sinus cavity.

_____4. Mouthfeel is the physical sensation made by a food or beverage in the mouth.

_____5. A blind taste test is a method to gather information about the taste of a food or beverage based on the brand name.

_____6. Discrimination tests are used to evaluate attributes such as sweetness, sourness, crunchiness, etc.

_____7. A "star chart" compares three samples in a descriptive test.

_____8. A contrast effect (giving higher or lower scores) happens when a higher quality sample is offered right before a lower quality sample.

_____9. Single-digit numbers are used to identify samples to prevent a psychological bias.

____10. Flavor is the sensory impression of a food or beverage; it is primarily determined by the senses of taste and smell.

Part Three: Short Answer

Instructions: **Answer the following.**

1. List and describe the five senses and their anatomy as they apply to foods and beverages.

2. List and describe the five taste categories.

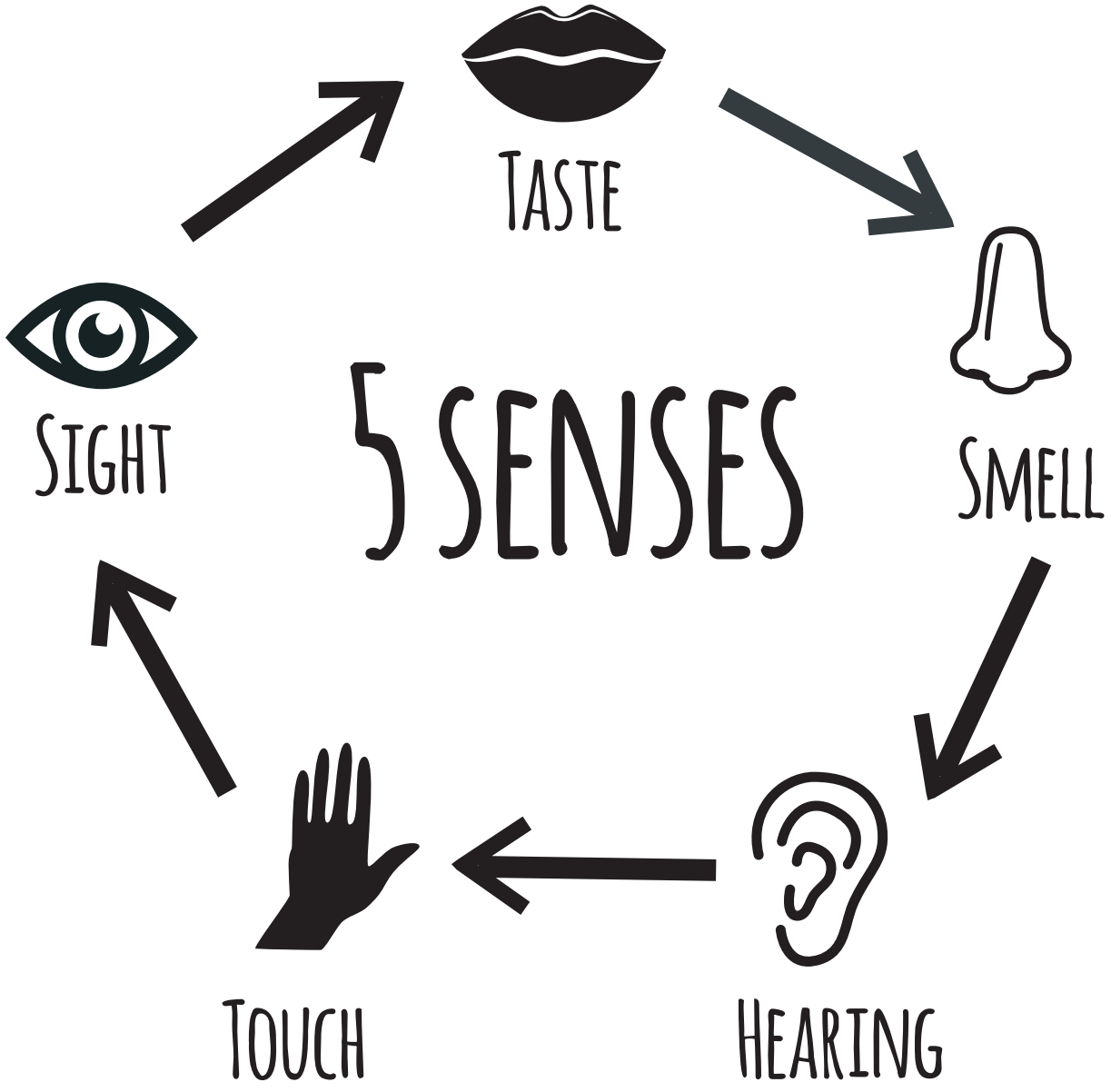
SENSORY SCIENCE DISCUSSION

- What is your favorite food? Identify how each of your senses perceives that food—taste, smell, touch, sound, and sight.
- What attributes are in the food you like? Is this food associated with a happy time?
- Is your favorite food showcased in a commercial?

Discussion may include:

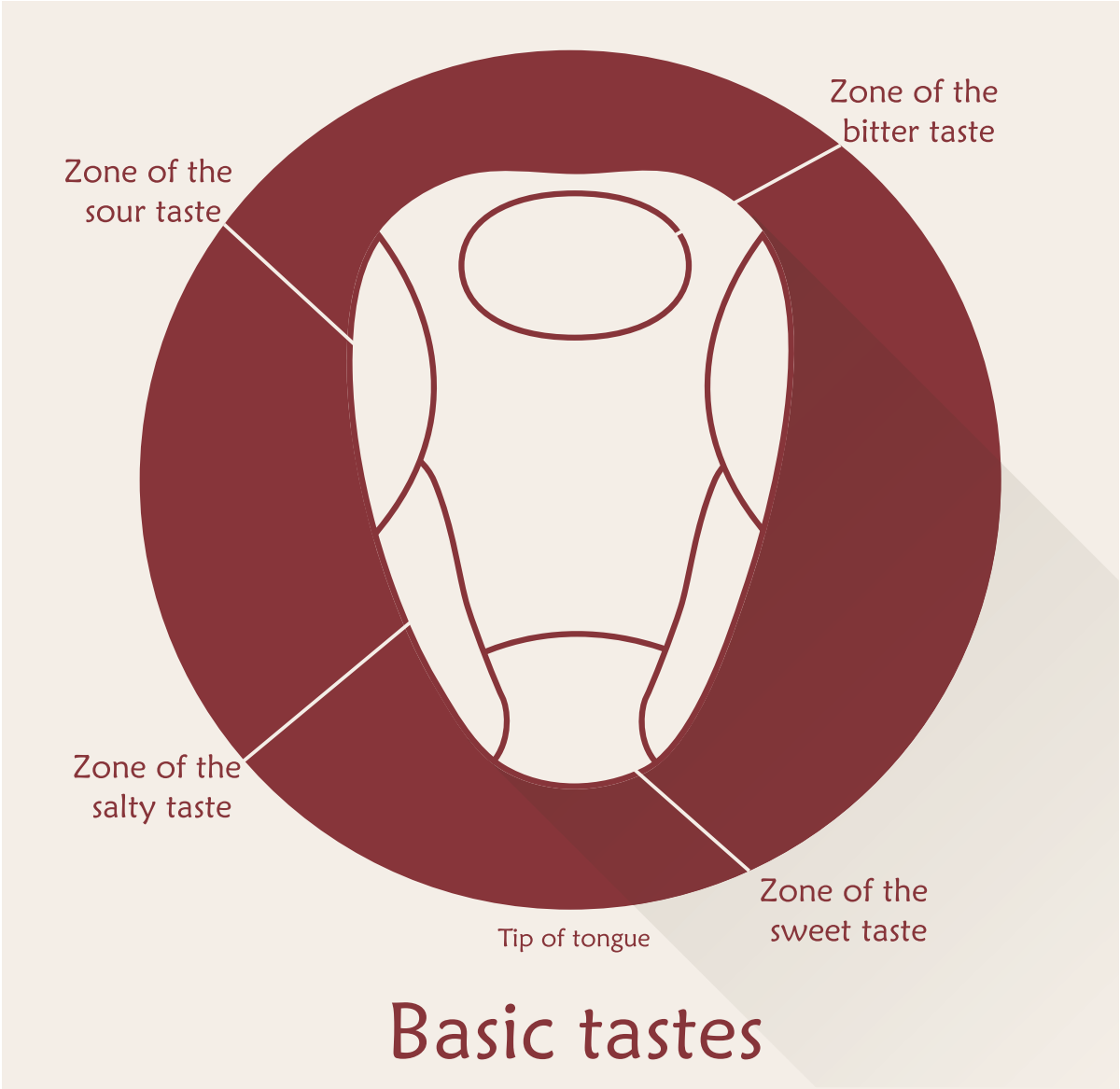
- What are the five taste senses?
- How do we identify attributes (characteristics) in food?
- What is a psychological response to food?
- How do marketing and/or commercials affect food purchases?

THE FIVE SENSES



Sensory science is the study of the reactions of the five senses to the characteristics of physical matter; physical matter includes foods and beverages.

SENSORY PERCEPTION—TASTE



Basic tastes

Sensory perception is an understanding gained through the use of one or more of the senses rather than by intellect. The senses of taste, smell, touch, sound, and sight impact and solidify your perception of food and beverages.

The five taste senses are:

- Bitter
- Salty
- Sour
- Sweet
- Savory (Think of savory as the opposite of sweet and a bit meaty.)

TASTE BLINDNESS

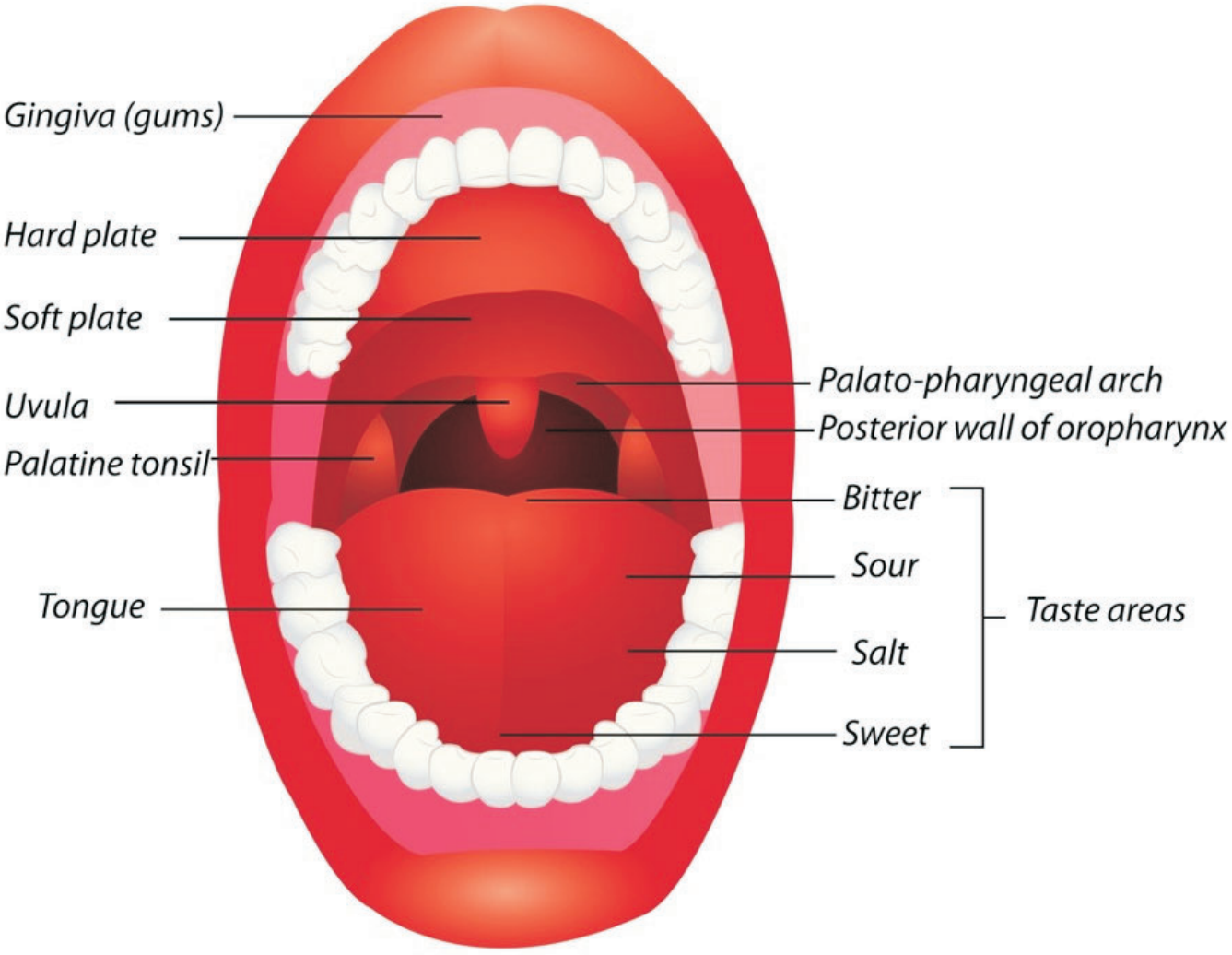
Taste blindness is a reduced ability to detect bitter tastes as a result of having fewer taste buds—a lack of gustatory stimuli. People with a cold may experience temporary taste blindness, and a person of advanced age may experience taste blindness.

MOUTHFEEL

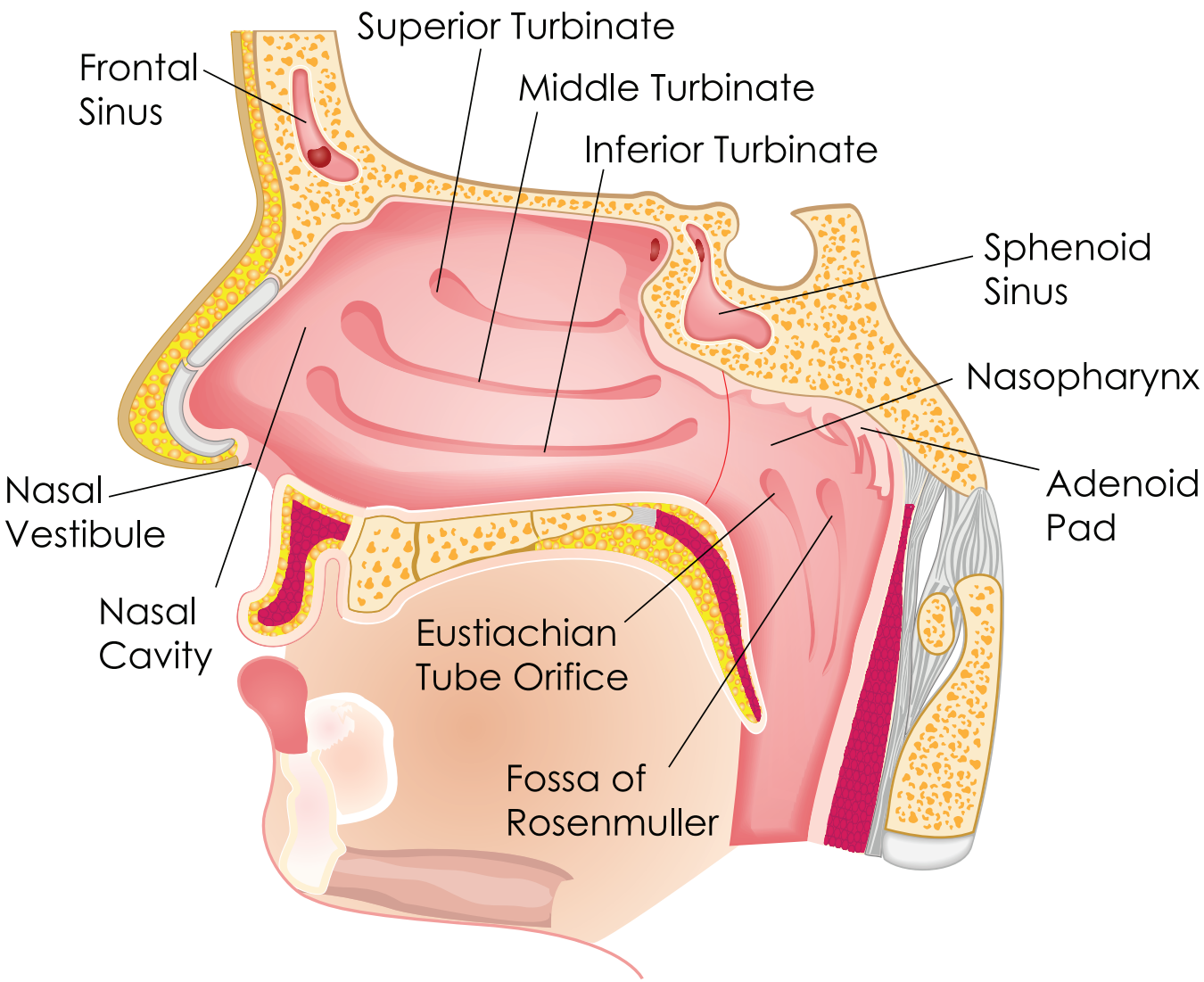
Mouthfeel is the physical sensation made by a food or beverage in the mouth or how the food "feels" in your mouth. Describe the mouthfeel of the cola, apples, crackers, and ice cream cone. Describe each food in terms of texture, sound, smell, and temperature. Which foods have multiple types of mouthfeel?

VM–F

ANATOMY OF THE FIVE SENSES—TASTE AND SMELL

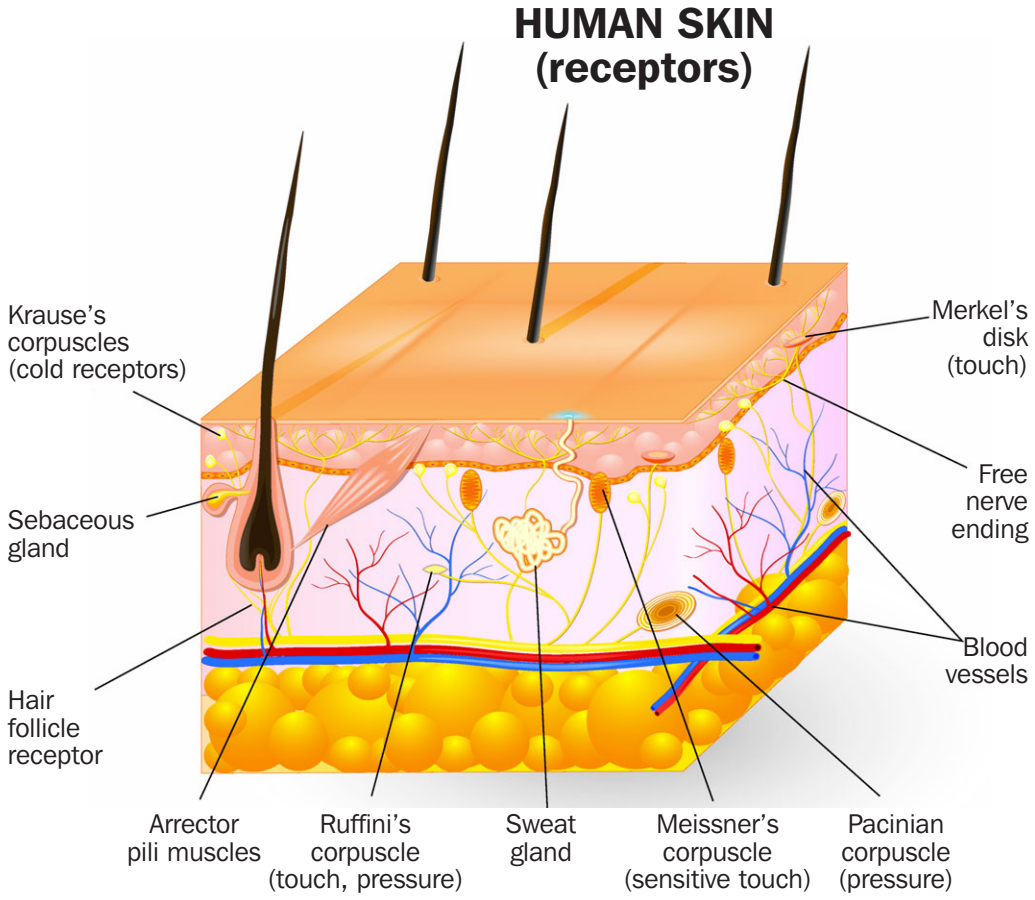


Gustation is the act of tasting; tasting is detected by taste buds on the tongue. Papillae are the bumps found on the tongue; they enclose hundreds of taste buds each.

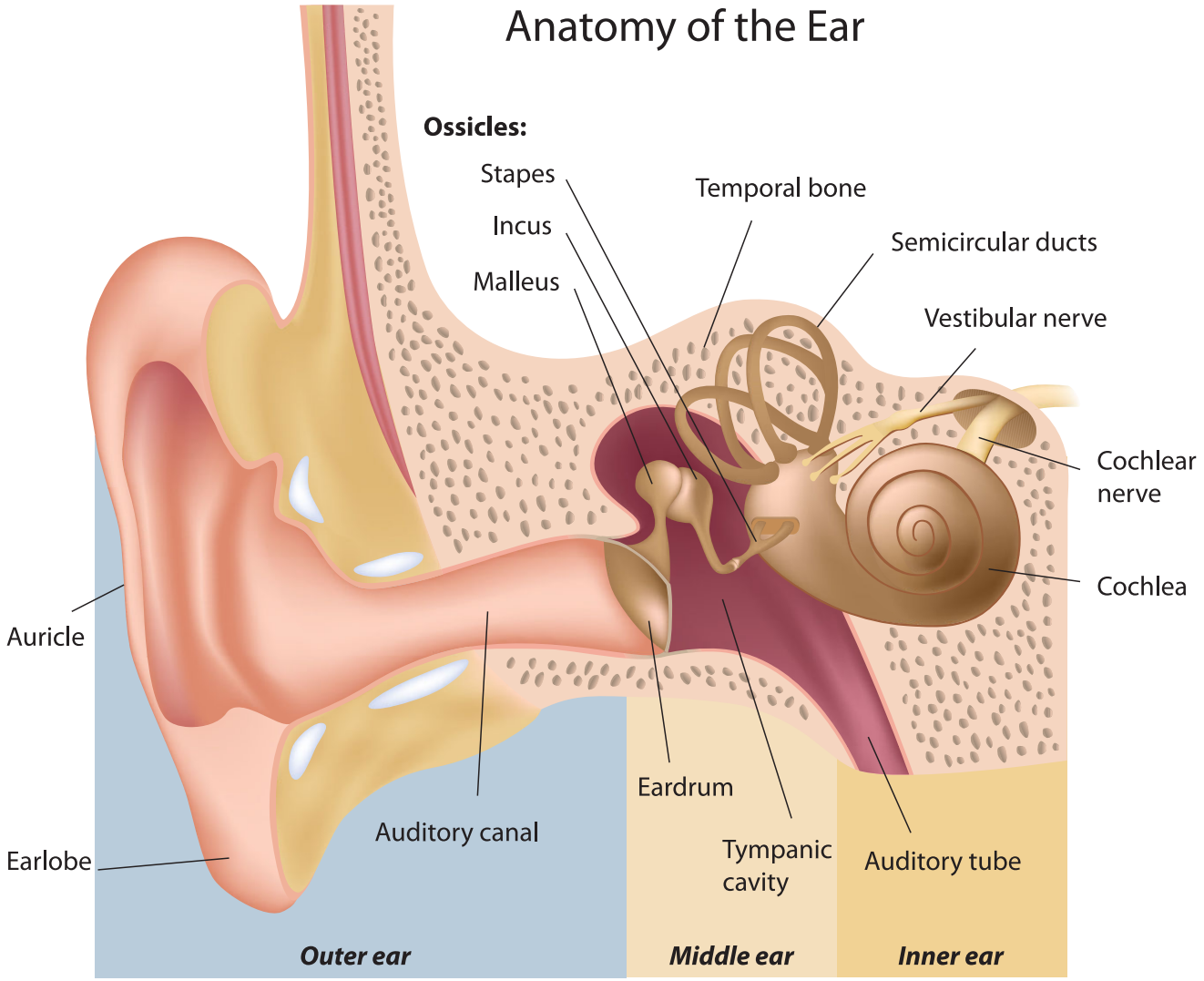


Odor or smell uses the olfactory organs that connect olfactory cells to the brain. The body responds to odors in the form of a gas. Odors are volatile (unstable), and volatile odors quickly evaporate at low temperatures. Odors are collected by the cilia in the nose. Cilia are hairs found in the nasal cavity that collect odors and sweep away foreign objects.

ANATOMY OF THE FIVE SENSES—TOUCH AND SOUND



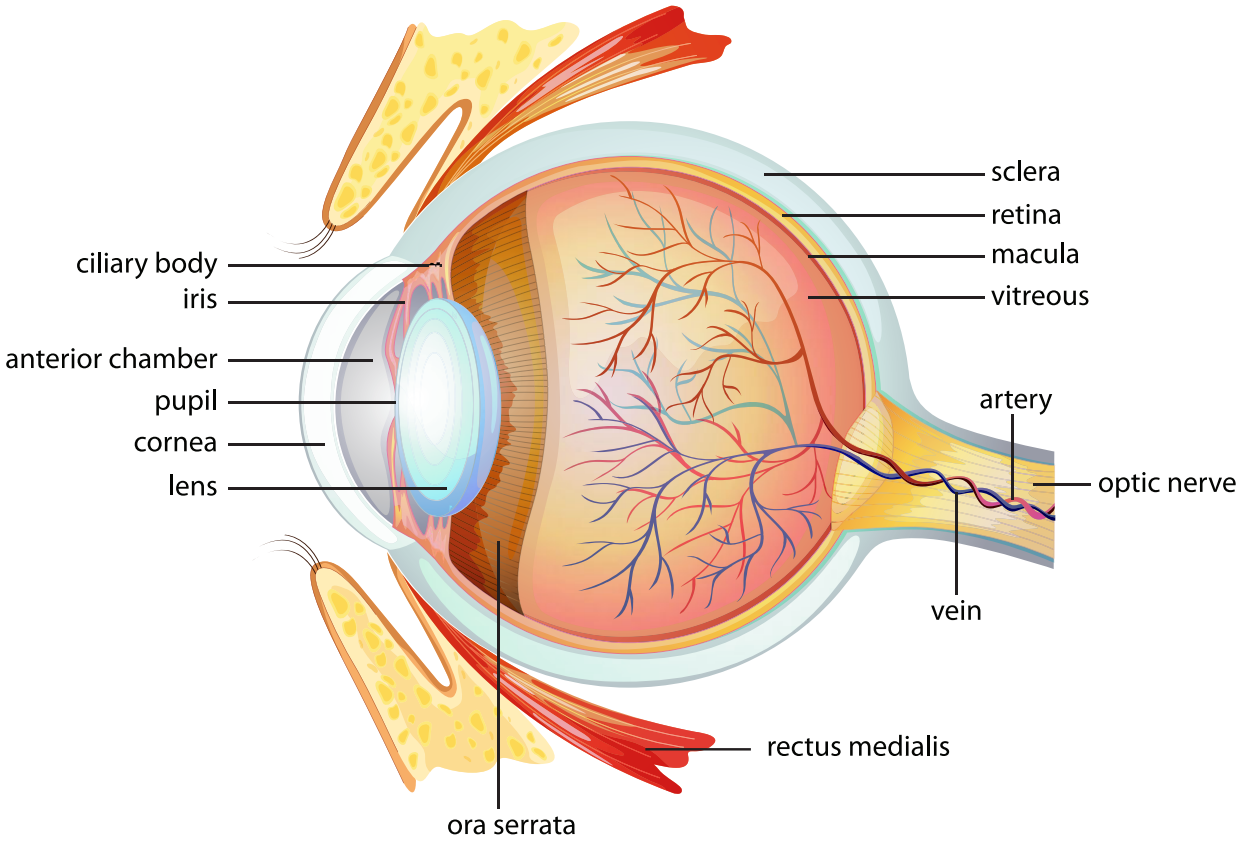
Touch is the perception of pressure on the skin or mouth. Mouthfeel is the physical sensation made by a food or beverage in the mouth. In this cross section of human skin, pressure, vibration, temperature, and pain are transmitted via special receptors. For example, 10 mm skin contains up to 2 receptors for heat, 12 for cold, 50 for pressure, and 200 for pain.



Sound occurs from vibratory changes in air pressure on the eardrums. Foods that make sounds include apples, chips, and crackers. Soft foods have little sound.

ANATOMY OF THE FIVE SENSES—SIGHT

Anatomy of the Human Eye



Sight or vision is the brain's ability to detect electromagnet waves. The eye's optic nerve is connected to the brain. The eye lens focuses the rays onto the retina in an upside down manner, and the brain reverses the image. Think of a time you decided to try a new food because its appearance was so appealing. Sight is a powerful sensory receptor used by food stylists.

SENSORY EVALUATION PANELS—BLIND TASTE TEST

A blind taste test is a method to gather information about the taste of a food or beverage without revealing the brand name. In a blind taste test, the testers do not know what food or beverage is being tasted. Why might this woman be blindfolded to participate in a sensory evaluation panel of the cake? Types of sensory evaluation panels include highly trained experts, laboratory panels, and consumer panels.

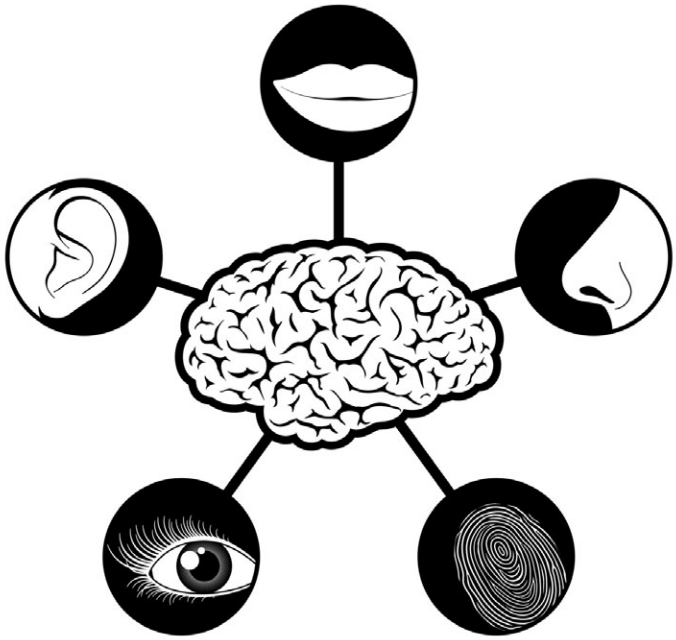
SENSORY EVALUATION PANELS—SELECTING PANELISTS

Would the woman in the picture be a good sensory evaluation panel member? Why or why not?

Avoid potential panelists who:

- Have taste or odor disorders
- Are colorblind
- Have denture defects
- Are affected by allergies, medications, or infections
- Have lost a sense of taste or smell due to advanced age
- Are unable to concentrate on the differences in food

SENSORY TEST TYPES



How is the brain related to the five senses? How does the brain relate to sensory tests?

- Preference tests use descriptors (e.g., “like” and “dislike”).
- Discrimination tests evaluate attributes (e.g., sweetness, sourness, and crunchiness).
- Ranking tests compare one attribute (e.g., sweetness).
- Descriptive tests use written descriptions of food products.

HOW TO CONDUCT A SENSORY TASTE EVALUATION

Should the samples in this image be labeled A, B, C? What would explain your answer?

- Serve all samples in the same size and at the same temperature.
- Eliminate bias by using colored lights, varying the order, and cleansing the palate.
- Limit the number of test samples to three. Larger numbers of samples make it difficult to compare.
- Conduct sensory evaluations in the late morning or mid-afternoon.
- Evaluate one food that comes in a variety of types (e.g., corn that is cooked fresh, frozen, and from a can).

SENSORY COMBINATIONS—SWEET/SOUR AND SWEET/SALTY

Asian sweet and sour pork is a classic sweet/sour sensory combination.

Butter caramel sea salt truffles and chocolate-covered bacon with caramel are examples of the sweet/salty combination.

SENSORY COMBINATIONS—SWEET/SAVORY AND SAVORY/BITTER

Watermelon salad with feta cheese and greens is a sweet/savory combination.

Chicken Korma is a spicy Indian meal of diced chicken, rice, and creamy korma sauce topped with cilantro and is an example of a savory/bitter combination.

LS–A

Name _____

Sensory Evaluation of a Food Product

Purpose

The purpose of this activity is to design and conduct a sensory evaluation of a food product.

Objectives

1. Review your class notes about sensory evaluation design.
2. Select a panel.
3. Write an action plan.
4. Prepare the samples and the sample containers.
5. Conduct the sensory taste test.
6. Compile the results of the taste test.
7. Word-process the results of the taste test.
8. Present the results.

Materials

- food or beverage item
- sample containers
- paper
- word processor
- printer
- materials to facilitate sensory evaluation (e.g., spoons, forks, plastic cups, and labels)

- sanitation materials as needed
- class notes
- scissors
- paper or labels
- markers
- stapler

Procedure

1. Work in assigned groups to design one or two sensory evaluation activities. Sensory evaluation is a scientific method used to analyze and measure human responses to the composition of food and beverages—appearance, taste, odor, touch, texture, and temperature. It is a structured way to collect and evaluate feedback on products and dishes. Researchers follow a strict tasting panel protocol. Tasting panels are an example of a scientific sensory evaluation process.
2. Design a plan for the sensory evaluation activities.
   a. Select a food or beverage product that has three variations (e.g., cooked fresh corn, frozen corn, and canned corn).
      Choice: _____
   b. Determine the consumer panel membership.
      Panelist description: _____
      Number of panelists: _____
   c. Select the test type (e.g., preference, discrimination, or ranking).
      Choice: _____
   d. Decide how the food or beverage would be served:
      (1) Serving size
      (2) Serving temperature
      (3) Serving container
      (4) Blindfolded, holding nose, etc.
      (5) Labels
   e. List sanitation procedures to prevent food contamination during the test.

f. Determine the input you desire from the panelists: like/dislike, description of appearance, texture, odor, touch, etc.

g. Create the signs or labels to identify samples. [Attach a copy to this lab sheet.]

h. Select a palate cleanser for the panelists.
Choice: _____

i. Select a method to tally the test results (e.g., total score and descriptive words).
Choice: _____

3. Discuss plans with your instructor. Make revisions as needed.

4. Design steps to organize your action plan. Complete the Data Table below, or design a table customized to your taste test. Draw your data table with rulers, or word process it. Word processing the panel's responses is mandatory. Add steps to the table as needed.

DATA TABLE Sample:

Sensory Evaluation Plan	Who Is Responsible? (May be more than one person)	Peer Evaluator Check Off	Teacher Evaluator Check Off
1. Word process the consumer panel test protocols (procedures).			
2. Recruit the panelists.			
3.			
4.			
5.			
6.			
7.			
8.			

5. Ask a peer evaluator and your instructor to review the data table organizational plan, and "check off" (✓) that step.

6. Prepare the food products for the sensory evaluation activity.

7. Administer the sensory evaluation with the consumer panel members.

8. Tally the results of the test. Word process the results as a handout, or project the results on a screen. Attach the results to this lab sheet.

9. Present your results to the class. Attach the presentation.

10. Turn in your completed lab sheet to your instructor.