FOOD SENSORY PERCEPTION

75 MINUTES
SNC1D, SNC1P, SNC2D, SNC2P, SBI3C, SBI3U

A high school lesson plan provided by the University of Guelph

This activity gives students the opportunity to learn how their five senses influence their experience with food. Students will increase their knowledge of how their olfactory and gustatory systems work together. Students are able to apply their creativity and their enhanced knowledge of sensory perception in a culminating sensory perception test.

Curriculum Alignments and Expectations

- Identify and describe a variety of careers related to the field of science under study and describe the contributions of scientists, including Canadians, to those fields
- Assess the relationships between changing societal needs, technological advances, and our understanding of internal systems of humans
- Demonstrate an understanding of structure, function, and interactions of the circulatory, digestive, and respiratory systems of mammals
- Investigate molecular shapes and physical properties of various types of matter

Learning objectives

- Discover the careers related to the field of food science
- Develop understanding of olfactory and gustatory system
- Apply knowledge of food sensory perception to the concept of developing food products

Assessment Strategies and Success Criteria

- Open-ended questions
- Think-pair-share
- Group summary and debrief

Cross Curricular Links

- Career Studies- Communicating with Others and Interpersonal Relations
- Career Studies- Identifying Trends and Opportunities
- Exploring Technologies- Communications Technology Fundamentals

Materials

- Smelling samples (i.e. Scentsy Testers; see additional resources)
- Jelly beans, preferably authentically flavored (i.e. jelly belly brand)
- Triangle test food sample, original product and alternative version (i.e. regular potato chips and reduced sodium potato chips)
- Complimentary presentation or handout (optional)

Contact

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TEACHER NOTES

1. Begin the lesson with an explanation on the field of food science and the role of food scientists in our food system.

   Food Science combines a diverse range of subjects including, chemistry, microbiology, and aspects of law, health, nutrition, and security. Food scientists fill the gap between the production of farm goods and consumers. Food scientists work in all levels of food processing and technical aspects of food including packaging, food safety and quality assurance and product development.

2. Provide some examples of careers related to Food science:
   - Food inspector
   - Food safety Research Analyst
   - Policy Advisor
   - Product Development Specialist
   - Quality Assurance Manager
   - Sensory Evaluation Specialist

3. Introduce sensory perception.

   Food sensory perception is the use of human senses to measure food characteristics. This is a good time in the lesson plan to discover what current knowledge of sensory perception and food experience students already have. Think-Pair-Share- for example, you could ask what the five senses are and what body system they are a part of.

4. Discus the role of sight in the experience of food.

   Size, shape, colour, and surface texture all play a part in helping to determine your first reaction to food. A pleasing or displeasing visual appearance of food can determine your appetite towards food. For example, in 2000 Heinz created ketchup in a multitude of different colours. Initially the product sold well, likely due to the novelty of the product. However, few people purchased the item a second time. Could it be the visual appeal of abnormally coloured ketchup was unappetizing?

5. Introduce smell and how it relates to food.

   The nose detects volatile aromas released from food. Olfactory receptors (proteins) bind to odour molecules that communicate with the olfactory bulb. Smell contributes to our enjoyment of food by stimulating a desire to eat, or detecting unpleasant smells that may detour us from eating (i.e. spoiled milk).

6. **Activity 1: What's that smell?**

   Required materials: smell test bottles or markers (unmarked)

   Have students sniff the sent samples with no associated label, colour or shape. Students can guess individually or as a group to guess what aroma they are detecting. By isolating your sense of smell, the relationship between different sensory systems, especially the olfactory and gustatory system is demonstrated. Using your sense of smell alone can be confusing because some odour molecules are similar.

Repeat with 4-6 different aromas. Group debrief findings and discuss solutions.

7. Examine the role of touch in the sensory perception of food.

   Texture can be assessed through touch. When food is placed in the mouth, the surface of the tongue and other sensitive skin reacts to the feed of the food. This is known as mouth-feel (i.e. pulp vs. no pulp orange juice).

8. Introduce taste and the five basic tastes detected by the tongue (bitter, sour, sweet, salty, and umami/savoury).

   Taste is a primary player in food experience. However, taste and smell work closely together to produce flavour.

9. **Activity 2: Can You Pass the Taste Test?**

   Required Materials: Authentically flavoured jelly beans (i.e. jelly belly brand)

   Demonstrate the reliance taste has on the other senses, especially smell, by removing all of their other senses. Have students close their eyes (removing the visual cue of colour), plug their nose, and eat a jelly bean. After placing the jelly bean in their mouth students can open their eyes but must keep their nose plugged. Repeat with 3-6 flavours. Be cautious of allergies, dietary restrictions and preferences.

10. Discuss the role of sound.

    The sounds of food being prepared, cooked, served and eaten influence our preferences of food. Certain foods will be far less satisfying to consume without the accompanying sound (i.e. kettle chips).

11. Discuss why sensory evaluation is important.

    Sensory evaluation allows similarities and differences in a range of foods and products to be identified. It can be used to gauge the response of a new product to consumers by conducting trials during product development. It can also aid in increasing the knowledge of surrounding food items and understanding preferences.

12. **Activity 3: Triangle Test**

    Required Materials: two types of the same product (i.e. regular potato chips and reduced sodium potato chips)

    Give students three samples of the food product (two should be the same and one should be modified). Label the samples with random 3 digit numbers and have students sample each and vote on which is the modified and what is different about it compared to the other two samples. Researching consuming preferences and perceptions of food products is vital to food manufacturers, retailers, and marketing specialists.

13. Debrief.

    Individually or in groups have students write

down two or more of ideas, concepts or facts they learned during the session. Have them share anonymously by handing in slips of paper or present to class.

Additional Resources

- Scentsy Testers https://www.amazon.com/Scentsy-Testers-Various-Scents-Collection/dp/B00VM8NRJA
- Duizer, Lisa. (2001). A review of acoustic research for studying the sensory perception of crisp, crunchy and crackly textures. Trends in Food Science & Technology, (12)1, 17-24. *https://doi.org/10.1016/S0924-2244(01)00050-4*
- Sheperd, M. Gordon. (2008). Smell images and the flavour system in the human brain. Nature, 444, 316-321. *https://www.nature.com/articles/nature05405*
- The Dairy Education and Technology ebook Series https://www.uoguelph.ca/foodscience/book-page/dairy-science-and-technology-ebook
- Department of Food Science, University of Guelph *www.uoguelph.ca/foodscience/*