



How Are the Senses of Taste and Smell Related?

Susan S. Plati

Topic

Nervous system: taste and smell



Time

1 hour



Safety

Please click on the safety icon to view the safety precautions.

Materials

knife

fruits and vegetables cut in 1-cm cubes: raw potato, apple, cucumber, pear, watermelon, cantaloupe, onion (two cubes of each food for each person in the experiment)

cutting board

toothpicks

paper plates

blindfold

glass of water (one for each subject)

Procedure

1. Decide on your sample size for this experiment: the members of your family, a few friends, or the members of your lab group; any of these could be your sample.
2. Cut fruits and vegetables into uniform pieces. Prepare two cubes, 1 cm on a side, of each food to be tested for each person in your sample. Eliminate seeds and peel. Thus, if your sample consists of three people and you are testing five different foods, you will need 30 cubes of food to complete the experiment. Place each kind of food on a separate plate. Serve the food with toothpicks. Cover the plates so that the subjects cannot see the foods.
3. Tell your subjects that they will be tasting a number of fruits and vegetables, but do not let them know what fruits and vegetables they will be testing. Blindfold your subjects, or have them close their eyes. Ask them to hold their noses while they sample the first cube of one of the foods you have prepared. Ask each subject to identify the food being sampled. Do not tell your subjects if they are correct until the end of the entire experiment. Record the answer on the data table. Place a Y in the box if the subject answers correctly; place an N if he or she does not answer correctly. Have each subject drink or rinse his or her mouth out with water after tasting each food. Repeat this procedure, one cube at a time, until all the foods have been sampled.

DATA TABLE														
	Foods tested													
Subject's name	Potato		Apple		Cucumber		Pear		Watermelon		Cantaloupe		Onion	
	Trial number													
	1	2	1	2	1	2	1	2	1	2	1	2	1	2

- Repeat the entire procedure with the second cube of the foods you have used. This time, blindfold your subjects, but do not have them hold their noses. Serve the foods in a different order than in the first trial, so that the subjects cannot rely on previous experience for identification. Record the results by writing Y or N in the number 2 boxes below each food.
- Do your results indicate that the sense of taste depends on the other senses? Explain your answer, making specific references to your data.
- Were some foods easier to identify than others? Give a hypothesis to explain any differences you noted.
- Some people lose their sense of taste when they have a cold. Do your results indicate why this may happen?

What's Going On

Subjects are more accurate in their identifications when their noses are unblocked. Bland foods are difficult to identify regardless of condition. Smell, touch, and sight work together to enhance our sense of taste. A cold typically clogs the nasal passages, reducing the sense of smell. Since taste is partially dependent on smell, a cold can reduce the sense of taste.

Connections

The human body has sense organs that correspond to the five recognized senses: sight, hearing, taste, smell, and touch. The taste buds—small structures found mostly on the tongue—are the organs of taste. This experiment explores the relationship between taste and the other senses by asking subjects to identify tastes without the use of their eyes or noses. The sense of taste is partially dependent on other senses.

Safety Precautions

READ AND COPY BEFORE STARTING ANY EXPERIMENT

Experimental science can be dangerous. Events can happen very quickly while you are performing an experiment. Things can spill, break, even catch fire. Basic safety procedures help prevent serious accidents. Be sure to follow additional safety precautions and adult supervision requirements for each experiment. If you are working in a lab or in the field, do not work alone.

This book assumes that you will read the safety precautions that follow, as well as those at the start of each experiment you perform, and that you will *remember* them. These precautions will not always be repeated in the instructions for the procedures. It is up to you to use good judgment and pay attention when performing potentially dangerous procedures. Just because the book does not always say “be careful with hot liquids” or “don’t cut yourself with the knife” does not mean that you should be careless when simmering water or stripping an electrical wire. It *does* mean that when you see a special note to be careful, it is extremely important that you pay attention to it. If you ever have a question about whether a procedure or material is dangerous, stop to find out for sure that it is safe before continuing the experiment. To avoid accidents, always pay close attention to your work, take your time, and practice the general safety procedures listed below.

PREPARE

- Clear all surfaces before beginning work.
- Read through the whole experiment before you start.
- Identify hazardous procedures and anticipate dangers.

PROTECT YOURSELF

- Follow all directions step by step; do only one procedure at a time.
- Locate exits, fire blanket and extinguisher, master gas and electricity shut-offs, eyewash, and first-aid kit.
- Make sure that there is adequate ventilation.
- Do not horseplay.
- Wear an apron and goggles.
- Do not wear contact lenses, open shoes, and loose clothing; do not wear your hair loose.
- Keep floor and work space neat, clean, and dry.
- Clean up spills immediately.
- Never eat, drink, or smoke in the laboratory or near the work space.
- Do not taste any substances tested unless expressly permitted to do so by a science teacher in charge.

USE EQUIPMENT WITH CARE

- Set up apparatus far from the edge of the desk.
- Use knives and other sharp or pointed instruments with caution; always cut away from yourself and others.
- Pull plugs, not cords, when inserting and removing electrical plugs.
- Don’t use your mouth to pipette; use a suction bulb.
- Clean glassware before and after use.
- Check glassware for scratches, cracks, and sharp edges.
- Clean up broken glassware immediately.

- Do not use reflected sunlight to illuminate your microscope.
- Do not touch metal conductors.
- Use only low-voltage and low-current materials.
- Be careful when using stepstools, chairs, and ladders.

USING CHEMICALS

- Never taste or inhale chemicals.
- Label all bottles and apparatus containing chemicals.
- Read all labels carefully.
- Avoid chemical contact with skin and eyes (wear goggles, apron, and gloves).
- Do not touch chemical solutions.
- Wash hands before and after using solutions.
- Wipe up spills thoroughly.

HEATING INSTRUCTIONS

- Use goggles, apron, and gloves when boiling liquids.
- Keep your face away from test tubes and beakers.
- Never leave heating apparatus unattended.
- Use safety tongs and heat-resistant mittens.
- Turn off hot plates, bunsen burners, and gas when you are done.
- Keep flammable substances away from heat.
- Have a fire extinguisher on hand.

WORKING WITH MICROORGANISMS

- Assume that all microorganisms are infectious; handle them with care.
- Sterilize all equipment being used to handle microorganisms.

GOING ON FIELD TRIPS

- Do not go on a field trip by yourself.
- Tell a responsible adult where you are going, and maintain that route.
- Know the area and its potential hazards, such as poisonous plants, deep water, and rapids.
- Dress for terrain and weather conditions (prepare for exposure to sun as well as to cold).
- Bring along a first-aid kit.
- Do not drink water or eat plants found in the wild.
- Use the buddy system; do not experiment outdoors alone.

FINISHING UP

- Thoroughly clean your work area and glassware.
- Be careful not to return chemicals or contaminated reagents to the wrong containers.
- Don't dispose of materials in the sink unless instructed to do so.
- Wash your hands thoroughly.
- Clean up all residue, and containerize it for proper disposal.
- Dispose of all chemicals according to local, state, and federal laws.

BE SAFETY-CONSCIOUS AT ALL TIMES