Activity 2: Food Selection

Objective
The students will determine the acceptability of food products for space flight by participating in a sensory taste panel.

Science Standards
- Science as Inquiry: Abilities necessary to do scientific inquiry
- Life Science: Matter, energy, and organization in living systems
- Science in Personal and Social Perspectives: Personal health
- Physical Science: Properties of objects and materials

Mathematics Standard
- Computation

Helpful Hints
1. If a food is disliked, delete that item from the list.
2. Students should not discuss the foods with group members while tasting the foods. Students should do their own evaluations and then compare.
3. If necessary, use water and crackers between samples to remove prior tastes.
4. Many of these foods can be found at the local grocery store.

Materials Needed
- Tray
- Paper plates
- Food samples (from menu list in appendix)
- Drink samples (from menu list in appendix)
- Water
- Crackers
- Taste Panel Evaluation Form
- Taste Panel Procedure and Descriptive Comments Form

Background
Astronauts select their menu for space about 5 months before they fly. For the Space Shuttle, they select a menu that will serve them through the duration of their flight. For the ISS, they will choose a 30-day flight menu. These foods will be stored in the galley. A special taste panel is set up for the astronauts to taste a variety of foods when they are selecting their menus. This lets the astronauts know whether they like the food before going into space. Foods are tested for appearance, color, odor, flavor, and texture. It does not help astronauts to take foods into space if they will not eat them. This taste panel helps facilitate the selection of a desirable menu and reduces the amount of waste from unacceptable, uneaten, or partially eaten portions.

Procedure
Place the students into groups. These groups will be known as the expert groups, and each group should be assigned a type of space food. Each group will be responsible for tasting a variety of foods from their particular group. They will fill out the Taste Panel Evaluation Form, rating the appearance, color, odor, flavor, and texture. The students will rate these items using the numerical scores listed on the bottom of the form. Each group will total the scores given each food and list them on the form. If an item receives a score of 6 or less, comments should be listed to explain the low score. All other items should be described by their good qualities. Brainstorm a list of descriptive words that can be used.

Discussion
1. Which space food would you prefer to take with you into space?
2. In each food type, which item received the highest score? Why?
3. In each food type, which item received the lowest score? Why?
4. Why do you think it is important that you test the foods before you take them into space?

Extensions
1. Have the students use the evaluation forms to choose a meal of their choice.
2. Use the descriptive words from the Taste Panel Evaluation Form to write a paragraph about the foods you have tested.

Assessment
When all of the tasting, evaluating, and computing have been done, each group should prepare a short presentation to share with the class about their findings.
# Taste Panel Evaluation Form

<table>
<thead>
<tr>
<th>ITEM</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Appearance</td>
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<tr>
<td>Color</td>
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<td>Odor</td>
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<td>Flavor</td>
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<tr>
<td>Texture</td>
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<tr>
<td>Overall</td>
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</tr>
<tr>
<td>Comments</td>
<td></td>
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</tbody>
</table>

**High Scores:**
- 9-Like Extremely
- 8-Like Very Much
- 7-Like Moderately

**Mid Scores:**
- 6-Like Slightly
- 5-Neither Like nor Dislike
- 4-Dislike Slightly

**Low Scores:**
- 3-Dislike Moderately
- 2-Dislike Very Much
- 1-Dislike Extremely
Taste Panel Procedure and Descriptive Comments Form

The following guidelines should be followed when rating a food product on the Taste Panel:
1. Emphasis is on the quality of the food product rather than on personal preferences such as likes and dislikes.
2. If you absolutely dislike the food product because of personal preferences, do not rate it.
3. If a product is rated below a 6 for any category, then note the reason in the space provided.
4. The overall rating is your overall general impression of the product, which is not necessarily an average of the other categories, but should be consistent with them.
5. Do not talk with other panelists during evaluations.
6. Refrain from smoking, eating, or drinking for 60 minutes prior to panels.
7. If necessary, use water or crackers between samples to clear the palate.
8. If you have a question regarding the Taste Panel, ask the person conducting the panel.

Descriptive Comments
Here is a list of descriptive terms that can be used to describe an attribute of a food and be an aid for food development. You may use the list below to describe attributes of a food sample. A score of 6.0 or below should have some descriptive comment that will explain a low score.

<table>
<thead>
<tr>
<th>Taste/Order</th>
<th>Texture</th>
<th>Color/Appearance</th>
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<tbody>
<tr>
<td>Bitter</td>
<td>Crisp</td>
<td>Dull</td>
</tr>
<tr>
<td>Sweet</td>
<td>Soft</td>
<td>Lustrous</td>
</tr>
<tr>
<td>Sour</td>
<td>Hard</td>
<td>Sparkling</td>
</tr>
<tr>
<td>Salty</td>
<td>Stringy</td>
<td>Bright</td>
</tr>
<tr>
<td>Oxidized</td>
<td>Tough</td>
<td>Light</td>
</tr>
<tr>
<td>Rancid</td>
<td>Chewy</td>
<td>Dark</td>
</tr>
<tr>
<td>Stale</td>
<td>Firm</td>
<td>Greasy</td>
</tr>
<tr>
<td>Tasteless</td>
<td>Fine</td>
<td>Glossy</td>
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<tr>
<td>Metallic</td>
<td>Grainy</td>
<td>Cloudy</td>
</tr>
<tr>
<td>Flat</td>
<td>Gummy</td>
<td>Old</td>
</tr>
<tr>
<td>Musty</td>
<td>Lumpy</td>
<td>Pal</td>
</tr>
<tr>
<td>Yeasty</td>
<td>Mushy</td>
<td></td>
</tr>
<tr>
<td>Floral</td>
<td>Pasty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubbery</td>
<td></td>
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<tr>
<td></td>
<td>Sticky</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Greasy</td>
<td></td>
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<tr>
<td></td>
<td>Juicy</td>
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Appendix A: Baseline Space Shuttle Food and Beverage List

<table>
<thead>
<tr>
<th>Abbreviations</th>
<th>Items</th>
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</thead>
<tbody>
<tr>
<td>A/S</td>
<td>Artificial Sweetener</td>
</tr>
<tr>
<td>(B)</td>
<td>Beverage</td>
</tr>
<tr>
<td>(FF)</td>
<td>Fresh Food</td>
</tr>
<tr>
<td>(IM)</td>
<td>Intermediate Moisture</td>
</tr>
<tr>
<td>(I)</td>
<td>Irradiated</td>
</tr>
<tr>
<td>(NF)</td>
<td>Natural Form</td>
</tr>
<tr>
<td>(R)</td>
<td>Rehydratable</td>
</tr>
<tr>
<td>(T)</td>
<td>Thermostabilized</td>
</tr>
</tbody>
</table>

- Beef w/BBQ Sauce (T)
- Beef, Dried (IM)
- Beef Patty (R)
- Beef Steak (I)
- Beef Stroganoff w/Noodles (R)
- Beef, Sweet n Sour (T)
- Beef Tips w/Mushrooms (T)
- Bread (FF)
- Breakfast Roll (FF)
- Brownies (NF)
- Candy,
  - Coated Chocolates (NF)
  - Coated Peanuts (NF)
  - Gum (NF)
  - Life Savers (NF)
- Cereal,
  - Bran Chex (R)
  - Cornflakes (R)
  - Granola (R)
  - Granola w/Blueberries (R)
  - Granola w/Raisins (R)
  - Grits w/Butter (R)
  - Oatmeal w/Brown Sugar (R)
  - Oatmeal w/Raisins (R)
  - Rice Krispies (R)
- Cheddar Cheese Spread (T)
- Chicken,
  - Chicken, Grilled (T)
  - Chicken Salad Spread (T)
  - Chicken, Sweet n Sour (R)
- Cookies,
  - Butter (NF)
  - Shortbread (NF)
- Crackers, Butter (NF)
- Eggs,
  - Scrambled (R)
  - Mexican Scrambled (R)
  - Seasoned Scrambled (R)
- Frankfurters (T)
- Fruit,
  - Apple, Granny Smith (FF)
  - Apple, Red Delicious (FF)
  - Applesauce (T)
  - Apricots, Dried (IM)
  - Banana (FF)
  - Cocktail (T)
  - Orange (FF)
  - Peach Ambrosia (R)
  - Peaches, Diced (T)
  - Peaches, Dried (IM)
  - Pears, Diced (T)
  - Pears, Dried (IM)
  - Pineapple (T)
  - Strawberries (R)
  - Trail Mix (IM)
- Granola Bar (NF)
- Ham (T)
- Ham Salad Spread (T)
- Jelly,
  - Apple (T)
  - Grape (T)
- Macaroni and Cheese (R)
- Noodles and Chicken (R)
Nuts,  
- Almonds (NF)  
- Cashews (NF)  
- Macadamia (NF)  
- Peanuts (NF)  
- Trail Mix (IM)  

Peanut Butter (T)  

Potatoes au Gratin (R)  

Puddings,  
- Banana (T)  
- Butterscotch (T)  
- Chocolate (T)  
- Tapioca (T)  
- Vanilla (T)  

Rice and Chicken (R)  
Rice Pilaf (R)  

Salmon (T)  

Sausage Patty (R)  

Shrimp Cocktail (R)  

Soups,  
- Chicken Consomme (B)  
- Mushroom (R)  
- Rice and Chicken (R)  

Spaghetti w/Meat Sauce (R)  

Tortillas (FF)  

Tuna,  
- Tuna (T)  
- Tuna Salad Spread (T)  

Turkey,  
- Turkey Salad Spread (T)  
- Turkey, Smoked (I)  
- Turkey Tetrazzini\textsuperscript{a}  

Vegetables,  
- Asparagus (R)  
- Broccoli au Gratin (R)  
- Carrot Sticks (FF)  
- Cauliflower w/Cheese (R)  
- Celery Sticks (FF)  
- Green Beans and Broccoli (R)  
- Green Beans/Mushrooms (R)  
- Italian (R)  
- Spinach, Creamed (R)  
- Tomatoes and Eggplant (T)  

**Beverages (B)**  

Apple Cider  

Cherry Drink w/A/S  

Cocoa  

Coffee,  
- Black  
- w/A/S  
- w/Cream  
- w/Cream and A/S  
- w/Cream and Sugar  
- w/Sugar  

Coffee (Decaffeinated),  
- Black  
- w/A/S  
- w/Cream  
- w/Cream and A/S  
- w/Cream and Sugar  
- w/Sugar  

Coffee (Kona),  
- Black  
- w/A/S  
- w/Cream  
- w/Cream and A/S  
- w/Cream and Sugar  
- w/Sugar  

Grape Drink  
Grape Drink w/A/S  

Grapefruit Drink  

Instant Breakfast,  
- Chocolate  
- Strawberry  
- Vanilla  

Lemonade  
Lemonade w/A/S  

Lemon-Lime Drink  

Orange Drink  
Orange Drink w/A/S  
Orange-Grapefruit Drink  
Orange Juice  
Orange-Mango Drink  
Orange-Pineapple Drink
Peach-Apricot Drink

Pineapple Drink

Strawberry Drink

Tea,
Plain
w/A/S
w/Cream
w/Lemon
w/Lemon & A/S
w/Lemon & Sugar
w/Sugar

Tropical Punch
Tropical Punch w/A/S

**Condiments**

Catsup (T)
Mayonnaise (T)
Mustard (T)
Pepper (Liquid)
Salt (Liquid)
Tabasco Sauce (T)
Taco Sauce (T)
## Refrigerated

### Dairy
- Cheese
- Cheese slices
- Cream cheese
- Sour cream
- Yogurt, fruit

### Fruits
- Apple
- Grapefruit
- Kiwi
- Orange
- Plum

## Frozen

### Meat and Eggs

#### Beef:
- Beef, brisket, BBQ
- Beef, enchilada with spanish rice
- Beef, fajita
- Beef, patty
- Beef, sirloin tips with mushrooms
- Beef, steak, bourbon
- Beef, steak, teriyaki
- Beef, stir fried with onion
- Beef, stroganoff with noodles
- Luncheon meat
- Meatloaf with mashed potatoes and gravy

#### Lamb:
- Lamb, broiled

#### Poultry:
- Chicken, baked
- Chicken, enchilada with spanish rice
- Chicken, fajita
- Chicken, grilled
- Chicken, oven fried

### Egg:
- Egg, omelet, cheese
- Egg, omelet, vegetable
- Egg, omelet, ham
- Egg, omelet, sausage
- Egg, omelet, vegetable and ham
- Egg, omelet, vegetable and sausage
- Eggs, scrambled with bacon, hash browns sausage

### Seafood:
- Fish, baked
- Fish, grilled
- Fish, sautéed
- Lobster, broiled tails
- Scallops, baked
- Seafood, gumbo with rice
- Shrimp, cocktail
- Tuna, noodle casserole

### Pasta mixtures:
- Lasagna, vegetable with tomato sauce
- Noodles, stir fry
- Spaghetti with meat sauce
- Spaghetti with tomato sauce
- Tortellini with tomato sauce, cheese
Other:
Egg rolls
Enchilada, cheese with Spanish rice
Pizza, cheese
Pizza, meat
Pizza, vegetable
Pizza, supreme

Fruit
Apples, escalloped
Peaches, sliced with bananas, blueberries
Peaches with bananas, grapes, strawberries
Strawberries, sliced

Soups
Beef, stew
Broccoli, cream of
Chicken, cream of
Chicken noodle
Mushroom, cream of
Won ton

Grains
Biscuits
Bread
Cornbread
Dinner roll
Garlic bread
Sandwich bun, wheat/white
Toast, wheat/white
Tortilla

Breakfast items:
Cinnamon roll
French toast
Pancakes, buttermilk
Pancakes, apple cinnamon
Waffles

Pasta:
Fettuccine alfredo
Macaroni and cheese
Spaghetti

Rice:
Fried
Mexican/Spanish
White

Starchy Vegetables
Corn, whole kernel
Potato, baked
Potatoes, escalloped
Potatoes, oven fried
Yams, candied
Squash corn casserole

Vegetables
Asparagus tips
Beans, green
Beans, green with mushrooms
Broccoli au gratin
Broccoli
Carrot coins
Cauliflower au gratin
Chinese vegetables, stir fry
Mushrooms, fried
Okra, fried
Peas
Peas with carrots
Squash, acorn with apple sauce and cinnamon
Zucchini, spears, fried

Desserts
Cakes:
Angel food cake
Brownie, chocolate
Chocolate fudge
Shortcake
Yellow cake with chocolate frosting

Dairy:
Ice cream, chocolate
Ice cream, strawberry
Ice cream, vanilla
Yogurt, frozen
### Pies and Pastry:
- Cheesecake, chocolate
- Cheesecake, plain
- Cobbler, peach
- Pie, apple
- Pie, coconut cream
- Pie, pecan
- Pie, pumpkin

### Beverages
- Apple juice
- Grape juice
- Grapefruit juice
- Lemonade
- Orange juice

### Condiments
- Margarine
- Grated cheese

### Cereals
- Hot cereal:
  - Oatmeal
  - Cream of wheat
  - Grits

### Thermostabilized

#### Fruit
- Applesauce
- Fruit cocktail
- Peaches
- Pears
- Pineapple

#### Salads
- Chicken salad
- Tuna salad
- Turkey salad

#### Vegetable:
- Bean salad, three
- Pasta salad
- Potato salad, German
- Sauerkraut

#### Soups
- Chili
- Clam chowder
- Egg drop
- Miso, Japanese
- Vegetable

#### Desserts
- Pudding, butterscotch
- Pudding, chocolate
- Pudding lemon
- Pudding, tapioca
- Pudding, vanilla

#### Condiments
- Barbecue sauce
- Catsup
- Chili con queso
- Cocktail sauce
- Cranberry sauce
- Dill pickle chips
- Dips, bean
- Dips, onion
- Dips, ranch
- Honey
- Horseradish sauce
- Jelly, assorted
- Lemon juice
- Mayonnaise
- Mustard
- Mustard, hot Chinese
- Orange marmalade
- Peanut butter (chunky, creamy, whipped)
- Picante sauce
- Sweet and sour sauce
- Syrup, maple
- Taco sauce
- Tartar sauce

#### Beverages
- Fruit juices:
  - Cranberry
  - Cranberry apple
  - Cranberry raspberry
  - Gatorade, assorted
  - Pineapple
  - Pineapple grapefruit
  - Tomato
  - V-8
Milk:
- Skim
- Low fat
- Chocolate (low fat or skim)
- Whole

Nuts:
- Almonds
- Cashews
- Macadamia
- Peanuts
- Candy-coated chocolates
- Candy-coated peanuts
- Lifesavers
- Gum (sugar free)

Fruit
- Apples, dried
- Apricots, dried
- Peach, dried
- Pear, dried
- Prunes
- Raisin
- Trail mix

Grains
- Animal crackers
- Cereal, cold
- Chex mix
- Crackers, assorted
- Baked chips, tortillas
- Baked chips, potato
- Pretzels
- Goldfish
- Tortilla chips
- Potato chips
- Rye krisp, seasoned

Desserts
- Cookies:
  - Butter
  - Chocolate chip
  - Fortune
  - Rice krispies treat
  - Shortbread

Snacks
- Beef jerky

Eva Food
- In-suit fruit bar

Rehydratable
- Beverages
  - Apple cider
  - Cherry drink
  - Cocoa
  - Coffee (assorted)
  - Grape drink
  - Grapefruit drink
  - Instant breakfast, chocolate
  - Instant breakfast, vanilla
  - Instant breakfast, strawberry
  - Orange drink
  - Orange mango drink
  - Orange pineapple drink
  - Tea (assorted)
  - Tropical punch

Irradiated Meat
- Beef steak
- Smoked turkey