

# Activity 2:

## Food Selection

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### 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

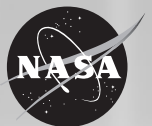
1. Which space food would you prefer to take with you into space?
2. In each food type, which item received the highest score? Why?
3. In each food type, which item received the lowest score? Why?
4. Why do you think it is important that you test the foods before you take them into space?

### 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

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<b>ITEM</b>				
Appearance				
Color				
Odor				
Flavor				
Texture				
Overall				
Comments				

**High Scores:**

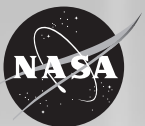
**9-Like Extremely**  
**8-Like Very Much**  
**7-Like Moderately**

**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

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The following guidelines should be followed when rating a food product on the Taste Panel:

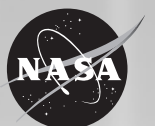
1. Emphasis is on the quality of the food product rather than on personal preferences such as likes and dislikes.
2. If you absolutely dislike the food product because of personal preferences, do not rate it.
3. If a product is rated below a 6 for any category, then note the reason in the space provided.
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

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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.

<u>Taste/Order</u>	<u>Texture</u>	<u>Color/Appearance</u>
Bitter	Crisp	Dull
Sweet	Soft	Lustrous
Sour	Hard	Sparkling
Salty	Stringy	Bright
Oxidized	Tough	Light
Rancid	Chewy	Dark
Stale	Firm	Greasy
Tasteless	Fine	Glossy
Metallic	Grainy	Cloudy
Flat	Gummy	Old
Musty	Lumpy	Pale
Yeasty	Mushy	
Floral	Pasty	
	Rubbery	
	Sticky	
	Stiff	
	Tender	
	Greasy	
	Juicy	



# Appendix A: Baseline Space Shuttle Food and Beverage List

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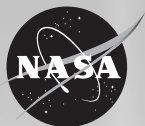
## Abbreviations

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A/S	Artificial Sweetener
(B)	Beverage
(FF)	Fresh Food
(IM)	Intermediate Moisture
(I)	Irradiated
(NF)	Natural Form
(R)	Rehydratable
(T)	Thermostabilized

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	Chicken, Teriyaki (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)
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)	



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<sup>2</sup>

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)**

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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,

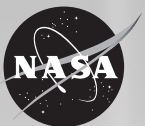
- Plain
- w/A/S
- w/Cream
- w/Lemon
- w/Lemon & A/S
- w/Lemon & Sugar
- w/Sugar

Tropical Punch  
Tropical Punch w/A/S

### **Condiments**

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



# Appendix B: International Space Station Daily Menu Food List

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## Refrigerated

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### *Dairy*

Cheese  
Cheese slices  
Cream cheese  
Sour cream  
Yogurt, fruit

### *Fruits*

Apple  
Grapefruit  
Kiwi  
Orange  
Plum

## Frozen

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### *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

Chicken, pot pie  
Chicken, stir fried with diced red pepper  
Chicken, teriyaki with spring vegetables  
Duck, roasted  
Meatball, porcupine (turkey)

#### Pork:

Bacon  
Bacon, Canadian  
Ham, baked with candied yams  
Pork, chop, baked with potatoes au gratin  
Pork, sausage, patties  
Pork, sweet and sour with rice

#### Seafood:

Fish, baked  
Fish, grilled  
Fish, saut ed  
Lobster, broiled tails  
Scallops, baked  
Seafood, gumbo with rice  
Shrimp, cocktail  
Tuna, noodle casserole

#### Eggs:

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  
Quiche, vegetable  
Quiche, lorraine

#### 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  
Potatoes, mashed  
Yams, candied  
Succotash  
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

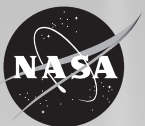
*Desserts*

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**

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*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

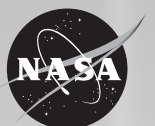
*Condiments*

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

**Natural Form**

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*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

Nuts:

Almonds  
Cashews  
Macadamia  
Peanuts

Candy:

Candy-coated chocolates  
Candy-coated peanuts  
Lifesavers  
Gum (sugar free)

**Eva Food**

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In-suit fruit bar

**Rehydratable**

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*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**

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Beef steak  
Smoked turkey

