

## Design A Meal

### Purpose

Students will apply their knowledge of healthy eating to design a menu for astronauts on a space mission.

### Objectives

- Students will be able to describe the components of a healthy diet-- protein, fruit, vegetables, dairy and grains.
- Students will be able to list reasons why astronauts must bring specific types of food to space.
- Students will be able conclude that astronauts need to eat a healthy diet in space just like on Earth.

### Related Standards and State Goals

Illinois State Goals:

### Early Elementary:

- 22.A.1b Identify methods of health promotion and illness prevention
- 23.B.1 Identify healthy actions that influence the functions of the body.

### Late Elementary:

- 23.B.2 Differentiate between positive and negative health-related actions on body systems.

### Integrated Subjects

- Health

### Audience

1<sup>st</sup>-5<sup>th</sup> grade

### Time Recommended

Part 1: 20-30 minutes

Part 2: 30-45 minutes

### Materials and Preparation

#### Part 1:

- Pitcher w/ premixed drink mix
- Beef or turkey jerky (optional)
- Drink mix packets

#### Part 2:

- MyPyramid Poster (<http://www.fns.usda.gov/tn/resources/mypyramidforkidsposter.html> )
- Picture of freeze dried food and a space food tray (An internet image search for “space food” returns some nice images.)
- Pre-made example of card meal of spaghetti and meatballs
  - One orange card for pasta.
  - One purple card for meatballs.
  - One green card for tomato sauce.

#### Each group of students has:

- Crayons or colored pencils
- Glue sticks or tape

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- Cafeteria trays or plastic trays (like those used in frozen meals) pre-labeled breakfast, lunch, & dinner
- 1 set of Food Type Cards (at the end of this lesson)

### Procedure

#### Part 1: (20 minutes)

1. Tell students that they will be learning about how people eat while they are in space. First they will learn about how food in space must be prepared and then they will be designing nutritious meals for astronauts aboard the International Space Station.
2. Discuss how the environment in space is different than on Earth covering the following points.
  - There is no air to breathe in space.
  - There is no water that people can use in space.
  - There are no sources of food in space.
3. Tell students that since there is no food in space, astronauts must bring it with them. Special consideration must be taken when making choices about what kinds of food to bring.
4. When going into space astronauts need to bring things to drink to stay healthy. Show students a full pitcher of prepared fruit punch/lemonade asking the following questions.
  - Who likes fruit punch/lemonade?
  - Do you think this would be something good for astronauts to bring into space?
  - Would this pitcher of fruit punch/lemonade be easy to pack? (No) Why not? (it would spill).
  - Ask students what kinds of things they like to drink. Would they want to only drink one thing all of the time? We like to drinks lots of different kinds of things. Do you think we can pack all of those things?
5. Take out drink packet and choose a volunteer. Ask which is heavier, the pitcher of fruit punch/lemonade or the packet of drink mix.
6. Tell students that it is very expensive to bring things into space. It costs \$10,000 to bring a pound of stuff into space! If we bring this whole pitcher of fruit punch it would cost about \$45,000! NASA needs to spend money carefully, so by bringing the drink packet we save a lot of weight and a lot of money!
7. Tell students that they also need to consider how much room stuff takes up when we pack. On the space shuttle there isn't a lot of room to pack stuff. Have you ever tried to get too much stuff in your backpack? Sometimes you can't bring everything that you want. You have to make decisions about what is important.
8. Ask students if they think it is a better idea for astronauts to bring drink packets or the prepared fruit punch/lemonade.
  - Drink packets weigh much less than prepared drinks and are therefore less expensive to take up into space.
  - Drink packets allow astronauts more variety. They can bring different things to drink and they will take up less room in the space shuttle.

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9. Tell students that these same things are true when astronauts choose which foods to pack. Just like we can add water to drink mix, we can do the same thing with food! Most food contains a lot of water. If we take the water away from food what will happen? (It won't weigh as much and will take up less room. If students have difficulty with this remind them of the drink mix versus the pitcher of liquid).
10. Dehydration is a process where water is removed from food. Dehydrated food is lighter and takes up less room.
  - Dehydrated food also lasts much longer than regular food! It won't spoil. Think about beef jerky (show if you have example). Beef jerky is dehydrated – all the water has been taken out. It doesn't need to be refrigerated. It lasts longer than regular beef, which goes bad quickly and needs to be refrigerated. For these reasons, astronauts take dehydrated food into space with them!
  - People take dehydrated food with them when they go camping or on long trips.
  - Show pictures of dehydrated food/space food tray.
11. Then ask students if they think astronauts just survive by eating dry food and powdered drinks. Because all living things need water, astronauts still need water even when they are in space. Relatively small amounts of water are brought to space in duffle bags. This water is used for rehydrating the food and drinks. Waste water (from astronaut urine, sweat, and exhaled breath) is then filtered and re-used in new food and drink products.

### Part 2: (30-45 minutes)

**Set-Up:** Divide students into small groups or pairs.

1. Tell students that now that they've learned about the special way that astronauts have to have their food prepared, they're going to plan some meals for astronauts to bring on a space mission.
2. Nutritionists are scientists that are experts in healthy foods. Students will become nutritionists and will design meals for astronauts to eat while they are on their missions.
3. Guide a brief discussion covering the following points.
  - What are your favorite foods?
  - We need food to be healthy! It gives us the energy we need to live, play, and grow.
  - What kinds of foods do we need stay healthy? (meat, fruits, vegetables, grains)
4. Show students the food pyramid and ask if they've heard of it before. Facilitate a discussion covering the following points.
  - Kids need 6-11 servings of grains. Ask students for some examples of grains. We need the most of this kind of food. (bread, cereal, toast, rice, pasta, etc). Orange cards represent grains.
  - Kids need 3-5 servings of vegetables. Ask for some examples of vegetables (carrots, tomato sauce, peppers, etc). Vegetables are green cards.
  - Kids need 2-4 servings of fruit. Ask for some examples of fruit (apple, banana, mango, orange juice, etc). Fruit will be red cards.
  - Kids need 2-3 servings of dairy. Ask for some examples of dairy (milk, yogurt, cheese, etc). Dairy will be blue cards.

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- Kids need 2-3 servings of meat/beans. Ask for some examples (beef, chicken, almonds, black beans). Meat/Beans will be purple cards. Show an example meat/beans card.
  - Oils/Fats/Sweets should be eaten sparingly (butter, oils, sweets). Oils/Sweets/Fats are black cards.
5. While we may like things like ice cream, potato chips, and cookies, is it a good idea to only bring these kinds of food? (No, they are not healthy). In space, just like on Earth, we need to eat a variety of foods so that we can be healthy!
  6. Remind students that they just learned about freeze-dried food. Entire meals like spaghetti and meatballs can be freeze dried. The food you choose to pack will look different than it does on Earth. Show pictures of freeze-dried food again. Point out that it's in a tray.
  7. NASA and other country's space agencies have nutritionists and food scientists that create healthy and delicious meals for their astronauts.
  8. Now it's time for to plan some healthy and delicious meals for the astronauts on the International Space Station!
    - Each group will now design three meals for one day of a space mission.
      - You have 6 orange cards for grains, 2 blue cards for dairy, 4 green cards for vegetables, 3 red cards for fruit, 2 purple cards for meat/nuts, and 1 black card for sweets/oils. Students should include these cards to design a breakfast, lunch, and dinner that are healthy and fit into the food pyramid. They also need to taste good!
    - Show students cards and pre-labeled meal trays. Explain that each group will make three meals. They will draw the food item for the meal on the appropriate colored card and tape/glue it into the tray
    - Show example of spaghetti and meatballs.
      - This is a dinner tray.
      - One orange for pasta. Pasta is a grain
      - One purple card for meatballs. Meatballs are meat.
      - One green card for tomato sauce. Tomato sauce is made from tomatoes, which are vegetables.
  9. Set students to work making a breakfast, lunch and dinner. If there is time, ask some groups to talk about their meals to everybody. If time is running short choose a couple of examples and mention how they fit into the food pyramid (i.e. number of servings of protein and fruit).
  10. Ask students to share their food choices with the class.

### **Assessment:**

Review meals that students have created to see if they meet the daily nutritional requirements as recommended by the USDA food pyramid.

### **Grade Level Adaptations**

- Younger students may benefit from dividing parts one and two into separate days.
- To shorten the duration of part two, each group could make a single meal.

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- Instead of having students draw food types, they can find pictures in magazines and cut and paste them on to the Food Type Cards.

## Optional Activities

- As a class, students could make “space pudding” using instant pudding, powdered milk, and water. Students can calculate the amount of powdered milk and water will be needed to use with the pudding mix.
- For more information about food on space missions, visit <http://www.nasa.gov/audience/formedia/presskits/spacefood/factsheets.html>

## Adler Planetarium Field Trip Connections

The following experiences\* at the Adler can enhance the content covered in this lesson.

Cyber Space Classroom Programs:

- Learn about what humans need to survive on other planets in our solar system in *Survival in Space* (Grade 3-8)

Guided Gallery Experiences:

- Learn about astronauts and space travel *In Our Solar System* (Grades 2-7)

Exhibitions:

- Learn about astronauts and space travel the *Shoot for the Moon Exhibit*

\* Please note that shows, classroom programs, and guided gallery experiences are available for an additional cost.

**VEGETABLE**

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**DAIRY**

**DAIRY**

**OILS/SWEETS**

**FRUIT**

**MEAT/BEAN**

**FRUIT**

**MEAT/BEANS**

**FRUIT**

**GRAIN**

**GRAIN**

**GRAIN**

**GRAIN**

**GRAIN**

**GRAIN**