

EDUCATOR'S GUIDE

Space Food

Preparation

Overview and Objectives

This lesson is geared toward an adult audience interested in learning about what astronauts eat in space.

This program discusses the history of food in space and the adjustments astronauts have to make when eating in a microgravity environment. The food must provide the necessary nutrients for the survival of the astronauts and be enjoyable to help maintain morale, but it also must be transportable and long lasting to survive the rigors of space travel. Many factors are taken into account when preparing food supplies for a space mission.

This lesson includes a [slideshow](#) in which an instructor can lead participants through ways that food is prepared for space travel and culminates with participants planning their very own space meal.

Films to watch while enjoying a "space meal"

Apollo 13 (1995)

Gravity (2013)

The Right Stuff (1983)

The Martian (2015)

Instructional Modalities

This activity was designed for both synchronous or asynchronous instruction.

For **synchronous instruction**, we recommend a platform that allows both for whole class discussion and for participants to interact in small groups.

For **asynchronous adaptations**, we provide suggestions for teachers to provide additional support for the activities and for participants to share their work with each other.

Materials

- [Space Food Slideshow](#)
- [Ingredients](#) for creating a "Space Night In" meal

Lesson

1. Introductory Activity

- Participants will watch eleven minute [video](#) (10:44-22:03) on space food and answer these questions:
 - **Why does food need to be prepared a certain way for space travel?**
 - **How had space food changed over time?**
- Discuss the responses with the group.

2. Core Activity

- Explain to participants that food being sent to space is treated in various ways. As you go over each preparation method, have participants write down foods they enjoy that could be prepared that way using their worksheet.
- Ask participants to look over their responses.
 - **Which of your favorite foods could easily be adapted for space travel?**
 - **What are some foods you enjoy that you don't think could be eaten in space?**
- As participants respond, encourage them to discuss possible ways their favorite foods could be enjoyed in space.
 - **Would these foods still look the same if they were prepared in these ways?**
- Show participants a photograph of a meal on slide 16 that was served in space. This meal included grilled chicken, Southwestern corn and baked beans. The meal in space started off with crackers, sausage, and brie and ended with apple pie.
- Encourage participants to try making this meal on their own and enjoying it with friends or loved ones. The recipes, or what NASA calls formulations, can be found [here](#). To further make this a space-themed “night in”, encourage participants to watch one of former astronaut Mike Massimino’s favorite space movies, which include: *Gravity*, *Apollo 13*, *The Martian*, and *The Right Stuff*.

Asynchronous Adaptation

Have participants go through the [slideshow](#) on their own. Encourage them to follow the [recipes](#) as they create their own space-themed “night in.” Have participants

share how their meal preparation went with a peer and compare following a standard recipe to following a NASA formulation.

Extension Activities

To deepen participant engagement with this content, you may choose to add the following activities :

Learn More About Food in Space

Have participants watch a [video](#) of a past “*Intrepid* Virtual Astronomy Live” event with ISS Food System Manager, Ryan Dowdy, and former NASA Astronaut Michael Massimino to learn more about nutrition and food selection for astronauts.

Additional Resources/ References

Space Food

Food in space is an imperative aspect in an astronaut’s journey. Besides taking a trip to space in a shuttle orbiter, the astronauts need to take many precautions in order to maintain good health and continue to be a positive influence. In addition to their successes exploring space, the astronauts have to take care of many different pre-flight procedures. One of these procedures is choosing their flight menu that they will use throughout their space mission. Astronauts choose from a menu to pick which types of foods they want to have on their individual menu in space which is repeated every seven days.

Originally, bite sized food items, freeze dried powders, and semi-liquid pastes in tubes were items that the Mercury astronauts ate when in space. Now, food items have been improved to be rehydrated in order to improve the taste. Items such as shrimp cocktail, chicken and vegetables and fruits are just a few of the choices the astronauts have now.

NASA has to take many factors into account when providing meals for its astronauts, in addition to nutrition and taste. For example, when eating in space, various foods will be more problematic than others. Foods such as breads are poor to eat in space because when crumbs break apart from the bread, they do not fall to the ground but rather float round the space shuttle.

Some foods are therefore covered in edible gelatin to prevent crumbs. Others are packaged in a dehydrated form and water is added to them when needed. Water, a

precious commodity for life, is conserved and recycled aboard the Space Shuttle and International Space Station.

The food must be packed, transported, and prepared in an efficient manner. Weight is always an important factor in space travel. The Space Shuttle needs 76lbs of fuel to lift just 1lb of payload into orbit. The weight of supplies on a mission, especially a long-duration mission, must be carefully measured. A total of 3.8lb per day per astronaut is allocated to food and packaging. The packaging must be taken into account because it too takes up space and has mass.

The fresh food locker is packed at the Kennedy Space Center and is installed on the Shuttle 18-24 hours prior to launch. The fresh food lockers contain food items such as tortillas, fresh bread, breakfast rolls, and fresh fruits and vegetables including apples, bananas, oranges and carrot/celery sticks. The rest of the food is packaged and stowed in locker trays in Houston about a month before each launch.

These lockers are installed in the Shuttle 2-3 days before launch. Frozen food includes entrees, vegetable and dessert items while refrigerated food includes fresh and fresh-treated fruits and vegetables, extended shelf-life refrigerated foods, and dairy products. Astronauts select their menu approximately five months before flight and these menus are analyzed for nutritional content by the Shuttle Dietitian.

The Museum is deeply grateful to the funders that make our education programs possible:



*This project was made possible in part by the
Institute of Museum and Library Services, Award ID:
CAGML-247144-OMLS-20*