

National Aeronautics and Space Administration



## Have Food Will Travel

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### Purpose

To understand the nutritional value of explorers' meals

To design a nutritionally balanced diet for long-duration space flight

### Background

When Captain Robert F. Scott and the crew of the RRS Discovery left England in 1901 to explore Antarctica, they took a variety of foods to meet their nutritional needs. When the explorers were stranded, the demands on them increased and they probably used more energy than they consumed. Although the average person uses about 2,000 calories each day, the explorers in Antarctica may have burned as many as 7,000–10,000 calories per day. By the end of their journey, they had basically no carbohydrates left to eat, existing on mainly seal, penguin, and seaweed. At this point, the explorers neither consumed enough calories to meet their level of activity nor had the variety of foods (especially carbohydrates and vitamins) in their diet necessary to fulfill basic nutritional needs. As a result, the explorers suffered from fatigue syndrome, a condition that made physical labor almost impossible.

Astronauts are also concerned about consuming a healthy diet, especially on long-duration space flights. Astronauts use about 3,500 calories per day, but the effects of space on their bodies sometimes make it difficult for astronauts to get the proper nutrition. For example, fluids in the body shift, leaving crewmembers congested, so food doesn't have much taste. To compensate for reduced taste sensations, astronauts often season their food with hot sauce or ketchup. Astronauts also report just not feeling hungry or being too busy to think about eating.

To be sure the astronauts are getting enough food and the correct amounts of each food type to meet their nutritional needs, nutritionists work with the astronauts and carefully plan their menus for space. To help monitor general food intake, astronauts keep a food frequency journal that records how many items they eat each day. Even beverages and water intake are recorded. As missions to the Moon, Mars, and beyond proceed, space nutrition will change even more. For example, astronauts may need to grow some of their foods. Technology and science will continue to help the astronauts live healthy lives even while they're away from Earth.

## **Materials**

- Computer with internet access
- Pencil

## **Procedure**

1. Visit [www.mypyramid.gov](http://www.mypyramid.gov) and click on “My Pyramid Plan.”
2. Put in your age, gender, and the amount of physical activity you do each day.
3. Click “submit” and find your average needs for each food group.
4. On the right side of the page, click on the “Meal Tracking Worksheet.”
5. Download and print a copy.
6. Use this sheet to keep track of everything you eat in a day.
7. Compare your food intake to the recommended amounts of each food group.
8. In your science journal, write an evaluation of your food choices.
9. Do some research to find out about which foods travel well in space.
10. Plan a 10-day rotating menu for a long-duration space flight. (Remember that astronauts need about 3,500 calories per day and that they will eat these same meals 18 times on a 180-day mission)

## Discussion

1. Why is a nutritionally balanced diet important?
2. What special problems do astronauts face when planning a diet?
3. Why do people have different nutritional needs?

## Extension

1. To learn more about the RRS Discovery and Captain Robert F. Scott, visit the RRS Discovery Museum web <http://www.rrsdiscovery.com/>
2. Visit the NOVA web site to learn more about the Shackleton expedition to Antarctica: <http://www.pbs.org/wgbh/nova/shackletonexped/1914/>
3. Complete the online adventure to learn more about endurance diets. <http://www.pbs.org/wgbh/nova/shackletonexped/classroom/w4meal.html>. Calculate the number of calories consumed by the Antarctic explorers and evaluate their diets' nutritional quality.
4. Conduct research to learn more about other historic expeditions.
5. When man explored the Moon for the first time in July 1969, we knew more about the Moon than Captain Scott knew about Antarctica when he began his expedition. Research and explain why.