National Aeronautics and
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Educational Product	
Educators	Grades K–8

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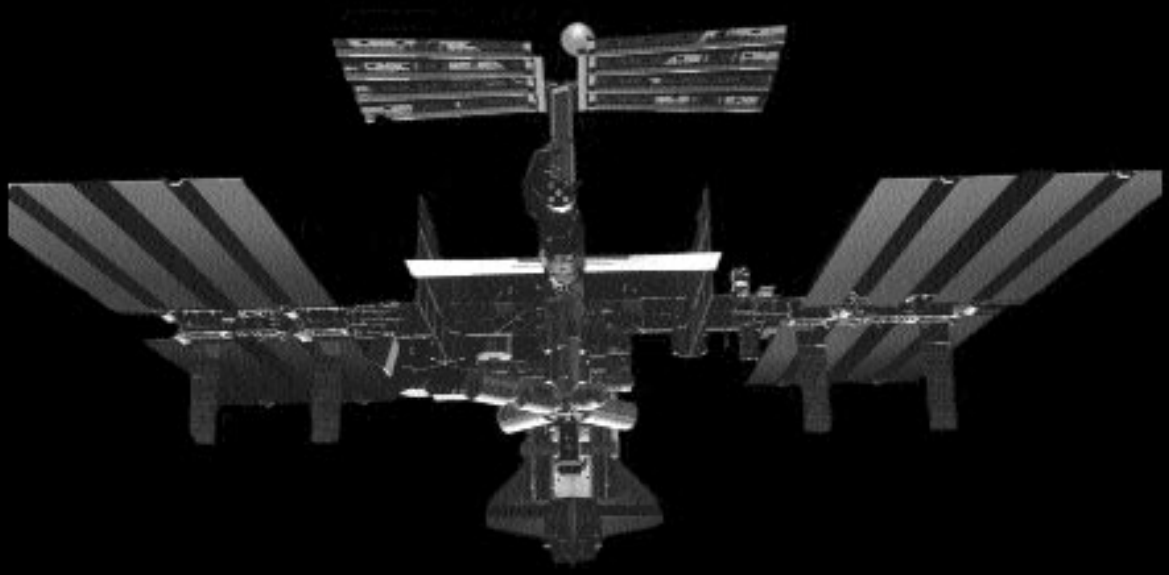
SPACE FOOD AND NUTRITION

An Educator's Guide With Activities in Science and Mathematics



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National Education Standards

National Science Education Standards
National Research Council, 1996
Grades K–8

	Food Preparation for Space	Food Selection	Planning and Serving Food	Classifying Space Food	Ripening of Fruits and Vegetables	Mold Growth	How Much Is Waste?	Dehydrating Food for Space Flight
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		√					√	
Position and motion of objects			√					

National Mathematic Standards

National Mathematic Standards
National Council of Teachers of Mathematics, 1988
Grades K–8

	Food Preparation for Space	Food Selection	Planning and Serving Food	Classifying Space Food	Ripening of Fruits and Vegetables	Mold Growth	How Much Is Waste?	Dehydrating Food for Space Flight
Computation	√	√	√				√	√
Measurement	√				√	√	√	√
Reasoning	√	√	√	√	√	√	√	√
Observing	√	√	√	√	√	√	√	√
Communicating	√	√	√	√	√	√	√	√

Introduction

From John Glenn's mission to orbit Earth to the International Space Station program, space food research has met the challenge of providing food that tastes good and travels well in space. To better understand this process, we can look back through history. Explorers have always had to face the problem of how to carry enough food for their journeys. Whether those explorers are onboard a sailing ship or on the Space Shuttle, adequate storage space has been a problem. Food needs to remain edible throughout the voyage, and it also needs to provide all the nutrients required to avoid vitamin-deficiency diseases such as scurvy.

Early in history, humans discovered that food would remain edible longer if it were dried and stored in a cool dry place until it was time to be consumed. Early food dehydration was achieved by cutting meat, fish, and certain fruits into thin strips and drying them in sunlight. Rubbing food with salt or soaking it in salt water, an early form of curing food, also helped preserve it. Later techniques were developed for cooking, processing, preserving, and storing food in sealed containers. With the developments of pasteurization and canning, a much larger variety of foods could be stored and carried on long journeys. More recently, refrigeration and quick-freezing have been used to help preserve food flavor and nutrients and prevent spoilage.

While these forms of packaged food products are fine for travel on Earth, they are not always suitable for use on space flights. There are limitations to weight and volume when traveling and the microgravity conditions experienced in space also affect the food packaging. Currently, there is limited storage space and no refrigeration. To meet these challenges, special procedures for the preparation, packaging, and storing of food for space flight were developed.