

## Spice It Up



### Design Brief

Hey there! Get ready for an incredible journey to become a space culinary expert! In this project, you'll dive deep into the fascinating world of space food. *Working in teams*, you'll create a delicious and nutritious meal fit for astronauts during their daring space missions. We'll discover *how to keep the food fresh for a long time and ensure it tastes* out-of-this-world even in zero gravity! Throughout the project, you'll enjoy engaging videos, hands-on experiments, and a final presentation to showcase your stellar space meal. Let's launch into the thrilling realm of space cuisine!

The *meal must include elements from at least three different food groups* to ensure balanced nutrition. The *packaging for the meal should be lightweight, compact, and designed for easy consumption in a zero-gravity environment*. Teams must consider the limitations of space travel, including the impact of zero gravity on taste and the availability of resources for food preservation techniques. Creativity and innovation in flavor enhancement strategies will be highly encouraged, emphasizing the use of condiments and other seasoning alternatives suitable for space conditions. All proposed meal plans must undergo a nutritional analysis to ensure they meet the dietary requirements for astronauts during prolonged space missions.

(Individual) Step 1. Identify the Problem, Opportunity, or Goal: Briefly explain the problem you are going to try to solve?

(Individual) Step 2: List Criteria and Constraints for the solution

Criteria (the requirements)	Constraints (the restrictions)
1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Spend 15 minutes researching concepts that are important for you to know about to be successful for this challenge. What do you need to learn to be successful in this challenge? (Examples:Freeze-drying, Zero gravity, Nutrient-dense foods, Space nutrition, Food preservation techniques,. NASA food technology, MyPlate guidelines, Astronaut taste perception, Compact food packaging, Seasoning alternatives for space meals)

Notes

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Exit Ticket:

What Knowledge do you already have about food preservation?

**(Individual) Step 3** Come up with three meals that you could send into space. Brainstorm ideas of foods that they could send to space.

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**Step 4 Select your Choice**

Evaluate the 3 ideas you generated. It is important to select what appears to be the best idea that solves the problem. Use the decision matrix below to evaluate your 3 ideas. Rank each design based on the design factors listed below. Rank your ideas 1 being the worst and 3 being being the best

Design Factor	Idea 1	Idea 2	Idea 3
Does it include the five food groups Fruit, Grain, Vegetables, Protein, and Dairy?			
Are the foods healthy?			
Can they be preserved easily, will they last somehow in space?			
Do they have the necessary ingredients?			
Can they be easily prepared in space?			

1. CIRCLE the idea that appears to be the best based on the results (highest number)
2. Do you agree that this idea is best? Yes or No, Why or Why Not?

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Is Freeze Drying Food Healthy?

- a. What is freeze-drying, and how does it preserve food?
- b. What are the advantages and disadvantages of freeze-dried food?
- c. How does freeze-drying affect the nutritional content of food?
- d. Can you provide examples of common freeze-dried foods and their benefits?

Notes From Article

How do you Make Freeze Dried Food?

- a. What are the steps involved in the freeze-drying process?
- b. Why is freeze-drying considered an effective food preservation method?
- c. What types of equipment are used in the freeze-drying process?
- d. Can you explain the role of temperature and pressure in freeze-drying food?

Notes From Article

Freeze-Dried Food in Space

- a. Why is freeze-dried food preferred for space missions?
- b. How does freeze-dried food help address the challenges of space travel?
- c. What are some examples of freeze-dried foods commonly consumed in space?
- d. How does the lack of gravity impact the consumption of freeze-dried food in space?

Notes From Article

Eating In Space

- a. How does the lack of gravity affect the dining experience in space?
- b. What are some strategies used by astronauts to consume food in a zero-gravity environment?
- c. What are the challenges astronauts face in terms of taste perception in space?
- d. Can you describe any special techniques used to package and prepare food for consumption in space?

## Notes From Article

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# FINAL PLAN PREP

## Day 1: Meal Planning and Preservation Strategy

**5 Minutes** - Discuss the challenges of preserving flavor and nutrients in your meal and the impact of reduced smell and taste in space.

**15 Minutes** - Team Brainstorming list the selected meal and potential preservation strategies. How are you going to preserve the meal without compromising taste and nutrition?

**27 Minutes** - Solution Development (27 minutes):Outline a detailed plan on how your chosen meal will be preserved in space.

What innovative preservation techniques will be utilized?

How can these techniques enhance the meal's flavor and nutritional value?

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**Day 2: Meal Planning and Preservation Strategy**

**20 Minutes** Flavor Enhancement Plan: Brainstorm strategies to ensure the meal has enhanced flavor in a reduced smell and taste environment. What seasoning alternatives can be considered? How can the taste be intensified?

**20 Minutes** Preservation Planning : Discuss the specific parts of the meal that require preservation and how they will be packaged. What challenges might zero gravity and limited storage space pose in terms of packaging?

**15 Minutes** Rehydration Strategy (15 minutes): Outline a clear plan for how the meal will be rehydrated in space. How can the rehydration process be adapted to the conditions of a zero-gravity environment?

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## Student Reflections

1. What were the key challenges you faced in designing a meal in space

2. How did the criteria and constraints shape your decision-making process in selecting the final meal?

3. What did you learn from the process of creating meals in space, do you feel you will ever freeze dry food?

4. How did the videos throughout the unit influence you on eating healthier and appreciating food?

5. Reflecting on the entire project, what new insights did you gain about problem-solving and innovation, and how might these insights be applicable to real-world scenarios you may experience in the future?

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