

# 5,4,3,2,1, lunch!

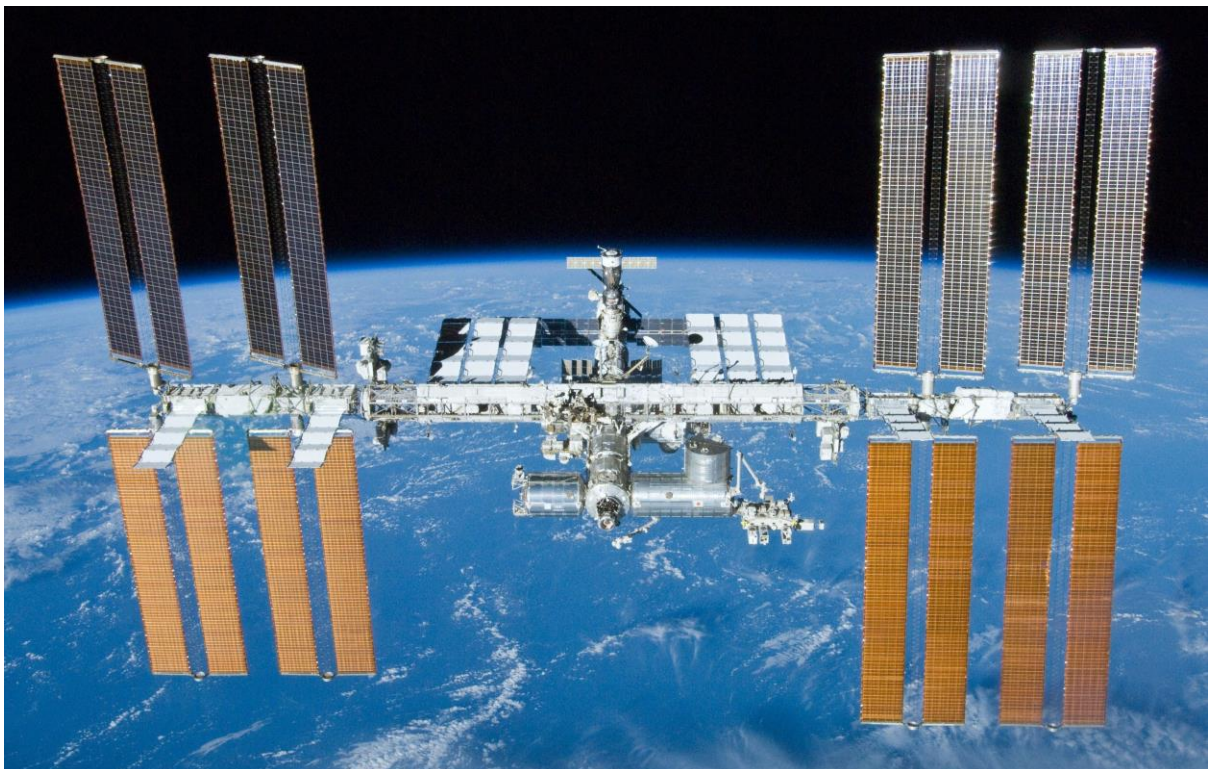
What do Astronauts eat for lunch?

Using the following worksheets, you can find out about Space food, how it is prepared, what you can eat and what you can't eat.

Task 1 – Testing Food for Space

Task 2 – Dehydrate your own space food

Task 3 – 7 day space menu



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## **So what do Astronauts eat in space?**

The first missions into space were only a few hours long so most Astronauts ate a big meal before take off!

As journeys became longer food was prepared for the Astronauts to eat in space. The first food was pureed and put into tube similar to toothpaste tubes.

Next they tried food cubes, which were cubes of compressed food coated in gelatine.

Neither of these types of food preparation were very good for long space flights. The Astronauts also didn't like eating them and it became boring very quickly.

Dehydration and freeze drying food came next and was much more popular as it retained flavour and the Astronauts felt they were actually eating proper food.

Now with advances in food preparation and the fact there is now a freezer and oven on the Space Station, the Astronauts eat very similar food to us here on Earth, although the preparation of their meal may be slightly different to how we would make our dinner.

## **But what food CAN'T go into space?**

- Crumbs—from bread, crackers, cookies, etc—don't do well in space. They float around, and can fly into an astronaut's eyes and interfere with important equipment.
- Salt, pepper and other granular spices and seasonings can make for a huge mess in microgravity. NASA has, instead, developed liquid alternatives for astronauts to use
- The carbonation in beverages like soda act differently in space than on Earth. As a result the carbon dioxide bubbles remain within the liquid as opposed to being released as a gas for an effervescent pop. This can cause astronauts digestive discomfort and, as a result, Coke and Sprite remain on the ground
- Fish. Cooking fish in space is a no-no purely because of it's smell! Due to the microgravity the smell of fish would linger!
- Brussel Sprouts. Apart from a lot of people not liking them, shall we just say that the resulting smells from eating Brussel Sprouts can cause a problem.

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## Task 1

### Testing food for space.

Read the following paragraph from NASA regarding one of the favourite foods of the Astronauts.

“As astronauts travel into space, they need energy and proper nutrition to keep them going. Astronauts have to take their food with them when they go into space. Preparation varies with the food type. Some foods can be eaten in their natural form, such as fruit.

Other foods require adding water to rehydrate them, such as macaroni and cheese or spaghetti. There are no refrigerators in space, so space food must be specially prepared and preserved to avoid spoilage, especially on longer missions. One of the favourite foods of the astronauts is the tortilla. Tortillas are popular in space for several reasons. First, they are nutritious. Tortillas contain large amounts of carbohydrates that the body needs to function. Second, tortillas are easily stored since they lay flat and they don't take up too much room. Third, tortillas are one of the perfect space foods because they do not produce crumbs. Crumbly or loose foods can float and contaminate the inside of the International Space Station or space shuttle and become an annoyance or even a hazard to crews and equipment. Tortillas are easier to handle in reduced gravity and they also stay fresh longer than sliced bread. Making a wrap type sandwich with a tortilla requires less handling than when using two slices of bread bags filled with nitrogen. The tortillas taken on the ISS have a shelf life of about eighteen months.”

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## Experiment

1. Select some food that you think might be suitable for use in space.
2. If possible, ask other people within the house to select food too.
3. Write down the selected food in the table on the next page.
4. As you can see there is a column for TESTING the food. Discuss with your parents or other people that are participating how you might test the food. They could include Questions and physical tests such as -
  - Does the food crumble?
  - Is there too much liquid in the food?
  - How will it be prepared?
  - Does it need to be heated up?
  - Does the food smell too strongly?
  - (There are NOTES pages at the end of this worksheet so you can write down your ideas before putting them into the table)
5. Once you have tested your food write down if you think it is suitable
6. Next think of the type preparation the food might need to be safe to go into space. Please read the following from NASA.

“There are eight categories of space food:

- **Rehydratable Food:** The water is removed from rehydratable foods to make them easier to store. Water is replaced in the foods before they are eaten. Rehydratable items include beverages as well as food items. Hot cereal such as oatmeal is a rehydratable food.
- **Thermostabilized Food:** Thermostabilized foods are heat processed so they can be stored at room temperature .Most of the fruits and fish (tuna fish) are thermostabilized in cans. The cans open with easy-open pull tabs similar to fruit cups that can be purchased in the local grocery store. Puddings are packaged in plastic cups.
- **Intermediate Moisture Food:** Intermediate moisture foods are preserved by taking some water out of the product while leaving enough in to maintain the soft texture. This way, it can

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be eaten without any preparation. These foods include dried peaches, pears, apricots, and beef jerky.

- **Natural Form Food:** These foods are ready to eat and are packaged in flexible pouches. Examples include nuts, granola bars, and cookies
- **Irradiated Food:** Beef steak and smoked turkey are the only irradiated products being used at this time. These products are cooked and packaged in flexible foil pouches and sterilized by ionizing radiation so they can be kept at room temperature.
- **Frozen Food:** These foods are quick frozen to prevent a build up of large ice crystals. This maintains the original texture of the food and helps it taste fresh. Examples include quiches, casseroles, and chicken pot pie.
- **Fresh Food:** These foods are neither processed nor artificially preserved. Examples include apples and bananas.
- **Refrigerated Food:** These foods require cold or cool temperatures to prevent spoilage. Examples include cream cheese and sour cream.
- **Frozen, Fresh and Refrigerated** foods must be eaten within 7 days of arrival

7. In the last column put a tick or a cross against each food - a tick if you think your food choice will be okay to go into space or a cross if it will not go into space.
8. Did your favourite foods make it into space?



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## Task 2

One of the main ways to take food into space is to dehydrate it. Dehydration just means to remove all moisture. Some foods can be re-hydrated by adding water

In this task you will dehydrate a piece of fruit as though it was being prepared to go into space. It is a simple process using an oven but it does take a while! NASA use industrial dehydrators to prepare the fruit and other food that they need.

### **Adult Supervision needed**

You will need –

- Fruit of choice- banana, strawberries, apple, raspberries
- Knife
- Baking tray
- Plastic container.

1. Cut the **fruit** into thin slices (2 or 3 mm) using a knife (Adult supervision or help needed)
2. Turn your oven to it's lowest setting
3. Place the fruit on a baking tray
4. Cook for 6-8 hours
5. Place in a plastic container with lid.

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## Task 3

### Space menu

Food is of course very important to the Astronauts but they can't take everything they want into space. Each Astronaut has to pick his food, from an approved list, 120 days before launch day so that it can be prepared and packaged.

A nutritional expert will also make sure that what the Astronaut wants to eat will keep him/her healthy and the right weight.

In this task we have provided you with a list of some of the foods available to the Astronauts. Using the list and the food pyramid, you must plan a 7 day menu which must include Breakfast, Lunch, Dinner, 2 snacks and drinks.

Why not do this task with others and compare your menus

Breakfast	Lunch	Dinner	Snacks	Drinks



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## Food List

<b><i>Dairy</i></b> Cheese Cream cheese Yogurt,	<b><i>Fruits</i></b> Apple Grapefruit Kiwi Orange Plum
<b><i>Meat and Eggs</i></b> Beef brisket BBQ Beef, Beef fajita Beef Meatloaf with mashed potatoes and gravy  Chicken Fajita Grilled Chicken Chicken Pot Pie Chicken Teriyaki	Bacon Pork Chops Pork Sausage Sweet and Sour Pork  Tuna Noodle casserole  Omelette – vegetable or Ham Vegetable Quiche

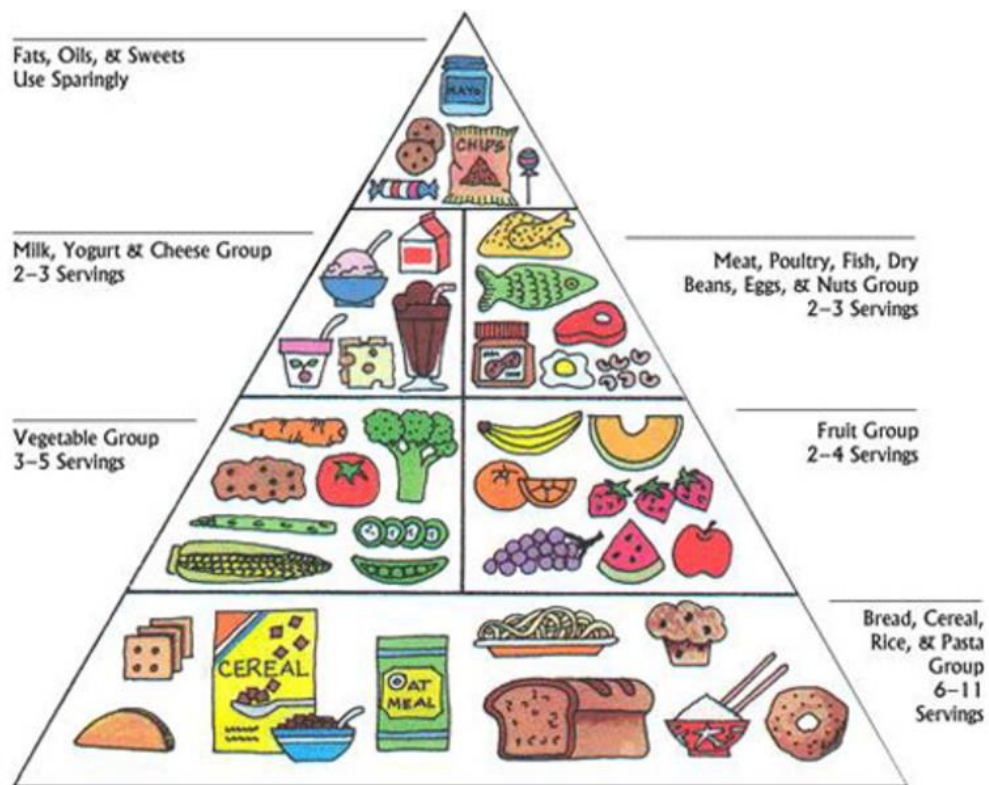
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<b><i>Pasta and Salad</i></b>  Lasagne Spaghetti with meat sauce Spaghetti with tomato sauce Tortellini with tomato sauce and cheese Chicken Salad Tuna Salad	<b><i>Rice and Tortillas</i></b>  Fried Rice White Rice Vegetable Rice White Tortillas
<b><i>Vegetables</i></b>  Mashed Potato Baked Potato Asparagus Broccoli Carrot  <b><i>Breakfast</i></b>  Pancakes Waffles Cereal Pancakes	  Cauliflower Mushrooms Peas  <b><i>Drinks</i></b>  Cranberry Juice Pineapple Juice Chocolate Milk Hot Chocolate Coffee Tea
<b><i>Soups</i></b>  Vegetable Chilli	<b><i>Puddings</i></b>  Cheesecake Apple Pie Butterscotch Pudding Jelly
<b><i>Snacks and Condiments</i></b>  Cashew Nuts Peanuts	  Honey Onion Dip

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Beef Jerky  
Shortbread  
Chocolates  
Chocolate Cookies

Ketchup  
Horseradish sauce  
Mayonnaise  
Mustard  
Peanut Butter



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## SPACE FOOD NOTES