





Space Cafe

Find What You Need...

- Cardboard, cookie sheet, or another flat item
- Containers such as baggies and plastic bottles
- Food wraps such as aluminum foil and wax paper
- Fasteners such as tape, glue, Velcro®, thread
- Scissors
- Markers and paper
- Plastic utensils, wooden chopsticks
- Food samples



How would you create a system to hold together one complete meal in space?

As astronauts travel into space, they need food and energy to keep them going. While traveling in space, astronauts live in zero gravity. They can't just eat their food from plates with forks and knives – the food would float away! They can't just drink a glass of juice – the juice droplets would float out of the glass. And they can't just take a big bite out of a sandwich. The bread crumbs would float around the space shuttle and jam up all the machinery. Food scientists at NASA have created special food systems to package the food so astronauts can select their food, put it together and eat it. An illustration of a NASA food tray is shown on page 3. It uses Velcro® and magnets to hold foods in place. You will create a food system to contain and serve a complete meal in space, just like the trays the astronauts use as they eat their lunch in the space shuttle.

Activity Instructions

 Begin the way NASA scientists do with a drawing of your concept. Use some paper and markers to sketch out your ideas. Do you need to create a new kind of spoon or bag? Make a list of the materials you want to use.



 Next, gather your materials. You'll need something to hold all the food together, containers to hold the food in place, tools to keep the food from floating around and a way for the astronauts to get the food and drinks into their mouths.



 Start your construction with a tray. You can use a sheet of cardboard from a box, a metal cookie sheet, or anything else that works as a base.



4. Now select the foods you've chosen for your menu. Make sure they're foods you think are okay for space travel. You can check the Sample Menu on page 4 to get some ideas about what astronauts like to eat in



5. Use your baggies, bottles, tape and other materials to put your tray together. Use strips of cardboard to

make separators as shown in the illustration. Make sure your tray contains everything an astronaut would need for one meal.



6. Once you have everything put together, add the food samples. Then label all the parts.



- 7. Look it over. Does it have everything you need? Will the food stay in place? What could you do to keep it from floating away? Will the astronaut like the meal and be able to eat it? Make sure they're foods you think are okay for space travel. If so, you've done your job.
- When you're all finished designing and building your tray, take a picture of it and send it to us at info@kidsciencechallenge.com. We'll post those pictures that we think show the most original or creative food trays.

Conclusions

Ask yourself these questions to check your food system. Will the food stay in place until the astronaut is ready to eat it? Will the food make it to the astronaut's mouth, or will it float out of its container as soon as it's opened? Can you find some of the foods you selected on the Sample Menu? Does it fit into the container you designed for it? The food systems that astronauts use today have come a long way. But there is still a long way to go to get ready for travel to Mars. Maybe you can come up with an idea that will help create the perfect food system for the future of space travel.



NASA Food Technology Commercial Space Center Shuttle Food Tray Mockup

NASA FTCSC Shuttle Food Tray Mockup

Bottles with droppers store salt and pepper in liquid form for use in seasoning foods during flight.

Beverage packets include special straws that have clamps on them to prevent liquids from escaping into the Shuttle cabin.

Rehydratable foods

weigh less and have a longer shelf life than foods that have not been dehydrated.



A spring holds food packets in place.

Because both the Russians and Americans supply food for space missions, food packages are labeled in both Russian and English.

Velcro® and magnets prevent utensils and food from floating around the Shuttle cabin.

http://www.ag.iastate.edu/centers/ftcsc

Brain Buster:

One Spring day, a scientist took his dog for a walk. The dog came home covered in burrs. The man noticed that the burrs were made of hundreds of tiny hooks. He realized that he could invent a material with many tiny hooks to hold things together. That's how Velcro was born. What can you find in nature to give you an idea for a new invention?

International Space Station Standard Menu (4 days of a 30-day menu)

DAY 1

Meal A Eggs Scrambled w/Bacon, Hash Browns, Sausage Toast Margarine Jelly, Assorted Apple Juice Coffee/Tea/Cocoa

Meal B

Chicken, oven-fried Macaroni and Cheese Corn, whole kernel Peaches Almonds Pineapple-Grapefruit Juice

Meal C

Beef Fajita Spanish Rice Tortilla Chips Picante Sauce Chili con Queso Tortilla Lemon Bar Apple Cider

DAY 2

Meal A

Cereal, cold Yogurt, fruit Biscuit Margarine Jelly, Assorted Milk Cranberry Juice Coffee/Tea/Cocoa

Meal B

Soup, cream of broccoli Beef Patty Cheese Slice Sandwich Bun Pretzels Dried Apples Vanilla Pudding Chocolate Instant Breakfast

Meal C

Fish, sauted Tartar Sauce Lemon Juice Pasta Salad Green Beans Bread Margarine Angel Food Cake Strawberries Orange-Pineapple Drink

DAY 3

Meal A

French Toast Canadian Bacon Margarine Syrup Orange Juice Coffee/Tea/Cocoa

Meal B

Cheese Manicotti w/ Tomato Sauce Garlic Bread Berry Medley Cookie, shortbread Lemonade

Meal C

Turkey Breast, sliced Mashed Sweet Potato Asparagus Tips Cornbread Margarine Pumpkin Pie Cherry Drink

DAY 4

Meal A

Cereal, hot Cinnamon Roll Milk Grape Juice Coffee/Tea/Cocoa

Meal B

Quiche Lorraine Seasoned Rye Krisp Fresh Orange Cookies, Butter

Meal C

Soup, won ton Chicken Teriyaki Chinese Vegetables, stir-fry Egg Rolls Hot Chinese Mustard Sweet 'n Sour Sauce Vanilla Ice Cream Cookies, fortune Tea

Space Fact:

Astronauts can't drink soda in space. The little gas bubbles in soda won't float up to the top of the glass in zero gravity.

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