

About This Module

Overview	Youth will consider what it takes to live in space. They will explore the International Space Station (ISS), taste space food, and learn the difference in living conditions between Earth and outer space.
Guiding Questions*	<ul style="list-style-type: none"> • Where do astronauts live and work in outer space? • What do astronauts eat in outer space? • How do spacesuits protect astronauts? • What equipment is used aboard the space station? How is it used?
Culminating Activities	Youth will develop a robotic arm to assist astronauts aboard the International Space Station.
Session 1	Life on the International Space Station Youth will be able to describe life and work on the International Space Station. They will be able to explain the importance of water filtration for astronauts on the ISS by designing a basic water filter.
Session 2	Space Food Youth will be able to describe the kinds of foods astronauts eat on the International Space Station. They will create their own space dessert based on the conditions in zero gravity.
Session 3	Spacesuits Youth will be able to design spacesuits by applying their knowledge of life in space.
Session 4	UV Rays Youth will conduct experiments with UV rays to understand how astronauts are affected by the unique environment of space.
Session 5	Robotic Arm Youth will apply their knowledge of engineering to build a robotic arm for the International Space Station.

*Guiding questions are not specifically asked in the sessions themselves, but are meant to guide your preparation and facilitation of the unit. Keep these questions in mind so you can help youth make connections and capture key takeaways relating to the topic.

Key Terms

Word	Definition
Astronaut	A person trained to travel and work in space.
International Space Station (ISS)	A laboratory that orbits Earth where people live and work.
Gravity	The pull of objects to Earth; the reason we don't float away.
Impurities	Things like dirt that make water unsafe to drink.
Filtration	Removing the dirt or unsafe material from water.
Porous	Full of tiny holes; for example, a sponge.
Prediction	A guess about what will happen.
Dehydrate	Remove the water from food.
Rehydrate	Put the water back into food.
Freeze dry	Freezing something, then warming it back up very slowly while removing any remaining water.
Zero gravity	When there is no gravity so everything is weightless and can float in the air.
Spacesuits	Specially designed suits, complete with gloves, helmet and boots, that protect astronauts in outer space.
Radiation	Form of energy that is released as waves or particles.
Sun	Star closest to Earth.
Ultraviolet (UV) rays	Energy from the sun in the form of heat. It can be harmful to humans without the right protection (sunglasses, sunscreen).
Atmosphere	Gases that surround Earth and offer protection from some forms of radiation.
Mission patch	Patches given to astronauts and crew members for completed missions.
Cupola	In the International Space Station, it's the place where astronauts sit to control the robotic arm. It is dome shaped and has seven windows so they can see out.
Robotic arm	Manually controlled machine that grabs on to equipment to move it or bring inside the International Space Station.

Supplies

Facilitator Needs	1	Whiteboard or flipchart paper and marker
	1	Computer or projector with internet connection
	1	Timer
	1	Large bowl
	1	Dirt, coffee grounds, and/or crunched-up leaves to make dirty water
	1	Water
	1	Coffee filter
	2	16-ounce bag mini marshmallows
	1	Pair of scissors
	1	Roll of masking tape
	1	Hot glue gun (optional)
	1	1/2 cup measuring cup
	1	Bottle of sunscreen (SPF 30 or greater)
	1	Device with internet connections (optional)
	2	Paper cups
Each Group Needs	1	Piece of paper
	1	1 tablespoon measuring spoon
	1	1/2 tablespoon measuring spoon
	Multiple	Assorted materials that could be used as a filter, such as coffee filters and rubber bands, cotton balls, paper towels, gravel, cut-up sponges, sand, etc.
	1	Empty plastic water bottle
	1	Plastic cup
	1	Penny
	1	Empty plastic container
	1	Rubber band
	1	Pair of heavy work gloves or oven mitts
	1	Pair of scissors
	1	Stopwatch
Multiple	Materials for robotic arm: paper towel rolls and long strips of cardboard; glue, masking tape, paper clips and pipe cleaners	

Supplies

Each Participant Needs	1	Sandwich baggie with zip closure (like Ziploc)
	1	Pen or pencil
	1	Small box raisins
	2-3	Freeze-dried strawberries
	2	Small cups or napkins
	1	1 tablespoon instant pudding mix (chocolate or vanilla)
	1	1/2 tablespoon powdered coffee creamer or powdered milk
	1	3 tablespoons cold drinking water
	1	Colored construction paper
	4-6	UV pony beads that change color when exposed to sunlight
	4	Pipe cleaners
	Several	Markers, crayons or colored pencils
	Several	Assorted materials (aluminum foil, fabric, paper, etc.)

Extension Activities

- Spot the Station: Track the International Space Station on [Nasa's website](https://spotthestation.nasa.gov) (spotthestation.nasa.gov)
 - Use the link to learn when the ISS will be in the sky above your Club location. Invite youth and families to go outside at night and have a viewing party where they live. Be sure to have youth share what they have learned about the ISS with their families.
- Space activities on [Train Like an Astronaut](https://trainlikeanastronaut.org/educational-activities) (trainlikeanastronaut.org/educational-activities)
 - During gym time, have youth try a few exercises to train like an astronaut.
- **STEM activities from NASA** (nasa.gov/learning-resources/for-students-grades-k-4)
 - This site contains additional crafts, STEM projects and online games for youth.
- **NASA Image of the Day** (nasa.gov/image-of-the-day)
 - Facilitators can start each day with a new photo to start conversations while youth are entering the room.
- **Request a Call With an Astronaut** (nasa.gov/learning-resources/in-flight-education-downlinks); email jsc-downlinks@mail.nasa.gov for more information.
- Space crafts from [I Heart Arts N Crafts](https://iheartartsn Crafts.com/20-outer-space-crafts-for-kids) (iheartartsn Crafts.com/20-outer-space-crafts-for-kids)
 - Series of low-budget crafts to try if the group has extra time.
- **NASA Career Connections** (nasaclips.arc.nasa.gov/careerconnection)
 - Youth can watch videos created by NASA employees who talk about their jobs as engineers, geologists, astronauts and more.

Career Connections

In this module, youth will explore careers that support space exploration. These are roles like astronaut, food scientist and engineer. Staff can further integrate career exploration by researching and sharing some of the careers that match youth strengths. Learn about unique space careers at [Fun Kids](https://funkidslive.com/learn/deep-space-high/space-for-all/writing-jobs-in-space) (funkidslive.com/learn/deep-space-high/space-for-all/writing-jobs-in-space).

Family and Caregiver Engagement

On-site:

- Invite families to join for the culminating Robotic Arm event. Have youth share what they've worked on and learned in the different sessions, and ask families to share what they know about space.

At home:

- Invite families to explore the [NASA Kids' Club webpage](https://nasa.gov/learning-resources/nasa-kids-club) (nasa.gov/learning-resources/nasa-kids-club) that contains games and activities around space and astronauts.
- Invite families to look for the ISS on [NASA's Spot the Station](https://spotthestation.nasa.gov) (spotthestation.nasa.gov).

Notes to Facilitator

- Session 2 contains activities with food. Send a note home and check for allergies before facilitating this session.
- Session 4 requires sunlight and the ability to go outside to complete the activities. Check the weather and schedule the session for a clear, sunny day. When planning to be outside in the sun for an extended amount of time, make sure youth apply sunscreen.
- Session 5 requires paper towel rolls and strips of cardboard. You may want to begin collecting those materials in advance of facilitating the session.