

Lift Off to the International Space Station with Noggin!

Activity Guide for Families and Educators



noggin

Developed in
collaboration with **NASA**

Ask an Astronaut!

Children from across the country had a unique opportunity to **talk with astronauts** aboard the International Space Station (ISS)!

NASA (National Aeronautics and Space Administration) **astronaut Shannon Walker** and JAXA (Japan Aerospace Exploration Agency) **astronaut Soichi Noguchi** had all of the answers!

View [NASA/Noggin Downlink](#) and then try some **out-of-this-world** activities with your child!



Astronaut Shannon Walker



Astronaut Soichi Noguchi

Why is it important to learn about Space?



- Children are naturally **curious** about space and want to explore it!
- Space makes it easy and fun to learn **STEM** (Science, Technology, Engineering, and Math).
- Space inspires **creativity, critical thinking** and **problem solving** skills.

Here is some helpful information to share with your child before you watch [Ask an Astronaut!](#)



What is the International Space Station?

The International Space Station (ISS) is a **large spacecraft that orbits around Earth**, approximately 250 miles up. Astronauts live and work there!

The ISS brings together astronauts from different countries; they use it as a **science lab** to explore space.



Learn Space Words!



Astronauts

An astronaut is someone who is trained to go into space and learn more about it. They have to wear special suits to help them breathe. They get to space in a rocket. Aboard the space station, astronauts do not walk on the floor like people on Earth do. Instead, they float around inside the space station.

The Moon

The Moon was the first place people landed in space. There are lots of craters on the Moon. The Moon orbits (goes around) the Earth. It sometimes looks like a circle and sometimes like only part of a circle.

The Sun

The Sun is actually an average-size star - it is the closest star to Earth and is still 93 million miles away! The Sun is over 300,000 times larger than Earth; the biggest thing in our Solar System. One million Earths could fit inside the Sun!

Planets

There are 8 planets that orbit the Sun.

Earth

Earth is the only planet that people have lived on. The Earth rotates - when it is day here and our part of the Earth faces the Sun, it is night on the other side of the world, as that part of Earth faces away from the Sun.

Orbit

An orbit is a path in space where one object travels around another object. The Earth orbits, or travels around, the Sun. The ISS is also in orbit. It travels around the Earth.

Stars

Bright balls of burning gas. There are more stars in the universe than grains of sand on all the beaches on Earth. That's at least a billion trillion!

Gravity

A force that makes sure that when we jump up in the air, we fall down. The space station has gravity too, almost as much as on Earth. But because the ISS is orbiting around the Earth, it makes it seem like there is a lot less gravity. That is why astronauts float in the space station.



ACTIVITY

Straw Rockets

Astronauts hitch a ride on a rocket to get to the International Space Station. Let's make a **straw rocket** and see how far it can go!

DIRECTIONS

Step 1: Cut a small piece of paper in a rectangle shape, about 2 inches long by 4 inches wide.

Step 2: Fold this in half and tape the top and long side opposite the fold. This “rocket” should fit loosely over the top of your straw.

Step 3: Decorate your rocket!

Step 4: Place your rocket over the straw and blow.

Step 5: Explore using your rocket together:

Ask your child, “How far does your rocket fly?”

- Use your feet to count how many steps it flies!
- Try blowing harder and blowing less—does this change how far your rocket flies?
- Try pointing your straw up in the air, straight out, and down towards the ground, changing the angle of your rocket. What happens?

Ask your child, “Why does your rocket fly?”

- When you blow air into the straw, the air goes through the straw and pushes out, pushing the rocket with it. When you blow harder into the straw, the air has more energy and the rocket can fly further!
- Gravity is a force that pulls your straw rocket down at the same time that your breath is a force pushing the rocket forward. These 2 forces work against each other, so the rocket makes a curved shape. When a real rocket goes into space, it has to push past the force of gravity pulling it down.



MATERIALS

- Scissors
- A straw
- Paper
- Tape

KEY VOCABULARY

Gravity - A force that makes sure that when we jump up in the air, we fall down. The space station has gravity too, almost as much as on Earth. But because the ISS is orbiting around the Earth, it makes it seem like there is a lot less gravity. That is why astronauts float in the space station.

Rocket - An object shaped like a tube that pushes something forward into the air, such as fireworks or spacecrafts

Force - A push or pull on an object

ACTIVITY

Hidden Stars

We can usually spot a **star** (or many!) in the night sky. But where do stars go during the day?

Stars *do* glow during the day, but we can't see them because of the **Sun**. During the day, the Sun's bright light gets scattered all over, and outshines the light coming from the stars. Therefore, we can't see stars until the sky gets dark at night.

You can explore this big question together with your child by **creating the night sky** out of crayons and watercolor paint! When you draw with white crayons on white paper, the white of the paper makes it hard to see the white crayon. This is similar to the way sunlight makes it difficult to see the bright stars during the day. However, when you paint over the stars with dark watercolor paint, you can see them again!

DIRECTIONS

Step 1: Draw stars, the Moon, and other parts of our **solar system** on a white sheet of paper.

Step 2: Observe the paper. Ask your child, "Can you see what you drew? Why or why not?" Let them know that this is similar to the way stars in the sky look during the day. It's nearly impossible to see them!

Step 3: Use a dark watercolor paint to paint over what you drew. Now ask your child, "What changed? Can you see your drawing?" Explain that just like in our sky, the stars are always there. During the day, the bright light from the Sun is so much brighter than the stars, that we don't see them. But when the Sun goes down, the darkness of night lets them shine through.



MATERIALS

- White Paper
- White Crayon
- Dark Watercolor Paint
- Paintbrush

KEY VOCABULARY

Star - A bright ball of burning gas.

Sun - An average-size star - it is the closest star to Earth and is still 93 million miles away!

Solar System - The Sun and everything that goes around the Sun (like planets)

Constellation - Groups of stars that form a pattern when viewed from Earth

Keep learning about stars together!

Constellations are groups of stars that form a pattern when viewed from Earth. Together, look up some famous constellations like Aries, Cygnus, and Leo. Try drawing them together or making them out of things you find in your house like cotton balls or q tips!

ACTIVITY

Healthy Astronauts

Astronauts work hard to take good care of their bodies. They exercise regularly so that they stay healthy for their space journeys. Do some **astronaut exercises** together!

DIRECTIONS

Step 1: Do 10 jumping jacks. Count backwards from 10 as if you were counting down to a spaceship's lift off!

Step 2: When we jump, **gravity** pulls us back down to Earth. But because the ISS is orbiting around the Earth, it makes it seem like there is a lot less gravity. That is why astronauts float in the space station! Do 10 big astronaut jumps and notice the point at which gravity starts pulling you back down to Earth.

Step 3: Astronauts need a lot of muscle strength to complete their missions. But because their bodies don't have to work as hard when there is less gravity, astronauts have to exercise a lot -- two hours each day to stay healthy! Train your arm, leg, and core muscles by doing a crab walk! Sit on the floor with your feet hip-distance apart in front of you and your arms behind your back with your fingers facing your hips. Lift your hips up and start crab walking forward by moving one hand and foot forward at a time. Race your child - who can get to the other side of the room first?

Step 4: Most food astronauts eat is freeze dried or vacuum packed. After exercising, snack on some dried fruit or a squeezie pouch to fuel up like astronauts!



MATERIALS

- None

KEY VOCABULARY

Astronaut - Someone who is trained to go into space and learn more about it.

Gravity - A force that makes sure that when we jump up in the air, we fall down. The space station has gravity too, almost as much as on Earth. But because the ISS is orbiting around the Earth, it makes it seem like there is a lot less gravity. That is why astronauts float in the space station.

Exercise - An activity that keeps the body or mind strong.