

Developed in partnership with NASA

Space Explorers!

Explore space as you and your children learn about astronauts, rocket ships, and planets!

- ★ Visit the International Space Station to ask real astronauts questions.
- ★ Increase your children's vocabulary as they make their own rockets, using math and problem-solving skills.
- ★ Practice important social and emotional skills as children work together to build their very own space station!



ABOUT

noggin



Noggin is a standards-aligned, interactive learning platform that allows kids to embark on the ultimate educational journey alongside their favorite characters from *PAW Patrol*, *Peppa Pig*, *Blue's Clues & You!*, and more. Noggin's team of education and child development experts is continually creating exciting new content – including learning games, activities, books, original video series, and classes – to build skills and knowledge that help kids succeed in school and life. By partnering with iconic organizations like NASA, Noggin creates unique experiences that excite a child's curiosity about the world and beyond – while helping to build their skills in math, literacy, social and emotional learning, and wellness. Noggin's team consists of educators, animators, designers, engineers, and other talented innovators who are dedicated to helping kids develop and grow by providing enriching, fun adventures every day – sparking their lifelong love for learning.



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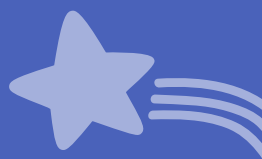


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I. Guide Overview

Welcome to Noggin's Educator Guide: Space Explorers!

This guide includes a series of Noggin's YouTube videos that aim to increase children's knowledge of natural sciences as they build their math, literacy, and problem-solving skills to learn about space. We also share activities and family extensions that you can use along with the videos to explore these concepts with your students.

Overall Learning Goals:

Noggin's Space Explorers playlist shares information about people and concepts that are fundamental to building a beginning understanding about space.

As children watch the videos, the primary takeaways are:

- There is so much that happens in space; I am just starting to learn about it.
- If I work hard, I can be an astronaut, make rockets, or have any other job connected to space.
- I am beginning to learn some new words, all about space.
- Space is FUN!



II. Noggin's Space Explorers YouTube Playlist



***Rhymes Through Times:
My Best***



***Take a Closer Look:
Earth's Best Friend***



Word Play: Constellation



***Take a Closer Look:
Red Hot Light***



***Learn About Space w/
Paw Patrol and Emmanuel***



***Take a Closer Look:
Space Flight***



Word Play: Planet



Word Play: Satellite



***International Space Station
Event: Ask an Astronaut***



Word Play: Meteor

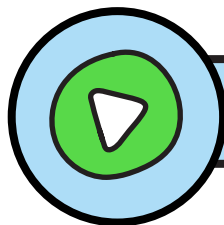


Helpful Heroes



III. Suggested Activities and Family Connections

Make a Straw Rocket



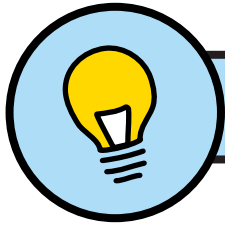
WATCH !

First, watch an episode from the YouTube playlist.

Here are some that align well with this activity:



Then, have fun doing this activity!



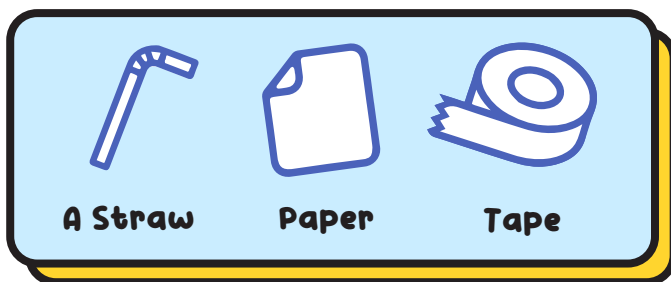
DO !

Make a straw rocket!

This activity encompasses math skills, social emotional skills, and applied sciences.

Astronauts use rockets to get their rocket ships, or spacecrafts, into space. Let's make a **straw rocket** and see how far it can fly!

First, have your children help you gather these materials:



Then, make rockets together! Follow these directions:

- Cut a small piece of paper in a rectangle shape, about 2 inches long by 4 inches wide.
- Fold this in half lengthwise and tape the top and long side opposite the fold.
- This “rocket” should fit loosely over the top of your straw.
- Decorate your rocket!
- Place your rocket over the straw and blow.



Ask some questions as children are making and playing with their rockets:

How far does your rocket fly?

- Use your feet to count your steps to measure how far your rocket flies.
- Try blowing harder and blowing more softly—does this change how far your rocket flies?
- Change the angle of your rocket by pointing your straw up in the air, straight ahead, and down towards the ground. What happens?
- Add one paper clip and then another to the rocket. What happens?



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 farther!
- **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 two forces work against each other, and 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.



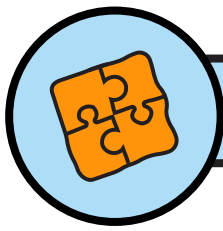
Simplify this activity for younger children:

- Count your steps everywhere you go—down the block, to the grocery store, or to the bathroom. Use words like longer, shorter, farther, and closer. Ask, *How many?*
- Blow up a balloon and see how far it travels in the air when you tap it.

Stretch this activity for older children:

- Make a chart showing how far the rocket flies. If you blow the rocket three times the same way, does it always land in the same place?
- Use a straw to make a painting. Put paint on a piece of paper and put the paper on a cookie sheet. Blow through the straw onto the paint and see what designs you can make!
- Make a paper airplane. Instead of using your breath as the force to make it fly, use your hand. How far can you make it fly?





SHARE !

Finally, extend the learning at home!

Share with families that their child has been learning about space. One of the figures they learned about is Katherine Johnson, who was a famous Black woman who worked for NASA as a mathematician. She solved math problems that helped NASA send astronauts to space, and to the Moon and back!

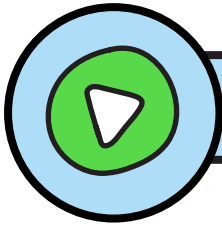
Encourage families to watch this read aloud of **Counting on Katherine: How Katherine Johnson Saved Apollo 13** by Helaine Becker:

<https://youtu.be/GFIqDDBfQh8>.

Katherine was always interested in math and knew that she might like to do something involving math when she grew up. Have parents ask their child what they might like to be when they grow up. Are there things they like doing now that they could turn into a career? For instance, a child who likes nature might want to be a botanist – a scientist who studies plants; a child who likes building with blocks might want to be an engineer. Families can encourage their child to draw pictures of what they want to be when they grow up. If their child wants to be many things, they can collect the pictures to create a book: *All the Things I Will Be!*



Build an International Space Station



WATCH !

First, watch an episode from the YouTube playlist.

Here are some that align well with this activity:



*International Space Station
Event: Ask an Astronaut*



*Take a Closer Look:
Earth's Best Friend*



Word Play: Constellation



Word Play: Planet



*Take a Closer Look:
Space Flight*



Word Play: Satellite



*Rhymes Through Times:
My Best*



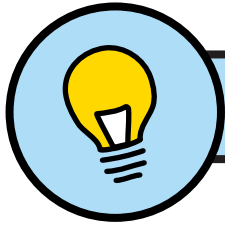
Word Play: Meteor



Helpful Heroes



Then, have fun doing this activity!



DO !

Let's make our own International Space Station!

This activity encompasses executive function skills and natural sciences.

Turn your dramatic play area into an International Space Station. Here are some ideas of items to include:

- Tools to fix the space station
- A control panel
- Space food
- Spacesuits
- A telescope
- A window like the one that astronauts use to look down on Earth
- A research lab

Make a rocket ship, or spacecraft, to get there.

- Use a big empty box to create a rocket ship that children can actually sit in!



Make the space station international by:

- Adding hello/welcome signs in different languages
- Adding flags and pictures of astronauts from different countries



Encourage play through questions:

- What do the astronauts do for fun up here?
- How do astronauts talk to their families?
- What does an astronaut do all day?
- How do astronauts move around and exercise?
- What do you think astronauts think about when they are in space for many days? How do you think they feel?
- If you had to live on the space station and could only bring one object from your bedroom, what would it be? Why?



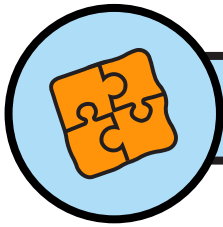
Simplify this activity for younger children:

- Help children make a rocket ship out of a cardboard box or building blocks. Sit in a chair in the rocket ship and pretend to fly into space!

Stretch this activity for older children:

- Have children work in groups to go on a mission – a spacewalk to fix an antenna, using blocks to create the correct colors and shapes for the rocket ship, etc. What is the task they need to do together? How do they plan to get it done? What kinds of things do they need? Have children draw and write about their mission!





SHARE !

Finally, extend the learning at home!

Share with families that the class built its own International Space Station! Encourage families to pretend they are on the International Space Station with their child looking out at the stars. They can do this by:

STEP 1

Covering one end of a paper towel roll with tin foil.

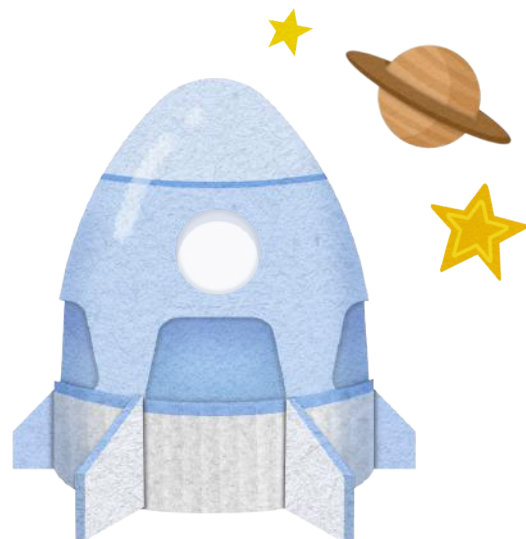
STEP 2

Taking a pen or pencil and poking a few small holes in the tin foil.

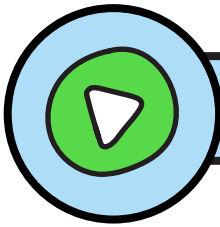
STEP 3

Turning off the lights in a room and shining a flashlight into the paper towel roll while aiming it at the ceiling.

Encourage children to observe patterns they see among the “stars,” count them, and even make up names for them!



Ask an Astronaut



WATCH !

First, watch an episode from the YouTube playlist.

Here are some that align well with this activity:



*International Space Station
Event: Ask an Astronaut*



Word Play: Constellation



Word Play: Planet



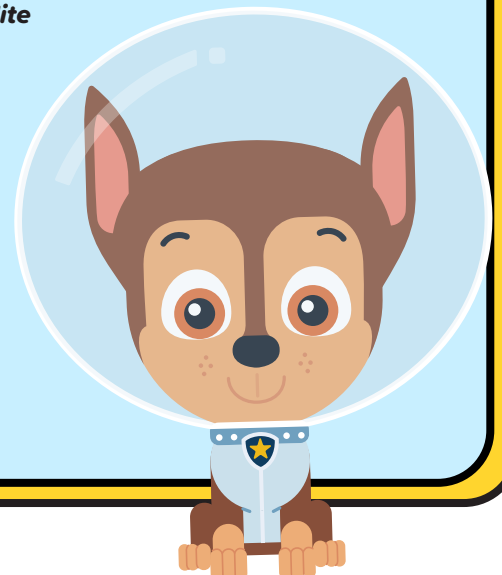
Word Play: Satellite



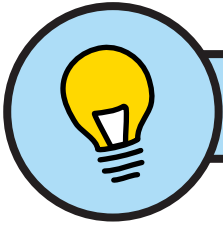
*Rhymes Through Times:
My Best*



Word Play: Meteor



Then, have fun doing this activity!



DO !

Ask an Astronaut!

Watch astronauts in space and learn answers to kids' questions!
This activity encompasses natural sciences, literacy skills, focus, and problem-solving skills.



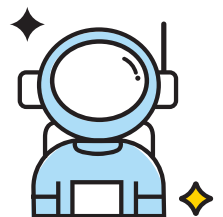
Before you watch the video, what questions do YOU have for astronauts who are in space?

1. Have your children brainstorm questions to ask astronauts.
What kinds of things do they want to know?



Watch here as children ask real astronauts questions about what happens on the International Space Station!

1. <https://www.youtube.com/watch?t=206&v=5uA855duba8&feature=youtu.be>
2. Were any of your questions the same as the children's questions in the video?
3. What questions do you want to learn more about?
4. Visit NASA's Space Place and learn more about space!
<https://spaceplace.nasa.gov/>

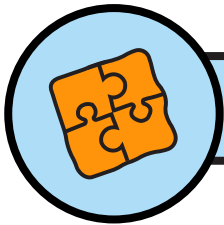


Simplify this activity for younger children:

- Explain what an astronaut is—someone who is trained to go into space and learn more about it. Model some questions, such as What do astronauts eat? And How do you get to be an astronaut? Then watch the clip together!

Stretch this activity for older children:

- What other questions do they have? Research and find the answers!



SHARE !

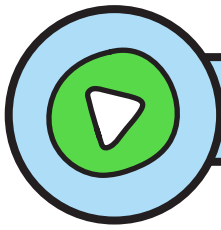
Finally, extend the learning at home!

Let families know that their child watched a video where children from all over the United States asked real astronauts who were up on the International Space Station questions about their experiences in space. These astronauts spent time in space exploring and making new discoveries.

Encourage families to write down an additional question – or questions! – they would like to ask an astronaut in space. Families can research the answers by going online together or visiting their local library to find relevant books. Children can then write or draw the answers next to their questions. If families have many questions, they can even assemble their questions and answers into a space book to be shared!



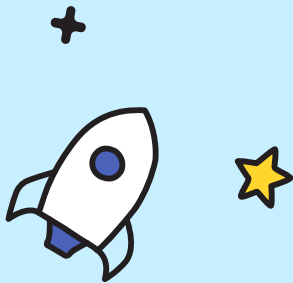
Healthy Astronauts



WATCH !

First, watch an episode from the YouTube playlist.

Here are some that align well with this activity:



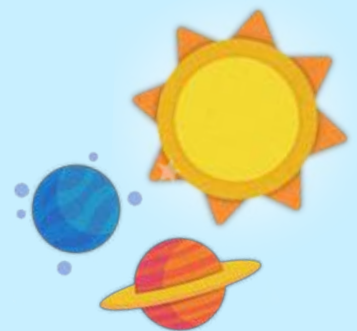
*International Space Station
Event: Ask an Astronaut*



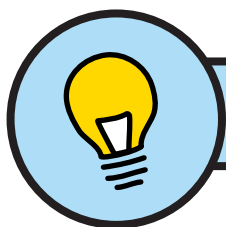
*Take a Closer Look:
Earth's Best Friend*



*Take a Closer Look:
Space Flight*



Then, have fun doing this activity!



DO !

Healthy Astronauts

This activity encompasses math skills, wellness skills, and natural sciences.

- Do 10 jumping jacks. Count backwards from 10 as if you were counting down to a spacecraft liftoff!
- When we jump, **gravity** pulls us back down to Earth. But because the International Space Station 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.
- 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?
- 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!

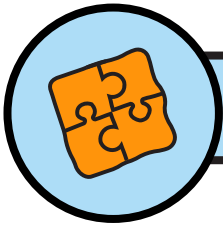


Simplify this activity for younger children:

- Start with 5 jumping jacks and work your way up to 10!
- Count up first and then count down.

Stretch this activity for older children:

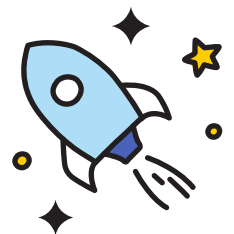
- Try counting up to 15!
- Make up your own exercise.



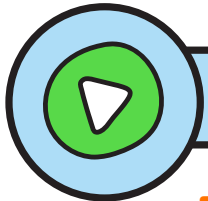
SHARE !

Finally, extend the learning at home!

Astronauts train very hard to make sure they are strong enough to go to space. Encourage families to make a training course at home! Set up "stations" along the course, and have everyone in the family move from one challenge to the next. For example, start by picking a spot in the living room to do 5 push-ups (count out loud!), then hop on one foot to a bedroom, and run in place there for 30 seconds. Then lift your arms up to the sky and hold this stretch for a count of 15. How many different stations can families think of?



Space Stories



WATCH !

First, watch an episode from the YouTube playlist.

Here are some that align well with this activity:



*Rhymes Through Times:
My Best*



*Take a Closer Look:
Earth's Best Friend*



*Word Play:
Constellation*



*Take a Closer Look:
Red Hot Light*



*Learn About Space w/
PAW Patrol and Emmanuel*



*Take a Closer Look:
Space Flight*



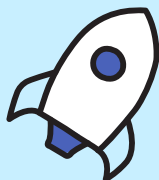
Word Play: Planet



Word Play: Satellite



*International Space Station
Event: Ask an Astronaut*



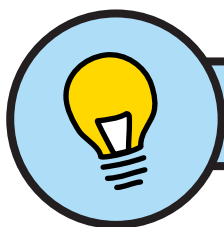
Word Play: Meteor



Helpful Heroes



Then, have fun doing this activity!



DO !

Space Stories

This activity encompasses literacy, executive function skills and natural sciences.

Group activity

Watch a clip and have children invent a story using a featured space word. Give your students a “story starter,” such as “This is a story about the time I saw a _____” [constellation / satellite / meteor, etc.]. Children can draw or write their story, or even act it out for others!

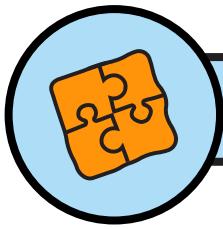
Simplify this activity for younger children:

- After watching the video together, have children draw pictures about the word, practicing saying the word out loud.

Stretch this activity for older children:

- Have children work in small groups; each group watches one video and creates a story to act out for the other groups. The groups watching need to guess what word the children are acting out!





SHARE !

Finally, extend the learning at home!

Share the vocabulary clips with families. Encourage them to watch them together, then make up a story using each word. One person starts the story by saying, “This is a story about the time I saw a _____” [constellation / satellite / meteor, etc.]. The next person adds on to the story, taking turns, until you have an entire story! Try making a story using ALL of the vocabulary words!



IV. Resources

Vocabulary

These are words to use with young children with definitions that they understand and are familiar with.

Astronaut

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

Computer

A machine that can solve problems and give information very quickly.

Earth

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 the Earth faces away from the Sun.

Effort

The hard work someone does when trying to do something.

Engineer

Someone who designs, makes, and uses machines.

Experiment

A test to figure out the answer to something.

Gravity

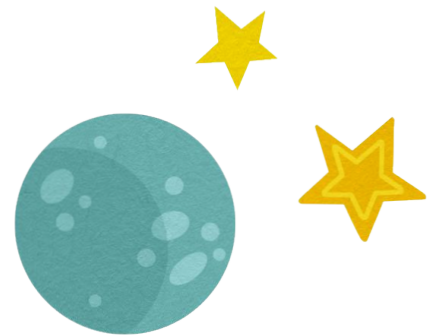
A force that makes sure that when we jump up in the air, we fall down.

Launch

To send an object into the air.

Mathematician

Someone who uses numbers to solve problems.



Moon

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

NASA

The National Aeronautics and Space Administration (commonly known as NASA) is an organization that studies and teaches people about space.

Orbit

A path in space where one object travels around another object. For instance, the Earth orbits, or travels around, the Sun. The International Space Station (ISS) is also in orbit. It travels around the Earth.

Persist

To keep trying to do something, even if you don't get it right the first time.

Pilot

Someone who flies an aircraft, like a plane or a rocket ship/spacecraft.

Planet

A large object in space that goes around (or orbits) the Sun or another star.

Rocket

An object shaped like a tube that pushes something forward into the air, such as a spacecraft.

Scientist

Someone who does experiments to figure out how things work.

Space

The area of the whole world, even outside of our planet, Earth.

Spacecraft

(often called a rocket ship)

A vehicle that carries people and objects to outer space.

Spacesuit

A special suit worn by astronauts that covers their whole body to keep them safe; a space suit helps astronauts breathe and work outside the space station.



Star

A bright ball of burning gas.
When you look at a star from Earth,
it looks like a shining light in the sky.
There are more stars in the universe
than grains of sand on all the beaches
on Earth!

Sun

An average-size star; it is the closest
star to Earth and is still 93 million
miles away! The Sun is the biggest
thing in our Solar System. Over one
million Earths could fit inside the Sun!

Trajectory

The path of an object.

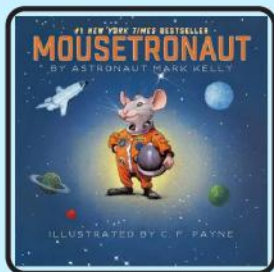




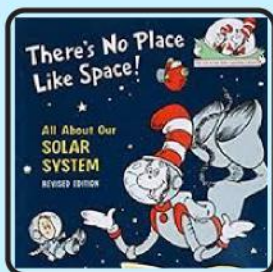
BOOKS & READ ALOUDS

Here are some resources that you can use to keep exploring space with your children:

Click on the artwork image to listen to a read aloud!



Mousetronaut
by Mark Kelly



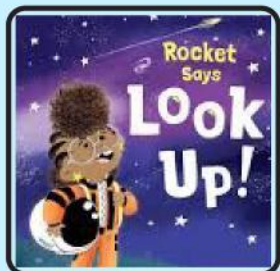
**There's No Place Like Space:
All About Our Solar System**
by Tish Rabe



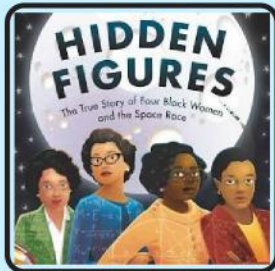
**My Best Pop-up
Space Book**
by DK



Mae Among the Stars
by Roda Ahmed



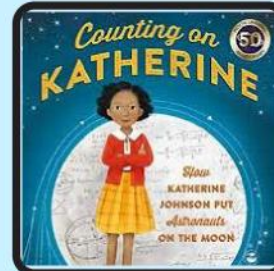
Rocket Says Look Up!
by Nathan Bryon



**Hidden Figures: The True
Story of Four Black Women
and the Space Race**
by Margot Lee Shetterly



Astronaut in Training
by Catherine Ard



**Counting on Katherine:
How Katherine Johnson
Saved Apollo 13**
by Helaine Becker

OTHER RESOURCES

NASA Kids' Club <https://www.nasa.gov/kidsclub/index.html>

NASA Space Place <https://spaceplace.nasa.gov/> (English)
<https://spaceplace.nasa.gov/sp/> (Spanish)

A Spin Around the Sun <https://www.noggin.com/smart-activities-spin-around-the-sun/>

Colors of Our Earth <https://www.noggin.com/smart-activities-colors-of-the-earth/>

Super Solar Power! <https://www.noggin.com/smart-activities-super-solar-power/>

NASA K-4 STEM at Home <https://www.nasa.gov/stem-at-home-for-students-k-4.html>

