

Dear Parents & Caregivers,

Inspire your child to reach for the stars! Join Snoopy and Woodstock as they explore the International Space Station, go on a spacewalk, travel to the Moon, and dream about the journey to Mars in this STEM program based on the new **Snoopy in Space** series available now on AppleTV+.

Developed by the curriculum specialists at Young Minds Inspired (YMI) as part of a unique partnership between NASA and Peanuts Worldwide, these easy-to-implement activities will engage your child with fascinating facts about space and the solar system, while boosting their creative problem-solving skills and reinforcing the value of perseverance to succeed. And your child can build on this experience as they watch Snoopy achieve his dream of becoming an astronaut!

We hope you enjoy these activities and exploring space with your child.

Sincerely,



Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired

SNOOPYTM

IN SPACE

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What Your Child Will Learn

These science experiments will help reinforce:

- ★ Facts about space and the solar system
- ★ Problem-solving skills
- ★ STEM skills

Grade Level

Children in grades K-2

How to Use the Activities

There are three standards-based activities in this program. Download and print the activity sheets that you plan to use and prepare the materials before getting started. Help your child by reading each activity sheet to them if they need support. Viewing **Snoopy in Space** episodes will enhance your child's engagement, but is not required to complete the activities.

Activity 1

All Aboard the ISS!

Your child will learn about thrust as they test balloon-powered straw rockets.

Materials needed:

- 1 textbook, 1 pencil,
- 1 round balloon,
- 1 long balloon, scissors,
- 1 piece of string or yarn about 10 feet long,
- 2 plastic straws (cut one in half), masking tape, the activity sheet, a pencil

Prepare the experiment by tying one end of the string to a chair or other support structure. Thread the other end through one of the straws and a half straw, pull

the string tight, and tie it to another support structure.

Start by having your child push a textbook to make it slide across a table. Then have them push the same book harder, using more force this time. Does the book slide faster the second time? Try the same experiment with a pencil. Did it take less force to move the pencil than the book?

Explain that Isaac Newton taught us that objects will move farther and faster when they are pushed harder. And a lighter object will move faster than a heavier object when both are pushed with the same force. In this example, the book has more weight than the pencil, so it took more force to propel it across the table. (Note: This explanation does not take into account inertia and friction, which are also significant factors.)

In the exciting new Apple TV+ series **Snoopy in Space**, NASA sends Snoopy to the International Space Station, or ISS, which orbits Earth. It takes a huge rocket and a

lot of force to get him there. A rocket is moved by a force called *thrust*. Thrust is created by energy from the rocket's engines.

Thrust helps the rocket take off and move forward. Tell your child they will be testing balloon-powered straw rockets to learn about how to create thrust and what makes the straw rocket travel so far.



Questions? Contact YMI toll-free at 1-800-859-8005 or by email at feedback@ymiclassroom.com.

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Review the instructions on the activity sheet. Blow up the round balloon and have your child pinch and hold the neck closed while you tape the balloon to the longer straw with the neck pointing away from the length of the string. Have your child make a prediction for Test 1, then have your child let go of the balloon. Talk about how your child's prediction compares to what happened.

For Test 2, use the long balloon, again taking time for your child to record their predictions and to discuss the test findings. Next, do Test 3 with a partially deflated balloon (either shape) and the half straw, again having your child mark their predictions.

After this final test, ask your child what they think is the relationship between the balloon and the straw rocket? (The balloon forcing its air out provides the force, or thrust, needed to move the straw rocket.) Continue this discussion with the Test Results questions on the activity sheet. (You might wish to add that friction between the string and straw is also a factor in all three tests.)

Activity 2 Mission to the Moon!

Your child will learn about the connection between the lack of weather on the Moon and craters, then make and measure their own Moon-like craters.

Materials needed: a cake pan, flour, cake sprinkles, cocoa, and spoon to make the layered Moon surface, plus 3 small rocks of different shapes and sizes to make craters; the activity sheet, a pencil, a ruler

Ask your child to share what they know about the Moon. Tell them that in **Snoopy in Space**, Snoopy is ecstatic to travel to the Moon. His mission? Measure Moon craters and collect Moon rocks. Tell your child that the Moon is covered with impact craters formed when space rocks crashed into the Moon. These bowl-shaped cavities or "dents" can be several miles deep and wide.

Explain that by measuring and recording the size of craters, scientists can learn more about how the space rocks that

hit the Moon have shaped its surface. This can help them understand the Moon's history. Because there is virtually no weather on the Moon, there is no wind or rain to disturb the craters.

Tell your child that, like Snoopy, you will be measuring impact craters that you make yourselves and record the results on the activity sheet. Read the activity sheet together before starting. With your child, prepare a Moon surface by filling a cake pan with a 1-inch layer of flour, a light coating of sprinkles, and a thin layer of cocoa on top. You and your child should wear safety goggles and review safety guidelines before you begin creating craters. Also explain that they will measure in centimeters (cm).

When all the tests are complete, discuss the Test Results questions on the activity sheet.

Activity 3 Ready, Set, Mars!

Your child will learn about NASA's plans for sending astronauts to Mars and what life will be like once they get there, then brainstorm ways to improve a prototype Hab (habitation module) and create one of their own.

Materials needed: a small container of Play-Doh or clay, 3 sheets of construction paper or cardstock, 8-10 wooden craft sticks, a paper plate or tin pie plate to use as a base, and a roll of masking tape; a fan for creating "wind"; the activity sheet, a pencil

Prepare a Hab prototype with your child. Use the craft sticks to create a freestanding three-dimensional cube or pyramid, connecting the craft sticks at the corners with masking tape or clay. Add a paper roof if you wish. Be creative and use whatever materials you have on hand to enhance your design. Do not anchor the base; the first prototype should be rather flimsy.

Tell your child that Snoopy and Woodstock dream about a trip to Mars. However, NASA won't be ready to send astronauts to Mars until they learn more about

surviving there and can build a place where astronauts can eat, sleep, and perform experiments. This habitation module, or Hab, will have to withstand winds that can blow up to 60 mph during dust storms that can last for weeks on Mars.

NASA scientists have been making prototypes or test models of Martian Habs. When a prototype fails, it teaches scientists what to do next.

Using the Hab prototype you created, ask your child to observe how well it stands up to the winds from a Martian dust storm, as demonstrated by using a fan to propel air. Place the fan in front of the Hab and turn it on so that the fan blows directly at the prototype. Try using a lower setting at first, and then a higher setting, if the fan has different speeds. Then have your child brainstorm ways to improve the Hab.

Conclude by having your child draw their own Hab design on the activity sheet. If possible, give them materials to build their design, and then test it with the fan.

Resources

ymiclassroom.com/peanutsfamily

Snoopy in Space:

apple.co/snoopyinspace

NASA Science Space Place:

spaceplace.nasa.gov/craters/en/

NASA Science Solar System

Exploration – Earth's Moon:

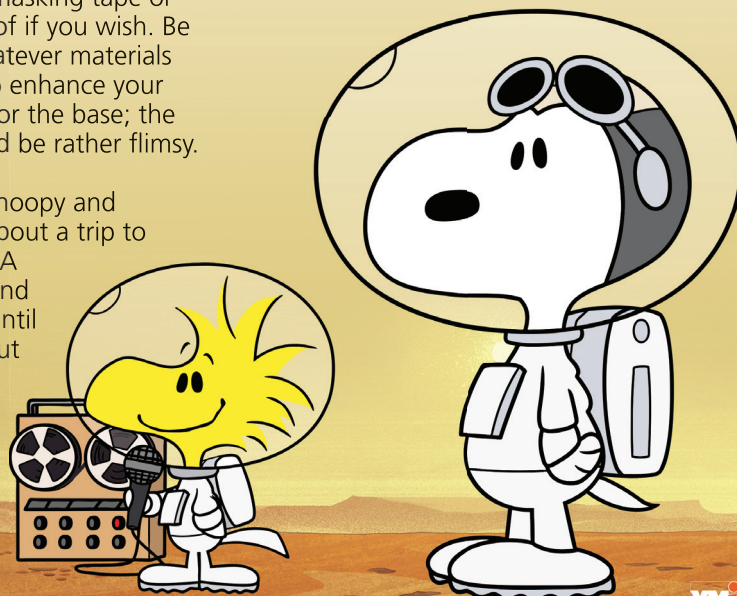
solarsystem.nasa.gov/moons/earths-moon/in-depth/

Kennedy Space Center –

Lunar Geology:

science.ksc.nasa.gov/mirrors/arc/prospector/science/geologys.html

NASA Mars Exploration: mars.nasa.gov/programmissions/science/goal4/



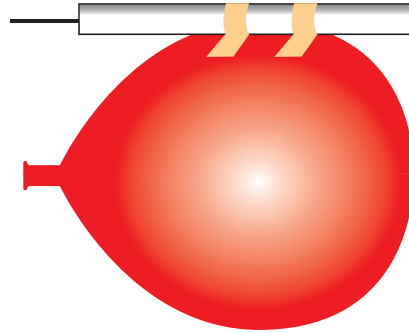
Activity 1

All Aboard the ISS!

Snoopy in Space is an exciting new series on AppleTV+. In one episode, Snoopy and Woodstock need a powerful rocket to get them to the International Space Station, or ISS. Today, you will test balloon-powered straw rockets!

TEST 1

Watch as your grown-up sets up a round balloon-powered straw rocket. What do you think will happen when you let go of the balloon? Draw an arrow to show which way you think the rocket will move, and mark the string to show how far you think it will go.



TEST 2

Now watch as your grown-up uses a different balloon. Draw the balloon to show its shape, and mark the string to show how far you think it will go.



TEST 3

Keep watching as your grown-up tests one more rocket. Draw the balloon to show its shape, and mark the string to show how far you think it will go.



HALFWAY

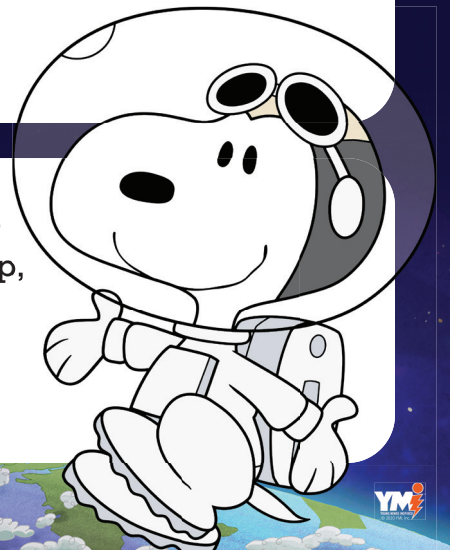
ALL THE WAY

TEST RESULTS

Which straw rocket went the farthest? Why?

Did you know? It takes astronauts like Snoopy about 6 hours to reach the International Space Station. What did Snoopy do when he got there? Find out by watching **Snoopy in Space** on AppleTV+, on the Apple TV app, or via apple.co/snoopyinspace.

Families: On a clear night, you can see the ISS with your own eyes! Visit spotthestation.nasa.gov to find out when the ISS will pass overhead near you.



Activity 2

Mission to the Moon!

Scientists can learn a lot about the Moon by looking closely at Moon rocks and by measuring Moon craters. Some Moon craters are very deep and miles wide, while other craters are small and shallow. Why?

One of Snoopy's missions in *Snoopy in Space* is to measure a large Moon crater. Today, with your grown-up, you will measure craters with a cake-pan Moon surface and three rocks. Use the boxes to draw what you see after each test. Smooth out each crater with a spoon before the next test. Remember your safety goggles and rules!

TEST 1

Raise the largest rock up high over your head. Drop it directly onto your Moon surface. Draw what you see. Then use the ruler to measure how deep and wide your impact crater is.

_____ cm deep _____ cm wide

TEST 2

Choose a smaller rock. Gently toss it into the pan from the side. How does this crater look different from the first one? Draw what you see. Then use the ruler to measure how deep and wide your impact crater is.

_____ cm deep _____ cm wide

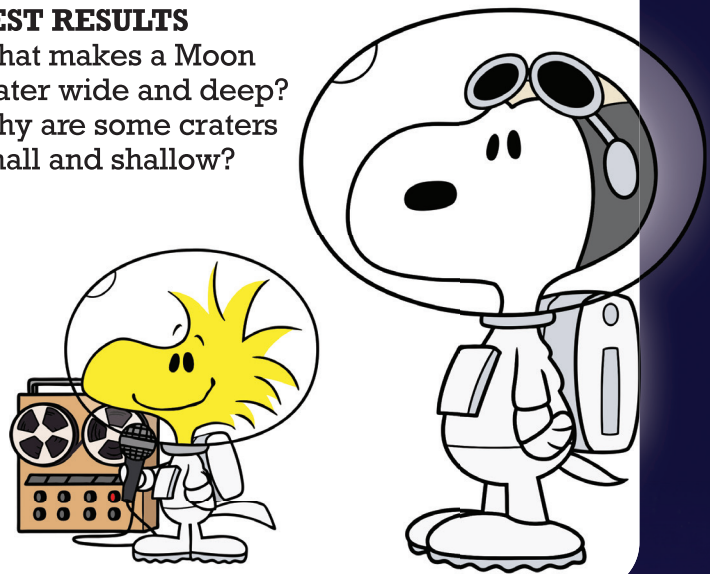
TEST 3

Drop your last rock from the height of your nose. How does this crater look different from the first two tests? Draw what you see. Then use the ruler to measure how deep and wide your impact crater is.

_____ cm deep _____ cm wide

TEST RESULTS

What makes a Moon crater wide and deep? Why are some craters small and shallow?



Did you know? Craters are holes made when a space rock hits a larger object, like the Moon. What happens when Snoopy and Woodstock fall into a crater on the Moon? Find out by watching *Snoopy in Space* on AppleTV+, on the Apple TV app, or via apple.co/snoopyinspace.

Families: Look at the Moon on a clear night. Can you see craters? If you have a telescope, take a closer look, and then help your child report to class on the details you saw.

Ready, Set, Mars!

Snoopy and Woodstock are dreaming of a mission to Mars. But NASA scientists need to learn more about surviving on Mars before we send astronauts there. And they need to design a safe place for astronauts to live while they explore Mars, where powerful dust storms can last for weeks.

Scientists test their designs by making a prototype, or model. With your grown-up, make a prototype Martian habitat, or “Hab,” to test. Will it stand up to the winds of a Martian dust storm? Watch as your grown-up demonstrates. What happened to the prototype? Draw a picture below.

Failures give us clues about what to try next. Do you have ideas for making the Hab stronger? For example, the Hab will need a strong base or bottom.

Now brainstorm your own design for a Hab. How would you keep astronauts safe from Martian windstorms? Draw a picture of your design below.



Did you know? It will take about 9 months for astronauts to travel from Earth to Mars. Find out what the Peanuts gang learns about Mars and how they create their own Mars mission by watching *Snoopy in Space* on AppleTV+, on the Apple TV app, or via apple.co/snoopyinspace.

Families: Can you find Mars or any other planets in the night sky? Find out how you can locate planets in the night sky by visiting cfa.harvard.edu/skyreport.