GRADES K-2

SNOOPY™ IN SPACE

Dear Educator,
Inspire your students 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 classroom activities will engage your students with fascinating facts about space and the solar system, while boosting their creative problem-solving skills and reinforcing the value of teamwork and perseverance to succeed. And students can build on this classroom experience as they watch Snoopy achieve his dream of becoming an astronaut!

Please share this program with other teachers at your school. And let us know your opinion of the program by visiting ymiclassroom.com/feedback-snoopy-in-space. We look forward to your comments and suggestions.

Sincerely,

Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired

Program Objectives

- ★ To fuel STEM learning by tapping into students' interest in space and the appeal of the Peanuts characters to inspire creative problem solving
- ★ To instill enthusiasm for space exploration and future NASA endeavors
- ★ To motivate students to become active participants in the next phases of our nation's real-life space adventure

Target Audience

Students in grades K-2

How to Use This Program

Download, photocopy, and distribute the three reproducible activity sheets to all students. Prepare the materials for each activity in advance. Have students take their sheets home to share the activities for families listed at the bottom of each sheet. Visit ymiclassroom.com/snoopy-in-space for standards alignment. Viewing ***Snoopy in Space*** episodes will enhance student engagement, but is not required to complete the activities.

Activity 1
All Aboard the ISS!

Students learn about thrust as they test balloon-powered straw rockets in class.

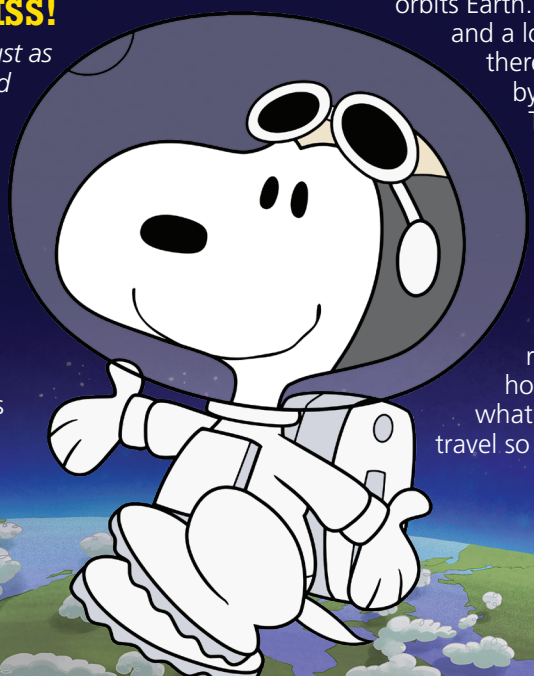
Materials needed:
1 textbook, 1 pencil, 1 round balloon, 1 long balloon, scissors, 1 piece of string or yarn about 10 feet long, 2 plastic straws (cut one in half), masking tape, copies of the activity sheet, pencils

Prepare the demonstration ahead of time 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.

Introduce the activity by having a student 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 students 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.

PEANUTS

Pass out the activity sheet and review the instructions. Blow up the round balloon and have a helper 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 students make their predictions for Test 1, then have the helper let go of the balloon. Discuss how students' predictions compare to what happened.

Repeat the demonstration using the long balloon, again taking time for students to record their predictions and to discuss the test findings. Repeat the demonstration a third time with a partially deflated balloon (either shape) and the half straw, again having students mark their predictions. After this final test, ask students 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.)

Note: For older students (or with adult helpers), you may choose to have the students work in groups to make and test their own rockets.

Activity 2
Mission to the Moon!

Students 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: Per group: 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; copies of the activity sheet, pencils, rulers

Ask students to share what they know about the Moon. Tell students that in ***Snoopy in Space***, Snoopy is ecstatic to travel to the Moon. His mission? Measure Moon craters and collect Moon rocks. Tell students 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.

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.

Pass out the activity sheet and tell students that, like Snoopy, they will be measuring impact craters, but theirs will be pretend craters that they make themselves. Divide students into small groups and review the activity together. Have each group prepare their 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. (Or you can prepare Moon surfaces for each group in advance.) Provide all students with safety guidelines before they begin creating craters and recording their test findings. Also explain that students will measure in centimeters (cm).

When all the tests are complete, create a chalkboard or whiteboard chart where students can post and compare their measurements for each test. Use these findings to guide discussion of the Test Results questions on the activity sheet.

Activity 3
Ready, Set, Mars!

Students 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 collaborate to create one of their own.

Materials needed: Per group: 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"; copies of the activity sheet, pencils

Prepare a Hab prototype in advance. 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.

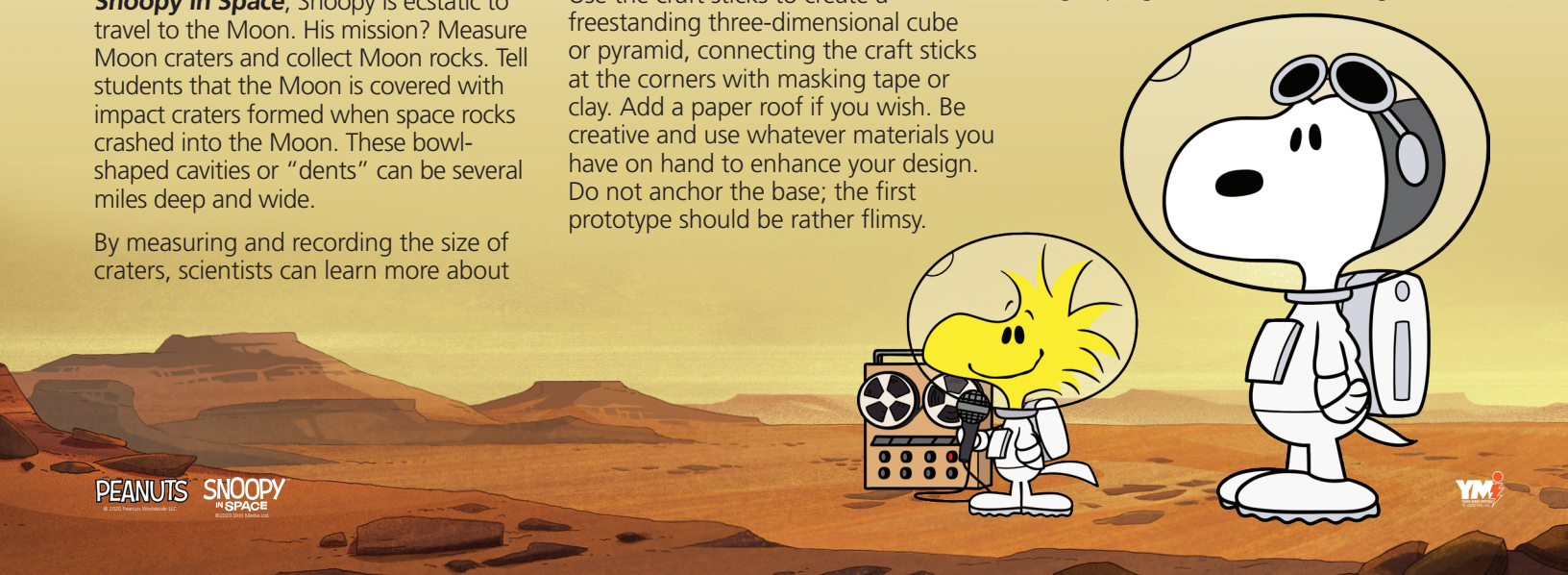
Tell students that Snoopy and Woodstock dream about a trip to Mars. However, NASA won't be ready to send astronauts to Mars until they learn more about surviving there and can build a place where astronauts can eat, sleep, and perform experiments. This habitation module, or Hab, will have to withstand 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.

Pass out the activity sheets and show students your Hab. Ask them 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 students brainstorm ways to improve your Hab by sharing their ideas in a classroom discussion.

Conclude by having students draw their own Hab designs. If possible, provide them with materials to build prototypes of their designs, then test each prototype with the fan.

Resources

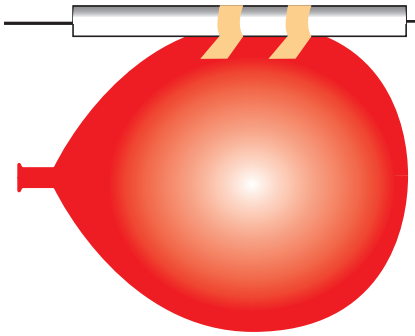
ymiclassroom.com/snoopy-in-space
***Snoopy in Space*:**
apple.co/snoopyinspace
NASA Science Space Place:
spaceplace.nasa.gov/craters/en/
NASA Science Solar System Exploration – Earth's Moon:
solarsystem.nasa.gov/moons/earths-moon/in-depth/
Kennedy Space Center – Lunar Geology:
science.ksc.nasa.gov/mirrors/arc/prospector/science/geologys.html
NASA Mars Exploration: mars.nasa.gov/programmissions/science/goal4/



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 in class!

TEST 1
Watch as your teacher sets up a round balloon-powered straw rocket. What do you think will happen when the helper lets 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 teacher 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 teacher tests one more rocket. Draw the balloon to show its shape, and mark the string to show how far you think it will go.

TEST RESULTS
Discuss in class: 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.

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 you will measure craters in your classroom 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.

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

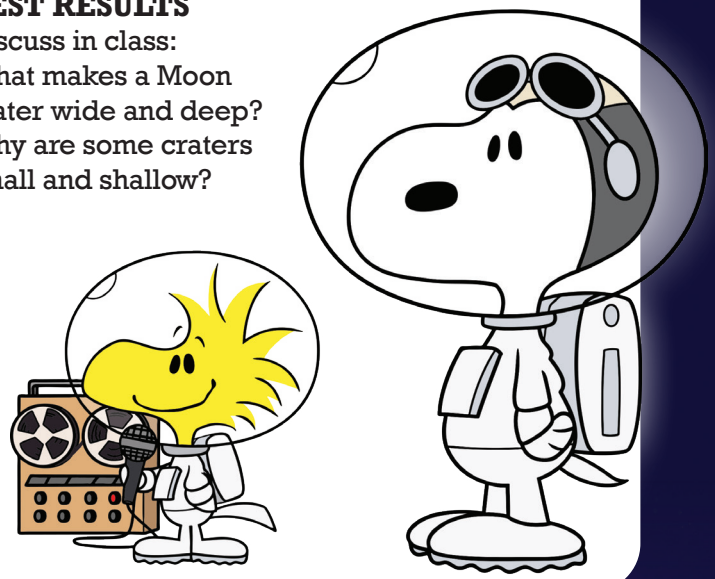
TEST 3

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

Discuss in class:
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.

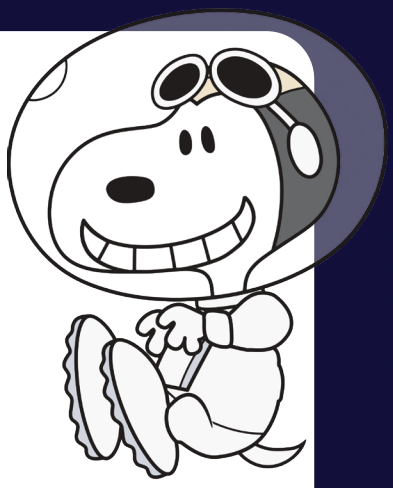
Ready, Set, Mars!

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. Your teacher has made a prototype Martian habitat, or "Hab," for you to test. Will it stand up to the winds of a Martian dust storm? Watch as your teacher 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? Share them in a class discussion. 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.