GRADES K-2

SNOOPY™ IN SPACE

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

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.

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.

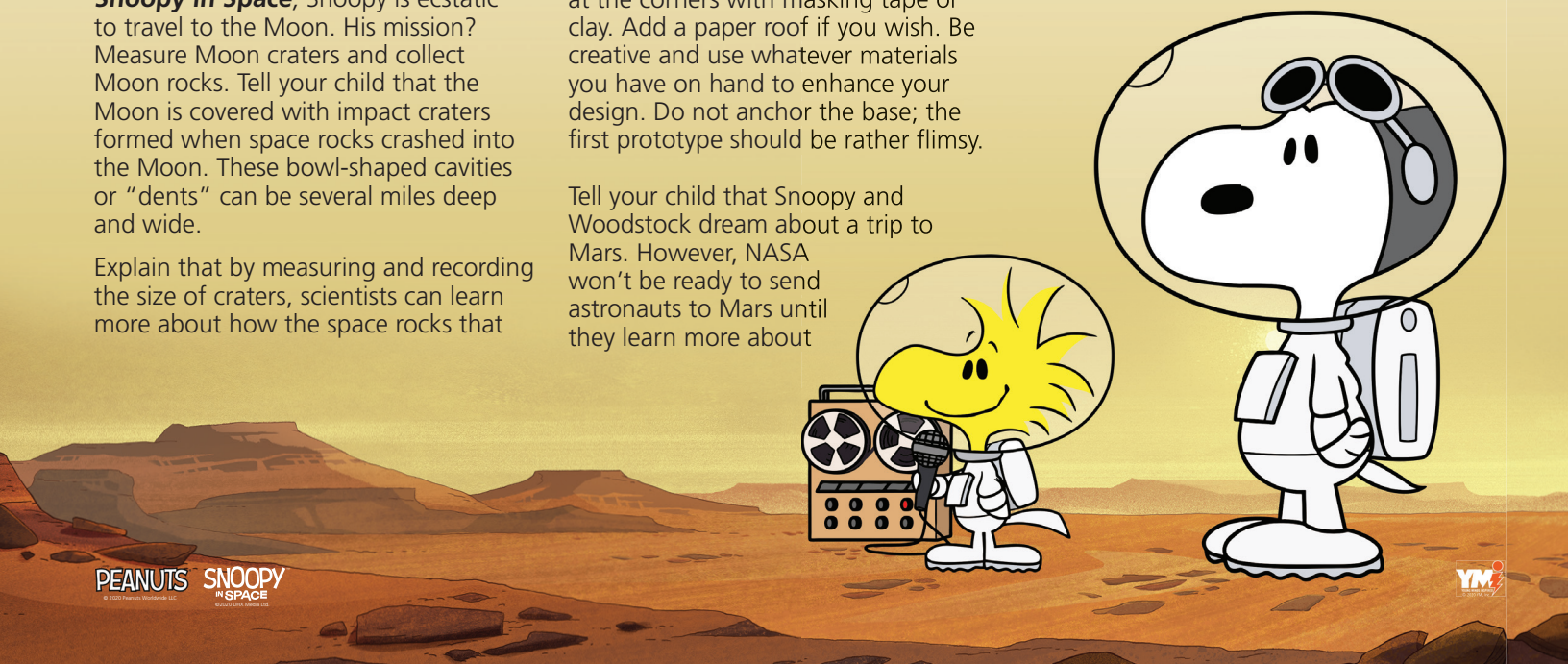
NASA scientists have been making prototypes or test models of Martian Habs. When a prototype fails, it teaches scientists what to do next.

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

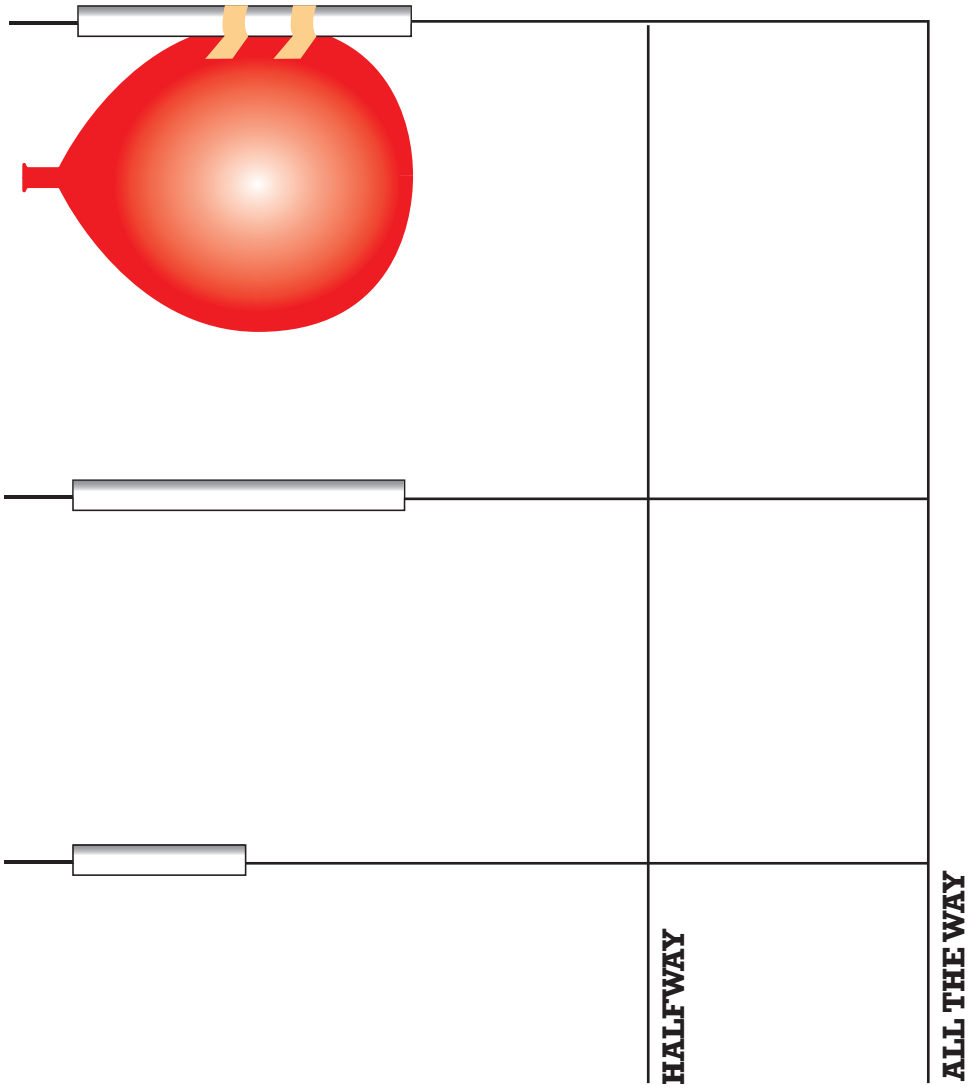
All Aboard the ISS!

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.



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

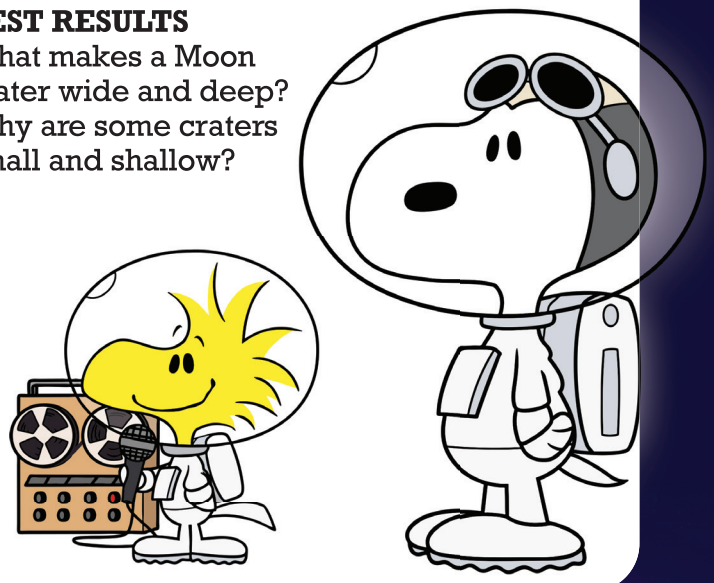
TEST 2
Choose a smaller rock. Gently toss it into the pan from the side. How does this crater look different from the first one? Draw what you see. Then use the ruler to measure how deep and wide your impact crater is.

_____ 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.

Activity 3

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.

GRADES 3-5

SNOOPY™ IN SPACE

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

Sincerely,

Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired

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 3-5

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

Start the activity 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?

Tell your child that they just demonstrated Newton's Second Law of Motion: The acceleration of an object depends on the amount of force acting on it and the mass of the object. In other words, an object will move faster when it is pushed harder. And an object with less mass will move faster than an object with more mass when both are pushed with the same force. In this example, the book has more mass (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. Rocket engineers call that force *thrust.* Tell your child that you're going to work together to design and test balloon-powered straw rockets. You will experiment to determine how much force is needed to move the straw rocket, how to generate that force or *thrust*, and how far the straw rocket moves.

Review the instructions on the activity sheet. Using the supplies listed, help your child build and test the straw rockets as described on the activity, and then answer the questions. When done, talk about which straw rocket was most successful and why.

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

Ask your child to describe how their test results might change in microgravity.

Explain that gravity is what pulls objects towards Earth. When you jump, gravity pulls you back down. Gravity always pulls on the space station to keep it in orbit. However, the space station is also going around the Earth, so it is free falling around Earth. Explain to your child that they may experience free fall when they are on a swing. At the top of each swing, when they feel they are lifting off the seat, they are experiencing a moment of free fall. This is microgravity. The space station is constantly in free fall, so the astronauts onboard are constantly experiencing microgravity. Would microgravity have any effect on your straw rockets?

Activity Sheet Answers: While answers will vary, here is an overview of anticipated results: **Test 1** – The movement of the air as it escapes from the balloon provides thrust; more thrust (or air) will make the straw rocket go faster. **Test 2** – The straw rocket will move faster and farther down the string. **Your Turn! (Test 3)** – If the balloon is filled halfway with air, the straw rocket will not travel as far along the string. Test results should show that the greater the force, the faster and farther an object moves. (Remind your child 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 use creative problem-solving skills to help Snoopy and Woodstock get out of a crater they've fallen into.

Materials needed: the activity sheet, a pencil

Ask your child to share what they know about the Moon. Tell them that in the new AppleTV+ series ***Snoopy in Space***, Snoopy is ecstatic to travel to the Moon. His mission? Measure Moon craters and collect Moon rocks.

Explain 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 wide and very deep. By measuring 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.

Explain to your child that during their Moon mission, Snoopy and Woodstock accidentally fall into a large crater. The walls are too steep to climb out, and although the gravity on the Moon is about one-sixth that of Earth, they cannot jump high enough to escape. All they have is an extendable golf club and a golf ball. How can they get out?

For fun, ask your child to guess how Snoopy and Woodstock use their golf equipment to escape the crater. (Answer: Woodstock sits on the golf ball, which Snoopy hits out of the crater. Then Snoopy extends the golf club and uses it to pole vault over the crater rim!) Using the activity sheet, have your child brainstorm a realistic way to escape the crater, listing the equipment they would need on the back of the worksheet and drawing a picture of how they imagine their escape method would work.

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 design a prototype of a Hab, or habitation module.

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

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 Hab (habitation module) where astronauts can eat, sleep, and perform experiments. The Hab will have to withstand winds that can blow up to 60 mph during dust storms that can last for weeks on Mars.

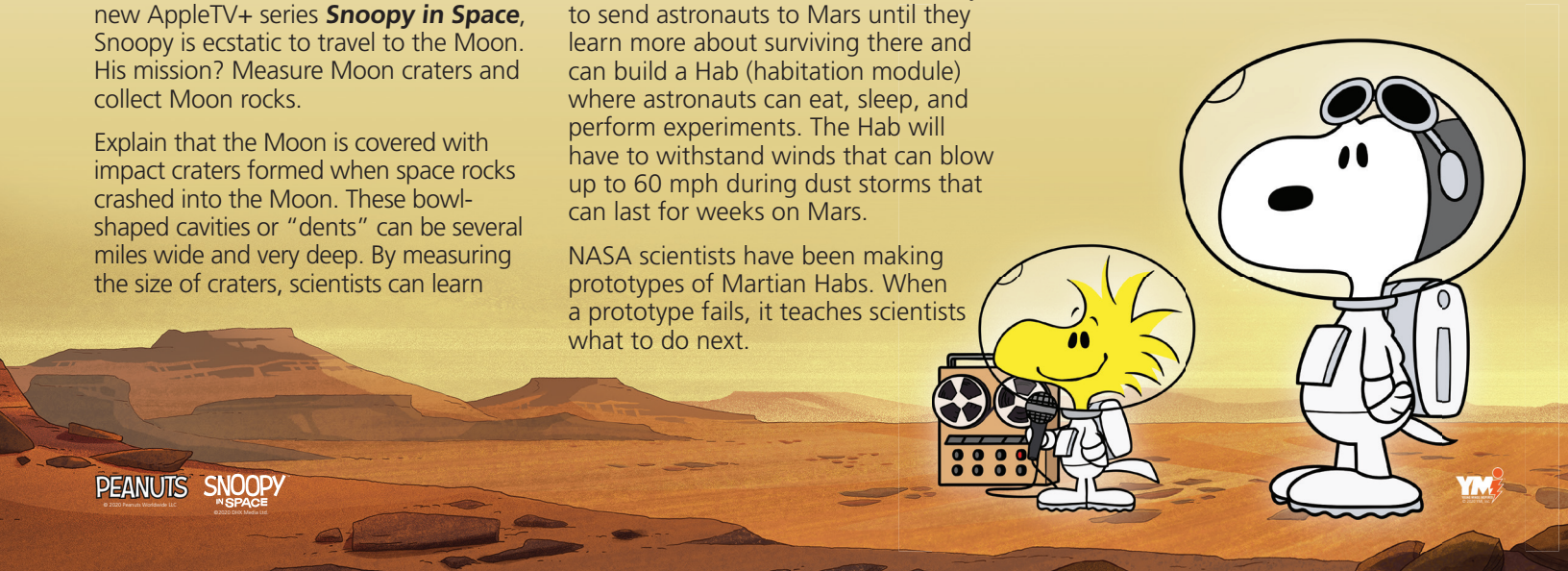
NASA scientists have been making prototypes of Martian Habs. When a prototype fails, it teaches scientists what to do next.

Tell your child that you will engineer your own Hab prototypes. Review the instructions on the activity sheet. Using the supplies listed, help your child build a prototype. Allow about 30 minutes to plan and build the design. **Tip!** Make the activity more challenging by creating a rule that your child may not tape their structure to the surface of the plate or pie tin.

Test the prototype. Place the fan in front of the Hab so that it blows directly at the prototype. Try using a lower setting at first, then a higher setting, if the fan has different speeds. After your child observes what happens to the Hab, help them brainstorm ways to improve their prototype while learning from its failures. Have your child make changes to the prototype and then test it again. Your child can then finish the activity sheet by drawing a picture of their best design and describing the changes they made to build it.

Resources

ymiclassroom.com/peanutsfamily
***Snoopy in Space*:**
apple.co/snoopyinspace
NASA on Microgravity:
nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-microgravity-58.html
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/

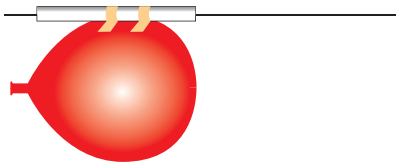


Activity 1

All Aboard the ISS!

In an exciting episode from ***Snoopy in Space*** on AppleTV+, Snoopy and Woodstock need a huge rocket to get them to the International Space Station, or ISS. As you've learned, Newton's Second Law of Motion tells us that it takes a lot of force, or thrust, to move such a big rocket. To learn more, you can experiment with balloon-powered straw rockets.

Test 1: Using the materials your grown-up gives you, follow these directions.



1. Tie one end of the string to a chair or other support structure.
2. Thread the other end of the string through one of the straws.
3. Pull the string tight and tie it to another support structure.
4. Blow up the **round** balloon, but do not tie off the end. How many breaths did it take? ___
5. Have one person pinch the end of the balloon closed and hold it, while another person tapes the balloon to the straw on the string. The balloon should hang below the straw with the end parallel to the string.
6. Position the straw at one end of the string and let go of the end of the balloon to see how far and fast your rocket travels.

What force propelled your straw rocket?

_____

What could you do to make the straw rocket go faster and farther?

_____

_____

Test 2: Try the experiment again, using the **long** balloon with the same number of breaths as Test 1 and one of the half straws. Describe what happens. Was it what you expected? Why or why not?

_____

_____

_____

Your Turn! Now try the experiment once more, changing one variable. For example, fill the balloon with half as many breaths or change the angle of the string. Use this template to record your results on the back of this sheet.

Test 3: Change made: _____

_____

What I think will happen: _____

_____

What happens? _____

_____

Test Results: On the back of this sheet, draw the straw rocket design that was most successful. Then describe how this activity demonstrates Newton's Second Law of Motion.

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 others are small and shallow.

In the new AppleTV+ series ***Snoopy in Space***, one of Snoopy's missions on the Moon is to measure a large crater. Unfortunately, Snoopy and Woodstock fall into the crater and become trapped at the bottom. Although the gravity on the Moon is about one-sixth that of Earth, they cannot jump high enough to get out of the crater. Instead, they must use creative problem-solving to escape. But all they have with them is an extendable golf club and a golf ball.

For fun, use your imagination to guess how Snoopy and Woodstock get out of the crater. Then brainstorm a real plan to escape the crater. List the equipment you would need on the back of this sheet. Then draw a picture of how you would get Snoopy and Woodstock to safety.

Did you know? The Apollo astronauts brought 800 pounds of Moon rocks back to Earth. Many contained large amounts of natural glass, which formed when meteors hit the Moon. What do Snoopy and Woodstock do with the rocks they find on the Moon? Find out by watching ***Snoopy in Space*** on AppleTV+, on the Apple TV app, or via apple.co/snoopyinspace.

Families: Make your own "Moon craters" at home, following the instructions at this link: jpl.nasa.gov/edu/teach/activity/make-a-crater/.

Activity 3

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. Scientists test their designs by making a prototype, or model. Some challenges on Mars are strong winds that can blow up to 60 mph during dust storms that can last for weeks. Martian habitats, or Habs, need to be strong enough to withstand these.

How would you keep astronauts safe from windy Martian dust storms? Use the materials you've been given to build a prototype of a Hab that can stand up to the winds of a Martian dust storm. Then ask your grown-up to test it with a fan. What happens when it encounters this "Martian wind"? Describe what happens below.

_____

_____

_____

_____

Failures give us clues about what to try next. Brainstorm ways to improve your Hab, and then rebuild it. When you are ready, ask your grown-up to test it with the fan again. What happens this time? Did your improvements work? Are there any more improvements you can make? Write your answers below.

_____

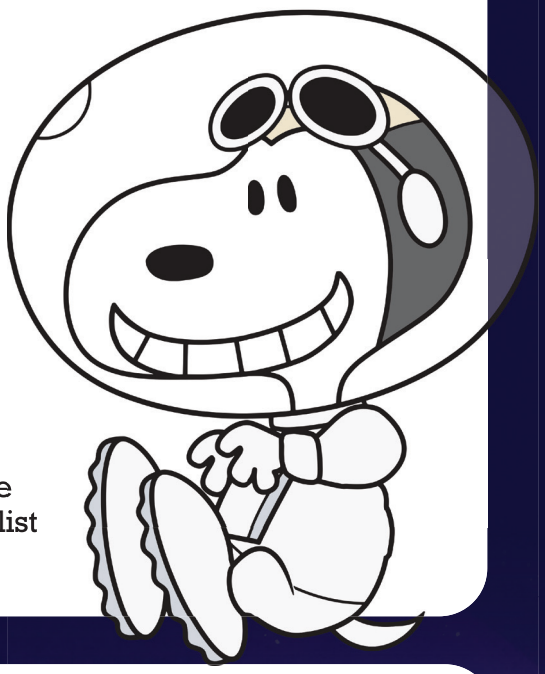
_____

_____

_____

_____

_____



Continue to test and improve your prototype. Draw a picture of the final version of your prototype on the other side of this sheet, and list the improvements you made to your design.

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.

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