GRADES K-2

IT TAKES PERSEVERANCE!

Dear Educator,
The planet Mars, an object of fascination since the ancients first observed its reddish hue in the skies, received its latest visitor when the NASA rover Perseverance landed on February 18, 2021, bringing with it the potential of becoming the first spacecraft to find evidence of past life on another planet.

Let Snoopy, a seasoned space traveler himself, take your students on Perseverance's exciting mission to seek signs of ancient life on Mars with this standards-based STEAM and language arts program for grades K-2. Along the way, your students will practice perseverance as they use critical thinking skills to solve problems in these easy-to-implement activities. Developed by the curriculum specialists at Young Minds Inspired as part of a unique partnership between NASA and Peanuts Worldwide, the activities can be taught remotely or in the classroom and include extensions the whole family can enjoy.

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-perseverance**. We look forward to your comments and suggestions.

Sincerely,

Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired

Program Objectives

- Fuel STEAM learning and interest in space
- Raise awareness of NASA's Mars mission with the Perseverance rover and instill enthusiasm for NASA's future space endeavors
- Reinforce STEAM and language arts skills

Target Audience

Students in grades K-2 and their families

How to Use This Program

Download, photocopy, and distribute the three reproducible activity sheets to all students, or share the PDFs through your school's digital platform if you're connecting with students remotely. Prepare the materials for each activity and preview videos in advance. Have students share their completed sheets with their families so that they can do the activities at the bottom of each sheet together. Visit **ymiclassroom.com/snoopy-perseverance** for standards alignment.

Activity 1
The Red Planet

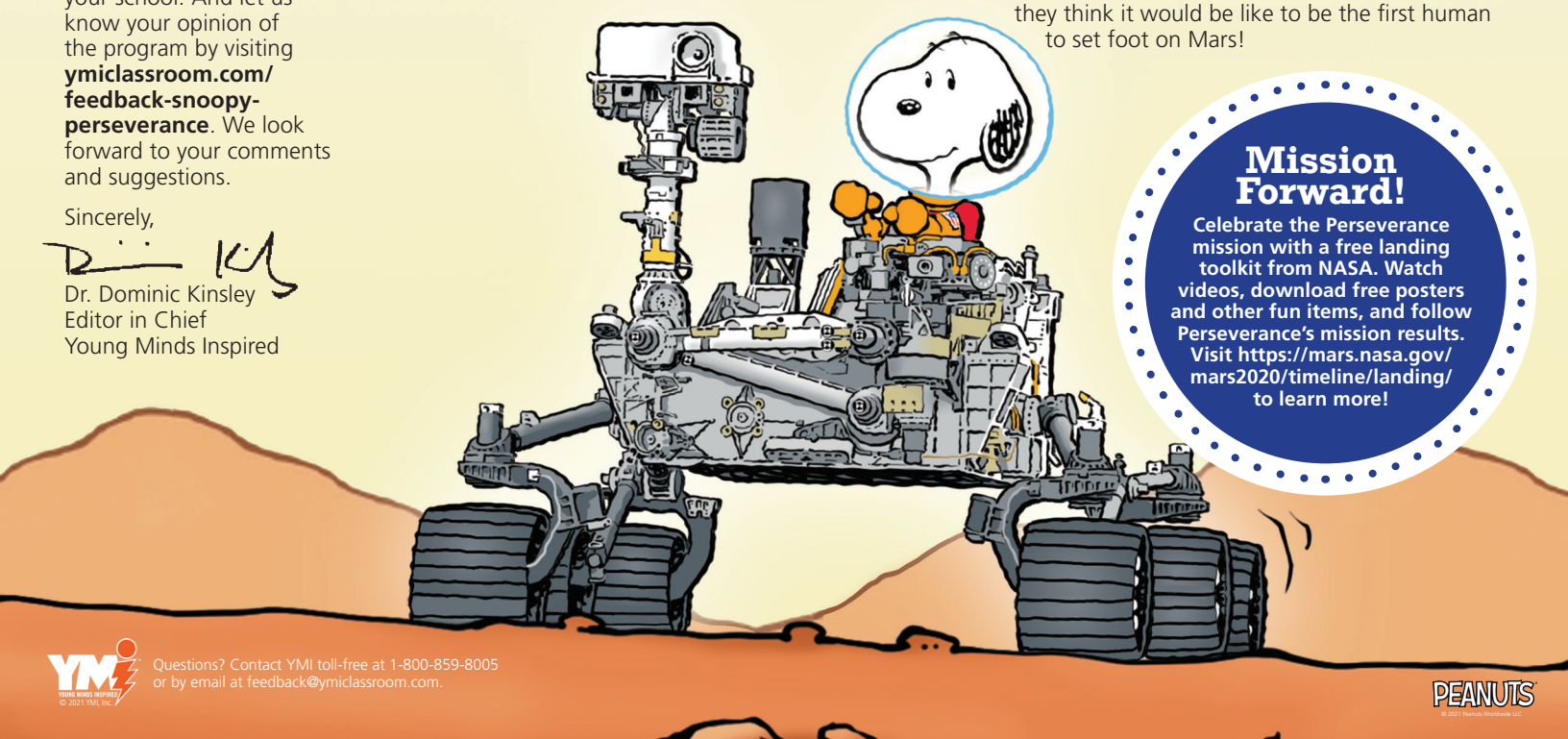
In this activity, students will explore Mars to learn why scientists study it and to better understand the amazing feat of landing a rover there.

Materials needed: Activity sheets, pencils, construction paper, scissors, markers or crayons

Show students the pictures of Mars found at https://nssdc.gsfc.nasa.gov/planetary/news/hst_pr_19990630.html. Ask them if they know which planet it is. Once they guess correctly, tell them that they are going to learn more about Mars today. Mars is one of Earth's neighbors in the Solar System, and scientists have been studying it for a long time. Tell students that today they are going to "think like a scientist" who studies objects in space. You will tell them a fun fact about Mars and then ask them a question about it. Note that the last two questions could be discussed in small groups and are not meant for students to guess the correct answer, but rather to problem-solve and use logic to spark a discussion about Mars. After students share their ideas, give them the correct answers. You may wish to write the numbers in question 1 on the board to help students see that the numbers are large and the distance is very far.

1. NASA is working to send humans to Mars. The distance from Earth to Mars changes depending on where the planets are in their orbits. It can range from a minimum of 33.9 million miles to a maximum of 249 million miles (or 54.6 million kilometers to 401 million kilometers). How long do you think it will take to get there? Will it be a long trip, or a short trip? (***Answer:*** A long trip, about 6 to 8 months.)
2. Mars is further away from the Sun than Earth is. Do you think Mars is hot or cold? (***Answer:*** Very cold. The average temperature is 80 degrees below zero Fahrenheit or 62 degrees below zero Celsius.)
3. Earth only has one moon. How many moons do you think Mars has? (***Answer:*** Two moons named Deimos and Phobos)
4. Before scientists can send humans to Mars, they need to learn more about it. To do that, they have been sending spacecraft called rovers that move over the surface of Mars. What might a Mars rover collect? (***Answer:*** Photos, mineral samples, weather data, etc.)
5. Mars does not have any grocery stores, but the astronauts who eventually will go there will need to eat. How do you think humans will get food on Mars? (***Answer:*** Scientists will have to learn how to create farms on Mars and grow food there.)

Now distribute the activity sheet. Have students use what they learned during the discussion to complete the word search. Then have them write about what they think it would be like to be the first human to set foot on Mars!



Mission Forward!
Celebrate the Perseverance mission with a free landing toolkit from NASA. Watch videos, download free posters and other fun items, and follow Perseverance's mission results. Visit https://mars.nasa.gov/mars2020/timeline/landing/ to learn more!

Answers: Part 1:

P	R	R	P	M	O	O	N	S	C
G	E	I	N	G	X	J	B	U	O
P	D	N	D	E	I	M	O	S	L
L	O	I	N	D	N	E	V	Y	D
A	A	S	T	R	O	N	A	U	T
N	B	L	P	O	J	Z	V	U	G
E	S	R	O	V	E	R	L	Z	A
T	M	M	A	R	S	O	H	S	P
N	P	H	O	B	O	S	T	Q	G
S	C	I	E	N	T	I	S	T	E

Part 2: Answers will vary.

Extension: Make "scientist goggles" out of colored construction paper. Have kids decorate them with stars and moons. Wear the goggles during the activity!

Activity 2
Mission to Mars

In this activity, students learn about the significance of the name given to the rover Perseverance and its mission to Mars.

Materials needed: Activity sheets, pencils, paper, markers or crayons

Tell students that the rover Perseverance landed on Mars on February 18 and its mission is to seek signs of ancient life by collecting samples of rocks and sediment from the ground for possible return to Earth.

Then explain that NASA held a naming contest for the rover. Students in grades K-12 were invited to write a short essay explaining why the name they chose would be good for a Mars rover. The winner was a seventh-grader. Show students the video at https://www.nasa.gov/press-release/virginia-middle-school-student-earns-honor-of-naming-nasas-next-mars-rover to find out why he picked that name and what it means.

After the video, discuss what it means to persevere. Tell students that scientists have had to persevere to find ways to reach Mars. One of the problems they had to solve was how to land rovers there. A rover like Perseverance approaches the planet at a high speed but must land gently on the surface. How is it done? Share this video that shows the process: https://mars.nasa.gov/resources/25473/perseverance-arrives-at-mars-feb-18-2021-mission-trailer/.

Now distribute the activity sheet. Ask students to read the paragraph at the top (or, for younger students, read it to them) about how millions of people sent their own names to Mars aboard the Perseverance rover as part of NASA's "Send Your Name to Mars" campaign — including Snoopy! Then have students write or draw a picture about a time when they persevered through something — learning to whistle, reading a thick book, completing a huge jigsaw puzzle, etc. When they are finished, ask student volunteers to share their stories.

Extension: Visit Space Place at https://spaceplace.nasa.gov/mars-rovers/en/ with your students and check out how the Mars rovers have evolved over the years. As scientists experiment and learn, they use new information to enhance, modify, and improve their work. Discuss how the rovers differ and how they have improved.

Activity 3
Engineered for Exploration

In this activity, students take a closer look at the components of Perseverance. They will also learn about the tiny helicopter called "Ingenuity," which hitched a ride to Mars strapped to the belly of the rover with the goal of achieving the first powered flight on Mars.

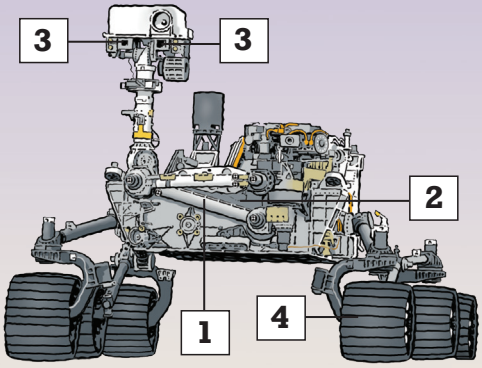
Materials needed: Activity sheets, paper, paper clips

Ask students to consider how they would use their bodies if they were searching the ground to find signs of past life. Let them share and discuss their ideas. For example, their legs carry them to the site, their eyes help them see where to explore, their fingers grasp the tools, and their arms work to use the tools. Explain that the Mars rover Perseverance was designed to have its own "body parts" work together to collect and analyze rock and sediment samples that will hopefully be sent back to Earth.

Since Perseverance isn't a human, its body parts look a little different from ours. Show students the interactive 3-D model of Perseverance found at https://mars.nasa.gov/mars2020/spacecraft/rover/. Click on various parts and talk about each one. How do the parts work together to help Perseverance complete its mission?

Distribute the activity sheet. In Part 1, ask students to match the parts of Perseverance with the description of what each specific part does.

Answers: Part 1:

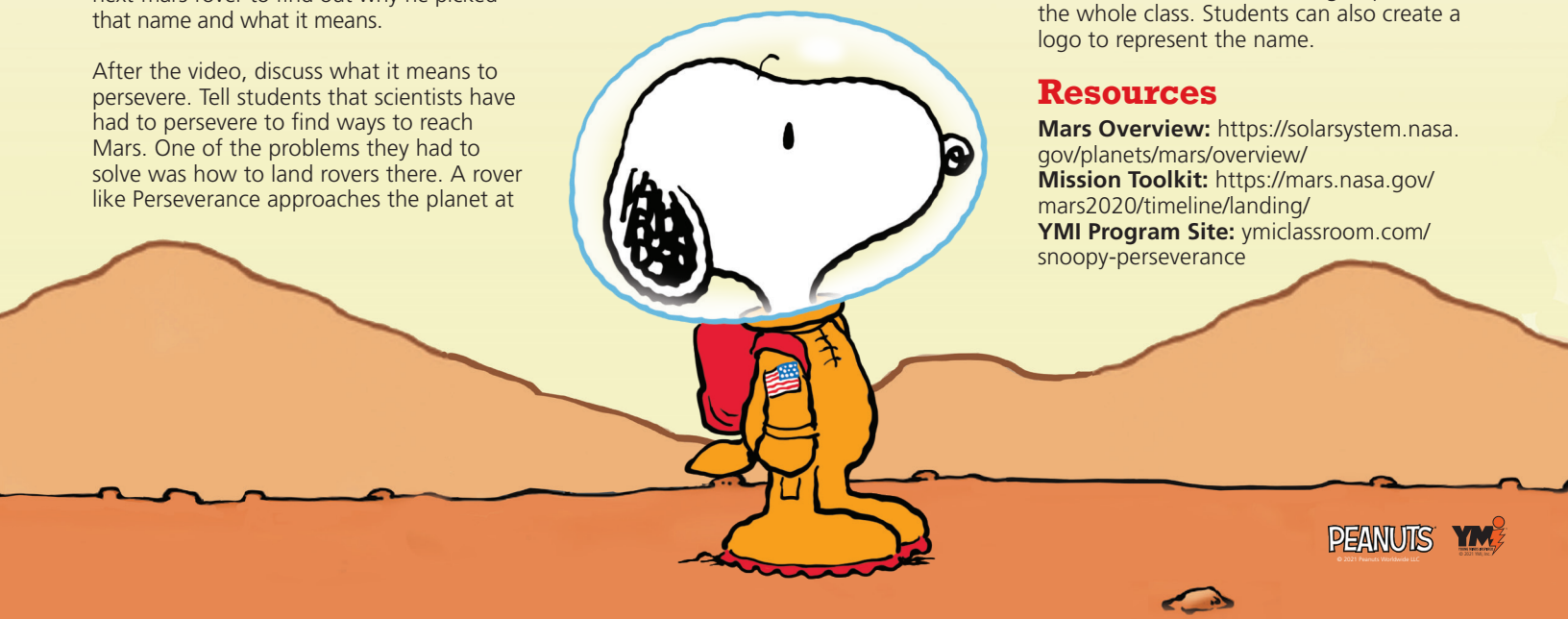


In Part 2, read the paragraph together about the Ingenuity helicopter, its goal, and how it got its name. Then have students follow the directions to create their own paper helicopters, modifying and improving their design along the way. Answers will vary.

Extension: Have students imagine they are charged with naming and designing a future Mars rover. What would be the significance of its name? What would it look like? What tools would it have? Let students share ideas in small groups or with the whole class. Students can also create a logo to represent the name.

Resources

Mars Overview: https://solarsystem.nasa.gov/planets/mars/overview/
Mission Toolkit: https://mars.nasa.gov/mars2020/timeline/landing/
YMI Program Site: ymiclassroom.com/snoopy-perseverance



The Red Planet

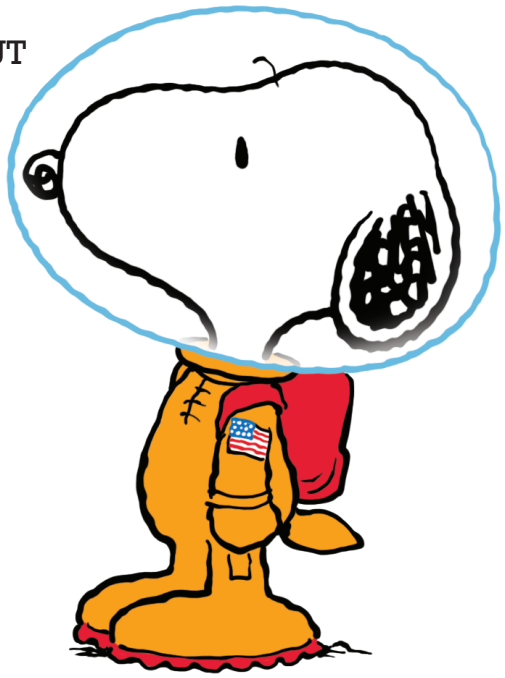
Part 1: As a seasoned space traveler, Snoopy is excited to think about the discoveries that NASA's new rover named *Perseverance* might make on Mars.

How many words about Mars can you find in this word search?

P	R	R	P	M	O	O	N	S	C
G	E	I	N	G	X	J	B	U	O
P	D	N	D	E	I	M	O	S	L
L	O	I	N	D	N	E	V	Y	D
A	A	S	T	R	O	N	A	U	T
N	B	L	P	O	J	Z	V	U	G
E	S	R	O	V	E	R	L	Z	A
T	M	M	A	R	S	O	H	S	P
N	P	H	O	B	O	S	T	Q	G
S	C	I	E	N	T	I	S	T	E

Word Bank

ASTRONAUT
SCIENTIST
PHOBOS
PLANET
ROVER
MOONS
MARS
RED
DEIMOS
COLD



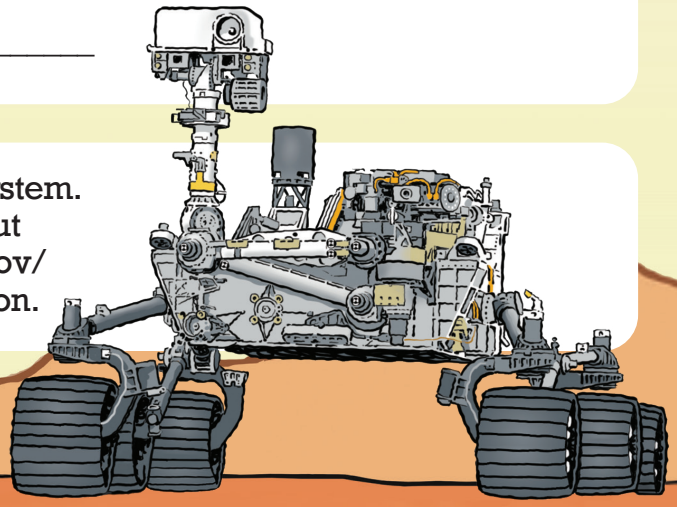
Part 2: Neil Armstrong was the first person to set foot on the moon. As he stepped onto the surface, he said, "That's one small step for a man, one giant leap for mankind." Imagine you are the first human to set foot on Mars. What would you say? Write your thoughts below.

_____

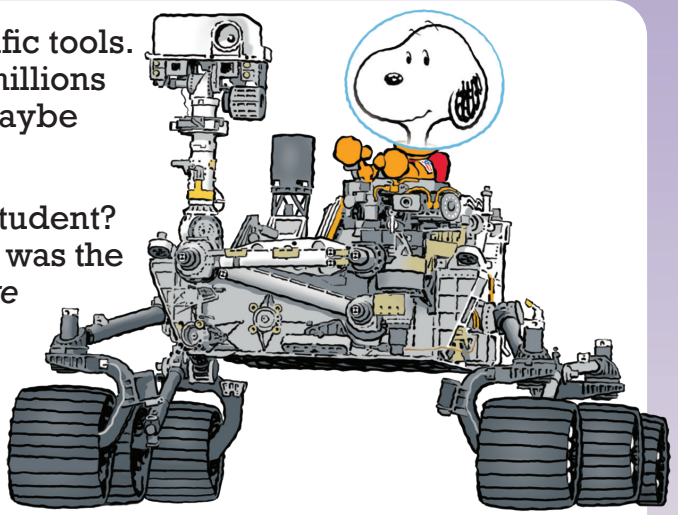
_____

_____

Families: Explore Mars together! Visit https://solarsystem.nasa.gov/planets/mars/overview/ to learn more about Earth's fascinating neighbor, and https://mars.nasa.gov/mars2020/ for more about Perseverance and its mission.



Mission to Mars



The Perseverance rover has lots of valuable scientific tools. It is also carrying something else — the names of millions of people! Even Snoopy has gotten in on the fun! Maybe someday he'll make the trip to Mars himself.

Did you know that Perseverance was named by a student? NASA held a naming contest, and a seventh-grader was the winner! He picked Perseverance because *persevere* means to keep trying, even when it's hard. Do you remember a time when you persevered to do something hard? Maybe it was when you were learning to whistle, or maybe the first time you finished a thick book.

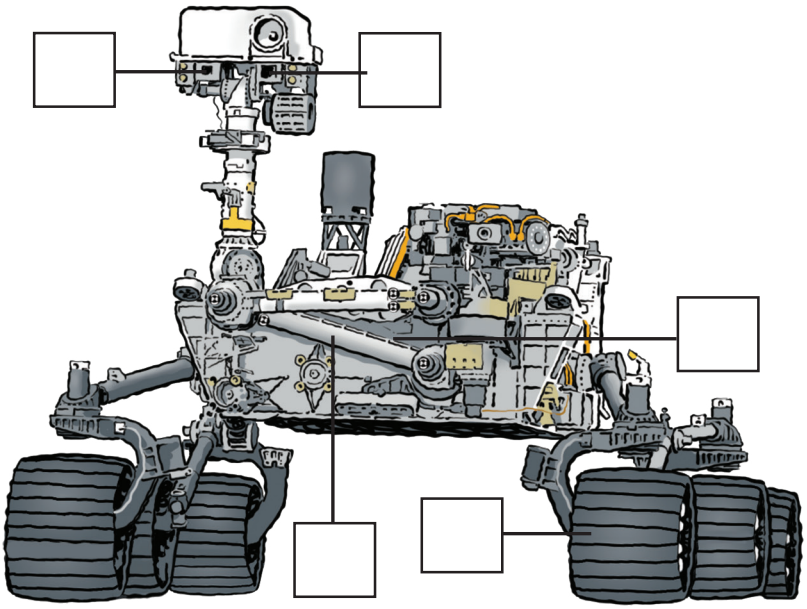
Get "mission ready" by describing a time when you have persevered. Write or draw a picture about what happened below. Then share your story with your classmates.

Families: What do you and a Mars rover have in common? Perseverance! Talk with your children about how you have persevered through difficult situations as a family, and how that has made you stronger. Then, learn more about Perseverance's mission by visiting https://mars.nasa.gov/mars2020/.

Engineered for Exploration

Part 1: Meet Perseverance! Match its "body parts" to the descriptions below. Write the correct number in each box.

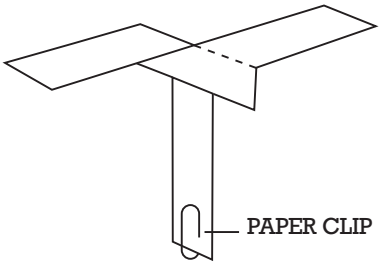
1. **Arm:** The arm can grab rocks on Mars. It can even hold tools and take pictures!
2. **Body:** The rover body carries and protects the computer and other electronics.
3. **Mastcam-Z:** These are the main cameras that take color pictures and videos of Mars.
4. **Wheels:** The light but strong wheels can drive over bumpy land.

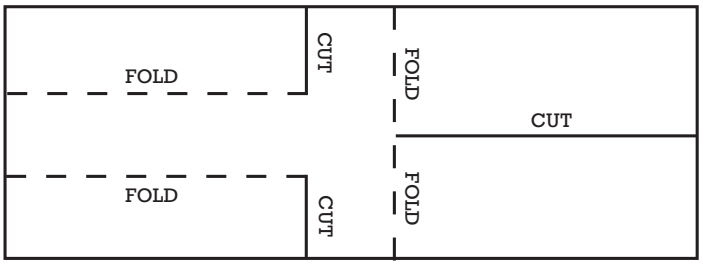


Part 2: You can't see it in the picture, but Perseverance has a small helicopter underneath. The helicopter is named *Ingenuity* and NASA engineers plan to fly it on Mars. They hope to learn how to build bigger flying robots to explore more of Mars in the future.

You can make and test your own tiny helicopter.

1. Cut out the model below. Cut on the solid lines and fold on the dotted lines.
2. Fold the two "blades" of the helicopter in opposite directions.
3. Now, experiment! Add weight with one or more paper clips. Make the body longer or shorter. Experiment with the blades. "Launch" your helicopter from a height just over your head each time you change and improve your design.
4. Persevere! Which design flew the best? Write and draw your results on a separate sheet of paper.





Families: Meet the high school student who named the Ingenuity helicopter and learn more about its part in the Perseverance mission. Visit https://www.jpl.nasa.gov/news/qa-with-the-student-who-named-ingenuity-nasas-mars-helicopter/.