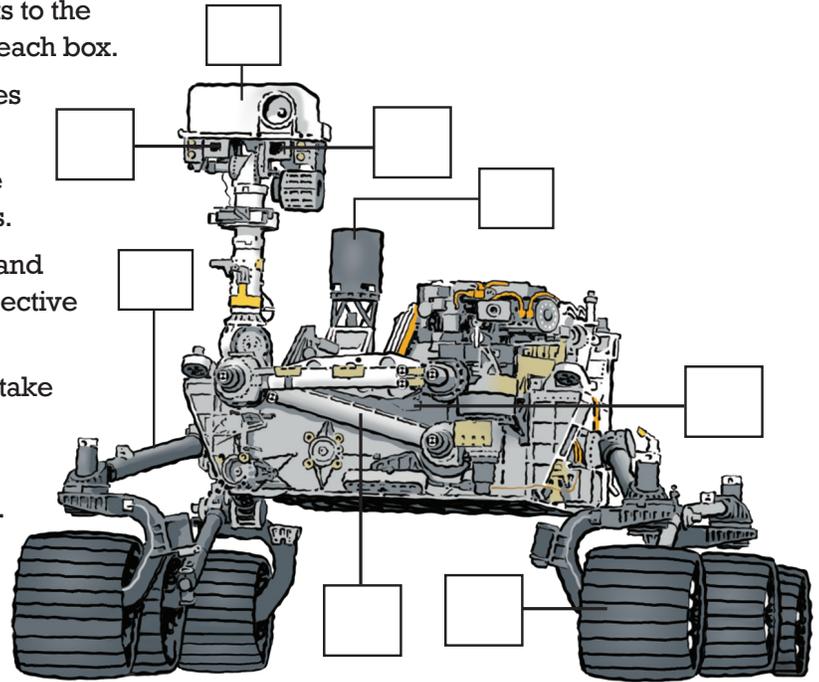


# Engineered for Exploration

**Part 1:** Meet Perseverance! Match its components to the descriptions below. Write the correct number in each box.

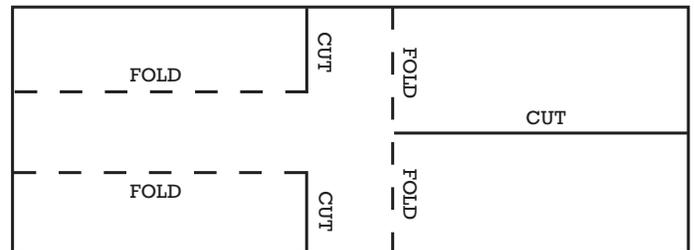
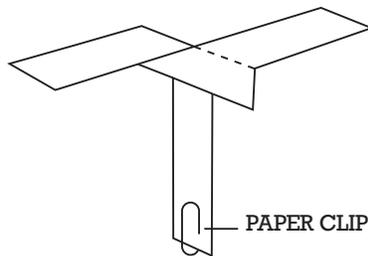
1. **Arm:** The arm helps the scientists grab samples of Martian rocks and sediment.
2. **Body:** The rover body carries and protects the computer, electronics, and instrument systems.
3. **Mast:** The mast elevates key camera systems and sensors, giving the rover a human-scale perspective on its environment.
4. **Mastcam-Z:** These are the main cameras that take color pictures and videos of Mars.
5. **Suspension:** The “rocker-bogie” suspension system allows the wheels to go over obstacles.
6. **UHF Antenna:** The Ultra-High Frequency Antenna transmits data to Earth using Mars orbiters overhead.
7. **Wheels:** The wheels are made of aluminum, with cleats for traction and curved titanium spokes for springy support.



**Part 2:** On the underside of Perseverance, snuggled tightly to its belly, is a small helicopter named Ingenuity. The helicopter is designed to see how well a robotic aircraft could fly in the bone-chillingly cold, thin atmosphere of Mars. If its test flights are successful, this tiny but strong robot can teach NASA a lot about future flights on Mars.

You can make and test your own tiny helicopter. Just follow this pattern. Then experiment! Follow the engineering design process — ask, imagine, plan, create, experiment, and improve. Add paper clips for weight. Make the body longer or shorter. Change the shape of the blades. “Launch” your helicopter from just over your head for each test.

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. Learn more about her and the tiny helicopter by visiting <https://www.jpl.nasa.gov/news/qa-with-the-student-who-named-ingenuity-nasas-mars-helicopter/>.

