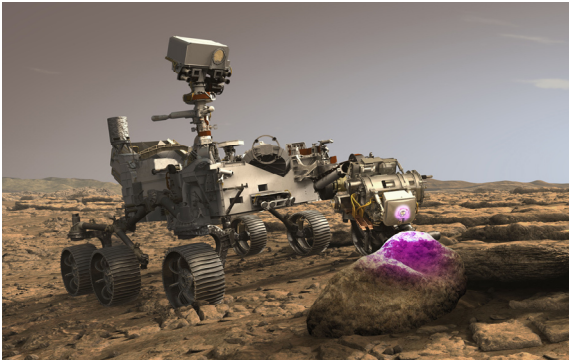


Mars Math with MOXIE

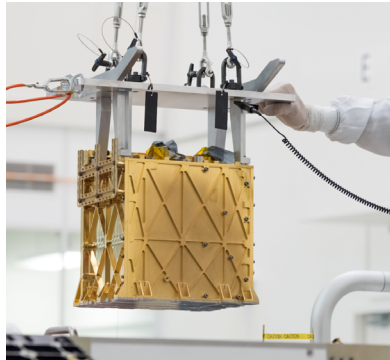
On February 18, 2021, the Mars 2020 mission successfully landed *Perseverance* on the “Red Planet” Mars. It took *Perseverance* almost seven months to travel to Mars, and while there will collect rock and sediment samples as it searches for evidence of water and past life.

Perseverance also carries along *Ingenuity*, the first aircraft on another planet. MOXIE is another passenger on board, generating oxygen from the thin Mars air. You can learn lots more about the mission from NASA here: <https://mars.nasa.gov/mars2020/>

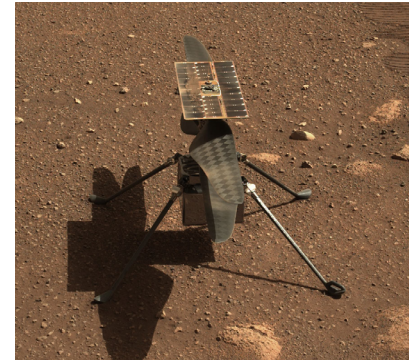
Let’s try out some math problems based on Mars Facts!



Perseverance



MOXIE



Ingenuity

Problems

- 1) One Mars year is the same as two Earth years. If *Perseverance* stays on Mars for four Mars years, how long will it be gone in Earth years?
- 2) *Curiosity* was the Mars Rover before *Perseverance*; they are about the same size. *Perseverance* weighs about 2,260 pounds, and is 278 pounds heavier than *Curiosity*. How much did *Curiosity* weigh?
- 3) MOXIE produces up to 10 grams of oxygen per hour. If MOXIE were capable of running for 6 hours, how much oxygen would it have made?

- 4) The Earth's orbit is not perfectly round nor is Mars's. So, the distance between the planets varies. The closest Mars is to Earth is 35.8 million miles. The furthest they are is 249.1 million miles. By how much do the distances vary?
- 5) If the diameter of Mars is 4,220 miles, what is its area? (Hints: $\text{Area} = 4\pi\text{Radius}^2$
 $\text{Diameter} = \text{Radius} \times 2$ | Use 3.14 for π)
- 6) If the gravity on Earth is 2.66 times that of Mars, where will you weigh more?
- 7) The volume of Mars is around 39 billion mi^3 (cubic miles) and the volume of Earth is about 260 billion mi^3 . About how many Mars planets would it take to fill up Earth? (Hint: You have the same units for each.)
- 8) On average, Earth is about 57°F . Mars has an average temperature of -81°F . What is the difference in temperature between their two averages?
- 9) MOXIE is about $9.4 \times 9.4 \times 12.2$ inches on each side. If we approximate and say it is $9 \times 9 \times 12$ inches, what is its volume?
- 10) *Ingenuity* is the Mars helicopter demonstration project. The blades spin about 2,400 rpm (rotations per minute). If the 'copter flies for 39 seconds, how many rotations did the blades make? (Watch your units!)