



Going the Distance

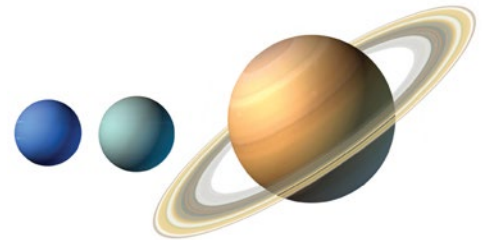
How far apart are the planets?

How do scientists stay in touch with faraway spacecraft? They use microwaves—similar to the ones that heat food in a microwave oven. Microwaves carry commands and data to and from spacecraft at the speed of light, or 300,000 kilometers (186,000 miles) per second. *Fast!*

Unfortunately, communicating with spacecraft can still be really slow. Why? It's because the distances across our solar system are huge. Take Earth—it's a whopping 149,597,870 kilometers (almost 93 million miles) from the Sun. Even for something moving at the speed of light, it takes about 8 minutes to travel the Earth-Sun distance.

The Earth-Sun distance is very important for scientists. They use it as a giant measuring stick. It is an easy way to describe the distances to the other planets. This measuring stick also makes it easy to calculate travel times at the speed of light. For example, Jupiter is five times farther from the Sun than the Earth is—or a 40-minute trip at the speed of light, instead of one that takes just 8 minutes.

This table uses the average distance from Earth to the Sun as a unit of measurement. The Earth-Sun distance is set at 1, and the average distance between each of the other planets and the Sun is relative to this unit of length.



Planet	Average distance from Sun compared to Earth
Mercury	0.4
Venus	0.7
Earth	1
Mars	1.5
Jupiter	5
Saturn	10
Uranus	19
Neptune	30

Do the activity

Use the information above and in the table to answer the questions. Be sure to show your work.

1. How would you use the information in the table to calculate the average distance from Earth to each of the other planets?

2. Calculate the average distance between Mars and Earth.

3. Calculate the average distance between Jupiter and Earth.

4. How many times farther is Jupiter from Earth than Mars is from Earth?

5. How many minutes would it take on average for a command to travel at the speed of light from Earth to a spacecraft on Mars?

6. How many minutes would it take on average for a command to travel at the speed of light from Earth to Jupiter?
