



VII. Getting to Mars: Are we there yet?

(Finding out about Mars' orbit and NASA missions.)

1

In 1609 Johannes Kepler formulated the three Laws of Planetary Motion. Write an obituary for Kepler, including some of his other contributions
See [Kepler: Renaissance Man](#)

2

In [Kepler: Renaissance Man](#) scroll down to “The 'War with Mars”
What was Kepler’s first law of planetary motion?

3

The orbits of all planets are ellipses; however, some are more elliptical than others. The amount of “ellipticalness” is called eccentricity.

Look at the information on [Planetary Orbits](#).

Which of the three orbits shown in the diagram has the most elliptical orbit ?

What is the eccentricity of Earth’s orbit? _____

What is the eccentricity of Mars’ orbit? _____

Which orbit is more like a circle? _____

How can you tell? _____

Which planet has the most elliptical orbit? _____

Which planet has the least elliptical orbit? _____

For more information about ellipses and an activity about Kepler’s first law see: [Kepler's Laws of Planetary Motion](#).



Since Earth's orbit is relatively circular and Mars' orbit is elliptical, there are certain times in their revolutions (their paths around the sun) when Mars is closer to Earth than at other times. When Earth and Mars are the closest to each other in their orbits it is called opposition, and this is a good time to travel to Mars. See [Earth and Mars Orbit](#) (you need Shockwave to operate this).

When will opposition occur in 2002? _____

When will opposition occur in 2003? _____

After 2003 when will opposition next occur? _____

How often do Mars and Earth line up? _____



NASA plans its Mars missions based on when opposition occurs. See [A Taste of Mars: Mars Sample Return Missions](#)

In the table below list the name of the missions, when they will occur and what they will accomplish

NAME OF MISSION	YEAR OF MISSION	PURPOSE OF MISSION
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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NASA hopes that someday a human mission to Mars will occur. A trip from Earth to Mars can take 6 to 12 months of space travel.

If there were a human mission to Mars and we assume that return to Earth from Mars depends on opposition, what is the maximum time a human would be gone from Earth? _____

Minimum time? _____



If humans were to go to Mars they will have to stay there for quite a while! Clearly, for humans to go to Mars there are some big problems that have to be solved. Make a list of problems you can think of that need to be solved to sustain humans while they are on Mars.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Want to be a Martian Sun-Times reporter? Write a story using the facts you have learned in this lesson. Choose one of the styles of reporting that your teacher gave you. [Email it to us!](#)