



Virtual Learning

# Aerospace Engineering

**Mars**

May 7, 2020



# Aerospace Engineering

## Lesson: May 6, 2020

### **Objective/Learning Target:**

Students will learn about Mars by exploring various aspects of planet.



## **Bell Work:**

How far away is Mars from Earth?

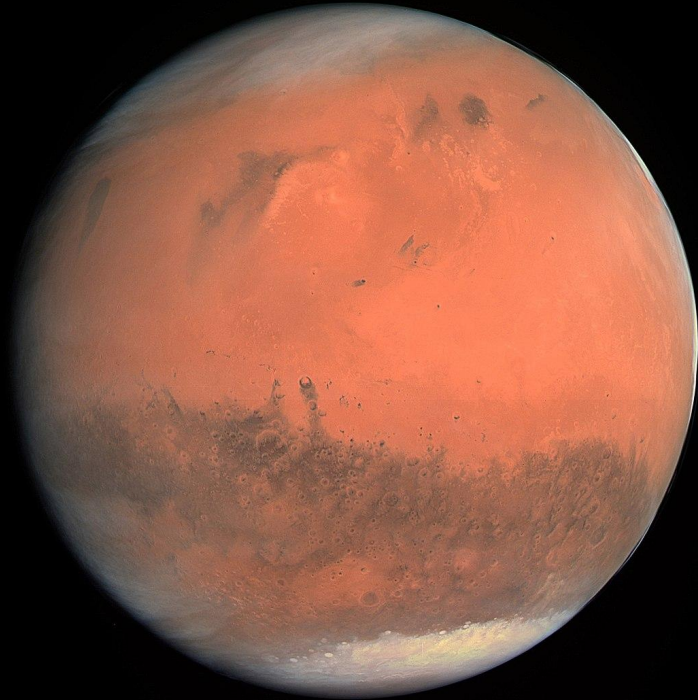


## Let's Get Started:

### Watch Videos:

- [Mars 101 | National Geographic](#)
- [Mars: Crash Course Astronomy #15](#)

# Mercury



# THE PLANETS



Mars was named by the ancient Romans for their god of war because its reddish color reminded them of blood. Other civilizations also named the planet for this attribute. The Egyptians called it "Her Desher," which meant "the red one." Today, it is called the "Red Planet" because iron minerals in the Martian dirt oxidize, or rust, causing the surface to look red.



No other planet has been studied as much as Mars. Recorded observations date back as far as ancient. They charted the planet's movements in the sky.

Today six spacecraft are orbiting Mars. NASA's trio are the Mars Reconnaissance Orbiter, Mars Odyssey and MAVEN. The European Space Agency (ESA) manages the ExoMars Trace Gas Orbiter and the Mars Express missions. India's manages their first Mars spacecraft, the Mars Orbiter Mission (MOM).

There are two robotic units currently working on the surface of Mars. NASA's Curiosity rover is exploring Mount Sharp in Gale Crater and NASA's InSight, a stationary lander, is probing Mars' interior from a site on a flat plain called Elysium Planitia. Both NASA and ESA have plans to send new rovers to Mars in 2020.





Mars has a radius of 2,106 miles, and is about half the size of Earth.

One astronomical unit (AU), is the distance from the Sun to Earth. Mars is 1.5 astronomical units away from the Sun. From this distance, it takes sunlight 13 minutes to travel from the Sun to Mars.

When Mars orbits the Sun, it completes one rotation every 24.6 hours, which is very similar to one day on Earth. Martian days are called sols, which is short for solar day. A year on Mars lasts 669.6 sols, which is equal to 687 Earth days.

Just like Earth, Mars has distinct seasons. However, they last longer than the seasons on Earth because Mars takes longer to orbit the Sun. Here on Earth, the seasons are evenly spread over the year, lasting 3 months each. On Mars the seasons vary in length because of Mars' elliptical, egg-shaped orbit around the Sun.

Spring in the northern hemisphere is the longest season at 194 sols. Autumn in the northern hemisphere is the shortest at 142 sols. Northern winter is 154 sols, and northern summer is 178 sols.

Mars has a dense core at its center between 930 and 1,300 miles in radius. It's made up of iron, nickel and sulfur. Surrounding the core is a rocky mantle between 770 and 1,170 miles thick, and above that is a crust made of iron, magnesium, aluminum, calcium and potassium. The crust runs between 6 and 30 miles deep.

When the solar system settled into its current layout about 4.5 billion years ago, Mars formed when gravity pulled gases and dust in to become the fourth planet from the Sun. Mars is about half the size of Earth, and like other planets, it has a central core, a rocky mantle and a solid crust.

Mars is actually several colors. At the surface you see colors such as brown, gold and tan. The reason Mars looks reddish is due to oxidation, or rusting of iron in the rocks, and dust of Mars. This dust gets kicked up into the atmosphere and from a distance makes the planet appear red.

Even though Mars is about half the diameter of Earth, it has nearly the same area as Earth's dry land.





Mars has a thin atmosphere that is made up of carbon dioxide, nitrogen and argon gases. If you were on Mars, the sky would look hazy and red because of suspended dust instead of the familiar blue we see on Earth.

The temperature on Mars can reach 70 degrees Fahrenheit and as low as negative 225 degrees Fahrenheit. Because the atmosphere is so thin, heat from the Sun easily escapes this planet. If you stand on the surface of Mars on the equator at noon, it would feel like a spring day at your feet and winter at your head.

Winds on Mars are strong enough to create dust storms that cover most of the planet. After these storms, it can take months for all of the dust to settle.

Mars has two small moons, Phobos and Deimos. These are potato-shaped because they do not have enough mass for gravity to make them spherical.

The moons' names come from the horses that pulled the chariot of the Greek god of war, Ares. In ancient Greek, Phobos means flight, and Deimos means fear.

Phobos is the innermost and larger of the two moons. It is heavily cratered, with deep grooves on its surface. It is slowly moving towards Mars and scientists believe that it will crash into the planet or break apart in about 50 million years.

Deimos is only about half as big as Phobos and orbits two and a half times farther away from Mars. It is covered in loose dirt that often fills the craters that are on its surface, and that makes it appear smoother than Phobos.



Scientists do not expect to find any living things currently living on Mars. What they are looking for is signs of life that existed long ago, when Mars was warmer and covered with water.



# Mars Understanding

1. How big is Mars?
2. How far away is Mars from the Sun?
3. How far away is Mars from the Earth?
4. How long does it take light to travel from the Sun to Mars?
5. How many moons does Mars have?
6. How old is Mars?