MARS

The Red Planet
About the Planet

- Common Name: Mars
- Mythological Name(s):
  - Greek: Ares
  - Roman: Mars
- Mars is named after the Roman God of War
A few Pictures...
Distance, Size, and Gravity Compared to Earth

Mars’ average distance from the sun is 228M km, or 1.524 AU

Earth’s average distance from the sun is 93M km, or 1 AU

Mars’ diameter is 4220 miles

Earth’s diameter is 7926 miles

Mars’ diameter is 2110/3963 the diameter of Earth

The surface gravity on Mars is roughly 37% of Earth’s surface gravity
Size Comparison

Mars’ appearance and size compared to Earth
Travel Distance and Time, and Natural Satellites

The journey time from Earth to Mars takes approximately 150 to 300 Earth days, depending on the speed of launch, the planets’ positions in their orbits, and length of the journey.

Unlike mars, Earth has a magnetic field which prevents the Sun's dangerous radiation from reaching the planet. Due to the fact that mars does not have a magnetic field the Sun's solar blasts striped away at Mars’ atmosphere.
Examples include:

<table>
<thead>
<tr>
<th>Mission</th>
<th>Year</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viking I</td>
<td>1976</td>
<td>335 days</td>
</tr>
<tr>
<td>Viking II</td>
<td>1976</td>
<td>360 days</td>
</tr>
<tr>
<td>Mars Recon Orbiter</td>
<td>2006</td>
<td>210 days</td>
</tr>
<tr>
<td>Phoenix Lander</td>
<td>2008</td>
<td>295 days</td>
</tr>
<tr>
<td>Curiosity Lander</td>
<td>2012</td>
<td>253 days</td>
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</table>
Pictures of Travel Time and Orbit

1 Earth Year = 365 days
1 Mars Year = 687 Earth days or 669 sols (martian days)
Mars’ Natural Satellites

Phobos:
6000 km from Mars
takes 7 hours and 39 minutes to orbit Mars

Deimos:
23460 km from Mars
takes 30.3 hours to orbit Mars
Composition of the Planet

The Martian Crust is mostly composed of volcanic basalt rock

The soil of Mars holds sodium, potassium, chloride, and magnesium

The crust is about 30 miles thick

Mars does not have tectonic plates

Mars has huge volcanoes.
Missions to Mars

The Viking missions to Mars are composed of spacecrafts Viking I and Viking II. Both consist of an orbiter and a lander. Objectives included obtaining high resolution images of the surface, characterizing the structure and composition, and search for possible life on Mars.
The Mars Observer was launched on September 15, 1992.

It was based on a commercial Earth-orbiting communications satellite which was converted into an orbiter for Mars.

The mission ended prematurely on August 22, 1993 when contact with the spacecraft was lost before entering orbit around Mars.
Missions to Mars (con’t)

The Mars Climate Observer’s objective was to function as an interplanetary weather satellite, and was also a communications relay for the Mars Polar Lander

It carried a copy of the atmospheric sounder on the Mars Observer spacecraft and lightweight color images combining wide and medium angle cameras
Missions to Mars (con’t)

The Phoenix mission was the first to return information from one of the polar regions.

Provides an important contribution to the overall strategy of Mars.

Objectives included studying the arctic water in the poles, locating a habitable zone, and assess the biological potential for the ice-soil boundary.
Missions to Mars (con’t)

The well known Pathfinder contains a lander and the Sojourner Rover

Unprecedented amounts of information have returned from the rover as it explored the Ancient Flood Plains, known as Ares Vallis

The Pathfinder Mission was the second launch in the Discovery Program, and cost $150 million for development

The Pathfinder was mostly an engineering demonstration for key technologies and concepts that will be used in future missions to Mars
Missions to Mars (con’t)

Mars Observer (bottom left), landing zones (center), Viking lander (bottom right)
Revolution and Rotation

Mars has a rotational period of 1.03 Earth days

Mars has a revolution period of 1.88 Earth years

The Martian atmosphere is 100 times thinner than Earth’s, and is composed of about 95% carbon dioxide, 2.7% nitrogen, .13% oxygen
Comparisons Between Earth and Mars

Atmosphere Composition (left), Axial Tilt and Rotation (right)

<table>
<thead>
<tr>
<th>Atmospheric Composition</th>
<th>Mars</th>
<th>Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td>95.3%</td>
<td>0.03%</td>
</tr>
<tr>
<td>N₂</td>
<td>2.6%</td>
<td>78%</td>
</tr>
<tr>
<td>Ar</td>
<td>1.6%</td>
<td>0.93%</td>
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<tr>
<td>O₂</td>
<td>0.13%</td>
<td>20.9%</td>
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<tr>
<td>CO</td>
<td>0.07%</td>
<td>N/A</td>
</tr>
<tr>
<td>H₂O</td>
<td>0.03%</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Did you know?

If you weighed 100 lbs. on Earth, you would weigh only 37 lbs on Mars! (Janelle Bundy-Lesley)

Mars has seasons like Earth, but they last twice as long. This is because Mars is tilted on its axis by about 25.19 degrees, while the axial tilt of Earth is about 22.5 degrees. (Avery Crawford)

Dust storms on Mars are some of the largest storms in the universe; they can last for months and can cover the entire planet (Michael Flicker)

Olympus Mons is a 21 km high shield volcano with a diameter of 600 km. It is the second largest mountain in the solar system (Aaron Berry)

Phobos is gradually spiraling toward Mars, drawing about 6 feet (1.8 meters) closer to the red planet each century. Within 50 million years, Phobos will either smash into Mars or break up and form a ring of debris around the planet (Erica Barnes)
References


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