8.2A: Mars and a Biosphere

LEARNING OBJECTIVES

- Discuss the Martian biosphere

Mars is the fourth planet from the Sun and the second smallest planet in the Solar System. The planet can be seen from Earth with the naked eye. Mars has a thin atmosphere and its surface is very similar to the Earth’s moon (craters). Mars has volcanoes, valleys, deserts, and polar ice caps similar to Earth. Additionally, Mars rotates similarly to Earth and has a tilt that produces seasons.
Figure: **Mars**: This is the true-color view of Mars as seen through NASA’s Hubble Space Telescope in 1999.

Mars was first observed at close proximity in 1965 by the Mariner 4. This observation began decades of study and speculations about the structure of the surface of Mars. Scientists hypothesize that its surface is covered by liquid water. Scientists are still collecting and analyzing data concerning its surface. The planet is currently host to five functioning spacecraft: three in orbit—the Mars Odyssey, Mars Express, and Mars Reconnaissance Orbiter; and two on the surface—Mars Exploration Rover Opportunity and the Mars Science Laboratory Curiosity.

**Biosphere**

A biosphere is typically defined as the part of the Earth and its atmosphere capable of supporting life. A biosphere can also be thought of as an global ecological system that incorporates all living beings and their relationships with the lithosphere, hydrosphere, and atmosphere. Currently, a great deal of research is going into developing hypotheses on a Martian biosphere. This research overlaps greatly with Martian terraforming, which explores how humans might manipulate the Martian environment to make it stable for maintaining life. As mentioned above, scientists are still collecting a great deal of data on the structure and functioning of Mars. This is a burgeoning field of research.

**Key Points**

- Mars has a thin atmosphere and its surface is very similar to the Earth’s moon (craters) and has volcanoes, valleys, deserts, and polar ice caps similar to Earth itself. Mars rotates similarly to Earth and has a tilt that produces seasons.
- Mars was first observed at close proximity in 1965 by the Mariner 4. Scientists hypothesize that the surface of Mars is covered by liquid water.
- Scientists are still collecting and analyzing data concerning the surface of Mars. The planet is currently host to five functioning spacecraft.
• A biosphere is an global ecological system that incorporates all living beings and their relationships with the lithosphere, hydrosphere, and atmosphere. A great deal of research is going into developing hypotheses on Martian biosphere. Results are currently inconclusive.

### Key Terms

- **Solar System**: The Sun and all the heavenly bodies that orbit around it, including the eight planets, their moons, the asteroids, and comets.

- **Mars**: The fourth planet in the solar system. Symbol:

  ![Mars Symbol](https://bio.libretexts.org/Bookshelves/Microbiology/Book%3A_Microbiology_(Boundless)/8%3A_Microbial_Evolution_Phyloge…)

- **planet**: A body which orbits the Sun directly and is massive enough to be in hydrostatic equilibrium (effectively meaning a spheroid) and to dominate its orbit. The eight planets in the Solar System are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto was considered a planet until 2006 and has now been reclassified as a dwarf planet.