

Chapter Nineteen: Exploring Space

Lesson 3: Recent and Future Space Missions

Solar Probes: probes that orbit the Sun

- *Ulysses*: launched in 1990, orbited the Sun and gathered data for 19 years

Lunar Probes: probes that orbit the moon

- *Lunar Reconnaissance Orbiter*: launched in 2009, collects data that will help select a future lunar outpost

Missions to the Inner Planets:

- Mercury, Venus, Earth, and Mars
- Probes help learn how they were formed, geologic forces active on them, and if they could support life
- *Messenger*: entered Mercury's orbit in 2011 (did 2 passes on Venus), it will study Mercury's geology and chemistry
- *Spirit and Opportunity*: 2 robotic rovers that will explore the Martian surface for the first time

Missions to the Outer Planets:

- Jupiter, Saturn, Uranus, and Neptune
- Dwarf planet: round body that orbits the Sun but is not massive enough to clear away other objects in its orbit
- *Cassini*: launched in 1997 (involving 19 countries) and went into Saturn's orbit in 2004. Smaller probe sent to the surface of Saturn's largest moon (Titan). It was so large it needed help from Venus, Earth, and Jupiter's gravity to help power it to Saturn.
- *New Horizons*: launched in 2006, it is speedy to Pluto. Needs help from Jupiter's gravity. Leave the solar system in 2029.

No person has traveled farther than the Moon but human space travel remains a goal of NASA.

Juno: spacecraft designed to study Jupiter's atmosphere, gravity, magnetic fields, and atmospheric conditions

Extraterrestrial life: life that originates outside Earth

Astrobiology: study of life in the universe, including life on Earth and the possibility of extraterrestrial life

- Conditions for life on Earth help scientists predict where they might find life elsewhere
 - Life can exist on dark ocean floors, deep in solid rocks, and in hot water like hot springs
- All known life-forms need liquid water, organic molecules, and some source of energy to survive

A lunar space probe found water in a crater on the Moon

- NASA plans to launch the *Mars Science Laboratory* to sample rocks and soils on Mars for the possibility of life that exists or did exist on the planet.

Kepler: launched in 2009 to look for Earthlike planets.

- Focuses on a single area of the sky containing 100,000 stars
- Can't detect life on any planet

Not all satellites that orbit the Earth look out into space. Many observe the Earth that help scientists better understand our climate and weather.