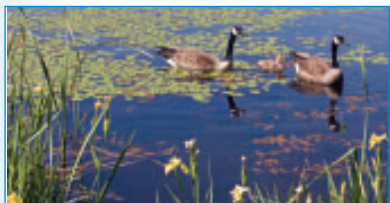


KEY CONCEPTS SUMMARY



Careful observation of the night sky can offer clues about the motion of celestial objects.

- The stars appear to move across the night sky from east to west, except for the North Star (Polaris), which appears stationary. (8.5–8.7)
- The Moon rises in the east and sets in the west. Sometimes the Moon is visible in the daytime. (8.9)
- Different constellations are visible at different times of year. (8.7, 8.8)
- Lunar and solar eclipses sometimes occur. They are due to the alignment of Earth and the Moon with respect to the Sun. (8.5)



The Sun emits light and other forms of radiant energy that are necessary for life on Earth to exist.

- Solar weather interacts with Earth's magnetic field, causing auroras around the North and South Poles. (8.2)
- Satellites in Earth orbit can be damaged by solar wind. (8.2)
- Various types of radiation from the Sun bring light and warmth to the surface of Earth, providing support for life on Earth. (8.1, 8.2)



Celestial objects in the Solar System have unique properties.

- There are eight planets in the Solar System. The physical properties of the four terrestrial planets are distinct from the physical properties of the four gas giant planets. (8.1)
- The planets all orbit the Sun in ellipses, in the same direction but at different distances. (8.3–8.5)
- Asteroids, meteoroids, comets, and dwarf planets all orbit the Sun but are smaller and have properties that distinguish them from the planets. (8.3)



Satellites have useful applications for technologies on Earth.

- Galileo Galilei first observed the Moon and the planets in the night sky with a telescope, obtaining evidence to support the heliocentric model of the Solar System. (8.5)
- RADARSAT-1 and RADARSAT-2 are successful Canadian satellites that observe the surface of Earth. (8.11)
- Astronomers gather information on the Sun with special observatories like SOHO and STEREO. (8.2)



Some celestial objects can be seen with the unaided eye and can be identified by their motion.

- Mars, Venus, Saturn, and Jupiter can be easily seen in the night sky without a telescope. They move eastward from night to night. (8.1, 8.3)
- The positions of the objects in the night sky can be specified by their altitude and azimuth. (8.8, 8.9)
- The planets that are farther from the Sun than Earth sometimes exhibit retrograde motion. (8.9)
- Artificial satellites orbiting Earth have different uses, such as communications, weather monitoring, and military applications. (8.11)

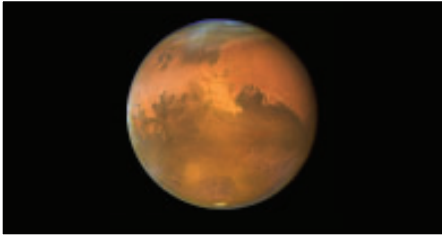


The study of the night sky has influenced the culture and lifestyles of many civilizations.

- Patterns of stars can be used for navigation. (8.6)
- Aboriginal peoples in Canada have a long history of observing patterns in the night sky for navigational and cultural purposes. (8.6)
- Cultures across the globe have legends and stories specific to their culture based on patterns of the stars in the night sky. Sometimes they built structures that aligned with the positions of certain stars. (8.6)

WHAT DO YOU THINK NOW?

You thought about the following statements at the beginning of the chapter. You may have encountered these ideas in school, at home, or in the world around you. Consider them again and decide whether you agree or disagree with each one.



- 1** Scientists have seen signs of life on other planets.
Agree/Disagree?



- 2** Many planets in the Solar System have moons.
Agree/Disagree?



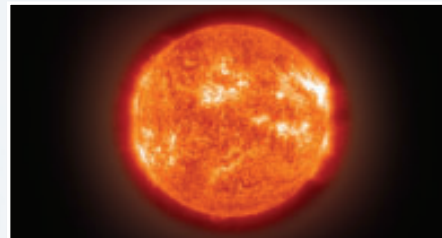
- 3** Canada is a world leader in satellite technology.
Agree/Disagree?



- 4** The stars and constellations can be used to map the night sky, as well as for accurate navigation.
Agree/Disagree?



- 5** We always see the same side of the Moon.
Agree/Disagree?



- 6** Storms on the surface of the Sun can affect Earth.
Agree/Disagree?

How have your answers changed since then?
What new understanding do you have?

Vocabulary

astronomy (p. 305)
celestial object (p. 305)
Universe (p. 305)
star (p. 305)
luminous (p. 305)
planet (p. 306)
Solar System (p. 306)
satellite (p. 306)
orbit (p. 306)
galaxy (p. 307)
electromagnetic (EM) radiation (p. 309)
electromagnetic (EM) spectrum (p. 309)
sunspots (p. 310)
solar flare (p. 310)
solar prominence (p. 310)
aurora borealis (p. 311)
astronomical unit (p. 313)
dwarf planet (p. 314)
comet (p. 316)
orbital radius (p. 320)
gravitational force (p. 321)
solstice (p. 323)
equinox (p. 323)
precession (p. 324)
lunar cycle (p. 324)
eclipse (p. 325)
tide (p. 327)
constellation (p. 329)
celestial sphere (p. 331)
celestial navigation (p. 331)
ecliptic (p. 339)
retrograde motion (p. 340)
azimuth (p. 341)
altitude (p. 341)
global positioning system (GPS) (p. 349)
geostationary orbit (p. 350)

BIG Ideas

- ✓ Different types of celestial objects in the Solar System and Universe have distinct properties that can be investigated and quantified.