

Ontario

Grade One

Describe, using models or simulations, how the earth's rotation causes the cycle of day and night, and how the earth's revolution causes the cycle of the seasons

Recognize major constellations visible at night and describe the origins of their names (e.g., Orion, Leo)

Describe, using models or simulations, the effects of the relative motion and positions of the earth, moon, and sun (e.g., solar and lunar eclipses, tides, phases of the moon)

Grade Six

Describe the physical characteristics of components of the solar system – the sun, planets, natural satellites, comets, asteroids, and meteoroids (e.g., relative size, surface temperature). Identify the bodies in space that emit light (stars) and those that reflect light (e.g., moons, planets).

Describe, using models or simulations, the features of the moon's surface (e.g., craters, maria, rills).

Identify cycles in nature (e.g., cycle of day and night, cycle of seasons) and describe the changes within the cycles (e.g., observe the phases of the moon over several months to determine the pattern of change, and record these observations).

Describe, using models or simulations, how the earth's rotation causes the cycle of day and night, and how the earth's revolution causes the cycle of the seasons.

Recognize major constellations visible at night and describe the origins of their names (e.g., Orion, Leo).

Describe, using models or simulations, the effects of the relative motion and positions of the earth, moon, and sun (e.g., solar and lunar eclipses, tides, phases of the moon).

Grades 9 Applied

Earth and Space Science: Space Exploration

Recognize and describe the major components of the universe using appropriate scientific terminology and units (e.g., record the location and movement of planets and satellites, stars, galaxies, and clusters of galaxies using Astronomical Units and light years).

Describe the generally accepted theory of the origin and evolution of the universe (i.e., the "big bang" theory) and the observational evidence that supports it.

Describe, compare, and contrast the general properties and motions of the components of the solar system (e.g., the composition and physical properties – such as size and state, rotation, size and period of orbit – of the Sun, planets, moons, asteroids, comets).

Describe the Sun and its effects on the Earth and its atmosphere (e.g., the Sun as an energy source, solar activity, aurora borealis).

Describe and explain the effects of the space environment on organisms and materials (e.g., the effects of microgravity and temperature on organisms during space exploration).

Conduct investigations on the motion of visible celestial objects, using instruments, tools, and apparatus safely, accurately, and effectively (e.g., graph sunrise and sunset data and relate them to the motions of the Earth).

Gather, organize, and record data through regular observations of the night sky and/or use of appropriate software programs, and use these data to identify and study the motion of visible celestial objects (e.g., track the position of the Moon and planets over time).

Grade 9 Academic

Earth and Space Science: The Study of the Universe

Describe and compare the major components of the universe, using appropriate scientific terminology and units (e.g., record the location and movement of planets and satellites, and of stars, galaxies, and clusters of galaxies, using Astronomical Units and light years).

Describe the generally accepted theory of the origin and evolution of the universe (i.e., the “big bang” theory) and the observational evidence that supports it.

Describe and compare the general properties and motions of the components of the solar system (e.g., the composition and the physical properties – such as size and state, rotation, size and period of orbit – of the Sun, planets, moons, asteroids, comets).

Describe and explain the effects of the space environment on organisms and materials (e.g., the effects of microgravity on organisms in a spacecraft).

Outline the generally accepted theory of the formation of the solar system (i.e., that it was formed from a contracting, spinning disc of dust and gas).

Describe the Sun and its effects on the Earth and its atmosphere (e.g., explain the importance of the Sun as an energy source and the types of radiation emitted; describe the aurora borealis).

Outline models and theories for describing the nature of the Sun and stars and their origin, evolution, and fate.

Grade Twelve Academic

Earth and Space Science: The Earth as a Planet

Visualize and describe the size, shape, and motions of the solar system, and the place of the Earth within it.

Describe the origin and evolution of the Earth and other objects in the solar system, and identify the fundamental forces and processes involved.

Compare the Earth with other objects in the solar system with respect to such properties as mass, size, composition, rotation, and magnetic field.

Describe and explain the following external processes and phenomena that affect the Earth: radiation and particles from the “quiet” and “active” sun; gravity and tides of the sun and moon; and the impacts of asteroidal and cometary material.

Describe the properties of the near-Earth space environment.

Relating Science to Technology, Society, and the Environment

Explain how the study of other planets and objects in the solar system has led to a better understanding of the Earth (e.g., explain how studying the greenhouse effect on Venus has increased understanding of the same effect on Earth).

Demonstrate an understanding of some of the historical, cultural, and aesthetic consequences of changes in the perception and understanding of the Earth’s place in space (e.g., evaluate the impact of images of the whole Earth taken from space).

Describe how observations and measurements of the Earth made from space are used to study and better understand natural physical elements of the Earth’s environment (e.g., its crust, water, air) as well as human-made elements (e.g., crops, cities, air and water pollution).

Describe the challenges of designing piloted and robotic spacecraft, and of operating them in near-Earth space.

Evaluate the negative effects of human activity on near-Earth space (e.g., space debris, pollution of the electromagnetic spectrum).