Earth & Space Science, Part 1
Course Outline & Objectives

Course Description:

In Earth and Space Science Part 1, students explore the origins of the Universe and Earth's place within it. Students investigate the Big Bang Theory, the composition of the Universe, galaxies, stars, the Sun, and the objects that make up our solar system. The course examines planetary motion, the Earth-Moon-Sun system, and the processes that shaped the formation and evolution of Earth. Students also investigate Earth's internal structure, plate tectonics, geological dating methods, and the processes that create and modify Earth's surface. Through scientific inquiry, data analysis, and real-world applications, students develop an understanding of both the dynamic Universe and the geological forces that continue to shape our planet.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits)

Course Outline

Unit 1: The Universe and Its Beginnings

1.1 The Electromagnetic Spectrum
1.2 The Big Bang Theory
1.3 Evidence Supporting the Big Bang Theory
1.4 Composition of the Universe
1.5 Gravity

Next Generation Science Standards (NGSS)

In Unit 1 students will:

Explore the electromagnetic spectrum and how different types of light help scientists study the universe.
Learn how the Big Bang Theory explains the origin and expansion of the universe.
Examine evidence supporting the Big Bang Theory, including redshift, cosmic microwave background radiation, and the abundance of elements.
Investigate the composition of the universe, including matter, dark matter, and dark energy.
Understand how gravity shapes the motion and structure of objects throughout the universe.

[HS-ESS1-2, HS-ESS1-3, HS-ESS1-4, HS-PS2-4, HS-PS4-1]

Unit 2: Stars and the Sun

2.1 Galaxies
2.2 What are Stars?
2.3 Nuclear Fusion
2.4 Life Cycle of Stars
2.5 The Sun and Its Energy

In Unit 2 students will:

Explore the structure and types of galaxies found throughout the universe.
Learn what stars are, how they form, and the characteristics scientists use to classify them.
Understand how nuclear fusion powers stars and produces the energy they release.
Examine the life cycles of stars, including how their mass influences their evolution and ultimate fate.
Investigate the Sun’s structure, energy production, and importance to life on Earth.

[HS-ESS1-1, HS-ESS1-2, HS-ESS1-3, HS-PS1-8]

Course Outline

Unit 3: Earth and the Solar System
3.1 Planets of the Solar System
3.2 Kepler's Laws
3.3 The Moon
3.4 Earth-Moon-Sun System
3.5 Asteroids and Comets

Next Generation Science Standards (NGSS)

In Unit 3 students will:
Compare the planets of the solar system and identify the characteristics that distinguish them.
Learn how Kepler's Laws describe the motion of planets around the Sun.
Explore the Moon's formation, features, and influence on Earth.
Understand how the interactions between the Earth, Moon, and Sun produce seasons, eclipses, and lunar phases.
Investigate asteroids and comets and their role in the history and evolution of the solar system.

[HS-ESS1-4, HS-ESS1-6]

Unit 4: Earth's Formation and Early History
4.1 How Earth Formed
4.2 Earth's Layers
4.3 Plate Tectonics
4.4 Continental Drift
4.5 Relative and Absolute Dating

In Unit 4 students will:
Learn how Earth formed and changed during its early history.
Explore the structure of Earth and the characteristics of its major layers.
Understand how plate tectonics drives movement within Earth's crust and shapes the planet's surface.
Examine the evidence supporting the theory of continental drift.
Use relative and absolute dating methods to determine the ages of rocks, fossils, and geological events.

[HS-ESS1-5, HS-ESS1-6, HS-ESS2-3]

Unit 5: The Geosphere
5.1 Weathering and Erosion
5.2 Minerals
5.3 Rocks and the Rock Cycle
5.4 Soil
5.5 Earth's Landforms

In Unit 5 students will:
Investigate how weathering and erosion shape Earth's surface over time.
Identify the properties and uses of minerals found within Earth's crust.
Explore the three major types of rocks and the processes involved in the rock cycle.
Learn how soil forms and why it is essential to ecosystems and agriculture.
Examine the processes that create Earth's diverse landforms, including mountains, valleys, plains, and canyons.

[HS-ESS1-5, HS-ESS2-1, HS-ESS2-5, HS-ESS3-1]