

## COURSE DESCRIPTION - GRADES 9-12

**Subject Area:** Science  
**Course Number:** 2001381  
**Course Title:** AICE Environmental Science I  
**Credit:** 1.0

### Will meet graduation requirements for Science

**A. Major Concepts/Content.** The purpose of this course is to develop and apply concepts basic to the Earth, its materials, processes, history, and environment in space.

The contents should include, but not be limited to, the following:

- internal structure of earth evidence
- evidence for plate tectonics
- formation of igneous, sedimentary, and metamorphic rocks
- weathering and erosion
- soil structure and formation
- distribution of global water supplies
- water cycle
- properties of water and their environmental consequences
- ocean currents and climate
- rainfall and climate
- structure and composition of the atmosphere
- carbon cycle
- nitrogen cycle
- formation and function of stratospheric ozone
- wind movement
- earth in the solar system solar radiation
- interaction of electromagnetic radiation with the earth's surface
  - Greenhouse effect
  - earth as environment for life
  - ecosystems and biomes
  - population dynamics

**B. Special Note.** Laboratory investigation of selected topics in the content, which include the reviews of scientific methods, measurements, laboratory apparatus, and safety procedures. Use of satellite imagery, image processing techniques, and computer model development and informative field trips and guest speakers from the business community are strongly recommended.

The Advanced International Certificate of Education (AICE) is an international pre-university curriculum and examination system administered by the Local Examinations Syndicate at the University of Cambridge. The AICE courses include embedded assessments and an internationally scored end of course assessment.

**C. Course Requirements.** These requirements include, but are not limited to, the benchmarks from the Sunshine State Standards that are most relevant to this course. Benchmarks correlated with a specific course requirement may also be addressed by other course requirements as appropriate.

**After successfully completing this course, the student will:**

**1. Describe crustal movements and their effects, the formation of landmasses, and basic mountain types.**

SC.D. 1.4.2 know that the solid crust of Earth consists of slow-moving, separate plates that float on a denser, molten layer of Earth and that these plates interact with each other, changing the Earth's surface in many ways (e.g., forming mountain ranges and rift valleys, causing earthquakes and volcanic activity, and forming undersea mountains that can become ocean islands).

**2. Identify and classify different rocks and minerals.**

SC.A. 1.4.2 know that the vast diversity of the properties of materials is primarily due to variations in the forces that hold molecules together.

SC.A. 1.4.5 know that connections (bonds) form between substances when outer-shell electrons are either transferred or shared between their atoms, changing the properties of substances.

SC.D. 1.4.3 know that changes in Earth's climate, geological activity, and life forms may be traced and compared.

**3. Describe and interpret types of erosion with emphasis on soil types, glaciation, ocean currents, and weather patterns.**

SC.B. 1.4.1 understand how knowledge of energy is fundamental to all the scientific disciplines (e.g., the energy for biological processes in living organisms and the energy required for the building, erosion, and rebuilding of the Earth).

SC.D. 1.4.1 know how climatic patterns on Earth result from an interplay of many factors (Earth's topography, its rotation on its axis, solar radiation, the transfer of heat energy where the atmosphere interfaces with lands and oceans, and wind and ocean currents).

**4. Analyze the movements of ocean waters and their effects.**

SC.B. 1.4.5 know that each source of energy presents advantages and disadvantages to its use in society (e.g., political and economic implications may determine a society's selection of renewable or nonrenewable energy sources).

- SC.E. 1.4.1 understand the relationships between events on Earth and the movements of the Earth, its moon, the other planets, and the Sun.
- SC.E. 2.4.7 know that mathematical models and computer simulations are used in studying evidence from many sources to form a scientific account of the universe.

**5. Describe the relationship between oceans and climates.**

- SC.G. 2.4.4 know that the world ecosystems are shaped by physical factors that limit their productivity.

**6. Describe the interrelationship between man and the ocean environment and the need for protection of the natural systems on Earth.**

- SC.D. 2.4.1 understand the interconnectedness of the systems on Earth and the quality of life.
- SC.G. 2.4.5 understand that the amount of life any environment can support is limited and that human activities can change the flow of energy and reduce the fertility of the Earth.
- SC.G. 2.4.6 know the ways in which humans today are placing their environmental support systems at risk (e.g., rapid human population growth, environmental degradation, and resource depletion).

**7. Describe the changes that occur over time in different Earth system processes.**

- SC.D. 1.4.4 know that Earth's systems and organisms are the result of a long, continuous change over time.
- SC.G. 2.4.1 knows that layers of energy-rich materials have gradually turned into great coal beds and oil pools (fossil fuels) by the pressure of the overlying earth and that humans burn fossil fuels to release the stored energy as heat and carbon dioxide.
- SC.G. 2.4.6 know that ways in which humans today are placing their environmental support systems at risk (e.g., rapid human population growth, environmental degradation, and resource depletion).

**8. Demonstrate understanding of the interdependence of all living things and the environment.**

- SC.G. 1.4.2 understand how the flow of energy through an ecosystem made up of producers, consumers, and decomposers carries out the processes of life and that some energy dissipates as heat and is not recycled.

- SC.G. 1.4.3 know that the chemical elements that make up the molecules of living things are combined and recombined in different ways.
- SC.G. 2.4.2 know that changes in a component of an ecosystem will have unpredictable effects on the entire system but that the components of the system tend to react in a way that will restore the ecosystem to its original condition.

**9. Demonstrate understanding of types of selection, variations, and adaptations, and how they lead to biological changes through time.**

- SC.D. 1.4.4 know that Earth's systems and organisms are the result of a long, continuous change over time.
- SC.F. 2.4.3 understand the mechanisms of change (e.g., mutation and natural selection) that lead to adaptations in a species and their ability to survive naturally in changing conditions and to increase species diversity.

**10. Demonstrate understanding of the impact of agricultural, food, and medical technologies on the quality of our lives and career opportunities.**

- SC.H. 3.4.2 know that technological problems often create a demand for new scientific knowledge and that new technologies make it possible for scientists to extend their research in a way that advances science.
- SC.H. 3.4.5 know that the value of a technology may differ for different people and at different times.
- SC.H. 3.4.6 know that scientific knowledge is used by those who engage in design and technology to solve practical problems, taking human values and limitations into account.

**11. Describe how the earth/space sciences interact with technology and society.**

- SC.H. 3.4.1 know that performance testing is often conducted using small-scale models, computer simulations, or analogous systems to reduce the chance of system failure.
- SC.H. 3.4.3 know that scientists can bring information, insights, and analytical skills to matters of public concern and help people understand the possible causes and effects of events.
- SC.H. 3.4.4 know that funds for science research come from federal government agencies, industry, and private foundations and that this funding often influences the areas of discovery