Science Standard
Catalina Foothills School District
High School: Environmental Science

Environmental Science is an inquiry, laboratory, and career-based course that studies local and global environments through the physics topics of mechanics, wave phenomena, energy and matter interactions, electricity, and magnetism. Other topics include physical geology, inter-relationship of plants and animals, scientific field sampling methods and equipment, and computer modeling of natural resource systems. The skills of scientific inquiry, systems thinking, and technological innovations are integrated throughout the course. In-depth investigations of natural resource systems and career opportunities are supported through real world authentic experiences. Students will be required to complete an independent, semester-long research project.

SCIENTIFIC INQUIRY

SCIENTIFIC INQUIRY: GENERATING SCIENTIFIC QUESTIONS

ENVSCI.1a.1 Frames testable questions showing evidence of observations and connections to prior knowledge.

ENVSCI.1a.2 Develops a testable question appropriate to the scientific domain being investigated.

SCIENTIFIC INQUIRY: FORMULATING HYPOTHESES

ENVSCI.1b.1 Develops a testable hypothesis based upon evidence of scientific principles, probability and/or modeling.

ENVSCI.1b.2 Clearly distinguishes relationships between variables (required: cause and effect or correlation) within a testable hypothesis.

SCIENTIFIC INQUIRY: DESIGNING INVESTIGATIONS

ENVSCI.1c.1 Specifies the parameters of measurement.

ENVSCI.1c.2 Describes suitable controls for the investigation.

ENVSCI.1c.3 Designs procedures that appropriately address the hypothesis.

SCIENTIFIC INQUIRY: DATA COLLECTION

ENVSCI.1d.1 Creates and demonstrates safe and ethical procedures.

ENVSCI.1d.2 Uses units of measurement with appropriate degree of accuracy.

ENVSCI.1d.3 Creates procedures that appropriately and adequately address the hypothesis (for example: adequate sample size, multiple trials).

ENVSCI.1d.4 Creates a suitable method of recording data.

SCIENTIFIC INQUIRY: ANALYSIS

ENVSCI.1e.1 Interprets data to describe relationships between variables (for example: positive, negative, no relationship).

ENVSCI.1e.2 Incorporates mathematical analysis, where appropriate.

ENVSCI.1e.3 Critiques the investigation for possible sources of error and suggests corrections.

CONCLUSIONS AND EXTENSIONS

ENVSCI.1f.1 Makes evidence-based predictions (for example: extrapolations and interpolations).

ENVSCI.1f.2 Evaluates whether the data support the hypothesis.

COMMUNICATION

ENVSCI.1g.1 Uses suitable media to inform an audience about an investigation.

ENVSCI.1g.2 Applies appropriate ethics (for example: language, style, citations).

INTERACTION OF SCIENCE AND SOCIETY

ENVSCI.2.1 Describes the interaction of science, human curiosity and societal needs (for example: recreation area enhancement improvements; buffel grass removal, trail improvements, stream restoration).

ENVSCI.2.2 Critically analyzes the science concepts behind societal issues (for example how natural resource management and scientific theory informs our understanding of global environmental issues).

SYSTEMS THINKING (CFSD Deep Learning Proficiency – DLP)

SYSTEMS THINKING: CHANGE OVER TIME

ENVSCI.3a.1Explains how a system's components change over time (for example: seasonal temperature fluctuations effect on atmosphere, current flow and speed change).

SYSTEMS THINKING: INTERDEPENDENCIES

ENVSCI.3b.1 Explains the causal relationships in a system as being either positive or negative feedback relationships (for example: how plant and animal diseases impact global environment).

SYSTEMS THINKING: SYSTEM-AS-CAUSE

ENVSCI.3c.1 Explains the reasons why specific behaviors result from the organization of a system (for example: how the carbon cycle affects the living system and its resources).

CARTOGRAPHIC SKILLS

ENVSCI.4.1 Determines the elevation and terrain features from topographic maps.

ENVSCI.4.2 Uses directional tools with maps to locate position and actual distance (for example: topographic, physiographic, hydrologic).

ENVSCI.4.3 Uses Geographic Information Systems and Global Positioning Systems to interface geospatial data (for example: interpret photos and images).

ENVSCI.4.4 Conducts authentic research to assess how the size and the rate of growth of a population are determined (for example: using photograph analysis to trace historical environmental changes).

MOTION AND FORCES

ENVSCI.5.1 Analyzes relationships between forces and motion (for example: wind currents, and stream velocity).

ENVSCI.5.2 Determines the rate of change of a quantity (for example: rate of erosion, rate of reaction, rate of growth, velocity).

ENVSCI.5.3 Analyzes the relationships among position, velocity, acceleration, and time.

ENVSCI.5.4 Explains how Newton's Laws apply to a variety of situations.

INTERACTIONS OF ENERGY AND MATTER

ENVSCI.6.1 Describes various ways in which matter and energy interact.

ENVSCI.6.2 Describes the characteristics of waves (required: wavelength, frequency, period, amplitude).

ENVSCI.6.3 Explains the relationship between the wavelength of light absorbed or released by an atom or molecule, and the transfer of a discrete amount of energy.

ENVSCI.6.4 Describes various ways in which energy is transferred from one system to another.

GEOCHEMICAL CYCLES

ENVSCI.7.1. Describes the interactions between the Earth's structures, atmosphere and biogeochemical cycles.

ENVSCI.7.2 Explains how dynamic processes such as weathering, erosion, sedimentation, metamorphism, and orogenesis relate to distribution of materials within the Earth's system.

ENVSCI.7.3 Demonstrates the relationship between the Earth's internal convective heat flow and plate tectonics.

ENVSCI.7.4 Explains how the rock cycle is related to plate tectonics.

ENERGY IN THE INTERNAL EARTH SYSTEM

ENVSCI.8.1 Describes the flow of energy to and from planets and its influence in Earth systems.

ENVSCI.8.2 Explains the mechanisms of heat transfer (convection, conduction, radiation) among the atmosphere, landmasses, and oceans.

ENVSCI.8.3 Describes the relationships among earthquakes, volcanoes, mountain ranges, mid-oceanic ridges, deep sea trenches, and tectonic plates.

ENERGY IN THE EXTERNAL EARTH SYSTEM

ENVSCI.9.1 Describes the effect of the Earth's rotation on the movement of water and air.

ENVSCI.9.2 Describes the origin, life cycle, and behavior of weather systems (for example: how weather is influenced by both natural and artificial Earth features).

ENVSCI.9.3 Describes the factors that determine weather and climate.

ENVSCI.9.4 Explains the cause and/or effects of climate changes (for example: weather-related dangers).

BIOGEOGRAPHY

ENVSCI.10.1 Describes the various stages in a biogeographic sequence to monitor the distribution of global natural resources (for example: establish sample plots/points, locate and identify resources).

ENVSCI.10.2 Explains how natural and man-caused environmental impacts can cause change within ecosystems (for example: uses data collection concerning resource availability and health).

ENVSCI.10.3 Conducts authentic research to describe the sequence of successional stages in an ecosystem after a disturbance (for example: re-establishment of a successional environment following fires).

ENVIRONMENTAL SCIENCE

ENVSCI.11.1 Describes the relationships among organisms within populations, communities, ecosystems, and biomes (for example: symbiotic relationship of forest and wildlife communities, as well as humans and range species).

ENVSCI.11.2 Describes how organisms are influenced by a particular combination of biotic and abiotic factors in an environment (for example: distribution of species in an area based on abiotic factors).

ENVSCI.11.3 Describes hazardous/poisonous animal and plant species.

ENVSCI.11.4 Demonstrates natural area restoration techniques (for example: wildlife habitat, recreation area, and forest stand enhancement techniques).