

WHAT CALIFORNIA SCIENCE CONTENT STANDARDS DO OUR HIKES MEET?

The following page details the fifth and sixth grade CA Science Standards our program offers. Hikes can also be adapted to meet the new Environmental Education Initiative.

WILDLIFE BIOLOGY/BOTANY :

Students discover the animals that live at the Outdoor School including their ecosystems, adaptations, food sources, and their relationships with other animals and humans.

Students learn to categorize and identify native plants and plant communities while discovering their ecological importance and their medicinal and edible uses.

Life Sciences

(5th Grade)

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
 - Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO₂) and oxygen (O₂) are exchanged in the lungs and tissues.
 - Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
 - Students know how sugar, water, and minerals are transported in a vascular plant.
 - Students know plants use carbon dioxide (CO₂) and energy from sunlight to build molecules of sugar and release oxygen.
 - Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO₂) and water (respiration).

(6th Grade)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:
 - Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
 - Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.

- Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
- Students know different kinds of organisms may play similar ecological roles in similar biomes.
- Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

GEOLOGY:

Students search for fossils, identify and classify rocks, learn about erosion and human impact on erosion and its prevention. Students also explore the geographical features of the Santa Ynez Mountains.

Earth Sciences

(6th Grade)

Plate Tectonics and Earth's Structure

1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:
 - Students know evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and midocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.
 - Students know Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.
 - Students know lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.
 - Students know that earthquakes are sudden motions along breaks in the crust called faults and that volcanoes and fissures are locations where magma reaches the surface.
 - Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.
 - Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.

Shaping Earth's Surface

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment. As a basis for understanding this concept:
 - Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.
 - Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.
 - Students know beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.
 - Students know earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.

Resources

Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:

- Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.
- Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.
- Students know the natural origin of the materials used to make common objects.

Energy in the Earth System

4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:
 - Students know heat from Earth's interior reaches the surface primarily through convection.
 - Students know convection currents distribute heat in the atmosphere and oceans.

- Students know differences in pressure, heat, air movement, and humidity result in changes of weather.

ASTRONOMY:

This hike is one of the highlights for the week at The Outdoor School. The students will learn about nocturnal animals, astronomy, and adaptations for life after dark.

(5th Grade)

5. The solar system consists of planets and other bodies that orbit the Sun in predictable paths. As a basis for understanding this concept:
 - Students know the Sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.
 - Students know the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects, such as asteroids and comets.
 - Students know the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.

(6th Grade)

Energy in the Earth System

5. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:
 - Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.
 - Students know solar energy reaches Earth through radiation, mostly in the form of visible light.

CHUMASH CULTURE:

Students discuss the interactions between the Chumash and their environment while learning about survival methods, food sources, and games.

HISTORY AND SOCIAL SCIENCE STANDARDS

(5th Grade)

Chronological and Spatial Thinking

1. Students place key events and people of the historical era they are studying in a chronological sequence and within a spatial context; they interpret time lines.
2. Students correctly apply terms related to time, including *past, present, future, decade, century, and generation*.
3. Students explain how the present is connected to the past, identifying both similarities and differences between the two, and how some things change over time and some things stay the same.

5.1

1. Describe how geography and climate influenced the way various nations lived and adjusted to the natural environment, including locations of villages, the distinct structures that they built, and how they obtained food, clothing, tools, and utensils.
2. Describe their varied customs and folklore traditions.

(6th Grade)

Chronological and Spatial Thinking

1. Students explain how major events are related to one another in time.
2. Students construct various time lines of key events, people, and periods of the historical era they are studying.

History-Social Science Content Standards

Students in grade six expand their understanding of history by studying the people and events that ushered in the dawn of the major Western and non-Western ancient civilizations. Geography is of special significance in the development of the human story. Continued emphasis is placed on the everyday lives, problems, and accomplishments of people, their role in developing social, economic, and political structures, as well as in establishing and spreading ideas that helped transform the world forever. Students develop higher levels of critical thinking by considering why civilizations developed where and when they did, why they became dominant, and why they declined.

6.1 Students describe what is known through archaeological studies of the early physical and cultural development of humankind...

- Describe the hunter-gatherer societies, including the development of tools and the use of fire.
- Identify the locations of human communities that populated the major regions of the world and describe how humans adapted to a variety of environments.

ENVIRONMENTAL EDUCATION INITIATIVE

The hikes offered at The Outdoor School can be modified to meet particular principles and concepts highlighted in the Environmental Education Initiative (EEI). The Education Director and Program Coordinator for the Outdoor School contact teachers directly before their visit and discuss what concepts they would like their students to learn.

The following page is an overview of the EEI and the standards therein. Information provided by the California Environmental Agency and their website:

(www.calepa.ca.gov). For a direct link to EEI go to:

(<http://www.calepa.ca.gov/Education/Principles/EPC.pdf>)

Introduction

The Education and the Environment Initiative [Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003) and Assembly Bill 1721 (Pavley, Chapter 581, Statutes of 2005)] directs the California Environmental Protection Agency and the California Integrated Waste Management Board, in cooperation with the Resources Agency, State Department of Education, State Board of Education, and Secretary for Education to develop education principles and concepts for the environment [California's Environmental Principles and Concepts (EP&C)].

The development of the California's EP&C was based on the contributions of over 100 scientists and technical experts, representing state agencies, universities, business and industry, and environmental organizations from across California. Subsequent to the drafting of the EP&C, they were widely distributed and subjected to field reviews across the State.

The Office of the Secretary of the California Environmental Protection Agency and the Integrated Waste Management Board have reviewed and approved these Environmental Principles and Concepts.

These Environmental Principles and Concepts will serve as the foundation for developing the Model Curriculum for California's K-12 that is mandated under the Education and the Environment Initiative.

California's Approved Environmental Principles and Concepts

The environmental principles examine the interactions and interdependence of human societies and natural systems.

The nature of these interactions is summarized in the Environmental Principles and Concepts.

Principle I

People Depend on Natural Systems

Example: People depend on the food and forest products produced by natural systems and on the services that ecosystems provide such as the purification of water as it flows through wetlands.

Technical Description of the Principle and Concepts:

The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services. As a basis for understanding this principle:

Concept a. Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept b. Students need to know that the ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept c. Students need to know that the quality, quantity and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

Principle II

People Influence Natural Systems

Example: People build dams to control the path and timing of water movement through lakes and rivers.

Technical Description of the Principle and Concepts:

The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies. As a basis for understanding this principle:

Concept a. Students need to know that direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept b. Students need to know that methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept c. Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

Concept d. Students need to know that the legal, economic and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

Principle III

Natural Systems Change in Ways that People Benefit from and can Influence

Example: Agricultural production depends on the nutrients deposited by rivers when water floods farmlands.

Technical Description of the Principle and Concepts:

Natural systems proceed through cycles that humans depend upon, benefit from and can alter. As a basis for understanding this principle:

Concept a. Students need to know that natural systems proceed through cycles and processes that are required for their functioning.

Concept b. Students need to know that human practices depend upon and benefit from the cycles and processes that operate within natural systems.

Concept c. Students need to know that human practices can alter the cycles and processes that operate within natural systems.

Principle IV

There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing between Systems

Example: The fertilizers and pesticides people use on lawns can enter the groundwater system and affect the quality of the drinking water supply.

Technical Description of the Principle and Concepts:

The exchange of matter between natural systems and human societies affects the long-term functioning of both.

As a basis for understanding this principle:

Concept a. Students need to know that the effects of human activities on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.

Concept b. Students need to know that the byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect.

Concept c. Students need to know that the capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

Principle V

Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors

Example: numerous stakeholders as well as economic, legal and political factors that are considered in making decisions.

Technical Description of the Principle and Concepts:

Decisions affecting resources and natural systems are based on a wide range of considerations and decision making processes. As a basis for understanding this principle:

Concept a. Students need to know the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.

Concept b. Students need to know the process of making decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.

