

ALIGNMENT WITH CALIFORNIA STATE BOARD GRADE 6 EDUCATION STANDARDS

The **Ecology (Life Science)** component of the State 6th Grade Science Standards is fully integrated into the 6th Grade program.

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

- a. *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.
- b. *Students know* matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
- c. *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.
- d. *Students know* different kinds of organisms may play similar ecological roles in similar biomes.
- e. *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.

The **Shaping Earth's Surface** component is addressed through observation and discussion of the features of UNB:

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:

- a. *Students know* water running downhill is the dominant process in shaping the landscape, including California's landscape.
- b. *Students know* rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.
- c. *Students know* beaches are dynamic systems in which sand is supplied by rivers and moved along the coast by the action of waves.
- d. *Students know* earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.

The **Resources** component is addressed through observation and discussion of the natural resources of UNB:

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

- a. *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.
- b. *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.
- c. *Students know* the natural origin of the materials used to make common objects

The program is designed for students to explore nature through observation and interpretation, consistent with the **Investigation and Experimentation** component of the State 6th Grade Science Contents Standards:

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

- a. Develop a hypothesis.
- b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
- c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
- d. Communicate the steps and results from an investigation in written reports and oral presentations.
- e. Recognize whether evidence is consistent with a proposed explanation.
- f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.
- g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).
- h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a stream, a hillslope).

The following component of the State 6th Grade **History/Social Science** Standards is reinforced through discussion of the life of local Indians based on 9,000+ year old archeological finds at the Bay, and published histories from the time of the Spanish Missions:

6.1 Students describe what is known through archaeological studies of the early physical and cultural development of humankind from the Paleolithic era to the agricultural revolution.

1. Describe the hunter-gatherer societies, including the development of tools and the use of fire.
2. Identify the locations of human communities that populated the major regions of the world and describe how humans adapted to a variety of environments.
3. Discuss the climatic changes and human modifications of the physical environment that gave rise to the domestication of plants and animals and new sources of clothing and shelter.

6TH GRADE SHELLMAKER SCHOOL TOUR PROGRAM

Shellmaker Island is the perfect setting for a truly remarkable outdoor learning experience that ties together so many of the various facets of the Science and History/Social Science curriculum. Shellmaker sits at the dividing line between the waterfront homes and yachts of Lower Newport Bay and the natural beauty of the Upper Newport Bay Ecological Reserve. Upper Newport Bay is one of only a few remaining estuaries in Southern California and is the home of nearly 200 species of birds, including several endangered species, as well as numerous species of mammals, fish, other critters and native plants. The Bay is an important stopover for migrating birds on the Pacific Flyway and up to 30,000 birds can be seen here on any day during the winter months.

The 6th Grade program is an intensive 1½ hour outdoor program designed to allow students to allow students to experience the wonders of nature while covering core materials of the California State Board Education Standards as shown overleaf. Shellmaker School Tours are conducted by trained volunteer naturalists on Wednesday and Friday mornings from 10:00 until 11:30 AM. Children rotate between four outdoor stations at which they learn about different aspects of the bay as related to the 6th grade curriculum. Each school group is divided into sub-groups of approximately 15 students. Each sub-group is assigned to a tour guide who leads the sub-group from station to station.

Ecology/Plant Station

Shellmaker Island is the home of the California Coastal Commission (CC) Native Plant Nursery. At the Ecology/Plant Station students learn about the photosynthesis of plants and the transfer of energy and matter from organism to organism in wetland food webs, and find out why coastal salt marsh vegetation has been found to be up to twice as productive as corn, three times as productive as wheat and twenty times as productive as ocean vegetation. Populations of various organisms and their ecological roles are discussed. Students compare the growth of cultivated native plants subject to variations in abiotic factors, such as quantities of water, range of salinity, and soil composition.

Geography/History Station

Here students observe their surroundings and study 3-dimensional, topographic and street maps and aerial photographs of Upper Newport Bay, Newport Beach, and Orange County. They have the opportunity to see how the reshaping of the earth's land surface occurs and discuss physical and human geography issues relating to the bay. Freshwater flows into the bay from a watershed drainage area of roughly 154 square miles. The ongoing formation of mudflats by the deposition of sediment washed down from the watershed can be readily seen. The Bay also sits on an old earthquake fault and the geologic processes of uplift, erosion, and landslide are apparent on the surrounding bluffs. Archaeologists digging into Upper Newport Bay's past discovered that the bay area was inhabited 9,000 years ago. This is the earliest dated site for a native American settlement in Orange County. The use of resources by the early hunter-gatherers will be compared with 20th century practices, and current threats to the bay will be examined.

Bird Station

At the Bird Station the concepts of scientific investigation are addressed through the use of binoculars for collection of bird or other data, that is then interpreted. Students discuss the various variables that affect the data collected, and suggest explanations for their findings. Concepts such as the food/energy pyramid and the biological magnification of pesticides in the tissues of pelicans and other birds at the top of the food chain are addressed.

Marine Life Station

Shellmaker Island is the home of the California Department of Fish and Game (DFG) Marine Studies Center (MSC). At the Marine Life Station students learn about the photosynthesis of algae and phytoplankton and the transfer of energy and matter from organism to organism in marine food webs discussed. Biotic and abiotic factors are addressed. Mud samples are taken from beneath the MSC dock and examined for worms, shellfish and other marine invertebrates. Mussels, sea squirts, etc. can be touched and fish observed in the outdoor tanks. Depending on availability, students may also go inside the Marine Lab and see the indoor aquaria that replicate the upper and lower bay and coastal tidepool ecosystems.