

# Marin County Outdoor School



## Walker Creek Ranch

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### Science Standards Based Instruction

The Marin County Outdoor School is certified every five years by the California Outdoor School Administrators (COSA), a statewide organization of County and District run outdoor school programs. In order for the program to be certified, the certification team must ensure that at least 9 of the 14 standards listed below are being addressed during a 5-day program, and at least 7 of the 14 standards are being addressed during a 4-Day program.

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#### Correlation of the Science Content Standards for California Public Schools (Grades 4 - 7) At Certified Outdoor Science Schools

Students that attend ROSS certified outdoor science schools will gain knowledge, skills and experiences in many curricular areas, and in particular science. Learning experiences and curriculum vary from outdoor school to outdoor school. *The following are examples of learning opportunities* that relate to the California State Science Standards.

#### Investigation and Experimentation

- 1. Investigation and experimentation is a focus of state science standards at all grade levels. Scientific progress is made by asking meaningful questions and conducting careful investigations.**

- Classify objects
- Measure and use appropriate tools
- Observe and identify change
- Develop a prediction or hypothesis
- Perform investigations
- Record data
- Formulate conclusions
- Communicate results of investigation

#### Life Sciences

- 2. All organisms need energy and matter to live and grow. (4<sup>th</sup> grade, #2)**

Students discuss photosynthesis and participate in an activity in which they assume the roles of the components involved.

Students name a consumer and find evidence of its prey in the natural area they are studying. They discuss what herbivores eat and what plants need to create energy and grow.

Students learn about food webs by participating in an activity such as creating a "Recipe For A Forest" which will include plants and animals of a natural area, and they will assume the roles of one of those organisms.

Students discuss the components of the cycle of producers, consumers and decomposers and participate in activities such as a scavenger hunt to find representatives of each part of the cycle.

Students participate in food chain activities such as Project Wild's "Quick Frozen Critters" or "Oh Deer".

Students study decomposers by visiting a garden, engaging in composting activities or other related activities.

### **3. Living organisms depend on one another and on their environment for survival (4<sup>th</sup> grade, #3)**

Students observe important relationships between plants and insects.

Students participate in webbing activities.

Students participate in activities such as a lap sit, yurt circle, etc., to demonstrate interdependence.

Students observe plant and animal adaptations and participate in activities that reinforce these concepts.

Students learn the four abiotic factors necessary for life through activities such as the "Mysteries of Life"

Students observe the process of decomposition

Students participate in composting or other related activities

### **4. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials (5<sup>th</sup> grade, #2)**

Students understand the photosynthesis process through activities such as experiments, games and songs.

Students taste the products of photosynthesis in sampling a garden vegetable or edible plant.

Students observe the xylem and phloem tissues in the cross section of a tree or branch.

### **5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment (6<sup>th</sup> grade, #5)**

Students observe and identify (and in some cases, hold and/or touch) organisms in the field and discuss the roles of these organisms in the ecosystem.

Students describe (role play, and sing about) how energy entering ecosystems as sunlight is transformed by producers into chemical energy through photosynthesis, and then from organism to organism in food webs.

Students communicate how populations of organisms can be categorized by the functions they serve in an ecosystem.

Students see first hand, how the number and types of organisms an ecosystem can support

depends on the resources available and abiotic factors such as quantity of light and water, range of temperatures, and soil composition.

**6. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. (7<sup>th</sup> grade, #3)**

Students observe the myriad of plant and animal adaptations that exist

Students observe how adaptations can be advantageous to the survival of a specie or population.

## **Earth Sciences**

**7. The properties of rocks and minerals reflect the processes that formed them. (4<sup>th</sup> grade, #4)**

Students observe natural specimens of igneous, sedimentary and metamorphic rocks and the processes that formed them.

Students discuss properties of igneous/metamorphic/sedimentary rocks based upon their first-hand experiences with actual specimens.

Students communicate the major processes of the rock cycle.

Students observe and understand the prominent geologic features of the outdoor school site.

**8. Waves, wind, water, and ice shape and reshape the Earth's land surface. (4<sup>th</sup> grade, #5)**

Students see firsthand how moving water erodes a stream's banks, and how pebbles, sand, silt, and mud are transported and deposited to create sand bars; and that the land forms around the stream are continually changing. In the absence of a stream or other riparian habitat, such concepts may be demonstrated using an appropriate model.

Students communicate how some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes such as landslides and earthquakes.

Students describe how natural processes such as freezing, thawing, wind, rain, and the growth of roots cause rocks to break down into smaller pieces.

**9. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. (5<sup>th</sup> grade, #3)**

Students learn the water cycle through observation, activities and demonstration.

**10. Energy from the sun heats the Earth unevenly, causing air movements resulting in changing weather patterns. (5<sup>th</sup> grade, #4)**

Students observe soaring birds using updrafts (when possible.)

Students observe wind patterns of up-canyon, down-canyon breezes, on shore and off-shore winds and morning and evening breezes.

**11. The solar system consists of planets and other bodies that orbit the sun in predictable paths. (5<sup>th</sup> grade, #5)**

Students observe the night sky (weather permitting.) They will differentiate between stars and planets. They will discuss which is the closest star (the sun) and which are the closest planets.

Students observe the moon (when visible in the night sky) and discuss why the moon orbits the

earth (gravity.) They will discuss why the planets likewise orbit the sun (gravity.)

Students observe one or more of the nine planets (when visible) through a telescope or with the naked eye.

Note: If weather or circumstances do not permit direct observation of the night sky, the previous astronomy concepts may be discussed and demonstrated using hands-on activities and models.

**12. Plate tectonics explains important features of the Earth's surface and major geologic events. (6<sup>th</sup> grade, #1)**

Students observe and hike mountains, or other natural areas, which are products of plate tectonics and mountain building.

Students observe past fault and/or volcanic activity (where possible), participate in geology-based games and activities and discuss plate tectonics .

**13. Topography is reshaped by weathering of rock and soil and by the transportation and deposition of sediment. (6<sup>th</sup> grade, #2)**

Students see and feel rocks and geologic formations shaped by streams, rivers, waves, wind, etc.

Students see erosion that has taken place due to weathering (rain storms, wind, etc.) or utilize a model or activity to demonstrate this process.

**14 . Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. (6<sup>th</sup> grade, #6)**

Students are involved in activities such as separating recyclable items from trash and will discuss the energy and resources used to make new items vs. reusing and recycling old ones.

Students learn about nonrenewable vs. renewable resources through discussions and activities.

Students participate in resource conservation activities (turning off lights, heaters, closing doors, saving water, reducing food waste, etc.)

Students participate in activities that illustrate how habitat loss is driven by people's needs for nonrenewable and renewable resources.

Through activities and discussions, students will understand how human activity affects resources.