ENVIRONMENTAL LITERACY CURRICULUM CONNECTIONS

The Lawrence Hall of Science
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SEPUP
Issue-Oriented Science

The Next Generation Science Standards (NGSS) are based on the premise that the purpose of learning science is to help students understand the natural world, solve problems, improve their lives and communities, and make the world a better place. Environmental literacy is an essential part of science and is deeply embedded throughout NGSS. We think environmental literacy should be deeply embedded throughout your science curriculum, too! This resource will help you identify the units in your curriculum that emphasize environmental concepts and that provide opportunities where outdoor learning experiences are part of regular classroom routines.

What is environmental literacy and how is it connected to science teaching and learning?

In this document, environmental literacy is represented by three interconnected categories:

1) **Connection to nature**: having a sense of wonder and curiosity, enjoying the physical, social and emotional benefits of being outdoors, making observations and asking questions, building our relationship with the natural world;
2) **Understanding natural systems**: figuring out how nature works by carrying out investigations, collecting and analyzing data, constructing explanations, arguing based on evidence; and
3) **Community engagement**: communicating ideas, applying knowledge to positive community actions, understanding the socio-political and historical context for longstanding environmental inequities.

Within NGSS, Performance Expectations (PE) at every grade level ask students to **connect to nature**, **understand natural systems** and **apply** that knowledge. For example:

Kindergarten (K-ESS3-3) Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
5th Grade (5-ESS3-1) Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.
Middle School (MS-LS2-4) Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Emphasizing environmental literacy supports students to develop skills that make them well-rounded, effective leaders in their human and ecological communities.

WHY DOES IT MATTER?

Environmental literacy leads to more equitable, inclusive, and culturally relevant learning experiences.

- Experiences in the local community with local partners are authentic, place-based and relevant to the lives of learners.
- Community leaders, community-based organizations, and environmental educators can help us understand environmental injustices and ensure that local issues and assets are part of student learning.
- Learning outdoors can be safer, healthier, more engaging than learning indoors.

How to use this tool

This teaching tool allows teachers, site leaders and instructional leaders, to complement their classroom instructional materials with local and easily accessible, real-world opportunities for their students to more fully understand the world around them.

Schoolyard Connections	Field Trip Connections	EP&C/Environmental Literacy Connections

- Select the appropriate curriculum document(s): FOSS Grades K-8; Amplify Science Grades K-8; SEPUP Grades 6-8; and, Ocean Sciences Sequence, Grades 6-8.
  - Read the environmental literacy curriculum connections (of select modules) organized by grade level and unit, describing meaningful outdoor learning activities for a schoolyard or local field trip destination
    - District office / school sites / or team of teachers may customize this tool, adding location ideas for outdoor learning when teaching the different units and lessons for each school, TK-8, in their district.

CONNECTING ENVIRONMENTAL LITERACY TO SCIENCE CURRICULUM

Districts don't always have the expertise to effectively, systematically use the outdoors as a classroom from Grades TK-12. We need partners who know the landscape, the natural and human history of the community, and know how to engage students in the world around them.

Environmental literacy curriculum connections in this document:

- support students to better understand natural systems,
- connect students to place, their schoolyard, their community, state and federal national parks; and
- encourage students to understand and create solutions to improve their communities.

Environmental Literacy Curriculum Connections funded by

CALIFORNIA ENVIRONMENTAL LITERACY INITIATIVE

Ten Strands
Connecting Education, Environment, and Community

SEPUP
Issue-Oriented Science

LAND, WATER, AND HUMAN INTERACTIONS

GRADE 6

Schoolyard Connections	Field Trip Connections	EP&C/Environmental Literacy Connections
This unit explores the issue of how geoscience processes and human activities change Earth's surface.		
One possible extension for **Activity 3**, "Water Quality"would be to obtain a water quality test kit and test water from different sources to compare with local water regulations. This could be done at the school with the school tap water and/or any other water sources on site (e.g. pond in the school garden), using water samples students bring in from local water sources (e.g. local creeks, reservoirs), or on a field trip to a local water source. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about their local environment and human effects on that environment. **E,P&C** Principles 1, II, III, and V. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

ENERGY

This unit explores issues around energy efficiency and energy use.		
Activities 11-13 focus on solar energy and students perform experiments outside using sunlight. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about solar energy and how it can be used efficiently. **E,P&C** Principle IV. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

WEATHER AND CLIMATE

GRADE 6

Schoolyard Connections	Field Trip Connections	EP&C/Environmental Literacy Connections
This unit explores issues related to the possible link between population growth and changes in local weather, atmosphere, and water availability.		
Several activities in this unit focus on local weather and climate, particularly **Activities 2, 3, and 12**. Opportunities are described within those activities for going outside to take temperature readings, measure wind speed, etc. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about weather and climate conditions and patterns in their local environment and how that relates to broader weather and climate locally and globally. **E,P&C** Principles 1-IV. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

REPRODUCTION

This unit explores issues related to the use of genetic information to make medical and health-related decisions.		
Activity 11, Plant-Animal Interactions, provides an opportunity to observe the flowers, insects, and other organisms in the schoolyard or garden and investigate their interactions. Students can compare their observations to those described in the activity. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and data about plant-animal interactions, particularly pollinators and their roles in the local environment. **E,P&C** Principles 1-III. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Enviroanalyzenmental Principles and Concepts"

ECOLOGY

GRADE 7

Schoolyard Connections	Field Trip Connections	EP&C/Environmental Literacy Connections
This unit focuses on the issue of invasive species and their effects on the local environment.		
In **Activity 1**, The Miracle Fish?, students explore some of the problems that introduced species can cause. Have students survey the plants and animals in the schoolyard or garden. The students can then research which species are native and which have been introduced or may be invasive. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about the native, introduced, and invasive species in the local environment. **E,P&C** Principles II, IV and V. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

GEOLOGICAL PROCESSES

This unit explores the issue of how an understanding of earth's geological processes can help inform decisions about where to store nuclear waste.		
As students are exploring aquifers, groundwater, landslides, and other geological features and processes in the beginning of the unit, have them explore the schoolyard and/or garden and investigate what types of rock and soil are present. These can be incorporated into their classroom investigations, particularly **Activity 2**, Investigating Groundwater. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations, investigate, and collect and analyze data about local soils, geological features, and evidence of geologic processes. **E,P&C** Principles 1-V. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

EVOLUTION

GRADE 8

Schoolyard Connections	Field Trip Connections	EP&C/Environmental Literacy Connections
This unit explores issues related to the rate of extinction of species.		
Activity 2, Hiding in the Background, can be modified to be done outdoors on grass or other surfaces. Use different color toothpicks so that one blends in more with the grass/surface than the other. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about their local environment, species in that environment, biodiversity, and natural resources. **E,P&C** Principles 1-V. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

EARTH'S RESOURCES

This unit explores issues related to the use of natural resources.		
In **Activity 8**, Groundwater Formation, samples of soil, rocks, etc from the schoolyard or garden could be incorporated into students' investigations. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about natural resources in their local environment. **E,P&C** Principle I-V. More information about specific E,P&C Principle connections by activity can be found in the Teacher Resources Section V under "Correlations for Issues and Science for California to the California Environmental Principles and Concepts"

SOLAR SYSTEM AND BEYOND

GRADE 8

Schoolyard Connections	Field Trip Connections	EP&C/Environmental Literacy Connections
This unit explores the issue of which proposed space missions have the most potential for technological advancements and better scientific understanding.		
Throughout this unit, students are learning about the solar system, stars, planets, the moon, and other space objects. An evening star-gazing event at the school or nearby location with unobstructed sky views is an excellent way to bring families together and have them share in their students' learning. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to connect their classroom learning to their local environment.

WAVES

This unit explores issues related to the use of genetic information to make medical and health-related decisions.		
Several activities in this unit (e.g. **Activity 11**, Selective Transmission, and **Activity 13**, Where Does the Light Go?) are performed outside using natural light. **LOCATION IDEA:**	A number of field trip suggestions for this unit, with links to relevant organizations, are listed in the Teacher Resources Section V under "Field Trip Ideas." **LOCATION IDEA:**	These extensions provide students with opportunities to make observations and to collect and analyze data about sunlight and its scientific properties.