Education and the Environment Initiative

Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003)

Model Curriculum Plan

DRAFT

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INTRODUCTION

The purpose of this document is to summarize the plan for developing the Model Curriculum required under Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003) the Education and the Environment Initiative (EEI).

The EEI provides specific directives regarding the development and dissemination of a "model curriculum" for the Environmental Principles and Concepts (Appendix A), which have been developed as part of this initiative. The key provisions are as follows:

a. The Model Curriculum is to be developed by the California Environmental Protection Agency and Integrated Waste Management Board, in cooperation with the Resources Agency, State Department of Education and State Board of Education;
b. The Model Curriculum is to be aligned with adopted academic content standards in Science, Mathematics, English/Language Arts, and History/Social Sciences;
c. The Model Curriculum is to be reviewed by the Curriculum Development and Supplemental Materials Commission, Secretary for Environmental Protection Agency and Secretary of the Resources Agency, and submitted to the State Board of Education for approval.

This document summarizes the plan for developing the EEI Model Curriculum and includes the following elements:

I. Purpose of the Model Curriculum
II. Goals of the Model Curriculum
III. Development of the Model Curriculum Plan
IV. Outline for Grade-Level Model Curriculum Components
V. Materials Design Strategies and Instructional Considerations
VI. Program Attributes of the Model Curriculum
VII. Learning Objectives Related to the Environmental Principles and Concepts
VIII. Scope and Sequence of the Model Curriculum
IX. Plan for Incorporating or Connecting with Existing Education Materials
X. Assessment and Evaluation
XI. Timetable
XII. Appendices
    A. Environmental Principles and Concepts
    B. Educator Needs Assessment Report
    C. County Office of Education Focus Group Meeting Report
    D. Grade- and Discipline-specific Learning Objectives

PURPOSE OF THE MODEL CURRICULUM

The EEI Model Curriculum is intended to provide K-12th grade teachers, schools and districts with standards-based curricular materials, approved by the State Board of Education that can be used to teach California's Environmental Principles and Concepts (EP&C). The Model Curriculum will be designed as a scope and sequence for teaching the EP&C through a learning continuum from kindergarten through twelfth grade with clearly defined learning objectives that are aligned to California's academic content standards and targeted at helping students achieve mastery of those standards at each grade level.

GOALS OF THE MODEL CURRICULUM

The EEI Model Curriculum will provide a K-12th grade instructional continuum that helps students master California's academic content standards and California's Environmental Principles and Concepts.

DEVELOPMENT OF THE MODEL CURRICULUM PLAN

The development of the plan for the Model Curriculum took place from January—April 2005. The major steps in the process of developing the plan were:

1. establishment of an Interagency Model Curriculum Planning Committee to guide the development of the model curriculum plan—participants included representatives of Cal/EPA, CIWMB, State Department of Education, State Board of Education, Curriculum Development and Supplemental Materials Commission, Office of the Secretary of Education and the Resources Agency;
2. definition of goals and scope for the Model Curriculum;
3. gathering of input on design—from the Standards Alignment Maps, Educator Needs Assessment, and County Office of Education Focus Group Meetings;
4. development of instructional design for the Model Curriculum—including initial grade level coverage, initial discipline coverage and breadth of content standards coverage;
5. development of grade-level and discipline-specific learning objectives—based on alignment to standards and the identified the grade-level sequence of instruction that will achieve mastery of the standards and EP&C in a sequence based on the Standards Alignment Maps;
6. assembly of the Model Curriculum Plan; and,
7. review of the draft plan with the Interagency Model Curriculum Planning Committee.

It is the intention of the EEI Planning Team to structure the Model Curriculum so that it takes advantage of the instructional materials that are adopted by the State Board of Education as well as the educational resources that are offered by the providers of California's diverse environmental curricula and education programs. This approach should provide students and teachers with the opportunity to make the most appropriate use of all of the rich instructional resources that are available to them.

OUTLINE FOR GRADE-LEVEL MODEL CURRICULUM COMPONENTS

In order to increase the ease of use for teachers, the general outline for each component of the Model Curriculum will be consistent among the various grade levels and disciplines. Since teachers may use a particular component independently or in combination with other components, they must each be designed to stand alone. As such, each major document for a grade-level or a discipline will include the background information that a teacher will need to fully implement the program.

The State Board of Education and its Curriculum Development and Supplemental Materials Commission reviews materials on the basis of five categories of criteria: alignment with standards; program organization; assessment; universal access; and instructional planning and support. In addition, all instructional programs are reviewed for "legal and social compliance." The EEI Planning Team will be developing a set of criteria that parallel these criteria that will be used to guide the writing teams who are developing materials for the Model Curriculum.

Each component of the Model Curriculum will include five major sections:

1. Introduction
2. California's Environmental Principles and Concepts
3. Instructional Overview
4. Grade-Specific Standards and Textbook Alignments
5. Instructional Components

The draft of the detailed outline is as follows:

I. Introduction
   a. The Education and the Environment Initiative
   b. Connections to: California's Academic Content Standards; the federal No Child Left Behind Act; and statewide student assessments
   c. Purpose of the Model Curriculum (linkage of standards, textbooks, and EP&C content)

II. California's Environmental Principles and Concepts
   a. Introduction
      i. Background
      ii. Development process
      iii. Scientific basis
   b. Scope of the Environmental Principles and Concepts (EP&C)
      i. Natural systems
      ii. Human social systems
      iii. Focus on interactions between natural and human social systems
   c. Environmental Principles and Concepts
      i. Statement of EP&C with descriptive terminology
      ii. Practical examples of each principle and concept
   d. Background information for using the EP&C (supporting non-expert and experienced teachers)
      i. Introduction to systems thinking for educators
      ii. Glossary
      iii. Listing of additional source materials and references

III. Instructional Overview
   a. EEI End of Course (high school) Learning Objectives
   b. K – 12 Scope and Sequence for EEI Learning Objectives

IV. Grade-Specific Standards and Textbook Alignments
   a. Standards Maps (alignment maps for science, history/social science, English/language arts, and mathematics)
   b. Discipline-specific Standards-based Learning Objectives for the EP&C
   c. Textbook Alignment Maps (alignment between EEI Learning Objectives and adopted instructional materials)

V. Instructional Components
   a. Overview of strategies for using the EP&C in standards-based instruction
   b. Grade- and discipline-specific strategies for using the model curriculum
   c. Model instructional activities including as appropriate:
      i. Lesson plans
      ii. Student materials (e.g., readings, worksheets, etc. [with masters as appropriate])
      iii. EP&C glossary for students
   d. Student assessment strategies and instruments with the "look and feel" of state assessment instruments
   e. Use of hands-on instruction and out-of-classroom learning experiences to support standards-based instruction for the EP&C
   f. Resources for further learning
      i. Grade-and discipline-specific literature list for EP&C-related content
      ii. Listings of instructional materials that offer teachers the opportunity to extend instruction
      iii. Listings of institutional programs that offer teachers the opportunity to extend instruction

MATERIALS DESIGN STRATEGIES AND INSTRUCTIONAL CONSIDERATIONS

The purpose of the Model Curriculum is to teach to mastery both the California's academic content standards and its Environmental Principles and Concepts. In order to achieve this goal, the design of the Model Curriculum must take into account several instructional considerations, including:

- alignment to academic content standards;
- strategies for teaching of the EP&C;
- development of specific skills identified in the content standards and curriculum frameworks (science investigation and experimentation skills; history/social science analysis skills; English/language arts reading, writing, listening and speaking skills; and, mathematics);
- opportunities to help teachers meet the science instruction requirement that hands-on activities compose at least 20 to 25 percent of the science instruction; and,
- appropriateness to the students' level of academic development.

The EEI Planning Team used information gathered from the Interagency Model Curriculum Planning Committee, Education Partnership, Educator Needs Assessment (Appendix B) and County Office of Education Focus Group meetings (Appendix C). The EEI Planning Team then developed four proposed design elements that take into account the instructional considerations identified above.

The Model Curriculum will consist of a mixture of these four materials design elements:

1. comprehensive units;
2. "bookend" units;
3. EPC-based supplemental materials; and,
4. individual lessons.

This table summarizes the key characteristics of each of the four design elements:

Design Elements	Relation to Standards	Design Elements
Comprehensive Units	directly teach one or more standards	• Learning objectives (LO) cover the standard and EP&C • Used in conjunction with adopted instructional materials • Provide a framework that presents teachers with an overview of connections to all the aligned content standards at their grade level
"Bookend" Units	used to frame instruction and directly teach some elements of the standards	• LO for bookend units will be used to frame all elements of the standard and relevant EP&C • LO for individual lessons cover the elements of the standard and EP&C • Used in conjunction with adopted instructional materials
EPC-based Supplemental Materials	use EP&C content as the basis for supporting skill development and knowledge	• LO cover content standards and EP&C and support skills development in the following disciplines: • ELA: reading, writing, listening and speaking • Mathematics: computation and analysis skills • Science: investigation and experimentation • History/Social Science: skills-based elements within the standards
Individual Lessons	use EP&C content to extend particular elements of some standards	• LO for lessons are based on aligned elements of the standard and relevant EP&C • Used in conjunction with adopted instructional materials

At each grade, the structure of the Model Curriculum will follow the Outline for Grade-Level Model Curriculum Components detailed on page two. The specific design elements that will be incorporated into the Instructional Components section of the Model Curriculum will vary among the different grades.

Several instructional factors will be used to determine which design elements should be included at any given grade. These instructional factors include:

- depth and breadth of opportunities to connect instruction about the academic contents standards and the EP&C;
- principle instructional goals at different grades — e.g., the focus of K – 3rd grade instruction on the development English/language arts (reading, writing, listening and speaking skills) and mathematics (fluency in basic computational skills, understanding of mathematical concepts);
- utility of the EP&C as a contextual framework to help students understand specific content knowledge and skills;
- academic development of the students — i.e., the abilities of students at various ages to comprehend content and analyze complex ideas;
- potential for integration with adopted instructional materials;
- ease of implementation by teachers at different grades; and,
- building on knowledge of the EP&C gained at earlier grades.

The Model Curriculum is not intended to add content to a teacher's instructional plan. It will be designed to use content from adopted instructional materials using the EP&C as the context for instruction. The EP&C will be used to help students mentally organize and frame the standards-based content, thus enabling them to more fully understand the standards-based content. The Model Curriculum will also provide opportunities for students to develop and apply: science investigation and experimentation skills; history/social science analysis skills; and, English/language arts reading, writing, listening and speaking skills; and, mathematics skills and knowledge.

The basic features of each of the design elements are described below.

COMPREHENSIVE UNITS

The Model Curriculum writing teams will develop "comprehensive units" in the cases where there is a complete alignment of one or more science or history/social science content standards to the EP&C. In these situations, the writing teams will develop instructional units that teach content standards and all of the sub-elements in their entirety. This strategy will allow students to simultaneously achieve mastery of academic content standards and the aligned EP&C. These strong and direct alignments occur most frequently in the 4th – 6th grades but they are also found in other grades.

The comprehensive units will include a teacher's guide offering background material, instructional overviews, alignment maps to standards and adopted textbooks, as well as complete lesson plans, and student materials comprised of readings, worksheets, and glossary.

The comprehensive units will be designed to build on knowledge of the EP&C gained at earlier grades and to provide a basis for the more in-depth analysis at the higher grades. The EP&C vocabulary and content gained by K – 3rd grade students, for example, will be used in 4th grade to help them more deeply explore the development of California as an agricultural and industrial power.

The lesson plans that are incorporated into the comprehensive units will provide specific activities that can be connected to the content in the textbooks. These lessons will offer teachers an opportunity to use EP&C-based activities that actively engage their students in achieving mastery of the science and history/social science content standards. While these

lessons will focus on science and history/social science, they will also provide opportunities to reinforce mathematics and English/language arts skills and knowledge. In addition, these lessons will simultaneously build students' understanding of relevant EP&C.

BOOKEND UNITS

The Model Curriculum writing teams will develop "bookend units" in the cases where there is a direct alignment between the major idea(s) and some sub-elements of a science or history/social science content standard and the EP&C. In these situations, the writing teams will develop materials that provide students with a context for understanding the content standard as a whole and its specific sub-elements. The Model Curriculum will identify how teachers are to use other available materials to complete their coverage of the standard(s). This design strategy will be most applicable at the secondary level where the standards call for in-depth study of specific science and history/social science content.

"Bookend" Units will be presented in the form of grade- and subject-specific teacher's guides. These guides will offer background material, instructional overviews, alignment maps to the standards and adopted textbooks, and other information to help guide discussions and investigations without offering individual lessons. The intent is to generate deeper understanding of content standards by using the bookend units to provide students with an cognitive structure for interconnecting all the knowledge that they are gaining.

The instructional plans that are included in the bookend units will, for example, use the EP&C to illustrate the economic terms and reasoning presented in 12th grade economics standards. The concepts of scarcity, opportunity cost, monetary and non-monetary incentives, supply and demand can be richly illustrated and made more meaningful by exploring them in the context of the interconnections between natural and human social systems. Investigations of the ecosystem goods and services (natural capital) and the interactions between these resources, human communities and decision-making processes, can be used to build students' understanding of economic concepts as it develops their knowledge of several of the EP&C.

EPC-BASED SUPPLEMENTAL MATERIALS

The Model Curriculum Planning Team intends to develop "EPC-based supplemental materials" as the basis for EEI instruction at the K – 3rd grade level, where the principle focus of instruction must be on the development of basic skills in, for example, English/language arts and math. Accordingly, the Model Curriculum writing teams will develop materials designed to help students build the skills identified in the English/Language Arts Content Standards and Reading/Language Arts Framework for California Public Schools. This aspect of the Model Curriculum will be focused on using science and history/social science content related to the EP&C to strengthen skills in: reading (including word analysis, fluency, and systematic vocabulary development; concept development; reading comprehension; literary response and analysis); writing (writing strategies and writing applications); written and oral English-language conventions; listening and speaking (listening and speaking strategies and speaking applications); and, mathematics: computation and analysis skills.

The Model Curriculum writing teams will develop grade-specific units consisting of literature collections, teacher's guide, and student materials. These units will be designed for use in conjunction with adopted instructional material, and will be teacher-centered at the K – 1st grades, and somewhat more student-directed at the 2nd – 3rd grades.

At each grade level, a collection of environment-based literature will serve as the focus for the EPC-based supplemental materials. An accompanying teacher's guide will provide background material, the instructional overview, and standards and textbooks alignments to demonstrate how the units fit into a teacher's broader instructional plans. Student activities—based on the reading of literature, class discussions and investigations—will be designed to help students:

1. master English/language arts skills;
2. understand concepts and vocabulary related to the science and history/social science content standards;
3. apply computation, analysis and investigation skills to science and history/social science content;
4. explore the EP&C; and,
5. develop and apply basic systems thinking ideas.

In addition to addressing specific skill sets and concepts related to these academic content standards, the EPC-based supplemental materials will provide opportunities for young students to think systematically about how their world works. Exposure to the literature, class discussions, and investigations will help students expand their understanding of the world and begin to process information through systems thinking. These students will be better prepared for 4th – 12th grades when they: begin to see the world around them as a whole, rather than as series of independent objects and events; explore how the parts of systems work together; start to understand that life constantly changes; and, discover how one event can influence another. This type of instruction will also prepare students for more advanced learning about the interconnections among the ideas of science, history/social science and the EP&C.

The design of the EPC-based supplemental materials at the K – 3rd grades will incorporate current research on how young students learn. At the K – 1st grade level the units will include recommendations for active learning, sensory-motor stimulation, the creation of rich, stimulating learning environments indoors and outdoors, and the support of language development. As the students advance into the 2nd – 3rd grade level the units will provide opportunities to apply simple logic and deductive reasoning by performing simple operations with physical objects.

INDIVIDUAL LESSONS

In some instances alignment between the content standards and the EP&C is only relevant to the sub-elements of a few grade-level standards. In these cases the writing teams will explore the <u>opportunities for developing individual lessons that use the EP&C to expand on particular elements of the content standards</u>, such as the chemistry of life in 8th grade.

The individual lessons will be packaged as grade-specific materials, along with student readings, worksheets, and glossary. In addition, educators will be provided with a teacher's guide that offers background material, instructional overviews, alignment maps to the standards and adopted textbooks, and other information to help guide discussions and investigations.

While these lessons will focus on science and history/social science, they will also provide opportunities to reinforce mathematics and English/language arts skills and knowledge. The content and skills presented in the Model Curriculum will offer fertile ground for having students read narrative and expository text aloud, develop a thesis statement, deliver persuasive presentations, develop vocabulary, conduct technology-based research, comprehend informational material, and assess an author's argument, including those of other students.

The major issues regarding the individual lessons relates distribution and acceptance by teachers and school districts. This strategy will only be used in cases such as 8th grade science where there is not a strong alignment between the content standards and the EP&C.

PROGRAM ATTRIBUTES OF THE MODEL CURRICULUM

The EEI Planning Team also gathered information regarding the program attributes that teachers and administrators regard as critical to the implementation of the Model Curriculum in districts, schools and individual classrooms. Input from the Interagency Model Curriculum Planning Committee, Education Partnership, Educator Needs Assessment and County Office of Education Focus Group meetings revealed that success would depend on:

- clear connections to the State's efforts to improve student learning through standards-based instruction;
- ease of implementation by teachers with varying levels of knowledge and expertise related to the environment;
- seamless incorporation into instructional plans in order to avoid placing extra burdens on teachers;
- connections to adopted instructional materials;
- relevance to the State's assessment practices; and,
- cost-effectiveness of implementation.

In addition, the Model Curriculum will be designed so that it may be used by permitees to satisfy educational requirements called for by state and regional environmental agencies.

LEARNING OBJECTIVES RELATED TO ENVIRONMENTAL PRINCIPLES AND CONCEPTS

The EEI Planning Team has developed specific learning objectives for the science and history/social science content standards in the context of California's EP&C. Each set of objectives is presented sequentially, beginning with knowledge and comprehension, and where appropriate, moving toward application, analysis, synthesis, and, ultimately, evaluation. These learning objectives will guide the work of the writing teams and ensure that students are provided with opportunities to achieve mastery of the content standards through EP&C-based levels of understanding. The learning objectives developed by the EEI Planning Team do not identify all learning that is essential, but rather, define what is essential for teaching the standards within the context of the EP&C.

Environment-specific content is not incorporated into these learning objectives. This material will be added when the writing teams begin the development process. They will then incorporate, as appropriate, in-depth examples and case studies related to specific environmental topics (e.g., air quality management; coastal development and pollution; water quality and management, alternative forms of energy).

Once the Model Curriculum writing teams begin preparing outlines for the instructional storylines, representatives of the Technical Working Groups, Education Partnership, and other stakeholders will have an opportunity to contribute recommendations for specific environmental topics.

The table below presents a sample of learning objectives for high school Earth science:

Structure and Composition of the Atmosphere 8. Life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
c. Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.	• Identify the significance of ozone and the ozone layer to natural systems and organisms, human life and to the functioning of human communities, economies and culture (e.g., role of the ozone layer in absorbing UV radiation). • Provide examples of how natural systems and human communities can affect Earth's ozone layer. • Describe how human activities and practices influence the ozone layer (e.g., refrigerants, aerosol propellants, fire extinguishers). • Describe the factors that limit knowledge about the scope and potential environmental impacts resulting from changes to the ozone layer. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to atmospheric change.

The table below presents a sample of these learning objectives for fourth grade history/social science.

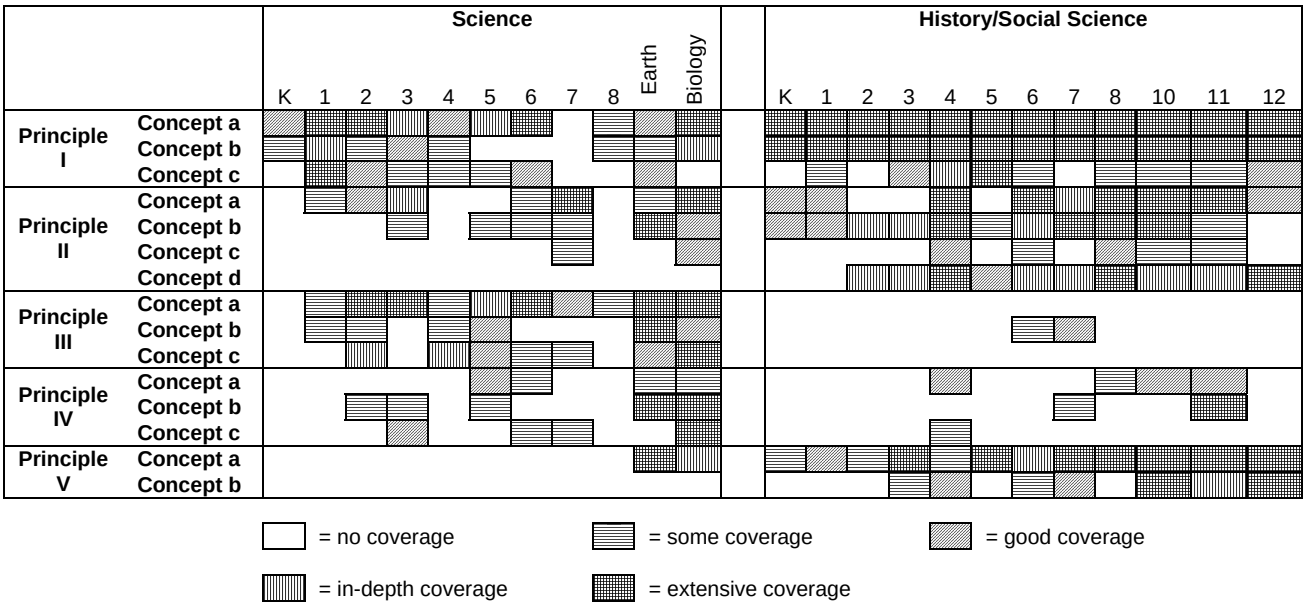
4. Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
4. Describe rapid American immigration, internal migration, settlement, and the growth of towns and cities (e.g., Los Angeles).	• Explain the role of the goods and services provided by California's natural systems in the rapid American immigration, internal migration, settlement, and the growth of towns and cities. • Provide examples of the direct and indirect changes to natural systems that resulted from rapid American immigration, internal migration, settlement, and the growth of towns and cities (e.g., the geographic extent, composition, biological diversity, and viability of natural systems). • Describe how the rapid American immigration, internal migration, settlement, and the growth of California's towns and cities, affected the state's laws, policies and incentives related to the management of natural systems (e.g., land use and water management laws.)

These two samples exemplify the development of learning objectives that are focused both on the academic content standards and the EP&C.

The complete set of learning objectives for science and history/social science from K-12th grade is attached in Appendix D.

SCOPE AND SEQUENCE OF THE MODEL CURRICULUM

The opportunities to make strong connections between grade-level content standards and the EP&C vary significantly among the different grades and across the disciplines. The table below summarizes the coverage of the EP&C across grade levels and disciplines, and indicates the breadth of coverage at each grade.



As the table indicates, the focus of learning associated with the EP&C advances from a content-based orientation to a focus on higher-level thinking skills as students advance from the

elementary grades to high school. Thus, for example, coverage of Principle V which is related to decision making increases as students get older.

This table will be used as a reference tool for the Model Curriculum writing teams to assure that students have the opportunity to learn the EP&C in a cogitatively appropriate sequence during their K-12th grade education.

At each grade, the Model Curriculum will be organized to encourage teachers to provide instruction in a sequence that helps students master the academic content standards as they are learning the EP&C. This strategy should help to avoid the use of the EP&C as "add-ons" rather than as an integral part of standards-based instruction.

PLAN FOR INCORPORATING OR CONNECTING WITH EXISTING EDUCATION MATERIALS

The California Environmental Education Interagency Network assisted the EEI Planning Team in soliciting the involvement of both state and national providers of environmental education material in development of the Model Curriculum. An electronic announcement was sent out directly to over 900 individuals and indirectly to over 1,000 additional individuals who received it through various relevant list-serves. This announcement provided a brief overview of the EEI, an invitation to participate in design of the Model Curriculum, a contact information sheet (for completion and return by recipient), and two appendices that provided more detailed information regarding the status of EEI activities as well as the EP&C. Those who responded to the initial survey were overwhelmingly supportive of the approach taken to develop the Model Curriculum. Key questions posed on this announcement focused on whether an institution was willing to:

- review its materials, complete the self-evaluation and submit the information to the EEI Planning Team;
- consider making available their materials for inclusion in or adaptation for the Model Curriculum;
- consider revising materials and programs to support teaching of the EP&C and aligned content standards; and,
- participate on the Model Curriculum Planning Team if requested.

The individuals and organizations who responded to the initial survey were all sent additional documents in February 2005. This material included a self-evaluation instrument and invitation to submit copies of materials that the institutions wanted to have considered by the Model Curriculum planning team. The instrument was designed to collect information related to grade-level coverage, connections to academic content standards, field-testing efforts, and level of external review of the materials, including Legal and Social Compliance.

All of the completed self-evaluation instruments and sample materials are currently stored at Cal/EPA where they are being catalogued. The Model Curriculum Planning Team will review all information and submitted materials, specifically seeking those materials that can be used to support the standards-based learning objectives that have been developed for the Model Curriculum. The materials that were submitted will be reviewed for their evaluations of technical accuracy, Legal and Social Compliance and conformity with specific design criteria. Once exemplary materials have been identified, a more detailed examination will focus on identifying lesson plans and activities that may be used to directly support the instructional design of the Model Curriculum. If it is determined there are potentially valuable connections to the Model Curriculum, the planning team will request permission to integrate or adapt the materials into the program. Credits for authorship and ownership of any such materials will be acknowledged in the final documents.

ASSESSMENT AND EVALUATION

The Model Curriculum will be subjected to multiple approaches of formative and summative evaluation. During the developmental stages, the materials will be field-tested to determine usability for teachers and educational efficacy for students. The materials will then be revised to take into account the knowledge gained during the field-testing.

When the initial revisions have been completed, the Model Curriculum will undergo a pilot-testing phase that will involve the full implementation of complete grade-level units. The EEI Planning Team will monitor and review the results of the pilot phase including school/classroom observation and focus group meetings with participating teachers. The materials will then be revised to take into account the knowledge gained during the pilot-testing.

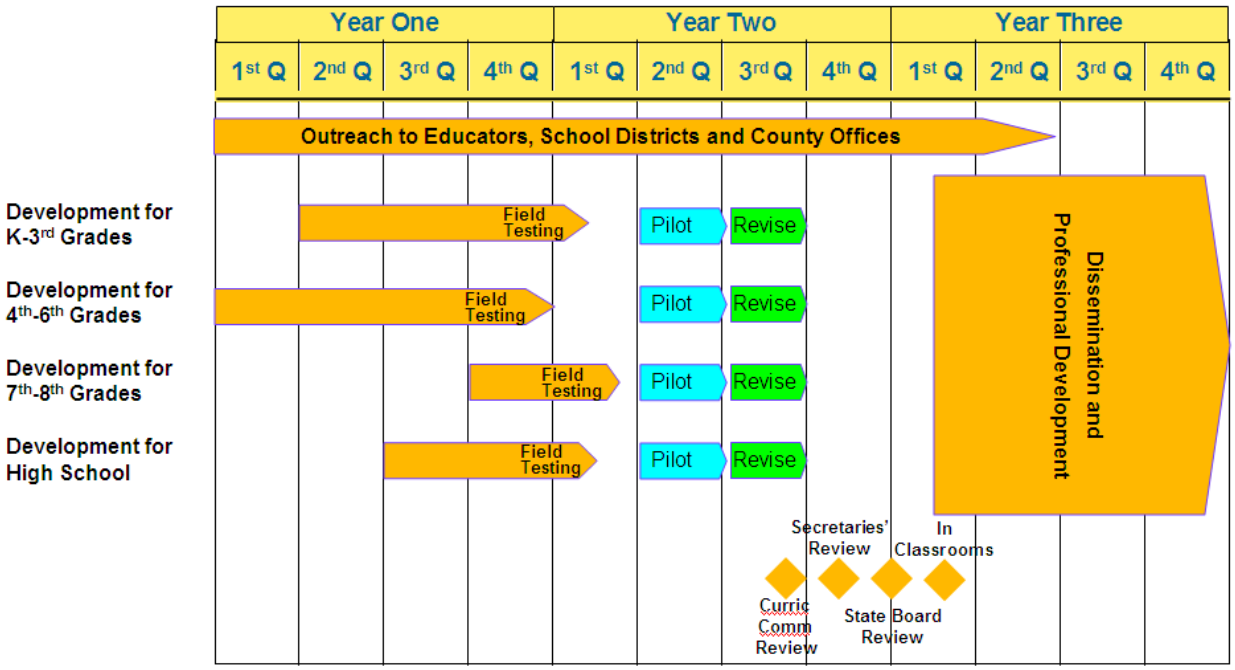
When the Model Curriculum documents have been completed and the dissemination, professional development and implementation phases have begun, the EEI Planning Team will initiate a comprehensive summative evaluation. This evaluation will assess the effectiveness of the implementation of the Model Curriculum, statewide dissemination and professional development program, teacher use, incorporation into district curriculum and instruction plans.

Student assessment strategies and instruments will be incorporated throughout the Model Curriculum. These assessments will consider both standards-based content and understanding of the EP&C. The instruments will be designed with the "look and feel" of state assessments that are in use by the California Department of Education.

The EEI Planning Team intends to identify research partners who will conduct research to determine the educational efficacy of the EEI Model Curriculum in helping students achieve mastery of the academic content standards.

TIMETABLE

The development of the Model Curriculum will start when funding is available to begin hiring the writing teams. The development process will be handled sequentially by grade-level group.



Appendices

A. Environmental Principles and Concepts
B. Educator Needs Assessment Report
C. County Office of Education Focus Group Meeting Report
D. Grade- and Discipline-specific Learning Objectives

Environmental Principles and Concepts

Introduction

The Education and the Environment Initiative [Pavley, Chapter 665, Statutes of 2003 — AB1548] 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 for elementary and secondary schools.
- ensure that the education principles and concepts for the environment are aligned to the academic content standards adopted by the State Board of Education and do not duplicate or conflict with any academic content standards.
- incorporate education principles for the environment in criteria developed for textbook adoption in Science, History/Social Sciences, Mathematics and English/Language Arts.

These Environmental Principles and Concepts (EP&C) are based on the contributions of over 100 scientists and technical experts, representing state agencies, universities, business and industry, and environmental organizations from across California.

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 that are presented below. The lists of examples will be further expanded, as necessary to fully encompass these principles and concepts.

The Office of the Secretary of the California Environmental Protection Agency and the Integrated Waste Management Board have reviewed and concur with these Environmental Principles and Concepts that are presented here.

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 presented below.

Principle I
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
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 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
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 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.

Appendix B.

Educator Needs Assessment

Executive Summary

In January 2005, the California Environmental Protection Agency and the Integrated Waste Management Board commissioned The Acorn Group and State Education and Environment Roundtable to conduct an educator needs assessment as part of the Education and the Environment Initiative (EEI) [Assembly Bill 1548 Pavley, Chapter 665, Statutes of 2003]. Among other mandates, the Law calls for development of a Model Curriculum designed to achieve standards-based education goals in the State's K-12 classrooms.

The EEI planning team developed this Educator Needs Assessment (ENA) to gather information about teachers' interests, constraints and perceived needs. The ENA was intended to guide the design of the Model Curriculum so that it would better meet the needs of classroom teachers. As such, the ENA was used to help identify:

- current patterns of use of adopted and supplementary materials in science and history/social science;
- preferred formats for the design and delivery of curriculum materials;
- criteria that influence actual use of curriculum materials by educators; and,
- preferred methods of delivery for professional development.

Surveys were sent to a total of 9,657 K-12 educators and administrators currently active in California public schools. The list of educators who received surveys represented a random sample from the California State Teachers' Retirement System database. A total of 361 surveys were completed and returned, resulting in a response rate of 3.74 percent.

The typical respondent was a classroom teacher with 15 years of teaching experience and an average class size of 25.5 students. Respondents represented a fairly even distribution of the core disciplines of English/language arts, science, mathematics, and history/social science.

Respondents were asked to identify design characteristics for the Model Curriculum that would best meet their needs. The results of the ENA indicated that educators:

- prioritize curricular materials targeted at grades 4 – 6 (reinforcing recommendations based on review of the EEI standards alignment maps);
- are most strongly interested in the development of materials for the teaching of science, followed by history/social science and English/language arts (ENA data do not support the development of materials that focus on mathematics *per se*);
- prefer printed rather than web-based curricular materials, (including lesson plans, student handouts, and student readings);
- require curricular materials to address grade- and discipline-specific content standards;
- need the curricular materials to be made available to them at no cost.

Respondents were asked to rank seven criteria that might influence the likelihood that the Model Curriculum would be used by teachers. The results indicate that teachers are most likely to use materials that:

- require little preparation time;
- are easy to use; and,
- emphasize hands-on instruction.

In general, respondents indicate fairly strong interest in the development of the Model Curriculum, providing that specific needs and constraints are addressed. To achieve success with the Model Curriculum, the EEI planning team should continue to solicit input from teachers and administrators and seek their involvement as the Model Curriculum is developed.

Introduction

In January 2005, the California Environmental Protection Agency and the Integrated Waste Management Board commissioned The Acorn Group and State Education and Environment Roundtable to conduct an educator needs assessment as part of the work of AB 1548 [Pavley, Chapter 665, Statutes of 2003] – the Education and the Environment Initiative (EEI). Using the database of the State Teachers' Retirement System, 9,657 surveys were mailed to K-12 educators and administrators currently active in California public schools.

Problem Statement and Research Purpose

The EEI planning committee has made a concerted effort to solicit input from educators and administrators during development of the work called for in the legislation. Online discussions, field review sessions, focus groups, and this educator needs assessment have provided numerous opportunities for members of California's teaching community to comment on the draft documents and voice any issues, needs, and concerns. Educators have been asked to provide input on all elements of the EEI including:

- definition of the environmental principles and concepts (EP&C);
- alignment of the EP&C to California's content standards in science and history/social science; and now,
- development of the design for the Model Curriculum.

This Educator Needs Assessment (ENA) was designed to provide information related to design and potential use of the Model Curriculum, a set of K–12 materials intended to achieve standards-based education goals using the EP&C as the context for learning. The purpose of the ENA was to help identify:

- current patterns of use of adopted and supplementary materials in science and history/social science;
- preferred formats for the design and delivery of curriculum materials;
- criteria that influence actual use of curriculum materials; and,
- preferred methods of delivery for professional development.

Methods

A written survey instrument was developed to gather the necessary information from California educators. This instrument was designed as a single-piece mailing consisting of the survey on one side, and cover letter and postage-paid reply form on the other (see Appendix A).

The study population was derived from the State Teachers' Retirement System database. An initial random sort of 50,000 names was created from the list of actively contributing members in the 2003-2004 database. Once this list was zip code sorted, every fifth name was selected. Accounting for 343 erroneous addresses, a net of 9,657 surveys were mailed out in early February 2005.

A total of 361 surveys were completed and returned from the net mailing of 9,657 surveys, a response rate of 3.74%. This response rate allows reporting of survey results with at a confidence level of 95% with a confidence interval of +/- 5.06% for the entire study population.

The survey instrument consisted of 26 questions. These questions were subdivided as follows:

- current status of teaching, name and location of school, subjects taught, and number of students in the classroom — seven questions
- selection and actual use of adopted and supplementary materials for teaching science and history/social science — ten questions
- preferred format and features offered in curriculum materials, preferred grade-group levels and subject areas to address, likelihood of use of a Model Curriculum, and criteria that influence one's actual use of material — five questions

- delivery aspects of professional development to help school district staff integrate the Model Curriculum into district plans — four questions

Results and Findings

The typical respondent in this study were characterized as follows:

- classroom teachers (88.1%)
- other educators, e.g., administrators (11.9%)
- 15 year average of teaching experience
- class size of average of 25.5 students
- discipline coverage was as follows (totals exceed 100% because many teachers cover more than one subject area):
  - 62.6% English/language arts
  - 61.8% science
  - 58.7% mathematics
  - 56.0% history/social science
  - 37.7% other

Respondents provided a wide representation of rural, urban, and suburban regions of the state. Not surprisingly, the greatest frequency of response came from respondents in cities representing the Bay Area (24), as well as Los Angeles (13), Sacramento (10), and San Diego (9). Names and locations of the schools where the respondents work are provided in Appendix C.

Grade level(s) taught are summarized below. Respondents were allowed to select more than one grade level, resulting in a percentage total that exceeds 100% and higher representation at the secondary level where one teacher often teaches at multiple grade levels.

Table 1 — Grade level(s) taught

Preschool	1.1%	6th	13.9%
Kindergarten	10.0%	7th	11.6%
1st	14.4%	8th	10.8%
2nd	14.4%	9th	20.5%
3rd	13.6%	10th	21.3%
4th	11.6%	11th	21.0%
5th	15.5%	12th	19.7%

When asked which state adopted science materials are currently in use, K-8 respondents selected Harcourt *Science* (21.33%), followed by Holt *Science and Technology* (8.31%) and Houghton Mifflin *Discovery Works* (8.03%). All results for these grade levels are summarized in Table 2. Responses given for the high school level are summarized in Appendix D.

Table 2 — State adopted science materials in use

Harcourt *Science*	21.3%
Holt *Science and Technology*	8.3%
Houghton Mifflin *Discovery Works*	8.0%
High school:	7.8%
McGraw-Hill *Science*	6.7%
Prentice Hall *Science Explorer*	5.5%
Glencoe *Science Voyages*	0.8%

When asked the same question of state adopted history/social science materials currently in use, very few elementary and middle school teachers selected any titles, as indicated in Table 3. At the high school level, over 21% (21.61%) selected Houghton Mifflin *Social Studies*, followed by McGraw-Hill *Adventures in Time & Place* (10.25%), and Harcourt Brace *Social Science* (9.42%).

Table 3 — State adopted history/social science materials in use

Addison-Wesley Longman *Why We Remember*	0.0%
Kendall/Hunt *Social Science 2000*	0.0%
HRW *Exploring America's Past*	0.0%
Kendall/Hunt *Ancient World 2000*	0.3%
Glencoe/McGraw-Hill *American Journey*	0.8%
Oxford University Press *A History of Us*	0.8%
Holt, Rinehart, Winston (HRW) *Call to Freedom*	1.1%
Prentice Hall *The American Nation*	2.2%
High school:	4.4%
Harcourt Brace *Social Studies*	9.4%
McGraw-Hill *Adventures in Time & Place*	10.3%
Houghton Mifflin *Social Studies*	21.6%

The average time spent teaching science and history/social science each week using state adopted materials was reported as:

Table 4 — Average time spent teaching science and history/social science each week using state adopted materials

Type	**Science**	**History/Social Science**
K – 3rd	56 minutes	49 minutes
4th – 5th	85 minutes	82 minutes
6th – 8th	112 minutes	83 minutes
9th – 12th	119 minutes	40 minutes

Over half of the respondents (54.9%) indicated they use supplementary science curriculum materials. Sources include GEMS (e.g., *Convection Currents*), as well as materials collected through attendance at workshops and from the library and Internet. Over half of the respondents (57.6%) indicated use of supplementary history/social science curriculum materials as well. Sources here include literature, movies, and reference materials for student research projects. The average time spent teaching science and history/social science each week using supplementary materials was reported as:

Table 5 — Average time spent teaching science and history/social science each week using supplementary curriculum materials

Type	**Science**	**History/Social Science**
K – 3rd	30 minutes	23 minutes
4th – 5th	60 minutes	32 minutes
6th – 8th	44 minutes	41 minutes
9th – 12th	49 minutes	21 minutes

Nearly a combined 80% of respondents preferred printed material in the form of a three-ring binder or bound book for curriculum materials for teachers. Over 75% preferred the same format for student materials. Less than eight percent (7.5%) expressed interest in web-based delivery of materials. All results are summarized in Table 6.

Table 6 — Preferred Format for Curriculum Materials

Type	Teacher	Student
3-ring binder	46.0%	57.9%
bound book	33.2%	17.7%
CD-ROM	13.6%	8.3%
DVD	9.7%	7.8%
web-based	7.5%	7.2%
other (specify):	3.3%	7.2%

Features respondents would like to see curriculum materials offer include student handouts (85.0%), lesson plans (80.3%), student readings (71.5%), and resource lists (56.5%). Other recommended features identified in the comments section include large visual charts, artifact samples, reading time before undertaking activities, and completeness of materials (e.g., all necessary supplies, plus suggestions for instruction, management strategies, etc.).

Based on the explanation that one strategy under consideration for the Model Curriculum is the development of a series of alternative teacher's guides that integrate the environmental principles and concepts with instruction using state adopted textbooks and other materials, respondents indicated a preference for grades 4 – 6, although the differences across all grade-group levels is slight.

Table 7 — Preferred Grade-group Level

K – 3rd	38.8%
4th – 5th	41.8%
6th – 8th	37.1%
9th – 12th	34.9%

Based on the same explanation, respondents expressed strong interest in seeing such material address science (76.7%), followed by history/social science (46.3%), English/language arts (31.9%), and mathematics (19.1%).

When respondents were asked to rank the likelihood of use of material using a scale from 1 – 4, results show a preference for teacher's guides that address all content standards in a particular grade or discipline, as opposed to only a subset of the content standards. There is also strong preference for materials that are available at no cost.

Table 8 — Likelihood of Use (ranked from 1-4, 4=high 1=low)

Address all content standards in a particular grade or discipline	3.3
Only address a subset of the content standards in a particular grade or discipline	2.6
Are made available at no cost	3.5

Respondents were also asked to rank seven criteria that influence a teacher's actual use of curriculum materials using a scale from 1 – 7. Responses varied widely; the same numeric values were applied more than once; and there may have even been reversed ranking in which

a score of one was deemed the highest value. The following data must therefore be interpreted cautiously.

Table 9 — Ranking of Criteria (ranked from 1-7, 7=high 1=low)

Preparation time and ease of use	5.1
Emphasis on hands-on instruction	4.6
Standards-based instructional plans	4.5
Level of comfort teaching the content	4.4
Availability of professional development	3.6
Availability of in-service support	3.3
Approval by school board/administration	3.3

When asked which incentive would most likely persuade the respondent to pursue EEI-related professional development, over 68% selected a stipend, while nearly 14% selected university credit. Ten percent selected "other," but did not qualify what this meant. Eight percent selected school district credit.

Over 27% identified the school district as the most effective provider of professional development; 25.8% identified the university; over 18.6% selected the county office of education. Respondents offered specific comments regarding the quality of professional development, including not combining grade-groups in the training and having a trainer who focuses on the development of a strong program and actively engages the audience.

Over 36% of respondents indicated a preference for weekday afternoons for participation in professional development; 24.4% indicated the start of summer vacation. Respondents also expressed interest in scheduling professional development during school release time, professional growth days, and other contracted work time.

Conclusions and Recommendations

The results of this study reinforce the recommendations made by the EEI planning team. Respondents indicated a preference for materials targeted at the 4 – 6 level—the grade-group level the planning team had identified for the first phase of development of Model Curriculum materials. Respondents also indicated strong interest in the development materials for the teaching of science, followed by history/social science and English/language arts. Also, reinforcing what the planning team had already deduced, the data do not support the development of EEI curriculum materials that focus on mathematics.

Results at the K – 8 level indicate that one science textbook was three times more likely to be used than all others. At the same time, it appears virtually no history/social science textbook is currently in use among respondents at these grade levels. At the high school level, three history/social science textbooks are currently in use among respondents, with one at least two times more likely to be used than the others. The planning team will need to take this information, as well as the science instructional materials adoption process, into account when developing the Model Curriculum materials in conjunction with textbook use.

Despite the presence of the Internet, respondents were not enthusiastic about web-based delivery of materials, with less than eight percent expressing interest. This finding is consistent with that noted in the 2002 study that The Acorn Group conducted for the Integrated Waste Management Board in which only six percent expressed interest. Like respondents in the former study, educators report that they are most comfortable receiving printed material in the form of a binder or bound book in which student handouts, lesson plans, and student readings are included. This finding has bearing on the design and financing of the Model Curriculum materials and delivery of professional development and support.

Not surprisingly, respondents are also expressed strong interest in materials that are available at no cost.

Respondents also indicated that they would prefer materials that address all, rather than only a subset of, the content standards in a particular grade or discipline.

When asked to rank seven criteria that influence actual use of curriculum materials, the highest-ranking criterion was preparation time and ease of use, while the lowest ranking criterion was approval by school board or administration. However, these data must be treated cautiously. One respondent noted on the survey form that "approval by the school board" was mandatory, and therefore, not a point of discussion. Further, the respondents may not have followed instructions on the survey form, leading to false ranking. The planning team should consider all seven criteria equally in the development of materials.

Stipends appear to be more of an incentive than credit for the pursuit of EEI-related professional development. Weekday afternoons, followed by the start of summer vacation, are preferred times to participate in professional development. Results are fairly evenly distributed among providers of professional development considered most effective, leaving the EEI planning team with some flexibility. However, it is interesting to note the number and nature of comments associated with this question, all summarized in Appendix D.

Compelling information also came from 19 hand-written comments that respondents volunteered on the survey forms. Several individuals voiced strong support for the EEI; others expressed frustration with what they incorrectly assumed to be another layer of information they are expected to teach despite their already crowded schedule. A marketing and outreach program to disseminate accurate information about the EEI and the Model Curriculum as widely and quickly as possible is needed. Classroom teachers and administrators need to understand the intent and benefits of the Model Curriculum without drawing incorrect conclusions. This effort, coupled with continued solicitation of input from classroom teachers and administrators, will help ensure success as the Model Curriculum is developed and implemented.

Note: It has been the EEI planning team's experience that it takes considerable time to fully explain to an audience the intent of the legislation, the strategies for implementation, and the potential benefits realized from the EEI approach to teaching the content standards. Despite the planning team's efforts to broadcast the legislation and solicit input among educators throughout the State, one cannot assume that these respondents know anything about the legislation other than the limited information provided in the survey instrument. Their responses, therefore, must be interpreted in this light.

1. School name: _____
2. Location (city): _____
3. What is your current position?
   [ ] classroom teacher [ ] department chair
   [ ] administrator [ ] other (specify):
   _____
4. If a teacher, state grade level(s) _____
5. If a teacher, what subject(s) do you teach?
   [ ] science [ ] mathematics
   [ ] English / language arts
   [ ] history / social science
   [ ] other (specify): _____
6. How many years have you taught? _____
7. On average, how many students are in your classroom each period? _____ students
8. Which, if any, of the following state adopted science materials do you currently use?
   [ ] Glencoe *Science Voyages*
   [ ] Harcourt *Science*
   [ ] Holt *Science and Technology*
   [ ] Houghton Mifflin *Discovery Works*
   [ ] McGraw-Hill *Science*
   [ ] Prentice Hall *Science Explorer*
   [ ] High school (name text[s] you use):
   _____
9. Which, if any, of the following state adopted history/social science materials do you use?
   [ ] Addison-Wesley Longman *Why We Remember*
   [ ] Kendall/Hunt *Ancient World 2000*
   [ ] Kendall/Hunt *Social Science 2000*
   [ ] Glencoe/McGraw-Hill *American Journey*
   [ ] Harcourt Brace *Social Studies*
   [ ] Holt, Rinehart, Winston (HRW) *Call to Freedom*
   [ ] HRW *Exploring America's Past*
   [ ] Houghton Mifflin *Social Studies*
   [ ] McGraw-Hill *Adventures in Time & Place*
   [ ] Oxford University Press *A History of Us*
   [ ] Prentice Hall *The American Nation*
   [ ] High school (name text[s] you use):
   _____
10. Do you currently use any **supplemental** science instructional materials?
    [ ] Yes [ ] No
11. If yes, list titles: _____
    _____
    _____
12. Do you currently use any **supplemental** history/social science instructional materials?
    [ ] Yes [ ] No
13. If yes, list titles: _____
    _____
    _____
14. How many minutes each week do you spend teaching science with **state adopted** materials? _____ minutes
15. How many minutes each week do you spend teaching history/social science with **state adopted** materials? _____ minutes
16. How many minutes each week do you spend teaching science with **supplementary** materials? _____ minutes
17. How many minutes each week do you spend teaching history/social science with **supplementary** materials? _____ minutes
18. Which <u>one</u> format do you prefer for curriculum materials? **(mark one box T [teacher materials] and one box S [student materials])**
    [ ][ ] CD-ROM [ ][ ] bound book
    [ ][ ] DVD [ ][ ] three-ring binder
    [ ][ ] web-based [ ][ ] other (specify):
    _____
19. Which features do you like to see curriculum materials offer? **(check all that apply)**
    [ ] lesson plans [ ] student readings
    [ ] student handouts [ ] resource lists
    [ ] other (specify): _____
    _____
    _____
    _____

The Environment and Education Initiative (EEI) calls for development of a Model Curriculum for K-12. One strategy is a series of alternative teacher's guides that integrate the environmental principles and concepts with instruction using state adopted textbooks and other materials.

20. If such teacher's guides are developed, which grade-level groups would you like them to address? **(mark no more than two)**
    [ ] K - 3 [ ] 4 - 5
    [ ] 6 - 8 [ ] 9 - 12
21. If such teacher's guides are developed, which subject areas would you like them to address? **(mark no more than two)**
    [ ] science [ ] English/language arts
    [ ] mathematics [ ] history/social science
22. Using a scale from 1 - 4 **[1=low – 4=high]** indicate the likelihood of your using these teacher's guides if they: **(circle one answer for each question)**
    a. Address all content standards in a particular grade or discipline?
       1 2 3 4
    b. Only address a subset of the content standards in a particular grade or discipline?
       1 2 3 4
    c. Are made available at no cost?
       1 2 3 4
23. Many criteria influence a teacher's actual use of curriculum materials. Rank the following seven criteria in order of importance to you **[1=low – 7=high]**:
    [ ] preparation time and ease of use
    [ ] level of comfort teaching the content
    [ ] emphasis on hands-on instruction
    [ ] standards-based instructional plans
    [ ] availability of professional development
    [ ] availability of in-service support
    [ ] approval by school board/administration

An integral part of the EEI is preparation and support for curriculum specialists and classroom teachers to assist them in integrating the Model Curriculum into their district curriculum plans.

24. With this is mind, which incentive is most likely to persuade you to pursue EEI-related professional development? **(select one)**
    [ ] a stipend
    [ ] school district credit
    [ ] university credit
    [ ] other (specify): _____
    _____
25. What type of institution do you consider the most effective provider of professional development? **(select one)**
    [ ] school district
    [ ] university
    [ ] county office of education
    [ ] non-profit or other organization
    [ ] other (specify): _____
    _____
26. When do you prefer to participate in professional development? **(select one)**
    [ ] weekday afternoons
    [ ] weekends
    [ ] start of summer vacation
    [ ] end of summer vacation
    [ ] off-track breaks in year-round schedules

Please provide the following information so we can enter your name in the gift drawing.

Name: _____
Address: _____
_____
City _____, CA
ZIP Code _____
Email: _____
Phone: (_____) _____

Appendix B
Data Tabulation

NOTE: Some answers total more than 100% due to the respondent failure to comply with instructions.

Q3. What is your current position?

[88.1%] classroom teacher
[13.6%] other
[4.7%] department chair
[2.8%] administrator

Q4. If a teacher, what grade level(s)?

Preschool	**1.1%**	**4th**	**11.6%**	**9th**	**20.5%**
Kindergarten	**10.0%**	**5th**	**15.5%**	**10th**	**21.3%**
1st	**14.4%**	**6th**	**13.9%**	**11th**	**21.0%**
2nd	**14.4%**	**7th**	**11.6%**	**12th**	**19.7%**
3rd	**13.6%**	**8th**	**10.8%**	**Other**	**1.7%**

Q5. If a teacher, what subject(s) do you teach?

[62.6%] English/language arts
[61.8%] science
[58.7%] mathematics
[56.0%] history/social science
[37.7%] other

Q6. How many years have you taught?

[14.9] Years

Q7. On average, how many students are in your classroom each period?

[25.5] Students

Q8. Which, if any, of the following state adopted science materials do you currently use?

[21.3%] Harcourt *Science*
[8.3%] Holt *Science and Technology*
[8.0%] Houghton Mifflin *Discovery Works*
[7.8%] High school
[6.7%] McGraw-Hill *Science*
[5.5%] Prentice Hall *Science Explorer*
[0.8%] Glencoe *Science Voyages*

Q9. Which, if any, of the following state adopted history/social science materials do you use?

[0.0%] Addison-Wesley Longman *Why We Remember*
[0.0%] Kendall/Hunt *Social Science 2000*
[0.0%] HRW *Exploring America's Past*
[0.3%] Kendall/Hunt *Ancient World 2000*
[0.8%] Glencoe/McGraw-Hill *American Journey*
[0.8%] Oxford University Press *A History of Us*
[1.1%] Holt, Rinehart, Winston (HRW) *Call to Freedom*
[2.2%] Prentice Hall *The American Nation*
[4.4%] High school
[9.4%] Harcourt Brace *Social Studies*
[10.3%] McGraw-Hill *Adventures in Time & Place*
[21.6%] Houghton Mifflin *Social Studies*

Q10. Do you currently use any supplemental science instructional materials?

[54.9%] Yes
[45.1%] No

Q12. Do you currently use any supplemental history/social science instructional materials?

[57.6%] No
[42.4%] Yes

Q14. How many minutes each week do you spend teaching science with state adopted materials?

[118.3] Minutes

Q15. How many minutes each week do you spend teaching history/social science with state adopted materials?

[78.7] Minutes

Q16. How many minutes each week do you spend teaching science with supplementary materials?

[61.7] Minutes

Q17. How many minutes each week do you spend teaching history/social science with supplementary materials?

[48.3] Minutes

Q18. Which format do you prefer for curriculum materials?

Type	**Teacher**	**Student**
3-ring binder	46.0%	57.9%
bound book	33.2%	17.7%
CD-ROM	13.6%	8.3%
DVD	9.7%	7.8%
web-based	7.5%	7.2%
other (specify):	3.3%	7.2%

Q19. Which features do you like to see curriculum materials offer?

[85.0%] student handouts [80.3%] lesson plans [71.5%] student readings
[56.5%] resource lists [35.2%] other

Q20. If such teacher's guides are developed, which grade-level groups would you like them to address?

[38.8%] K – 3 [41.8%] 4 – 5
[37.1%] 6 – 8 [34.9%] 9 - 12

Q21. If such teacher's guides are developed, which subject areas would you like them to address?

[76.7%] science [46.3%] history/social science
[31.9%] English/language arts [19.1%] mathematics

Q22. Using a scale from 1 - 4 [1=low - 4=high] indicate the likelihood of your using these teacher's guides if they:

a. Address all content standards in a particular grade or discipline?
   [3.3]
b. Only address a subset of the content standards in a particular grade or discipline?
   [2.6]
c. Are made available at no cost?
   [3.5]

Q23. There are many criteria that influence a teacher's use of curriculum materials. Using a scale from 1 - 7 [1=low - 7=high] rate each of the following in terms of influence:

[5.1] Preparation time and ease of use
[4.6] Emphasis on hands-on instruction
[4.5] Standards-based instructional plans
[4.4] Level of comfort teaching the content
[3.6] Availability of professional development
[3.3] Availability of in-service support
[3.3] Approval by school board/administration

Q24. With this is mind, which incentive is most likely to persuade you to pursue EEI-related professional development?

[68.4%] A stipend
[13.9%] University credit
[10.8%] Other
[8.0%] School district credit

Q25. What type of institution do you consider the most effective provider of professional development?

[27.7%] School district
[25.8%] University
[18.6%] County office of education
[16.9%] Non-profit or other organization
[13.3%] Other

Q26. When do you prefer to participate in professional development?

[36.6%] weekday afternoons
[24.4%] start of summer vacation
[16.9%] end of summer vacation
[15.0%] weekends
[8.0%] off-track breaks in year-round schedules

Average time spent teaching science and history/social science each week using state adopted materials

Type	Science	History/Social Science
K – 3rd	56 minutes	49 minutes
4th – 5th	85 minutes	82 minutes
6th – 8th	112 minutes	83 minutes
9th – 12th	119 minutes	40 minutes

Average time spent teaching science and history/social science each week using supplementary materials

Type	Science	History/Social Science
K – 3rd	30 minutes	23 minutes
4th – 5th	60 minutes	32 minutes
6th – 8th	44 minutes	41 minutes
9th – 12th	49 minutes	21 minutes

Appendix C
Schools and Locations

Albany Middle School	Albany
Cornell	Albany
Mark Keppel High School	Alhambra
Don Juan Avila Elementary	Aliso Viejo
Jonas Salk Elementary	Anaheim
Riverdale Elementary	Anaheim
Savanna High School	Anaheim
Kimball	Antioch
Aptos High School	Aptos
Aptos Junior High	Aptos
Paulding Middle School	Arroyo Grande
Selby Lane	Atherton
Shaffer	Atwater
Pine Ridge	Auberry
Freedom Middle	Bakersfield
General Shafter	Bakersfield
Thorner	Bakersfield
Baldwin Park Adult School	Baldwin Park
Cameron	Barstow
Rio Vista Elementary	Bay Point
Palm Elementary	Beaumont
Corona Avenue School	Bell
Bell Garden Inter	Bell Gardens
Carlmont High School	Belmont
Berkeley High	Berkeley
Washington Elementary	Berkeley
Beverly Vista	Beverly Hills
Bonsall Elementary	Bonsall
Rancheria High School	Boonville
Browley High School	Browley
Excelsior Middle School	Byron
Calistoga Elementary	Calistoga
Coast Union High School	Cambria
El Camino Creek	Carlsbad
Canalino	Carpinteria
Castaic Middle School	Castaic
ABC Adult	Cerritos
Germain St Elementary	Chatsworth
Walnut	Chino
Country Springs Elementary	Chino Hills
Arlington Heights	Citrus Heights
Oak Hill Middle	Clearlake
McKinley Elementary	Colton
Davis Middle School	Compton
Kelly Elementary	Compton

Corona Fundamental Intermediate	Corona
Lincoln	Corona
Santiago High School	Corona
Rea Elementary	Costa Mesa
John Swett High	Crockett
Park Ave.	Cudahy
Kennedy Middle	Cupertino
Monte Vista High School	Danville
O.W. Holmes Junior High School	Davis
Pioneer	Davis
Torrey Pines High School	Del Mar
Fremont	Delano
Harmony	Delhi
Anderson Elementary	Dixon
Northview	Duarte
Magnolia	El Cajon
Meridian	El Cajon
Elementary School	El Cerrito
El Sobrante	El Sobrante
Dieguens	Encintas
Rhoades School	Encinitas
Farr	Escondido
Rose Elementary	Escondido
Eureka High School	Eureka
Freshwater	Eureka
Vandon High School	Fairfield
Folsom Lake High School	Folsom
Grant Elementary	Fontana
Fremont Unified School District	Fremont
Vallejo Mill	Fremont
Miguel Hidalgo Elementary	Fresno
Galt High School	Galt
Mount Madanna High	Gilroy
Benjamin Franklin	Glendale
John Marshall Elementary	Glendale
John Muir Elementary	Glendale
El Camino	Goleta
Kennedy High	Granada Hills
Porter Middle School	Granada Hills
Van Gogh Elementary	Granada Hills
Gridley High School	Gridley
Wilson High	Hacienda Heights
Newton Middle	Hacienda Hts
Lee Richmond	Hanford
Hayward 55+	Hayward
Ruus Peixoto	Hayward
Eldridge	Haywood

Hermosa Valley	Hermosa Beach
Hawes Elementary	Huntington Beach
John R. Peterson	Huntington Beach
Marina High	Huntington Beach
Huntington Park High School	Huntington Park
West View	Imperial Beach
Lakeside Middle School	Irvine
Rancho Middle School	Irvine
28th Street School	La
La Canada Elementary	La Canada
Lincoln	La Crescenta
Las Positas Elementary	La Habra
La Mirada High School	La Mirada
Villacorta Elementary	La Puente
Niguel Hills Middle	Laguna Niguel
Bimingham High School	Lake Balboa
Canyon Lake Middle School	Lake Elsinore
Terra Cotta Middle School	Lake Elsinore
Hughes-Lake Elizabeth	Lake Hughes
Kern Valley High School	Lake Isabella
Holmes	Lakewood
Lakewood High	Lakewood
Mayfair High School	Lakewood
Northmont Glen	La Mesa
Alicante Ave.	Lamont
Amargosa Creek Middle School	Lancaster
Lincoln Elementary	Lancaster
Piute Middle School	Lancaster
Tesovo High School	Las Flores
Laytonville High School	Laytonville
Lemoore High School	Lemoore
Moffett	Lennox
Cedar Lane	Linda
Littlerock High School	Littlerock
Livingston Middle School	Livingston
Cabrillo	Lompoc
Miguelito Elementary	Lompoc
Vandenberg High School	Lompoc
Loinyo Elementary	Lone Pine
Cesar Chavez Elementary	Long Beach
Hughes Middle School	Long Beach
Patrick Henry	Long Beach
Special Ed	Long Beach
Stephens	Long Beach
Los Altos High School	Los Altos
Baldwin Hills Elementary	Los Angeles
Brooklyn	Los Angeles

Clifford St	Los Angeles
D.W.Griffith Middle School	Los Angeles
Eagle Rock Elementary	Los Angeles
Hollenbeck Middle School	Los Angeles
Infant And Preschool	Los Angeles
Los Angeles High	Los Angeles
Los Feliz Academy	Los Angeles
Roscomare Elementary	Los Angeles
West Athens	Los Angeles
Wilson High School	Los Angeles
Center For Marine Studies	Los Angeles Unified
Lynwood High School	Lynwood
Roosevelt	Lynwood
W. Woodward	Manteca
Cedar Lane Elementary	Marysville
Olivehurst	Marysville
Dow's Prarie Elementary	McKinleyville
Weimar Hills	Meadow Vista
Callie Kirkpatrick	Menifee
Hillview Middle	Menlo Park
Merced High School	Merced
Middletown High School	Middletown
Green Hills	Millbrae
Randall Elementary	Milpitas
Burbank	Modesto
Chrysler Elementary	Modesto
Flory Academy	Moorpark
Joaquin Moraga Is	Moraga
Armada Elementary	Moreno Valley
Moreno Valley High School	Moreno Valley
Nordstrom	Morgan Hills
Napa Valley Language Academy	Napa
Silverado Middle School	Napa
Valley View	Newhall
Valley View	Newhall
Orestimba High School	Newman
Corona Del Mar	Newport Beach
Ensign Intermediate	Newport Beach
Newport Coast Elementary	Newport Coast
Camellia Ave	No. Hollywood
Norco High School	Norco
Highlands	North Highlands
Plummer Elementary	North Hills
Darby Ave. Elementary	Northridge
D. D. Johnston	Norwalk
Oakdale Junior High	Oakdale
Hawthorne	Oakland

Libby	Oceanside
Oceanside High	Oceanside
Olivehurst Elementary	Olivehurst
Chaffey Community Day	Ontario
Colony High	Ontario
Oaks Middle	Ontario
Ontario Center School	Ontario
Orange High School	Orange
Santago Charter Middle School	Orange
Cesar Chavez	Oxnard
Chappel Iscrays High School	Oxnard
Katherine Finchy Elementary	Palm Springs
Palmdale High School	Palmdale
Ohlone Elementary	Palo Alto
Orange	Paramount
Lewis Middle School	Paso Robles
Berbard Eldredge	Petaluma
Casa Grande High School	Petaluma
Phelan Elementary	Phelan
North Ranch	Pico Rivera
Pine Grove Elementary	Pine Grove
Sierra Elementary	Placerville
Sierra	Placerville
Donlon	Pleasanton
Hope	Porterville
Monache High School	Porterville
Prospect Ed. Center Pec	Porterville
Twin Peaks Middle School	Poway
Tesoro High	Ranch Santa Margarita
Rancho Bernardo High School	Rancho Bernardo
Rancho Cucamonga High School	Rancho Cucamonga
Metteer	Red Bluff
Red Bluff High School	Red Bluff
Orangewood High School	Redlands
Hoover Elementary	Redwood City
Gerald Fitzgerald Elementary	Rialto
Kucean	Rialto
Mira Vista	Richmond
Boulder Creek	Redding
Murray Middle School	Ridgecrest
Monroe	Riverside
Pacific Ave	Riverside
Poly High	Riverside
Sherman Indian High School	Riverside
Terrace Elementary	Riverside
Tomas Rivera Elementary	Riverside
Sierra Christian Academy	Rocklin

Rice	Rosemead
Sierra Gardens	Roseville
Bowling Green	Sacramento
Cal Middle School	Sacramento
Glenwood	Sacramento
Joseph Bonnheim	Sacramento
Kennedy High School	Sacramento
Pony Express	Sacramento
Rosemont High School	Sacramento
Will C. Wood	Sacramento
Jane L. Pena	Sacramento
Natomas Park Elementary	Sacramento
Frank Paul	Salinas
Fremont	Salinas
Loma Visita	Salinas
Prunedale	Salinas
Carmel Valley Middle	San Diego
Hardy	San Diego
Kimbrough Elementary	San Diego
Mason Elementary	San Diego
Mt Carmel High School	San Diego
O'Farrp	San Diego
Sequoia Elementary	San Diego
Webster	San Diego
Westhills High	San Diego
Hillcrest Elementary	San Francisco
Krouzian Zekarian	San Francisco
Miraloma	San Francisco
Sfusd	San Francisco
Golden Plains Alternative Program	San Joaquin
Gunderson High School	San Jose
Millbrook Elementary	San Jose
Santa Teresa High School	San Jose
Silver Creek High School	San Jose
Windmill Springs	San Jose
Deanza	San Jacinto
Bancroft	San Leandro
Hillside	San Leandro
James Madison El.	San Leandro
John Muir Middle School	San Leandro
San Marcos Middle School	San Marcos
Hillsdale High School	San Mateo
Tara Hills	San Pablo
Laurel Dell	San Rafael
Terra Linda High School	San Rafael
Hidden Hills	San Ramon
Smythe	San Ysidro

Centerville Elementary	Sanger
Washington Elementary	Santa Ana
Bracher Elementary	Santa Clara
Buchser Middle School	Santa Clara
Scott Lane Elementary	Santa Clara
Shoreline	Santa Cruz
Battles	Santa Maria
Pathways Charter	Santa Rosa
Schaefer Elementary	Santa Rosa
West Hills High School	Santee
Franklin	Santa Barbara
Scotts Valley High School	Scotts Valley
Selma High	Selma
Shasta Lake Middle School	Shasta Lake
Soquel High School	Soquel
Liberty Blvd	South Gate
Monte Vista High School	Spring Valley
Escondido	Stanford
Bear Creek High School	Stockton
Commodore	Stockton
Hoover Elementary	Stockton
Francis Polytechnic	Sun Valley
Bishop	Sunnyvale
Freemont High School	Sunnyvale
Vargas	Sunnyvale
Meadow View	Susanville
Seanville School Dist	Susanville
Cloverly	Temple City
Coachella Valley High School	Thermal
Weathersfield	Thousand Oaks
North High	Torrance
Sherry High	Torrance
Travis Education Center	Travis Air Force Base
Glenshire	Truckee
Independence High School	Turlock
Dennis Earl	Turlock
Nokomis Elementary	Ukiah
Cabrillo Elementary	Upland
Padan	Vacaville
Bassett Street Elementary	Van Nuys
Mound School	Ventura
Crowley	Visalia
Vista Focus Academy	Vista
River City High School	W. Sacramento
Indian Valley	Walnut Creek
Walnut Heights Elementary	Walnut Creek
Palm Ave	Wasco

South Fork	Weldon
Evergreen Elementary	West Sacramento
Jordan Elementary	Whitter
Lincoln	Whittier
Broad Ave	Wilmington
Broadave	Wilmington
Winchester Elementary	Winchester
Waggoner	Winters
Gibson	Woodland

Appendix D
Narrative Responses

Question 8

- Addison Wesley Chemistry
- AGS Science
- Automotive Technology
- Biology Prentice Hall
- Chemistry
- Health Occupations
- Hole's Essentials Of Anatomy And Physiology
- Holt Science And Technology
- IAB Int/Coord Science For 21st Century
- Low Reading Level
- McGraw-Hill Health
- Miller Living In Environment
- Modern Biology
- Perdmon
- The Pinnipeds

Question 9

- American Government
- Glencoe Series AGS
- Government in America (AP Gov)
- Norton: America, A Narrative History
- Prentice Hall World history Making Connections
- Vaughn World History I & II

Question 11

- "Convection Currents"
- Through workshops over the years
- From the library & Internet (Too many to list)

Question 12

- First people to the present & materials from Internet library

Question 13

- College board course description interaction
- Stories, book, movies
- Topics (for typing practice)

Question 15

- Integrated in H. Mifflin L.A.

Question 16

- Done by "unit, not daily”
- All integrated throughout the day

Question 18

- Hands-on experimentation
- No technology to use these in our district (CD-ROM, DVD, web-based)

Question 19

- Colorful master, simplicity
- Cont-ideas for differentiation
- Incorporates environmental education to some degree - - I'm delighted
- Matches to state standards
- Spend learning English reading

- Charts (large visuals)
- Artifact samples
- Hours to read before hand
- Work and dovetail with other subjects (ex reading, science, soc. studies)
- Those are quite complete in ensuring teachers can do the activities (hands, management strategies, etc)
- All necessary supplies for possible experiments
- Hands-on kits, soc. Science maps, globe, biographies, civics

Question 20

- Oh great another mandate!
- Integrate this into already established areas of lang. arts & math materials
- Why not all?

Question 22

- Depends on how good they are!
- If they relate to chemistry and physics. I am interested in developing curricula in chemistry and physics that involve the environment. Please call me if teachers are needed for this purpose.

Question 23

- Note that has to happen anyway.
- You left out "Student interest and engagement"
- The curriculum is terribly impacted with the state standards already; I can't imagine introducing more materials at this time!

Question 24

- Oh goodie

Question 25

- I can't select 1 since I got training workshops from all that were quite relevant & meaningful for my kids & myself
- Lousy job-instruction is key
- Individual presentation
- School setting
- Treat me as a child when presenting
- No combined grades such as K-3. Single grade only meetings
- Not as important, since we have approval, and I cannot take off school hours for in-services
- The presentation rather than where person is from
- To enhance presentation of most important concepts
- Someone who develops good programs w/ sound philosophy and doesn’t just re-read what's already in the text

Question 26

- What happened to "The Child's Place in the Environment?" It was an excellent curriculum!
- Best is school release time
- Professional growth days
- Anything but weekday afternoons
- I am too, too busy
- Work day-set sub paid by district
- Only will do professional development during contracted work time

Summary of
County Office of Education Focus Group Meetings

As part of the process of implementing the Education and the Environment Initiative (EEI) [Assembly Bill 1548 Pavley, Chapter 665, Statutes of 2003], the California Environmental Protection Agency and the Integrated Waste Management Board have made substantial effort to solicit input from teachers and education administrators. As part of this ongoing process, a series of focus group meetings was held in February and March 2005 to solicit comments on various components of the plan for developing the EEI Model Curriculum.

The EEI sought county offices of education, representing various regions of California, as partners in conducting these focus group meetings. The San Bernardino, Riverside, Los Angeles, Orange, Sacramento and Alameda County Office of Education offered their assistance and were instrumental in recruiting classroom teachers and administrators for the meetings.

Ultimately, three formal focus group meetings were held in San Bernardino/Riverside, Los Angeles and Alameda Counties. Two additional, less structured meetings were held in Orange and Sacramento Counties.

Representatives of the EEI facilitated each of the meetings. Each session began with a brief overview of the EEI, the environmental principles and concepts (EP&C), the standards alignment maps, and status and purpose for the Model Curriculum. Following the presentations, participants engaged in facilitated discussion regarding attributes of high quality curricula, factors that might increase the likelihood of use, grade-level coverage of the Model Curriculum, and opportunities and methods to best address content standards. (The introduction to the EEI was brief due to time constraints. The information gathered during these meetings should, therefore, be interpreted in this context.)

The information that was gathered during these focus group meetings reconfirmed the information that was obtained through the Educator Needs Assessment (see Educator Needs Assessment Report, March 2005). Specifically, the participants commented that the EEI Model Curriculum should be designed so that the instructional strategies and materials:

- are easy to use;
- can be readily connected with their structured instructional programs;
- offer clear and direct alignment to California content standards;
- are tailored to meet the needs of specific grades; and,
- clearly integrate with the State's assessment program.

The participants also identified the need for strong professional development program and an on-going support system for teachers.

The teachers and administrators repeatedly commented on the need for materials that are easy to use and implement. Citing FOSS kits as an example, participants indicated that having specific and functional procedures clearly stated and supported by illustrations is a key to success. The also commented on the need for easy access to student workbooks or journals with worksheets (e.g., copy masters), and the complete packaging of materials so teachers do not have to spend time gathering supplies, lesson plans, and worksheets from multiple sources.

The participants stressed the importance of direct alignment to California's content standards, although their comments about methodology and degree of coverage varied from region to region. Several of the teachers and administrators cited the Blueprints for the California Standards Test (CST) as a useful reference during development of the Model Curriculum Plan. Others stressed the importance of specifically defining what is meant by "know" when addressing the content standards. Some participants voiced support for complete coverage of standards, while others advocated support for a select number. Regardless of approach, direct alignment of the Model Curriculum to the standards in a manner that offers

specific strategies for achievement was clearly regarded as an essential element of the program.

Participants encouraged coordination between the EEI team and state assessment team to ensure inclusion of Model Curriculum content in the California Standards Tests.

In some cases the focus group participants misinterpreted the standards alignment maps as they were presented. The maps were incorrectly perceived by some as “add-ons” to the standards with the potential of “markedly changing instruction in biology, chemistry, and earth science instruction.” At the same time, other participants readily perceived the value of the EP&C as providing the context for teaching the state standards. A few others reported that they were already aware of the EP&C and were using them in their districts.

Participants expressed strong support for the grade-group design elements proposed for the EEI Model Curriculum, including pursuit of English/language arts skills development at the K – 3rd grade level; the science and history/social science focus at the 4th – 6th grade level; and the idea of using the EP&C as a context for framing instruction and particular standards at the 7th – 12th grade level. In addition, opportunities for hands-on investigations should be provided at the K – 3rd level; opportunities for service-learning should be provided at the upper elementary – secondary levels.

The focus group participants commented that using an interdisciplinary approach in the EEI Model Curriculum might make it difficult to implement. The did, however, comment about the benefits of such an approach—that students may learn concepts more comprehensively and thus, may perform better on assessments. Since several of the teachers and administrators (most notably those from Alameda County) are already involved in successful integrated programs, they should be considered as possible participants in the early phases of implementation and in the review process for the Model Curriculum.

Participants strongly supported development of a field-testing process prior to implementation to allow the EEI to adjust and refine the Model Curriculum prior to full production and implementation.

The focus group members strongly supported the creation of a program for ongoing professional development and technical support as a means of helping districts integrate the Model Curriculum into their instructional plans. They saw this as a key step in getting teachers to fully implement the Model Curriculum in their classrooms. Release time and stipends would be appreciated. One participant went so far as to state a strong support system can be more critical than the curriculum itself.

In conclusion, the majority of focus group participants were very supportive of the Model Curriculum and the intent of the EEI. Their suggestions they offered were comparable to those voiced by the educators who responded to the Educator Needs Assessment. In essence, they reaffirmed the design attributes for the EEI Model Curriculum that had been collected from other sources.

Grade- and Discipline-Specific Standards-based Learning Objectives

Science and History/Social Science

In the Context of California's Environmental Principles and Concepts

Science

Kindergarten	**40**
First Grade	**42**
Second Grade	**44**
Third Grade	**46**
Fourth Grade	**49**
Fifth Grade	**52**
Sixth Grade	**56**
Seventh Grade	**61**
Eighth Grade	**66**
Earth Science — High School	**70**
Biology/Life Science — High School	**78**

History/Social Science

Kindergarten	**85**
First Grade	**87**
Second Grade	**89**
Third Grade	**91**
Fourth Grade	**94**
Fifth Grade	**101**
Sixth Grade	**108**
Seventh Grade	**115**
Eighth Grade	**123**
Tenth Grade	**131**
Eleventh Grade	**137**
Twelfth Grade	**145**

Kindergarten — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Physical Sciences 1. Properties of materials can be observed, measured, and predicted. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know objects can be described in terms of the materials they are made of (e.g., clay, cloth, paper) and their physical properties (e.g., color, size, shape, weight, texture, flexibility, attraction to magnets, floating, sinking).	
b. Students know water can be a liquid or a solid and can be made to change back and forth from one form to the other.	
c. Students know water left in an open container evaporates (goes into the air) but water in a closed container does not.	

Life Science 2. Different types of plants and animals inhabit the earth. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).	• Recognize that the similarities and differences in the appearance and behavior of plants and animals are related to their use of similar resources to meet their needs (e.g., food).
b. Students know stories sometimes give plants and animals attributes they do not really have.	
c. Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).	

Earth Sciences 3. Earth is composed of land, air, and water. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.	• List different habitats (ecosystems) that are found in mountains, rivers, oceans, valleys, deserts, and in their local area. • Name some of the plants and animals that live in their local area.
b. Students know changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.	
c. Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.	• Identify resources (goods and ecosystem services) that people use in everyday life (e.g., food, air, water, clothing). • Describe the origins of everyday resources (e.g., food comes from plants and animals, air comes from the atmosphere, water from lakes and rivers). • Recognize that all of the everyday resources they use come from natural systems. • Provide examples of how these resources are gathered, harvested or extracted from natural systems. • List ways these resources can be conserved.

Investigation and Experimentation

4. 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.

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework).*"

These will be developed to connect with the EP&C learning objectives.

First Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Physical Sciences 1. Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know solids, liquids, and gases have different properties.	
b. Students know the properties of substances can change when the substances are mixed, cooled, or heated.	

Life Sciences 2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.	• Recognize that natural systems (environments) provide the resources (goods and ecosystem services) for survival for plants and animals. • Provide examples of the external features of plants and animals that help them live in a particular environment and obtain the resources they need to survive there. • Describe human activities that can influence the functioning of natural systems and the availability of resources for plants and animals. • Explain that if there are significant changes to natural systems (environments) plants and animals may not be able to survive in those areas.
b. Students know both plants and animals need water, animals need food, and plants need light.	• Recognize that to survive, plants and animals (including humans) need resources including water, food, air, and light. • List the resources that plants need to survive. • List the resources animals (including humans) need to survive. • Explain that the resources that plants and animals (including humans) need to survive are produced by natural systems. • Provide examples of things that humans do that can influence the availability of resources needed by plants and animals (including humans).
c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.	• Identify the different type of food that animals eat and categorize the sources of those foods as plants or animals. • Recognize that natural systems produce all the food that animals eat. • List examples of the materials that animals use to make shelter and nests and categorize the sources of those materials as plants or animals. • Recognize that natural systems produce all the materials animals use to make shelter and nests. • Provide examples of things that humans do that can influence the availability of materials animals (including humans) use for food, shelter, and nesting. • Explain that humans also rely on natural systems for their supplies of materials for food and shelter.
d. Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants).	• Provide examples of the shapes of specialized animals' teeth or beaks and the foods they eat (e.g., sharp teeth: eats meat; flat teeth: eats plants). • Recognize that if the food that an animal needs is not available, it may not be able to survive because many animals cannot change their diets (e.g., the main diet of Pandas is bamboo). • Provide examples of human activities that could change the supplies of food for animals and make it difficult for them to survive.
e. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.	• Recognize that plants make their own food using sunlight, air, soil nutrients and water. • Identify that natural systems provide the water, air and soil nutrients, and the Sun provides the light necessary for plants to survive. • Recognize that the survival of plants depends on the supply of clean water and nutrients in the soil. • Provide examples of human activities that can affect the supply of clean water, soil nutrients, and plants' roots.

Earth Sciences 3. Weather can be observed, measured, and described. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how to use simple tools (e. g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.	
b. Students know that the weather changes from day to day but that trends in temperature of rain (or snow) tend to be predictable during a season.	• Describe how weather changes that occur day to day and seasonally affect natural systems.
c. Students know the sun warms the land, air, and water.	• Recognize that the Sun's warming of the land, air, and water is necessary for the survival of humans and all other living things.

Investigation and Experimentation

4. 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.

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework)."*

These will be developed to connect with the EP&C learning objectives.

Second Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Physical Sciences 1. The motion of objects can be observed and measured. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the position of an object can be described by locating it in relation to another object or to the background.	
b. Students know an object's motion can be described by recording the change in position of the object over time.	
c. Students know the way to change how something is moving is by giving it a push or a pull. The size of the change is related to the strength, or the amount of force, of the push or pull.	
d. Students know tools and machines are used to apply pushes and pulls (forces) to make things move.	
e. Students know objects fall to the ground unless something holds them up.	
f. Students know magnets can be used to make some objects move without being touched.	
g. Students know sound is made by vibrating objects and can be described by its pitch and volume.	

Life Sciences 2. Plants and animals have predictable life cycles. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.	• Recognize that reproduction is essential to the survival of a species. • Identify reproduction as a process that maintains plant and animal populations in natural systems. • Describe the reproduction of plants and animals as a process that provides humans with food and other goods and ecosystem services. • Explain why plant and animal reproduction is important in providing resources necessary for human survival.
b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.	• Identify reproductive cycles for different animals such as butterflies, frogs, and mice. • Explain that, in order to reproduce, different animals such as butterflies, frogs, and mice have different needs met by the natural systems where they live (e.g., monarch butterflies need milkweed).
c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.	• Identify some of the characteristics that organisms inherit from their parents. • Recognize that some of these characteristics are essential to the survival of the organisms. • Provide examples of inherited characteristics that are caused or influenced by the environment.
d. Students know there is variation among individuals of one kind within a population.	• Recognize that there is variation among individuals within a population. • Provide examples of variations among individuals within a population that are caused or influenced by the environment.
e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.	• Recognize that changes to conditions in the environment (e.g., light, water, environmental stress) may affect the germination, growth and development of plants. • Explain how the environment may affect a plant's ability to reproduce. • Predict what happens to a plant when a specific change in the environment occurs (e.g., there is suddenly no water).

f. Students know flowers and fruits are associated with reproduction in plants.	• Identify flowers and fruits as part of the reproductive process in some plants. • Explain that, in order to reproduce, plants have different needs (e.g., soil, nutrients, water) met by the natural systems in which they live. • Identify plant reproduction as an important function for humans because it provides food sources, building materials and other resource materials for use by humans and other animals. • Provide examples of environmental stresses to plants that can result from human activities.

Earth Sciences 3. Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how to compare the physical properties of different kinds of rocks and know that rock is composed of different combinations of minerals.	• Identify rocks and minerals as important components of natural systems. • Provide examples of rocks and minerals that are used directly by humans and human communities. • Provide examples of rocks and minerals that are used by humans and human communities to manufacture other products.
b. Students know smaller rocks come from the breakage and weathering of larger rocks.	• Recognize examples of the importance of small rocks and sand to natural systems (e.g., the spawning of salmon in streams).
c. Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.	• Describe the importance of soil to plants and natural systems. • Identify different soils by their color, texture, and capacity to retain water. • Identify the role of decomposition in returning organic materials to soil. • Explain the role of soil in providing the water, minerals and organic materials that are necessary for plant growth. • Recognize that a plant's roots help it take up water and other chemicals from the soil, some of which can affect the germination, growth and development of the plants in beneficial, neutral, or harmful ways.
d. Students know that fossils provide evidence about the plants and animals that lived long ago and that scientists learn about the past history of Earth by studying fossils.	
e. Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.	• Recognize rocks, water, plants and soil as components of natural system. • Identify that humans use and depend upon the components of natural system for goods and ecosystem services (e.g., food, fuel, building materials). • Identify the origins of everyday resources as coming from natural systems (e.g., food, air, water). • Explain that the quantity, quality and reliability of goods produced by natural systems are influenced by the health and functioning of those systems (e.g., healthy forests produce more trees). • Provide examples of human activities that can influence the health of a natural system.

Investigation and Experimentation

4. 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.

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework)."*

These will be developed to connect with the EP&C learning objectives.

Third Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Physical Sciences 1. Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know energy comes from the Sun to Earth in the form of light.	• Recognize that the Sun is the primary source of energy for Earth. • Provide examples of the role of the Sun's energy in natural systems and human communities (e.g., growth of plants, lighting and warming of Earth).
b. Students know sources of stored energy take many forms, such as food, fuel, and batteries.	• Provide examples of energy storage in natural systems and human communities (e.g., plants, food, fuel, batteries). • Recognize that the energy in our food ultimately comes from the Sun. • Explain that energy in fuels such as wood, coal, oil, and natural gas originated from the Sun.
c. Students know machines and living things convert stored energy to motion and heat.	• Identify that natural systems and human communities operate by converting stored energy to motion and heat.
d. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.	• Recognize that energy can be carried from one place to another by moving objects including those that come from natural systems such as food, wood, coal, oil, and natural gas.
e. Students know matter has three forms: solid, liquid, and gas.	
f. Students know evaporation and melting are changes that occur when the objects are heated.	
g. Students know that when two or more substances are combined, a new substance may be formed with properties that are different from those of the original materials.	• Recognize that many manufacturing processes involve combining two or more substances that come from natural systems to produce new substances (products) that are different from those of the original materials. • Explain that process of combining substances, such as through manufacturing activities, can produce byproducts, some of which have beneficial, neutral or detrimental effects. • Provide examples of new substances formed through the combination of two or more substances and that have properties that differ from those of the original materials. • Provide examples of recycling processes that can separate substances from each other and allow them to be recovered for new uses.
h. Students know all matter is made of small particles called atoms, too small to see with the naked eye.	
i. Students know people once thought that earth, wind, fire, and water were the basic elements that made up all matter. Science experiments show that there are more than 100 different types of atoms, which are presented on the periodic table of the elements.	

2. Light has a source and travels in a direction. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know sunlight can be blocked to create shadows.	
b. Students know light is reflected from mirrors and other surfaces.	
c. Students know the color of light striking an object affects the way the object is seen.	
d. Students know an object is seen when light traveling from the object enters the eye.	

Life Sciences 3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.	• Identify that plants and animals have different structures that allow them to grow, survive, and reproduce by using/consuming the goods and ecosystem services provided by natural systems. • Recognize that growth, survival, and reproduction are necessary for the survival of plants and animals, as well as the survival of humans and human communities. • Provide examples of how the functioning of structures plants and animals (including humans) have for growth, survival, and reproduction depends on the health of those plants and animals and the health of natural systems. • Explain that the growth, survival, and reproduction of plants and animals processes can be influenced by human activities.
b. Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.	• Identify the characteristics of various natural systems (e.g., ocean, desert, tundra, forest, grassland and wetland environments). • Give examples of diverse life forms in ocean, desert, tundra, forest, grassland and wetland environments. • Explain that different kinds of organisms are adapted for living in different environments.
c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.	• Identify how living things (including humans) can cause changes in the environments in which they live. • Provide examples of changes to the environment caused by living things that are beneficial, detrimental or neutral in their effects on other organisms. • Explain how changes to the environment, brought about by an organism, may harm that organism or other organisms. • Provide examples of large-scale changes to ecosystems that result from human activities and natural events.
d. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.	• Recognize that when the environment changes, some plants and animals will die or move to new locations because the natural system can no longer meet their needs. • Explain that not all organisms respond to environmental changes in the same way. • Provide examples of animals or plants that have not survived as the result of a change to their environment. • Describe habitat restoration as a process that can sometimes be used to make it possible for plants and animals to survive and reproduce in areas where they once could not.
e. Students know that some kinds of organisms that once lived on Earth have completely disappeared.	• Define the term extinction. • Provide examples of organisms that have become extinct over Earth's geologic time. • Provide examples of organisms that have become extinct in recent times. • Recognize that organisms that are extinct are gone from the Earth forever. • Describe extinction as a natural process that can also be caused or accelerated by human activities.

Earth Sciences 4. Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the patterns of stars stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.	
b. Students know the way in which the Moon's appearance changes during the four-week lunar cycle.	

c. Students know telescopes magnify the appearance of some distant objects in the sky, including the Moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than the number that can be seen by the unaided eye.	
d. Students know that Earth is one of several planets that orbit the Sun and that the Moon orbits Earth.	
e. Students know the position of the Sun in the sky changes during the course of the day and from season to season.	• Recognize that the changing position of the Sun over the course of a day and from season to season is a natural cycle. • Explain how the Sun's changing position over the course of a day and from season to season affects natural systems. • Describe how the Sun's differential warming of the land, air, and water is critical to many of the cycles and processes required for natural systems to function.

Investigation and Experimentation

5. 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.

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Fourth Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Physical Sciences 1. Electricity and magnetism are related effects that have many useful applications in everyday life.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.	
b. Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field	
c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.	
d. Students know the role of electromagnets in the construction of electric motors, electric generators, and simple devices, such as doorbells and earphones	
e. Students know electrically charged objects attract or repel each other.	
f. Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.	
g. Students know electrical energy can be converted to heat, light, and motion.	

Life Sciences 2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know plants are the primary source of matter and energy entering most food chains.	• Recognize that living things have needs that must be met for survival (including energy). • Recognize that plants are the primary source of energy for living things in an ecosystem. • Explain how living things meet their needs and survive by using resources (e.g., matter and energy) from their environment. • Identify that humans are living things and therefore have needs essential to their survival. • Identify that the needs of humans are met by using resources (goods and ecosystem services) from natural systems (e.g., matter and energy). • Recognize that everything humans need was originally derived from a natural system including the matter and energy that plants produce.
b. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.	• Recognize that plants and animals, including humans, can be classified by the sources of energy and matter (food) they consume. • Classify organisms from a terrestrial, freshwater, coastal or marine ecosystem as producers and consumers and explain their roles in that system. • Define ecosystems as interacting assemblages of organisms, non-living components that support those organisms and the interactions among them. • Recognize that some resources within an ecosystem, including those upon which humans depend, are readily available and others are limited in supply. • Describe how organisms compete for limited resources. • Explain potential consequences when a component of an ecosystem is changed or eliminated (e.g., when components of a food chain or food web are affected by competition for resources or other changes, whether natural or human-caused). • Describe factors that can adversely affect the health of an ecosystem (e.g., loss of organisms, disruption of food webs).

c. Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.	• Give examples of organisms that are decomposers. • Explain the role of decomposers in an ecosystem. • Recognize that the cycles and processes involving recycling of matter and transfer of energy among organisms are essential to the functioning of natural systems (ecosystem). • Provide examples of human practices that directly depend on the cycles and processes involving decomposers in terrestrial, freshwater, coastal and marine ecosystems (e.g., their role in food production and waste management). • Describe the dependence of human practices on the cycles and processes that occur in terrestrial, freshwater, coastal and marine ecosystems (e.g., the role of decomposers in: food production through soil formation and fertility; waste management through the decay of waste products).

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know ecosystems can be characterized by their living and nonliving components.	• Categorize the components of natural systems as living and non-living. • Describe the living and nonliving components from terrestrial, freshwater, coastal or marine ecosystems that have similar roles. • Recognize that the living and nonliving components of an ecosystem and the interactions among them produce the resources that are required for the survival of the living components of the ecosystem. • Identify that the needs of humans are met by using resources (goods and ecosystem services) from natural systems.
b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.	• Recognize that living things meet their needs by using resources (goods and ecosystem services) from the environment around them. • Recognize that some resources within an ecosystem are finite in supply; others are less limited. • Explain how the health of an ecosystem affects the ability of plants and animals to survive in any particular environment. • Provide examples of how the health of an ecosystem influences the quality, quantity, and reliability of the goods and ecosystem services it produces. • Recognize that changes to the environment caused by humans and other animals influence the survival of some kinds of plants and animals. • Identify that some changes to the environment caused by humans and other animals affect the cycles and processes that occur naturally in ecosystems and in turn affect the survival of some kinds of plants and animals. • Provide examples of how human practices have altered the cycles and process that occur naturally in terrestrial, freshwater, coastal and marine ecosystems.
c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.	• Identify key ecological roles organisms play in natural systems (ecosystems). • Identify processes (e.g., pollination, and seed dispersal) occurring in natural systems that are required for their functioning. • Provide examples and describe cycles and processes that occur in natural systems. • Explain the role of cycles and processes in the interactions and interdependence among the components of an ecosystem, (e.g., plants relying on animals for pollination and seed dispersal, animals depending on plants for food and shelter).
d. Students know that most microorganisms do not cause disease and that many are beneficial.	• Give examples of microorganisms. • Describe the roles of microorganisms in natural systems including the human body. • Recognize that microorganisms are involved in many natural system processes that are used by humans and human communities and that such processes are considered “ecosystem services” (e.g., processes involving microorganisms such as fermentation, decomposition, etc.). • Describe the role of ecosystem services involving microorganisms in human communities and societies (e.g., food production, waste treatment, production of pharmaceuticals). • Recognize that some microorganisms can cause changes to living things that may be harmful.

Earth Sciences 4. The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).	
b. Students know how to identify common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.	

5. Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.	• Provide examples of how geologic processes (erosion, landslides, volcanic eruptions, and earthquakes) affect humans, human communities and natural systems. • Describe how human activities can magnify the impacts of some geologic processes, such as increasing the rate of erosion or landslide occurrence.
b. Students know natural processes, including freezing and thawing and the growth of roots, cause rocks to break down into smaller pieces.	
c. Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).	• Provide examples of how moving water erodes landforms and the reshaping of the land affect humans, human communities and natural systems. • Describe how human activities can affect the flow of water and therefore affect the natural erosion of landforms, and the weathering, transport, and deposition of pebbles, sand, silt, and mud.

Investigation and Experimentation

6. 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:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

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Fifth Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Physical Sciences 1. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.	
b. Students know all matter is made of atoms, which may combine to form molecules.	
c. Students know metals have properties in common, such as high electrical and thermal conductivity.	
d. Students know that each element is made of one kind of atom.	
e. Students know scientists have developed instruments that can create discrete images of atoms and molecules that show that the atoms and molecules often occur in well-ordered arrays.	
f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.	
g. Students know properties of solid, liquid, and gaseous substances, such as sugar ($C_6H_{12}O_6$), water (H_2O), helium (He), oxygen (O_2), nitrogen (N_2), and carbon dioxide (CO_2).	
h. Students know living organisms and most materials are composed of just a few elements.	
i. Students know the common properties of salts, such as sodium chloride (NaCl)	

Life Sciences	
2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:** • Describe how respiration, digestion, waste disposal, and transport of materials result in byproducts. • Recognize that movement of matter and energy through ecosystems generates byproducts. • Describe how matter and energy flow in ecosystems. • Describe and discuss the concept of boundary in natural systems. • Recognize that natural systems are not separated by impermeable or permanent boundaries. • Provide examples of how the byproducts of human activities (e.g., carbon dioxide [CO_2]) enter natural systems (terrestrial, freshwater, coastal and marine ecosystems).
a. Students know many multicellular organisms have specialized structures to support the transport of materials.	
b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO_2) and oxygen (O_2) are exchanged in the lungs and tissues.	
c. 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.	

d. Students know the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.	• Explain the role of the human kidney in removing or mitigating the effects of contaminants generated by human activities and natural processes.
e. Students know how sugar, water, and minerals are transported in a vascular plant.	• Provide examples of the role of materials transport in vascular plants on the movement of the byproducts of human activities (e.g., contaminants) into natural systems (e.g., entering plant tissue, soil).
f. Students know plants use carbon dioxide (CO_2) and energy from sunlight to build molecules of sugar and release oxygen.	• Explain the role of photosynthesis in the functioning of terrestrial, freshwater, coastal and marine ecosystems. • Explain why photosynthesis is essential to the survival of humans and human communities. • Provide examples of how humans and human communities can influence the process of photosynthesis and thus the flow of matter and energy within natural systems.
g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO_2) and water (respiration).	

Earth Sciences 3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.	• Identify that humans are living things and clean fresh water is essential to their survival. • Recognize that because most of Earth's water is salt water located in the oceans, the vast majority of water is not available for human consumption. • Describe freshwater, coastal and marine ecosystems and compare the chemical characteristics of the water in these systems. • Provide examples of the goods that are produced by freshwater, coastal and marine ecosystems (e.g., clean fresh water, oxygen, food, energy resources). • Explain how humans and human communities can influence the quantity, distribution and chemical characteristics of the water in freshwater, coastal and marine ecosystems (e.g., global climate change, water management practices).
b. Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.	• Describe the roles of evaporation, liquefaction and freezing in the water cycle. • Describe the role of the water cycle, evaporation, liquefaction and freezing in the functioning of natural systems. • Provide examples of the roles these cycles and processes play in human life and human communities.
c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.	• Identify the role of precipitation (rain, hail, sleet, or snow) in terrestrial, freshwater, coastal and marine ecosystems). • Provide examples of how humans and human communities directly and indirectly depend on precipitation (rain, hail, sleet, or snow) and the water cycle (e.g., agricultural systems, water delivery systems). • Provide examples of how human activities can influence the quantity, distribution and chemical characteristics of precipitation.

d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.	• Identify sources of fresh water and describe the reservoirs of Earth's water. • Recognize that water moves from one reservoir to another over time. • Describe the ways in which humans, human communities and their practices use water. • Recognize that the supply of fresh water is limited at any given time and discuss how some resources within an ecosystem are finite in supply while others are less limited. • Describe the methods by which wastewater can be treated and cycled back into the environment. • Provide examples of how water use can be decreased by humans and human communities. • Explain potential consequences when the quantity, distribution or chemical characteristics of water are changed (e.g., contamination of an aquifer can compromise the use of the groundwater supply by humans and other organisms). • Describe how changes to the quantity, distribution and chemical characteristics of water in natural systems can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., acid precipitation affecting the growth of trees).
e. Students know the origin of the water used by their local communities.	• Identify sources of fresh water in their local community. • Describe the process by which water is supplied to students' homes and their community. • Identify the steps used to make water potable in their community. • Describe the ways in which humans use water in their local community. • Provide examples of how human activities can influence the quantity, quality and reliability of water supplies. • Explain how changes to the quantity, quality and reliability of water supplies can influence humans, human communities and their practices.

4. Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know uneven heating of Earth causes air movements (convection currents).	
b. Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.	
c. Students know the causes and effects of different types of severe weather.	• Provide examples of how human practices can influence weather. • Identify the potential consequences of severe weather on human communities and natural systems.
d. Students know that weather forecasts depend on many variables.	
e. Students know that the Earth's atmosphere exerts a pressure that decreases with distance above Earth's surface and that at any point it exerts this pressure equally in all directions.	

5. The solar system consists of planets and other bodies that orbit the Sun in predictable paths.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. 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.	
b. 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.	
c. Students know the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.	

Investigation and Experimentation

6. 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:

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Sixth Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
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:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:** • Describe how geologic events and processes affect the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of these geologic events and processes on humans and human communities. • Explain how these geologic events and processes affect the distribution of goods and ecosystems services from natural systems (e.g., water supply).
a. Students know evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and mid-ocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.	
b. Students know Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.	
c. Students know lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.	
d. 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.	
e. Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.	
f. Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.	
g. Students know that the effects of an earthquake on any region vary, depending on the size of the earthquake, the distance of the region from the epicenter, the local geology, and the type of construction in the region.	

Shaping Earth's Surfaces 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:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
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.	• Identify how humans and human communities benefit from the dynamic nature of rivers and streams in ways that are essential to human life and to the functioning of our economies and cultures (e.g., deposition of fertile sediment). • Describe how humans and human communities are influenced by soil erosion, sediment transport, course changes and flooding of rivers and streams (e.g., food production, housing construction). • Provide examples of how human activities can influence the flow of rivers and streams. • Describe how changes to the flow of rivers and streams can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., spawning of salmon).

c. Students know beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.	• Identify how humans and human communities benefit from the dynamic systems of beaches in ways that support our economies and cultures (e.g., housing development, sand supplies). • Describe how human communities are influenced by the sand that is supplied by rivers and moved along the coast by the action of waves. • Provide examples of how human activities can influence the movement of sand and the formation of beaches. • Describe how changes in the movement of sand and the formation of beaches can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., nesting habitat for shorebirds).
d. Students know earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.	• Describe how earthquakes, volcanic eruptions, landslides, and floods can influence the distribution of terrestrial, freshwater and coastal ecosystems and thus change wildlife habitats. • Provide examples of the direct and indirect influences of earthquakes, volcanic eruptions, landslides, and floods on humans and human communities. • Provide examples of how human practices can compound or lessen the impacts of earthquakes, volcanic eruptions, landslides, and floods on human communities and wildlife habitats.

Heat (Thermal Energy) (Physical Science)	**Standards-based Learning Objectives in the Context of the EP&C**
3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:	**Students will:**
a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.	
b. Students know that when fuel is consumed, most of the energy released becomes heat energy.	• Explain that various types of fuel are among the goods produced by natural systems and that fuel is essential for human communities, economies and cultures. • Describe how human consumption of fuel and the resulting release of heat energy can influence several of the cycles and processes that operate within natural systems (e.g., thermal pollution in coastal waters). • Identify that when fuels are consumed, other types of byproducts, in addition to heat energy, are produced and released, resulting in positive, neutral or detrimental effects on the environment. • Provide examples of the indirect influences of human fuel consumption on terrestrial, freshwater, coastal and marine ecosystems.
c. Students know heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).	
d. Students know heat energy is also transferred between objects by radiation (radiation can travel through space).	

Energy in the Earth System	**Standards-based Learning Objectives in the Context of the EP&C**
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 will:** • Describe how the energy-related phenomena on Earth's surface (i.e., those affected by the transfer of energy through radiation and convection currents) influence the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of these energy-related phenomena on Earth's surface on humans and human communities. • Explain how these energy-related phenomena on Earth's surface affect the distribution of goods and ecosystem services from natural systems (e.g., water supply).
a. 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.	• Recognize that wind and ocean currents can be harvested to generate electricity. • Provide examples of the advantages and disadvantages related to the use of energy generated from wind and ocean currents.

b. Students know solar energy reaches Earth through radiation.	
c. Students know heat from Earth's interior reaches the surface primarily through convection.	• Recognize that geothermal energy can be harvested to generate electricity. • Provide examples of the advantages and disadvantages related to the use of geothermal energy.
d. Students know convection currents distribute heat in the atmosphere and oceans.	• Humans depend on convection currents because they provide ecosystem services and the conditions for the production of goods for human use (e.g., the distribution of organisms). • Ocean currents along California's coasts are a major factor in determining what organisms live in coastal waters, as well as California's weather and climate.
e. Students know differences in pressure, heat, air movement, and humidity result in changes of weather.	

Ecology (Life Science) 5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
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.	• Describe how sunlight is transferred by producers into chemical energy through photosynthesis. • Recognize that plants are the primary source of energy for living things in an ecosystem. • Describe how energy and matter are transferred from organism to organism, including humans, through food webs. • Provide examples of human practices (e.g., ranching) that directly depend on the transfer of energy and matter 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.	• Recognize that matter is transferred over time between organisms in an ecosystem. • Describe the role of food webs in the flow of matter within natural systems. • Explain how the transfer of matter results in the movement of energy to organisms on different levels of the food web. • Describe different means through which humans get matter and energy from food webs (e.g., food consumption and respiration). • Recognize that the transfer of matter through an ecosystem generates byproducts (e.g., matter and heat energy are dissipated during transfers between levels in the food web). • Describe the effects of human practices (e.g., agriculture, forestry) and resulting byproducts, on the transfer of matter through natural systems (e.g., food chains and webs).
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.	• Define a population. • Give examples of the functions (producer, consumer, and decomposer) populations of organisms serve in an ecosystem. • Explain how energy is transferred in an ecosystem and how the amount of available energy varies at the level of consumption (primary, secondary and tertiary consumers). • Identify humans as consumers within ecosystems. • Identify and describe byproducts generated by the human consumption of goods (matter) produced by natural systems (ecosystems). • Describe the effects of human practices on the transfer of matter through natural systems. • Provide examples of how the quantities of resources consumed, and the quantity and characteristics of the resulting byproducts can affect natural systems.

d. Students know different kinds of organisms may play similar ecological roles in similar biomes.	• Recognize different biomes. • Identify the characteristics of various biomes. • Provide examples of different organisms playing similar ecological roles (herbivores, carnivores, omnivores, and decomposers) in similar biomes. • Explain how human practices make use of and/or have similar effects on organisms that play similar roles in different biomes. • Describe the effects of human practices on the transfer of matter through natural systems (e.g., the effects of agriculture and forestry on organisms with similar ecological roles are comparable 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.	• Identify abiotic factors that affect ecosystems. • Classify components of ecosystems as either living (biotic) or non-living (abiotic). • Explain the effects of changing biotic and abiotic factors on an ecosystem (e.g., the effects of changing: quantities of light or water, and soil composition on plant growth; range of temperatures on the species composition of animals and plants). • Provide examples of how human practices and rates of consumption affect the biotic and abiotic components (e.g., the availability of resources) in a natural system, thus influencing the number and types of organisms an ecosystem can support. • Provide examples of how the quantities of resources consumed, and the quantity and characteristics of the resulting byproducts can affect natural systems (e.g., as a result of overgrazing by cattle, the ecological characteristics of rangeland can change making it less productive).

Resources 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:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
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.	• Identify the various forms and uses of energy in students' communities. • Describe different methods of producing energy (including using fuel, converting solar energy to electricity, using hydro or wind power). • Recognize that when fuel is used (consumed) most of the energy released becomes heat, a byproduct that transfers to the surrounding environment. • Describe other byproducts of energy production and consumption (e.g., liquids, gases and solids that may have varied effects). • Provide examples of how the byproducts of converting energy sources into useful forms enter natural systems. • Describe how the quantities of energy resources consumed, and the quantity and characteristics of the resulting byproducts, affect natural systems. • Explain that the "usefulness" of energy sources is determined by weighing the benefits of their use against the costs of conversion and the generation and release of byproducts.
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.	• Identify different energy and material resources (e.g. air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests) that are provided by natural systems. • Explain that: renewable resources are replaced over a relatively short time period (e.g., fresh water, hydroelectric power, or living resources); non-renewable resources accumulate over such a long period of time that they must be considered as fixed (e.g., minerals or fossil fuels); and, inexhaustible resources have no practical limits (e.g., solar or hydrothermal energy). • Classify energy and material resources as renewable, non-renewable, or inexhaustible. • Identify energy and material resources that are essential to human life. • Provide examples of how human practices and rates of consumption can affect the availability (quality, quantity and reliability) of energy and material resources that are essential to human life.

c. Students know the natural origin of the materials used to make common objects.	• Identify the natural origin of the materials used to make common objects. • Provide examples of the goods that are produced by natural systems that are used to make common objects used by humans. • Explain the methods used to make common objects (useable products) from natural resources. • Describe the methods used to extract, harvest and transport the materials used to make common objects from natural resources. • Provide examples of how the methods used to extract, harvest and transport natural resources, and consume them (or make useable products) affect natural systems.

Investigation and Experimentation

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:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework)."*

These will be developed to connect with the EP&C learning objectives.

Seventh Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Cell Biology 1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know cells function similarly in all living organisms.	
b. Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.	
c. Students know the nucleus is the repository for genetic information in plant and animal cells.	
d. Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis.	
e. Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.	
f. Students know that as multicellular organisms develop, their cells differentiate.	

Genetics 2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.	
b. Students know sexual reproduction produces offspring that inherit half their genes from each parent.	
c. Students know an inherited trait can be determined by one or more genes.	
d. Students know plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive.	
e. Students know DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell.	

Evolution	**Standards-based Learning Objectives in the Context of the EP&C**
3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:	**Students will:** • Recognize that living and non-living things change. • Recognize that living things, including humans, cause changes in their environment. • Recognize factors that influence populations of organisms and biological diversity. • Describe the effects of demographics and distribution of human populations and their consumption rates on natural systems (e.g., their geographic extent, composition, biological diversity, and viability). • Provide examples of how the methods used to extract, harvest, and transport natural resources, and consume natural resources (or make useable products) affect natural systems (e.g., their geographic extent, composition, biological diversity, and viability). • Compare historic and present day geographic extents of natural systems (terrestrial, freshwater, coastal and marine ecosystems). • Describe how the activities related to the expansion and operation of human communities influence natural systems.
a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.	• Define evolution and identify its causes. • Describe the influence of genetic variation on the evolution and diversity of organisms. • Identify the role of environmental factors on the evolution and diversity of organisms, and the long-term functioning and health of natural systems. • Provide examples of how human population growth and human activities (e.g., expansion of communities, production and consumption of natural resources, the operation and expansion of human communities, and generation of byproducts) can affect both genetic variation and environmental factors). • Describe how human activities can affect reproductive cycles and genetic diversity, and thus, the evolution and diversity of species.
b. Students know the reasoning used by Charles Darwin in reaching his conclusion that natural selection is the mechanism of evolution.	
c. Students know how independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution.	• Identify evidence for the theory of evolution and process of natural selection through case studies that investigate the effects of human activities.
d. Students know how to construct a simple branching diagram to classify living groups of organisms by shared derived characteristics and how to expand the diagram to include fossil organisms.	
e. Students know that extinction of a species occurs when the environment changes and that the adaptive characteristics of a species are insufficient for its survival.	• Define and give examples of adaptation in living things. • Explain the effects of changing environmental factors in a natural system on species (e.g., changing biotic and abiotic factors including the availability of resources). • Identify factors that can cause extinction of a species and explain that some extinctions are natural while others are human-induced. • Recognize that throughout the history of life on Earth, some plants and animal species have died out completely in response to environmental changes. • Provide examples of how human population growth and expansion of communities, production and consumption of natural resources, and the operation and expansion of human communities can influence rates of extinction. • Describe how the capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity, and on the nature and health of the natural system. • Identify that in cases where species cannot respond to the degree of change, extinction may occur.

Earth and Life History (Earth Science) 4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.	• Define and distinguish the terms cycles and processes. • Describe the cycles and processes that occur in natural systems. • Explain that the effects of geologic processes on natural systems that are observed today are similar to those that occurred in the past. • Provide examples of how the functioning of natural systems is dependent upon geologic processes that operate over long periods of time. • Provide examples of how the cycles and processes that occur in natural systems today are similar to those that occurred in the past.
b. Students know the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.	• Describe the ways that major catastrophic events, such as major volcanic eruptions or the impacts of asteroids, can disrupt the processes and cycles that occur in natural systems. • Provide examples of how the disruption of these processes and cycles by major catastrophic events can influence the geographic extent, composition, biological diversity, and viability of natural systems. • Explain how the disruption of these processes and cycles by major catastrophic events can influence the geographic extent, composition, biological diversity, and viability of natural systems.
c. Students know that the rock cycle includes the formation of new sediment and rocks, and that rocks are often found in layers, with the oldest generally on the bottom.	
d. Students know that evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.	
e. Students know fossils provide evidence of how life and environmental conditions have changed.	• Explain that fossils provide useful evidence of how life and environmental conditions have changed over geological time since the effects of the changes that are observed today are similar to those that occurred in the past. • Provide examples of how recent major catastrophic events have influenced the geographic extent, composition, biological diversity, and viability of natural systems.
f. Students know how movements of Earth's continental and oceanic plates through time, with associated changes in climate and geographic connections, have affected the past and present distribution of organisms.	• Describe how changes in climate and geographic connections can affect the distribution of organisms. • Explain that the effects of geologic processes on natural systems that are observed today are similar to those that occurred in the past. • Describe how humans can affect the distribution of organisms. • Provide examples of changes in the distribution of organisms and natural systems that have resulted from human-induced disruption of the cycles and processes that occur in natural systems.
g. Students know how to explain significant developments and extinctions of plant and animal life on the geologic time scale.	• Identify changes to biotic and abiotic factors in natural systems that can result in the extinction of species. • Explain how extinction occurs. • Give examples of extinctions on Earth in geologic time. • Describe how natural systems can change gradually on a geologic time scale or rapidly (e.g., changes to biogeochemical cycles, system processes, species composition, and capacity to yield goods and ecosystem services). • Provide examples of human activities, and the resulting byproducts, that can cause rapid and/or significant changes to plant and animal life that might result in extinction. • Describe the effects when natural systems cannot adjust to human-caused alterations and how these effects are influenced by the nature of the system as well as the scope, scale, duration and byproducts of the activity.

Structure and Function in Living Systems 5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.	• Describe how the components, processes, and cycles that occur in natural systems are analogous to the structures and functions that occur in whole organisms. • Provide examples of components and processes that occur in terrestrial, freshwater, coastal and marine systems that parallel the functions served by cells, tissues, organs, organ systems, and whole organisms.
b. Students know organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.	
c. Students know how bones and muscles work together to provide a structural framework for movement.	
d. Students know how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy.	
e. Students know the function of the umbilicus and placenta during pregnancy.	
f. Students know the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.	
g. Students know how to relate the structures of the eye and ear to their functions.	

Physical Principles in Living Systems (Physical Science) 6. Physical principles underlie biological structures and functions. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know visible light is a small band within a very broad electromagnetic spectrum.	
b. Students know that for an object to be seen, light emitted by or scattered from it must be detected by the eye.	
c. Students know light travels in straight lines if the medium it travels through does not change.	
d. Students know how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.	
e. Students know that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.	
f. Students know light can be reflected, refracted, transmitted, and absorbed by matter.	
g. Students know the angle of reflection of a light beam is equal to the angle of incidence.	
h. Students know how to compare joints in the body (wrist, shoulder, thigh) with structures used in machines and simple devices (hinge, ball-and-socket, and sliding joints).	
i. Students know how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system.	
j. Students know that contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system.	

Investigation and Experimentation

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The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework).*"

These will be developed to connect with the EP&C learning objectives.

Eighth Grade — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Motion 1. The velocity of an object is the rate of change of its position. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know position is defined in relation to some choice of a standard reference point and a set of reference directions.	
b. Students know that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.	
c. Students know how to solve problems involving distance, time, and average speed.	
d. Students know the velocity of an object must be described by specifying both the direction and the speed of the object.	
e. Students know changes in velocity may be due to changes in speed, direction, or both.	
f. Students know how to interpret graphs of position versus time and graphs of speed versus time for motion in a single direction.	

Forces 2. Unbalanced forces cause changes in velocity.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know a force has both direction and magnitude.	
b. Students know when an object is subject to two or more forces at once, the result is the cumulative effect of all the forces.	
c. Students know when the forces on an object are balanced, the motion of the object does not change.	
d. Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.	
e. Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).	
f. Students know the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.	
g. Students know the role of gravity in forming and maintaining the shapes of planets, stars, and the solar system.	

Structure of Matter 3. Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.	
b. Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.	

c. Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers.	
d. Students know the states of matter (solid, liquid, gas) depend on molecular motion.	
e. Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.	
f. Students know how to use the periodic table to identify elements in simple compounds.	

Earth in the Solar System (Earth Science) 4. The structure and composition of the universe can be learned from studying stars and galaxies and their evolution.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know galaxies are clusters of billions of stars and may have different shapes.	
b. Students know that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.	
c. Students know how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.	
d. Students know that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.	
e. Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.	

Reactions 5. Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know reactant atoms and molecules interact to form products with different chemical properties.	
b. Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.	
c. Students know chemical reactions usually liberate heat or absorb heat.	
d. Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction.	
e. Students know how to determine whether a solution is acidic, basic, or neutral.	

Chemistry of Living Systems (Life Science) 6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.	• Identify that carbon-based goods produced by natural systems and yielded by human practices are essential to human life (e.g., agricultural and forest products). • Recognize that the carbon cycle is an ecosystem service upon which all living things depend. • Provide examples of carbon-based goods and ecosystem services provided by natural systems that are the basis of our economies and cultures (e.g., agricultural products, forest products).
b. Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.	• Identify the roles of molecules formed by carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur in the functioning of natural systems. • Explain that matter comprised of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur is the essential component of all goods produced by natural systems and as such is the basis for human life. • Provide examples of key processes in natural systems that are dependent on carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur. • Describe how carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur flow through natural systems in cycles and processes. • Describe how human practices can interrupt cycles and processes that allow carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur to flow through natural systems
c. Students know that living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA.	

Periodic Table 7. The organization of the periodic table is based on the properties of the elements and reflects the structure of atoms.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how to identify regions corresponding to metals, nonmetals, and inert gases.	
b. Students know each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.	
c. Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.	

Density and Buoyancy 8. All objects experience a buoyant force when immersed in a fluid.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know density is mass per unit volume.	
b. Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.	
c. Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced.	
d. Students know how to predict whether an object will float or sink.	

Investigation and Experimentation

9. 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:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

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Earth Science High School — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Earth's Place in the Universe 1. Astronomy and planetary exploration reveal the solar system's structure, scale, and change over time. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know how the differences and similarities among the sun, the terrestrial planets, and the gas planets may have been established during the formation of the solar system.	
b. Students know the evidence from Earth and moon rocks indicates that the solar system was formed from a nebular cloud of dust and gas approximately 4.6 billion years ago.	
c. Students know the evidence from geological studies of Earth and other planets suggest that the early Earth was very different from Earth today.	
d. Students know the evidence indicating that the planets are much closer to Earth than the stars are.	
e. Students know the Sun is a typical star and is powered by nuclear reactions, primarily the fusion of hydrogen to form helium.	
f. Students know the evidence for the dramatic effects that asteroid impacts have had in shaping the surface of planets and their moons and in mass extinctions of life on Earth	
g. * Students know the evidence for the existence of planets orbiting other stars	

2. Earth-based and space-based astronomy reveal the structure, scale, and changes in stars, galaxies, and the universe over time. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the solar system is located in an outer edge of the disc-shaped Milky Way galaxy, which spans 100,000 light years.	
b. Students know galaxies are made of billions of stars and comprise most of the visible mass of the universe.	
c. Students know the evidence indicating that all elements with an atomic number greater than that of lithium have been formed by nuclear fusion in stars.	
d. Students know that stars differ in their life cycles and that visual; radio, and X-ray telescopes may be used to collect data that reveal those differences.	
e. * Students know accelerators boost subatomic particles to energy levels that simulate conditions in the stars and in the early history of the universe before stars formed.	
f. * Students know the evidence indicating that the color, brightness, and evolution of a star are determined by a balance between gravitational collapse and nuclear fusion.	
g. * Students know how the red-shift from distant galaxies and the cosmic background radiation provide evidence for the "big bang" model that suggests that the universe has been expanding for 10 to 20 billion years.	

Dynamic Earth Processes 3. Plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on Earth's surface. As the basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:** • Describe how geologic events and processes have affected the distribution of terrestrial, freshwater and coastal ecosystems, and changed the patterns of land, sea, and mountains. • Provide examples of the direct and indirect influences of these geologic events and processes on humans and human communities. • Explain how these geologic events and processes affect the distribution of goods and ecosystems services from natural systems (e.g., water supply).
a. Students know features of the ocean floor (magnetic patterns, age, and sea-floor topography) provide evidence of plate tectonics.	
b. Students know the principal structures that form at the three different kinds of plate boundaries.	
c. Students know how to explain the properties of rocks based on the physical and chemical conditions in which they formed, including plate tectonic processes.	
d. Students know why and how earthquakes occur and the scales used to measure their intensity and magnitude.	
e. Students know there are two kinds of volcanoes: one kind with violent eruptions producing steep slopes and the other kind with voluminous lava flows producing gentle slopes.	
f. * Students know the explanation for the location and properties of volcanoes that are due to hot spots and the explanation for those that are due to subduction.	

Energy in the Earth System 4. Energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:** • Describe how the energy-related phenomena on the Earth's surface (i.e., solar radiation and the escape of heat) influence the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of these energy-related phenomena on humans and human communities. • Explain how these energy-related phenomena affect the distribution of goods and ecosystem services from natural systems (e.g., water supply).
a. Students know the relative amount of incoming solar energy compared with Earth's internal energy and the energy used by society.	• Identify the sources of energy used by human communities and natural systems (e.g., solar energy, Earth's internal energy, energy stored on the Earth over time [oil, forests], hydropower). • Describe the uses of these sources of energy in human communities and natural systems. • Quantify the use of different sources of energy in their communities. • Provide examples of the methods used to obtain/convert and consume energy from the different sources. • Compare the effects, on both human communities and natural systems, of the methods used to obtain/convert and consume energy. • Recognize that the amount of energy used by society is relative compared to incoming solar energy and energy from Earth's interior. • Compare the relative amounts of incoming solar energy to Earth's internal energy with energy used by human society and natural systems.

b. Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.	• Identify the significance of solar radiation, reflection, absorption, and photosynthesis to humans, human communities and natural systems (e.g., photosynthesis as the basis of food, dissipation of energy from the Earth that moderates temperature). • Describe the roles of reflection, absorption, and photosynthesis on the processes and cycles that are required for the functioning of natural systems. • Recognize the influence of human practices and the expansion of human communities on the fate and effect of incoming solar radiation in terms of reflection, absorption, and photosynthesis (e.g., effects on local climate and microclimates, and human health).
c. Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.	• Identify the role of different atmospheric gases in the functioning of natural systems, human life and human communities. • Recognize the roles of natural systems and human communities in the production and absorption of atmospheric gases. • Describe the possible effects of human activities on the accumulation and dissipation of greenhouse gases. • Provide examples of the influences of the greenhouse effect and possible global climate change on natural systems and recognize that the effects depend on the characteristics of the particular natural system and the scope, scale, and duration of the changes. • Describe the spectrum of considerations that are involved in decisions about global climate change. • Describe the factors that limit knowledge about the scope and potential environmental impacts of global climate change. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to global climate change.
d. * Students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climatic consequences of each.	• Recognize the benefits and limitations of using information about greenhouse conditions on Mars and Venus in developing an understanding of similar conditions on Earth. • Predict the climatic consequences of differing greenhouse conditions on the future conditions on Earth, Mars, and Venus.

5. Heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:** • Explain how the production of winds and ocean currents through convection within the atmosphere and oceans (resulting from heating of Earth's surface and atmosphere) influences the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of how the convection within the atmosphere and oceans influences humans and human communities. • Explain how the convection within the atmosphere and oceans affects the distribution of goods and ecosystem services from natural systems (e.g., water supply, ocean currents).
a. Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.	• Describe the influence of atmospheric and oceanic circulation patterns on weather and weather patterns. • Explain how the circulation patterns and resulting weather patterns influence the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of atmospheric and oceanic circulation patterns on humans and human communities. • Explain how of atmospheric and oceanic circulation patterns affect the distribution of goods and ecosystem services from natural systems (e.g., water supply).

b. Students know the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.	• Recognize that the circular motion of ocean currents and air in pressure centers influences the distribution of nutrients and organisms, thus influencing the goods and ecosystem services provided by coastal and marine systems. • Describe how the rotation of Earth results in circulation patterns in the atmosphere and ocean that govern the flow of energy within and between natural systems. • Explain that fluctuations in climate and weather conditions resulting from the rotation of Earth and the circular motions of ocean currents affect ocean temperature, thereby changing the distribution of organisms (e.g., fish and algae) on which humans depend.
c. Students know the origin and effects of temperature inversions.	• Identify the effects of temperature inversions in terms of the trapping of gases and particulate matter close to the Earth's surface. • Recognize that human activities can increase the quantity and affect the chemical characteristics of the gases and particulate matter that are trapped close to the Earth's surface as a result of temperature inversions. • Explain how the trapping of gases and particulate matter influences the quality of air humans and other organisms breathe. • Explain the reasons that some regions in California are particularly vulnerable to temperature inversions. • Describe the role of scientific knowledge regarding temperature inversions and air quality on making policy and management decisions about human activity in some regions in California. • Provide examples of human practices that can decrease the quantity or the effects of the gases and particulate matter that are trapped during temperature inversions, thus diminishing the influence on the health of humans and natural systems.
d. Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.	• Identify the properties of ocean water that can affect the geographic distribution of coastal and marine organisms. • Describe how the layered structure of the oceans and, horizontal and vertical ocean currents influence the geographic distribution of coastal and marine organisms. • Explain the importance of coastal and marine organisms to human lives and communities. • Provide examples of human practices that can locally influence the layered structure of the oceans or horizontal and vertical ocean currents. • Explain how changes to the geographic distribution of marine organisms can influence coastal and marine ecosystems, and human communities and economies. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to coastal and marine ecosystems.
e. Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.	• Describe the properties of rain forests and map their locations on Earth. • Describe the properties of deserts and map their locations on Earth. • Identify factors that affect the geographic distribution of rain forests and desert ecosystems on Earth. • Explain the importance of rain forests and desert ecosystems to human lives and communities. • Provide examples of human practices that can influence the functioning or geographic distribution of rain forests and desert ecosystems. • Explain how changes to the geographic distribution of rain forests and desert ecosystems can influence humans and human communities, economies and cultures. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to rain forests and desert ecosystems.
f. * Students know the interaction of wind patterns, ocean currents, and mountain ranges results in the global pattern of latitudinal bands of rain forests and deserts.	

g. * Students know features of the ENSO (El Niño southern oscillation) cycle in terms of sea-surface and air temperature variations across the Pacific and some climatic results of this cycle.	• Identify some climatic results of the ENSO cycle. • Recognize the direct and indirect effects of sea-surface, air temperature variations, and the climatic changes that result from the ENSO cycle on coastal and marine ecosystems across the Pacific. • Provide examples of direct and indirect effects of sea-surface, air temperature variations, and the climatic changes that result from the ENSO cycle on terrestrial and freshwater ecosystems across the Pacific. • Explain how the direct and indirect effects result from the ENSO cycle on affect humans and human communities, economies and cultures.

6. Climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.	• Describe effects of weather and climate on the functioning of natural systems and the production of goods and ecosystem services by these systems. • Provide examples of direct and indirect effects of weather and climate on humans and human communities, economies and cultures.
b. Students know the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.	• Provide examples of direct and indirect effects of latitude, elevation, and topography on the functioning of natural systems and the production of goods and ecosystem services by natural systems.
c. Students know how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.	• Identify how changes to Earth's climate, geography, and atmospheric composition influence the functioning of natural systems and the production of goods and ecosystem services by natural systems. • Provide examples of direct and indirect effects of changes to Earth's climate, geography, and atmospheric composition on humans and human communities, economies and cultures. • Identify how human activities can contribute to changes in climate and atmospheric composition. • Describe the effects of changes to Earth's climate, geography, and atmospheric composition on evolutionary processes.
d. * Students know how computer models are used to predict the effects of the increase in greenhouse gases on climate for the planet as a whole and for specific regions.	• Recognize that computer models are used to predict the effects of the increase in greenhouse gases on climate. • Recognize that such models are among the spectrum of factors considered in making decisions about resources and natural systems. • Identify how human activities (e.g., population growth, resource production and consumption, operation and expansion of communities) can influence the quantity and distribution of global greenhouse gases. • Describe how computer models about the effects of greenhouse gases on climate are used in the development of laws, regulations, policies, and incentives that govern management of greenhouse gas emissions. • Describe how the assessment of social, economic, political and environmental factors involved in decisions about greenhouse gases, and the laws, regulations, policies, and incentives that govern management of greenhouse gas emissions have changed over time. • Explain how computer models are used to predict the effects of the increased greenhouse gases on the geographic extent, composition, biological diversity, and viability of natural systems. • Describe the role of scientific knowledge in making predictions about the effects of increases in greenhouse gases on climate for the planet as a whole and for specific regions.

Biogeochemical Cycles 7. Each element on Earth moves among reservoirs, which exist in the solid earth, in oceans, in the atmosphere, and within and among organisms as part of biogeochemical cycles. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle.	• Identify the significance of the carbon cycle of photosynthesis and respiration and the nitrogen cycle to natural systems and human life. • Describe the role of carbon and nitrogen cycles in the flow of energy and matter within and between natural systems and human systems. • Provide examples of the dependence of human life and human communities, economies and culture on the cycling of carbon and nitrogen. • Identify human practices that can alter carbon and nitrogen cycles.
b. Students know the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.	• Recognize that carbon is used by natural systems and organisms in a variety of physical and chemical forms. • Identify how the global carbon cycle is essential to all natural systems and organisms and to the functioning of human communities, economies and culture. • Provide examples of various carbon reservoirs (e.g., atmosphere, oceans, organisms/biomass, coal and oil deposits). • Describe how the movement of carbon among its various reservoirs (atmosphere, oceans, biomass, coal and oil deposits, and the atmosphere) is central to the flow of energy and matter within and between natural systems and human communities. • Provide examples of human practices that can influence the global carbon cycle (e.g., the movement of carbon among its various reservoirs).
c. Students know the movement of matter among reservoirs is driven by Earth's internal and external sources of energy.	
d. * Students know the relative residence times and flow characteristics of carbon in and out of its different reservoirs.	• Provide examples of human practices that can alter the relative residence times and flow characteristics of carbon in and out of its different reservoirs (e.g., use of coal and oil as energy sources). • Identify how changing the flow of carbon through the global carbon cycle can affect the geographic extent, composition, biological diversity, and viability of natural systems.

Structure and Composition of the Atmosphere 8. Life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the thermal structure and chemical composition of the atmosphere.	• Recognize the roles of natural systems and human communities in the production and absorption of atmospheric gases. • Identify specific chemical components of the atmosphere that are essential to the functioning of natural systems, human life and human communities. • Provide examples of how natural systems, human life and human communities have affected Earth's atmosphere. • Describe human activities and practices that can influence the thermal structure or chemical composition of the atmosphere. • Describe the factors that limit knowledge about the scope and potential environmental impacts resulting from atmospheric change. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to atmospheric change.
b. Students know how the composition of Earth's atmosphere has evolved over geologic time and know the effect of outgassing, the variations of carbon dioxide concentration, and the origin of atmospheric oxygen.	

c. Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.	• Identify the significance of ozone and the ozone layer to natural systems and organisms, human life and to the functioning of human communities, economies and culture (e.g., role of the ozone layer in absorbing UV radiation). • Provide examples of how natural systems and human communities can affect Earth's ozone layer. • Describe how human activities and practices influence the ozone layer (e.g., refrigerants, aerosol propellants, fire extinguishers). • Describe the factors that limit knowledge about the scope and potential environmental impacts resulting from changes to the ozone layer. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to atmospheric change.

California Geology 9. The geology of California underlies the state's wealth of natural resources as well as its natural hazards. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the resources of major economic importance in California and their relation to California's geology.	• List natural resources of major economic importance to California and describe how they are economically important. • Identify the sources and locations of these major natural resources in California. • Correlate the sources and locations of these major natural resources with California's geological features. • Classify these resources as renewable, non-renewable, or effectively inexhaustible. • Describe the methods used to extract, harvest, transport and consume the major natural resources and explain the effects of these practices on the geographic extent, composition, biological diversity, and viability of natural systems. • Identify the byproducts of extracting, harvesting, transporting and consuming these natural resources and describe the direct and indirect effects of those byproducts on natural systems, human life and human communities, economies and cultures. • Describe the factors that limit knowledge about the scope and potential environmental impacts resulting from extracting, harvesting, transporting and consuming the major natural resources. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to extracting, harvesting, transporting and consuming the major natural resources.
b. Students know the principal natural hazards in different California regions and the geologic basis of those hazards.	• Identify the direct and indirect effects of principal natural hazards in different California regions on natural systems, human life and human communities, economies and cultures. • Recognize the influence of human practices and the expansion of human communities on the scope and scale of the impacts of the principal natural hazards in different California regions (e.g., with population increases, there is increasing pressure to build in geologically hazardous areas). • Describe how the existence of geological hazards throughout California influences decisions about a variety of human practices including the expansion and operation of human communities and use of resources. • Describe the factors that limit knowledge about the scope and scale of the potential impacts of California's principal natural hazards. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to California's principal natural hazards.

c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.	• List major uses of water in California and describe their importance to society. • Identify the sources and locations of major water supplies in California (e.g., surface water, reservoirs, and aquifers). • Describe the methods used to collect, transport and consume water in California. • Provide examples of the direct and indirect effects of the growing human demand for water on the geographic extent, composition, biological diversity, and viability of natural systems. • Describe the spectrum of considerations that are involved in decisions about California's supplies of fresh water. • Describe the factors that limit knowledge about the scope and potential environmental impacts of water resource policies (e.g., economics, environmental costs and benefits, public health, historical and cultural implications, and personal views). • Describe the role of scientific knowledge on making policy and management decisions about human activity related to California's water supply.
d. * Students know how to analyze published geologic hazard maps of California and know how to use the map's information to identify evidence of geologic events of the past and predict geologic changes in the future.	• Describe the spectrum of considerations that are involved in decisions about human communities and activities related to California's geological hazards. • Describe the factors that limit knowledge about the scope and potential effects of geological hazards on California's human communities. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to California's geological hazards.

Biology/Life Science High School — California Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Cell Biology 1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know cells are enclosed within semi-permeable membranes that regulate their interaction with their surroundings.	• Recognize that because cell membranes are semi-permeable the byproducts of human activity (e.g., chemicals released into air and water) can readily enter cells. • Explain that byproducts of human activity that enter cells are not readily prevented from entering natural systems. • Provide examples of byproducts of human activity that have beneficial, neutral, and detrimental affects on cells and organisms.
b. Students know enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.	
c. Students know how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure.	
d. Students know the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm.	
e. Students know the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.	
f. Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.	• Explain the importance of the usable energy that is captured by chloroplasts to the functioning of all natural systems. • Describe the role of the synthesis of sugar from carbon dioxide in the functioning of all natural systems and our economies.
g. Students know the role of the mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.	
h. Students know most of macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.	• Recognize that if the simple precursors of macromolecules are not available to cells and organisms, they will not be able to produce polysaccharides, nucleic acids, proteins, lipids. • Explain that if cells and organisms cannot produce polysaccharides, nucleic acids, proteins, and lipids, the cells and organisms will not survive. • Provide examples of how human activities can influence the availability of the simple precursors of macromolecules.
i. Students know how chemiosmotic gradients in the mitochondria and chloroplast store energy for ATP production.	
j. Students know how eukaryotic cells are given shape and internal organization by a cytoskeleton or cell wall or both.	

Genetics	Standards-based Learning Objectives in the Context of the EP&C
2. Mutation and sexual reproduction lead to genetic variation in a population. As a basis for understanding this concept:	**Students will:** • Identify byproducts of human activities that can lead to mutations. • Describe how these byproducts can lead to mutations, increased mutation rates, and genetic variation in a population. • Provide examples of how increased mutation rates can affect the health and functioning of organisms and natural systems.

a. Students know meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.	
b. Students know only certain cells in a multicellular organism undergo meiosis.	
c. Students know how random chromosome segregation explains the probability that a particular allele will be in a gamete.	
d. Students know new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).	
e. Students know why approximately half of an individual's DNA sequence comes from each parent.	
f. Students know the role of chromosomes in determining an individual's sex.	
g. Students know how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents.	

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive).	
b. Students know the genetic basis for Mendel's laws of segregation and independent assortment.	
c. * Students know how to predict the probable mode of inheritance from a pedigree diagram showing phenotypes.	
d. * Students know how to use data on frequency of recombination at meiosis to estimate genetic distances between loci and to interpret genetic maps of chromosomes.	

4. Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know the general pathway by which ribosomes synthesize proteins, using tRNAs to translate genetic information in mRNA.	
b. Students know how to apply the genetic coding rules to predict the sequence of amino acids from a sequence of codons in RNA	
c. Students know how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein.	
d. Students know specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the genes themselves.	

e. Students know proteins can differ from one another in the number and sequence of amino acids.	
f. * Students know why proteins having different amino acid sequences typically have different shapes and chemical properties	

5. The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know the general structures and functions of DNA, RNA, and protein.	
b. Students know how to apply base-pairing rules to explain precise copying of DNA during semi-conservative replication and transcription of information from DNA into mRNA.	• Identify factors caused by natural events and human activity that can influence the precision of the copying of DNA. • Recognize which of these factors can be affected or caused by human activities. • Explain the significance of imprecise copying of DNA to the survival of individual organisms, populations and natural systems.
c. Students know how genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products.	• Recognize the importance of the genetic resources that are available from natural systems in the production of novel biomedical and agricultural products (e.g., pharmaceuticals, new crops). • Identify the ways the production and use of genetically engineered agricultural products may influence the composition, biological diversity, and viability of natural systems, as well as human health. • Identify the ways the production and use of biomedical products may influence the composition, biological diversity, and viability of natural systems, as well as human health. • Explain that genetically engineered agricultural products cannot be readily prevented from entering natural systems and may have beneficial, neutral or detrimental effects on those natural systems. • Identify the spectrum of factors that should be considered in making decisions regarding the introduction of genetically engineered products into natural systems.
d. * Students know how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, ligation, and transformation) is used to construct recombinant DNA molecules.	
e. * Students know how exogenous DNA can be inserted into bacterial cells to alter their genetic makeup and support expression of new protein products.	

Ecology 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.	• Define biodiversity (biological diversity) as a measure of the different kinds of organisms in an ecosystem. • Explain the importance of biodiversity to human lives, communities and societies in terms of the goods and ecosystem services natural systems provide. • List the direct and indirect changes to natural systems that can affect biodiversity (e.g., alterations of habitats). • Describe the implications of loss of biodiversity to natural systems and human societies. • Provide examples of human activity that can influence the biodiversity of natural systems (e.g., methods used extract, harvest, transport and consume natural resources; expansion and operation of human communities; and, laws, regulations, policies, and incentives that govern management of natural resources). • Explain the influence of human activities on biodiversity is directly related to population growth, the quantities of resources consumed and the quantity and characteristics of the byproducts of those activities.

b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.	• List variables that can cause changes to ecosystems (e.g., climate change and human activities such as the introduction of nonnative species and the conversion of land [loss of habitat]). • Provide examples of how each of these variables can lead to changes in ecosystems. • Categorize the effects on ecosystems as short-term, long-term or not determined • Determine if these variables have cumulative and/or synergistic effects on ecosystems. • Catalog the factors that influence the scope, scale and duration of these effects on ecosystems. • Explain the spectrum of factors and the processes that are involved in analysis and decision-making regarding the management of ecosystems.
c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.	• Describe human activities that can directly and indirectly cause fluctuations in population size in an ecosystem. • Identify how fluctuations in population size in an ecosystem can influence the biodiversity, composition and viability of natural systems. • Provide examples of fluctuations in population size in an ecosystem that have been caused by human activities.
d. Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.	• Analyze the roles of water, carbon, nitrogen, and oxygen cycles and processes in the functioning of terrestrial, freshwater, coastal and marine ecosystems. • Describe the roles of cycles and processes in yielding the goods and ecosystem services upon which humans depend. • Appraise how human practices benefit from the cycles and processes that occur in terrestrial, freshwater, coastal and marine ecosystems. • Analyze how various human practices can alter the cycles and processes that affect the functioning of natural systems.
e. Students know a vital part of an ecosystem is the stability of its producers and decomposers.	• Analyze the role of producers and decomposers in transferring energy and matter through natural systems. • Provide examples of how producers and decomposers produce goods and ecosystem services that are essential to all organisms, including humans. • Describe how humans and their practices benefit from the stability of producers and decomposers in natural systems. • Evaluate how various human practices can alter the stability of producers and decomposers in natural systems. • Identify what can happen to an ecosystem if the stability of its producers and decomposers is compromised.
f. Students know at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.	• Describe how humans and their practices benefit from the stability of food chains and webs in natural systems. • Identify what can happen if links in a food chain or web are changed or eliminated. • Provide examples of human practices that can alter food chains and webs.
g. * Students know how to distinguish between the accommodation of an individual organism to its environment and the gradual adaptation of a lineage of organisms through genetic change.	• Provide examples of environmental changes, including those caused by human activities, that individual organisms can and cannot accommodate. • Provide examples of environmental changes, including those caused by human activities that individual organisms accommodate. • Describe what happens to organisms if they cannot accommodate an environmental change. • Explain how the capacity of a natural system to adjust to human-caused environmental change depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

Evolution 7. The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know why natural selection acts on the phenotype rather than the genotype of an organism.	• Recognize that an organism's ability to survive in its environment is dependent on its genetically determined capabilities and that individual organisms cannot change their genetic makeup in order to survive.

b. Students know why alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool.	
c. Students know new mutations are constantly being generated in a gene pool.	• Explain that although new mutations are constantly being generated in gene pools, human practices can change the rate of mutations and make the mutations more significant to the survival of an organism.
d. Students know variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.	• Recognize that human practices can change environmental conditions and affect the survival of both individual organisms and particular populations of a species. • Explain that the scope, scale, and duration of human activities and the nature of the resulting byproducts affect the capacity of individual organisms and particular populations of a species to adjust to alterations.
e. * Students know the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature.	
f. * Students know how to solve the Hardy-Weinberg equation to predict the frequency of genotypes in a population, given the frequency of phenotypes.	

8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
a. Students know how natural selection determines the differential survival of groups of organisms.	• Identify the natural factors that can influence the rates at which environments change. • Recognize the natural factors that can influence the differential survival of groups of organisms. • Describe human activities that can influence the rates at which environments change. • Provide examples of human activities that can influence the differential survival of groups of organisms.
b. Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.	• Recognize that interacting groups of living and non-living things and their interactions comprise ecosystems. • Give examples of the interactions and interdependence among the components of an ecosystem (e.g., plants relying on animals for pollination and seed dispersal, and animals depending on plants for food and shelter). • Identify human activities and practices that can influence the interactions and interdependence among the components of an ecosystem (e.g., alterations of habitats, methods used extract, harvest, transport, and consume natural resources). • Discuss the varied scientific views about the relationship between biological diversity and ecosystem stability.
c. Students know the effects of genetic drift on the diversity of organisms in a population.	
d. Students know reproductive or geographic isolation affects speciation.	• Describe human activities and practices that can influence the geographic isolation of populations of organisms (e.g., the expansion of human communities). • Provide cases studies in which the introduction of non-native species into ecosystems has caused the reproductive or geographic isolation of native organisms. • Explain the factors that cause increased susceptibility of island-dwelling organisms to rapid environmental changes.
e. Students know how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction.	
f. * Students know how to use comparative embryology, DNA or protein sequence comparisons, and other independent sources of data to create a branching diagram (cladogram) that shows probable evolutionary relationships.	

g. * Students know how several independent molecular clocks, calibrated against each other and combined with evidence from the fossil record, can help to estimate how long ago various groups of organisms diverged evolutionarily from one another.	

Physiology	**Standards-based Learning Objectives in the Context of the EP&C**
9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. As a basis for understanding this concept:	**Students will:**
a. Students know how the complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.	
b. Students know how the nervous system mediates communication between different parts of the body and the body's interactions with the environment.	
c. Students know how feedback loops in the nervous and endocrine systems regulate conditions in the body.	
d. Students know the functions of the nervous system and the role of neurons in transmitting electrochemical impulses.	
e. Students know the roles of sensory neurons, interneurons, and motor neurons in sensation, thought, and response	
f. * Students know the individual functions and sites of secretion of digestive enzymes (amylases, proteases, nucleases, lipases), stomach acid, and bile salts.	
g. * Students know the homeostatic role of the kidneys in the removal of nitrogenous wastes and the role of the liver in blood detoxification and glucose balance.	
h. * Students know the cellular and molecular basis of muscle contraction, including the roles of actin, myosin, Ca^{+2}, and ATP.	
i. * Students know how hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.	

10. Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
a. Students know the role of the skin in providing nonspecific defenses against infection.	
b. Students know the role of antibodies in the body's response to infection.	
c. Students know how vaccination protects an individual from infectious diseases.	
d. Students know there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.	

e. Students know why an individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign.	
f. * Students know the roles of phagocytes, B-lymphocytes, and T-lymphocytes in the immune system.	

Kindergarten — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students understand that being a good citizen involves acting in certain ways.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Follow rules, such as sharing and taking turns, and know the consequences of breaking them.	• List examples of basic rules people need to follow regarding natural systems and resources (e.g., littering, fishing).
2. Learn examples of honesty, courage, determination, individual responsibility, and patriotism in American and world history from stories and folklore.	• Study examples of people demonstrating honesty, courage, determination, individual responsibility, and patriotism in American and world history as they worked to protect natural systems and resources.
3. Know beliefs and related behaviors of characters in stories from times past and understand the consequences of the characters' actions.	• Provide examples of beliefs and related behaviors of characters in stories from times past and understand the consequences of the characters' actions related to the environment.

2. Students recognize national and state symbols and icons such as the national and state flags, the bald eagle, and the Statue of Liberty.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
	• Recognize that images portrayed on national and state flags and icons are often animals that have great symbolic importance to people.

3. Students match simple descriptions of work that people do and the names of related jobs at the school, in the local community, and from historical accounts.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
	• Match simple descriptions of work that people do and the names of related jobs to extraction, harvesting, transporting and consuming natural resources.

4. Students compare and contrast the locations of people, places, and environments and describe their characteristics.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Determine the relative locations of objects using the terms near/far, left/right, and behind/in front.	
2. Distinguish between land and water on maps and globes and locate general areas referenced in historical legends and stories.	• Point out examples of land and water on maps and globes. • Identify the locations of forests, deserts, bodies of water and mountains on a map of the local community.
3. Identify traffic symbols and map symbols (e.g., those for land, water, roads, cities).	
4. Construct maps and models of neighborhoods, incorporating such structures as police and fire stations, airports, banks, hospitals, supermarkets, harbors, schools, homes, places of worship, and transportation lines.	• Construct maps and models of natural systems near their school, home or community (e.g., streams, parks, wooded areas).
5. Demonstrate familiarity with the school's layout, environs, and the jobs people do there.	• Recognize that the environment surrounding the school today is most likely different from what it was when the school was built. • List jobs at the school related to the use and maintenance of any natural systems at the school (e.g., school gardens, green spaces).

5. Students put events in temporal order using a calendar, placing days, weeks, and months in proper order.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**

6. Students understand that history relates to events, people, and places of other times.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Identify the purposes of, and the people and events honored in, commemorative holidays, including the human struggles that were the basis for the events (e.g., Thanksgiving, Independence Day, Washington's and Lincoln's Birthdays, Martin Luther King Jr. Day, Memorial Day, Labor Day, Columbus Day, Veterans Day).	• Identify holidays that honor explorers or groups of people who traveled to new areas seeking the goods and ecosystem services provided by natural systems (e.g., Thanksgiving and Columbus Day).
2. Know the triumphs in American legends and historical accounts through the stories of such people as Pocahontas, George Washington, Booker T. Washington, Daniel Boone, and Benjamin Franklin.	• Explain that many of the triumphs in American legends and historical accounts are related to discovery of new resources or methods of using those resources (e.g., electricity, “new” territories, types of food and methods of food production). • Recognize that the need for “new” supplies of natural resources drove many of the decisions to explore and expand human communities into new areas on the American continent.
3. Understand how people lived in earlier times and how their lives would be different today (e.g., getting water from a well, growing food, making clothing, having fun, forming organizations, living by rules and laws).	• Recognize that people in earlier times used many of the same goods and ecosystem services as we do today (e.g., timber, clean water, food). • Identify that in earlier times people more directly consumed the goods and ecosystem services from natural systems rather than obtaining them from secondary sources (e.g., food markets, lumber yards). • Explain that the quantity of goods consumed by people increases as human communities grow (e.g., water and energy consumption).

First Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students describe the rights and individual responsibilities of citizenship.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the rule-making process in a direct democracy (everyone votes on the rules) and in a representative democracy (an elected group of people make the rules), giving examples of both systems in their classroom, school, and community.	
2. Understand the elements of fair play and good sportsmanship, respect for the rights and opinions of others, and respect for rules by which we live, including the meaning of the "Golden Rule."	

2. Students compare and contrast the absolute and relative locations of places and people and describe the physical and/or human characteristics of places.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Locate on maps and globes their local community, California, the United States, the seven continents, and the four oceans.	• Identify specific natural features such as parks, forests, and bodies of water on maps of their neighborhoods or communities.
2. Compare the information that can be derived from a three-dimensional model to the information that can be derived from a picture of the same location.	
3. Construct a simple map, using cardinal directions and map symbols.	
4. Describe how location, weather, and physical environment affect the way people live, including the effects on their food, clothing, shelter, transportation, and recreation.	• Describe how location, weather, and the physical environment interact to create specific conditions that determine what humans use for food, clothing, shelter, transportation, and recreation. • Recognize that human communities are generally located in close proximity to the natural systems (e.g., forests, farmland, bodies of water) that provide the goods and ecosystem services upon which humans depend. • Explain that human activities and naturally-occurring events can change natural systems. • Provide examples of how changes to natural systems can affect how people live.

3. Students know and understand the symbols, icons, and traditions of the United States that provide continuity and a sense of community across time.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Recite the Pledge of Allegiance and sing songs that express American ideals (e.g., "My Country 'Tis of Thee").	
2. Understand the significance of our national holidays and the heroism and achievements of the people associated with them.	
3. Identify American symbols, landmarks, and essential documents, such as the flag, bald eagle, Statue of Liberty, U.S. Constitution, and Declaration of Independence, and know the people and events associated with them.	• Recognize that many of the images portrayed on national and state flags, and icons are often animals that have great symbolic importance to people.

4. Students compare and contrast everyday life in different times and places around the world and recognize that some aspects of people, places, and things change over time while others stay the same.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Examine the structure of schools and communities in the past.	• Recognize that communities in the past relied on the goods and ecosystem services provided by natural systems, just as we do today. • Identify, using photographs and other primary sources, that their communities have grown and changed over time
2. Study transportation methods of earlier days.	• Recognize that the distances people traveled in the past were often shorter than distances traveled routinely today with the growth and expansion of human communities and development of transportation systems. • Compare transportation systems used in the past with those used today. • Recognize the differences between the types and quantities of energy used by transportation systems in the past with those used today.
3. Recognize similarities and differences of earlier generations in such areas as work (inside and outside the home), dress, manners, stories, games, and festivals, drawing from biographies, oral histories, and folklore.	• Recognize that in earlier generations, a greater proportion of jobs were directly related to the extraction, harvesting, transporting and consumption of natural resources (e.g., farming and food production). • Provide examples of how jobs related to the extraction, harvesting, transporting and consumption of natural resources have changed from the past to the present. • Compare energy use between past and present methods for extracting, harvesting, transporting and consuming natural resources.

5. Students describe the human characteristics of familiar places and the varied backgrounds of American citizens and residents in those places.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Recognize the ways in which they are all part of the same community, sharing principles, goals, and traditions despite their varied ancestry; the forms of diversity in their school and community; and the benefits and challenges of a diverse population.	
2. Understand the ways in which American Indians and immigrants have helped define Californian and American culture.	• Recognize that many of the beliefs, customs, ceremonies, traditions, and social practices of American Indians and immigrants were significantly influenced by the natural systems and resources on which they depended. • Provide examples of the beliefs, customs, ceremonies, traditions, and social practices of American Indians and immigrants that are part of Californian and American culture.
3. Compare the beliefs, customs, ceremonies, traditions, and social practices of the varied cultures, drawing from folklore.	• Provide examples of beliefs, customs, ceremonies, traditions, and social practices of varied cultures that were influenced by the natural systems and resources on which they depended.

6. Students understand basic economic concepts and the role of individual choice in a free-market economy.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the concept of exchange and the use of money to purchase goods and services.	
2. Identify the specialized work that people do to manufacture, transport, and market goods and services and the contributions of those who work in the home.	• List jobs that are related to extracting, harvesting, transporting and consuming natural resources.

Second Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students differentiate between things that happened long ago and things that happened yesterday.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Trace the history of a family through the use of primary and secondary sources, including artifacts, photographs, interviews, and documents.	
2. Compare and contrast their daily lives with those of their parents, grandparents, and/ or guardians.	• Compare and contrast their dependence on natural systems and resources with that of their parents, grandparents, and/ or guardians. • Provide examples of jobs related to extraction, harvesting, transportation and consumption of natural resources in the past and present. • Recognize that the ways we use natural resources (goods and ecosystem services) from natural systems has changed over time and can be discovered by comparing our daily lives with those of recent generations.
3. Place important events in their lives in the order in which they occurred (e.g., on a time line or storyboard).	

2. Students demonstrate map skills by describing the absolute and relative locations of people, places, and environments.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Locate on a simple letter-number grid system the specific locations and geographic features in their neighborhood or community (e.g., map of the classroom, the school).	• Identify specific natural features such as parks, forests, and bodies of water on the maps of their neighborhoods or communities.
2. Label from memory a simple map of the North American continent, including the countries, oceans, Great Lakes, major rivers, and mountain ranges. Identify the essential map elements: title, legend, directional indicator, scale, and date.	• Label the locations of major ecosystems and landforms such as oceans, Great Lakes, major rivers, mountain ranges, deserts and the Great North American Prairie on a simple map of the North American continent.
3. Locate on a map where their ancestors live(d), telling when the family moved to the local community and how and why they made the trip.	• Recognize that many people moved to and around the United States seeking natural resources (goods and ecosystem services) from natural systems. • Identify why their ancestors moved to the local community.
4. Compare and contrast basic land use in urban, suburban, and rural environments in California.	• List different types of land use in urban, suburban, and rural environments in California. • Recognize that land use patterns in California have changed over time. • Compare how different types of land use affect natural systems in urban, suburban, and rural environments. • Recognize that as urban and suburban areas expand, natural systems are converted due to human activity. • Explain that more people have moved into urban and suburban settings as populations grew and economies have changed.

3. Students explain governmental institutions and practices in the United States and other countries.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Explain how the United States and other countries make laws, carry out laws, determine whether laws have been violated, and punish wrongdoers.	• Recognize that the United States and other countries make laws and carry out laws to govern the use and management of natural systems and resources. • Provide examples of natural resources management laws (e.g., fishing regulations).
2. Describe the ways in which groups and nations interact with one another to try to resolve problems in such areas as trade, cultural contacts, treaties, diplomacy, and military force.	

4. Students understand basic economic concepts and their individual roles in the economy and demonstrate basic economic reasoning skills.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe food production and consumption long ago and today, including the roles of farmers, processors, distributors, weather, and land and water resources.	• Identify the role of land and water resources in food production. • Provide examples of how natural processes such as climate and weather affect the quality, quantity, and reliability of food resources. • List jobs associated with the production and consumption of food. • Recognize that more food must be produced to support growing human populations. • Provide examples of farming or ranching practices that have changed over the past century. • Describe some of the effects of food production and consumption on natural systems.
2. Understand the role and interdependence of buyers (consumers) and sellers (producers) of goods and services.	
3. Understand how limits on resources affect production and consumption (what to produce and what to consume).	• Recognize that food production depends on the availability of natural resources (goods and ecosystems services) from natural systems (e.g., water, air, light, soil nutrients). • Explain that natural systems contain limited supplies of natural resources (e.g., water, soil nutrients). • Identify that limits on natural resources can influence food production. • Provide examples of how decisions about what to produce and what to consume can be affected by the quality, quantity and reliability of the resources provided by natural systems.

5. Students understand the importance of individual action and character and explain how heroes from long ago and the recent past have made a difference in others' lives (e.g., from biographies of Abraham Lincoln, Louis Pasteur, Sitting Bull, George Washington Carver, Marie Curie, Albert Einstein, Golda Meir, Jackie Robinson, Sally Ride).	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
	• Name individuals from long ago and the recent past who have played a role in conserving natural systems and resources (e.g., Theodore Roosevelt's role in the national park system).

Third Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students describe the physical and human geography and use maps, tables, graphs, photographs, and charts to organize information about people, places, and environments in a spatial context.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Identify geographical features in their local region (e.g., deserts, mountains, valleys, hills, coastal areas, oceans, lakes).	• Locate the deserts, mountains, valleys, hills, coastal areas, oceans, and lakes in their local region on a map. • Identify the ecosystems (natural systems) that are found in the deserts, mountains, valleys, hills, coastal areas, oceans, and lakes in their local region. • List the resources (goods and ecosystem services) that are provided by the ecosystems (natural systems) in their local region.
2. Trace the ways in which people have used the resources of the local region and modified the physical environment (e.g., a dam constructed upstream changed a river or coastline).	• Recognize the ways that people use the resources (goods and ecosystem services) that are provided by the ecosystems (natural systems) in their local region. • Identify the ways humans have changed the natural systems (physical and living environment) in their local region to extract, harvest, transport and consume natural resources (goods and ecosystem services). • Provide examples of how the extraction, harvesting, transportation and consumption of natural resources have influenced the natural systems in the local region. • Explain that some changes to the natural systems are detrimental while others may be beneficial or neutral in their effects.

2. Students describe the American Indian nations in their local region long ago and in the recent past.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Describe national identities, religious beliefs, customs, and various folklore traditions.	• Recognize that the beliefs, customs, ceremonies, traditions, and social practices of American Indians were significantly influenced by the natural systems in which those cultures were/are located and by the natural resources upon which they depended. • Provide examples of the national identities, religious beliefs, customs, and folklore traditions that were based on the natural systems where they lived and the natural resources they consumed.
2. Discuss the ways in which physical geography, including climate, influenced how the local Indian nations adapted to their natural environment (e.g., how they obtained food, clothing, tools).	• Provide examples of goods and ecosystem services that were used by specific American Indian nations. • Explain how local Indian nations adapted to their natural environment so that they could extract, harvest, transport and consume natural resources (goods and ecosystem services). • Describe how physical geography, including climate, affected the natural resources (goods and ecosystem services) upon which American Indian nations depended. • Explain how the American Indian nations affected the natural systems where they lived.
3. Describe the economy and systems of government, particularly those with tribal constitutions, and their relationship to federal and state governments.	• Describe how the economies of American Indian nations were historically based on the natural systems in the areas where they lived and the natural resources they consumed. • Describe the relationship between the American Indian nations and, federal and state governments in the context of controlling the natural systems and resources in the areas where they lived.
4. Discuss the interaction of new settlers with the already established Indians of the region.	• Recognize the significance of goods and ecosystem services provided by local natural systems as the basis for the interactions (e.g., conflicts, cooperative arrangements) among new settlers with the already established Indians of the region. • Identify examples of cooperation between the new settlers and the already established Indians when the settlers learned to take advantage of goods and ecosystem services provided by the natural systems in the region.

3. Students draw from historical and community resources to organize the sequence of local historical events and describe how each period of settlement left its mark on the land.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Research the explorers who visited here, the newcomers who settled here, and the people who continue to come to the region, including their cultural and religious traditions and contributions.	• Explain that explorers traveled to new areas seeking the goods and ecosystem services provided by natural systems in the region. • Recognize that settlers who moved to the newly explored regions area were seeking the natural resources (goods and ecosystem services) provided by natural systems in those regions. • Compare the cultural and religious traditions of the American Indian nations, explorers and settlers and describe how those traditions influenced their decisions about natural systems and resources.
2. Describe the economies established by settlers and their influence on the present-day economy, with emphasis on the importance of private property and entrepreneurship.	• Identify the basis of the economies of the settlers including the roles of the goods and ecosystem services provided by local natural systems. • Explain the importance of private property rights and responsibilities of land ownership in the settlement of new areas. • Describe the importance of the natural resources (goods and ecosystem services) provided by natural systems as the basis of the economy of settlers. • Explain how the availability of natural systems and resources influence decisions about how and where the settlers should select the location of their property.
3. Trace why their community was established, how individuals and families contributed to its founding and development, and how the community has changed over time, drawing on maps, photographs, oral histories, letters, newspapers, and other primary sources.	• Identify the goods and ecosystem services provided by natural systems in their local areas that contributed to the founding and development of their communities. • Trace how the ecosystems in and near their communities changed over time, by drawing on maps, photographs, oral histories, letters, newspapers, and other primary sources. • Describe how the dependence of their communities on local natural systems and resources has changed over time by drawing on maps, photographs, oral histories, letters, newspapers, and other primary sources.

4. Students understand the role of rules and laws in our daily lives and the basic structure of the U.S. government.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Determine the reasons for rules, laws, and the U.S. Constitution; the role of citizenship in the promotion of rules and laws; and the consequences for people who violate rules and laws.	• Provide examples of rules and laws that are associated with the management of natural systems and resources (e.g., endangered species). • Identify the consequences for people who violate rules and laws related to the management of natural systems and resources.
2. Discuss the importance of public virtue and the role of citizens, including how to participate in a classroom, in the community, and in civic life.	• Discuss the importance of public virtue and the role of individual citizens in making decisions about natural systems and resources. • Provide examples of how individual citizens can be involved in protecting the environment. • Identify ways students can be involved in protecting the environment.
3. Know the histories of important local and national landmarks, symbols, and essential documents that create a sense of community among citizens and exemplify cherished ideals (e.g., the U.S. flag, the bald eagle, the Statue of Liberty, the U.S. Constitution, the Declaration of Independence, the U.S. Capitol).	
4. Understand the three branches of government, with an emphasis on local government.	
5. Describe the ways in which California, the other states, and sovereign American Indian tribes contribute to the making of our nation and participate in the federal system of government.	

6. Describe the lives of American heroes who took risks to secure our freedoms (e.g., Anne Hutchinson, Benjamin Franklin, Thomas Jefferson, Abraham Lincoln, Frederick Douglass, Harriet Tubman, Martin Luther King, Jr.).	

5. Students demonstrate basic economic reasoning skills and an understanding of the economy of the local region.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the ways in which local producers have used and are using natural resources, human resources, and capital resources to produce goods and services in the past and the present.	• Provide examples of the natural resources (goods and ecosystem services) used by local producers in the past and the present. • Compare the costs and benefits of methods used by local producers to extract, harvest, transport and consume natural resources in the past and present.
2. Understand that some goods are made locally, some elsewhere in the United States, and some abroad.	• Identify the availability of natural resources (goods and ecosystem services) as the reason that some goods are made locally, some elsewhere in the United States, and some abroad.
3. Understand that individual economic choices involve trade-offs and the evaluation of benefits and costs.	• Recognize the wide spectrum of considerations (e.g., economic, legal, environmental, public health, and socio-cultural) that can be involved in making economic choices. • Describe the importance of considering the full spectrum of factors in evaluating the benefits, costs and trade-offs of individual economic choices.
4. Discuss the relationship of students' "work" in school and their personal human capital.	

Fourth Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students demonstrate an understanding of the physical and human geographic features that define places and regions in California**.**	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Explain and use the coordinate grid system of latitude and longitude to determine the absolute locations of places in California and on Earth.	• Use the coordinate grid system of latitude and longitude to determine the absolute location of various landforms, bodies of water, vegetation and climatic zones in California and on Earth.
2. Distinguish between the North and South Poles; the equator and the prime meridian; the tropics; and the hemispheres, using coordinates to plot locations.	
3. Identify the state capital and describe the various regions of California, including how their characteristics and physical environments (e.g., water, landforms, vegetation, climate) affect human activity.	• Describe the differences among the various regions of California, providing examples of landforms, bodies of water, vegetation and climate in each. • Give examples of the variety of ecosystems in California. • Provide examples of how water, landforms, vegetation and climate affect human activity in California. • Identify that the needs of humans in California are met by using goods and ecosystem services from natural systems.
4. Identify the locations of the Pacific Ocean, rivers, valleys, and mountain passes and explain their effects on the growth of towns.	• Identify that humans depend on California's rivers, valleys, and mountain passes for movement and for the transport of goods and use of ecosystem services. • Describe how the Pacific Ocean, and California's rivers, valleys, and mountain passes influence the availability of goods and ecosystem services provided by natural systems for human use. • Explain how decisions to settle in certain areas of California and build towns are typically based on geographic features and distribution of natural systems (e.g., forests, rangelands, bodies of water). • Provide examples of how the factors influencing the location of towns have changed as the human population in California has grown and technology has advanced. • Recognize that although some factors influencing the location of towns in California have changed, human communities are still dependent on the local natural systems for basic resources.
5. Use maps, charts, and pictures to describe how communities in California vary in land use, vegetation, wildlife, climate, population density, architecture, services, and transportation.	• Use maps, charts, and pictures to identify and locate the different types of land use, vegetation, wildlife, and climatic zones in California. • Use charts and pictures to provide examples and describe the diverse architectural styles and transportation systems in various California communities and show how they are influenced by local natural systems. • Use maps, charts, and pictures to compare human population density in different areas of California (e.g., urban, suburban, rural, agricultural, undeveloped). • Use maps, charts, and pictures to compare areas representing different population density with areas of varying types of land use, vegetation, wildlife and climate.

2. Students describe the social, political, cultural, and economic life and interactions among people of California from the pre-Columbian societies to the Spanish mission and Mexican rancho periods.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the major nations of California Indians, including their geographic distribution, economic activities, legends, and religious beliefs; and describe how they depended on, adapted to, and modified the physical environment by cultivation of land and use of sea resources.	• Identify the goods and ecosystem services that were essential to the lives, economies, and cultures of each of the major nations of California Indians. • Describe how the regions where different California Indian nations lived supplied them with different natural resources, goods and ecosystem services and resulted in different land use patterns and economic activities in each region. • Identify that California Indian nations developed different methods to extract, harvest, transport and consume natural resources. • Provide examples of how the extraction, harvesting, transporting and consuming of goods and use of ecosystem services by California Indians influenced the geographic extent, composition, biological diversity, and viability of the natural systems they inhabited. • Explain how the California Indian nations modified their physical environment by cultivation of land and use of sea resources.
2. Identify the early land and sea routes to, and European settlements in California with a focus on the exploration of the North Pacific (e.g., by Captain James Cook, Vitus Bering, Juan Cabrillo), noting especially the importance of mountains, deserts, ocean currents, and wind patterns.	• Identify the reasons for the development of the early land and sea routes used in exploration of the North Pacific (e.g., the discovery, extraction, harvest and consumption of natural resources). • Describe the influence of various geographic features including mountains, deserts, ocean currents, and wind patterns on the development of land and sea routes used in European exploration and settlements in California. • Recognize the roles of key explorers in the discovery of natural systems that would provide goods and ecosystem services for the continued growth and development of European nations. • Provide examples of the effects of exploring the North Pacific on the geographic extent, composition, biological diversity, and viability of natural systems found in that region. • Identify how the demographics, distribution and consumption rates of human populations in Europe influenced the geographic extent, composition, biological diversity, and viability of natural systems in the North Pacific.
3. Describe the Spanish exploration and colonization of California, including the relationships among soldiers, missionaries, and Indians (e.g., Juan Crespi, Junipero Serra, Gaspar de Portola).	• Identify the reasons for the Spanish exploration and colonization of California (e.g., the discovery, extraction, harvest and consumption of natural resources). • Describe the influence of various geographic features including mountains, deserts, ocean currents, and wind patterns on Spanish settlements in California. • Recognize the roles of key explorers in the discovery of natural systems that would provide for the continued growth and development of European nations. • Provide examples of the effects of Spanish settlements on the geographic extent, composition, biological diversity, and viability of natural systems found in that region. • Identify how the demographics, distribution and consumption rates of human populations in Spain influenced the geographic extent, composition, biological diversity, and viability of natural systems in California. • Examine how decisions about resources and natural systems made during Spanish colonization of California were influenced by the relationships between and the varying perspectives of the soldiers, missionaries, and Indians populating the area.

4. Describe the mapping of, geographic basis of, and economic factors in the placement and function of the Spanish missions; and understand how the mission system expanded the influence of Spain and Catholicism throughout New Spain and Latin America.	• Identify the reasons for the placement and function of the Spanish missions including the geographic basis, economic factors and availability of the goods and ecosystem services produced by natural systems. • Describe the influences of California's mission system on the surrounding natural systems. • Identify how the demographics, distribution and consumption rates of human populations in Spain and Latin America influenced the geographic extent, composition, biological diversity, and viability of natural systems in the North Pacific. • Describe how the mission system expanded the influence of Spain and Catholicism throughout New Spain and Latin America.
5. Describe the daily lives of the people, native and nonnative, who occupied the presidios, missions, ranchos, and pueblos.	• Identify how the jobs of the people who lived in the presidios, missions, ranchos, and pueblos of California were related to the extraction, harvesting, transporting and consumption of goods and ecosystem services from natural systems. • Describe how the relationship of the native people to natural systems was affected by the growth of human populations centered in and near the presidios, missions, ranchos, and pueblos of California. • Provide examples of how the daily lives of the people, native and nonnative, who occupied the presidios, missions, ranchos, and pueblos were influenced by the natural systems in these areas. • Identify how the daily lives of the people, native and nonnative, changed over time in response to the growth of human communities and the resulting changes to the local natural systems.
6. Discuss the role of the Franciscans in changing the economy of California from a hunter-gatherer economy to an agricultural economy.	• Identify the differences between hunter-gatherer and agricultural economies. • Describe how the daily lives of native and nonnative people changed as the result of shifting from a hunter-gatherer economy to an agricultural economy (e.g., human communities became rooted to one location and had greater influence on local natural systems). • Discuss the role of the Franciscans in changing the economy of California from a hunter-gatherer economy to an agricultural economy. • Provide examples of how changing the economy of California from a hunter-gatherer economy to an agricultural economy influenced the natural systems in different regions of California. • Describe how these changes to California's natural systems in turn affected the daily lives of native and nonnative people.
7. Describe the effects of the Mexican War for Independence on Alta California, including its effects on the territorial boundaries of North America.	• Identify the reasons for the Mexican War for Independence including the desire to control or provide access to certain goods and ecosystem services provided by natural systems. • Compare the goods and ecosystem services provided by natural systems in Baja and Alta California. • Describe how the differences between goods and ecosystem services provided by natural systems in Baja and Alta California influenced the location and expansion of human communities in these regions.
8. Discuss the period of Mexican rule in California and its attributes, including land grants, secularization of the missions, and the rise of the rancho economy.	• Discuss the period of Mexican rule in California and its attributes, including land grants, secularization of the missions, and the rise of the rancho economy. • Identify how the land grants during the period of Mexican rule in California influenced the extraction, harvesting, transporting and consumption of the goods and ecosystem services provided by California's natural systems. • Provide examples of how the period of Mexican rule (e.g., land grants, secularization of the missions, and the rise of the rancho economy) influenced the development of laws and management practices for California's natural resources. • Provide examples of how the rise of the rancho economy influenced the natural systems in different regions of California.

3. Students explain the economic, social, and political life in California from the establishment of the Bear Flag Republic through the Mexican-American War, the Gold Rush, and the granting of statehood.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Identify the locations of Mexican settlements in California and those of other settlements, including Fort Ross and Sutter's Fort.	• Identify the reasons Mexican and other settlements in California were located where they are, including access to the goods and ecosystem services provided by natural systems (e.g., Fort Ross was established as a Russian settlement to hunt sea otter, to grow wheat and other crops for the Russian settlements in Alaska, and to trade with Spanish California. Sutter's Fort was established as a land grant to Sutter from the Mexican government and flourished as an agricultural community and eventually became the center of Gold Rush activities). • Provide examples of how economic, social and political decisions in other countries affected the use of goods and ecosystem services from California's natural systems (e.g., Russia's need to supply its Alaskan settlements).
2. Compare how and why people traveled to California and the routes they traveled (e.g., James Beckwourth, John Bidwell, John C. Fremont, Pio Pico).	• Identify the goods and ecosystem services provided by California's natural systems that attracted various well-known individuals (James Beckwourth, John Bidwell, John C. Fremont, Pio Pico) and the multitudes of individuals and families to migrate to California. • Describe how the decisions to settle in some areas of California rather than others were influenced by the goods and ecosystem services provided by the natural systems. • Compare how and why people traveled to California and the routes they chose.
3. Analyze the effects of the Gold Rush on settlements, daily life, politics, and the physical environment (e.g., using biographies of John Sutter, Mariano Guadalupe Vallejo, Louise Clapp).	• Identify how the methods used to extract, harvest and transport gold in California influenced the natural systems where the gold was being sought. • Using the biographies of John Sutter, Mariano Guadalupe Vallejo, and Louise Clapp, describe how the quest for gold influenced the growth, development and operation of new communities in various parts of California. • Describe how the changing resource production and consumption patterns in California during the Gold Rush resulted in the need for new laws, policies, and incentives regarding resource use and management. • Identify byproducts of the Gold Rush communities, and the mining and extraction practices that influenced the health of the natural systems in the surrounding areas (e.g., the use of mercury in the refining process). • Examine how political and economic decisions made during the Gold Rush influenced the social, economic, political, and legal systems in local communities and in California as a whole.
4. Study the lives of women who helped build early California (e.g., Biddy Mason).	
5. Discuss how California became a state and how its new government differed from those during the Spanish and Mexican periods.	

4. Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the story and lasting influence of the Pony Express, Overland Mail Service, Western Union, and the building of the transcontinental railroad, including the contributions of Chinese workers to its construction.	• Identify the role of communication and transportation systems in bringing the goods and ecosystem services produced by California's natural systems (e.g. agricultural products) to other parts of the nation and world. • Provide examples of how changes in communication and transportation systems, since the 1850s, have influenced the development of California's agricultural and industrial economic powers. • Describe the role of expanding communication and transportation systems and growing demands from other areas of the nation and world, on the rates of consumption of the goods and ecosystem services produced by California's natural systems.

2. Explain how the Gold Rush transformed the economy of California, including the types of products produced and consumed, changes in towns (e.g., Sacramento, San Francisco), and economic conflicts between diverse groups of people.	• Provide examples of the direct and indirect changes to the surrounding natural systems that came about as a result of the rapid population growth, community construction and operation changes in California's towns (e.g., Sacramento, San Francisco). • Describe how the transformation of California's economy, which resulted from the Gold Rush, influenced the types of products produced and consumed in the state and caused economic conflicts between diverse groups of people. • Identify how the changes brought about by the transformation of California's economy (i.e., the types and amounts of products produced and consumed) resulted in the consumption of different goods and ecosystem services from natural systems and the production of different byproducts. • Using the Gold Rush period in California as an example, describe the influence of consuming goods and ecosystem services and producing different byproducts on natural systems.
3. Discuss immigration and migration to California between 1850 and 1900, including the diverse composition of those who came; the countries of origin and their relative locations; and conflicts and accords among the diverse groups (e.g., the 1882 Chinese Exclusion Act).	• Identify the role of the goods and ecosystem services provided by California's natural systems in attracting and providing jobs for people who migrated to California between 1850 and 1900. • Compare the availability of the goods and ecosystem services provided by California's natural systems to their availability in the immigrants' countries of origin. • Discuss immigration and migration to California between 1850 and 1900, including the diverse composition of those who came; the countries of origin and their relative locations; and conflicts and accords among the diverse groups (e.g., the 1882 Chinese Exclusion Act).
4. Describe rapid American immigration, internal migration, settlement, and the growth of towns and cities (e.g., Los Angeles).	• Explain the role of the goods and ecosystem services provided by California's natural systems in the rapid American immigration, internal migration, settlement, and the growth of towns and cities. • Provide examples of the direct and indirect changes to natural systems that resulted from rapid American immigration, internal migration, settlement, and the growth of towns and cities (e.g., the geographic extent, composition, biological diversity, and viability of natural systems). • Describe how the rapid American immigration, internal migration, settlement, and the growth of California's towns and cities, affected the state's laws, policies and incentives related to the management of natural systems (e.g., land use and water management laws.)
5. Discuss the effects of the Great Depression, the Dust Bowl, and World War II on California.	• Recognize the relationship between the Dust Bowl and the Great Depression on the availability and consumption of the goods and ecosystem services from natural systems. • Identify the role of human practices (e.g., agriculture) in altering the cycles that operate within natural systems and the relevance of those practices to the Dust Bowl. • Provide examples of how the migration to California that resulted from the Great Depression, the Dust Bowl, and World War II influenced the consumption of goods and ecosystem services from California's natural systems (e.g., growth of human communities directly and indirectly consumed natural resources). • Recognize that the capacity of natural systems to adjust to these human-caused alterations depends on the scope, scale, and duration of the activity and the nature of their byproducts (e.g., the effects of the "temporary" internment camps (e.g., Manzanar) and migrant work camps (e.g., to house Dust Bowl migrants remain visible on California's landscape after many decades.)

6. Describe the development and locations of new industries since the turn of the century, such as the aerospace industry, electronics industry, large-scale commercial agriculture and irrigation projects, the oil and automobile industries, communications and defense industries, and important trade links with the Pacific Basin.	• Identify the locations of new industries in California since the turn of the century, such as the aerospace industry, electronics industry, large-scale commercial agriculture and irrigation projects, the oil and automobile industries, communications and defense industries, and the development of important trade links with the Pacific Basin. • Identify the influence of new industries, since the turn of the century, on the growth and expansion of human communities in California. • Recognize the influence of California's growing communities on the supply and consumption of goods and ecosystem services from the natural systems where they are located. • Describe how large-scale commercial agriculture and irrigation projects influence the cycles and processes that operate within natural systems of California. • Provide examples of the relationship between the development of new industries in California and the quantities of resources consumed and the quantity and characteristics of the resulting byproducts. • Recognize that the byproducts of both new and old industries enter natural systems and that their effects on those systems may be beneficial, neutral, or detrimental.
7. Trace the evolution of California's water system into a network of dams, aqueducts, and reservoirs.	• Identify the importance of California's water to humans, human communities, and natural systems. • Describe how the availability of a reliable supply of clean water influenced the growth of human communities and the development of California's agriculture-based economy. • Describe how the development of California's water system has influenced the natural systems of the state (e.g., Mono Lake, Owen's Lake, Salton Sea). • Describe how the health of California's natural systems directly affects the quality, quantity, and reliability of California's water supply. • Explain how California's economic health is related to the reliability and quantity of water resources available for human use. • Identify the spectrum of considerations that are involved in making decisions about California's water system (e.g., legal factors, economic factors, environmental sustainability, public health, and socio-cultural factors). • Describe how the assessment of these decision-making factors have changed over time in response to changing conditions, which influences how those decisions are made.
8. Describe the history and development of California's public education system, including universities and community colleges.	
9. Analyze the impact of twentieth-century Californians on the nation's artistic and cultural development, including the rise of the entertainment industry (e.g., Louis B. Meyer, Walt Disney, John Steinbeck, Ansel Adams, Dorothea Lange, John Wayne).	

5. Students understand the structures, functions, and powers of the local, state, and federal governments as described in the U.S. Constitution.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Discuss what the U.S. Constitution is and why it is important (i.e., a written document that defines the structure and purpose of the U.S. government and describes the shared powers of federal, state, and local governments).	
2. Understand the purpose of the California Constitution, its key principles, and its relationship to the U.S. Constitution.	

3. Describe the similarities (e.g., written documents, rule of law, consent of the governed, three separate branches) and differences (e.g., scope of jurisdiction, limits on government powers, use of the military) among federal, state, and local governments.	• Identify the similarities and differences among federal, state, and local governments' jurisdiction over laws, regulations, policies, and incentives that govern the use, management, and consumption of goods and ecosystem services from natural systems. • Describe the similarities (e.g., written documents, rule of law, consent of the governed, three separate branches) and differences (e.g., scope of jurisdiction, limits on government powers, use of the military) among federal, state, and local governments.
4. Explain the structures and functions of state governments, including the roles and responsibilities of their elected officials.	• Identify the structures and functions of state governments that enforce laws, regulations, and policies regarding the use, management, and consumption of goods and ecosystem services from natural systems. • Compare the roles of different state agencies in the use, management, and consumption of goods and ecosystem services from natural systems (e.g., California EPA, Resources Agency and Department of Transportation). • Provide examples of the roles and responsibilities of elected officials in governing the use, management, and consumption of goods and ecosystem services from natural systems. • Explain the structures and functions of state governments, including the roles and responsibilities of their elected officials, regarding the use, management, and consumption of goods and ecosystem services from natural systems.
5. Describe the components of California's governance structure (e.g., cities and towns, Indian rancherias and reservations, counties, school districts).	• Recognize that California has laws, regulations, and policies regarding the use, management, and consumption of goods and ecosystem services from natural systems among cities, towns, counties, Indian rancherias and reservations, and school districts. • Identify the structures and functions of local governments that enforce laws, regulations, and policies regarding the use, management, and consumption of goods and ecosystem services from natural systems. • Describe the components of California's governance structure (e.g., cities and towns, Indian rancherias and reservations, counties, school districts).

Fifth Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students describe the major pre-Columbian settlements, including the cliff dwellers and pueblo people of the desert Southwest, the American Indians of the Pacific Northwest, the nomadic nations of the Great Plains, and the woodland peoples east of the Mississippi River.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
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.	• Recognize that pre-Columbian peoples (cliff dwellers and pueblo people of the desert Southwest, the American Indians of the Pacific Northwest, the nomadic nations of the Great Plains, and the woodland peoples east of the Mississippi River) all depended on the goods and ecosystem services provided by natural systems for their survival. • Describe how geography and climate and the natural resources (goods and ecosystem services) available in different regions of North America determined the lifestyles of the communities that developed in each area. • Provide examples of how the structures, clothing, tools, utensils, and choice of foods varied as a result of the natural resources available in particular regions of the continent. • Identify how decisions by the various Indian nations regarding the location of villages, the structures they built, and the methods used to obtain various goods were influenced by the health and viability of natural systems. • Explain that ancient cultures sometimes changed the location of their villages in response to changes in the availability of the goods and ecosystem services provided by the natural systems where they lived. • Explain that pre-Columbian peoples had the same needs as we do today (e.g., water, food, shelter) even though we often meet some of those needs in different ways.
2. Describe their varied customs and folklore traditions.	• Describe how the resources and natural systems available to the particular nations influenced the cultures, customs and folklore that developed in each region. • Recognize that the customs, folklore, and religious traditions often reflected the direct dependence of pre-Columbian peoples on natural systems for food, water, shelter, and other goods and ecosystem services.
3. Explain their varied economies and systems of government.	• Describe the direct dependence of the Indian nations on the goods and ecosystem services produced by natural systems. • Identify how the direct dependence of the Indian nations on the goods and ecosystem services influenced the development of their economies and governmental systems. • Explain that although systems of government and economy varied among American Indian nations, these systems were instrumental in determining how decisions about resource use and the treatment of natural systems were made. • Recognize that Indian nations' systems of government had the same goals as current systems of government (e.g., enabling the society to survive).

2. Students trace the routes of early explorers and describe the early explorations of the Americas.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Describe the entrepreneurial characteristics of early explorers (e.g., Christopher Columbus, Francisco Vásquez de Coronado) and the technological developments that made sea exploration by latitude and longitude possible (e.g., compass, sextant, astrolabe, seaworthy ships, chronometers, gunpowder).	• Identify that the principle entrepreneurial drive motivating early exploration of the Americas was the pursuit of the natural resources (goods and ecosystem services provided by natural systems) available in other parts of the world. • Recognize that the pursuit of new sources of natural resources was driven by population growth in Europe where some of these resources were becoming less abundant. • Identify how the demographics, distribution and consumption rates of human populations in Europe influenced the geographic extent, composition, biological diversity, and viability of natural systems in North America.

2. Explain the aims, obstacles, and accomplishments of the explorers, sponsors, and leaders of key European expeditions and the reasons Europeans chose to explore and colonize the world (e.g., the Spanish Reconquista, the Protestant Reformation, the Counter Reformation).	• Recognize that the explorers, sponsors, and leaders of the European expeditions were in large part motivated by the natural resources (goods and ecosystem services) available in other parts of the world. • Identify other reasons that Europeans chose to explore and colonize the world (e.g., the Spanish Reconquista, the Protestant Reformation, the Counter Reformation). • Describe how the cycles and processes associated with natural systems sometimes acted as obstacles to the exploration and colonization of the world (e.g., Magellan, Shackleton). • Provide examples of the direct and indirect effects on natural systems and the resources that resulted from the exploration of the world (e.g., exposure of indigenous peoples to diseases, extermination of species). • Explain how decisions to explore and colonize other parts of the world were made and how these decisions influenced the economic and political systems in Europe, and the natural systems and economies in the regions that were being explored.
3. Trace the routes of the major land explorers of the United States, the distances traveled by explorers, and the Atlantic trade routes that linked Africa, the West Indies, the British colonies, and Europe.	• Identify the principle natural resources sought by the major land explorers of the United States and exchanged through the Atlantic trade routes that linked Africa, the West Indies, the British colonies, and Europe. • Describe how the climate and physical geography of the United States, the Atlantic, Africa, the West Indies, the British colonies, and Europe influenced the development of the major routes. • Recognize that the cycles and processes operating within natural systems, such as wind patterns, ocean currents and climate, influenced the routes and distances traveled by the land explorers and traders. • Trace the routes of the major land explorers of the United States, the distances traveled by explorers, and the Atlantic trade routes that linked Africa, the West Indies, the British colonies, and Europe.
4. Locate on maps of North and South America land claimed by Spain, France, England, Portugal, the Netherlands, Sweden, and Russia.	• Identify the principle natural resources sought by Spain, France, England, Portugal, the Netherlands, Sweden, and Russia in the areas that they claimed in North and South America. • Locate on maps of North and South America land claimed by Spain, France, England, Portugal, the Netherlands, Sweden, and Russia.

3. Students describe the cooperation and conflict that existed among the American Indians and between the Indian nations and the new settlers.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the competition among the English, French, Spanish, Dutch, and Indian nations for control of North America.	• Identify how the goods and ecosystem services provided by the natural systems in North America and already in use by Indian nations became increasingly important to the European economies. • Recognize that population growth in Europe, where some of these resources were becoming less abundant, increased the demand for the goods and ecosystem services provided by North America's natural systems. • Compare the European and Indian nations' methods of extracting, harvesting, transporting and consuming natural resources and their effects on natural systems (terrestrial, freshwater, coastal and marine ecosystems). • Describe how the demand for North American goods and ecosystem services led to competition among the English, French, Spanish, Dutch, and Indian nations for control of areas of North America.

2. Describe the cooperation that existed between the colonists and Indians during the 1600s and 1700s (e.g., in agriculture, the fur trade, military alliances, treaties, cultural interchanges).	• Identify why the goods and ecosystem services provided by the natural systems in North America and already in use by American Indian nations became increasingly important to the colonists who came to settle in North America. • Recognize the factors that influenced the colonists' decisions to cooperate with American Indian nations were motivated by their desire to take advantage of an area's natural resources. • Identify how the cooperation between the colonists and Indians during the 1600s and 1700s in agriculture, the fur trade, military alliances, treaties, and cultural interchanges depended on the demand for goods and ecosystem services from the region's natural systems. • Describe the effects of the cooperation between the colonists and Indians on the natural systems where the colonists and Indians lived. • Provide examples of the types of alliances that existed between the colonists and Indians during the 1600s and 1700s (e.g., in agriculture, the fur trade, military alliances, treaties, cultural interchanges).
3. Examine the conflicts before the Revolutionary War (e.g., the Pequot and King Philip's Wars in New England, the Powhatan Wars in Virginia, the French and Indian War).	
4. Discuss the role of broken treaties and massacres and the factors that led to the Indians defeat, including the resistance of Indian nations to encroachments and assimilation (e.g., the story of the Trail of Tears).	• Identify why the goods and ecosystem services provided by the natural systems in North America led to conflicts between the American Indian nations and North America's settlers and colonists (e.g., population growth among the settlers and colonists). • Provide examples of how the colonists' influences on the natural systems (e.g., operation of their settlements and farms) affected the ability of the Indian nations to resist encroachments and assimilation. • Discuss the factors that led to broken treaties, defeats and the massacres of American Indians including economic and socio-cultural factors, and the demand for natural resources. • Describe the resistance of Indian nations to encroachments and assimilation (e.g., the story of the Trail of Tears).
5. Describe the internecine Indian conflicts, including the competing claims for control of lands (e.g., actions of the Iroquois, Huron, Lakota [Sioux]).	• Identify the role of natural systems in the internecine Indian conflicts (e.g., competition for control of the goods and ecosystem services provided by natural systems). • Describe the influence of growing populations of colonists on internecine Indian conflicts including competing claims for control of lands (e.g., the colonists encroached on the natural systems that supported the Indian nations, thereby consuming greater quantities of the goods and ecosystem services). • Recognize the influence of the relationships between the various Indian nations and the colonists on the internecine Indian conflicts. • Provide examples of the competing claims for control of lands among the Indian nations (e.g., the Iroquois, Huron, Lakota [Sioux]).
5. Explain the influence and achievements of significant leaders of the time (e.g., John Marshall, Andrew Jackson, Chief Tecumseh, Chief Logan, Chief John Ross, Sequoyah).	• Recognize the influence of significant leaders of the time on developing laws, policies, and incentives regarding the use and management of natural resources and natural systems (e.g., Chief Justice John Marshall's stand on the concept of sovereignty, Andrew Jackson and the Indian Removal Bill that resulted in the removal of the Cherokees [Chief John Ross] from their land and resources). • Describe the claims of the American Indians in relation to natural systems (e.g., Chief Tecumseh's claim that the land was their natural heritage and belief that the Indian nations should unite under this claim). • Provide examples of laws, policies, and incentives related to the use and management of natural resources and natural systems that were enacted by the government during this time. • Explain the influence and other achievements of significant leaders of the time (e.g., John Marshall, Andrew Jackson, Chief Tecumseh, Chief Logan, Chief John Ross, and Sequoyah).

4. Students understand the political, religious, social, and economic institutions that evolved in the colonial era.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the influence of location and physical setting on the founding of the original 13 colonies, and identify on a map the locations of the colonies and of the American Indian nations already inhabiting these areas.	• Identify the goods and ecosystem services provided by natural systems that were necessary for the settlement of the 13 colonies. • Provide examples of the physical settings that were important factors in making decisions to locate and develop settlements on the eastern seaboard of North America. • Explain why the physical geography and the natural resources (goods and ecosystem services) on the eastern seaboard of North America made colonization attractive and settlement possible. • Recognize how the role of the goods and ecosystem services provided by natural systems in the original 13 colonies influenced the development of their economic systems. • Identify on a map the locations of the 13 colonies and of the American Indian nations already inhabiting these areas.
2. Identify the major individuals and groups responsible for the founding of the various colonies and the reasons for their founding (e.g., John Smith, Virginia; Roger Williams, Rhode Island; William Penn, Pennsylvania; Lord Baltimore, Maryland; William Bradford, Plymouth; John Winthrop, Massachusetts).	• Provide examples of the role of natural resources in the founding of the colonies.
3. Describe the religious aspects of the earliest colonies (e.g., Puritanism in Massachusetts, Anglicanism in Virginia, Catholicism in Maryland, Quakerism in Pennsylvania).	
4. Identify the significance and leaders of the First Great Awakening, which marked a shift in religious ideas, practices, and allegiances in the colonial period, the growth of religious toleration, and free exercise of religion.	
5. Understand how the British colonial period created the basis for the development of political self-government and a free-market economic system and the differences between the British, Spanish, and French colonial systems.	• Recognize the methods and motives for British colonization (i.e., based on increasing economic prosperity at home and acquiring natural resources from the colonies). • Describe how the British colonial period created the basis for the development of political self-government in America. • Identify trade in natural resources between Britain and the colonies as the basis for the development of the free-market system (e.g., tobacco crop, shipbuilding and mercantilism). • Explain the differences between the British, Spanish, and French colonial systems and their impacts on natural resources.
6. Describe the introduction of slavery into America, the responses of slave families to their condition, the ongoing struggle between proponents and opponents of slavery, and the gradual institutionalization of slavery in the South.	• Describe how population growth in the colonies and Europe increased the demand for the goods and ecosystem services provided by natural systems (e.g., agricultural production). • Recognize that increased demand for the goods and ecosystem services created the need for additional laborers to extract, harvest, transport and produce consumable natural resources. • Identify that slavery was instituted to increase the production rates and profits from harvesting natural resources, including agricultural crops and minerals (as not all slaves were farm workers, some worked in mines). • Describe the responses of slave families to their conditions, including limited access to goods provided by natural systems).
7. Explain the early democratic ideas and practices that emerged during the colonial period, including the significance of representative assemblies and town meetings.	

5. Students explain the causes of the American Revolution.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand how political, religious, and economic ideas and interests brought about the Revolution (e.g., resistance to imperial policy, the Stamp Act, the Townshend Acts, taxes on tea, Coercive Acts).	
2. Know the significance of the first and second Continental Congresses and of the Committees of Correspondence.	
3. Understand the people and events associated with the drafting and signing of the Declaration of Independence and the document's significance, including the key political concepts it embodies, the origins of those concepts, and its role in severing ties with Great Britain.	
4. Describe the views, lives, and impact of key individuals during this period (e.g., King George III, Patrick Henry, Thomas Jefferson, George Washington, Benjamin Franklin, John Adams).	

6. Students understand the course and consequences of the American Revolution.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Identify and map the major military battles, campaigns, and turning points of the Revolutionary War, the roles of the American and British leaders, and the Indian leaders' alliances on both sides.	
2. Describe the contributions of France and other nations and of individuals to the outcome of the Revolution (e.g., Benjamin Franklin's negotiations with the French, the French navy, the Treaty of Paris, The Netherlands, Russia, the Marquis Marie Joseph de Lafayette, Tadeusz Ko´sciuszko, Baron Friedrich Wilhelm von Steuben).	
3. Identify the different roles women played during the Revolution (e.g., Abigail Adams, Martha Washington, Molly Pitcher, Phyllis Wheatley, Mercy Otis Warren).	
4. Understand the personal impact and economic hardship of the war on families, problems of financing the war, wartime inflation, and laws against hoarding goods and materials and profiteering.	
5. Explain how state constitutions that were established after 1776 embodied the ideals of the American Revolution and helped serve as models for the U.S. Constitution.	

6. Demonstrate knowledge of the significance of land policies developed under the Continental Congress (e.g., sale of western lands, the Northwest Ordinance of 1787) and those policies' impact on American Indians' land.	• Identify the land policies developed under the Continental Congress (e.g., the sale of western lands, the Northwest Ordinance of 1787) that had an effect on the availability and use of the goods and ecosystem services provided by natural systems to the American Indian. • Describe the influences of the sale of western lands and the Northwest Ordinance of 1787 on the natural systems in those regions (e.g., sale of western lands brought population growth, changes in resource management practices). • Recognize that the goods and ecosystem services in these regions were attractive to settlers but were already being used by the already established Indian nations. • Explain that the laws, policies, and incentives that were enacted to encourage settlement of these regions displaced Indian peoples that were already living in those regions. • Discuss the impact of the land policies on American Indians' land.
7. Understand how the ideals set forth in the Declaration of Independence changed the way people viewed slavery.	

7. Students describe the people and events associated with the development of the U.S. Constitution and analyze the Constitution's significance as the foundation of the American republic.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. List the shortcomings of the Articles of Confederation as set forth by their critics.	
2. Explain the significance of the new Constitution of 1787, including the struggles over its ratification and the reasons for the addition of the Bill of Rights.	
3. Understand the fundamental principles of American constitutional democracy, including how the government derives its power from the people and the primacy of individual liberty.	
4. Understand how the Constitution is designed to secure our liberty by both empowering and limiting central government and compare the powers granted to citizens, Congress, the president, and the Supreme Court with those reserved to the states.	
5. Discuss the meaning of the American creed that calls on citizens to safeguard the liberty of individual Americans within a unified nation, to respect the rule of law, and to preserve the Constitution.	
6. Know the songs that express American ideals (e.g., "America the Beautiful," "The Star Spangled Banner").	

8. Students trace the colonization, immigration, and settlement patterns of the American people from 1789 to the mid-1800s, with emphasis on the role of economic incentives, effects of the physical and political geography, and transportation systems.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**

1. Discuss the waves of immigrants from Europe between 1789 and 1850 and their modes of transportation into the Ohio and Mississippi Valleys and through the Cumberland Gap (e.g., overland wagons, canals, flatboats, steamboats).	• Identify the reasons people from Europe immigrated to the United States between 1789 and 1850 (e.g., in large part they were motivated by the availability of natural resources in the United States). • Describe how the natural resources available in the American territories led to the establishment of communities, economies, and other social systems in the interior of the nation. • Explain the effects of immigration from Europe on the United States as a whole (i.e., individual communities grew, increasing the demand for natural resources as well as directly affecting the natural systems around them). • Provide examples of the modes of transportation used by immigrants to travel into the Ohio and Mississippi Valleys and through the Cumberland Gap and explain how they took advantage of cycles operating within natural systems (e.g., canals, flatboats, and steamboats require natural waterways that depend upon the water cycle). • Discuss how decisions to migrate and settle in particular areas of the United States were influenced by a variety of factors, including the availability of resources and the character of the region's natural systems.
2. Name the states and territories that existed in 1850 and identify their locations and major geographical features (e.g., mountain ranges, principal rivers, dominant plant regions).	• Name the states and territories in the United States that existed in 1850. • Provide examples of the geographic features of the states and territories that existed in 1850 (e.g., mountain ranges, rivers, dominant plant regions). • Identify the goods and ecosystem services provided by the natural systems in these states and territories that existed in 1850. • Explain why the major cities in these states and territories were typically located on natural waterways.
3. Demonstrate knowledge of the explorations of the trans-Mississippi West following the Louisiana Purchase (e.g., Meriwether Lewis and William Clark, Zebulon Pike, John Fremont).	• Identify the reasons for the explorations of the trans-Mississippi West following the Louisiana Purchase (e.g., identifying and cataloging goods and ecosystem services available west of the Missouri river). • Describe the roles of key explorers (e.g., Meriwether Lewis and William Clark, Zebulon Pike, John Fremont) in locating natural resources that supported the economic growth of the United States and encouraged westward expansion.
4. Discuss the experiences of settlers on the overland trails to the West (e.g., location of the routes; purpose of the journeys; the influence of the terrain, rivers, vegetation, and climate; life in the territories at the end of these trails).	• Identify reasons that the settlers moved to the West (e.g., population growth in the Eastern United States, the availability of untapped sources of natural resources in the West). • Recognize that the natural systems in the American territories west of the Mississippi and Missouri Rivers influenced the experiences of settlers as they traversed the overland trails to the West (e.g., the influence of the terrain, rivers, vegetation, and climate). • Describe how the cycles and processes that operate within natural systems influenced the experiences of settlers as they traversed the overland trails to the West (e.g., the choice and location of the routes, seasons to travel, and length of journey). • Provide examples of the factors that influenced the settlers' decisions to migrate and settle in particular areas (e.g., availability of natural resources, character of the region's natural systems). • Explain how life in the territories at the end of the overland trails was different from life in the regions from which these settlers had originally come.
5. Describe the continued migration of Mexican settlers into Mexican territories of the West and Southwest.	• Identify reasons for the continued migration of Mexican settlers into Mexican territories of the West and Southwest. • Recognize how the natural systems influenced the experiences of Mexican settlers as they migrated into Mexican territories of the West and Southwest. (e.g., the influence of the terrain, rivers, vegetation, and climate). • Explain the factors that influenced the settlers' decisions to migrate and settle in particular areas (e.g., availability of natural resources, character of the region's natural systems).
6. Relate how and when California, Texas, Oregon, and other western lands became part of the United States, including the significance of the Texas War for Independence and the Mexican-American War.	• Identify the role of the western lands that later became California, Texas, Oregon, and other western states in supplying goods and ecosystem services to the growing populations in other regions of the country. • Explain how the Texas War for Independence and the Mexican-American War were influenced by economic and political factors related to the natural resources available in those regions, as well as other factors.

9. Students know the location of the current 50 states and the names of their capitals.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**

Sixth Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
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.	**Standards-based Learning Objectives in the Context of the EP&C**
1. Describe the hunter-gatherer societies, including the development of tools and the use of fire.	• Recognize how hunter-gatherer societies met their needs (i.e., they depended upon the goods and ecosystem services that they obtained from natural systems). • Identify the purpose of the development of tools and use of fire by hunter-gatherer societies (i.e., helping them extract, harvest, transport, and consume goods and use ecosystem services from the natural systems where they lived). • Explain that even though humans today may use different tools and practices, they require the same goods and ecosystem services as those of hunter-gatherer societies to assure their survival. • Describe how the expansion and operation of hunter-gatherer societies influenced the geographic extent, composition, biological diversity, and viability of natural systems (e.g., the extinction of mastodons, flightless birds, and other large animals).
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.	• Identify the locations of early human communities that populated the major regions of the world. • Provide examples of the factors that influenced the settlement of early human communities in a variety of environments in each of the major regions of the world. • Compare the methods used by different early human communities to extract, harvest, transport and consume natural resources in the major regions of the world. • Describe how humans adapted their practices to the goods and ecosystem services, as well as to the cycles and processes that operated in the natural systems that they inhabited.
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.	• Identify both the climatic changes and human modifications of the physical environment that early humans caused as their populations grew. • Describe the effects of the climatic changes and human modifications of the physical environment on the natural systems they inhabited and harvested. • Explain the processes that gave rise to the domestication of plants and animals. • Provide examples of new sources of clothing and shelter developed by humans from the Paleolithic era to the agricultural revolution. • Recognize that as the climate warmed and the environment changed, human populations moved into new areas to obtain more goods and ecosystem services from natural systems. • Describe the methods used by humans to extract, harvest, transport and consume natural resources and how those methods influenced the geographic extent, composition, biological diversity, and viability of natural systems. • Explain the relationship between the domestication of plants and animals (e.g., agriculture and ranching), textiles, cooking and preserving food, and work specialization. • Describe how these new practices and their resulting byproducts affected the natural systems that these human communities inhabited.

2. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Mesopotamia, Egypt, and Kush.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Locate and describe the major river systems and discuss the physical settings that supported permanent settlement and early civilizations.	• Identify the importance of water and major river systems to human life and social systems (economic, political, legal, cultural, and religious) to the early civilizations of Mesopotamia, Egypt, and Kush. • Compare the uses of water and major river systems from early civilizations to today. • Describe the role of the major river systems and their physical settings in the choice of locations for permanent settlement in these early civilizations. • Provide examples of seasonal cycles in the major river systems that benefited humans and the permanent settlement of early civilizations. • Map the locations and describe the major river systems that were important to the early civilizations of Mesopotamia, Egypt, and Kush and discuss the physical settings of those river systems.
2. Trace the development of agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power.	• Recognize changes to and the development of agricultural techniques over time (e.g., domestication of plants and animals). • Identify the factors that influenced changes to and the development of agricultural techniques in early civilizations (i.e., as humans learned more about natural systems, resources and cycles, they applied their knowledge to the development of agricultural techniques). • Describe how the development of agricultural techniques produced more goods from the natural systems inhabited by the early civilizations. • Describe how improvements to agricultural practices increased supplies of food and other agricultural products (sometimes surpluses), which in turn resulted in the growth of human populations and the development of larger settlements and cities. • Explain that as humans settled in cities and the population grew, they needed to import agricultural products such as food from farther and farther away. • Provide examples of the direct and indirect influences of agricultural techniques on the natural systems inhabited by the early civilizations (e.g., loss of natural habitat, changes to local water distribution). • Trace the development of agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power.
3. Understand the relationship between religion and the social and political order in Mesopotamia and Egypt.	• Provide examples of religious beliefs and cultural practices that were based on the goods, ecosystem services, and cycles and processes (e.g., cyclical flooding of rivers) associated with the natural systems inhabited by the early civilizations of Mesopotamia, Egypt, and Kush. • Describe how the religious beliefs and cultural practices based on natural systems changed over time into social practices (economic, political, legal, cultural, and religious).
4. Know the significance of Hammurabi's Code.	• Recognize that Hammurabi's Code set up laws for early civilizations to govern themselves once people started living in communities. • Identify Hammurabi's Code as the first known attempt to formalize decision-making about natural resources on the basis of private property rights. • Provide examples of how the consequences prescribed in Hammurabi's Code influenced actions of individuals in relation to natural resources.
5. Discuss the main features of Egyptian art and architecture.	• Identify the role of the goods, ecosystem services, and cycles and processes associated with natural systems in Egyptian art (e.g., dependence on natural cycles such as the flooding of the Nile, appreciation for animals). • Discuss the main features of Egyptian art and architecture, and the incorporation of goods supplied by natural systems in their development.

6. Describe the role of Egyptian trade in the eastern Mediterranean and Nile Valley.	• Identify that the Nile River and Valley provided the natural resources necessary to establish the region's agricultural economy. • Explain the effect of Egypt's improved agricultural methods and practices on the civilization and its borders (i.e., they produced surplus goods [e.g., food and textiles] that allowed the civilization to grow and expand its borders). • Provide examples of the goods that played a role in Egyptian trade in the eastern Mediterranean and Nile Valley. • Provide examples of the direct and indirect influences of Egyptian trade in the eastern Mediterranean and Nile Valley on the natural systems in the region. • Describe the influence of Egyptian trade on the development of laws, policies, and incentives that were created to govern the use and management of the natural resources in the eastern Mediterranean and Nile Valley.
7. Understand the significance of Queen Hatshepsut and Ramses the Great.	
8. Identify the location of the Kush civilization and describe its political, commercial, and cultural relations with Egypt.	• Recognize that the Nile River and Valley were the basis for the natural resources used by the Kush civilization to establish an agricultural economy. • Describe the similarities and differences between the Kush and Egyptian civilizations (e.g., agricultural practices, economic, political and religious systems). • Describe the Kush's political, commercial, and cultural relations with Egypt. • Explain the reasons each Egyptian dynasty had a policy related to control of the Kush to ensure access to the goods and ecosystem services provided by the Nile River. • Locate the Kush civilization on a map.
9. Trace the evolution of language and its written forms.	

3. Students analyze the geographic, political, economic, religious, and social structures of the Ancient Hebrews.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the origins and significance of Judaism as the first monotheistic religion based on the concept of one God who sets down moral laws for humanity.	
2. Identify the sources of the ethical teachings and central beliefs of Judaism (the Hebrew Bible, the Commentaries): belief in God, observance of law, practice of the concepts of righteousness and justice, and importance of study; and describe how the ideas of the Hebrew traditions are reflected in the moral and ethical traditions of Western civilization.	• Provide examples of the beliefs, practice, and law expressed in Judaism regarding the care for natural systems and the environment.
3. Explain the significance of Abraham, Moses, Naomi, Ruth, David, and Yohanan ben Zaccai in the development of the Jewish religion.	
4. Discuss the locations of the settlements and movements of Hebrew peoples, including the Exodus and their movement to and from Egypt, and outline the significance of the Exodus to the Jewish and other people.	• Identify the role of natural resources and systems, and cycles and processes in the location of settlements and the movements of Hebrew peoples.
5. Discuss how Judaism survived and developed despite the continuing dispersion of much of the Jewish population from Jerusalem and the rest of Israel after the destruction of the second Temple in A.D. 70.	

4. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Ancient Greece.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the connections between geography and the development of city-states in the region of the Aegean Sea, including patterns of trade and commerce among Greek city-states and within the wider Mediterranean region.	• Identify the influence of the Aegean Sea and the surrounding region on the development of Greek city-states and an economy based on trade (i.e., the natural systems that provided the goods and ecosystem services necessary for settlement and trade). • Provide examples of the goods and ecosystem services in the region that were the basis for trade and commerce among Greek city-states resources. • Explain how surpluses of natural resources (e.g., agricultural products) in civilizations around the Aegean Sea became the basis of a trade economy throughout the entire Mediterranean. • Describe how the operation of the Greek city-states was based upon ensuring safe trade routes and accessibility of goods to trading partners. • Discuss how patterns of trade and commerce affected the growth and movement of human populations in the Aegean Sea and the wider Mediterranean region. • Provide examples of the influence of the growing human populations on the natural systems bordering the Aegean Sea and the wider Mediterranean.
2. Trace the transition from tyranny and oligarchy to early democratic forms of government and back to dictatorship in ancient Greece, including the significance of the invention of the idea of citizenship (e.g., from *Pericles' Funeral Oration).*	
3. State the key differences between Athenian, or direct, democracy and representative democracy.	
4. Explain the significance of Greek mythology to the everyday life of people in the region and how Greek literature continues to permeate our literature and language today, drawing from Greek mythology and epics, such as Homer's *Iliad* and *Odyssey,* and from *Aesop's Fables.*	
5. Outline the founding, expansion, and political organization of the Persian Empire.	• Recognize that the Persian Empire depended on the goods and ecosystem services available to humans from the natural systems in the region. • Identify that, as the population of the empire grew, it required more natural resources. • Explain the factors that led to the expansion of the empire in increasing demand for natural resources as the population of the empire grew. • Provide examples of how the resource supply methods and consumption patterns of the empire affected the natural systems in the region. • Explain that the political organization and decision-making processes involving the expansion of the empire were made by the ruling class and were based upon growing demands by the empire's growing population.
6. Compare and contrast life in Athens and Sparta, with emphasis on their roles in the Persian and Peloponnesian Wars.	
7. Trace the rise of Alexander the Great and the spread of Greek culture eastward and into Egypt.	• Recognize that the empire of Alexander the Great depended on the goods and ecosystem services available to humans from the natural systems in the region. • Identify that, as the population of the empire grew, more natural resources were required. • Explain the factors that led to the expansion of the empire (i.e., the increasing demand for natural resources as the population grew). • Provide examples of how the resource supply methods and consumption patterns of the empire affected the natural systems in the region. • Explain that the spread of Greek culture eastward and into Egypt resulted from the expansion of the empire to new areas as it sought additional natural resources.
8. Describe the enduring contributions of important Greek figures in the arts and sciences (e.g., Hypatia, Socrates, Plato, Aristotle, Euclid, Thucydides).	

5. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of India.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Locate and describe the major river system and discuss the physical setting that supported the rise of this civilization.	• Identify the importance of water and India's major river systems to human life and social systems (economic, political, legal, cultural, and religious). • Provide examples of the natural resources (goods and ecosystem services) upon which early Indian civilizations relied. • Compare the uses of water and major river systems with other early civilizations. • Describe the factors that influenced the settlement of Indian communities (e.g., the role of the major river systems and other physical settings in providing goods and ecosystem services). • Provide examples of seasonal cycles in the major river systems that benefited humans and the permanent settlement of early Indian civilizations. • Map the locations and describe the major river systems that were important to the early civilizations of India and discuss their physical settings.
2. Discuss the significance of the Aryan invasions.	
3. Explain the major beliefs and practices of Brahmanism in India and how they evolved into early Hinduism.	
4. Outline the social structure of the caste system.	
5. Know the life and moral teachings of Buddha and how Buddhism spread in India, Ceylon, and Central Asia.	
6. Describe the growth of the Maurya empire and the political and moral achievements of the emperor Asoka.	
7. Discuss important aesthetic and intellectual traditions (e.g., Sanskrit literature, including the *Bhagavad Gita;* medicine; metallurgy; and mathematics, including Hindu-Arabic numerals and the zero).	

6. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of China.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Locate and describe the origins of Chinese civilization in the Huang-He Valley during the Shang Dynasty.	• Identify the importance of water and the major river system of the Huang-He Valley to the origin of Chinese civilization and social systems (economic, political, legal, cultural, and religious). • Provide examples of the natural resources (goods and ecosystem services) upon which the early Chinese civilizations relied. • Provide examples of the influence of the Huang-He Valley on the development of the Shang Dynasty. • Map the location of the major river systems in the Huang-He Valley.
2. Explain the geographic features of China that made governance and the spread of ideas and goods difficult and served to isolate the country from the rest of the world.	• Provide examples of the factors that influenced the settlement of new areas in China (e.g., availability of natural resources). • Describe the major geographic features of China. • Identify and compare the geographic features that could influence governance, the spread of ideas and the distribution of goods and services. • Recognize how China's major geographic features influenced the consumption of natural resources and the associated effects on natural systems. • Explain how the geographic features of China served to isolate the country from the rest of the world. • Provide examples of the effects of China's isolation on itself and the rest of the world.
3. Know about the life of Confucius and the fundamental teachings of Confucianism and Taoism.	
4. Identify the political and cultural problems prevalent in the time of Confucius and how he sought to solve them.	

5. List the policies and achievements of the emperor Shi Huangdi in unifying northern China under the Qin Dynasty.	
6. Detail the political contributions of the Han Dynasty to the development of the imperial bureaucratic state and the expansion of the empire.	• Recognize that the Han Dynasty depended on the goods and ecosystem services available to humans from the natural systems in the region. • Identify that as the population of the Han Dynasty grew, more natural resources were required. • Explain why the expansion of the Han Dynasty to new areas was necessitated by the growing demand for natural resources. • Describe the forced immigration policies of the Han Dynasty and its extensive effort to catalog and keep records of the natural resources throughout China. • Provide examples of how the resource supply methods and consumption patterns of the Han Dynasty affected the natural systems in the region. • Explain the political organization and decision-making processes of the Han Dynasty as they related to the use and management of natural resources.
7. Cite the significance of the trans-Eurasian "silk roads" in the period of the Han Dynasty and Roman Empire and their locations.	• Recognize silk as one of the goods and ecosystem services provided by China's natural systems. • Identify the role of the silk trade in the growth of communities and populations in many areas of China. • Provide examples of how the silk trade directly and indirectly affected the natural systems in the region. • Cite the significance of the trans-Eurasian "silk roads" in the period of the Han Dynasty and Roman Empire and their locations.
8. Describe the diffusion of Buddhism northward to China during the Han Dynasty.	

7. Students analyze the geographic, political, economic, religious, and social structures during the development of Rome.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Identify the location and describe the rise of the Roman Republic, including the importance of such mythical and historical figures as Aeneas, Romulus and Remus, Cincinnatus, Julius Caesar, and Cicero.	
2. Describe the government of the Roman Republic and its significance (e.g., written constitution and tripartite government, checks and balances, civic duty).	
3. Identify the location of and the political and geographic reasons for the growth of Roman territories and expansion of the empire, including how the empire fostered economic growth through the use of currency and trade routes.	• Recognize that the Roman Empire and its territories depended on the goods and ecosystem services available to humans from the natural systems in the region. • Identify that as the population of the Roman Empire and its territories grew, more natural resources were required. • Explain why the expansion of the Roman Empire and its territories to new areas was necessitated by the growing demand for natural resources. • Identify the locations of the geographic expansion of the Roman Empire. • Provide examples of how the resource supply methods and consumption patterns of the Roman Empire affected the natural systems in the region. • Describe how the operations of the Roman Empire centered on resource acquisition and transportation and how the Empire fostered economic growth through the use of currency and trade routes. • Map the location of the Roman Empire and the sources of natural resources used at that time.
4. Discuss the influence of Julius Caesar and Augustus in Rome's transition from republic to empire.	
5. Trace the migration of Jews around the Mediterranean region and the effects of their conflict with the Romans, including the Romans' restrictions on their right to live in Jerusalem.	

6. Note the origins of Christianity in the Jewish Messianic prophecies, the life and teachings of Jesus of Nazareth as described in the New Testament and the contribution of St. Paul the Apostle to the definition and spread of Christian beliefs (e.g., belief in the Trinity, resurrection, salvation).	
7. Describe the circumstances that led to the spread of Christianity in Europe and other Roman territories.	
8. Discuss the legacies of Roman art and architecture, technology and science, literature, language, and law.	

Seventh Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students analyze the causes and effects of the vast expansion and ultimate disintegration of the Roman Empire.	**Standards-based Learning Objectives in the Context of the EP&C**
1. Study the early strengths and lasting contributions of Rome (e.g., significance of Roman citizenship; rights under Roman law; Roman art, architecture, engineering, and philosophy; preservation and transmission of Christianity) and its ultimate internal weaknesses (e.g., rise of autonomous military powers within the empire, undermining of citizenship by the growth of corruption and slavery, lack of education, and distribution of news).	
2. Discuss the geographic borders of the empire at its height and the factors that threatened its territorial cohesion.	• Recognize that the Roman Empire depended on the goods and ecosystem services available to humans from the natural systems in its territories. • Explain that the expansion of the Roman Empire and its territories to new areas was necessitated by the growing demand for natural resources. • Locate the geographic borders of the Roman Empire at its height. • Provide examples of how the resource supply methods and consumption patterns of the Roman Empire affected the natural systems in the region. • Explain that Roman Empire was not able to protect the farmers in the provinces/territories and that the farmers were not able to both operate their farms and protect themselves against barbarian invaders. • Discuss why the territorial cohesion of the Roman Empire was threatened by its inability to adequately protect all its provinces/territories.
3. Describe the establishment by Constantine of the new capital in Constantinople and the development of the Byzantine Empire, with an emphasis on the consequences of the development of two distinct European civilizations, Eastern Orthodox and Roman Catholic, and their two distinct views on church-state relations.	

2. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Islam in the Middle Ages.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Identify the physical features and describe the climate of the Arabian peninsula, its relationship to surrounding bodies of land and water, and nomadic and sedentary ways of life.	• Identify the importance of water supplies to human life and the social systems (economic, political, legal, cultural, and religious) of the Arabian Peninsula. • Identify and describe the physical features and climate of the Arabian Peninsula. • Identify the cycles and natural processes that were important to the nomadic and sedentary ways of life on the Arabian Peninsula. • Explain the relationship of the physical features and climate of the Arabian Peninsula to surrounding bodies of land and water. • Recognize that the nomadic and sedentary ways of life on the Arabian Peninsula resulted from the distribution of water and other goods and ecosystem services on which the people of the region depended. • Describe how both the nomadic and sedentary ways of life on the Arabian Peninsula depended on the people's knowledge of natural systems in the region.
2. Trace the origins of Islam and the life and teachings of Muhammad, including Islamic teachings on the connection with Judaism and Christianity.	
3. Explain the significance of the Qur'an and the Sunnah as the primary sources of Islamic beliefs, practice, and law, and their influence in Muslims' daily life.	• Provide examples of the beliefs, practice, and law expressed in the Qur'an and the Sunnah regarding the care for natural systems and the environment.

4. Discuss the expansion of Muslim rule through military conquests and treaties, emphasizing the cultural blending within Muslim civilization and the spread and acceptance of Islam and the Arabic language.	• Recognize that as Muslims conquered other peoples in other regions, they learned how to utilize the natural resources in those regions, and adapt local farming techniques.
5. Describe the growth of cities and the establishment of trade routes among Asia, Africa, and Europe, the products and inventions that traveled along these routes (e.g., spices, textiles, paper, steel, new crops), and the role of merchants in Arab society.	• Describe how improvements to agricultural practices on the Arabian Peninsula increased supplies of food and other agricultural products (sometimes creating surpluses) which led to the growth of trade. • Describe how the growth of human populations and cities led to the establishment of trade routes among Asia, Africa, and Europe to import various goods and products (e.g., agricultural products). • Provide examples of the goods, products and inventions that were transported along these routes (e.g., spices, textiles, paper, steel, new crops). • Describe how towns were settled along well-known routes, thus allowing Arab society to take advantage of raw materials from locations that were even more distant from the region. • Provide examples of the direct and indirect influences of trade routes on the natural systems that were the sources of the goods and products that were being transported.
6. Understand the intellectual exchanges among Muslim scholars of Eurasia and Africa and the contributions Muslim scholars made to later civilizations in the areas of science, geography, mathematics, philosophy, medicine, art, and literature.	

3. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of China in the Middle Ages.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the reunification of China under the Tang Dynasty and reasons for the spread of Buddhism in Tang China, Korea, and Japan.	
2. Describe agricultural, technological, and commercial developments during the Tang and Sung periods.	• Recognize that Medieval China depended on the goods and ecosystem services available to humans from the natural systems in its territories. • Provide examples of the agricultural, technological, and commercial developments during the Tang and Sung periods. • Explain how the agricultural, technological, and commercial advances made production of a variety of goods faster, more efficient or safer, and in turn supported the growth of trade. • Provide examples of the direct and indirect influences of the agricultural, technological, and commercial developments on the natural systems where these methods were being used.
3. Analyze the influences of Confucianism and changes in Confucian thought during the Sung and Mongol periods.	
4. Understand the importance of both overland trade and maritime expeditions between China and other civilizations in the Mongol Ascendancy and Ming Dynasty.	• Recognize that technological advances improved the time, safety, and efficiency rate of maritime expeditions and overland trade. • Identify supply and demand for natural resources as the basis for overland trade and maritime expeditions between China and other civilizations in the Mongol Ascendancy and Ming Dynasty. • Provide examples of the goods and ecosystem services in the region that were the basis for trade and commerce between China and other civilizations in the Mongol Ascendancy and Ming Dynasty. • Discuss how patterns of trade and commerce affected the growth and movement of human populations in China and other civilizations in the Mongol Ascendancy and Ming Dynasty. • Provide examples of the influence of the overland trade and maritime expeditions between China and other civilizations in the Mongol Ascendancy and Ming Dynasty on the natural systems in the region.

5. Trace the historic influence of such discoveries as tea, the manufacture of paper, wood-block printing, the compass, and gunpowder.	• Identify the sources of the natural resources that were involved in discoveries such as tea, the manufacture of paper, wood-block printing, the compass, and gunpowder. • Recognize how discoveries such as tea and gunpowder, and the processes involved in their production, influenced worldwide natural resource production practices and consumption patterns. • Provide examples of the methods used to extract, harvest, transport and consume natural resources associated with the production of tea, the manufacture of paper, wood-block printing, the compass, and gunpowder. • Describe the effects of the methods used to extract, harvest, transport and consume natural resources associated with these discoveries. • Trace the historic influence of these discoveries on human social systems (economic, political, legal, cultural, and religious).
6. Describe the development of the imperial state and the scholar-official class.	

4. Students analyze the geographic, political, economic, religious, and social structures of the sub-Saharan civilizations of Ghana and Mali in Medieval Africa.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Study the Niger River and the relationship of vegetation zones of forest, savannah, and desert to trade in gold, salt, food, and slaves; and the growth of the Ghana and Mali empires.	• Recognize that human communities living in the forest, savannah, and desert regions near the Niger River depended on goods and ecosystem services available to humans from these natural systems. • Identify the Niger River and the vegetation zones of forest, savannah, and desert as the sources of the goods, products, and other resources (e.g., gold, salt, food, and slaves) that people in the region traded. • Provide examples of the goods, products and people that were transported along these routes (e.g., gold, salt, food, and slaves). • Provide examples of the direct and indirect influences of trade in gold, salt, food, and slaves; and the growth of the Ghana and Mali empires on the natural systems in the region. • Explain the role of trade in the growth of the Ghana and Mali empires.
2. Analyze the importance of family, labor specialization, and regional commerce in the development of states and cities in West Africa.	• Provide examples of the goods, products and ecosystem services that were involved in the regional commerce in West Africa. • Describe the influences of regional commerce in these the goods, products and ecosystem services on the development of states and cities in West Africa. • Provide examples of the direct and indirect influences of regional commerce on the natural systems that were the sources of the goods and products that were being transported.
3. Describe the role of the trans-Saharan caravan trade in the changing religious and cultural characteristics of West Africa and the influence of Islamic beliefs, ethics, and law.	• Describe how the trans-Saharan caravan trade changed the resource supply and consumption patterns of the human communities in Western Africa and other parts of the continent. • Identify how this trade supported the growth of human communities in Western Africa and other parts of the continent. • Provide examples of how the growing communities of Africa influenced the surrounding natural systems. • Explain that the Islamic beliefs, ethics, and law resulted from the trans-Saharan caravan trade that was based on the distribution of goods, products and ecosystem services from natural systems.
4. Trace the growth of the Arabic language in government, trade, and Islamic scholarship in West Africa.	
5. Describe the importance of written and oral traditions in the transmission of African history and culture.	

5. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Japan.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the significance of Japan's proximity to China and Korea and the intellectual, linguistic, religious, and philosophical influence of those countries on Japan.	• Provide examples of the goods and ecosystem services that were the basis of the Japan's economies and trading systems. • Discuss the significance of Japan's proximity to China and Korea and the availability of the natural resources that were the basis for its intellectual, linguistic, religious, philosophical and economic development. • Explain the factors involved in making decisions regarding the supply and use of natural resources and how decisions were made in Japan.
2. Discuss the reign of Prince Shotoku of Japan and the characteristics of Japanese society and family life during his reign.	
3. Describe the values, social customs, and traditions prescribed by the lord-vassal system consisting of *shogun, daimyo,* and *samurai* and the lasting influence of the warrior code in the twentieth century.	• Identify the values, social customs, and traditions prescribed by the lord-vassal system in medieval Japan as a mechanism for producing and controlling goods and ecosystem services. • Recognize how lord-vassal system relationships, because they controlled the production of goods and ecosystem services (e.g., agricultural products), influenced the medieval Japanese economy. • Explain the influence of the lord-vassal system on the distribution of goods and ecosystem services.
4. Trace the development of distinctive forms of Japanese Buddhism.	
5. Study the ninth and tenth centuries' golden age of literature, art, and drama and its lasting effects on culture today, including Murasaki Shikibu's *Tale of Genji.*	
6. Analyze the rise of a military society in the late twelfth century and the role of the samurai in that society.	

6. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Europe.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Study the geography of Europe and the Eurasian landmass, including its location, topography, waterways, vegetation, and climate and their relationship to ways of life in Medieval Europe.	• Use a map to identify the geography of Europe and the Eurasian landmass, including its location and topography, major waterways, vegetation, and climatic zones. • Provide examples of the goods and ecosystem services on which human communities in Medieval Europe relied. • Describe how the availability of goods and ecosystem services influenced ways of life in Medieval Europe. • Explain the factors involved in making decisions regarding the supply and use of natural resources and how such decisions were made in Medieval Europe.
2. Describe the spread of Christianity north of the Alps and the roles played by the early church and by monasteries in its diffusion after the fall of the western half of the Roman Empire.	
3. Understand the development of feudalism, its role in the medieval European economy, the way in which it was influenced by physical geography (the role of the manor and the growth of towns), and how feudal relationships provided the foundation of political order.	• Identify the development of feudalism in medieval Europe as a mechanism for producing and controlling goods and ecosystem services. • Recognize how feudal relationships, because they controlled the production of goods and ecosystem services (e.g., agricultural products) influenced the medieval European economy. • Explain the influence of feudalism on the distribution of goods and services. • Describe how feudalism's role in the economy of medieval European provided the foundation for the development of the political order. • Provide examples of ways by which development of feudalism was influenced by physical geography (e.g., the role of manors, growth of towns).
4. Demonstrate an understanding of the conflict and cooperation between the Papacy and European monarchs (e.g., Charlemagne, Gregory VII, Emperor Henry IV).	

5. Know the significance of developments in medieval English legal and constitutional practices and their importance in the rise of modern democratic thought and representative institutions (e.g., Magna Carta, parliament, development of habeas corpus, an independent judiciary in England).	• Provide examples of the laws and practices established in the Magna Carta regarding responsibilities for the management and care of lands (natural systems).
6. Discuss the causes and course of the religious Crusades and their effects on the Christian, Muslim, and Jewish populations in Europe, with emphasis on the increasing contact by Europeans with cultures of the Eastern Mediterranean world.	
7. Map the spread of the bubonic plague from Central Asia to China, the Middle East, and Europe and describe its impact on global population.	• Recognize that the growing populations and communities of Europe consumed large quantities of natural resources. • Describe waste removal practices in Medieval Europe and other regions. • Explain how waste removal practices influenced the spread of the bubonic plague in Medieval Europe and other regions. • Map the spread of the bubonic plague from Central Asia to China, the Middle East, and Europe. • Quantify and describe the impact of the bubonic plague on human populations from Central Asia to China, the Middle East, and Europe.
8. Understand the importance of the Catholic church as a political, intellectual, and aesthetic institution (e.g., founding of universities, political and spiritual roles of the clergy, creation of monastic and mendicant religious orders, preservation of the Latin language and religious texts, St. Thomas Aquinas's synthesis of classical philosophy with Christian theology, and the concept of "natural law").	• Provide examples of the beliefs, practice, and law expressed in the Catholic Church regarding the care for natural systems and the environment.
9. Know the history of the decline of Muslim rule in the Iberian Peninsula that culminated in the Reconquista and the rise of Spanish and Portuguese kingdoms.	

7. Students compare and contrast the geographic, political, economic, religious, and social structures of the Meso-American and Andean civilizations.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Study the locations, landforms, and climates of Mexico, Central America, and South America and their effects on Mayan, Aztec, and Incan economies, trade, and development of urban societies.	• Use a map to identify the locations of Mexico, Central America, and South America and identify the location of major landforms in the region. • Differentiate among the climatic zones throughout Mexico, Central America, and South America. • Describe the dependence of the Mayan, Aztec, and Incan civilizations on the goods and ecosystem services provide by the local natural systems. • Provide examples of the goods and ecosystems services that were the basis of the Mayan, Aztec, and Incan economies and trading systems. • Discuss the role of physical geography, climate and the availability of natural resources in the development of Mayan, Aztec, and Incan urban societies. • Explain the factors involved in making decisions regarding the supply and use of natural resources and how such decisions were made in the Mayan, Aztec, and Incan cultures.
2. Study the roles of people in each society, including class structures, family life, warfare, religious beliefs and practices, and slavery.	

3. Explain how and where each empire arose and how the Aztec and Incan empires were defeated by the Spanish.	• Recognize the dependence of the Aztec and Incan empires on goods, ecosystem services, natural systems and physical geography of Central and South America. • Use a map to identify the locations of the Aztec and Incan empires and describe how each empire arose. • Compare the factors taken into account by the Aztecs, Incas and the Spanish, and the decisions-making processes they used in relation to natural resources management. • Explain how the introduction of European diseases played an important part in the defeat of the Aztecs and Incas and had devastating effects on their populations.
4. Describe the artistic and oral traditions and architecture in the three civilizations.	• Identify the relationships between the artistic and oral traditions and architecture in the three civilizations and the natural systems they inhabited.
5. Describe the Meso-American achievements in astronomy and mathematics, including the development of the calendar and the Meso-American knowledge of seasonal changes to the civilizations' agricultural systems.	• Recognize the importance of knowledge of seasonal changes to the civilizations' agricultural systems and to their ability to harvest the goods and ecosystem services upon which they depended. • Identify the cycles and processes in natural systems that were important to the Mayan, Aztec, and Incan civilizations. • Explain how the Meso-American achievements in astronomy and mathematics, including the development of the calendar, were important to their survival and social systems (economic, political, legal, cultural, and religious).

8. Students analyze the origins, accomplishments, and geographic diffusion of the Renaissance.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the way in which the revival of classical learning and the arts fostered a new interest in humanism (i.e., a balance between intellect and religious faith).	
2. Explain the importance of Florence in the early stages of the Renaissance and the growth of independent trading cities (e.g., Venice), with emphasis on the cities' importance in the spread of Renaissance ideas.	
3. Understand the effects of the reopening of the ancient "Silk Road" between Europe and China, including Marco Polo's travels and the location of his routes.	• Identify that as the population of Europe grew, it consumed more natural resources. • Provide examples of the goods and ecosystem services that were traded between Europe and China. • Recognize the impact of the reopening of the ancient "Silk Road" between Europe and China had an impact on the natural systems of the regions. • Discuss how physical geography, climate and the availability of natural resources influenced Marco Polo's travels and the location of his routes.
4. Describe the growth and effects of new ways of disseminating information (e.g., the ability to manufacture paper, translation of the Bible into the vernacular, printing).	
5. Detail advances made in literature, the arts, science, mathematics, cartography, engineering, and the understanding of human anatomy and astronomy (e.g., by Dante Alighieri, Leonardo da Vinci, Michelangelo di Buonarroti Simoni, Johann Gutenberg, William Shakespeare).	• Discuss the role of scientific discovery, mathematics, and cartography during the Renaissance in improving human knowledge of organisms, natural systems, and the planet as a whole, a process that continues today.

9. Students analyze the historical developments of the Reformation.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. List the causes for the internal turmoil in and weakening of the Catholic church (e.g., tax policies, selling of indulgences).	
2. Describe the theological, political, and economic ideas of the major figures during the Reformation (e.g., Desiderius Erasmus, Martin Luther, John Calvin, William Tyndale).	

3. Explain Protestants' new practices of church self-government and the influence of those practices on the development of democratic practices and ideas of federalism.	
4. Identify and locate the European regions that remained Catholic and those that became Protestant and explain how the division affected the distribution of religions in the New World.	
5. Analyze how the Counter-Reformation revitalized the Catholic church and the forces that fostered the movement (e.g., St. Ignatius of Loyola and the Jesuits, the Council of Trent).	
6. Understand the institution and impact of missionaries on Christianity and the diffusion of Christianity from Europe to other parts of the world in the medieval and early modern periods; locate missions on a world map.	
7. Describe the Golden Age of cooperation between Jews and Muslims in medieval Spain that promoted creativity in art, literature, and science, including how that cooperation was terminated by the religious persecution of individuals and groups (e.g., the Spanish Inquisition and the expulsion of Jews and Muslims from Spain in 1492).	

10. Students analyze the historical developments of the Scientific Revolution and its lasting effect on religious, political, and cultural institutions.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the roots of the Scientific Revolution (e.g., Greek rationalism; Jewish, Christian, and Muslim science; Renaissance humanism; new knowledge from global exploration).	• Discuss the role of the Scientific Revolution and new knowledge from global exploration in improving human understanding of the natural world, thus improving our ability to make better decisions about resources and natural systems, a process that continues today.
2. Understand the significance of the new scientific theories (e.g., those of Copernicus, Galileo, Kepler, Newton) and the significance of new inventions (e.g., the telescope, microscope, thermometer, barometer).	• Explain the significance of the new scientific theories of Copernicus, Galileo, Kepler, and Newton and of new inventions in improving human understanding of the natural world, thus improving our ability to make better decisions about resources and natural systems, a process that continues today.
3. Understand the scientific method advanced by Bacon and Descartes, the influence of new scientific rationalism on the growth of democratic ideas, and the coexistence of science with traditional religious beliefs.	• Explain the significance of the scientific method in increasing knowledge, thus improving our ability to make better decisions about resources and natural systems, a process that continues today. • Explain how scientific rationalism affected the growth of democratic ideas and coexisted with traditional religious beliefs, and specifically how this influenced decisions about the management of natural resources.

11. Students analyze political and economic change in the sixteenth, seventeenth, and eighteenth centuries (the Age of Exploration, the Enlightenment, and the Age of Reason).	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Know the great voyages of discovery, the locations of the routes, and the influence of cartography in the development of a new European worldview.	• Discuss the role of the great voyages of discovery on increasing human understanding of the planet as a whole, thus improving our ability to make better decisions about resources and natural systems, a process that continues today. • Describe the influence of cartography in the communication of new knowledge and the resulting development of a new European worldview.

2. Discuss the exchanges of plants, animals, technology, culture, and ideas among Europe, Africa, Asia, and the Americas in the fifteenth and sixteenth centuries and the major economic and social effects on each continent.	• Provide examples of the major economic, social and environmental effects (e.g., impact on natural systems, loss of native species) on each continent that resulted from exchanges of plants, animals, technology, culture, and ideas among Europe, Africa, Asia, and the Americas in the fifteenth and sixteenth centuries. • Provide examples of the decisions made during the Age of Exploration, Age of Enlightenment and Age of Reason that influenced exploration, harvesting, and trade related to natural resources. • Describe how the assessment of social, economic, political, and environmental factors changed during the fifteenth and sixteenth centuries as a result of the exchanges of plants, animals, technology, culture, and ideas among Europe, Africa, Asia, and the Americas.
3. Examine the origins of modern capitalism; the influence of mercantilism and cottage industry; the elements and importance of a market economy in seventeenth-century Europe; the changing international trading and marketing patterns, including their locations on a world map; and the influence of explorers and map makers.	• Describe the role of goods and ecosystem services from natural systems in supporting mercantilism, cottage industry and the origins of modern capitalism.
4. Explain how the main ideas of the Enlightenment can be traced back to such movements as the Renaissance, the Reformation, and the Scientific Revolution and to the Greeks, Romans, and Christianity.	
5. Describe how democratic thought and institutions were influenced by Enlightenment thinkers (e.g., John Locke, Charles-Louis Montesquieu, American founders).	
6. Discuss how the principles in the Magna Carta were embodied in such documents as the English Bill of Rights and the American Declaration of Independence.	

Eighth Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students understand the major events preceding the founding of the nation and relate their significance to the development of American constitutional democracy.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:** • Provide examples of major events leading to the development of revolutionary fervor that were directly related to the management, control and consumption of goods and ecosystem services from natural systems. • Explain the issues related to ownership of land and natural resources in the major events preceding the founding of the nation.
1. Describe the relationship between the moral and political ideas of the Great Awakening and the development of revolutionary fervor.	
2. Analyze the philosophy of government expressed in the Declaration of Independence, with an emphasis on government as a means of securing individual rights (e.g., key phrases such as "all men are created equal, that they are endowed by their Creator with certain unalienable Rights").	• Describe the concepts of individual rights versus the common good as they related to land ownership and use of natural resources prior to the American Revolution.
3. Analyze how the American Revolution affected other nations, especially France.	
4. Describe the nation's blend of civic republicanism, classical liberal principles, and English parliamentary traditions.	

2. Students analyze the political principles underlying the U.S. Constitution and compare the enumerated and implied powers of the federal government.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Discuss the significance of the Magna Carta, the English Bill of Rights, and the Mayflower Compact.	
2. Analyze the Articles of Confederation and the Constitution and the success of each in implementing the ideals of the Declaration of Independence.	
3. Evaluate the major debates that occurred during the development of the Constitution and their ultimate resolutions in such areas as shared power among institutions, divided state-federal power, slavery, the rights of individuals and states (later addressed by the addition of the Bill of Rights), and the status of American Indian nations under the commerce clause.	
4. Describe the political philosophy underpinning the Constitution as specified in the *Federalist Papers* (authored by James Madison, Alexander Hamilton, and John Jay) and the role of such leaders as Madison, George Washington, Roger Sherman, Governor Morris, and James Wilson in the writing and ratification of the Constitution.	
5. Understand the significance of Jefferson's Statute for Religious Freedom as a forerunner of the First Amendment and the origins, purpose, and differing views of the founding fathers on the issue of the separation of church and state.	
6. Enumerate the powers of government set forth in the Constitution and the fundamental liberties ensured by the Bill of Rights.	

7. Describe the principles of federalism, dual sovereignty, separation of powers, checks and balances, the nature and purpose of majority rule, and the ways in which the American idea of constitutionalism preserves individual rights.	• Identify the socio-cultural, legal, and political factors that are reflected in Constitutional principles and related to land ownership, resource use, and the operation of human communities.

3. Students understand the foundation of the American political system and the ways in which citizens participate in it.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Analyze the principles and concepts codified in state constitutions between 1777 and 1781 that created the context out of which American political institutions and ideas developed.	
2. Explain how the ordinances of 1785 and 1787 privatized national resources and transferred federally owned lands into private holdings, townships, and states.	• Describe how Federal legislation such as the Ordinances of 1785 and 1787 changed land ownership, and access to and use of national resources. • Provide examples of contemporary issues that are influenced by Federal legislation that changed land ownership, and access to and use of national resources (e.g., oil, gas and mineral leases, and management of lands for endangered species).
3. Enumerate the advantages of a common market among the states as foreseen in and protected by the Constitution's clauses on interstate commerce, common coinage, and full-faith and credit.	
4. Understand how the conflicts between Thomas Jefferson and Alexander Hamilton resulted in the emergence of two political parties (e.g., view of foreign policy, Alien and Sedition Acts, economic policy, National Bank, funding and assumption of the revolutionary debt).	
5. Know the significance of domestic resistance movements and ways in which the central government responded to such movements (e.g., Shays' Rebellion, the Whiskey Rebellion).	
6. Describe the basic law-making process and how the Constitution provides numerous opportunities for citizens to participate in the political process and to monitor and influence government (e.g., function of elections, political parties, interest groups).	
7. Understand the functions and responsibilities of a free press.	

4. Students analyze the aspirations and ideals of the people of the new nation.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the country's physical landscapes, political divisions, and territorial expansion during the terms of the first four presidents.	• Identify the factors associated with the consumption of natural resources that led to territorial expansion during the terms of the first four presidents. • Describe how the country's physical landscapes and natural systems influenced territorial expansion. • Provide examples of the spectrum of factors that influenced the development of federal laws, policies, and incentives developed to regulate natural resource use and management during the terms of the first four presidents. • Recognize the influences of these natural resource use and management laws, policies, and incentives on natural systems.
2. Explain the policy significance of famous speeches (e.g., Washington's Farewell Address, Jefferson's 1801 Inaugural Address, John Q. Adams's Fourth of July 1821 Address).	

3. Analyze the rise of capitalism and the economic problems and conflicts that accompanied it (e.g., Jackson's opposition to the National Bank; early decisions of the U.S. Supreme Court that reinforced the sanctity of contracts and a capitalist economic system of law).	
4. Discuss daily life, including traditions in art, music, and literature, of early national America (e.g., through writings by Washington Irving, James Fenimore Cooper).	• Identify the influence of the availability of natural resources (goods and ecosystem services) on the daily life of early Americans. • Provide examples of the methods used by early Americans to extract, harvest, transport and consume natural resources (e.g., forest and agricultural products, metals and minerals). • Describe how the growth of the American population during the nineteenth century affected the demand for natural resources. • Explain how the growing demand for natural resources affected the natural systems in the areas inhabited by early Americans. • Describe the influence of natural systems (e.g., wildlife and forests, exploration of wilderness) in early American traditions of art, music, and literature, of early national America (e.g., through writings by Washington Irving, James Fenimore Cooper).

5. Students analyze U.S. foreign policy in the early Republic.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the political and economic causes and consequences of the War of 1812 and know the major battles, leaders, and events that led to a final peace.	• Recognize the significance of the growing British demand for natural resources as one of the political and economic causes of the War of 1812.
2. Know the changing boundaries of the United States and describe the relationships the country had with its neighbors (current Mexico and Canada) and Europe, including the influence of the Monroe Doctrine, and how those relationships influenced westward expansion and the Mexican-American War.	• Describe the changing boundaries of the United States in the context of the growing American population and growing demands for natural resources. • Explain how growing demands for natural resources influenced national behavior (e.g., decisions about wars, negotiations over boundaries) and the relationships the country had with its neighbors (current Mexico and Canada) and Europe. • Explain the Monroe Doctrine in terms related to the control of natural resources on the northwest coast of North America.
3. Outline the major treaties with American Indian nations during the administrations of the first four presidents and the varying outcomes of those treaties.	• Explain the outcomes of major treaties with American Indian nations in terms of effects on America's growing population and increasing demands for natural resources.

6. Students analyze the divergent paths of the American people from 1800 to the mid-1800s and the challenges they faced, with emphasis on the Northeast.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the influence of industrialization and technological developments on the region, including human modification of the landscape and how physical geography shaped human actions (e.g., growth of cities, deforestation, farming, mineral extraction).	• Identify the influences of industrialization and technological developments on the natural systems in the Northeast region. • Provide examples of both short-term and long-term effects of industrialization and technological developments on the natural systems in the Northeast region. • Discuss how the physical geography of the region and the natural systems that are found there (e.g., forests, wetlands) influenced human actions (e.g., growth of cities and ports, deforestation and drainage of wetlands, farming, mineral extraction). • Describe the role of scientific and technological knowledge in industrialization and technological developments on the region. • Describe the influence of industrialization and technological developments on the growth of human populations in the region. • Provide examples of the effects of the growing human population on the natural systems in the region (e.g., chemical byproducts, reshaping of the landscape). • Categorize the direct and indirect effects of industrialization and technological developments as beneficial, neutral or detrimental to the natural systems in the Northeast region.

2. Outline the physical obstacles to and the economic and political factors involved in building a network of roads, canals, and railroads (e.g., Henry Clay's American System).	• Identify natural systems and physical obstacles that affected the building of networks of roads, canals, and railroads. • Describe the direct effects of building the networks of roads, canals, and railroads on the natural systems in the Northeast region. • Provide examples of the indirect effects of building the networks of roads, canals, and railroads on the natural systems in the Northeast region (e.g., increasing rates of resource extraction and consumption).
3. List the reasons for the wave of immigration from Northern Europe to the United States and describe the growth in the number, size, and spatial arrangements of cities (e.g., Irish immigrants and the Great Irish Famine).	• Identify changes to Northern Europe's natural systems and natural resources that played a role in the wave of immigration from Northern Europe to the United States. • Recognize how natural systems (the availability of goods and ecosystem services) played a role in the wave of immigration from Northern Europe to the United States during the 1800s. • Explain that the wave of immigration from Northern Europe caused the population of the United States, as well as its individual communities, to grow, thereby increasing the demand for natural resources and directly affecting the natural systems around them. • Discuss how decisions to migrate and settle in particular areas were influenced by a variety of factors, including the availability of resources and the character of the region's natural systems, and frequently by the similarities of the natural systems and resources in the immigrants' countries of origin.
4. Study the lives of black Americans who gained freedom in the North and founded schools and churches to advance their rights and communities.	
5. Trace the development of the American education system from its earliest roots, including the roles of religious and private schools and Horace Mann's campaign for free public education and its assimilating role in American culture.	
6. Examine the women's suffrage movement (e.g., biographies, writings, and speeches of Elizabeth Cady Stanton, Margaret Fuller, Lucretia Mott, Susan B. Anthony).	
7. Identify common themes in American art as well as transcendentalism and individualism (e.g., writings about and by Ralph Waldo Emerson, Henry David Thoreau, Herman Melville, Louisa May Alcott, Nathaniel Hawthorne, Henry Wadsworth Longfellow).	• Describe the influence of natural systems (e.g., wildlife and forests, exploration of wilderness) in writings about and by Ralph Waldo Emerson, Henry David Thoreau, Herman Melville, Louisa May Alcott, Nathaniel Hawthorne, Henry Wadsworth Longfellow. • Provide examples of the roles of nature and natural systems in developing the Transcendentalists' perspective on the world (e.g., Ralph Waldo Emerson's 1836 book *Nature*). • Discuss of the roles of nature and natural systems in writings about individualism and self-reliance (e.g., Henry David Thoreau's 1854 book *Walden*).

7. Students analyze the divergent paths of the American people in the South from 1800 to the mid-1800s and the challenges they faced.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the development of the agrarian economy in the South, identify the locations of the cotton-producing states, and discuss the significance of cotton and the cotton gin.	• Recognize that the development of the agrarian economy in the South depended on the natural systems and the physical geography of the region. • Provide examples of advantages and disadvantages of an economy that was exceedingly dependent on a single crop (i.e., cotton) rather than multiple crops and/or resources. • Describe how the methods used to grow cotton influenced the health of the croplands in the South and had an impact on the surrounding natural systems. • Explain how the South's dependence on an agrarian economy influenced the region's political and legal decisions.

2. Trace the origins and development of slavery; its effects on black Americans and on the region's political, social, religious, economic, and cultural development; and identify the strategies that were tried to both overturn and preserve it (e.g., through the writings and historical documents on Nat Turner, Denmark Vesey).	
3. Examine the characteristics of white Southern society and how the physical environment influenced events and conditions prior to the Civil War.	• Recognize how the physical environment and natural systems of the region influenced the development of the agrarian economy in the South. • Explain how the South's direct dependence on an agrarian economy and thus, physical environment, influenced events in the region and conditions prior to the Civil War.
4. Compare the lives of and opportunities for free blacks in the North with those of free blacks in the South.	

8. Students analyze the divergent paths of the American people in the West from 1800 to the mid-1800s and the challenges they faced.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the election of Andrew Jackson as president in 1828, the importance of Jacksonian democracy, and his actions as president (e.g., the spoils system, veto of the National Bank, policy of Indian removal, opposition to the Supreme Court).	
2. Describe the purpose, challenges, and economic incentives associated with westward expansion, including the concept of Manifest Destiny (e.g., the Lewis and Clark expedition, accounts of the removal of Indians, the Cherokees' "Trail of Tears," settlement of the Great Plains) and the territorial acquisitions that spanned numerous decades.	• Identify the reasons for westward expansion in terms of exploration for natural resources (goods and ecosystem services). • Recognize the role of the growing population in the United States in relation to the westward expansion. • Describe the effects of the westward expansion on the natural systems and resources that were being settled. • Provide examples of the economic incentives provided to individuals willing to settle in the West that are related to natural resources (e.g., homesteading, land ownership). • Explain how the concept of Manifest Destiny related to the control of additional territories and the natural resources that they contained.
3. Describe the role of pioneer women and the new status that western women achieved (e.g., Laura Ingalls Wilder, Annie Bidwell; slave women gaining freedom in the West; Wyoming granting suffrage to women in 1869).	
4. Examine the importance of the great rivers and the struggle over water rights.	• Identify the role that the great rivers and water resources played in the West from 1800 to the mid-1800s (e.g., the location of towns, farming and ranching). • Describe the role of scientific and technological knowledge in the establishment of water rights. • Provide examples of the economic, political, legal, and cultural factors that played a role in decisions about water rights in the West. • Describe how the great river systems and struggles over water rights influenced the development of economic, political, and legal systems in the West. • Compare the issues related to water use and management in the West with other parts of the United States.
5. Discuss Mexican settlements and their locations, cultural traditions, attitudes toward slavery, land-grant system, and economies.	• Use a map to identify the locations of Mexican Settlements in the 1800s. • Recognize the factors that influenced decisions about the location of Mexican settlements. • Compare the economic, political, and legal systems related to the ownership of land and natural resources in the United States and the Mexican settlements. • Provide examples of how the different economic, political, and legal systems influence the management of land and natural resources.

6. Describe the Texas War for Independence and the Mexican-American War, including territorial settlements, the aftermath of the wars, and the effects the wars had on the lives of Americans, including Mexican Americans today.	• Describe the role of natural resources in the Texas War for Independence and the Mexican-American War.

9. Students analyze the early and steady attempts to abolish slavery and to realize the ideals of the Declaration of Independence.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the leaders of the movement (e.g., John Quincy Adams and his proposed constitutional amendment, John Brown and the armed resistance, Harriet Tubman and the Underground Railroad, Benjamin Franklin, Theodore Weld, William Lloyd Garrison, Frederick Douglass).	
2. Discuss the abolition of slavery in early state constitutions.	
3. Describe the significance of the Northwest Ordinance in education and in the banning of slavery in new states north of the Ohio River.	
4. Discuss the importance of the slavery issue as raised by the annexation of Texas and California's admission to the union as a free state under the Compromise of 1850.	
5. Analyze the significance of the States' Rights Doctrine, the Missouri Compromise (1820), the Wilmot Proviso (1846), the Compromise of 1850, Henry Clay's role in the Missouri Compromise and the Compromise of 1850, the Kansas-Nebraska Act (1854), the *Dred Scott* v. *Sandford* decision (1857), and the Lincoln-Douglas debates (1858).	
6. Describe the lives of free blacks and the laws that limited their freedom and economic opportunities.	

10. Students analyze the multiple causes, key events, and complex consequences of the Civil War.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Compare the conflicting interpretations of state and federal authority as emphasized in the speeches and writings of statesmen such as Daniel Webster and John C. Calhoun.	
2. Trace the boundaries constituting the North and the South, the geographical differences between the two regions, and the differences between agrarians and industrialists.	• Use a map to trace the boundaries constituting the North and the South. • Recognize economic, political and cultural differences between agrarian and industrial societies especially as related to the use, management, and consumption of natural resources. • Provide examples of how these differences played a role in the instigation of the Civil War.
3. Identify the constitutional issues posed by the doctrine of nullification and secession and the earliest origins of that doctrine.	
4. Discuss Abraham Lincoln's presidency and his significant writings and speeches and their relationship to the Declaration of Independence, such as his "House Divided" speech (1858), Gettysburg Address (1863), Emancipation Proclamation (1863), and inaugural addresses (1861 and 1865).	

5. Study the views and lives of leaders (e.g., Ulysses S. Grant, Jefferson Davis, Robert E. Lee) and soldiers on both sides of the war, including those of black soldiers and regiments.	
6. Describe critical developments and events in the war, including the major battles, geographical advantages and obstacles, technological advances, and General Lee's surrender at Appomattox.	
7. Explain how the war affected combatants, civilians, the physical environment, and future warfare.	• Identify how the Civil War directly and indirectly affected the natural systems and resources in the North and South both during and after the war. • Provide examples of the effects of the Civil War on the physical environment (natural systems) and the availability of natural resources in the North and South both during and after the war.

11. Students analyze the character and lasting consequences of Reconstruction.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. List the original aims of Reconstruction and describe its effects on the political and social structures of different regions.	
2. Identify the push-pull factors in the movement of former slaves to the cities in the North and to the West and their differing experiences in those regions (e.g., the experiences of Buffalo Soldiers).	
3. Understand the effects of the Freedmen's Bureau and the restrictions placed on the rights and opportunities of freedmen, including racial segregation and "Jim Crow" laws.	
4. Trace the rise of the Ku Klux Klan and describe the Klan's effects.	
5. Understand the Thirteenth, Fourteenth, and Fifteenth Amendments to the Constitution and analyze their connection to Reconstruction.	

12. Students analyze the transformation of the American economy and the changing social and political conditions in the United States in response to the Industrial Revolution.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Trace patterns of agricultural and industrial development as they relate to climate, use of natural resources, markets, and trade and locate such development on a map.	• Recognize patterns of agricultural and industrial development as they relate to climate, use of natural resources (i.e., goods and ecosystem services) and availability of markets. • Describe the role of scientific and technological knowledge in agricultural and industrial development. • Describe how technological advances in industry and agriculture during the late nineteenth and twentieth centuries influenced the growth of human populations and communities. • Provide examples of how the technological advances in industry and agriculture during the late nineteenth and twentieth centuries affected the natural systems where this development was taking place. • Explain how political, economic, cultural and environmental factors affected technological advances in industry and agriculture during the late nineteenth and twentieth centuries.
2. Identify the reasons for the development of federal Indian policy and the wars with American Indians and their relationship to agricultural development and industrialization.	• Recognize the growth of the United States population as one of the reasons for the development of federal Indian policy and the wars with American Indians. • Describe the federal Indian policy and the wars with American Indians in the context of controlling access to natural resources that directly and indirectly supported the industrialization of America. • Explain the political, economic, cultural and environmental factors that played a role in decisions about federal Indian policy and the wars with American Indians.

3. Explain how states and the federal government encouraged business expansion through tariffs, banking, land grants, and subsidies.	• Provide examples of how incentives such as land grants and government subsidies influenced the use and management of natural resources and systems in the United States. • Describe the political, economic, cultural and environmental factors that played a role in decisions about the use and management of natural resources and systems in the United States. • Explain the effects of these policies and practices of natural systems.
4. Discuss entrepreneurs, industrialists, and bankers in politics, commerce, and industry (e.g., Andrew Carnegie, John D. Rockefeller, Leland Stanford).	• Discuss the role of entrepreneurs, industrialists, and bankers (e.g., Andrew Carnegie, John D. Rockefeller, Leland Stanford) in the discovery, extraction, harvest and consumption of natural resources. • Describe the long-term effects of the activities of these entrepreneurs, industrialists, and bankers on the geographic extent, composition, biological diversity, and viability of the natural systems.
5. Examine the location and effects of urbanization, renewed immigration, and industrialization (e.g., the effects on social fabric of cities, wealth and economic opportunity, the conservation movement).	• Describe the role of the growing population in the United States on the growth of cities and consumption of natural resources. • Recognize the factors that were considered in decisions regarding the growth and urbanization of cities (e.g., choice of areas and materials for construction, transportation systems). • Provide examples of how the growth of cities resulted in increasing demands for goods and ecosystem services from natural systems (e.g., agricultural products, forestry products) that placed greater demands on farmland (soils, water) and forests (timber). • Describe the direct and indirect effects of urbanization on the surrounding natural systems. • Explain the role of the Industrial Revolution in the development of the conservation movement. • Describe the role of scientific and technological knowledge in urbanization, renewed immigration, and industrialization, wealth and economic opportunity, and the conservation movement.
6. Discuss child labor, working conditions, and laissez-faire policies toward big business and examine the labor movement, including its leaders (e.g., Samuel Gompers), its demand for collective bargaining, and its strikes and protests over labor conditions.	
7. Identify the new sources of large-scale immigration and the contributions of immigrants to the building of cities and the economy; explain the ways in which new social and economic patterns encouraged assimilation of newcomers into the mainstream amidst growing cultural diversity; and discuss the new wave of nativism.	
8. Identify the characteristics and impact of Grangerism and Populism.	
9. Name the significant inventors and their inventions and identify how they improved the quality of life (e.g., Thomas Edison, Alexander Graham Bell, Orville and Wilbur Wright).	

Tenth Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students relate the moral and ethical principles in ancient Greek and Roman philosophy, in Judaism, and in Christianity to the development of Western political thought.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Analyze the similarities and differences in Judeo-Christian and Greco-Roman views of law, reason and faith, and duties of the individual.	• Describe the similarities and differences in Judeo-Christian and Greco-Roman views of law, reason and faith, and duties of the individual as they relate to the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions. • Describe the similarities and differences in Judeo-Christian and Greco-Roman views of law, reason and faith, and duties of the individual as they relate to 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.
2. Trace the development of the Western political ideas of the rule of law and illegitimacy of tyranny, using selections from Plato's *Republic* and Aristotle's *Politics.*	
3. Consider the influence of the U.S. Constitution on political systems in the contemporary world.	• Identify the influence of the U.S. Constitution on the process of making decisions about resources and natural systems in the contemporary world.

2. Students compare and contrast the Glorious Revolution of England, the American Revolution, and the French Revolution and their enduring effects worldwide on the political expectations for self-government and individual liberty.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Compare the major ideas of philosophers and their effects on the democratic revolutions in England, the United States, France, and Latin America (e.g., John Locke, Charles-Louis Montesquieu, Jean-Jacques Rousseau, Simón Bolívar, Thomas Jefferson, James Madison).	• Compare the major ideas of philosophers (e.g., John Locke, Charles-Louis Montesquieu, Jean-Jacques Rousseau, Simón Bolívar, Thomas Jefferson, James Madison) as they relate to the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions. • Provide examples of how these differing philosophical ideas affected decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.
2. List the principles of the Magna Carta, the English Bill of Rights (1689), the American Declaration of Independence (1776), the French Declaration of the Rights of Man and the Citizen (1789), and the U.S. Bill of Rights (1791).	• Provide examples of the principles in the Magna Carta, the English Bill of Rights (1689), the American Declaration of Independence (1776), the French Declaration of the Rights of Man and the Citizen (1789), and the U.S. Bill of Rights (1791) that are related to rights, ownership and decisions about resources and natural systems
3. Understand the unique character of the American Revolution, its spread to other parts of the world, and its continuing significance to other nations.	
4. Explain how the ideology of the French Revolution led France to develop from constitutional monarchy to democratic despotism to the Napoleonic empire.	• Describe the changes in the ideology associated with rights, ownership and decisions about resources and natural systems during the time of the French Revolution, from the constitutional monarchy to democratic despotism to the Napoleonic Empire.
5. Discuss how nationalism spread across Europe with Napoleon but was repressed for a generation under the Congress of Vienna and Concert of Europe until the Revolutions of 1848.	

3. Students analyze the effects of the Industrial Revolution in England, France, Germany, Japan, and the United States.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Analyze why England was the first country to industrialize.	• Recognize that the growth in human populations and human communities in England placed greater demands on natural systems. • Describe how these increased demands provided an economic opportunity for the English to improve the methods they used to extract, harvest, transport, and produce goods from the natural resources that were available.

2. Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).	• Identify how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change. • Describe how the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison depended on natural systems for the basic resources used and/or more efficiently extracted as a result of these inventions and discoveries (e.g., sources of energy transformed into electricity). • Provide examples of how the increased demands on natural systems that resulted from these changes, as well as the availability of new forms of energy, influenced the availability of natural resources and the health and functioning of the natural systems (e.g., the byproducts of energy production for industrialization, such as the burning of coal and the harnessing of rivers for hydroelectric power).
3. Describe the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.	• Identify the relation between the Industrial Revolution and the growth in human populations in urban areas (e.g., migration from rural to urban areas for new jobs). • Describe how the urbanization of the population that resulted from the Industrial Revolution influenced the natural systems surrounding the cities and towns directly and indirectly (e.g., the development of new housing and transportation systems, energy transmission systems). • Provide examples of changes to laws, policies, and incentives associated with natural resource use and management that resulted from the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.
4. Trace the evolution of work and labor, including the demise of the slave trade and the effects of immigration, mining and manufacturing, division of labor, and the union movement.	• Describe the evolution of work and labor as human communities changed from direct dependence on natural resources (e.g., agricultural systems, mining) to the dependence of jobs on manufactured products, transportation systems for growing communities, etc. • Provide examples of the influence of mining and manufacturing practices on the health of workers and the general public. • Identify the role of concerns regarding the health of workers in the development of unions and the union movement.
5. Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.	• Recognize natural systems and the resources they provide (goods and ecosystem services) as the basic capital for the development of an industrial economy. • Provide examples of the major connections between natural systems and resources, and entrepreneurship, labor, and capital in industrial economies (e.g., the labor necessary to extract, harvest, transport, and produce goods and ecosystem services for human communities).
6. Analyze the emergence of capitalism as a dominant economic pattern and the responses to it, including Utopianism, Social Democracy, Socialism, and Communism.	
7. Describe the emergence of Romanticism in art and literature (e.g., the poetry of William Blake and William Wordsworth), social criticism (e.g., the novels of Charles Dickens), and the move away from Classicism in Europe.	

4. Students analyze patterns of global change in the era of New Imperialism in at least two of the following regions or countries: Africa, Southeast Asia, China, India, Latin America, and the Philippines.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the rise of industrial economies and their link to imperialism and colonialism (e.g., the role played by national security and strategic advantage; moral issues raised by the search for national hegemony, Social Darwinism, and the missionary impulse; material issues such as land, resources, and technology).	• Identify the role of natural resources (goods and ecosystem services)—most of which were supplied by the colonial possessions in Africa, Southeast Asia, China, India, Latin America, and the Philippines)—in the rise of industrial economies. • Describe how the practices of resource extraction, transport and consumption affected the natural systems and economies in the colonies. • Explain the role, in decisions about the control and use of natural resources, played by national security and strategic advantage; moral issues raised by the search for national hegemony, Social Darwinism, and the missionary impulse; material issues such as land, resources, and technology. • Provide examples of the laws, policies and practices developed by the colonial powers as they related to control of supplies of natural resources and energy in the colonies.
2. Discuss the locations of the colonial rule of such nations as England, France, Germany, Italy, Japan, the Netherlands, Russia, Spain, Portugal, and the United States.	• Identify the natural resources (goods and ecosystem services) sought from the colonies during this period by England, France, Germany, Italy, Japan, the Netherlands, Russia, Spain, Portugal, and the United States. • Provide examples of the natural systems in the colonies that were the sources of these natural resources. • Explain that decisions to colonize certain areas of the world were made primarily on the basis on the need to acquire certain natural resources, raw materials and energy for the colonial powers.
3. Explain imperialism from the perspective of the colonizers and the colonized and the varied immediate and long-term responses by the people under colonial rule.	• Describe imperialism from the perspective of local control and economic benefit from natural resources versus control and economic benefits gained by the colonial powers. • Provide examples of how control over the natural resources influenced the immediate and long-term responses by the people under colonial rule.
4. Describe the independence struggles of the colonized regions of the world, including the roles of leaders, such as Sun Yat-sen in China, and the roles of ideology and religion.	• Identify the role of access to and control of natural resources (goods and ecosystem services) on the independence struggles of the colonized regions of the world.

5. Students analyze the causes and course of the First World War.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Analyze the arguments for entering into war presented by leaders from all sides of the Great War and the role of political and economic rivalries, ethnic and ideological conflicts, domestic discontent and disorder, and propaganda and nationalism in mobilizing the civilian population in support of "total war."	
2. Examine the principal theaters of battle, major turning points, and the importance of geographic factors in military decisions and outcomes (e.g., topography, waterways, distance, climate).	• Recognize the influence of topography, waterways, distance and climate on the location of the principal theaters of battle. • Describe the importance of geographic factors including the location of various natural systems in military decisions and outcomes.
3. Explain how the Russian Revolution and the entry of the United States affected the course and outcome of the war.	
4. Understand the nature of the war and its human costs (military and civilian) on all sides of the conflict, including how colonial peoples contributed to the war effort.	
5. Discuss human rights violations and genocide, including the Ottoman government's actions against Armenian citizens.	

6. Students analyze the effects of the First World War.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Analyze the aims and negotiating roles of world leaders, the terms and influence of the Treaty of Versailles and Woodrow Wilson's Fourteen Points, and the causes and effects of the United States's rejection of the League of Nations on world politics.	
2. Describe the effects of the war and resulting peace treaties on population movement, the international economy, and shifts in the geographic and political borders of Europe and the Middle East.	• Identify the economic factors related to control over natural resources that were elements in decisions about the war and development of peace treaties. • Provide examples of the effects of the war on natural systems and the availability of natural resources. • Describe how such effects influenced demands for natural resources. • Describe the role of demand for natural resources in decisions about the geographic and political borders of Europe and the Middle East.
3. Understand the widespread disillusionment with prewar institutions, authorities, and values that resulted in a void that was later filled by totalitarians.	
4. Discuss the influence of World War I on literature, art, and intellectual life in the West (e.g., Pablo Picasso, the "lost generation" of Gertrude Stein, Ernest Hemingway)	

7. Students analyze the rise of totalitarian governments after World War I.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the causes and consequences of the Russian Revolution, including Lenin's use of totalitarian means to seize and maintain control (e.g., the Gulag).	
2. Trace Stalin's rise to power in the Soviet Union and the connection between economic policies, political policies, the absence of a free press, and systematic violations of human rights (e.g., the Terror Famine in Ukraine).	• Describe the role of control over the production of goods from natural systems (e.g., agriculture) as the basis for the Terror Famine in Ukraine. • Identify the connection between Stalin's rise to power, economic policies and the control over the production of goods from natural systems.
3. Analyze the rise, aggression, and human costs of totalitarian regimes (Fascist and Communist) in Germany, Italy, and the Soviet Union, noting especially their common and dissimilar traits.	

8. Students analyze the causes and consequences of World War II.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Compare the German, Italian, and Japanese drives for empire in the 1930s, including the 1937 Rape of Nanking, other atrocities in China, and the Stalin-Hitler Pact of 1939.	• Describe the German, Italian, and Japanese drives for empire in the 1930s, including the 1937 Rape of Nanking, other atrocities in China, and the Stalin-Hitler Pact of 1939 from the perspective of human population growth and increasing demands for natural resources. • Provide examples of the economic factors related to control over natural resources that were considered in decisions about the German, Italian, and Japanese drives for empire in the 1930s.
2. Understand the role of appeasement, nonintervention (isolationism), and the domestic distractions in Europe and the United States prior to the outbreak of World War II.	
3. Identify and locate the Allied and Axis powers on a map and discuss the major turning points of the war, the principal theaters of conflict, key strategic decisions, and the resulting war conferences and political resolutions, with emphasis on the importance of geographic factors.	• Recognize the influence of topography, waterways, distance and climate on the location of the principal theaters of conflict. • Describe the importance of geographic factors including the location of various natural systems in military decisions and outcomes. • Identify the role of decisions regarding the control of natural resources on these conferences and political resolutions of the war.

4. Describe the political, diplomatic, and military leaders during the war (e.g., Winston Churchill, Franklin Delano Roosevelt, Emperor Hirohito, Adolf Hitler, Benito Mussolini, Joseph Stalin, Douglas MacArthur, Dwight Eisenhower).	
5. Analyze the Nazi policy of pursuing racial purity, especially against the European Jews; its transformation into the Final Solution; and the Holocaust that resulted in the murder of six million Jewish civilians.	
6. Discuss the human costs of the war, with particular attention to the civilian and military losses in Russia, Germany, Britain, the United States, China, and Japan.	• Provide examples of the human costs of the war that resulted from indirect effects on the natural systems in the principal theaters of conflict (e.g., habitat destruction, damage to and pollution of agricultural lands).

9. Students analyze the international developments in the post-World World War II world.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Compare the economic and military power shifts caused by the war, including the Yalta Pact, the development of nuclear weapons, Soviet control over Eastern European nations, and the economic recoveries of Germany and Japan.	
2. Analyze the causes of the Cold War, with the free world on one side and Soviet client states on the other, including competition for influence in such places as Egypt, the Congo, Vietnam, and Chile.	• Identify, as a primary motivation for the Cold War, the importance of acquiring and controlling natural resources (goods and ecosystem services), guaranteeing a reliable supply of energy, and establishing consumer markets for the finished products that would enable industry to grow. • Provide examples of the natural resources in Egypt, the Congo, Vietnam, and Chile that were the cause of competition for influence in these regions.
3. Understand the importance of the Truman Doctrine and the Marshall Plan, which established the pattern for America's postwar policy of supplying economic and military aid to prevent the spread of Communism and the resulting economic and political competition in arenas such as Southeast Asia (i.e., the Korean War, Vietnam War), Cuba, and Africa.	• Identify the natural resources sought from in areas such as Southeast Asia, Cuba, and Africa. • Describe the importance of the Truman Doctrine and the Marshall Plan from the perspective of control and economic benefit from natural resources in areas such as Southeast Asia, Cuba, and Africa.
4. Analyze the Chinese Civil War, the rise of Mao Tse-tung, and the subsequent political and economic upheavals in China (e.g., the Great Leap Forward, the Cultural Revolution, and the Tiananmen Square uprising).	
5. Describe the uprisings in Poland (1952), Hungary (1956), and Czechoslovakia (1968) and those countries' resurgence in the 1970s and 1980s as people in Soviet satellites sought freedom from Soviet control.	
6. Understand how the forces of nationalism developed in the Middle East, how the Holocaust affected world opinion regarding the need for a Jewish state, and the significance and effects of the location and establishment of Israel on world affairs.	
7. Analyze the reasons for the collapse of the Soviet Union, including the weakness of the command economy, burdens of military commitments, and growing resistance to Soviet rule by dissidents in satellite states and the non-Russian Soviet republics.	
8. Discuss the establishment and work of the United Nations and the purposes and functions of the Warsaw Pact, SEATO, NATO, and the Organization of American States.	• Provide examples of the work of the United Nations, Warsaw Pact, SEATO, NATO, and the Organization of American States related to the process of making decisions about resources and natural systems.

10. Students analyze instances of nation-building in the contemporary world in at least two of the following regions or countries: the Middle East, Africa, Mexico and other parts of Latin America, and China.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the challenges in the regions, including their geopolitical, cultural, military, and economic significance and the international relationships in which they are involved.	
2. Describe the recent history of the regions, including political divisions and systems, key leaders, religious issues, natural features, resources, and population patterns.	• Provide examples of the influence of natural features, resources, and human population patterns on nation-building in the contemporary world.
3. Discuss the important trends in the regions today and whether they appear to serve the cause of individual freedom and democracy.	• Discuss the influence of the control of natural resources and associated decision-making processes on individual freedom and democracy in the Middle East, Africa, Mexico and other parts of Latin America, and China.

11. Students analyze the integration of countries into the world economy and the information, technological, and communications revolutions (e.g., television, satellites, computers).	**Standards-based Learning Objectives in the Context of the EP&C Students will:** • Identify the influence of the availability of natural resources (goods and ecosystem services) on the integration of countries into the world economy. • Describe how the integration of countries into the world economy influences the growth of their human populations, demand for natural resources and the generation of byproducts that result from the extracting, harvesting, transportation, consumption, and production of goods from natural resources. • Provide examples of how the integration of countries into the world economy influences their decisions, policies, laws and incentives regarding the use and management of natural resources.

Eleventh Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
1. Students analyze the significant events in the founding of the nation and its attempts to realize the philosophy of government described in the Declaration of Independence.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Describe the Enlightenment and the rise of democratic ideas as the context in which the nation was founded.	
2. Analyze the ideological origins of the American Revolution, the Founding Fathers' philosophy of divinely bestowed unalienable natural rights, the debates on the drafting and ratification of the Constitution, and the addition of the Bill of Rights.	
3. Understand the history of the Constitution after 1787 with emphasis on federal versus state authority and growing democratization.	
4. Examine the effects of the Civil War and Reconstruction and of the industrial revolution, including demographic shifts and the emergence in the late nineteenth century of the United States as a world power.	

2. Students analyze the relationship among the rise of industrialization, large-scale rural-to-urban migration, and massive immigration from Southern and Eastern Europe.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Know the effects of industrialization on living and working conditions, including the portrayal of working conditions and food safety in Upton Sinclair's *The Jungle.*	• Identify the influences of industrialization and technological developments on the natural systems in the United States. • Provide examples of both short-term and long-term effects of industrialization and technological developments on the natural systems in the United States. • Describe the influence of industrialization and technological developments on the growth of human populations in the United States. • Provide examples of the effects of the growing human population on the natural systems in the region (e.g., chemical byproducts, reshaping of the landscape). • Describe the environmental effects of industrialization on living and working conditions. • Categorize the direct and indirect effects of industrialization and technological developments as beneficial, neutral or detrimental to the natural systems in the United States.
2. Describe the changing landscape, including the growth of cities linked by industry and trade, and the development of cities divided according to race, ethnicity, and class.	• Provide examples of how the growing population in the United States changes the landscape and influences the natural systems where cities are expanding. • Recognize the factors that are considered in decisions regarding the growth and urbanization of cities (e.g., choice of areas and materials for construction, transportation systems). • Provide examples of how the growth of cities results in increasing demands for goods and ecosystem services from natural systems (e.g., agricultural products, forestry products) that places greater demands on farmland (soils, water) and forests (timber). • Describe the direct and indirect effects of urbanization on the surrounding natural systems.
3. Trace the effect of the Americanization movement.	
4. Analyze the effect of urban political machines and responses to them by immigrants and middle-class reformers.	
5. Discuss corporate mergers that produced trusts and cartels and the economic and political policies of industrial leaders.	

6. Trace the economic development of the United States and its emergence as a major industrial power, including its gains from trade and the advantages of its physical geography.	• Identify the advantages of the physical geography that enabled the United States to emerge as a major industrial power. • Describe how natural systems and physical geography provide resources (goods and ecosystem services) upon which economic development is based. • Explain that economic development directly and indirectly affects natural systems. • Provide example of how economic development can directly influence natural systems (e.g., conversion of landscapes). • Provide example of how economic development can indirectly influence natural systems (e.g., release of byproducts of agricultural and industrial practices).
7. Analyze the similarities and differences between the ideologies of Social Darwinism and Social Gospel (e.g., using biographies of William Graham Sumner, Billy Sunday, Dwight L. Moody).	
8. Examine the effect of political programs and activities of Populists.	
9. Understand the effect of political programs and activities of the Progressives (e.g., federal regulation of railroad transport, Children's Bureau, the Sixteenth Amendment, Theodore Roosevelt, Hiram Johnson).	• Provide examples of how the political programs and activities of the Progressives influenced decisions made regarding natural systems and resources (e.g., the founding of national parks, impact of mining and agriculture on the laws concerning water rights).

3. Students analyze the role religion played in the founding of America, its lasting moral, social, and political impacts, and issues regarding religious liberty.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Describe the contributions of various religious groups to American civic principles and social reform movements (e.g., civil and human rights, individual responsibility and the work ethic, antimonarchy and self-rule, worker protection, family-centered communities).	• Describe the contributions of various religious groups to the conservation movement in America and to the laws, policies and incentives that control the use and management of natural systems and the goods and ecosystem services they provide.
2. Analyze the great religious revivals and the leaders involved in them, including the First Great Awakening, the Second Great Awakening, the Civil War revivals, the Social Gospel Movement, the rise of Christian liberal theology in the nineteenth century, the impact of the Second Vatican Council, and the rise of Christian fundamentalism in current times.	
3. Cite incidences of religious intolerance in the United States (e.g., persecution of Mormons, anti-Catholic sentiment, anti-Semitism).	
4. Discuss the expanding religious pluralism in the United States and California that resulted from large-scale immigration in the twentieth century.	
5. Describe the principles of religious liberty found in the Establishment and Free Exercise clauses of the First Amendment, including the debate on the issue of separation of church and state.	

4. Students trace the rise of the United States to its role as a world power in the twentieth century.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. List the purpose and the effects of the Open Door policy.	• Identify the role of the Open Door Policy in providing the United States with access to commercial activities in China including trading in natural resources, supplies of energy and development of consumer markets for finished products.

2. Describe the Spanish-American War and U.S. expansion in the South Pacific.	• Describe the significance of controlling access to natural resources to the causes of the Spanish-American War and U.S. expansion in the South Pacific.
3. Discuss America's role in the Panama Revolution and the building of the Panama Canal.	• Recognize that the decision to assist Panama in its revolution was made to assure cooperation in building the Panama Canal, which was based on the need to acquire raw materials and guarantee a reliable supply of goods to consumer markets. • Provide examples of the effects of building of the Panama Canal on the terrestrial ecosystems of Panama, as well as the Caribbean and Pacific coastal and marine ecosystems in the area.
4. Explain Theodore Roosevelt's Big Stick diplomacy, William Taft's Dollar Diplomacy, and Woodrow Wilson's Moral Diplomacy, drawing on relevant speeches.	
5. Analyze the political, economic, and social ramifications of World War I on the home front.	
6. Trace the declining role of Great Britain and the expanding role of the United States in world affairs after World War II.	

5. Students analyze the major political, social, economic, technological, and cultural developments of the 1920s.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the policies of Presidents Warren Harding, Calvin Coolidge, and Herbert Hoover.	
2. Analyze the international and domestic events, interests, and philosophies that prompted attacks on civil liberties, including the Palmer Raids, Marcus Garvey's "back-to-Africa" movement, the Ku Klux Klan, and immigration quotas and the responses of organizations such as the American Civil Liberties Union, the National Association for the Advancement of Colored People, and the Anti-Defamation League to those attacks.	
3. Examine the passage of the Eighteenth Amendment to the Constitution and the Volstead Act (Prohibition).	
4. Analyze the passage of the Nineteenth Amendment and the changing role of women in society.	
5. Describe the Harlem Renaissance and new trends in literature, music, and art, with special attention to the work of writers (e.g., Zora Neale Hurston, Langston Hughes).	
6. Trace the growth and effects of radio and movies and their role in the worldwide diffusion of popular culture.	
7. Discuss the rise of mass production techniques, the growth of cities, the impact of new technologies (e.g., the automobile, electricity), and the resulting prosperity and effect on the American landscape.	• Identify the relationship between mass production techniques and: the consumption of natural resources; the rates of consumption of manufactured goods; and the production of byproducts that may have detrimental, beneficial or neutral effects on natural systems. • Describe the direct and indirect influences of growing cities on the American landscape and the associated natural systems. • Provide examples of the direct and indirect effects of new technologies (e.g., automobiles, electricity) on natural systems (e.g., consumption of land for transportation systems, release of toxic and non-toxic byproducts and waste materials).

6. Students analyze the different explanations for the Great Depression and how the New Deal fundamentally changed the role of the federal government.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**

1. Describe the monetary issues of the late nineteenth and early twentieth centuries that gave rise to the establishment of the Federal Reserve and the weaknesses in key sectors of the economy in the late 1920s.	
2. Understand the explanations of the principal causes of the Great Depression and the steps taken by the Federal Reserve, Congress, and Presidents Herbert Hoover and Franklin Delano Roosevelt to combat the economic crisis.	• Recognize how the growth of human populations in areas of the United States, and their resource supply methods (e.g., agricultural practices) and consumption rates affected the natural systems from which resources came. • Describe how the quantity and character of the byproducts of agricultural practices had a lasting and cumulative effect on natural systems (e.g., erosion and soil exhaustion) and ultimately resulted in the interruption of natural system functions. • Explain how some human behaviors and practices were adjusted during the Depression and Dust Bowl era in order to preserve the natural systems that sustained human communities.
3. Discuss the human toll of the Depression, natural disasters, and unwise agricultural practices and their effects on the depopulation of rural regions and on political movements of the left and right, with particular attention to the Dust Bowl refugees and their social and economic impacts in California.	• Identify how natural disasters and unwise agricultural practices can diminish the productivity of natural systems on a short-term or long-term basis. • Describe how diminishing the productivity and/or functioning of a natural system can influence the human population in an area. • Provide examples of laws, policies and human practices that were changed to ameliorate the effects of the natural disasters and unwise agricultural practices that occurred during the Depression and Dust Bowl era. • Describe the effects of migration of the Dust Bowl refugees into California (e.g., new housing developments, increased demands for water and other resources on natural systems and resources). • Identify how the assessment of economic, social, and environmental costs can change as the result of major events such as the Depression and natural disasters like the Dust Bowl that occurred during this era.
4. Analyze the effects of and the controversies arising from New Deal economic policies and the expanded role of the federal government in society and the economy since the 1930s (e.g., Works Progress Administration, Social Security, National Labor Relations Board, farm programs, regional development policies, and energy development projects such as the Tennessee Valley Authority, California Central Valley Project, and Bonneville Dam).	• Explain the purposes of the energy development projects such as the Tennessee Valley Authority, California Central Valley Project, and Bonneville Dam from the perspective of human population growth and increasing demands for natural resources including energy. • Describe the effects on natural systems and resources that resulted from energy development projects such as the Tennessee Valley Authority, California Central Valley Project, and Bonneville Dam. • Describe the role of the federal government during the 1930s and beyond in bringing about changes to populations, the location and operation of communities, and resource supply methods and consumption rates. • Provide examples of laws, regulations, policies and incentives developed by the federal government since the 1930s to govern the use and management natural systems and resources in the United States.
5. Trace the advances and retreats of organized labor, from the creation of the American Federation of Labor and the Congress of Industrial Organizations to current issues of a postindustrial, multinational economy, including the United Farm Workers in California.	• Identify how agricultural practices influenced the health of individuals and human communities and how these practices influenced the expansion of the United Farm Workers in California and other organized labor groups.

7. Students analyze America's participation in World War II.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Examine the origins of American involvement in the war, with an emphasis on the events that precipitated the attack on Pearl Harbor.	• Recognize that Japan's growing populations placed increasing demands for natural resources. • Describe how Japan sought control over natural resources in the Pacific and Asian regions and desired to expand its territory to gain access to and control of additional natural resources.
2. Explain U.S. and Allied wartime strategy, including the major battles of Midway, Normandy, Iwo Jima, Okinawa, and the Battle of the Bulge.	• Identify the strategic goal of the engagement of United States submarine warfare against Japan as a means of cutting-off Japan's supply of natural resources from other parts of Asia.
3. Identify the roles and sacrifices of individual American soldiers, as well as the unique contributions of the special fighting forces (e.g., the Tuskegee Airmen, the 442nd Regimental Combat team, the Navajo Code Talkers).	

4. Analyze Roosevelt's foreign policy during World War II (e.g., Four Freedoms speech).	
5. Discuss the constitutional issues and impact of events on the U.S. home front, including the internment of Japanese Americans (e.g., *Fred Korematsu v. United States of America)* and the restrictions on German and Italian resident aliens; the response of the administration to Hitler's atrocities against Jews and other groups; the roles of women in military production; and the roles and growing political demands of African Americans.	
6. Describe major developments in aviation, weaponry, communication, and medicine and the war's impact on the location of American industry and use of resources.	• Identify the role of rationing of limited resources and recycling of materials as strategies that were used during World War II to control the consumption of natural resources. • Describe how the location of American military bases and supporting industries caused human populations and communities in certain areas to grow, resulting in changes to the natural systems in these areas. • Provide examples of the resources consumed and byproducts produced during World War II. • Describe how the resources consumed and the quantity and character of the byproducts of the war and supporting industries had lasting and/or cumulative effects on natural systems and the local environment.
7. Discuss the decision to drop atomic bombs and the consequences of the decision (Hiroshima and Nagasaki).	• Provide examples of the direct and indirect effects of the decision to drop atomic bombs on Hiroshima and Nagasaki, including the effects on human health, human communities, natural systems and resources (e.g., water contamination). • Recognize that the byproducts of producing atomic weaponry affected the natural systems near the facilities in the U.S. where the fissile materials and weapons were produced.
8. Analyze the effect of massive aid given to Western Europe under the Marshall Plan to rebuild itself after the war and the importance of a rebuilt Europe to the U.S. economy.	

8. Students analyze the economic boom and social transformation of post-World War II America.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Trace the growth of service sector, white collar, and professional sector jobs in business and government.	
2. Describe the significance of Mexican immigration and its relationship to the agricultural economy, especially in California.	
3. Examine Truman's labor policy and congressional reaction to it.	
4. Analyze new federal government spending on defense, welfare, interest on the national debt, and federal and state spending on education, including the California Master Plan.	
5. Describe the increased powers of the presidency in response to the Great Depression, World War II, and the Cold War.	

6. Discuss the diverse environmental regions of North America, their relationship to local economies, and the origins and prospects of environmental problems in those regions.	• Identify the major ecosystems and environmental regions in North America. • Provide examples of the goods and ecosystem services provided to the human communities and local economies by major ecosystems across the environmental regions of North America. • Describe the methods used by human communities to extract, harvest, transport, manufacture products and consume goods and ecosystem services from the major ecosystems in their regions. • Explain the relationship between the methods used to extract, harvest, transport, manufacture products and consume goods and ecosystem services and the prospects for environmental problems in these regions. • Provide examples of how, as a result of environmental problems in these regions, the assessment of social, economic, political, and environmental factors has changed over time and influenced decisions about processes used to extract, harvest, transport, and manufacture products and consume goods and ecosystem services.
7. Describe the effects on society and the economy of technological developments since 1945, including the computer revolution, changes in communication, advances in medicine, and improvements in agricultural technology.	• Provide examples of ways that technological developments since 1945, including the computer revolution, changes in communication, and advances in medicine, have influenced the types and quantities of natural resources humans consume, the quantity and qualities of useful products, and the quantity and character of the byproducts generated by human practices. • Describe how specific technological advances since 1945 have changed human practices related to industrial, housing, and land development that in turn can alter or affect the viability of natural systems. • Identify examples of direct and indirect effects of improvements in agricultural technology that are beneficial, neutral and detrimental to natural systems (e.g., genetically modified plants, chemical fertilizers and pesticides).
8. Discuss forms of popular culture, with emphasis on their origins and geographic diffusion (e.g., jazz and other forms of popular music, professional sports, architectural and artistic styles).	

9. Students analyze U.S. foreign policy since World War II.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the establishment of the United Nations and International Declaration of Human Rights, International Monetary Fund, World Bank, and General Agreement on Tariffs and Trade (GATT) and their importance in shaping modern Europe and maintaining peace and international order.	• Provide examples of how The Earth Summit (United Nations Conference on Environment and Development, Rio de Janeiro, 1992) influenced international treaties and policies about the use and management of natural systems and resources around the world. • Identify several major international treaties and conventions that regulate the extraction, harvesting, transporting, and manufacturing of goods and ecosystem services from natural systems around the world (e.g., Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), The Convention on Biological Diversity).
2. Understand the role of military alliances, including NATO and SEATO, in deterring communist aggression and maintaining security during the Cold War.	
3. Trace the origins and geopolitical consequences (foreign and domestic) of the Cold War and containment policy, including the following: a) The era of McCarthyism, instances of domestic Communism (e.g., Alger Hiss) and blacklisting b) The Truman Doctrine c) The Berlin Blockade d) The Korean War e) The Bay of Pigs invasion and the Cuban Missile Crisis f) Atomic testing in the American West, the "mutual assured destruction" doctrine, and disarmament policies g) The Vietnam War h) Latin American policy	

4. List the effects of foreign policy on domestic policies and vice versa (e.g., protests during the war in Vietnam, the "nuclear freeze" movement).	
5. Analyze the role of the Reagan administration and other factors in the victory of the West in the Cold War.	
6. Describe U.S. Middle East policy and its strategic, political, and economic interests, including those related to the Gulf War.	• Identify natural resource-based factors (e.g., demand for oil) as a factor in U.S. Middle East policy. • Provide examples of other regions in the world where U.S. demand for natural resources has or has had a significant influence on decisions about the nation's strategic, political, and economic interests (e.g., Vietnam).
7. Examine relations between the United States and Mexico in the twentieth century, including key economic, political, immigration, and environmental issues.	• Identify key environmental issues that influence the relations between the United States and Mexico. • Describe the differences between the two countries in terms of how each assesses and balances social, economic, political, and environmental factors in its decisions about the use and management of natural systems and the goods and ecosystem services they produce. • Recognize the influence of growing human populations in the United States and Mexico on the relationships between the countries and their decisions about the use and management of natural systems and the goods and ecosystem services they produce. • Identify treaties and conventions that regulate environmental issues shared by both the United States and Mexico. • Provide examples of environmental impacts that are not contained by the political boundaries between the United States and Mexico.

10. Students analyze the development of federal civil rights and voting rights.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Explain how demands of African Americans helped produce a stimulus for civil rights, including President Roosevelt's ban on racial discrimination in defense industries in 1941, and how African Americans' service in World War II produced a stimulus for President Truman's decision to end segregation in the armed forces in 1948.	
2. Examine and analyze the key events, policies, and court cases in the evolution of civil rights, including *Dred Scott* v. *Sandford, Plessy* v. *Ferguson, Brown* v. *Board of Education, Regents of the University of California* v. *Bakke,* and California Proposition 209.	
3. Describe the collaboration on legal strategy between African American and white civil rights lawyers to end racial segregation in higher education.	
4. Examine the roles of civil rights advocates (e.g., A. Philip Randolph, Martin Luther King, Jr., Malcolm X, Thurgood Marshall, James Farmer, Rosa Parks), including the significance of Martin Luther King, Jr.'s "Letter from Birmingham Jail" and "I Have a Dream" speech.	
5. Discuss the diffusion of the civil rights movement of African Americans from the churches of the rural South and the urban North, including the resistance to racial desegregation in Little Rock and Birmingham, and how the advances influenced the agendas, strategies, and effectiveness of the quests of American Indians, Asian Americans, and Hispanic Americans for civil rights and equal opportunities.	

6. Analyze the passage and effects of civil rights and voting rights legislation (e.g., 1964 Civil Rights Act, Voting Rights Act of 1965) and the Twenty-Fourth Amendment, with an emphasis on equality of access to education and to the political process.	
7. Analyze the women's rights movement from the era of Elizabeth Stanton and Susan Anthony and the passage of the Nineteenth Amendment to the movement launched in the 1960s, including differing perspectives on the roles of women.	• Identify the role of women and the women's rights movement in the development of the conservation movement in the United States (e.g., National Audubon Society).

11. Students analyze the major social problems and domestic policy issues in contemporary American society.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Discuss the reasons for the nation's changing immigration policy, with emphasis on how the Immigration Act of 1965 and successor acts have transformed American society.	
2. Discuss the significant domestic policy speeches of Truman, Eisenhower, Kennedy, Johnson, Nixon, Carter, Reagan, Bush, and Clinton (e.g., with regard to education, civil rights, economic policy, environmental policy).	• Identify and describe the topics of policy speeches by Truman, Eisenhower, Kennedy, Johnson, Nixon, Carter, Reagan, Bush, and Clinton that reflect changes to the assessment of and balance between environmental considerations and social, economic, and political considerations. • Provide examples of environmental policies and initiatives that were implemented by the Truman, Eisenhower, Kennedy, Johnson, Nixon, Carter, Reagan, Bush, and Clinton administrations.
3. Describe the changing roles of women in society as reflected in the entry of more women into the labor force and the changing family structure.	
4. Explain the constitutional crisis originating from the Watergate scandal.	
5. Trace the impact of, need for, and controversies associated with environmental conservation, expansion of the national park system, and the development of environmental protection laws, with particular attention to the interaction between environmental protection advocates and property rights advocates.	• Recognize the spectrum of factors considered in making decisions about resources and natural systems and how those factors influence decisions. • Identify the benefits and costs associated with the establishment and maintenance of the national park, national wildlife refuge and national forest systems. • Provide examples of the social, economic, and political considerations that lead to controversies associated with environmental conservation and the development of environmental protection laws. • Provide examples of laws, policies and regulations related to the use and management of natural systems and resources that influence individual property rights and liberties. • Identify the role of environmental protection advocates and property rights advocates in generating the controversies associated with environmental conservation and the enforcement of environmental protection laws.
6. Analyze the persistence of poverty and how different analyses of this issue influence welfare reform, health insurance reform, and other social policies.	
7. Explain how the federal, state, and local governments have responded to demo-graphic and social changes such as population shifts to the suburbs, racial concentrations in the cities, Frostbelt-to-Sunbelt migration, international migration, decline of family farms, increases in out-of-wedlock births, and drug abuse.	

Twelfth Grade — California History/Social Science Learning Objectives
In the Context of California's Environmental Principles and Concepts

Academic Content Standards	
Principles of American Democracy 1. Students explain the fundamental principles and moral values of American democracy as expressed in the U.S. Constitution and other essential documents of American democracy.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Analyze the influence of ancient Greek, Roman, English, and leading European political thinkers such as John Locke, Charles-Louis Montesquieu, Niccolò Machiavelli, and William Blackstone on the development of American government.	• Analyze the influence of ancient Greek, Roman, English, and leading European political thinkers such as John Locke, Charles-Louis Montesquieu, Niccolò Machiavelli, and William Blackstone on the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.
2. Discuss the character of American democracy and its promise and perils as articulated by Alexis de Tocqueville.	
3. Explain how the U.S. Constitution reflects a balance between the classical republican concern with promotion of the public good and the classical liberal concern with protecting individual rights; and discuss how the basic premises of liberal constitutionalism and democracy are joined in the Declaration of Independence as "self-evident truths."	• Identify how decisions made regarding natural resources and systems, such as land use and land ownership, reflect a balance between the classical republican concern with promotion of the public good and the classical liberal concern with protecting individual rights.
4. Explain how the Founding Fathers' realistic view of human nature led directly to the establishment of a constitutional system that limited the power of the governors and the governed as articulated in the *Federalist Papers.*	
5. Describe the systems of separated and shared powers, the role of organized interests (Federalist *Paper Number 10),* checks and balances (Federalist *Paper Number 51),* the importance of an independent judiciary (Federalist *Paper Number 78),* enumerated powers, rule of law, federalism, and civilian control of the military.	
6. Understand that the Bill of Rights limits the powers of the federal government and state governments.	• Describe how the Bill of Rights limits the powers of the federal government and state governments in relation to land use, land ownership, and control over the process of making decisions about resources and natural systems. • Provide examples of how the powers of the federal government and state governments have changed over time in relation to the assessment of environmental concerns.

2. Students evaluate and take and defend positions on the scope and limits of rights and obligations as democratic citizens, the relationships among them, and how they are secured.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Discuss the meaning and importance of each of the rights guaranteed under the Bill of Rights and how each is secured (e.g., freedom of religion, speech, press, assembly, petition, privacy).	• Recognize the significance of the clause in the Fifth Amendment regarding the taking of private property for public use in relation to the establishment of park, wildlife refuge and forest systems at the national and state level. • Explain the influence of the Tenth Amendment in delegating federal and state powers to make decisions about resources and natural systems, and describe how this has changed over time.
2. Explain how economic rights are secured and their importance to the individual and to society (e.g., the right to acquire, use, transfer, and dispose of property; right to choose one's work; right to join or not join labor unions; copyright and patent).	• Describe how laws, regulations and policies affecting land use and land ownership can have a major influence on the growth of human populations and communities. • Describe how laws, regulations and policies also directly affect the extraction, harvest, transportation, and consumption of natural resources, as well as management of the resulting byproducts.
3. Discuss the individual's legal obligations to obey the law, serve as a juror, and pay taxes.	

4. Understand the obligations of civic-mindedness, including voting, being informed on civic issues, volunteering and performing public service, and serving in the military or alternative service.	• Provide examples of opportunities individual citizens have to participate in decision-making about resources and natural systems as a part of civic life. • Identify additional opportunities individual citizens, including students, have to become involved in their community on behalf of the environment.
5. Describe the reciprocity between rights and obligations; that is, why enjoyment of one's rights entails respect for the rights of others.	• Identify the spectrum of factors considered in making decisions about resources and natural systems, how those factors influence decisions, and how the enjoyment of one's rights in relation to the environment entails respect for the rights of others. • Provide examples of how decisions related to the use and management of natural systems and resources can result in the need to establish a balance between individual rights and liberties and choices related to the "common good."
6. Explain how one becomes a citizen of the United States, including the process of naturalization (e.g., literacy, language, and other requirements).	

3. Students evaluate and take and defend positions on what the fundamental values and principles of civil society are (i.e., the autonomous sphere of voluntary personal, social, and economic relations that are not part of government), their interdependence, and the meaning and importance of those values and principles for a free society.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Explain how civil society provides opportunities for individuals to associate for social, cultural, religious, economic, and political purposes.	
2. Explain how civil society makes it possible for people, individually or in association with others, to bring their influence to bear on government in ways other than voting and elections.	• Identify examples of how civil society makes it possible for people, individually or in association, to influence the factors considered in making decisions about natural systems, resources, and environmental management and, in turn affect how those factors influence decisions. • Provide specific examples of how people, individually and in association, have influenced decisions about natural systems, resources and environmental management.
3. Discuss the historical role of religion and religious diversity.	
4. Compare the relationship of government and civil society in constitutional democracies to the relationship of government and civil society in authoritarian and totalitarian regimes.	• Provide specific examples of the differing roles of civil society related to decisions about natural systems, resources and environmental management in constitutional democracies and in authoritarian and totalitarian regimes (e.g., water pollution management practices in the U.S. compared to the former Soviet Union).

4. Students analyze the unique roles and responsibilities of the three branches of government as established by the U.S. Constitution.	**Standards-based Learning Objectives in the Context of the EP&C Students will:** • Identify specific clauses in the U.S. Constitution regarding the unique roles and responsibilities of the three branches of government in relation to the ownership, management and use of natural systems and resources (e.g., land ownership).
1. Discuss Article I of the Constitution as it relates to the legislative branch, including eligibility for office and lengths of terms of representatives and senators; election to office; the roles of the House and Senate in impeachment proceedings; the role of the vice president; the enumerated legislative powers; and the process by which a bill becomes a law.	
2. Explain the process through which the Constitution can be amended.	
3. Identify their current representatives in the legislative branch of the national government.	

4. Discuss Article II of the Constitution as it relates to the executive branch, including eligibility for office and length of term, election to and removal from office, the oath of office, and the enumerated executive powers.	
5. Discuss Article III of the Constitution as it relates to judicial power, including the length of terms of judges and the jurisdiction of the Supreme Court.	
6. Explain the processes of selection and confirmation of Supreme Court justices.	

5. Students summarize landmark U.S. Supreme Court interpretations of the Constitution and its amendments.	**Standards-based Learning Objectives in the Context of the EP&C Students will:** • Identify specific landmark U.S. Supreme Court interpretations of the Constitution and its amendments regarding the ownership, management and use of natural systems and resources (e.g., land ownership), and responsibilities for environmental management issues.
1. Understand the changing interpretations of the Bill of Rights over time, including interpretations of the basic freedoms (religion, speech, press, petition, and assembly) articulated in the First Amendment and the due process and equal-protection-of-the-law clauses of the Fourteenth Amendment.	
2. Analyze judicial activism and judicial restraint and the effects of each policy over the decades (e.g., the Warren and Rehnquist courts).	
3. Evaluate the effects of the Court's interpretations of the Constitution in *Marbury* v. *Madison, McCulloch* v. *Maryland,* and *United States* v. *Nixon,* with emphasis on the arguments espoused by each side in these cases.	
4. Explain the controversies that have resulted over changing interpretations of civil rights, including those in *Plessy* v. *Ferguson, Brown* v. *Board of Education, Miranda* v. *Arizona, Regents of the University of California* v. *Bakke, Adarand Constructors, Inc.* v. *Pena,* and *United States* v. *Virginia* (VMI).	

6. Students evaluate issues regarding campaigns for national, state, and local elective offices.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Analyze the origin, development, and role of political parties, noting those occasional periods in which there was only one major party or were more than two major parties.	• Provide examples of political parties that were organized for specific purposes related to decisions about natural systems, resources and environmental management.
2. Discuss the history of the nomination process for presidential candidates and the increasing importance of primaries in general elections.	
3. Evaluate the roles of polls, campaign advertising, and the controversies over campaign funding.	
4. Describe the means that citizens use to participate in the political process (e.g., voting, campaigning, lobbying, filing a legal challenge, demonstrating, petitioning, picketing, running for political office).	
5. Discuss the features of direct democracy in numerous states (e.g., the process of referendums, recall elections).	

6. Analyze trends in voter turnout; the causes and effects of reapportionment and redistricting, with special attention to spatial districting and the rights of minorities; and the function of the Electoral College.	

7. Students analyze and compare the powers and procedures of the national, state, tribal, and local governments.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Explain how conflicts between levels of government and branches of government are resolved.	
2. Identify the major responsibilities and sources of revenue for state and local governments.	• Identify the major responsibilities of state and local governments in: controlling and mitigating environmental pollution; managing water, energy and air resources; establishing and managing park, wildlife refuge and forest systems; and other key environmental concerns. • Provide specific examples of the role of the State of California in controlling and mitigating environmental pollution; managing water, energy and air resources; establishing and managing park, wildlife refuge and forest systems; and other key environmental concerns. • Provide examples of laws, regulations, policies and incentives developed by the State of California to govern the use and management of natural systems and resources.
3. Discuss reserved powers and concurrent powers of state governments.	• Provide specific examples of the reserved powers and concurrent powers of state governments regarding the ownership of land and natural resources, and environmental management.
4. Discuss the Ninth and Tenth Amendments and interpretations of the extent of the federal government's power.	• Provide specific examples of the Tenth Amendment limiting the extent of the federal government's power in the process of making decisions regarding ownership, management and use of natural systems and resources, and responsibilities for environmental management issues.
5. Explain how public policy is formed, including the setting of the public agenda and implementation of it through regulations and executive orders.	• Describe how public policy is formed, including the setting of the public agenda and implementation of it through regulations and executive orders, using a historical environmental issue as an example.
6. Compare the processes of lawmaking at each of the three levels of government, including the role of lobbying and the media.	• Compare the processes of lawmaking at each of the three levels of government, including the role of lobbying and the media, using a historical environmental issue as an example.
7. Identify the organization and jurisdiction of federal, state, and local (e.g., California) courts and the interrelationships among them.	• Describe the jurisdiction of federal, state (e.g., California), and local courts and the interrelationships among them regarding decisions about ownership, management and use of natural systems and resources, and responsibilities for environmental management issues.
8. Understand the scope of presidential power and decision-making through examination of case studies such as the Cuban Missile Crisis, passage of Great Society legislation, War Powers Act, Gulf War, and Bosnia.	• Explain the scope of presidential power and decision-making through examination of case studies related to the establishment of the national park, national wildlife refuge and national forest systems.

8. Students evaluate and take and defend positions on the influence of the media on American political life.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**
1. Discuss the meaning and importance of a free and responsible press.	
2. Describe the roles of broadcast, print, and electronic media, including the Internet, as means of communication in American politics.	
3. Explain how public officials use the media to communicate with the citizenry and to shape public opinion.	

9. Students analyze the origins, characteristics, and development of different political systems across time, with emphasis on the quest for political democracy, its advances, and its obstacles.	**Standards-based Learning Objectives in the Context of the EP&C** **Students will:**

1. Explain how the different philosophies and structures of feudalism, mercantilism, socialism, fascism, communism, monarchies, parliamentary systems, and constitutional liberal democracies influence economic policies, social welfare policies, and human rights practices.	• Describe how decision-making regarding natural systems and resources were made through different processes under feudalism, mercantilism, socialism, fascism, communism, monarchies, parliamentary systems, and constitutional liberal democracies. • Examine how these different philosophies and political structures resulted in the development of a wide range of laws, regulations, policies, and incentives that govern management and consumption of natural resources.
2. Compare the various ways in which power is distributed, shared, and limited in systems of shared powers and in parliamentary systems, including the influence and role of parliamentary leaders (e.g., William Gladstone, Margaret Thatcher).	
3. Discuss the advantages and disadvantages of federal, confederal, and unitary systems of government.	
4. Describe for at least two countries the consequences of conditions that gave rise to tyrannies during certain periods (e.g., Italy, Japan, Haiti, Nigeria, Cambodia).	
5. Identify the forms of illegitimate power that twentieth-century African, Asian, and Latin American dictators used to gain and hold office and the conditions and interests that supported them.	
6. Identify the ideologies, causes, stages, and outcomes of major Mexican, Central American, and South American revolutions in the nineteenth and twentieth centuries.	• Describe the significance of controlling access to natural resources as one of the causes of the major Mexican, Central American, and South American revolutions in the nineteenth and twentieth centuries.
7. Describe the ideologies that give rise to Communism, methods of maintaining control, and the movements to overthrow such governments in Czechoslovakia, Hungary, and Poland, including the roles of individuals (e.g., Alexander Solzhenitsyn, Pope John Paul II, Lech Walesa, Vaclav Havel).	
8. Identify the successes of relatively new democracies in Africa, Asia, and Latin America and the ideas, leaders, and general societal conditions that have launched and sustained, or failed to sustain, them.	

10. Students formulate questions about and defend their analyses of tensions within our constitutional democracy and the importance of maintaining a balance between the following concepts: majority rule and individual rights; liberty and equality; state and national authority in a federal system; civil disobedience and the rule of law; freedom of the press and the right to a fair trial; the relationship of religion and government.	**Standards-based Learning Objectives in the Context of the EP&C Students will:** • Formulate questions about and defend their analyses of tensions within our constitutional democracy and the importance of maintaining a balance between the following concepts: majority rule and individual rights; liberty and equality; state and national authority in a federal system; civil disobedience and the rule of law, using a historical environmental issue as an example.

Principles of Economics 1. Students understand common economic terms and concepts and economic reasoning.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Examine the causal relationship between scarcity and the need for choices.	• Recognize the causal relationship between scarcity of the goods and ecosystem services provided by natural systems and the need for choices. • Provide examples of how the quality, quantity and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

2. Explain opportunity cost and marginal benefit and marginal cost.	• Identify the spectrum of factors that is considered in placing economic and other values on the opportunity costs, marginal benefits and marginal costs involved in decisions about use and management of natural systems and resources. • Compare the concepts of opportunity cost, marginal benefit and marginal cost by evaluating a state or local decision about the use or management of natural systems and resources. • Explain how unexpected long-term costs arise when decisions regarding natural systems and resources are made without sufficient information.
3. Identify the difference between monetary and non-monetary incentives and how changes in incentives cause changes in behavior.	• Provide an example of the difference between monetary and non-monetary incentives using the management of natural systems and resources as an example. • Explain how incentives have been used to cause changes in the management of natural systems and resources. • Provide examples of state and federal incentive that have been used to encourage and discourage the extraction, harvest, transportation, or consumption of natural resources and/or the management of the byproducts that result from these processes. • Evaluate whether these incentives have beneficial, neutral or detrimental effects on natural systems and resources.
4. Evaluate the role of private property as an incentive in conserving and improving scarce resources, including renewable and nonrenewable natural resources.	• Identify and analyze examples of conservation and the improvement of scarce resources that have been achieved through ownership of private property. • Identify and analyze examples of renewable and nonrenewable natural resources that are managed through the system of private property ownership. • Explain how incentive systems are used to encourage specific management practices that conserve natural resources (e.g., endangered species, coal, timber, oil).
5. Analyze the role of a market economy in establishing and preserving political and personal liberty (e.g., through the works of Adam Smith).	

2. Students analyze the elements of America's market economy in a global setting.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the relationship of the concept of incentives to the law of supply and the relationship of the concept of incentives and substitutes to the law of demand.	• Identify the relationship of the concept of incentives to the law of supply and the relationship of the concept of incentives and substitutes to the law of demand using the management of natural systems and resources as an example (e.g., coal, timber, oil).
2. Discuss the effects of changes in supply and/or demand on the relative scarcity, price, and quantity of particular products.	• Provide contemporary examples of the effects of changes in supply and/or demand on the relative scarcity, price, and quantity of particular goods and ecosystems services that are provided by natural systems (e.g., oil, hydroelectric power, water, agricultural products). • Describe the direct and indirect effects on natural systems of changes in supply and/or demand for specific goods and ecosystem services (e.g., changing water flow to obtain either water supplies or hydroelectric power). • Provide examples of laws, policies, and incentives that have been developed to regulate changes in supply and/or demand on the relative scarcity, price, and quantity of particular products (e.g., hydroelectric power, water, agricultural products).
3. Explain the roles of property rights, competition, and profit in a market economy.	• Identify the roles of property rights, competition, and profit in a market economy that depends on the availability of natural resources (e.g., coal, timber, oil).
4. Explain how prices reflect the relative scarcity of goods and services and perform the allocative function in a market economy.	• Explain how prices reflect the relative scarcity of goods and ecosystem services using international trade in regulated plant and animal products as an example.
5. Understand the process by which competition among buyers and sellers determines a market price.	
6. Describe the effect of price controls on buyers and sellers.	• Identify the effects of price controls on buyers and sellers using specific natural resources as examples.

7. Analyze how domestic and international competition in a market economy affects goods and services produced and the quality, quantity, and price of those products.	• Identify examples of how domestic and international competition in a market economy affects the rates of extraction, harvest, transportation, and consumption of natural resources as well as the management of the resulting byproducts. • Describe the direct and indirect effects of increased rates of extraction, harvest, transportation, and consumption of natural resources. • Explain how greater quantities of the resulting byproducts influence the quality, quantity and reliability of the goods and ecosystem services provided by natural systems and the health of those systems.
8. Explain the role of profit as the incentive to entrepreneurs in a market economy.	
9. Describe the functions of the financial markets.	• Identify the role of commodity markets in the rates of extraction, harvest, transportation, and consumption of natural resources.
10. Discuss the economic principles that guide the location of agricultural production and industry and the spatial distribution of transportation and retail facilities.	• Provide examples of the influence of environmental management considerations on the economic considerations that guide the location of agricultural production and industry and the spatial distribution of transportation and retail facilities. • Identify environmental management considerations that are influenced by the location of agricultural production and industry, and the spatial distribution of transportation and retail facilities.

3. Students analyze the influence of the federal government on the American economy.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand how the role of government in a market economy often includes providing for national defense, addressing environmental concerns, defining and enforcing property rights, attempting to make markets more competitive, and protecting consumers' rights.	• Describe examples of environmental laws, regulations, policies and incentives that influence the market economy. • Explain the effects of these environmental laws, regulations, policies and incentives on making markets more or less competitive; and, protecting consumers' rights, as well as environmental and human health.
2. Identify the factors that may cause the costs of government actions to outweigh the benefits.	• Identify different categories of environmental factors that may cause the costs of government actions to outweigh the benefits. • Use a case study to produce a comparative cost-benefit analysis that does and doesn't take into account key environmental factors.
3. Describe the aims of government fiscal policies (taxation, borrowing, spending) and their influence on production, employment, and price levels.	• Describe a government fiscal policy (taxation, borrowing, spending) that is used to encourage or discourage the extraction, harvest, transportation, or consumption of natural resources and/or the management of the byproducts that result from these processes.
4. Understand the aims and tools of monetary policy and their influence on economic activity (e.g., the Federal Reserve).	

4. Students analyze the elements of the U.S. labor market in a global setting.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Understand the operations of the labor market, including the circumstances surrounding the establishment of principal American labor unions, procedures that unions use to gain benefits for their members, the effects of unionization, the minimum wage, and unemployment insurance.	
2. Describe the current economy and labor market, including the types of goods and services produced, the types of skills workers need, the effects of rapid technological change, and the impact of international competition.	• Evaluate the economic significance to the current economy of the industries involved in the extraction, harvest, transportation, or consumption of natural resources and/or the management of the byproducts that result from these processes.
3. Discuss wage differences among jobs and professions, using the laws of demand and supply and the concept of productivity.	
4. Explain the effects of international mobility of capital and labor on the U.S. economy.	

5. Students analyze the aggregate economic behavior of the U.S. economy.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Distinguish between nominal and real data.	
2. Define, calculate, and explain the significance of an unemployment rate, the number of new jobs created monthly, an inflation or deflation rate, and a rate of economic growth.	
3. Distinguish between short-term and long-term interest rates and explain their relative significance.	

6. Students analyze issues of international trade and explain how the U.S. economy affects, and is affected by, economic forces beyond the United States' borders.	**Standards-based Learning Objectives in the Context of the EP&C Students will:**
1. Identify the gains in consumption and production efficiency from trade, with emphasis on the main products and changing geographic patterns of twentieth-century trade among countries in the Western Hemisphere.	• Identify the goods and ecosystem services provided by natural systems that are the main products in twentieth-century trade among countries in the Western Hemisphere. • Describe the changing geographic patterns of trade in the goods and ecosystem services provided by natural systems during the twentieth-century.
2. Compare the reasons for and the effects of trade restrictions during the Great Depression compared with present-day arguments among labor, business, and political leaders over the effects of free trade on the economic and social interests of various groups of Americans.	
3. Understand the changing role of international political borders and territorial sovereignty in a global economy.	
4. Explain foreign exchange, the manner in which exchange rates are determined, and the effects of the dollar's gaining (or losing) value relative to other currencies.	