Alignment of

Project Learning Tree
Secondary Environmental Education Program

Exploring Environmental Issues: Focus on Forests
to

California Science,
English-Language Arts,
and
History-Social Science

Content Standards
Introduction

The purpose of this document is to provide California secondary educators who use Project Learning Tree's Exploring Environmental Issues: Focus on Forests with an easy reference guide as to how PLT's activities align to the California Content Standards for English Language Arts, History/Social Sciences and Science for grades 9-12. As part of the national movement to reform education, the California State Board of Education has adopted criteria to measure the skills, knowledge and ability that all students should be able to master in language arts, history/social science, science and mathematics.

Project Learning Tree (PLT) is an interdisciplinary environmental education program. PLT activities supplement curriculum and can be used to organize instructional units in a variety of subjects. As this alignment will demonstrate, educators can use PLT activities to teach or assess mastery of knowledge and skills in a variety of content areas. It is the goal of this document to help teachers provide students with lessons that reinforce critical and creative thinking while also teaching the required standards.

The research and development for the Language Arts and Social Studies portion of the original alignment document were prepared in 2000 by Lori Mann, environmental education consultant, supported by a grant from the U. S. Environmental Protection Agency's Environmental Education Training and Partnership (ETTAP - 1999) program. To accommodate revisions in Focus on Forests, Michael Roa updated the document and developed the Science portion in 2012, supported by a grant from the American Forest Foundation. The California Department of Forestry and Fire Protection coordinated the project with support from the California Community Forests Foundation.

For more information about Project Learning Tree in California, contact Kay Antunez, PLT Coordinator, California Department of Forestry and Fire Protection, P. O. Box 944246, Sacramento, CA 94244-2460, or call (916) 653-7958.

A copy of the Content Standards for Grades K-12 can be obtained at: http://www.cde.ca.gov/be/st/ss

Additional information about Project Learning Tree and copies of the correlations for other PLT materials can be obtained at: http://www.plt.org/

October 2000; revised June 2012.
SCIENCE STANDARDS ALIGNMENTS

GRADES 9-12

Standards without asterisks represent those that all students are expected to achieve in the course of their studies. Standards with asterisks represent those that all students should have the opportunity to learn.

PHYSICS

Heat and Thermodynamics
3. Energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat. As a basis for understanding this concept, students know:
   a. heat flow and work are two forms of energy transfer between systems.

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   Climate Change and Forests (#8)

CHEMISTRY

Acids and Bases
5. Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept, students know:
   a. the observable properties of acids, bases and salt solutions.

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   Monitoring Forest Health (#1)

   d. how to use the pH scale to characterize acid and base solutions.

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Solutions
6. Solutions are homogenous mixtures of two or more substances. As a basis for understanding this concept, students know:
   f.* how molecules in solution are separated or purified by the methods of chromatography and distillation.

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   Monitoring Forest Health (#1)
   Forest to Faucet (#6)
Cell Biology
1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism’s cells. As a basis for understanding this concept, students know:
   f. usable energy is captured from sunlight by chloroplasts, and stored via the synthesis of sugar from carbon dioxide.

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Ecology
6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept, students know:
   a. biodiversity is the sum total of different kinds of organisms, and is affected by alterations of habitats.

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   b. how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of non-native species, or changes in population size.

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   c. how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.
d. how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles via photosynthesis and respiration.

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e. a vital part of an ecosystem is the stability of its producers and decomposers.

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g.* 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.

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**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, students know:
   d. variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.

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8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, students know:
   a. how natural selection determines the differential survival of groups of organisms.

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b. a great diversity of species increases the chance that at least some organisms survive large changes in the environment.

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EARTH SCIENCES

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, students know:
   b. the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.

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  Climate Change and Forests (#8)

c. the different atmospheric gases that absorb the earth’s thermal radiation and the mechanism and significance of the greenhouse effect.

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  Climate Change and Forests (#8)

Biogeochemical Cycles
7. Each element on Earth moves among reservoirs in the solid Earth, oceans, atmosphere, and organisms as part of biogeochemical cycles. As a basis for understanding this concept, students know:
   a. the carbon cycle of photosynthesis and respiration, and the nitrogen cycle.

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b. 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.

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1. **Scientific progress is made by asking meaningful questions and conducting careful investigations.** As a basis for understanding this concept, and to address the content the other four strands, students should develop their own questions and perform investigations. Students will:

a. select and use appropriate tools and technology (such as computer-linked probes, spread sheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.

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- Story of Succession (#2)

d. formulate explanations using logic and evidence.

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- Monitoring Forest Health (#1)
- Story of Succession (#2)

g. recognize the use and limitations of models and theories as scientific representations of reality.

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h. read and interpret topographic and geologic maps.

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j. recognize the issues of statistical variability and the need for controlled tests.

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k. recognize the cumulative nature of scientific evidence.

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l. analyze situations and solve problems that require combining and applying concepts from more than one area of science.

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m. investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.

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- Words to Live By (#9)
Reading

2.0 Reading Comprehension (Focus on Informational Materials)
Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced. The selections in Recommended Literature, Grades Nine through Twelve (1990) illustrate the quality and complexity of the materials to be read by students. In addition, by grade twelve, students read two million words annually on their own, including a wide variety of classic and contemporary literature, magazines, newspapers, and online information. In grades nine and ten, students make substantial progress toward this goal.

Comprehension and Analysis of Grade-Level-Appropriate Text

2.3 Generate relevant questions about readings on issues that can be researched.

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2.4 Synthesize the content from several sources or works by a single author dealing with a single issue; paraphrase the ideas and connect them to other sources and related topics to demonstrate comprehension.

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Words to Live By (#9)

2.5 Extend ideas presented in primary or secondary sources through original analysis, evaluation, and elaboration.

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Who Owns America’s Forests? (#3)
Tough Choices (#4)

2.6 Demonstrate use of sophisticated learning tools by following technical directions (e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet).

Project Learning Tree: Focus on Forests
Monitoring Forest Health (#1)
Expository Critique
2.8 Evaluate the credibility of an author's argument or defense of a claim by critiquing the relationship between generalizations and evidence, the comprehensiveness of evidence, and the way in which the author's intent affects the structure and tone of the text (e.g., in professional journals, editorials, political speeches, primary source material).

Project Learning Tree: Focus on Forests
Who Owns America’s Forests? (#3)
Tough Choices (#4)
Words to Live By (#9)

3.0 Literary Response and Analysis
Students read and respond to historically or culturally significant works of literature that reflect and enhance their studies of history and social science. They conduct in-depth analyses of recurrent patterns and themes. The selections in Recommended Literature, Grades Nine through Twelve illustrate the quality and complexity of the materials to be read by students.

Structural Features of Literature
3.2 Compare and contrast the presentation of a similar theme or topic across genres to explain how the selection of genre shapes the theme or topic.

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Words to Live By (#9)

Literary Criticism
3.12 Analyze the way in which a work of literature is related to the themes and issues of its historical period. (Historical approach)

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Words to Live By (#9)

Writing
1.0 Writing Strategies
Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students’ awareness of the audience and purpose. Students progress through the stages of the writing process as needed.

Organization and Focus
1.1 Establish a controlling impression or coherent thesis that conveys a clear and distinctive perspective on the subject and maintain a consistent tone and focus throughout the piece of writing.

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Research and Technology
1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.

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Who Owns America’s Forests? (#3)
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1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.

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Who Owns America’s Forests? (#3)
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1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.

Project Learning Tree: Focus on Forests
Who Owns America’s Forests? (#3)
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1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.

Project Learning Tree: Focus on Forests
Who Owns America’s Forests? (#3)
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1.8 Design and publish documents by using advanced publishing software and graphic programs.

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Written and Oral English Language Conventions
1.0 Written and Oral English Language Conventions
Students write and speak with a command of standard English conventions.
Grammar and Mechanics of Writing
1.2 Understand sentence construction (e.g., parallel structure, subordination, proper placement of modifiers) and proper English usage (e.g., consistency of verb tenses).

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- Story of Succession (#2)
- The Nature of Fire (#5)
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1.3 Demonstrate an understanding of proper English usage and control of grammar, paragraph and sentence structure, diction, and syntax.

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- The Nature of Fire (#5)
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Manuscript Form
1.4 Produce legible work that shows accurate spelling and correct use of the conventions of punctuation and capitalization.

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- Story of Succession (#2)
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- Words to Live By (#9)

Listening and Speaking
1.0 **Listening and Speaking Strategies**
Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.

Comprehension
1.1 Formulate judgments about the ideas under discussion and support those judgments with convincing evidence.

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1.2 Compare and contrast the ways in which media genres (e.g., televised news, news magazines, documentaries, online information) cover the same event.

**Project Learning Tree: Focus on Forests**  
The Nature of Fire (#5)

**Organization and Delivery of Oral Communication**

1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.

**Project Learning Tree: Focus on Forests**  
Who Owns America’s Forests? (#3)

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**GRADES ELEVEN AND TWELVE**

**Reading**

2.0 **Reading Comprehension (Focus on Informational Materials)**  
Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced. The selections in *Recommended Readings in Literature, Kindergarten Through Grade Twelve* illustrate the quality and complexity of the materials to be read by students. In addition, by grade twelve, students read two million words annually on their own, including a wide variety of classic and contemporary literature, magazines, newspapers, and online information.

**Comprehension and Analysis of Grade-Level-Appropriate Text**

2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

**Project Learning Tree: Focus on Forests**  
Who Owns America’s Forests? (#3)  
Tough Choices (#4)

2.4 Make warranted and reasonable assertions about the author's arguments by using elements of the text to defend and clarify interpretations.

**Project Learning Tree: Focus on Forests**  
Who Owns America’s Forests? (#3)  
Tough Choices (#4)
2.5 Analyze an author's implicit and explicit philosophical assumptions and beliefs about a subject.

**Project Learning Tree: Focus on Forests**  
Words to Live By (#9)

**Expository Critique**  
2.6 Critique the power, validity, and truthfulness of arguments set forth in public documents; their appeal to both friendly and hostile audiences; and the extent to which the arguments anticipate and address reader concerns and counterclaims (e.g., appeal to reason, to authority, to pathos and emotion).

**Project Learning Tree: Focus on Forests**  
Tough Choices (#4)  
Words to Live By (#9)

3.0 **Literary Response and Analysis**  
Students read and respond to historically or culturally significant works of literature that reflect and enhance their studies of history and social science. They conduct in-depth analyses of recurrent themes. The selections in Recommended Readings in Literature, Grades Nine through Twelve illustrate the quality and complexity of the materials to be read by students.

**Narrative Analysis of Grade-Level-Appropriate Text**  
3.2 Analyze the way in which the theme or meaning of a selection represents a view or comment on life, using textual evidence to support the claim.

**Project Learning Tree: Focus on Forests**  
Words to Live By (#9)

3.5 Analyze recognized works of American literature representing a variety of genres and traditions:  
a. Trace the development of American literature from the colonial period forward.  
b. Contrast the major periods, themes, styles, and trends and describe how works by members of different cultures relate to one another in each period.  
c. Evaluate the philosophical, political, religious, ethical, and social influences of the historical period that shaped the characters, plots, and settings.

**Project Learning Tree: Focus on Forests**  
Words to Live By (#9)

**Writing**  
1.0 **Writing Strategies**  
Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students’ awareness of the audience and purpose and progression through the stages of the writing process.
Organization and Focus
1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.

**Project Learning Tree: Focus on Forests**
Who Owns America’s Forests? (#3)
Tough Choices (#4)
Words to Live By (#9)

1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.

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Who Owns America’s Forests? (#3)
Tough Choices (#4)
Words to Live By (#9)

Research and Technology
1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).

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Story of Succession (#2)
The Nature of Fire (#5)
Climate Change and Forests (#8)

2.0 Writing Applications
2.2 Write responses to literature:
   b. Analyze the use of imagery, language, universal themes, and unique aspects of text.

**Project Learning Tree: Focus on Forests**
Words to Live By (#9)

Written and Oral English Language Conventions
1.0 Written and Oral English Language Conventions
Students write and speak with a command of standard English conventions.

1.1 Demonstrate control of grammar, diction, and paragraph and sentence structure and an understanding of English usage.

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1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

**Project Learning Tree: Focus on Forests**
- Story of Succession (#2)
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1.3 Reflect appropriate manuscript requirements in writing.

**Project Learning Tree: Focus on Forests**
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### Listening and Speaking

1.0 **Listening and Speaking Strategies**
Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.

**Comprehension**

1.1 Recognize strategies used by the media to inform, persuade, entertain, and transmit culture (e.g., advertisements; perpetuation of stereotypes; use of visual representations, special effects, language).

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- Tough Choices (#4)
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1.2 Analyze the impact of the media on the democratic process (e.g., exerting influence on elections, creating images of leaders, shaping attitudes) at the local, state, and national levels.

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- Who Owns America’s Forests? (#3)
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2.0 **Speaking Applications (Genres and Their Characteristics)**
Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
Using the speaking strategies of grades eleven and twelve outlined in Listening and Speaking Standard 1.0, students:

2.1 Deliver reflective presentations:
   a. Explore the significance of personal experiences, events, conditions, or concerns, using appropriate rhetorical strategies (e.g., narration, description, exposition, persuasion).
   b. Draw comparisons between the specific incident and broader themes that illustrate the speaker’s beliefs or generalizations about life.
   c. Maintain a balance between describing the incident and relating it to more general, abstract ideas.

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2.3 Deliver oral responses to literature:
   a. Demonstrate a comprehensive understanding of the significant ideas of literary works (e.g., make assertions about the text that are reasonable and supportable).
   b. Analyze the imagery, language, universal themes, and unique aspects of the text through the use of rhetorical strategies (e.g., narration, description, persuasion, exposition, a combination of those strategies).
   c. Support important ideas and viewpoints through accurate and detailed references to the text or to other works.
   d. Demonstrate an awareness of the author's use of stylistic devices and an appreciation of the effects created.
   e. Identify and assess the impact of perceived ambiguities, nuances, and complexities within the text.

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Students in grade ten study major turning points that shaped the modern world, from the late 18th century through the present, including the cause and course of the two world wars. They trace the rise of democratic ideas and develop an understanding of the historical roots of current world issues, especially as they pertain to international relations. They extrapolate from the American experience that democratic ideals are often achieved at a high price, remain vulnerable and are not practiced everywhere in the world. Students develop an understanding of current world issues and relate them to their historical, geographic, political, economic, and cultural contexts. Students consider multiple accounts of events in order to understand international relations from a variety of perspectives.

10.3 Students analyze the effects of the Industrial Revolution in England, France, Germany, Japan and the United States, in terms of:

7. the emergence of the Romantic impulse in art and literature (e.g., the poetry of William Blake and William Wordsworth), social criticism (e.g., Charles Dickens’ novels) and the move away from Classicism in Europe

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Words to Live By (#9)
Students in grade eleven study the major turning points in American history in the 20th century. Following a review of the nation's beginnings and the impact of the Enlightenment on U.S. democratic ideals, students build upon the tenth grade study of global industrialization to understand the emergence and impact of new technology and a corporate economy, including the social and cultural effects. They trace the change in the ethnic composition of American society; the movement towards equal rights for racial minorities and women; and the role of the United States a major world power. An emphasis is placed on the expanding role of the federal government and federal courts as well as the continuing tension between the individual and the state. Students consider the major social problems of our time and trace their causes in historical events. They learn that the United States has served as a model for other nations and that the rights and freedoms we enjoy are not accidents, but the results of a defined set of political principles that are not always basic to citizens of other countries. Students understand that our rights under the U.S. Constitution comprise a precious inheritance that depends on an educated citizenry for their preservation and protection.

11.8 Students analyze the economic boom and social transformation of post-World War II America, in terms of:

6. the diverse environmental regions in North America, their relation to particular forms of economic life, and the origins and prospects of environmental problems in those regions

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11.11 Students analyze the major social problems and domestic policy issues in contemporary American society, in terms of:

5. the impact, need 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 and property rights

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Students in grade twelve pursue a deeper understanding of the institutions of American government. They compare systems of government in the world today and analyze the life and changing interpretations of the Constitution, the Bill of Rights, and the current state of the legislative, executive and judiciary branches of government. An emphasis is placed on analyzing the relationship among federal, state and local governments, with particular attention paid to important historical documents such as The Federalist. These standards represent the culmination of civic literacy as students prepare to vote, participate in community activities and assume the responsibilities of citizenship. In addition to studying government in grade twelve, students will also master fundamental economic concepts, applying the tools (graphs, statistics, equations) from other subject areas to the understanding of operations and institutions of economic systems. Studied in a historic context are the basic economic principles of micro and macroeconomics, international economics, comparative economics systems, measurement and methods.

12.2 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, in terms of:

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…)

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4. the obligation of civic-mindedness including voting, being informed on civic issues, volunteering and performing public service, and serving in the military or alternative service

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Words to Live By (#9)

12.3 Students evaluate, 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 not part of government), their interdependence, and meaning and importance for a free society, in terms of:

1. how civil society provides opportunities for individuals to associate for social, cultural, religious, economic, and political purposes

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Words to Live By (#9)

2. 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

**Project Learning Tree: Focus on Forests**
Words to Live By (#9)
12.7 Students analyze and compare the powers and procedures of the national, state, tribal, and local governments, in terms of:
5. how public policy is formed, including the setting of the public agenda and how it is carried out through regulations and executive orders

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Who Owns America’s Forests? (#3)
Tough Choices (#4)
Words to Live By (#9)

12.8 Students evaluate, take and defend positions on the influence of the media on American political life, in terms of:
1. the meaning and importance of a free and responsible press

**Project Learning Tree: Focus on Forests**
The Nature of Fire (#5)
Words to Live By (#9)

2. the role of electronic, broadcast, print media, and the Internet as means of communication in American politics

**Project Learning Tree: Focus on Forests**
The Nature of Fire (#5)

3. how public officials use the media to communicate with the citizenry and to shape public opinion

**Project Learning Tree: Focus on Forests**
The Nature of Fire (#5)
Words to Live By (#9)
PRINCIPLES OF ECONOMICS

12.1 Students understand common economic terms and concepts and economic reasoning, in terms of:
   1. the causal relationship between scarcity and the need for choices

   **Project Learning Tree: Focus on Forests**
   Who Owns America’s Forests? (#3)
   Tough Choices (#4)
   The Nature of Fire (#5)
   Forest to Faucet (#6)
   Forest Invaders (#7)
   Words to Live By (#9)

   4. the role of private property as an incentive in conserving and improving scarce resources, including renewable and non-renewable natural resources

   **Project Learning Tree: Focus on Forests**
   Who Owns America’s Forests? (#3)
   Tough Choices (#4)
   The Nature of Fire (#5)
   Forest to Faucet (#6)
   Forest Invaders (#7)
   Climate Change and Forests (#8)
   Words to Live By (#9)

12.3 Students analyze the influence of the U.S. government on the American economy, in terms of:
   1. 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 consumer rights

   **Project Learning Tree: Focus on Forests**
   Who Owns America’s Forests? (#3)
   Tough Choices (#4)
   The Nature of Fire (#5)
   Forest to Faucet (#6)
   Forest Invaders (#7)
   Climate Change and Forests (#8)
   Words to Live By (#9)

12.4 Students analyze the unique roles and responsibilities of the three branches of government as established by the U. S. Constitution, in terms of:
   2. the process through which the U. S. Constitution is amended

   **Project Learning Tree: Focus on Forests**
   Words to Live By (#9)