

**Alignment  
of**

**Project Learning Tree  
Secondary Environmental  
Education Program**

**Exploring Environmental Issues:  
Focus on Risk**

**to**

**California  
Science  
Mathematics  
History-Social Studies  
English-Language Arts  
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 Risk* with an easy reference guide as to how PLT's activities align to the California Content Standards 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 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 content areas knowledge and skills. It is the goal of this document to help teachers provide students with lessons that reinforce critical and creative thinking while also covering the required standards.

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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/>

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# SCIENCE STANDARDS

## 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

### Electronic and Magnetic Phenomena

5. **Electric and magnetic phenomena are related and have many practical applications.** As a basis for understanding this concept, students know:
- magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and experience forces due to magnetic fields of other sources.

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Special Topic: Electromagnetic Fields

## CHEMISTRY

### Chemical Bonds

2. **Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds based on electrostatic forces between electrons and protons, and between atoms and molecules.** As a basis for understanding this concept, students know:
- atoms combine to form molecules by sharing electrons to form covalent or metallic bonds, or by exchanging electrons to form ionic bonds.

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Special Topic: Chlorine: Looking at Tradeoffs

### Solutions

6. **Solutions are homogenous mixtures of two or more substances.** As a basis for understanding this concept, students know:
- how to calculate the concentration of a solute in terms of grams per liter, molarity, parts per million and percent composition

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## **Reaction Rates**

- 8. Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules.** As a basis for understanding this concept, students know:
- how reaction rates depend on such factors as concentration, temperature, and pressure.

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Special Topic: Chlorine: Looking at Tradeoffs

## **Organic and Biochemistry**

- 10. The bonding characteristics of carbon lead to many different molecules with varied sizes, shapes, and chemical properties, providing the biochemical basis of life.** As a basis for understanding this concept, students know:
- the bonding characteristics of carbon lead to a large variety of structures ranging from simple hydrocarbons to complex polymers and biological molecules.

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Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

# **BIOLOGY - LIFE SCIENCES**

## **Ecology**

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

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Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

- 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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What is Risk?

Chances Are ... Understanding Probability and Risk

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

Special Topic: Chlorine: Looking at Tradeoffs  
Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

## EARTH SCIENCES

### Dynamic Earth Processes

3. **Plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on the Earth's surface.** As the basis for understanding this concept, students know:
- f.\* explanation for the location and properties of volcanoes that are due to hot spots and those that are due to subduction.

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Decision Making: Ecological Risk, Wildfires, and Natural Hazards

### 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, students know:
- b. the principal natural hazards in different California regions, and the geological basis of those hazards.

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What is Risk?

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

## INVESTIGATION AND EXPERIMENTATION

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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Communicating Risk

Special Topic: Electromagnetic Fields

- d. formulate explanations using logic and evidence.

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Things Aren't Always What They Seem

Risk Assessment: Tools of the Trade

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

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

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Chances Are ... Understanding Probability and Risk

Risk Assessment: Tools of the Trade

- k. recognize the cumulative nature of scientific evidence.

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Risk Assessment: Tools of the Trade

Special Topic: Electromagnetic Fields

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

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Things Aren't Always What They Seem

Communicating Risk

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

- 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.

**Project Learning Tree—Focus on Risk**

What is Risk?

Things Aren't Always What They Seem

Risk Assessment: Tools of the Trade

Communicating Risk

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

Special Topic: Chlorine: Looking at Tradeoffs

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

# HISTORY-SOCIAL STUDIES STANDARDS

## GRADE 11

### UNITED STATES HISTORY AND GEOGRAPHY: CONTINUITY AND CHANGE IN THE TWENTIETH CENTURY

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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Special Topic; Electromagnetic Fields

- 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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Communicating Risk  
Weight the Options: A Look at Tradeoffs  
Decision Making: Ecological Risk, Wildfires, and Natural Hazards  
Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

## **GRADE 12**

### **PRINCIPLES OF AMERICAN DEMOCRACY**

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:
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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Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

5. the reciprocity between rights and obligations, i.e., why enjoyment of one's rights entails respect for the rights of others

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Decision Making: Ecological Risk, Wildfires, and Natural Hazards

- 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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Taking Action: Reducing Risk in Your School or Community

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

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Communicating Risk

Special Topic: Electromagnetic Fields

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

Taking Action: Reducing Risk in Your School or Community

- 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

**Project Learning Tree—Focus on Risk**

Things Aren't Always What They Seem

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

6. the process of lawmaking at each of the three levels of government, including the role of lobbying and the media

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Special Topic: Electromagnetic Fields

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

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What is Risk?

Things Aren't Always What They Seem

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

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What is Risk?

Communicating Risk

## 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

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Weighing the Options: A Look at Tradeoffs

2. opportunity cost and marginal benefit and marginal cost

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Weighing the Options: A Look at Tradeoffs

3. the difference between monetary and non-monetary incentives and how changes in incentives cause changes in behavior

**Project Learning Tree—Focus on Risk**

Communicating Risk

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

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

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Decision Making: Ecological Risk, Wildfires, and Natural Hazards

5. the role of a market economy in establishing and preserving political and personal liberty (e.g., the works of Adam Smith)"

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Weighing the Options: A Look at Tradeoffs

- 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 Risk**

Things Aren't Always What They Seem

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

## ENGLISH-LANGUAGE ARTS STANDARDS

### **GRADES NINE AND TEN**

#### **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.

##### **Structural Features of Informational Materials**

- 2.1 Analyze the structure and format of functional workplace documents, including the graphics and headers, and explain how authors use the features to achieve their purposes.

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Communicating Risk

##### **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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Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields  
Special Topic: Chlorine: Looking at Tradeoffs

- 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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Decision Making: Ecological Risk, Wildfires, and Natural Hazards  
Special Topic: Electromagnetic Fields

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

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade  
Communicating Risk  
Weighing the Options: A Look at Tradeoffs  
Decision Making: Ecological Risk, Wildfires, and Natural Hazards  
Special Topic: Electromagnetic Fields

**Expository Critique**

- 2.7 Critique the logic of functional documents by examining the sequence of information and procedures in anticipation of possible reader misunderstandings.

**Project Learning Tree—Focus on Risk**

Communicating Risk

- 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).

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Special Topic: Electromagnetic Fields

## **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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Special Topic: Electromagnetic Fields

**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.

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade

Communicating Risk

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).

**Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives found in each medium (e.g., almanacs, microfiche, news sources, in-depth field studies, speeches, journals, technical documents).

**Project Learning Tree—Focus on Risk**

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

- 1.8 Design and publish documents by using advanced publishing software and graphic programs.

**Project Learning Tree—Focus on Risk**

Communicating Risk

**Evaluation and Revision**

- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

**Project Learning Tree—Focus on Risk**

## Communicating Risk

### **2.0 Writing Applications (Genres and Their Characteristics)**

Students combine the rhetorical strategies of narration, exposition, persuasion, and description to produce texts of at least 1,500 words each. Student writing demonstrates a command of standard American English and the research, organizational, and drafting strategies outlined in Writing Standard 1.0.

Using the writing strategies of grades nine and ten outlined in Writing Standard 1.0, students:

2.3 Write expository compositions, including analytical essays and research reports:

- a. Marshal evidence in support of a thesis and related claims, including information on all relevant perspectives.
- b. Convey information and ideas from primary and secondary sources accurately and coherently.
- c. Make distinctions between the relative value and significance of specific data, facts, and ideas.
- d. Include visual aids by employing appropriate technology to organize and record information on charts, maps, and graphs.
- e. Anticipate and address readers' potential misunderstandings, biases, and expectations.
- f. Use technical terms and notations accurately.

#### **Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

2.4 Write persuasive compositions:

- a. Structure ideas and arguments in a sustained and logical fashion.
- b. Use specific rhetorical devices to support assertions (e.g., appeal to logic through reasoning; appeal to emotion or ethical belief; relate a personal anecdote, case study, or analogy).
- c. Clarify and defend positions with precise and relevant evidence, including facts, expert opinions, quotations, and expressions of commonly accepted beliefs and logical reasoning.
- d. Address readers' concerns, counterclaims, biases, and expectations.

#### **Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

2.6 Write technical documents (e.g., a manual on rules of behavior for conflict resolution, procedures for conducting a meeting, minutes of a meeting):

- a. Report information and convey ideas logically and correctly.
- b. Offer detailed and accurate specifications.

- c. Include scenarios, definitions, and examples to aid comprehension (e.g., troubleshooting guide).
- d. Anticipate readers' problems, mistakes, and misunderstandings.

**Project Learning Tree—Focus on Risk**  
Communicating Risk

## **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.

**Project Learning Tree—Focus on Risk**

What is Risk?

Things Aren't Always What They Seem

Risk Assessment: Tools of the Trade

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

- 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 Risk**

What is Risk?

#### **Organization and Delivery of Oral Communication**

- 1.3 Choose logical patterns of organization (e.g., chronological, topical, cause and effect) to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.

**Project Learning Tree—Focus on Risk**

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

- 1.5 Recognize and use elements of classical speech forms (e.g., introduction, first and second transitions, body, conclusion) in formulating rational arguments and applying the art of persuasion and debate.

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade

Special Topic: Electromagnetic Fields

- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof (e.g., statistics, testimony, specific instances) that meet standard tests for evidence, including credibility, validity, and relevance.

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade

Weighing the Options: A Look at Tradeoffs

Special Topic: Electromagnetic Fields

Special Topic: Chlorine: Looking at Tradeoffs

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

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

**Project Learning Tree—Focus on Risk**

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Chlorine: Looking at Tradeoffs

- 1.8 Produce concise notes for extemporaneous delivery.

**Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

**Analysis and Evaluation of Oral and Media Communications**

- 1.11 Assess how language and delivery affect the mood and tone of the oral communication and make an impact on the audience.

**Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

- 1.12 Evaluate the clarity, quality, effectiveness, and general coherence of a speaker's important points, arguments, evidence, organization of ideas, delivery, diction, and syntax.

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade

Weighing the Options: A Look at Tradeoffs

Special Topic: Electromagnetic Fields

**2.0 Speaking Applications (Genres and Their Characteristics)**

Students deliver polished formal and extemporaneous presentations that combine the 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 nine and ten outlined in Listening and Speaking Standard 1.0, students:

- 2.2 Deliver expository presentations:
- a. Marshal evidence in support of a thesis and related claims, including information on all relevant perspectives.
  - b. Convey information and ideas from primary and secondary sources accurately and coherently.
  - c. Make distinctions between the relative value and significance of specific data, facts, and ideas.
  - d. Include visual aids by employing appropriate technology to organize and display information on charts, maps, and graphs.
  - e. Anticipate and address the listener's potential misunderstandings, biases, and expectations.
  - f. Use technical terms and notations accurately.

**Project Learning Tree—Focus on Risk**

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Chlorine: Looking at Tradeoffs

Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

- 2.5 Deliver persuasive arguments (including evaluation and analysis of problems and solutions and causes and effects):
- a. Structure ideas and arguments in a coherent, logical fashion.
  - b. Use rhetorical devices to support assertions (e.g., by appeal to logic through reasoning; by appeal to emotion or ethical belief; by use of personal anecdote, case study, or analogy).
  - c. Clarify and defend positions with precise and relevant evidence, including facts, expert opinions, quotations, expressions of commonly accepted beliefs, and logical reasoning.
  - d. Anticipate and address the listener's concerns and counterarguments.

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade

Weighing the Options: A Look at Tradeoffs

Decision Making: Ecological Risk, Wildfires, and Natural Hazards

Special Topic: Electromagnetic Fields

## **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, Grades Nine through 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.

#### **Structural Features of Informational Materials**

2.1 Analyze both the features and the rhetorical devices of different types of public documents (e.g., policy statements, speeches, debates, platforms) and the way in which authors use those features and devices.

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Communicating Risk

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

2.2 Analyze the way in which clarity of meaning is affected by the patterns of organization, hierarchical structures, repetition of the main ideas, syntax, and word choice in the text.

##### **Project Learning Tree—Focus on Risk**

Communicating Risk

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

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Special Topic: Electromagnetic Fields

2.5 Analyze an author's implicit and explicit philosophical assumptions and beliefs about a subject.

##### **Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

#### **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 Risk**

Risk Assessment: Tools of the Trade

Communicating Risk

**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 Risk**

Weighing the Options: A Look at Tradeoffs

**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 Risk**

Communicating Risk

Special Topic: Electromagnetic Fields

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

**Project Learning Tree—Focus on Risk**

Special Topic: Electromagnetic Fields

**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).

**Project Learning Tree—Focus on Risk**

Risk Assessment: Tools of the Trade  
Communicating Risk  
Decision Making: Ecological Risk, Wildfires, and Natural Hazards  
Special Topic: Electromagnetic Fields  
Special Topic: Plastics, Risk/Benefit Analysis, and Environmental Legislation

### **Evaluation and Revision**

- 1.9 Revise text to highlight the individual voice, improve sentence variety and style, and enhance subtlety of meaning and tone in ways that are consistent with the purpose, audience, and genre.

**Project Learning Tree—Focus on Risk**  
Communicating Risk

## **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).

**Project Learning Tree—Focus on Risk**  
What is Risk?  
Things Aren't Always What They Seem  
Communicating Risk

- 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.

**Project Learning Tree—Focus on Risk**  
Things Aren't Always What They Seem  
Communicating Risk

- 1.3 Interpret and evaluate the various ways in which events are presented and information is communicated by visual image makers (e.g., graphic artists, documentary filmmakers, illustrators, news photographers).

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Communicating Risk

## **Organization and Delivery of Oral Communication**

- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.

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Risk Assessment: Tools of the Trade

Weighing the Options: A Look at Tradeoffs

Special Topic: Electromagnetic Fields

Special Topic: Chlorine: Looking at Tradeoffs

- 1.8 Use effective and interesting language, including:
- Informal expressions for effect
  - Standard American English for clarity
  - Technical language for specificity

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Special Topic: Electromagnetic Fields

Special Topic: Chlorine: Looking at Tradeoffs

## **Analysis and Evaluation of Oral and Media Communications**

- 1.11 Critique a speaker's diction and syntax in relation to the purpose of an oral communication and the impact the words may have on the audience.

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- 1.13 Analyze the four basic types of persuasive speech (i.e., propositions of fact, value, problem, or policy) and understand the similarities and differences in their patterns of organization and the use of persuasive language, reasoning, and proof.

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