Alignment of Project Learning Tree Curriculum

to the
Science Content Standards for California Public Schools
and the
California Education and the Environment Initiative's Environmental Principles and Concepts and Curriculum Units

For more information about Project Learning Tree, California Department of Forestry and Fire Protection at (916) 653-7958 or Kay.Antunez@fire.ca.gov

Introduction:

The purpose of this document is to provide California educators who use Project Learning Tree materials with an easy cross reference to the grade and academic standards that align with California environmental principles and concepts and the Education and the Environmental (EEI) units that were developed to teach them. The EEI units were developed in support the mandate described in Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003 and AB 1721 and Pavley, Chapter 581, Statutes of 2005) called the "Education and the Environment Initiative (EEI). Information about the EEI can be obtained at: http://www.calepa.ca.gov/Education/EEI .

This alignment was originally developed and reviewed by a team of Project Learning Tree partners. A biographical list of those participating in the alignment project follows this introduction. Funding was provided by the United States Environmental Protection Agency, Office of Environmental Education under agreement number NT-83272501-1 between the U.S. EPA and the University of Wisconsin-Stevens Point, the American Forest Foundation and the California Community Forests Foundation. Additional support was provided by the California Department of Forestry and Fire Protection.

June 2010

Academic Content Standards	California Environmental Principle and Concepts	Project Learning Tree Activities	California Education and the Environment Initiative Units
Kindergarten			
Earth Sciences (Kindergarten)			
3. Earth is composed of land, air, and water. As a basis for understanding this concept:			

a. Students know characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.	I. The continuation and health of individual human lives and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services. CONCEPT A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economiies and cultures.	Habitat Pen Pals (7); Environmental Exchange Box (20)	**The World Around Me**
c. Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.	I. The continueation and health of individual human lives and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services. CONCEPT A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economiies 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.	We All need Trees (13); Three Cheers for Trees (30); Energy Sleuths (39-a); Make Your Own Paper (51); Earth Manners (87)	**A Day in My Life**
First Grade			
Life Sciences			
2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:			

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.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.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.	Picture This! (6);The Forest of ST Shrew (8);Trees as Habitats (22); Nature's Recyclers (24); Birds and Worms (25); Plant a Tree (31); How Plants Grow (41); Have Seeds, Will Travel (43); School Yard Safari (46); Are Vacant Lots Vacant? (47); Forest, Field and Stream-variation (48)	**Striving and Thriving**
c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.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 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.	Picture This! (6); The Forest of ST Shrew (8); Pass the Plants Please (16); Adopt a Tree (21); Trees as Habitats (22); Trees as Habitats (23); Nature's Recyclers(24); Every Tree for Itself (27); A Forest of Many Uses (32); School Yard Safari (46); Are Vacant Lots Vacant (47); The Closer You Look (61)	**Finding 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).	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.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.		**Open Wide! Look Inside!**
Second Grade			
Life Sciences			

2. Plants and animals have predictable life cycles. As a basis for understanding this concept:			
a. Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 the expansion and operation of human practices depend upon and benefit from the cycels and processes that operate within natural systems.	Have Seeds, Will Travel (43); Tree Lifecycle (79)	**Cycle of Life**
b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.	See Above 2.a	Tree Lifecycle (79)	**Cycle of Life**
c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. CONCEPT A: Students need to know that natural systems proceed through cycles and processes that are required for their functioning. CONCEPT C: Students need to know that human practices can alter the cycles and processes that operate within natural systems	How Big is Your Tree? (67); Trees in Trouble (77);	**Alike and Different**
d. Students know there is variation among individuals of one kind within a population.	See Above 2..c.	How Plants Grow (41); Looking at Leaves (67)	**Alike and Different**

e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans 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.	Adopt a Tree (21); Every Tree for Itself (27); How Plants Grow (41); Sunlight and Shades of Tree (42); The Closer You Look (48); Germinating Giants (65); Tree Cookies (76); Trees in Trouble (77)	**Flowering Plants in Our Changing Environment**
f. Students know flowers and fruits are associated with reproduction in plants.	See 2.e	Have Seeds, Will Travel (43); Tree Lifecycle (79)	**Flowering Plants in Our Changing Environment**
3. Earth is made of materials that have distinct properties and provide resources for human activities.			
a. Students know how to compare the physical provperties of different kinds of rocks and know that rock is composed of different combinations of minerals.	I. The continuation and health of individual human lives and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services. CONCEPT A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economiies and cultures.		**The Earth Rocks**
b. Students know smaller rocks come from the breakage and weathering of larger rocks.	See .3a		**The Earth Rocks**
3rd Grade			
Life Sciences			

3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:			
a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans 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.	Sounds Around (4-b); Can It Be Real? (11); Birds and Worms (25); Air Plants (28); How Plants Grow (41); Sunlight and Shades of Green (42); Have Seeds, Will Travel (43); To Be A Tree (62); Tree Factory (63)	**Structures for Survival in a Healthy Ecosystem.**
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.	II. The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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.	Forest of ST Shrew (8);The Fallen Log (23); Nature's Recyclers (24); Every Tree For Itself (27); Air Plants (28); Three Cheers for Trees (30); Plant a Tree (31); A Forest of Many Uses (32); Pollution Search (36); Web of Life (45); Tropical Tree House-part c; Nothing Succeeds Like Succession (80)	**Living Things in Changing Environments.**

d. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.	II. The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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.	Birds and Worms (+ enrichment) (25); Every Tree for Itself-variation (27); A Forest of Many Uses (32); How Plants Grow (41); Sunlight and Shades of Green (42); Web of LIfe (45); Tree Cookies (76); Trees in Trouble (77); Nothing Succeeds Like Succession-B (80);	**Living Things in Changing Environments.**
4th Grade			
Life Sciences			
2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:			
a. Students know plants are the primary source of matter and energy entering most food chains.	I. The continuation and health of individual human lives and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services. CONCEPT A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economiies 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.	Sunlight and Shades of Green (42); Web of Life (45); May the Source Be With You (Energy and Society)	**Plants: The Ultimate Energy Source**

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.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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.	Adopt a Tree (21-b, enrichment); Trees as Habitats (22); Birds and Worms (25); Every Tree for Itself (27); Web of Life (45); School Yard Safari (46); Are Vacant Lots Vacant (47); Life on the Edge (88);	**The Flow of Energy Through the Ecosystem**
c. Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans practices depend upon and benefit from the cycles and processes that operate within natural systems.	The Story of ST Shrew (8); The Fallen Log (23); Nature's Recyclers (24);Tree Lifecycle (79);	**Life and Death with Composers**
3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:			
d. Students know that most microorganisms do not cause disease and that many are beneficial.	I. The continuation and health of individual human lives and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services. 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.	The Fallen Log (23); Nature's Recyclers (24)	**Microogranisms and the Human World**
5th Grade			
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:			
a. Students know most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans practices depend upon and benefit from the cycles and processes that operate within natural systems.	Water Wonders (44)	**Earth's Water**
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.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 taht methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological divestiy, and viability of natural systems.	Water Wonders (44-a);	**Changing States - Water, Natural Systems, 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.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans 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.	Water Wonders (44)	**Precipitation, People, and the Natural World**
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.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans practices depend upon and benefit from the cycles and processes that operate within natural systems.	Rewable or Not (14); Every Drop Counts (38); OurChanging World (86)	**Our Water: Sources and Uses**
Sixth Grade			
Shaping Earth's Surface			
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:			

b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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 humans 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.	Water Wonders (44-b)	**The Dynamic Nature of Rivers**
Ecology (Life Science)			
5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:			
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.	V. The exchange of matter between natural systems and human societies affects the long-term functioning of both. 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 know that the byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental to their effect.	Fallen Log (23); Nature's Recyclers (24); Web of Life (45); A59	**Energy - Pass it On!**

d. Students know different kinds of organisms may play similar ecological roles in similar biomes.	IV. The exchange of matter between natural systems and human societies affects the long term functioning ot both. CONCEPT B: Students need to know that the byproducts of human activities are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect.	Charting Diversity (10); Environmental Exchange Box (20); Tropical Treehouse (49)	**Playing the Same Role**
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:			
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.	IV. The exchange of matter between natural systems and human societies affects the long term functioning of both.CONCEPT A: Students need to know that the effects of human activitries on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.	Renewable or Not (14); Energy Sleuths (39); Waste Watchers (73); Resources Go-Around (82); A Peek at Packaging (83); Energy Chains, What Powers the Move (Energy & Society)	**Energy: It's Not All the Same to You!**
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.	I. The continuation and health of individual human lives and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services. CONCEPT A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economiies and cultures.CONCEPT C: Students need to know that the quality, quantity, and reliability of the goods and ecosystems services provided by natural systems are directly affected by the health of those systems.	Renewable or Not (14); A Few of My Favorite Things (15); A Forest for Many Uses (32); Forest Consequences (33); Reduce, Reuse, Recycle (37); Every Drop Counts (39); Energy Sleuths (39); Make Your Own Paper (51); A Look at Aluminum (52)On the Move (53); Forest for the Trees (69); Waste Watchers (73); Peek at Packaging (83)	**Energy and Material Resources: Renewable or Not?**

c. Students know the natural origin of the materials used to make common objects.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 taht methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.	We All Need Trees (13); A Few of My Favorite Things (15); A Forest of Many Uses (32); Make Your Own Paper (51); A Look at Aluminum (52); Tipi-Talk (75); Resources-Go-Around (75); Resources-Go-Around (82); A Peak at Packaging (84);	**Made from the Earth: How Natural Resources Become Things We Use**
Seventh Grade			
Evolution			
3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:			
a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. CONCEPT A: Students need to know that natural systems proceed through cycles and processes that are required for their functioning. CONCEPT C: Students need to know that human practices can alter the cycles and processes that operate within natural systems.	Can It Be Real? (11); Invasive Species (12)	**Shaping Natural Systems Through Evolution**

e. Students know that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. CONCEPT A: Students need to know that natural systems proceed through cycles and processes that are required for their functioning. CONCEPT C: Students need to know that human practices can alter the cycles and processes that operate within natural systems.	Life on the Edge (88-a)	**Responding to Environmental Change**
Earth and Life History (Earth Sciences)			
4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept:4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept:			
g. Students know how to explain significant developments and extinctions of plant and animal life on the geologic time scale.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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.	Life on the Edge (88-a)	**Extinction - Past and Present**
High School- Biology/Life Science			
Cell Biology			
5. The genetic composition of cells can be altered by incorporation of exogenous DNA into cells. As a basis for understanding this concept:			

c. Students know how genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products.	V. Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. CONCEPT A: Students need to know the spectrum of what is considered when making decisions about resources and natural systems and how those factors influence decisions.	(Risk-Biotechnology Supplement) Activity 1: Biotechnology and You; Part B: Genetic Engineering; Part C: Risks and Benefits of Genetically Engineered Organisms; Part D: Case Studies of Genetically Engineered Crops; Activty 4: Forest Biotechnology:Tree Improvement	**High Tech Harvest: Genetic Engineering and the Environment.**
6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:			
a. Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 taht 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.	Tough Choices, Case Study: Old Growth Forests (Focus on Forests); C77Nature of Plants, Saga of the Gypsy Moth, Home Sweet Home, Story of Succession, Understanding Fire, Fire Management (Forest Ecology); Global Invaders, Potatoes, Pesticies,and Biodiversity (Biodiversity)+C77	**Biodiversity - The Keystone to Life on Earth**

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.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 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.	Adopt a Forest, Cast of Thousands, Nature of Plants, Home Sweet Home, Story of Succession, Understanding Fire, Fire Management (Forest Ecology); Mapping Your Community Through Time, Neighborhood Design, Green Space, A Vision for the Future, Far Reaching Decisions+A54	**Ecosystem Change in California**
Evolution			
8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:			
a. Students know how natural selection determines the differential survival of groups of organisms.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. CONCEPT A: Students need to know that natural systems proceed through cycles and processes that are required for their functioning. CONCEPT C: Students need to know that human practices can alter the cycles and processes that operate within natural systems.	Story of Succession, Understanding Fire, Fire Management (Forest Ecology)	**Differential Survival of Organisms**

b. Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.	IV. The exchange of matter between natural systems and human societies affects the long term functioning ot both.CONCEPT C: Students need to know that the capacity of natural systems to adjust to human-caused alternations depends on the nature of the system as well as the scope, scale, and duration of the activity and nature of its byproducts.	Cast of Thousands, Story of Succession, Understandig Fire, Fire Management (Forest Ecology) Global Invaders (Biodiversity) A83	**Biological Diversity: The World's Riches**
d. Students know reproductive or geographic isolation affects speciation.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 taht 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.		**The Isolation of Species**
High School -- Earth Science			
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:			

c. Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.	IV. The exchange of matter between natural systems and human societies affects the long term functioning ot both.CONCEPT A: Students need to know that the effects of human activities on natural systems are directly related to the quantities of natural resources consumed and to the quantity and characteristics of the resulting byproducts. CONCEPT B: Students need to know that the byproducts of human activities 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 alternations depends on the nature of the system as well as the scope, scale, and duration of the activity and nature of its byproducts.	The Nature of Plants (Forest Ecology)	**The Greenhouse Effect: Earth's Natural Insulator**
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:			
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.	V. Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. CONCEPT A: Students need to know the spectrum of what is considered when making decisions about resources and natural systems and how those factors influence decisions.		**Ocean Currents and Natural Systems**

e. Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.	II. The long-term functioning and health of terrestrail, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. 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 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.	Mapping the World's Forests(Global Connections: Forests of the World)	**Rainforests and Deserts: Distribution, Uses and Human Influences**
Biogeochemical Cycles (Earth Science)			
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:			
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.	III. Natural systems proceed through cycles that humans depend upon, benefit from and can alter. 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.	The Global Climate (84); The Forest Plant (Global Connections: Forests of the World)	**The Life and Times of Carbon**

California Geology (Earth Science)			
8. Life has changed Earth's atmoshpere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:			
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.	IV. The exchange of matter between natural systems and human societies affects the long term functioning ot both.CONCEPT A: Students need to know that the effects of human activities on natural systems are directly related to the quantities of natural resources consumed and to the quantity and characteristics of the resulting byproducts. CONCEPT B: Students need to know that the byproducts of human activities 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 alternations depends on the nature of the system as well as the scope, scale, and duration of the activity and nature of its byproducts.	The Global Climate (84)	**Living Under One Roof**
9. The geology of California underlies the state's wealth of natural resources its natural hazards. As a basis for understanding this concept:			

c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.	V. Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. CONCEPT A: Students need to know the spectrum of what is considered when 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.		**Liquid Gold: California's Water**

Participants (2006) in the initial review of the Project Learning Tree materials and the development of a cross reference correlation to the Environmental Education Initiative's Principals and Concepts included:

Kay Antunez de Mayolo
M.S., B.S., Biological Sciences
California Teaching Credential (Life Credential) – Secondary Science
Classroom science teacher – (grades 3-8, high school, community college, outdoor school educator) – 12 years
Education Director – Sacramento Tree Foundation

Marianne Chang
B.A. International Relations
California Teaching Credential – multiple subjects (K-8)
Reading Certificate, CLAD
Classroom teacher (grades 1, 2, 5)
Reading Specialist, Reading Recovery teacher, Literacy Coach,Scorer - CSET (multiple subjects) and RICA exams
PLT Educator of the Year (1998)
Facilitator - Project Learning Tree

Linda Desai
BS, Conservation Education, M.S. Conservation Education
Community College credential-Biological Sciences, Natural Resources, Forestry and related technologies
Education Director, Placer Nature Center — California PLT Advisory Committee member — Facilitator- Project Learning Tree, Project WILD, Project WET
PLT "Educator of the Year" award (2005)

Dennis Mitchell
BA, Liberal Studies
California Teaching Credential (Life) Multiple Subjects
Science and Math teacher (grades 3, 8) - 28 years
Staff development/consultant – California Science Project ,Science in Rural California, Project ARISE; K12 Alliance — PLT Educator of the Year (2000)
Staff - Forestry Institute for Teachers — Facilitator - Project Learning Tree, Project WILD

Participants (2010) in the review of the Project Learning Tree materials and the cross reference correlation to the Environmental Education Initiative's curriculum units included:

Helen de la Maza
BA, Comparative Literature & Biological Sciences
MS, Wildlife Science
MA, Curriculum & Instruction
California Teaching Credentials: Biological Sciences, Language Arts, Spanish, Multiple Subjects
Environmental Educator - 15 years
Science Teacher - 2 years — Curricululm Writer- Education and the Environment Inititative
Facilitator - Project Learning Tree, Project WILD, Project WET, Population Connection

Michael Roa

(minor-Physical Sciences)

California Teaching Credentials: Standard Secondary (life), Multiple Subject, Administrative Services

Administrator (grades 4-12) - 38 years

Development Consortium; Lead Teacher - Redwood Area Science Project

Environmental Science Activities Kit, A Guide to the Side of the Sea, Redwood Ed

Environment Initiative

WET

BA, Life Sciences

MA, Secondary Education

Classroom teacher and

Staff Developer- North Coast Professional

Author -

Curriculum Writer - Education and the

Facilitator - Project Learning Tree, Project WILD, Project