Correlation of

Project Learning Tree, Project WET, Project WILD &

Activity Guides

to the

Science Content Standards for California Public Schools

and the

Principles & Concepts of the California Environmental Education Initiative Model Curriculum

Introduction

The purpose of this document is to provide California educators who use Project Learning Tree, Project WILD and Aquatic WILD, and Project WET materials with a cross reference to the Grade and Discipline-specific Standards-based learning objectives for K-12 Science and History/Social Science in context to California Environmental Principles and Concepts.

The Environmental Principles and Concepts (EP&C) and Standards-based learning objectives were developed as a template for the development of a "model curriculum" 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 "Environmental Education Initiative (EEI). Information about the "EEI" can be obtained at: http://www.calepa.ca.gov/Education/EEI .

These correlations were developed and reviewed by teams of Project Learning Tree, Project WILD and Project WET partners. A biographical list of those participating in the correlation project follows this introduction. Funding for the development of this correlation was provided by the United States Environmental Protection Agency, Office of Environmental Education under agreement number NT-83272501-0 between the U.S. EPA and the University of Wisconsin-Stevens Point. Additional support was provided by the California Department of Forestry and Fire Protection, California Department of Fish and Game, and the Water Education Foundation.

November 2006

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Kindergarten

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
	* Denotes activity that addresses standard when used in context of EEI			
Physical Sciences (Kindergarten)				
1. Properties of materials can be observed, measured, and predicted. As a basis for understanding this concept:				
a. Students know objects can be described in terms of the materials they are made of (e.g., clay, cloth, paper) and their physical properties (e.g., color, size, shape, weight, texture, flexibility, attraction to magnets, floating, sinking).	· Aqua Bodies (p. 63) · Stream Sense (p. 191)	Make a coat	The Shape of Things (1); Get in Touch with Trees (2)	
b. Students know water can be a liquid or a solid and can be made to change back and forth from one form to the other.	· Water Match (p. 50) · Molecules in Motion (p. 47)			
Life Science (Kindergarten)				
2. Different types of plants and animals inhabit the earth. As a basis for understanding this concept:				
a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).	· Stream Sense (p. 191) · Water Address (p. 122)	Color Crazy; Seeing is Believing; Surprise Terrarium; The Thicket Game; What Bear Goes Where?; What's Wild, Wildlife is Everywhere Aquatic WILD: Are You Me?; Fashion a Fish; Water Plant Art	Picture This! (6-b); Adopt a Tree (21-a);Trees as Habitats (22); How Plants Grow (41); Have Seeds, Will Travel (43); SchoolYard Safari (46); Are Vacant Lots Vacant (47)	• Recognize that the similarities and differences in the appearance and behavior of plants and animals are related to their use of similar resources to meet their needs (e.g., food).
b. Students know stories sometimes give plants and animals attributes they do not really have.	· Raining Cats & Dogs	And The Wolf Wore Shoes, First Impressions, Saturday Morning Wildlife Watching	The Forest of ST Shrew (8)	
c. Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).		What Bear Goes Where? Aquatic WILD: Water Plant Art	Picture This! (6); Pass the Plants Please (16); Looking at Leaves(64); Bursting Buds (65); Tree Lifecycle (79)	

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.	· Branching Out · Stream Sense (p. 191)	Graphananimal	Habitat Pen Pals (7);	• List different habitats (ecosystems) that are found in mountains, rivers, oceans, valleys, deserts, and in their local area. • Name some of the plants and animals that live in their local area.
b. Students know changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.	· A House of Seasons (p. 155) · The Thunderstorm (p. 196)	Forest in a Jar, Surprise Terrarium, What Bear Goes Where?		
c. Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.	· Idea Pools (p.7)	Ethi-Thinking, Make a Coat, Playing Lightly On The Earth Aquatic WILD: Aqua Words, Water We Eating?	We All need Trees (15); A Few of My Favorite Things (15); Pass the Plants, Please (16); Environmental Exchange Box (20); Adopt a Tree (21); Three Cheers for Trees (30); Plant a Tree (31)A Forest of Many Uses (32); Energy Sleuths (39-a); Make Your Own Paper (51)	• Identify resources (goods and ecosystem services) that people use in everyday life (e.g., food, air, water, clothing). • Describe the origins of everyday resources (e.g., food comes from plants and animals, air comes from the atmosphere, water from lakes and rivers). • Recognize that all of the everyday resources they use come from natural systems. • Provide examples of how these resources are gathered, harvested or extracted from natural systems. • List ways these resources can be conserved.

Investigation and Experimentation (Kindergarten)

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

a. Observe common objects by using the five senses.	· Stream Sense (p. 191)	Classroom Carrying Capacity;Learning to look, Looking to See;Seeing is Believing; The Thicket Game; Too Close for Comfort;Wildlife is Everywhere	Peppermint Beetle (3); Sounds Around (4); Picture This (6); Adopt a Tree (21) ; Trees as Habitats (22); The Closer You Look (61);	The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
b. Describe the properties of common objects.		Color Crazy; Learning to Look; Looking to See; Surprise Terrarium; Wildlife is Everywhere! Aquatic WILD: Aqua Words	Shapes of Things (1); Get in Touch with Trees (2); Picture This (6); Adopt a Tree (21);The Closer You Look (61)	
c. Describe the relative position of objects by using one reference (e.g., above or below).	· Stream Sense (p. 191)	Classroom Carrying Capacity, Everyone needs a Home, Learning to Look, Looking to See, Too Close for Comfort, Wildlife is Everywhere, What's Wild (extension)		
d. Compare and sort common objects by one physical attribute (e.g., color, shape, texture, size, weight).	· Idea Pools (p. 7) · A House of Seasons (p. 155) · Water Address (p. 122)	Color Crazy, Everyone Needs a Home, Make A Coat!, Surprise Terrarium, What Bear Goes Where?, What's Wild Aquatic WILD: Are You Me?	The Shape of Things (#1)Picture This (#6); Birds and Worms (#25); How Plants Grow (#41); Have Seeds, Will Travel (#43); How Big is Your Tree #67); Signs of Fall (#78)	

e. Communicate observations orally and through drawings.	· Stream Sense (p. 191)	Color Crazy, Ethi Thinking, Everybody Needs a Home, First Impressions, Forest in a Jar,Make a Coat!, Playing lightly on the Earth,Surprise Terrarium, Wildlife is Everywhere,What Bear Goes Where?,What's Wild Aquatic WILD: Aqua Words, Fashion a Fish, Plaxtic Jelly fish, Water Plant Art	Shapes of Things (1); Get in Touch with Trees (2); Sounds Around (4); Adopt a Tree (21); School Yard Safari (46); The Closer You Look (61)	

First Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Physical Sciences (1st Grade)				
1. Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:				
a. Students know solids, liquids, and gases have different properties.	· Molecules in Motion (p. 47) · Water Match (p. 50) · Incredible Journey (p. 161)			
b. Students know the properties of substances can change when the substances are mixed, cooled, or heated.	· Cold Cash in the Icebox (p. 373)		Energy&Society - Energy Dectectives (1)	
Life Sciences (1st Grade)				
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.	· Water Address (p. 122)	Color Crazy; Everybody Needs a Home; Surprise Terrarium; The Thicket Game; Wildlife Is Everywhere; What's That Habitat?; What's WILD; Learning to Look Aquatic WILD: Are You Me?; Fashion a Fish; Wetlands Metaphors;Water Plant Art	Picture This! (6);The Forest of ST Shrew (8); Every Tree for Itself (27); A Forest for Many Uses (32); How Plants Grow (41); Have Seeds, Will Travel (43); Forest, Field and Stream (48); To Be a Tree (62); Tree Factory (63); Soil Stories (79-a); Living with Fire (81-c)	• Recognize that natural systems (environments) provide the resources (goods and ecosystem services) for survival for plants and animals. • Provide examples of the external features of plants and animals that help them live in a particular environment and obtain the resources they need to survive there. • Describe human activities that can influence the functioning of natural systems and the availability of resources for plants and animals. • Explain that if there are significant changes to natural systems (environments) plants and animals may not be able to survive in those areas.

b. Students know both plants and animals need water, animals need food, and plants need light.	· Aqua Notes (p. 66) · A Drop In The Bucket (p. 238) · Choices and Preferences, Water Index, (p. 367) · Aqua Bodies (p. 63) · The Life Box (p. 76)	Everybody Needs a Home, Forest in a Jar, Habitracks, Oh, Deer!, What's For Dinner?	The Forest of ST Shrew (8); Trees as Habitats (22); Nature's Recyclers (24); Every Tree for Itself (27), How Plants Grow (41); SchoolYard Safari (46);To Be a Tree (62); Tree Factory (63)	• Recognize that to survive, plants and animals (including humans) need resources including water, food, air, and light. • List the resources that plants need to survive. • List the resources animals (including humans) need to survive. • Explain that the resources that plants and animals (including humans) need to survive are produced by natural systems. • Provide examples of things that humans do that can influence the availability of resources needed by plants and animals (including humans).

c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.	· Irrigation Interpretation (p. 254)	Ants on a Twig; The Beautiful Basics; Everybody Needs a Home; Habitat Lap Sit; Habitracks; My Kingdom For A Shelter; Wildlife is Everywhere; What's That Habitat- Aquatic WILD: Wetlands Metaphors	Picture This! (6); Habitat Pen Pals (7); The Forest of ST Shrew (8); Pass the Plants Please (16); Trees as Recyclers (24); Every Tree for Itself (27); A Forest of Many Yuses (32-a); School Yard Safari (46); Are Vacant Lots Vacant (47); Bursting Buds (65); Tree Lifecycle (79)	• Identify the different type of food that animals eat and categorize the sources of those foods as plants or animals. • Recognize that natural systems produce all the food that animals eat. • List examples of the materials that animals use to make shelter and nests and categorize the sources of those materials as plants or animals. • Recognize that natural systems produce all the materials animals use to make shelter and nests. • Provide examples of things that humans do that can influence the availability of materials animals (including humans) use for food, shelter, and nesting. • Explain that humans also rely on natural systems for their supplies of materials for food and shelter.
e. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.	· Irrigation Interpretation (p. 254)		Every Tree for Itself (27); Plant a Tree (31); Pollution Search (36); How Plants Grow (41); Sunlight and Shades of Green (42); Are Vacant Lots Vacant (47); To Be a Tree (62); Tree Factory (63); Soil Stories (70-a); Trees in Trouble (77)	• Recognize that plants make their own food using sunlight, air, soil nutrients and water. • Identify that natural systems provide the water, air and soil nutrients, and the Sun provides the light necessary for plants to survive. • Recognize that the survival of plants depends on the supply of clean water and nutrients in the soil. • Provide examples of human activities that can affect the supply of clean water, soil nutrients, and plants' roots.
Earth Sciences (1st Grade)				
3. Weather can be observed, measured, and described. As a basis for understanding this concept:				
a. Students know how to use simple tools (e. g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.	· The Thunderstorm (p.196)			
b. Students know that the weather changes from day to day but that trends in temperature of rain (or snow) tend to be predictable during a season.	· The Thunderstorm (p. 196) · The House of Seasons (p. 155)		Signs of Fall(78)	• Describe how weather changes that occur day to day and seasonally affect natural systems.
c. Students know the sun warms the land, air, and water.	· Incredible Journey (p. 161)			• Recognize that the Sun's warming of the land, air, and water is necessary for the survival of humans and all other living things.

Investigation and Experimentation (1st Grade)

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
a. Draw pictures that portray some features of the thing being described.	· A House of Seasons (p. 155) · Stream Sense (p. 191) · The Thunderstorm (p. 196) · Water Address (p.219) · Choices and Preferences, Water Index (p.367)	Color Crazy; Everybody Needs a Home; What Bear Goes Where? Aquatic WILD: Fashion a Fish	Shapes of Things (1-b); The Forest of ST Shrew (8); Adopt a Tree (21-enrichment);Three Cheers for Trees (30); Pollution Search (36-variation); School Yard Safari (46); Are Vacant Lots Vacant (47-variation); The Closer You Look (61); Bursting Buds (65); Trees in Trouble (77-a); May the Source Be With You (Energy and Society)	
b. Record observations and data with pictures, numbers, or written statements.	· Water Log (p. 19) · Stream Sense (p. 191) · The Thunderstorm (p. 196)	Color Crazy; Everybody Needs a Home; Make a Coat!; What Bear Goes Where?; What's Wild Aquatic WILD: Aqua Words; Aquatic Times, Fashion a Fish; Plastic Jellyfish; Water Plant Art	Shapes of Things (1);Adopt a Tree (21-a); Nature's Recyclers (24); Pollution Seach (36-variation); Reduce, Reuse, Recycle (37); School Yard Safari (46); The Closer You Look (61); Bursting Buds (65); How Big is Your Tree (67-variation); Trees in Trouble (77-a); Signs of Fall (78-a); Energy Detectives (Energy and Society)	
c. Record observations on a bar graph.	· The Thunderstorm (p. 196)	Graphananimal	Pass the Plants Please (16); Birds and Worms (25)	
d. Describe the relative position of objects by using two references (e.g., above and next to, below and left of).			Are Vacant Lots Vacant (47-variation)	
e. Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.		First Impressions; Saturday Morning Wildlife Watch; What Bear Goes Where; Wildlife is Everywhere; What's Wild		

2nd Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Life Sciences (2nd Grade)				
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.		Aquatic WILD: Are You Me?	Have Seeds, Will Travel (43)	• Recognize that reproduction is essential to the survival of a species. • Identify reproduction as a process that maintains plant and animal populations in natural systems. • Describe the reproduction of plants and animals as a process that provides humans with food and other goods and ecosystem services. • Explain why plant and animal reproduction is important in providing resources necessary for human survival.
b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.		Aquatic WILD: Are You Me?		• Identify reproductive cycles for different animals such as butterflies, frogs, and mice. • Explain that, in order to reproduce, different animals such as butterflies, frogs, and mice have different needs met by the natural systems where they live (e.g., monarch butterflies need milkweed).
c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.		Color Crazy, Grasshopper Gravity, What Bear Goes Where? Aquatic WILD: Are You Me?, Fashion a Fish	Sounds Around (4-b); Birds and Worms (25)	• Identify some of the characteristics that organisms inherit from their parents. • Recognize that some of these characteristics are essential to the survival of the organisms. • Provide examples of inherited characteristics that are caused or influenced by the environment.
d. Students know there is variation among individuals of one kind within a population.		Grasshopper Gravity	How Plants Grow (41)	• Recognize that there is variation among individuals within a population. • Provide examples of variations among individuals within a population that are caused or influenced by the environment.

e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.	· The Life Box (p. 76) · House of Seasons (p. 155) · Irrigation Interpretation (p. 254) · Water Address (p. 122)	Forest in a Jar	Every Tree for Itself (27);Plant a Tree (31); How Plants Grow (41); Sunlight and Shades of Tree (42); Tree Cookies (76); Signs of Fall (78); Life Cycle of a Tree (79)	• Recognize that changes to conditions in the environment (e.g., light, water, environmental stress) may affect the germination, growth and development of plants. • Explain how the environment may affect a plant's ability to reproduce. • Predict what happens to a plant when a specific change in the environment occurs (e.g., there is suddenly no water).
f. Students know flowers and fruits are associated with reproduction in plants.			Have Seeds, Will Travel (43); Tree Factory (63-variation); Tree Cookies (76); Trees in Trouble (77)	• Identify flowers and fruits as part of the reproductive process in some plants. • Explain that, in order to reproduce, plants have different needs (e.g., soil, nutrients, water) met by the natural systems in which they live. • Identify plant reproduction as an important function for humans because it provides food sources, building materials and other resource materials for use by humans and other animals. • Provide examples of environmental stresses to plants that can result from human activities.

Earth Sciences (2nd Grade)				
3. Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:				
c. Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.	· Rainy Day Hike (p: 186) · Just Passing Through (p: 166) · Capture, Store & Release (p: 133)		Story of ST Shrew (8); Soil Stories (70-a); Fallen Log (23); Nature's Recyclers (24)	• Describe the importance of soil to plants and natural systems. • Identify different soils by their color, texture, and capacity to retain water. • Identify the role of decomposition in returning organic materials to soil. • Explain the role of soil in providing the water, minerals and organic materials that are necessary for plant growth. • Recognize that a plant's roots help it take up water and other chemicals from the soil, some of which can affect the germination, growth and development of the plants in beneficial, neutral, or harmful ways.
e. Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.	· Life Box (p. 76) · Aqua Bodies (p. 63) · Aqua Notes (p.66) · A Drop in the Bucket (p: 238) · The Long Haul (p. 260)		Picture This! (6); We All Need Trees (13); A few of My Favorite Things (15); Pass the Plants Please (16); The Fallen Log (23); Nature's Recyclers (24); Tree for Itself (27); Air Plants (28); Three Cheers for Trees (28); How Plants Grow (41); A Forest of Many Uses (52)	• Recognize rocks, water, plants and soil as components of natural system. • Identify that humans use and depend upon the components of natural system for goods and ecosystem services (e.g., food, fuel, building materials). • Identify the origins of everyday resources as coming from natural systems (e.g., food, air, water). • Explain that the quantity, quality and reliability of goods produced by natural systems are influenced by the health and functioning of those systems (e.g., healthy forests produce more trees). • Provide examples of human activities that can influence the health of a natural system.

Investigation and Experimentation (2nd Grade)

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

a. Make predictions based on observed patterns and not random guessing.	· Irrigation Interpretation (p.254) · A House of Seasons (p. 155) · The Thunderstorm (p. 196)	Aquatic WILD: Puddle Wonder;What's in the Air?	Peppermint Beetle (3); How Plants Grow (41-variation); Are Vacant Lots Vacant? (47-variation); Forest, Field and Stream (48-variation)Sounds Around (4); Picture This (6); Adopt a Tree (21) ; Trees as Habitats (22); The Closer You Look (61);
b. Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standard metric system units.	· The Thunderstorm (p. 196)		Talking Trash, Not! (37); How Plants Grow (41); How Big is Your Tree (67)
c. Compare and sort common objects according to two or more physical attributes (e.g., color, shape, texture, size, weight).	· Water Address (p. 122)	Color Crazy; What Bear Goes Where; What's Wild Aquatic WILD: Fashion a Fish; Water Plant Art	Picture This! (6); We All Need Trees (12-b); Birds and Worms (25); Have Seeds, Will Travel (43); Name that Tree (68);
d. Write or draw descriptions of a sequence of steps, events, and observations.	· A House of Seasons (p: 15) · Water Log (p. 19)	Grasshopper Gravity Aquatic WILD: Aqua Words, Aquatic Times, Fashion a Fish, Plastic Jellyfish, Puddle Wonders!, Somethings Fishy Here!	Are Vacant Lots Vacant (47); Trees in Trouble (77)
e. Construct bar graphs to record data, using appropriately labeled axes.	· The Thunderstorm (p. 196)	Graphananimal	Pass the Plants Please (16); Birds and Worms (25);
f. Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.		Grasshopper Gravity	Are Vacant Lots Vacant (47-variation)

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

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

g. Follow oral instructions for a scientific investigation.	· Irrigation Interpretation	Graphananimal; Grasshopper Gravity; What's Wild Aquatic WILD: Aqua Words, Aquatic Times,Fashion a Fish,Plastic Jellyfish, Puddle Wonders, Something Fishy Here!, What's in the Air	Nature's Recyclers (24)	

3rd Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Physical Sciences (3rd Grade)				
1. Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept:				
a. Students know energy comes from the Sun to Earth in the form of light.	· Imagine (p. 157) · Incredible Journey (p. 161) · Piece It Together (p. 174) · Life Box (p. 76)	What's For Dinner	Every Tree for Itself (27); Air Plants (28); Sunlight and Shades of Green (42); What Powers the Move (Energy and Society-4)	• Recognize that the Sun is the primary source of energy for Earth. • Provide examples of the role of the Sun's energy in natural systems and human communities (e.g., growth of plants, lighting and warming of Earth).
b. Students know sources of stored energy take many forms, such as food, fuel, and batteries.	· Energetic Water (p. 242) · Water In Motion (p. 450) · Molecules in Motion (p.47)	What's For Dinner? Aquatic WILD: Marsh Munchers	Energy Sleuths (39); Energy Detectives, What Powers the Move (from Energy and Society); May the Source Be With You (Energy and Society)	• Provide examples of energy storage in natural systems and human communities (e.g., plants, food, fuel, batteries). • Recognize that the energy in our food ultimately comes from the Sun. • Explain that energy in fuels such as wood, coal, oil, and natural gas originated from the Sun.
c. Students know machines and living things convert stored energy to motion and heat.	· Energetic Water (p. 242) · Water In Motion (p. 450) · Molecules in Motion (p.47)	Aquatic WILD: Marsh Munchers	Energy Detectives; May the Source be With you; What powers the Move (from Energy and Society)	• Identify that natural systems and human communities operate by converting stored energy to motion and heat.
d. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.	· Energetic Water (p. 242) · Water in Motion (p. 450)			• Recognize that energy can be carried from one place to another by moving objects including those that come from natural systems such as food, wood, coal, oil, and natural gas.
e. Students know matter has three forms: solid, liquid, and gas.	· Molecules in Motion (p.47) · Incredible Journey (p. 161) · Poetic Precipitation (p. 182) · Water Match (p. 50) · Water Models (p. 201) * · Cold Cash in the Icebox · Imagine (p. 157)			

f. Students know evaporation and melting are changes that occur when the objects are heated.	· Molecules in Motion (p. 47) · Incredible Journey · Cold Cash in the Icebox · Imagine (p. 157) · Poetic Precipitation (p. 182) · Water Match (p. 50)			

2. Light has a source and travels in a direction. As a basis for understanding this concept:				
c. Students know the color of light striking an object affects the way the object is seen.		The Ticket Game Aquatic WILD: Fashion a Fish; Micro Odyssey		
Life Sciences (3rd Grade)				
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.	· Life in the Fast Lane (p. 79) · No Bellyachers (p. 85) · Salt Marsh Players (p.99) · Water Address (p. 122) · Irrigation Interpretation (p. 254)	Color Crazy, Forest In a Jar, Grasshopper Gravity, Owl Pellets, Seeing is Believing, Surprise Terrarium, What Bear Goes Where? Aquatic WILD: Fashion a Fish, Hooks and Ladders, Sockeye Scents	Sounds Around (4-b); Can It Be Real? (11); Birds and Worms (25); Every Tree for Itself (27); How Plants Grow (41); Sunlight and Shades of Green (42); Have Seeds, Will Travel (43); Are Vacant Lots Vacant (47); To Be A Tree (62); Tree Factory (63)	• Identify that plants and animals have different structures that allow them to grow, survive, and reproduce by using/consuming the goods and ecosystem services provided by natural systems. • Recognize that growth, survival, and reproduction are necessary for the survival of plants and animals, as well as the survival of humans and human communities. • Provide examples of how the functioning of structures plants and animals (including humans) have for growth, survival, and reproduction depends on the health of those plants and animals and the health of natural systems. • Explain that the growth, survival, and reproduction of plants and animals processes can be influenced by human activities.
b. Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.	· Life in the Fast Lane (p. 79) · Salt Marsh Players (p.99) · Water Address (p. 122)	Color Crazy, Environmental Barometer, Forest in a Jar, Graphananimal, Grasshoper Gravity, Habitat Rummy, Surprise Terrarium, Wildlife us Everywhere, What Bear Goes Where?, What's Wild Aquatic WILD: Wetlands Metaphors, Marsh Munchers, Sockeye Scents	Habitat Pen Pals (7); Charting Diverstiy (10); Can it Be Real? (11); Tropical Treehouse (49-a);	• Identify the characteristics of various natural systems (e.g., ocean, desert, tundra, forest, grassland and wetland environments). • Give examples of diverse life forms in ocean, desert, tundra, forest, grassland and wetland environments. • Explain that different kinds of organisms are adapted for living in different environments.

c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.	· Capture, Store & Release (p.133) · Just Passing Through (p.166) · Old Water (p. 171) · Irrigation Interpretation (p. 254) · The Long Haul (p. 260) ** · Humpty Dumpty (p. 316) · Macroinvertebrate Mayhem (p. 322)	Everybody Needs a Home, Environmental Barometer, Ethi-Thinking, Forest in a Jar, Habitracks, Oh, Deer!, Playing Lightly on the Earth Aquatic WILD: Hooks and Ladders, Marsh Munchers, Plastic Jellyfish, Silt: A Dirty Word, Something's Fishy Here!, What in the Air?, What's in the Water?	Forest of ST Shrew (8); Adopt a Tree (21);Trees as Habitats (22); 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); Pollution Search (36); How Plants Grow (41); SchoolYard Safari (46);Trees in Trouble (77); Tree Lifecycle (79); Nothing Succeeds Like Succession (80-b, c)	
d. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.	· Salt Marsh Players (p.99) · Just Passing Through (p. 166) · Water Address (p.122) · Capture, Store & Release (p. 133) · Old Water (p. 171) · Sum of the Parts (p.267) · Humpty Dumpty (pg. 316) · Macroinvertebrate Mayhem(p. 322)	Environmental Barometer, Forest in a Jar, How Many Bears Can Live in this Forest?, Too Close for Comfort Aquatic WILD: Puddle Wonders, Silt: A Dirty Word, Sockeye Scents, Something's Fishy Here, What's in the Air?, What's in the Water?	Every Tree for Itself (27); A Forest of Many Uses (32); Pollution Search (36); How Plants Grow (41); Are Vacant Lots Vacant (47); Tree Cookies (76); Trees in Trouble (77); Nothing Succeeds Like Succession (80-b)	• Recognize that when the environment changes, some plants and animals will die or move to new locations because the natural system can no longer meet their needs. • Explain that not all organisms respond to environmental changes in the same way. • Provide examples of animals or plants that have not survived as the result of a change to their environment. • Describe habitat restoration as a process that can sometimes be used to make it possible for plants and animals to survive and reproduce in areas where they once could not.
e. Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.	· Life in the Fast Lane (pg. 79) · Old Water (pg. 171)	Here Today Gone Tomorrow		• Define the term extinction. • Provide examples of organisms that have become extinct over Earth's geologic time. • Provide examples of organisms that have become extinct in recent times. • Recognize that organisms that are extinct are gone from the Earth forever. • Describe extinction as a natural process that can also be caused or accelerated by human activities.

Investigation and Experimentation (3rd Grade)

5. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
a. Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.	· Irrigation Interpretation (pg. 254)	Environmental Barometer, Forest in a Jar, Graphananimal	How Plants Grow (41-variation)	
b. Differentiate evidence from opinion and know that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.		Environmental Barometer, Graphananimal Aquatic WILD: Aquatic Times, Something's Fishy Here		
c. Use numerical data in describing and comparing objects, events, and measurements.	· Life in the Fast Lane (p.30) · Capture, Store & Release (p. 133) · Water Models (p. 201) · Cold Cash in the Icebox (p. 373) · Irrigation Interpretation (p. 254	Graphananimal, How many Bears Can Live in This Forest?, Make a Coat!, Polar Bears in Phoenix Aquatic WILD: Puddle Wonders, Whale of a Tail	Pass the Plants Please (16-variation); Birds and Worms (25); How Plants Grow (41)	
d. Predict the outcome of a simple investigation and compare the result with the prediction.d. Predict the outcome of a simple investigation and compare the result with the prediction.	· Capture, Store & Release (p. 133) · Cold Cash in the Icebox (p. 373) · Irrigation Interpretation (p. 254)	This is included in the Extensions for many WILD activities	Birds and Worms (25); How Plants Grow (41);	
e. Collect data in an investigation and analyze those data to develop a logical conclusion.	· Irrigation Interpretation (p.254) · Life in the Fast Lane (p. 79) · Capture, Store & Release (p. 133) · Cold Cash in the Icebox (p. 373)	Ants on a Twig, Ethi-Thinking, First Impressions, Grasshopper Gravity, Owl Pellets, Polar Bears in Phoenix, Wildwork, What's For Dinner? Aquatic WILD: Puddle Wonders, Silt: A Dirty Word, Sockeye Scents, Something's Fishy Here, What's in the Air?	Pass the Plants Please (16-b); Trees as Habitats (22-b, variation); Nature's Recyclers (24);Birds and Worms (25); How Plants Grow (41); Forest, Field and Stream (48); Energy Dectectives (Energy and Society)	

4th Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Life Sciences (4th Grade)				
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.	· Life In The Fast Lane, (p: 79) · Salt Marsh Players, (p: 99)	Career Critters, Hazardous Links: Possible Solutions, Lobster in Your Lunchbox, Move Over Rover, Owl Pellets, Time Lapse, What Did Your Lunch Cost Wildlife?, What's for Dinner Aquatic WILD: Marsh Munchers, Wetland Metaphors	Pass the Plants Please (16); Air Plants (28), Sunlight and Shades of Green (42); Web of Life (45); May the Source Be With You (Energy and Society)	• Recognize that living things have needs that must be met for survival (including energy). • Recognize that plants are the primary source of energy for living things in an ecosystem. • Explain how living things meet their needs and survive by using resources (e.g., matter and energy) from their environment. • Identify that humans are living things and therefore have needs essential to their survival. • Identify that the needs of humans are met by using resources (goods and ecosystem services) from natural systems (e.g., matter and energy). • Recognize that everything humans need was originally derived from a natural system including the matter and energy that plants produce.

b. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.	· Life In The Fast Lane, (p: 79) · Salt Marsh Players, (p: 99) · Macroinvertebrate Mayhem, (p: 322)	Career Critters, Environmental Barometer, Good Buddies, Graphananimal, Hazardous Links, Move Over Rover, Muskox Maneuvers, Planting Animals, Quick Frozen Critters, Time Lapse, Urban Nature Search, What's For Dinner? Aquatic WILD: Blue Ribbon Niche, Marsh Munchers, Micro Odyssey	Air Plants (28); Can It Be Real (11); Adopt a Tree (21-b, enrichment); Trees as Habitats (22); Birds and Worms (25); Web of Life (45); School Yard Safari (46); Are Vacant Lots Vacant (47); Forest for the Trees (69); Tree Lifecycle (79)	• Recognize that plants and animals, including humans, can be classified by the sources of energy and matter (food) they consume. • Classify organisms from a terrestrial, freshwater, coastal or marine ecosystem as producers and consumers and explain their roles in that system. • Define ecosystems as interacting assemblages of organisms, non-living components that support those organisms and the interactions among them. • Recognize that some resources within an ecosystem, including those upon which humans depend, are readily available and others are limited in supply. • Describe how organisms compete for limited resources. • Explain potential consequences when a component of an ecosystem is changed or eliminated (e.g., when components of a food chain or food web are affected by competition for resources or other changes, whether natural or human-caused). • Describe factors that can adversely affect the health of an ecosystem (e.g., loss of organisms, disruption of food webs).
c. Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.	· Salt Marsh Players, (p: 99) · Macroinvertebrate Mayhem, (p: 322) · People of the Bog, (p: 89)*	Ants on a Twig, Eco-Enrichers Aquatic WILD: Marsh Munchers, Micro Odyssey, Water Canaries	The Story of ST Shrew (8); The Fallen Log (23); Nature's Recyclers (24);Tree Lifecycle (79); Nothing Succeeds Like Succession (80-b,c)	• Give examples of organisms that are decomposers. • Explain the role of decomposers in an ecosystem. • Recognize that the cycles and processes involving recycling of matter and transfer of energy among organisms are essential to the functioning of natural systems (ecosystem). • Provide examples of human practices that directly depend on the cycles and processes involving decomposers in terrestrial, freshwater, coastal and marine ecosystems (e.g., their role in food production and waste management). • Describe the dependence of human practices on the cycles and processes that occur in terrestrial, freshwater, coastal and marine ecosystems (e.g., the role of decomposers in: food production through soil formation and fertility; waste management through the decay of waste products).

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:				
a. Students know ecosystems can be characterized by their living and nonliving components.	· Life In The Fast Lane, (p: 79) · Salt Marsh Players, (p: 99) · Water Address, (p: 122) · Imagine!, (p:157) · The Incredible Journey, (p: 161) · Just Passing Through, (p: 166) · Piece It Together, (p: 174) · Stream Sense, (p: 191) · Water Models, (p: 201) · Sum of the Parts, (p: 267) · Humpty Dumpty, (p: 316) · Macroinvertebrate Mayhem, (p: 322) · Capture, Store and Release, (p: 133) · Branching Out!, (p: 129)* · People of the Bog, (p: 89)*	Career Critters, Habitat Lap Sit, Habitat Rummy, How Many Bears Can Live in This Forest?, Move Over Rover, The Beautiful Basics, Time Lapse Aquatic WILD: Designing a Habitat, Sockeye Scents	Habitat Pen Pals (7); The Forest of ST Shrew (8); Planet Diversity (9); Charting Diversity (10); Can It Be Real? (11); Environmental Exchange Box (20); Birds and Worms (25); Plant a Tree (27); School Yard Safari(2=46); Are Vacant Lots Vacant (47); Forest, Field and Stream (48); Tropical Tree HOuse (49); Trees in /Trouble (77); Nothing Succeeds Like Succession (80)	• Categorize the components of natural systems as living and non-living. • Describe the living and nonliving components from terrestrial, freshwater, coastal or marine ecosystems that have similar roles. • Recognize that the living and nonliving components of an ecosystem and the interactions among them produce the resources that are required for the survival of the living components of the ecosystem. • Identify that the needs of humans are met by using resources (goods and ecosystem services) from natural systems.
b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.	· Life In The Fast Lane, (p: 79) · Salt Marsh Players, (p: 99) · Water Address, (p: 122) · The Incredible Journey, (p: 161) · Just Passing Through, (p: 166) · Piece It Together, (p: 174) · Stream Sense, (p: 191) · Water Models, (p: 201) · Sum of the Parts, (p: 267) · Humpty Dumpty, (p: 316) · Macroinvertebrate Mayhem, (p: 322) · Capture, Store and Release, (p: 133) · Branching Out!, (129)* · People of the Bog*	Adaptation Artistry, Career Critters, Carrying Capacity, Environmental Barometer, Graphananimal, How Many Bear Can Live in This Forest?, Move Over Rover, Muskox Maneuvers, Oh Deer, Seed Need, Time Lapse, We're in This Together, Who Fits Here?, AquaticWILD: Designing a Habitat, Fashion a Fish, Fishy Who's Who, Migration Headache, Sockeye Scents	Habitat Pen Pals (7); The Forest of ST Shrew (8); Planet Diversity (9); Charting Diversity (10); Can It Be Real? (11); Environmental Exchange Box (20); Birds and Worms (25); Plant a Tree (27); School Yard Safari(2=46); Are Vacant Lots Vacant (47); Forest, Field and Stream (48); Tropical Tree House (49); Trees in Trouble (77); Nothing Succeeds Like Succession (80); Life on the Edge (88)	• Recognize that living things meet their needs by using resources (goods and ecosystem services) from the environment around them. • Recognize that some resources within an ecosystem are finite in supply; others are less limited. • Explain how the health of an ecosystem affects the ability of plants and animals to survive in any particular environment. • Provide examples of how the health of an ecosystem influences the quality, quantity, and reliability of the goods and ecosystem services it produces. • Recognize that changes to the environment caused by humans and other animals influence the survival of some kinds of plants and animals. • Identify that some changes to the environment caused by humans and other animals affect the cycles and processes that occur naturally in ecosystems and in turn affect the survival of some kinds of plants and animals. • Provide examples of how human practices have altered the cycles and process that occur naturally in terrestrial, freshwater, coastal and marine ecosystems.

c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.	· Life In The Fast Lane, (p: 79) · Salt Marsh Players, (p: 99) · Great Water Journeys, (p: 246)*	Career Critters, Good Buddies, How Many Bears Can Live in This Forest?, Hazardous Links, Move Over Rover, Seed Need, The Beautiful Basics, Time Lapse, What's in the Air, What's For Dinner? Aquatic WILD: Wetlands Metphors	Charting Diversity (10); Can It Be Real (11); Adopt a Tree (21-b, enrichment); Trees as Habitats (22); Nature's Recyclers (24); /Air Plants (28); Have Seeds, Will Travel (43); Web of Life (45); Field, Forest and Stream (48); Tropical Treehouse (49-a)	• Identify key ecological roles organisms play in natural systems (ecosystems). • Identify processes (e.g., pollination, and seed dispersal) occurring in natural systems that are required for their functioning. • Provide examples and describe cycles and processes that occur in natural systems. • Explain the role of cycles and processes in the interactions and interdependence among the components of an ecosystem, (e.g., plants relying on animals for pollination and seed dispersal, animals depending on plants for food and shelter).
d. Students know that most microorganisms do not cause disease and that many are beneficial.	· No Bellyachers, (p: 85) · People of the Bog, (p:89)*	Aquatic WILD: Micro Odyssey, Sockeye scents, Water Canaries	The Fallen Log (23); Nature's Recyclers (24)	• Give examples of microorganisms. • Describe the roles of microorganisms in natural systems including the human body. • Recognize that microorganisms are involved in many natural system processes that are used by humans and human communities and that such processes are considered "ecosystem services" (e.g., processes involving microorganisms such as fermentation, decomposition, etc.). • Describe the role of ecosystem services involving microorganisms in human communities and societies (e.g., food production, waste treatment, production of pharmaceuticals). • Recognize that some microorganisms can cause changes to living things that may be harmful.

Earth Sciences (4th Grade)				
5. Waves, wind, water, and ice shape and reshape Earth's land surface.				
a.Students know some changes in the earth are due to slow processes, such as erosion, andsome changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.	· Just Passing Through, (p: 166) · Old Water, (p: 171) · Sum of the Parts, (p: 267) · Branching Out!, (p: 129)*	Forest in a Jar Aquatic WILD: Pond Succession, Silt a Dirty Word		• Provide examples of how geologic processes (erosion, landslides, volcanic eruptions, and earthquakes) affect humans, human communities and natural systems. • Describe how human activities can magnify the impacts of some geologic processes, such as increasing the rate of erosion or landslide occurrence.
c. Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).	· Just Passing Through, (p: 166) · Old Water, (p: 171) · Sum of the Parts, (p: 267) · Branching Out!, (p: 129)* · Rainy-Day Hike, (p: 186)	Career Critters Aquatic WILD: Pond Succession, Silt a Dirty Word, Where Does the Water Run After School?	Water Wonders (44-b)	• Provide examples of how moving water erodes landforms and the reshaping of the land affect humans, human communities and natural systems. • Describe how human activities can affect the flow of water and therefore affect the natural erosion of landforms, and the weathering, transport, and deposition of pebbles, sand, silt, and mud.
Investigation and Experimentation (4th Grade)				
6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
a. Differentiate observation from inference (interpretation), and know that scientifists' explanations come partly from what they observe and partly from how they interprest their observations.	· Water Address, (p: 122) · Stream Sense, (p: 191) · Just Passing Through, (p: 166) · Rainy Day Hike, (p: 186) · Salt Marsh Players, (p: 99) · People of the Bog, (p: 89)* · Wetland Soils In Living Color, (p: 212) · The Great Stoney Book, (p: 150)*	Ants on a Twig, Environmental Barmeter, Grasshopper Gravity, Microtrek Treasure Hunt, Urban Nature Search, Wild Words Aquatic WILD: Edge of Home, How Wet is Our Planet?, Mermaids and Manatees, Micro Odyssey, Migration Headache, Puddle Wonders, Something's Fishy Here, Watershed, Water Caneries, What's in the Air?, What's in the Water?, Where Does the Water Run After School?	Plant of Plenty (9), Nature's Recyclers (24), Pollution Search (36), How Plants Grow (41), Are Vacant Lots Vacant? (47), Field, Forest and Stream (48), Tipi Talk (75), Tree Cookies (76), Nothing Suceeds Like Succession (80-Parts B, C)	

b. Measure and estimate weight, length, or volume of objects.	· Drop in the Bucket, (p: 238) · Water Meter, (p: 271)	Bearly Growing, Grasshopper Gravity, Lobster in Your Lunchbox, Make a Coat, Planning for People and Wildlife, Polar Bears in Phoenix Aquatic WILD: Designing a Habitat, How Wet is Our Planet?, Pond Succession, Puddle Wonders, Watershed, Whale of a Tail, Where Does the Water Run?	Reduce, Reuse, Recycle (37-Part A), How Plants Grow (41), How Big is Your Tree (67).
c. Formulate predictions and justify predictions based on cause and effect relationships.	· Rainy Day Hike, (p: 186) · Energetic Water, (p: 242)	Beautiful Basics, Environmental Barometer, Habitat Lap Sit, Microtrek Treasure Hunt, Planting Animals, Who Lives Here?, Wild Words Aquatic WILD: Hooks and Ladders, Net Gain, Net Effect, Puddle Wonders, Silt: A Dirty Word, Sockeye Scents, The Edge of Home, Water Canaries, Water Down History, What's in the Water?	Planet of Plenty (9), Every Drop Counts (38-Part A), How Plants Grow (41), Sunlight and Shades of Green (42), Water Wonders (44 Part B), Are Vacant Lots Vacant (47), Trees in Touble (77-Part B)
d. Conduct multiImple trials to test a prediction and draw conclusions about the relationships between results and predictions.	· Rainy-Day Hike, (p. 186) · Water Models, (p: 201) · Just Passing Through, (p: 166)	Environmental Barometer, Habitat Lap Sit, Migration Barriers Aquatic WILD: Hooks and Ladders, Migration Headache, Puddle Wonders, Pond Succession, Silt: A Dirty Word, Sockeye Scents, Water Canaries, What's in the Air?	How Plants Grow (41), Have Seeds Will Travel (43-enrichment), Wonders (44), Trees in Trouble (77)

e. Construct and interpret graphs from measurements.	· Drop in the Bucket, (p: 238) · Every Drop Counts, (p: 307) · The Incredible Journey, (p: 161) · Water Meter, (p: 271)	Bearly Growing, Environmental Barometer, Graphananimal, Lobster In Your Lunchbox, Make a Coat, Polar Bears in Phoenix, What Did Your Lunch Cost Wildlife? Aquatic WILD: Net Gain, Net Effect, Silt: A Dirty Word, What's in the Water, Where have All the Salmon Gone?	Reduce, Reuse, Recycle (37-Part A), How Plants Grow (41), Water Wonders (44), Trees in Trouble (77-Part B),	
f. Follow a set of writtren instructions for a scienfic investigation.	· Water Models, (p: 201)	Microtrek Treasure Hunt Aquatic WILD: Silt: A Dirty Word, Sockeye Scents	How Plants Grow (41), Signs of Fall(78)-Part B and enrichment)	

5th Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Physical Sciences (5th Grade)				
1. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:				
a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.	· Molecules In Motion, (p: 47) · What's The Solution?, (p: 54)			
b. Students know all matter is made of atoms, which may combine to form molecules.	· Hangin Together, (p: 35) · What's the Solution?, (p: 54)			
f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.	· Hangin Together, (p: 35) · Is There Water on Zork?, (43)* · Water Models, (p:203) · What's the Solution?, (p: 54)			
g. Students know properties of solid, liquid, and gaseous substances, such as sugar ($C_6H_{12}O_6$), water (H_2O), helium (He), oxygen (O_2), nitrogen (N_2), and carbon dioxide (CO_2).	· H2Olympics, (p: 30) · Molecules In Motion, (p: 47) · What's the Solution?, (p: 54) · Let's Even Things Out, (p: 72) · Geyser Guts, (p: 144) · Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Poetic Precipitation, (p: 182) · Water Models, (p: 201) · A-maze-ing Water, (p: 219) · Water in motion, (p: 450) · Thirsty Plants, (p: 116)			
h. Students know living organisms and most materials are composed of just a few elements.	· Aqua Bodies, (p: 65)			
i. Students know the common properties of salts, such as sodium chloride (NaCl)	· Irrigation Interpretation, (p: 254)			

Life Sciences (5th Grade)				
2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:				•Describe how respiration, digestion, waste disposal, and transport of materials result in byproducts. • Recognize that movement of matter and energy through ecosystems generates byproducts. • Describe how matter and energy flow in ecosystems. • Describe and discuss the concept of boundary in natural systems. • Recognize that natural systems are not separated by impermeable or permanent boundaries. • Provide examples of how the byproducts of human activities (e.g., carbon dioxide [CO2]) enter natural systems (terrestrial, freshwater, coastal and marine ecosystems).
a. Students know many multicellular organisms have specialized structures to support the transport of materials.	· Water Address, (p: 122) · Let's Even Things Out, (p: 72) · Thirsty Plants, (p: 116)	Energy Pipeline, Move Over Rover, Owl Pellets, Seed Need Aquatic WILD: Kelp Help, Sockeye Scents	Air Plants (28); Sunlight and Shades of Green (42);	
e. Students know how sugar, water, and minerals are transported in a vascular plant.	· Thirsty Plants, (p: 116) · The Incredible Journey, (p: 161) · Water Address, (p: 122)		Tree Factory (63); Tree Cookies (76).	• Provide examples of the role of materials transport in vascular plants on the movement of the byproducts of human activities (e.g., contaminants) into natural systems (e.g., entering plant tissue, soil).
f. Students know plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen.	· Salt Marsh Players, (p: 99) · Life Box, (p: 76)	Time Lapse	Air Plants (28); Every Tree for Itself (27); Three Cheers for Trees (30); A Forest for Many Uses (32); Sunlight and Shades of Green (42); Web of Life (45)	• Explain the role of photosynthesis in the functioning of terrestrial, freshwater, coastal and marine ecosystems. • Explain why photosynthesis is essential to the survival of humans and human communities. • Provide examples of how humans and human communities can influence the process of photosynthesis and thus the flow of matter and energy within natural systems.
g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).	· Salt Marsh Players, (p: 99) · The Incredible Journey, (p: 161) · Thirsty Plants, (p: 116)	Energy Pipeline, Time Lapse	Air Plants (28); Three Cheers for Trees (30); Plant a Tree (31); A Forest for Many Uses (32); Sunlight and Shades of Green (42); Web of Life (45)	

Earth Sciences (5th Grade)

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.	Drop in the Bucket,(p: 238) · The Incredible Journey, (p: 161) · Imagine!, (p: 157)	Aquatic WILD: How Wet is Our Planet?		• Identify that humans are living things and clean fresh water is essential to their survival. • Recognize that because most of Earth's water is salt water located in the oceans, the vast majority of water is not available for human consumption. • Describe freshwater, coastal and marine ecosystems and compare the chemical characteristics of the water in these systems. • Provide examples of the goods that are produced by freshwater, coastal and marine ecosystems (e.g., clean fresh water, oxygen, food, energy resources). • Explain how humans and human communities can influence the quantity, distribution and chemical characteristics of the water in freshwater, coastal and marine ecosystems (e.g., global climate change, water management practices).
b. Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.	· Molecules in Motion, (p: 47) · Geyser Guts, (p: 144) · Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Poetic Precipitation, (p: 182) · Water Models, (p: 201) · Hanging Together, (p: 35)	Aquatic WILD: How Wet is Our Planet?, Water Wings, Where Does Water Run?	Water Wonders (44-a); Energy Chains (Energy and Society)	• Describe the roles of evaporation, liquefaction and freezing in the water cycle. • Describe the role of the water cycle, evaporation, liquefaction and freezing in the functioning of natural systems. • Provide examples of the roles these cycles and processes play in human life and human communities.
c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.	· Thirsty Plants, (p: 116) · Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Old Water, (p: 171) · Poetic Precipitation, (p: 182) · Water Models, (p: 201) · Hanging Together, (p: 35) · Piece It Together, (p: 174)	Rainfall and the Forest, Stormy Weather Aquatic WILD: How Wet, is our Planet, Puddle Wonders, Water Wings, Where Does Water Run?	Water Wonders (44)	• Identify the role of precipitation (rain, hail, sleet, or snow) in terrestrial, freshwater, coastal and marine ecosystems). • Provide examples of how humans and human communities directly and indirectly depend on precipitation (rain, hail, sleet, or snow) and the water cycle (e.g., agricultural systems, water delivery systems). • Provide examples of how human activities can influence the quantity, distribution and chemical characteristics of precipitation.

d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.	· Imagine!, (p: 157) · Old Water, (p: 171) · Piece It Together, (p: 174) · The Long Haul, (p: 260) · Water Meter, (p: 271) · Water Works, (p: 274) · Every Drop Counts, (p: 307) · Money Down The Drain, (p: 328) · Water Concentration, (p: 407)	Aquatic WILD: Alice in Waterland, How Wet is Our Planet?, Puddle Woners, Watershed, Water's Going on?	Rewable or Not (14); Every Drop Counts (38); OurChanging World (86)	• Identify sources of fresh water and describe the reservoirs of Earth's water. • Recognize that water moves from one reservoir to another over time. • Describe the ways in which humans, human communities and their practices use water. • Recognize that the supply of fresh water is limited at any given time and discuss how some resources within an ecosystem are finite in supply while others are less limited. • Describe the methods by which wastewater can be treated and cycled back into the environment. • Provide examples of how water use can be decreased by humans and human communities. • Explain potential consequences when the quantity, distribution or chemical characteristics of water are changed (e.g., contamination of an aquifer can compromise the use of the groundwater supply by humans and other organisms). • Describe how changes to the quantity, distribution and chemical characteristics of water in natural systems can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., acid precipitation affecting the growth of trees).

e. Students know the origin of the water used by their local communities.	· Irrigation Interpretation, (p: 254) · The Long Haul, (p: 260) · Water Meter, (p: 271) · Water Works, (p: 274) · Every Drop Counts, (p: 307) · Super Bowl Surge, (p: 353) · Water Concentration, (p: 407) · Get The Groundwater Picture, (p: 136) · Easy Street, (p: 382) · Stream Sense, (p: 191) · Water Celebration, (p: 446) · Choices and Preferences, (p: 367)* · Reaching Your Limits, (p: 344) · The Incredible Journey, (p: 161) · Imagine!, (p: 157) · A-Maze-ing Water, (p: 219) · Poison Pump, (p: 93) · Sum of the Parts, (p: 267) · Common Water, (p: 232) · Water Works, (p: 274)	Aquatic WILD: Alice in Waterland, Living Research; Aquatic Heroes and Heroines, Watershed, Water Down History, Where Does the Water Run?		• Identify sources of fresh water in their local community. • Describe the process by which water is supplied to students' homes and their community. • Identify the steps used to make water potable in their community. • Describe the ways in which humans use water in their local community. • Provide examples of how human activities can influence the quantity, quality and reliability of water supplies. • Explain how changes to the quantity, quality and reliability of water supplies can influence humans, human communities and their practices.
4.Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns.				
a. Students know uneven heating of Earth causes air movements (convection currents).	· Piece It Together, (p: 174) · Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Old Water, (p: 171) · The Thunderstorm, (p: 196) · Dust Bowls and Failed Levees, (p: 303) · Wet Vacation, (p: 206)			
b.Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.	· Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Old Water, (p: 171)	Aquatic WILD: How Wet is Our Planet?, Water Wings		
c. Students know the causes and effects of different types of severe weather.	· The Thunderstorm, (p: 196) · Dust Bowls and Failed Levees, (p: 303)			• Provide examples of how human practices can influence weather. • Identify the potential consequences of severe weather on human communities and natural systems.

d. Students know that weather forecasts depend on many variables.	· Wet Vacation, (p: 206) · Poetic Precipitation, (p: 182)			

Investigation and Experimentation (5th Grade)

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
a. Classify objects (eg. rocks, plants, leaves) based on appropriate criteria.	· Get The Groundwater Picture, (p: 136) · Life in the Fast Lane, (p: 79) · Macroinvertebrate Mayhem, (p: 322) · Piece It Together, (p: 174) · Stream Sense, (p: 191) · Salt Marsh Players, (p: 99) · Water Concentration, (p: 407) · Wetland Soils In Living Color, (p: 212) · Wet Vacation, (p: 206)	And the Wolf Wore Shoes, First Impressions, Forest in a Jar, Good Buddies, Graphananimal, Here Today, Gone Tommorrow, How Many Bears Live in This Forest?, Loster in Your Lunchbox, Make a Coat, Microtrek Treasure Hunt, Migration Barriers, Polar Bears in Phoenix, Urban Nature Search Aquatic WILD: Aquatic Roots, Blue Ribbon Niche, Fashion a Fish, Fishy Who's Who, Marsh Munchers, Mermaids and Manatees, Micro Odyssey, Water Canaries	Get in Touch with Trees (2), Habitat Pen Pals (7), Charting Diversity (10), We all Need Plants (13), A Few of My Favorite Things (15), Pass the Plants, Please (16), Birds and Worms (25), Reduce, Reuse, Recycle (37), Have Seeds will Travel (43), Are Vacant Lots Vacant (47), Soil Stories (70).	
b. Develop a testable questions.	· H2Olympics, (p: 30) · People of the Bog, (p: 89) · The Pucker Effect, (p: 338) · Money Down The Drain, (p: 328) · Water Models, (p: 201) · Wetland Soils In Living Color, (p: 212) · What's the Solution?, (p: 54)	Changing Attitudes, Urban Nature Search, Water's Going On? Aquatic WILD: Edge of Home, Watershed, What's in the Air?	How Plants Grow (41)	

c. Plan and conduct a simple investigation based on a student developed question, and write instructions others can follow to carry out the procedure.		Can Do!, Environmental Barometer, Ethi Thinking,First Impressions, Flip the Switch for Wildlife, Here Today, Gone Tomorrow, Migration Barriers, Planting Animals, Polar Bears in Phoenix, Improving Wildlife Habitat, Lobster in Your Lunchbox, Urban Nature Search, Wildwork Aquatic WILD: Aquatic Times, Mermaids and Manatees, Pond Succession, Something's Fishy Here!	How Plant's Grow (41)	
d. Identify the dependent and controlled variables in an investigation.		Flip the Switch for Wildlife, Forest in a Jar, How Many Bears can Live in this Forest?, Muskox Maneuvers, Oh Deer!, Smokey the Bear Said What?, Planting Animals, Urban Nature Search, What's for Dinner? Aquatic WILD: Something's Fishy Here!, The Edge of Home, To Dam or Not to Dam, Water Canaries, Wetland Metaphor, What's in the Air?	How Plant's Grow (41)	The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
e. Identify a single independent variable in a scientific investigation and explain what will be learned by collecting data on this variable.		Changing Attitudes, Environmental Barometer, First Impressions, Flip the Switch for Wildlife, Here Today Gone Tomorrow, Improving Wildlife Habitats, Interview a Spider, Planting Animals, Seed Need, Smokey Bear Said What?, Wildwork Aquatic WILD: Aquatic Roots, Blue Ribbon Niche, Fishy Who's Who, How Wet is Our Planet?, Puddle Wonders, The edge of Home, Water Canaries, Whale of a Tail	Adopt a Tree (21-Part B), Nature's Recyclers (24), How Plants Grow (41) Sundlight and Shades of Green (42), Water Wonders (44-Part B), Soil Stories (70-Part B); Trees in Trouble (77-Part B).	

f. Select appropriate tools (eg. Thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations).	· A Drop in the Bucket, (p: 238) · Aqua Bodies, (p: 65) · Life in the Fast Lane, (p: 79) · Rainy Day Hike, (p: 186) · Thirsty Plants, (p: 116) · Water Meter, (p: 271) · Wetland Soils In Living Color, (p: 212) · What's the Solution?, (p: 54)	Grasshopper Gravity, Forest in a Jar, Make a Coat!, Polar Bears in Phoenix, Seed Need, Urban Nature Search Aquatic WILD: How Wet is Our Planet?, Puddle Wonders,Watershed, Water Canaries, Whale of a Tail, Where Does the Water Run?	Planet Diversity (9), Nature's Recyclers (24), Every Drop Counts (38), How Plants Grow(41), Water Wonders (44-Part B), How Big is Your Tree (67), Soil Stories (70), Trees in Trouble (77), Nothing Succeeds Like Succession (80)
g. Record data using appropriate graphic representation (including charts, graphs, and labeled diagrams), and make inferences based on those data.	· A Drop in the Bucket, (p: 238) · Choices and Preferences, (p: 367)* · Every Drop Counts, (p: 307) · The Thunderstorm, (p: 196) · The Incredible Journey, (p: 161) · Irrigation Interpretation, (p: 254) · Get The Groundwater Picture, (p: 136) · The Great Stony Book, (p: 150) · Piece It Together, (p: 174) · The Pucker Effect, (p: 338)	And the Wolf Wore Shoes, Bearly Growing, Changing Attitudes, Environmental Barometer, Flip a Switch for Wildlife, Forest in a Jar, Graphananimal, Here Today, Gone Tomorrow, How Many Bears Can Live in This Forest, Lobster in Your Lunchbox, Migration Barriers, Oh Deer, Polar Bears in Phoenix, Saturday Morning Wildlife Watch, Seed Need, Smokey the Bear Said What?, Urban Nature Search, Water's Going On?, What Did Your Lunch Coat Wildlife, What's For Dinner Aquatic WILD: Net Gain, Net Effect, Puddle Wonders, Watershed, Where Does Water Run?	Planet Diversity (9), Trees as Habitats (22-Part B), Birds and Worms (25), Every Tree for Itself (27), Recycle, Reduce, Reuse (27-Part A), Every Drop Counts (38), How Plants Grow(41), Are Vacant Lots Vacant (47), How Big is Your Tree (67), Soil Stories (70), Trees in Trouble (77-Part B), Nothing Succeeds Like Succession (80-Parts B&C)
h. Draw conclusions based on scientific evidence and indicate whether further information is needed to support a specific conclusion.	· H2Olympics, (p: 30) · Macroinvertebrate Mayhem, (p: 322) · The Pucker Effect, (p: 338) · A Grave Mistake, (p: 311) · Poison Pump, (p: 93) · Rainy Day Hike, (p: 186)	Bearly Growing, First Impressions, Grasshopper Gravity, Good Buddies, Graphananimal, Habitat Rummy, Interview a Spider, Oh Deer!, Migration Barriers, Planting Animals, Seed Need Aquatic WILD: Aquatic Roots, To Dam or Not to Dam, Turtle Hurdles, Something's Fishy Here!, Water Canaries, What's in the Air, What's in the Water?	Planet Diversity (9), Trees as Habitats (22-Part B),The Fallen Log (23), Reuse (27-Part A), Every Drop Counts (38), How Plants Grow(41), Water Wonders (44), Are Vacant Lots Vacant (47), Soil Stories (70). Trees in Trouble (77-Part B), Nothing Succeeds LIke Succession (80-Part B & C), In the Driver's Seat (85).

Sixth Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Plate Tectonics and Earth's Structure (6th Grade)				• Describe how geologic events and processes affect the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of these geologic events and processes on humans and human communities. • Explain how these geologic events and processes affect the distribution of goods and ecosystems services from natural systems (e.g., water supply).
1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:				
b. Students know Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.	· Geyser Guts, (p: 144)			
f. Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.	· Nature Rules!, (p: 262)	Watershed		
g. Students know that the effects of an earthquake on any region vary, depending on the size of the earthquake, the distance of the region from the epicenter, the local geology, and the type of construction in the region.	· Nature Rules!, (p: 262)			
Shaping Earth's Surface (6th Grade)				
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:				
a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.	· Branching Out!, (p: 129) · The Great Stoney Book, (p:150) · Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Just Passing Through, (p: 166) · Old Water, (p: 171) · Rainy-Day Hike, (p: 186) · Wetland Soils In Living Color, (p: 212) · Nature Rules!, (p: 262)	Ecosystem Facelift, Rainfall and the Forest, Watered Down History Aquatic WILD: Pond Succession, Silt: A Dirty Word, Watershed, What's in the Water?, Where Does the Water Run?		

b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.	· Branching Out!, (p: 129) · The Great Stoney Book, (p:150) · Imagine!, (p: 157) · Just Passing Through, (p: 166) · Old Water, (p: 171) · Wetland Soils In Living Color, (p: 212) · Nature Rules!, (p: 262) · AfterMath,(p: 289) · Back to the Future,(p: 293) · Capture, Store and Release, (p:133) · Color Me A Watershed, (p: 223)* · Energetic Water, (p: 242) · Sum of the Parts, (p: 267) · Common Water, (p: 232) · The Thunderstorm, (p: 196) · Rainy-Day Hike, (p: 186) · Stream Sense, (p: 191) · Irrigation Interpretation, (p: 254)	Ecosystem Facelift, Rainfall and the Forest Aquatic WILD: Pond Succession, Silt: A Dirty Word, Watershed, Watered Down History, Where Does the Water Run?	Water Wonders (44-b)	• Identify how humans and human communities benefit from the dynamic nature of rivers and streams in ways that are essential to human life and to the functioning of our economies and cultures (e.g., deposition of fertile sediment). • Describe how humans and human communities are influenced by soil erosion, sediment transport, course changes and flooding of rivers and streams (e.g., food production, housing construction). • Provide examples of how human activities can influence the flow of rivers and streams. • Describe how changes to the flow of rivers and streams can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., spawning of salmon).
c. Students know beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.	· Wetland Soils In Living Color, (p: 212) · Salt Marsh Players, (p:99)	Ecosystem Facelift Aquatic WILD: Silt A Dirty Word		• Identify how humans and human communities benefit from the dynamic systems of beaches in ways that support our economies and cultures (e.g., housing development, sand supplies). • Describe how human communities are influenced by the sand that is supplied by rivers and moved along the coast by the action of waves. • Provide examples of how human activities can influence the movement of sand and the formation of beaches. • Describe how changes in the movement of sand and the formation of beaches can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., nesting habitat for shorebirds).

d. Students know earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.	· Nature Rules!, (p: 262) · AfterMath,(p: 289) · Back to the Future,(p: 293) · Capture, Store and Release, (p: 133)	Ecosystem Facelift Aquatic WILD: Silt A Dirty Word		• Describe how earthquakes, volcanic eruptions, landslides, and floods can influence the distribution of terrestrial, freshwater and coastal ecosystems and thus change wildlife habitats. • Provide examples of the direct and indirect influences of earthquakes, volcanic eruptions, landslides, and floods on humans and human communities. • Provide examples of how human practices can compound or lessen the impacts of earthquakes, volcanic eruptions, landslides, and floods on human communities and wildlife habitats.
Heat (Thermal Energy) (Physical Science- 6th Grade)				
3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:				
a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.	· Energetic Water, (p: 242) · Choices and Preferences, Water Index, (p: 367) · Geyser Guts, (p: 144) · Cold Cash in the Icebox, (p: 373)		Energy Chains and Energy Challenge Game (Energy and Scoiety)	
b. Students know that when fuel is consumed, most of the energy released becomes heat energy.			In the Driver's Seat (85); Energy Chains and Energy Challenge Game (Energy and Society)	• Explain that various types of fuel are among the goods produced by natural systems and that fuel is essential for human communities, economies and cultures. • Describe how human consumption of fuel and the resulting release of heat energy can influence several of the cycles and processes that operate within natural systems (e.g., thermal pollution in coastal waters). • Identify that when fuels are consumed, other types of byproducts, in addition to heat energy, are produced and released, resulting in positive, neutral or detrimental effects on the environment. • Provide examples of the indirect influences of human fuel consumption on terrestrial, freshwater, coastal and marine ecosystems.
c. Students know heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).	· Piece It Together, (p: 174)			

d. Students know heat energy is also transferred between objects by radiation (radiation can travel through space).	· The Incredible Journey, (p: 161) · Water Models, (p: 201) · Molecules in Motion, (p: 47)		Energy Chains (Energy and Society)	
Energy in the Earth System (6th Grade)				
4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:				• Describe how the energy-related phenomena on Earth's surface (i.e., those affected by the transfer of energy through radiation and convection currents) influence the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of these energyrelated phenomena on Earth's surface on humans and human communities. • Explain how these energy-related phenomena on Earth's surface affect the distribution of goods and ecosystem services from natural systems (e.g., water supply).
a. Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.	· Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Piece It Together, (p: 174) · Poetic Precipitation, (p: 182) · Water Models, (p: 201)	Energy Pipeline Aquatic WILD: How Wet is Our Planet?, Water Wings	Energy Dectectives (Energy and Society)	• Recognize that wind and ocean currents can be harvested to generate electricity. • Provide examples of the advantages and disadvantages related to the use of energy generated from wind and ocean currents.
b. Students know solar energy reaches Earth through radiation.	· Imagine!, (p: 157) · The Incredible Journey, (p: 161) · Piece It Together, (p: 174) · Poetic Precipitation, (p: 182) · Water Models, (p: 201) · Raining Cats and Dogs, (p: 435) · Wet Vacations, (p: 206)	Energy Pipline		
c. Students know heat from Earth's interior reaches the surface primarily through convection.	· Geyser Guts, (p: 144)			• Recognize that geothermal energy can be harvested to generate electricity. • Provide examples of the advantages and disadvantages related to the use of geothermal energy.
d. Students know convection currents distribute heat in the atmosphere and oceans.	· Piece It Together, (p: 174) · Water Models, (p: 201) · Great Water Journeys, (p: 246) · Salt Marsh Players, (p: 99)			• Humans depend on convection currents because they provide ecosystem services and the conditions for the production of goods for human use (e.g., the distribution of organisms). • Ocean currents along California's coasts are a major factor in determining what organisms live in coastal waters, as well as California's weather and climate.

e. Students know differences in pressure, heat, air movement, and humidity result in changes of weather.	· Imagine!, (p: 157) · Piece It Together, (p: 174) · Wet Vacation, (p: 206) · The Thunderstorm, (p: 196) · Dust Bowls and Failed Levees, (p: 303) · AfterMath, (p: 289)			
Ecology (Life Science- 6th Grade)				
5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:				
a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.	· Water Works, (p: 274) · Life Box, (p: 76)	Career Critters, Eco-Enricher, Ecosystem Facelift, Hazardous Links: Possible Solutions, Oh Deer, Owl Pellets, Quick Frozen Critters, Shrinking Habitats, Move Over Rover, Time Lapse, What's for Dinner, What Did Your Lunch Cost Wildlife?, World Travelers Aquatic WILD: Blue Ribbon Niche, Kelp Help,Marsh Munchers, Micro Odyssey,The Glass Menagerie, Water Plant Art, Wetland Metaphors	Air Plants (28); Plant a Tree (31); Sunlight and Shades of Green (42); Web of Life (45)	• Describe how sunlight is transferred by producers into chemical energy through photosynthesis. • Recognize that plants are the primary source of energy for living things in an ecosystem. • Describe how energy and matter are transferred from organism to organism, including humans, through food webs. • Provide examples of human practices (e.g., ranching) that directly depend on the transfer of energy and matter through food webs.
b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.	· The Incredible Journey, (p: 161) · Super Sleuths, (p: 107) · Poison Pump, (p: 93) · Super Bowl Surge, (p: 353) · Sparkling Water, (p: 348) · A Grave Mistake, (p: 311) · The Pucker Effect, (p: 338) · A-Maze-ing Water, (p: 219) · Reaching Your Limits, (p: 344)	Career Critters, Eco-Enrichers, Ecosystem Facelift, Hazardous Links: Possible Solutions, Let's Talk Turkey, Move Over Rover, Oh Deer, Owl pellets, Quick Frozen Critters, Shrinking Habitats, Time Lapse, What's for Dinner, What Did Your Lunch Cost Wildlife?, World Travelers Aquatic WILD: Marsh Munchers, Micro Odyssey, The Glass Menagerie, Water Plant Art, Wetland Metaphors	Fallen Log (23); Nature's Recyclers (24); Web of Life (45)	• Recognize that matter is transferred over time between organisms in an ecosystem. • Describe the role of food webs in the flow of matter within natural systems. • Explain how the transfer of matter results in the movement of energy to organisms on different levels of the food web. • Describe different means through which humans get matter and energy from food webs (e.g., food consumption and respiration). • Recognize that the transfer of matter through an ecosystem generates byproducts (e.g., matter and heat energy are dissipated during transfers between levels in the food web). • Describe the effects of human practices (e.g., agriculture, forestry) and resulting byproducts, on the transfer of matter through natural systems (e.g., food chains and webs).

c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.	· Macroinvertebrate Mayhem, (p: 322) · People of the Bog, (p: 89) · Salt Marsh Players, (p:99)	Ants on a Twig, Birds of Prey, Career Critters, Eco-Enrichers, Ecosystem Facelift, Graphananimal, Good Buddies, Grasshopper Gravity, Interview a Spider, Let's Talk Turkey, Move Over Rover, Muskox Maneuvers, Urban Nature Search, Quick Frozen Critters, Oh Deer!, Time Lapse, World Travelers Aquatic WILD: Blue Ribbon Niche, Marsh Munchers, Micro Odyssey, Water Canaries,Where Have all the Salmon Gone?	Fallen Log (23); Nature's Recyclers (24); Web of Life (45); Are Vacant Lots Vacant (47); Nothing Succeeds Like Succession (80-b, c)	• Define a population. • Give examples of the functions (producer, consumer, and decomposer) populations of organisms serve in an ecosystem. • Explain how energy is transferred in an ecosystem and how the amount of available energy varies at the level of consumption (primary, secondary and tertiary consumers). • Identify humans as consumers within ecosystems. • Identify and describe byproducts generated by the human consumption of goods (matter) produced by natural systems (ecosystems). • Describe the effects of human practices on the transfer of matter through natural systems. • Provide examples of how the quantities of resources consumed, and the quantity and characteristics of the resulting byproducts can affect natural systems.
d. Students know different kinds of organisms may play similar ecological roles in similar biomes.	· Macroinvertebrate Mayhem, (p: 322) · Water Address, (p: 122)	Bearly Growing, Career Critters, Eco-Enrichers, Ecosystem Facelift, Graphananimal, Interview a Spider, Let's Talk Turkey, Microtrek Treasure Hunt, Move Over Rover, Quick Frozen Critters, Time Lapse, Urban Nature Search, Which Niche?, World Travelers Aquatic WILD: Blue Ribbon Niche, Micro Odyssey, Water Canaries	Charting Diversity (10); Tropical Treehouse (49)	• Recognize different biomes. • Identify the characteristics of various biomes. • Provide examples of different organisms playing similar ecological roles (herbivores, carnivores, omnivores, and decomposers) in similar biomes. • Explain how human practices make use of and/or have similar effects on organisms that play similar roles in different biomes. • Describe the effects of human practices on the transfer of matter through natural systems (e.g., the effects of agriculture and forestry on organisms with similar ecological roles are comparable in similar biomes).

e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.	· People of the Bog, (p: 89) · Water Address, (p: 122) · Piece It Together, (p: 174) · Common Water, (p: 232) · A Drop in the Bucket, (p: 238) · Irrigation Interpretation, (p: 254) · The Long Haul, (p: 260) · Where Are The Frogs?, (p: 279) · Macroinvertebrate Mayhem, (p: 322) · Choices and Preferences, Water Index (p: 367)* · Dilemma Derby, (p: 377) · Life in the Fast Lane, (p: 79) · Super Sleuths, (p: 107) · Poison Pump, (p: 93) · Super Bowl Surge, (p: 353) · Sparkling Water, (p: 348) · A Grave Mistake, (p: 311) · The Pucker Effect, (p: 338) · A-Maze-ing Water, (p: 219) · Reaching Your Limits, (p: 344)	Career Critters, Changing the Land, Ecosystem Facelift, Edge of Home, Eat and Glow, Forest in a Jar, Habitat Rummy, Here Today, Gone Tomorrow, How Many Bear Can Live in this Forest, Habitat Lap Sit, Hazardous Links: Possible Solutions, Let's Talk Turkey, Move Over Rover, Planting Animals, Oh Deer!, Rainfall and the Forest, Shrinking Habitat, The Beautiful Basics, Time Lapse, World Travelers Aquatic WILD: Blue Ribbon Niche, Pond Succession, Glass Menagerie, The Edge of Home, Water Canaries, Wetlands Metaphors	Habitat PenPals (7); Forest of ST Shrew (8); Planet Diversity (9); Every Tree for Itself (27); Plant a Tree (31)l How Plants Grow (41); Web of Life (45); Fields, Forest and Stream (48); Noting Succeeds Like Succession (80)By the Rivers of Bablylon (94)	• Identify abiotic factors that affect ecosystems. • Classify components of ecosystems as either living (biotic) or non-living (abiotic). • Explain the effects of changing biotic and abiotic factors on an ecosystem (e.g., the effects of changing: quantities of light or water, and soil composition on plant growth; range of temperatures on the species composition of animals and plants). • Provide examples of how human practices and rates of consumption affect the biotic and abiotic components (e.g., the availability of resources) in a natural system, thus influencing the number and types of organisms an ecosystem can support. • Provide examples of how the quantities of resources consumed, and the quantity and characteristics of the resulting byproducts can affect natural systems (e.g., as a result of overgrazing by cattle, the ecological characteristics of rangeland can change making it less productive).

Resources (6th Grade)

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.	· Energetic Water, (p: 242) · Water Works, (p: 274) · Dilemma Derby, (p: 377) · Pass The Jug, (p: 392) · Water Bill of Rights, (p: 403) · Whose Problem Is It?, (p: 429) · Geyser Guts, (p: 144)	Ecosystem Facelift, Flip the Switch for Wildlife, Lobster in Your Lunchbox, Move Over Rover, Time Lapse, World Travelers Aquatic WILD: To Dam or Not to Dam	We All Need Trees (13); Renewable or Not (14); A Few of My Favorite Things (15); 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); Resources Go-Around (82); A Peek at Packaging (83); By the Rivers of Bablylon (94); Energy Chains, What Powers the Move - Energy and Society	• Identify the various forms and uses of energy in students' communities. • Describe different methods of producing energy (including using fuel, converting solar energy to electricity, using hydro or wind power). • Recognize that when fuel is used (consumed) most of the energy released becomes heat, a byproduct that transfers to the surrounding environment. • Describe other byproducts of energy production and consumption (e.g., liquids, gases and solids that may have varied effects). • Provide examples of how the byproducts of converting energy sources into useful forms enter natural systems. • Describe how the quantities of energy resources consumed, and the quantity and characteristics of the resulting byproducts, affect natural systems. • Explain that the "usefulness" of energy sources is determined by weighing the benefits of their use against the costs of conversion and the generation and release of byproducts.

b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.	· Common Water, (p: 232) · A Drop in the Bucket, (p: 238) · Energetic Water, (p: 242) · The Long Haul, (p: 260) · Water Meter, (p: 271) · Water Works, (p: 274) · Pass The Jug, (p: 392) · Geyser Guts, (p: 144) · Get the Groundwater Picture, (p: 136)	Career Critters, Ecosystems Facelift, Flip the Switch for Wildlife, Make A Coat, Move Over Rover, Time Lapse, What Did Your Lunch Cost Wildlife?, What You Wear is What They Were, World Travelers Aquatic WILD: Dragonfly Pond, How Wet is Our Planet?, To Dam or Not to Dam, Water's Going On?	Renewable or Not (14); A Few of My Favorite Things (15); A Forest for Many Uses (32); Forest Consequences (33); 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); By the Rivers of Bablylon (94)	• Identify different energy and material resources (e.g. air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests) that are provided by natural systems. • Explain that: renewable resources are replaced over a relatively short time period (e.g., fresh water, hydroelectric power, or living resources); nonrenewable resources accumulate over such a long period of time that they must be considered as fixed (e.g., minerals or fossil fuels); and, inexhaustible resources have no practical limits (e.g., solar or hydrothermal energy). • Classify energy and material resources as renewable, non-renewable, or inexhaustible. • Identify energy and material resources that are essential to human life. • Provide examples of how human practices and rates of consumption can affect the availability (quality, quantity and reliability) of energy and material resources that are essential to human life.

c. Students know the natural origin of the materials used to make common objects.	· Old Water, (p: 171) · Common Water, (p: 232) · Energetic Water, (p: 242) · The Long Haul, (p: 260) · Water Meter, (p: 271) · Water Works, (p: 274) · Choices and Preferences, Water Index (p: 367)	Ecosystem Facelift, Lobster in Your Lunch Box, Make A Coat, Move Over Rover, Time Lapse, What Did Your Lunch Cost Wildlife?, What You Wear is What They Were, World Travelers Aquatic WILD: Kelp Help, Water We Eating	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); A Peak at Packaging (84); By the Rivers of Babylon (85).	• Identify the natural origin of the materials used to make common objects. • Provide examples of the goods that are produced by natural systems that are used to make common objects used by humans. • Explain the methods used to make common objects (useable products) from natural resources. • Describe the methods used to extract, harvest and transport the materials used to make common objects from natural resources. • Provide examples of how the methods used to extract, harvest and transport natural resources, and consume them (or make useable products) affect natural systems.
Investigation and Experimentation (6th Grade)				
7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
a. Develop a hypothesis.	· Branching Out!, (p: 129) · Cold Cash In The Icebox, (p: 373) · Energetic Water, (p: 242) · H2Olympics, (p: 30) · Let's Even Things Out!, (p: 72) · People of the Bog, (p: 89) · Wetland Soils In Living Color, (p: 212) · What's The Solution, (p: 54) · Where Are The Frogs?, (p: 279)	Bearly Growing, Eco Enrichers, Ecosystems Facelift, First Impressions, Interview A Sipder, Planting Animals, Smokey Bear Said What? Aquatic WILD: Blue Ribbon Niche, Edge of Home, Somethings's Fishy Here, The Glass Menagerie, Water Canaries, What's in the Air?, Where Does the Water Run?	Trees in Trouble (77)	

b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.	· A Drop in the Bucket, (p: 238) · Aqua Bodies, (p: 65) · Branching Out!, (p: 129) · Back to the Future, (p: 293) · Life in the Fast Lane, (p: 79) · People of the Bog, (p: 89) · Rainy Day Hike, (p: 186) · Thirsty Plants, (p: 116) · Water Meter, (p: 271) · Wetland Soils In Living Color, (p: 212) · What's the Solution?, (p: 54)	Ants on a Twig, Ecosystem Facelift, Forest in a Jar, Grasshopper Gravity, Improving Wildlife Habitat in the Community, Litter We Know, Microtrek Treasure Hunt, My Kingdom for a Shelter, Owl Pellets, Rainfall and the Forest, Seed Need, Seeing is Believing or the Eyes Have It, Tracks Aquatic WILD: How Wet is our Planet?, Puddle Woner, The Glass Menagerie, Watershed, Water Canaries, Water's Going on?, Whale of a Tail? What's in the Water?, Where Does the Water Run?	Sounds Around (4-c); Planet Diversity (9); Adopt a Tree (21-b); Rain Reasions (29-a); Every Drop Counts (38); How Plants Grow (41); Soil Stories (70-b); Nothing Succeeds Like Succession (80)	
c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.	· A Drop in the Bucket, (p: 238) · Back to the Future, (p. 293) · Choices and Preferences, (p: 367)* · Every Drop Counts, (p: 307) · The Incredible Journey, (p: 161) · Irrigation Interpretation, (p: 254) · Get The Groundwater Picture, (p: 136) · The Great Stony Book, (p: 150) · Piece It Together, (p: 174) · The Pucker Effect, (p: 338) · Water Models, (p. 201) · Wetland Soils In Living Color, (p: 212)	Bearly Growing, Ecosystem Facelift, Here today, Gone Tomorrow, Graphananimal, Lobster in Your Lunch Box, Oh Deer!, Rainfall and the Forest, Saturday Morning Wildlife Watch, The Beautiful Basics, What's for Dinner? Aquatic WILD: Net Gain, Net Effect, What's in the Water, Where Have All the Salmon Gone?	Sounds Around (4-c); Planet Diversity (9); Birds and Worms (25); Loving it Too Much (35); Energy Sleuths (39-a); How Plants Grow (41); Soil Stories (70-b); Trees in Trouble (77-b); Nothing Succeeds Like Succession (80-c)	

d. Communicate the steps and results from an investigation in written reports and oral presentations.	· Energetic Water, (p: 242) · Macroinvertebrate Mayhem, (p: 322) · Water Models, (p: 201) · Where Are the Frogs?, (p: 279)	Ants on a Twig, Can Do!, Ethi-Thinking, Ecosystem Facelift, First Impressions, Improving Wildlife Habitat, Interview a Spider, Planting Animals, Playing Lightly on the Earth, Grasshooper Gravity, Here Today, Gone Tomorrow, Lobster in Your Lunchbox, Microtrek Treasure Hunt, Wildwork Aquatic WILD: Aquatic Roots, Designing a Habitat, Fashion a Fish, Fishy Who's Who, Kelp Help, Mermaids and Manatees, Watered Down History, Wetlands Metaphors	Rain Reasons (29-a); Energy Sleuths (39-b); Are Vacant Lots Vacant (47); Soil Stories (70-b)	
e. Recognize whether evidence is consistent with a proposed explanation.	· Branching Out!, (p: 129) · Macroinvertebrate Mayhem, (p: 322) · People of the Bog, (p: 89) · Poison Pump, (p: 93) · Rainy-Day Hike, (p: 186) · Wetland Soils In Living Color, (p: 212) · What's the Solution?, (p: 54) · Where Are the Frogs?, (p: 279)	Bearly Growing, Career Critters, Eco-Enrichers, Interview a Spider Aquatic Wild: Dragonfly Pond, Facts and Falsehoods, The Edge of Home, The Glass Menagerie, Watered Down History, What's in the Air?, What's in the Water?	Sounds Around (4-c); Planet Diversity (9); Birds and Worms (25); Rain Reasons (29); Reduce Reuse, Recycle (37-a); Every Drop Counts (38-b); Energy Sleuths (39); How Plants Grow (41); Have Seeds, Will Travel (43); Water Wonders (44-b); Soil Stories (70-b); Trees in Trouble (77-b); Nothing Succeeds Like Succession (80-c)	

f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.	· Branching Out!, (p: 129) · Get the Groundwater Picture, (p: 136) · The Great Stony Book, (p: 150) · Great Water Journeys, (p: 246) · Piece It Together, (p: 174) · Rainy-Day Hike, (p: 186) · The Thunderstorm, (p: 196)	Career Critters, Ecosystems Facelift, Rainfall and the Forest Aquatic WILD: Watershed, Where Does the Water Run	Rain Reasons (29-c)	
g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).	· Back to the Future,(p: 293) · A Grave Mistake, (p: 311) · The Great Stony Book, (p: 150) · Old Water, (p: 171)	Ecosystems Facelift		
h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).		Changing Attitudes, Ecosystems Facelift, Forest in a Jar, Pond Succession, Rainfall and the Forest Aquatic WILD- The Glass Menagerie	Adopt a Tree (21); Field, Forest and Stream (48-enrichment); Nothing Succeeds Like Succession (80)	

7th Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Cell Biology (7th Grade)				
1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept:				
b. Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.		Aq. WILD-Micro Odyssey		
d. Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis.			Sunlight and Shades of Green (42)	
Genetics (7th Grade)				
2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept:				
b. Students know sexual reproduction produces offspring that inherit half their genes from each parent.		Bottleneck Genes, Let's Talk Turkey		
c. Students know an inherited trait can be determined by one or more genes.		Bottleneck Genes, Let's Talk Turkey		
d. Students know plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive.		Bottleneck Genes, Let's Talk Turkey		

Evolution (7th Grade)				
3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:				• Recognize that living and non-living things change. • Recognize that living things, including humans, cause changes in their environment. • Recognize factors that influence populations of organisms and biological diversity. • Describe the effects of demographics and distribution of human populations and their consumption rates on natural systems (e.g., their geographic extent, composition, biological diversity, and viability). • Provide examples of how the methods used to extract, harvest, and transport natural resources, and consume natural resources (or make useable products) affect natural systems (e.g., their geographic extent, composition, biological diversity, and viability). • Compare historic and present day geographic extents of natural systems (terrestrial, freshwater, coastal and marine ecosystems). • Describe how the activities related to the expansion and operation of human communities influence natural systems.
a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.	· Old Water (p.171) · Macroinvertebrate Mayhem, (p: 322)	Adaptation Artistry, Back from the Brink, Bottleneck Genes, Changing the Land, I'm Thirsty!, Let's Talk Turkey, Time Lapse, Muskox Maneuvers, Rainfall and the Forest, Who Fits Here, World Travelers Aquatic WILD: Aquatic Roots, Blue Ribbon Niche, Eat & Glow, Fashion a Fish, Fishy Who's Who, The Edge of Home		• Define evolution and identify its causes. • Describe the influence of genetic variation on the evolution and diversity of organisms. • Identify the role of environmental factors on the evolution and diversity of organisms, and the long-term functioning and health of natural systems. • Provide examples of how human population growth and human activities (e.g., expansion of communities, production and consumption of natural resources, the operation and expansion of human communities, and generation of byproducts) can affect both genetic variation and environmental factors). • Describe how human activities can affect reproductive cycles and genetic diversity, and thus, the evolution and diversity of species.

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.	· Macroinvertebrate Mayhem, (p: 322) · Water Address (p. 122)	Bottleneck Genes, Back from the Brink, Here Today, Gone Tomorrow, Let's Talk Turkey, Muskox Maneuvers, Polar Bears in Phoenix, Shrinking Habitat, What Bear Goes Where?, World Travelers Aquatic WILD: Eat & Glow, Migration Headache, Pond Succession, Turtle Hurdles, Watered Down History, Whale of a Tail, Where Have All the Salmon Gone?	Life on the Edge (88-a)	• Define and give examples of adaptation in living things. • Explain the effects of changing environmental factors in a natural system on species (e.g., changing biotic and abiotic factors including the availability of resources). • Identify factors that can cause extinction of a species and explain that some extinctions are natural while others are human-induced. • Recognize that throughout the history of life on Earth, some plants and animal species have died out completely in response to environmental changes. • Provide examples of how human population growth and expansion of communities, production and consumption of natural resources, and the operation and expansion of human communities can influence rates of extinction. • Describe how the capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity, and on the nature and health of the natural system. • Identify that in cases where species cannot respond to the degree of change, extinction may occur.
Earth and Life History (Earth Sciences- 7th Grade))				
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:				
a. Students know Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.a. Students know Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.	· People of the Bog (p. 89) · Old Water (p. 171) · Great Stony Book (p. 150)			• Define and distinguish the terms cycles and processes. • Describe the cycles and processes that occur in natural systems. • Explain that the effects of geologic processes on natural systems that are observed today are similar to those that occurred in the past. • Provide examples of how the functioning of natural systems is dependent upon geologic processes that operate over long periods of time. • Provide examples of how the cycles and processes that occur in natural systems today are similar to those that occurred in the past.

b. Students know the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.	· Old Water (p. 171)			• Describe the ways that major catastrophic events, such as major volcanic eruptions or the impacts of asteroids, can disrupt the processes and cycles that occur in natural systems. • Provide examples of how the disruption of these processes and cycles by major catastrophic events can influence the geographic extent, composition, biological diversity, and viability of natural systems. • Explain how the disruption of these processes and cycles by major catastrophic events can influence the geographic extent, composition, biological diversity, and viability of natural systems.
c. Students know that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.	· The Great Stony Book (p.150)			
e. Students know fossils provide evidence of how life and environmental conditions have changed.	· The Great Stony Book (p.150)		By the Rivers of Babylon (94)	• Explain that fossils provide useful evidence of how life and environmental conditions have changed over geological time since the effects of the changes that are observed today are similar to those that occurred in the past. • Provide examples of how recent major catastrophic events have influenced the geographic extent, composition, biological diversity, and viability of natural systems.

g. Students know how to explain significant developments and extinctions of plant and animal life on the geologic time scale.	· Old Water (p. 171)			• Identify changes to biotic and abiotic factors in natural systems that can result in the extinction of species. • Explain how extinction occurs. • Give examples of extinctions on Earth in geologic time. • Describe how natural systems can change gradually on a geologic time scale or rapidly (e.g., changes to biogeochemical cycles, system processes, species composition, and capacity to yield goods and ecosystem services). • Provide examples of human activities, and the resulting byproducts, that can cause rapid and/or significant changes to plant and animal life that might result in extinction. • Describe the effects when natural systems cannot adjust to human-caused alterations and how these effects are influenced by the nature of the system as well as the scope, scale, duration and byproducts of the activity.
Structure and Function in Living Systems (7th Grade)				
5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept:				
a. Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.	· Thirsty Plants · Let's Even Things Out	Bottleneck Genes, Ecosystems Facelift, World Travelers	Have Seeds, Will Travel (43);	• Describe how the components, processes, and cycles that occur in natural systems are analogous to the structures and functions that occur in whole organisms. • Provide examples of components and processes that occur in terrestrial, freshwater, coastal and marine systems that parallel the functions served by cells, tissues, organs, organ systems, and whole organisms.
b. Students know organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.	· Super Sleuths (p. 107) · Poison Pump (p.93)	Botleneck Genes, Ecosystems Facelift, World Travelers		
Investigation and Experimentation (7th Grade)				
7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive

a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.	· People of the Bog (p. 89)	Fire Ecologies, Noisy Neighbors, Rainfall and the Forest, Time Lapse, Wildlife Research, Aquatic WILD: How Wet, is Our Planet?, Puddle Wonders, The Glass Menagerie, Water Canaries, Whale of a Tail	Adopt a Tree (21-b); Trees as Habitats (22-b); Rain Reasons (29-a); Every Drop Counts (38); How Plants Grow (41); Watch on Wetlands (71); How Big is Your Tree (67); Air We Breathe (72); Trees in Trouble (77); Nothing Succeeds Like Succession (80-b,c); Composting	connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."
b. Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.	· Super Sleuths (p. 107)	Here Today, Gone Tomorrow, Interview a Spider, Noisy Neighbors, Planting Animals, Rainfall and the Forest, Wildlife Research Aquatic WILD: Aquatic Roots, Aquatic Times, Blue Ribbon Niche, Fishy Who's Who, Kelp Help, Whale of a Tail, Where Have All The Salmon Gone?	Sounds Around (4); Charting Diversty (10), Energy Sleuths (39-c); The Global Climate (84)	
c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.	· Poison Pump (p. 93)	Adaptation Artistry, Fire Ecologies, I'm Thirsty, Rainfall and the Forest, Urban Nature Search, Wildlife Research Aquatic WILD: Glass Menageries, Plastic Jellyfish, Something's Fishy Here, What's in the Air, Where Have All the Salmon Gone?	Sounds Around (4); Charting Diversity (10); How Plants Grow (41); Have Seeds, Will Travel (7-c); Air We Breathe (72; Trees in Trouble (77); Nothing Succeeds Like Succession (80-c); Composting (MSW)	
d. Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).	· Super Sleuths (p. 107) · The Great Stony Book (p. 150) · Old Water (p. 171) · Lets Even Things Out (p. 72)	Rainfall and the Forest Aquatic WILD: Pond Succession	Watch on Wetlands (71-a,b); Nothing Succeeds Like Succession (80); Our Changing World (86)	
e. Communicate the steps and results from an investigation in written reports and oral presentations.		Eco-Enrichers, Fire Ecologies, Habitrekking, Urban Nature Search Aquatic WILD: Designing a Habitat, Facts and Falsehoods, Whale of a Tail	Sounds Around (4-c); Rain Reasons (29); Where Does Your Garbage Go? (MSW)	

8th Grade

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Forces (8th Grade)				
2. Unbalanced forces cause changes in velocity. As a basis for understanding this concept:				
d. Students know how to identify separately the two or more forces that are acting on.a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.	· H2O Olympics (p. 30) · Energetic Water (p. 242)			
e. Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).	· H2O Olympics (p. 30) · Energetic Water (p.242)			
Structure of Matter (8th Grade)				
3. Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements. As a basis for understanding this concept:3. Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements. As a basis for understanding this concept:				
a. Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.	· Hanging Together (pg 35) · Where Are the Frogs (p. 279)			
b. Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.	· Where Are the Frogs (p. 279) · Hanging Together (p. 35)			
d. Students know the states of matter (solid, liquid, gas) depend on molecular motion.	· Molecules in Motion * (p. 47) · Adventures in Density (p. 25) · Whats the Solution (p. 54) · The Incredible Journey (p.161)			

e. Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.	· Molecules in Motion · Adventures in Density (p. 25) · The Incredible Journey (p. 161)			
Reactions (8th Grade)				
5. Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. As a basis for understanding this concept:				
a. Students know reactant atoms and molecules interact to form products with different chemical properties.	· Hanging Together · Is There Water on Zork? (p. 43)			
c. Students know chemical reactions usually liberate heat or absorb heat.	· Hanging Together (p. 35)		Composting (MSW); Energy Chains (Energy and Society)	
d. Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction.	· Hanging Together (p. 35) · Water Models (p.201)			
e. Students know how to determine whether a solution is acidic, basic, or neutral.e. Students know how to determine whether a solution is acidic, basic, or neutral.	· Where Are the Frogs (p. 279)		Composting (MSW)	
Chemistry of Living Systems (Life Sciences- 8th Grade)				
6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:				
a. Students know that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.		Aquatic WILD: Eat & Glow	Air Plants (28)	• Identify that carbon-based goods produced by natural systems and yielded by human practices are essential to human life (e.g., agricultural and forest products). • Recognize that the carbon cycle is an ecosystem service upon which all living things depend. • Provide examples of carbon-based goods and ecosystem services provided by natural systems that are the basis of our economies and cultures (e.g., agricultural products, forest products).

b. Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.		Aquatic WILD: Eat & Glow		• Identify the roles of molecules formed by carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur in the functioning of natural systems. • Explain that matter comprised of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur is the essential component of all goods produced by natural systems and as such is the basis for human life. • Provide examples of key processes in natural systems that are dependent on carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur. • Describe how carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur flow through natural systems in cycles and processes. • Describe how human practices can interrupt cycles and processes that allow carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur to flow through natural systems
c. Students know that living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA.		Aquatic WILD: Eat & Glow		
Density and Buoyancy (8th Grade)				
8. All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept:				
a. Students know density is mass per unit volume.	· Adventures in Density			
Investigation and Experimentation (8th Grade)				
9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:				The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also
a. Plan and conduct a scientific investigation to test a hypothesis.	· What's the Solution (p. 54) · Adventures in Density (p.25) · Is There Water on Zork? (p. 43) · Energetic Water (p. 242) · Water Models (p. 201)	Aquatic WILD: Eat & Glow	Rain Reasons (28); How Plants Grow (41); Nothing Succeeds Like Succession (80)	

b. Evaluate the accuracy and reproducibility of data.	· Is There Water on Zork? (p. 43) · Energetic Water (p 242)	Aquatic WILD: Eat & Glow	Rain Reasons (28); How Plants Grow (41); Air We Breathe (72); Trees in Trouble (77); Nothing Succeeds Like Succession (80)	help teachers conform to recommendations of the California State Board of Education that “hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework.”
c. Distinguish between variable and controlled parameters in a test.	· H2O Olympics (p. 30) · Water Models (p. 201)	Aquatic WILD: Eat & Glow	Rain Reasons (28-b); How Plants Grow; Trees in Trouble (77-a,b); Composting, Where Does Your Garbage Go? (MSW)	

High School -- Chemistry

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Chemical Bonds (High School Chemistry)				
2. Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules. As a basis for understanding this concept:				
a. Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.	· Hangin' Together, (p: 35) · What's the Solution?, (p: 54)			
d. Students know the atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular forces are too weak to hold the atoms or molecules in a solid form.	· What's the Solution?, (p: 54) · Adventures In Density, (p: 25)			
Acids and Bases (High School Chemistry)				
5. Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept:				
a. Students Know the observable properties of acids, bases, and salt solutions.		Aquatic WILD: Eat & Glow Science & Civics: To Breathe or Not to Breathe, Change Mt pH and I'll Change Yours, Who Lives in Soil?		
d. Students know how to use the pH scale to characterize acid and base solutions.	· The Pucker Effect, (p: 338)	**Activities can be used for standards a-d as introduction to pH:** Eco-Enrichers Aquatic WILD: Eat & Glow, Water Canaries, What's in the Air? Science & Civics: Layering Soil, Change My pH and I'll Change Yours		

High School -- Biology/Life Science.

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Cell Biology (High School- Biology/Life Science)				
1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. As a basis for understanding this concept:				
a. Students know cells are enclosed within semi-permeable membranes that regulate their interaction with their surroundings.	· Let's Even Things Out, (p: 76)			• Recognize that because cell membranes are semi-permeable the byproducts of human activity (e.g., chemicals released into air and water) can readily enter cells. • Explain that byproducts of human activity that enter cells are not readily prevented from entering natural systems. • Provide examples of byproducts of human activity that have beneficial, neutral, and detrimental affects on cells and organisms.
f. Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.		Science & Civics: To Breathe or Not To Breathe	Nature of Plants (Forest Ecology)	• Explain the importance of the usable energy that is captured by chloroplasts to the functioning of all natural systems. • Describe the role of the synthesis of sugar from carbon dioxide in the functioning of all natural systems and our economies.

Ecology (High School- Biology/Life Science)				
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.	· People of the Bog, (p: 89) · Sum of the Parts, (p: 267) · Water Address, (p: 122)	A Picture is Worth a Thousand Words, Artic Survival, Back from the Brink, Birds of Prey, Carrying Capacity, Checks and Balances, Deer Dilemma, Dropping in on Deer, Fire Ecologies, From Bison to Bread, Improving Wildlife Habitat in the Community, No Water Off a Ducks Back, Planting Animals, Riparian Retreat, Wildlife Bibliography, Aquatic WILD: Blue Ribbon Niche, Dam Design, Designing a Habitat, Eat & Glow, How Wet is Our Planet?, Puddle Wonders, The Edge of Home, The Glass Menagerie, Water Canaries, Water Plant Art Science & Civics: Color Me a Watershed, Then and Now, Ecology Begins at Home, A place for Every Living Thing, How to Evaluate Habitats	Adopt a Forest, Cast of Thousands, Home Sweet Home, Story of Succession, Understanding Fire, Fire Management (Forest Ecology); Waste to Energy, Landfills (MSW)	• Define biodiversity (biological diversity) as a measure of the different kinds of organisms in an ecosystem. • Explain the importance of biodiversity to human lives, communities and societies in terms of the goods and ecosystem services natural systems provide. • List the direct and indirect changes to natural systems that can affect biodiversity (e.g., alterations of habitats). • Describe the implications of loss of biodiversity to natural systems and human societies. • Provide examples of human activity that can influence the biodiversity of natural systems (e.g., methods used extract, harvest, transport and consume natural resources; expansion and operation of human communities; and, laws, regulations, policies, and incentives that govern management of natural resources). • Explain the influence of human activities on biodiversity is directly related to population growth, the quantities of resources consumed and the quantity and characteristics of the byproducts of those activities.

b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size. b. (Continued)	· Color Me A Watershed, (p: 223) · Great Water Journeys, (p: 246) · The Long Haul, (p: 260) · A Grave Mistake, (p: 311) · The Price Is Right, (p: 333) · Super Bowl Surge, (353) · Dilemma Derby, (p: 377) · Perspectives, (p: 397) · Water: Read All About It, (p: 400)** · Whose Problem Is It?, (p:429) · Back To The Future, (p: 293) · Choices and Preferences, (p: 367) · People of the Bog, (p: 89) · The CEO, (p: 300) · Pass the Jug, (p: 392) · Sum of the Parts, (p: 267) · The Pucker Effect,(p: 338)**	A Picture is Worth a Thousand Words, Artic Survival, Back from the Brink, Birds of Prey, Bottleneck Genes, Carrying Capacity, Changing Attitudes, Checks and Balances, Deer Crossing, Deer Dilemma, Dropping in on Deer, Fire Ecologies, From Bison to Bread, Hazardous Links: Possible Solutions, Here Today, Gone Tomorrow, No Water Off a Ducks Back, Oh Deer!, Planting Animals, Philosophical Differences, Sea Turtle International, Time Lapse, To Zone or Not to Zone, We're in This Together, What Did Your Lunch Cost Wildlife? When a Whale is Right, Wildlife Bibliography, Wildlife Issues Aquatic WILD: Blue Ribbon Niche, Dam Design, Dragonfly Pond, Eat & Glow, Migration Headache, The Glass Menagerie, To Dam or Not to Dam, Water Canaries, What's in the Air, What's In the Water? Science & Civics: Color Me a Watershed, Then and Now, Ecology Begins at Home, Testing the Law, Who Cares? Close to Home, Is There Hardpan Underfoot?, Where does the Water Run?, Limits to Living Here, A place for Every Living Thing, How to Evaluate Habitats	Adopt a Forest, Cast of Thousands, Nature of Plants, Home Sweet Home, Story of Succession, Understanding Fire, Fire Management (Forest Ecology); Waste to Energy, Where Did Your Garbage Go?, Landfills (MSW)	• List variables that can cause changes to ecosystems (e.g., climate change and human activities such as the introduction of nonnative species and the conversion of land [loss of habitat]). • Provide examples of how each of these variables can lead to changes in ecosystems. • Categorize the effects on ecosystems as short-term, long-term or not determined • Determine if these variables have cumulative and/or synergistic effects on ecosystems. • Catalog the factors that influence the scope, scale and duration of these effects on ecosystems. • Explain the spectrum of factors and the processes that are involved in analysis and decision-making regarding the management of ecosystems.

c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.	· Macroinvertebrate Mayhem, (p: 322) · Where Are The Frogs?, (p: 279)	A Picture is Worth a Thousand Words, Artic Survival, Back From the Brink, Bird Song Survey, Birds of Prey, Bottleneck Genes, Carrying Capacity, Deer Dilemma, Dropping in on Deer, From Bison to Bread, Here Today, Gone Tomorrow, Oh Deer, Sea Turtle International, Turkey Trouble Aquatic WILD: Dam Design, Eat & Glow, Hooks and Ladders, Migration Headache, The Glass Menageries, Turtle Hurdles, Wetland Metaphors, Where Have All the Salmon Gone. Science & Civics: The Law: Before and After	Home Sweet Home (Forest Ecology)	• Describe human activities that can directly and indirectly cause fluctuations in population size in an ecosystem. • Identify how fluctuations in population size in an ecosystem can influence the biodiversity, composition and viability of natural systems. • Provide examples of fluctuations in population size in an ecosystem that have been caused by human activities.
d. Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.	· Sparkling Water, (p: 348) · People of the Bog, (p: 89) · Super Bowl Surge, (p: 353)	Aquatic WILD: Eat & Glow Science & Civics: To Breathe or Not To Breathe, Change my pH and I'll Change Yours, Feeding the Soil, How to Evaluate Habitats	Cast of Thousands, The Nature of Plants, Fire Management (Forest Ecology); Composting (MSW)	• Analyze the roles of water, carbon, nitrogen, and oxygen cycles and processes in the functioning of terrestrial, freshwater, coastal and marine ecosystems. • Describe the roles of cycles and processes in yielding the goods and ecosystem services upon which humans depend. • Appraise how human practices benefit from the cycles and processes that occur in terrestrial, freshwater, coastal and marine ecosystems. • Analyze how various human practices can alter the cycles and processes that affect the functioning of natural systems.

e. Students know a vital part of an ecosystem is the stability of its producers and decomposers.	· People of the Bog, (p: 89) · Where Are The Frogs?, (p: 279) · Macroinvertebrate Mayhem, (p: 322) · Sum of the Parts, (p: 267)** · Color Me A Watershed, (p: 223)**	Ants on a Twig, Artic Survival, Back From the Brink, Deer Dilemma, Dropping in on Deer, Eco-Enrichers, From Bison to Bread, Hazardous Links: Possible Solutions, How Many Bears Can Live in this Forest, Riparian Retreat Aquatic WILD: Blue Ribbon Niche, Micro Odyssey, Wetland Metaphors Science & Civics: Who Lives in This Soil?	Adopt a Forest (Forest Ecology); Composting (MSW)	• Analyze the role of producers and decomposers in transferring energy and matter through natural systems. • Provide examples of how producers and decomposers produce goods and ecosystem services that are essential to all organisms, including humans. • Describe how humans and their practices benefit from the stability of producers and decomposers in natural systems. • Evaluate how various human practices can alter the stability of producers and decomposers in natural systems. • Identify what can happen to an ecosystem if the stability of its producers and decomposers is compromised.
f. Students know at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.		Artic Survival, Back from the Brink, Birds of Prey, Deer Dilemma, Dropping in on Deer, From Bison to Bread, Hazardous Links: Possible Solutions, Oh Deer!, What Did Your Lunch Cost Wildlife? Aquatic WILD: Blue Ribbon Niche, Dam Design, Designing a Habitat, Micro Odyssey Science & Civics: Who Lives in Soil?	Composting (MSW)	• Describe how humans and their practices benefit from the stability of food chains and webs in natural systems. • Identify what can happen if links in a food chain or web are changed or eliminated. • Provide examples of human practices that can alter food chains and webs.
g. * Students know how to distinguish between the accommodation of an individual organism to its environment and the gradual adaptation of a lineage of organisms through genetic change.		Artic Survival, Back from the Brink, From Bison to Bread, I'm Thirsty!, Turkey Trouble Aquatic WILD: Dam Design, Eat & Glow, Fashion a Fish	Saga of the Gypsy Moth (Forest Ecology)	• Provide examples of environmental changes, including those caused by human activities, that individual organisms can and cannot accommodate. • Provide examples of environmental changes, including those caused by human activities that individual organisms accommodate. • Describe what happens to organisms if they cannot accommodate an environmental change. • Explain how the capacity of a natural system to adjust to human-caused environmental change depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

Evolution (High School- Biology/Life Science)				
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:				
a. Students know why natural selection acts on the phenotype rather than the genotype of an organism.		Bottleneck Genes		• Recognize that an organism's ability to survive in its environment is dependent on its genetically determined capabilities and that individual organisms cannot change their genetic makeup in order to survive.
d. Students know variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.		Bottleneck Genes	Saga of the Gypsy Moth, Story of Succession, Understanding Fire (Forest Ecology)	• Recognize that human practices can change environmental conditions and affect the survival of both individual organisms and particular populations of a species. • Explain that the scope, scale, and duration of human activities and the nature of the resulting byproducts affect the capacity of individual organisms and particular populations of a species to adjust to alterations.
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.		Bottleneck Genes	Story of Succession, Understanding Fire, Fire Management (Forest Ecology)	• Identify the natural factors that can influence the rates at which environments change. • Recognize the natural factors that can influence the differential survival of groups of organisms. • Describe human activities that can influence the rates at which environments change. • Provide examples of human activities that can influence the differential survival of groups of organisms.
b. Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.		Bottleneck Genes	Cast of Thousands, Story of Succession, Understandig Fire, Fire Management (Forest Ecology)	• Recognize that interacting groups of living and non-living things and their interactions comprise ecosystems. • Give examples of the interactions and interdependence among the components of an ecosystem (e.g., plants relying on animals for pollination and seed dispersal, and animals depending on plants for food and shelter). • Identify human activities and practices that can influence the interactions and interdependence among the components of an ecosystem (e.g., alterations of habitats, methods used extract, harvest, transport, and consume natural resources). • Discuss the varied scientific views about the relationship between biological diversity and ecosystem stability.

c. Students know the effects of genetic drift on the diversity of organisms in a population.		Bottleneck Genes		
d. Students know reproductive or geographic isolation affects speciation.		Bottleneck Genes, Ecosystem Facelift, World Travelers		• Describe human activities and practices that can influence the geographic isolation of populations of organisms (e.g., the expansion of human communities). • Provide cases studies in which the introduction of non-native species into ecosystems has caused the reproductive or geographic isolation of native organisms. • Explain the factors that cause increased susceptibility of island-dwelling organisms to rapid environmental changes.
Physiology (High School- Biology/Life Science)				
10. Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:				
d. Students know there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.	· Super Sleuths, (p: 107) · Poison Pump, (p: 93)			

High School -- Earth Science

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
Dynamic Earth Processes (High School- Earth Science)				
3. Plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on Earth's surface. As the basis for understanding this concept:			Decision Making; Ecological Risk, Wildfires and Natural Hazards (Risk)	• Describe how geologic events and processes have affected the distribution of terrestrial, freshwater and coastal ecosystems, and changed the patterns of land, sea, and mountains. • Provide examples of the direct and indirect influences of these geologic events and processes on humans and human communities. • Explain how these geologic events and processes affect the distribution of goods and ecosystems services from natural systems (e.g., water supply).

Energy in the Earth System (High School- Earth Science)				
4. Energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:				• Describe how the energy-related phenomena on the Earth's surface (i.e., solar radiation and the escape of heat) influence the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of these energyrelated phenomena on humans and human communities. • Explain how these energy-related phenomena affect the distribution of goods and ecosystem services from natural systems (e.g., water supply).
a. Students know the relative amount of incoming solar energy compared with Earth's internal energy and the energy used by society.			Energy Sleuths (33-b,c); Waste to Energy (Energy and Society)	• Identify the sources of energy used by human communities and natural systems (e.g., solar energy, Earth's internal energy, energy stored on the Earth over time [oil, forests], hydropower). • Describe the uses of these sources of energy in human communities and natural systems. • Quantify the use of different sources of energy in their communities. • Provide examples of the methods used to obtain/convert and consume energy from the different sources. • Compare the effects, on both human communities and natural systems, of the methods used to obtain/convert and consume energy. • Recognize that the amount of energy used by society is relative compared to incoming solar energy and energy from Earth's interior. • Compare the relative amounts of incoming solar energy to Earth's internal energy with energy used by human society and natural systems.

b. Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.			The Nature of Plants (Forest Ecology)	• Identify the significance of solar radiation, reflection, absorption, and photosynthesis to humans, human communities and natural systems (e.g., photosynthesis as the basis of food, dissipation of energy from the Earth that moderates temperature). • Describe the roles of reflection, absorption, and photosynthesis on the processes and cycles that are required for the functioning of natural systems. • Recognize the influence of human practices and the expansion of human communities on the fate and effect of incoming solar radiation in terms of reflection, absorption, and photosynthesis (e.g., effects on local climate and microclimates, and human health).
c. Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.			The Nature of Plants (Forest Ecology)	• Identify the role of different atmospheric gases in the functioning of natural systems, human life and human communities. • Recognize the roles of natural systems and human communities in the production and absorption of atmospheric gases. • Describe the possible effects of human activities on the accumulation and dissipation of greenhouse gases. • Provide examples of the influences of the greenhouse effect and possible global climate change on natural systems and recognize that the effects depend on the characteristics of the particular natural system and the scope, scale, and duration of the changes. • Describe the spectrum of considerations that are involved in decisions about global climate change. • Describe the factors that limit knowledge about the scope and potential environmental impacts of global climate change. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to global climate change.

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:				• Explain how the production of winds and ocean currents through convection within the atmosphere and oceans (resulting from heating of Earth's surface and atmosphere) influences the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of how the convection within the atmosphere and oceans influences humans and human communities. • Explain how the convection within the atmosphere and oceans affects the distribution of goods and ecosystem services from natural systems (e.g., water supply, ocean currents).
a. Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.	· Adventures In Density, (p: 25)			• Describe the influence of atmospheric and oceanic circulation patterns on weather and weather patterns. • Explain how the circulation patterns and resulting weather patterns influence the distribution of terrestrial, freshwater and coastal ecosystems. • Provide examples of the direct and indirect influences of atmospheric and oceanic circulation patterns on humans and human communities. • Explain how of atmospheric and oceanic circulation patterns affect the distribution of goods and ecosystem services from natural systems (e.g., water supply).
b. Students know the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.	· Piece It Together, (p: 174)			• Recognize that the circular motion of ocean currents and air in pressure centers influences the distribution of nutrients and organisms, thus influencing the goods and ecosystem services provided by coastal and marine systems. • Describe how the rotation of Earth results in circulation patterns in the atmosphere and ocean that govern the flow of energy within and between natural systems. • Explain that fluctuations in climate and weather conditions resulting from the rotation of Earth and the circular motions of ocean currents affect ocean temperature, thereby changing the distribution of organisms (e.g., fish and algae) on which humans depend.

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.	· Adventures In Density, (p: 25)			• Identify the properties of ocean water that can affect the geographic distribution of coastal and marine organisms. • Describe how the layered structure of the oceans and, horizontal and vertical ocean currents influence the geographic distribution of coastal and marine organisms. • Explain the importance of coastal and marine organisms to human lives and communities. • Provide examples of human practices that can locally influence the layered structure of the oceans or horizontal and vertical ocean currents. • Explain how changes to the geographic distribution of marine organisms can influence coastal and marine ecosystems, and human communities and economies. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to coastal and marine ecosystems.
e. Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.	· Piece It Together, (p: 174) · Wet Vacation, (p: 206) *			• Describe the properties of rain forests and map their locations on Earth. • Describe the properties of deserts and map their locations on Earth. • Identify factors that affect the geographic distribution of rain forests and desert ecosystems on Earth. • Explain the importance of rain forests and desert ecosystems to human lives and communities. • Provide examples of human practices that can influence the functioning or geographic distribution of rain forests and desert ecosystems. • Explain how changes to the geographic distribution of rain forests and desert ecosystems can influence humans and human communities, economies and cultures. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to rain forests and desert ecosystems.
f.* Students know the interaction of wind patterns, ocean currents, and mountain ranges results in the global pattern of latitudinal bands of rain forests and deserts.	· Piece It Together, (p: 174) · Wet Vacation, (p: 206) * · Raining Cats and Dogs, (p: 435)			

6. Climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:				
a. Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.	· Piece It Together, (p: 174) · Wet Vacation, (p: 206) * · Raining Cats and Dogs, (p: 435)			• Describe effects of weather and climate on the functioning of natural systems and the production of goods and ecosystem services by these systems. • Provide examples of direct and indirect effects of weather and climate on humans and human communities, economies and cultures.
b. Students know the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.	· Piece It Together, (p: 174) · Wet Vacation, (p: 206) * · Raining Cats and Dogs, (p: 435)	Science & Civics: Getting Acquainted		• Provide examples of direct and indirect effects of latitude, elevation, and topography on the functioning of natural systems and the production of goods and ecosystem services by natural systems.
c. Students know how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.c. Students know how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.	· Old Water, (p: 171)		The Global Climate (84-b,c)	• Identify how changes to Earth's climate, geography, and atmospheric composition influence the functioning of natural systems and the production of goods and ecosystem services by natural systems. • Provide examples of direct and indirect effects of changes to Earth's climate, geography, and atmospheric composition on humans and human communities, economies and cultures. • Identify how human activities can contribute to changes in climate and atmospheric composition. • Describe the effects of changes to Earth's climate, geography, and atmospheric composition on evolutionary processes.
Biogeochemical Cycles (High School- 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:				
a. Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle.		Science & Civics: To Breathe or Not to Breathe	The Nature of Plants (Forest Ecology)	• Identify the significance of the carbon cycle of photosynthesis and respiration and the nitrogen cycle to natural systems and human life. • Describe the role of carbon and nitrogen cycles in the flow of energy and matter within and between natural systems and human systems. • Provide examples of the dependence of human life and human communities, economies and culture on the cycling of carbon and nitrogen. • Identify human practices that can alter carbon and nitrogen cycles.

California Geology (High School- Earth Science)				
9. The geology of California underlies the state's wealth of natural resources its natural hazards. As a basis for understanding this concept:				
a. Students know the resources of major economic importance in California and their relation to California's geology.	· Nature Rules, (p: 262) · Dust Bowls and Failed Levees, (303) · Back To The Future, (p: 293) · After Math, (p: 289)	Aquatic WILD: Dam Design Science & Civics: Color Me a Watershed, Then and Now		• List natural resources of major economic importance to California and describe how they are economically important. • Identify the sources and locations of these major natural resources in California. • Correlate the sources and locations of these major natural resources with California's geological features. • Classify these resources as renewable, non-renewable, or effectively inexhaustible. • Describe the methods used to extract, harvest, transport and consume the major natural resources and explain the effects of these practices on the geographic extent, composition, biological diversity, and viability of natural systems. • Identify the byproducts of extracting, harvesting, transporting and consuming these natural resources and describe the direct and indirect effects of those byproducts on natural systems, human life and human communities, economies and cultures. • Describe the factors that limit knowledge about the scope and potential environmental impacts resulting from extracting, harvesting, transporting and consuming the major natural resources. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to extracting, harvesting, transporting and consuming the major natural resources.

b. Students know the principal natural hazards in different California regions and the geologic basis of those hazards.		Aquatic WILD: Dam Design Science & Civics: Color Me a Watershed, Then and Now, Ecology Begins at Home, Where Does Water Run? Can Water Get Through This?, Layering the Soil, Feeding the Soil	What's a Risk?, Decsionmaking: Ecological Risks Wildfire and Natural Harzards (Risk)	• Identify the direct and indirect effects of principal natural hazards in different California regions on natural systems, human life and human communities, economies and cultures. • Recognize the influence of human practices and the expansion of human communities on the scope and scale of the impacts of the principal natural hazards in different California regions (e.g., with population increases, there is increasing pressure to build in geologically hazardous areas). • Describe how the existence of geological hazards throughout California influences decisions about a variety of human practices including the expansion and operation of human communities and use of resources. • Describe the factors that limit knowledge about the scope and scale of the potential impacts of California's principal natural hazards. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to California's principal natural hazards.

c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.	· Color Me A Watershed, (p: 223) · The Long Haul, (p: 260) · The CEO, (p: 300) · Dust Bowls and Failed Levees, (303) · Choices and Preferences, (p: 367) · Dilemma Derby, (377) · Hot Water, (p: 388) · Perspectives, (p: 397) · Water: Read All About It!, (p: 400) · Water Bill of Rights,(p: 403) · Whose Problem s It?, (p: 429) · Pass The Jug, (p: 392) · Water Works, (p: 294)*	Aquatic WILD: Dam Design Science & Civics: Color Me a Watershed, Is There Hardpan Underfoot?, Where Does Water Run? Can Water Get Through This?		• List major uses of water in California and describe their importance to society. • Identify the sources and locations of major water supplies in California (e.g., surface water, reservoirs, and aquifers). • Describe the methods used to collect, transport and consume water in California. • Provide examples of the direct and indirect effects of the growing human demand for water on the geographic extent, composition, biological diversity, and viability of natural systems. • Describe the spectrum of considerations that are involved in decisions about California's supplies of fresh water. • Describe the factors that limit knowledge about the scope and potential environmental impacts of water resource policies (e.g., economics, environmental costs and benefits, public health, historical and cultural implications, and personal views). • Describe the role of scientific knowledge on making policy and management decisions about human activity related to California's water supply.
d.* Students know how to analyze published geologic hazard maps of California and know how to use the map's information to identify evidence of geologic events of the past and predict geologic changes in the future.			Decisionmaking: Ecological Risks-Wildfire and Natural Hazards (Risk)	• Describe the spectrum of considerations that are involved in decisions about human communities and activities related to California's geological hazards. • Describe the factors that limit knowledge about the scope and potential effects of geological hazards on California's human communities. • Describe the role of scientific knowledge on making policy and management decisions about human activity related to California's geological hazards

High School -- Investigation & Experimentation

Academic Content Standards	Project WET Activities	Project WILD Activities	Project Learning Tree Activities	Current Model Curriculum
1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other 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, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.		Flip the Switch for Wildlife, Improving Wildlife Habitat in the Community, Planning for People and Wildlife, Polar Bears in Phoenix, Rainfall and the Forest, Spider Web Geometry Aquatic WILD: Dam Design, Designing A Habitat, How Wet is Our Planet? Pond Succession, Puddle Wonders, The Edge of Home, Water Canaries, Water's Going on?, Where Does the Water Run? Science & Civics: Ecology Begins at HOME, Getting Acquainted, The Law: Before and After, Wild Bill's Fate, Give Wildlife a Break, Executive Prerogatives, Testing the Law, Do You Hear What I Hear, See What I See?, What's Their Difference?, Is There a Feather in My Cap?, Legal Eagles, Who Cares?, Close to Home, Is There Hardpan Underfoot?, Where Does Water Run?, Can Water Get Through This?, Layering he Soil, To Breathe or Not to Breathe, Feeding the Soil, Who lives in Soil?, A Place for Every Living Thing, Defining Action, Planning to Act, Telling the World		The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards." Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "hands-on activities compos) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework."

c. Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.		Carrying Capacity, How Many Bears Can Live in this Forest?, Oh Deer!, Rainfall and the Forest, Aq. WILD- Designing a Habitat, How Wet is our Planet?, Migration Headache, The Edge of Home, Water Canaries, Where Have All the Salmon Gone? Sci & Civ- Do You Hear What I Hear, See What I See?, Is There a Feather in My Cap?, Who Lives in Soil?, What Did They Do Over There? A Job Well Done	Composting (MSW)	

d. Formulate explanations by using logic and evidence. d. (Continued)		Birds of Prey, Carrying Capacity, How Many Bears Can Live in this Forest?, Improving Wildlife Habitat in the Community, Oh Deer!, Planning for People and Wildlife, Polar Bears in Phoenix, Rainfall and the Forest, Spider Web Geometry, Urban Nature Search Aquatic WILD: Aquatic Roots, Aquatic Times, Blue Ribbon Niche, Dam Design, Designing a Habitat, Dragonfly Pond, Mermaids and Manatees, Micro Odyssey, Pond Succession, Puddle Wonders, Something's Fishy Here!, The Edge of Home, The Glass Menagerie, Water Canaries, Water's Going On?, Wetland Metaphors Science & Civics: Color Me a Watershed, Then and Now, Ecology Begins at Home, Structural Review, The Law: Before and After, Wild Bill's Fate, Give Wildlife a Break, Executive Prerogatives, Testing the Law, Do You Hear What I Hear, See What I See?, What's Their Difference? Legal Eagles, Who Cares? Close to Home, Is There Hardpan Underfoot?, Where Does the Water Run?, Can Water Get Through This?, Layering the Soil, To Breathe or Not to Breathe, Change My pH and I'll Change Your, Feeding the Soil, Limits to Living Here, Who Lives in Soil? A Place for Every Living Thing, How to Evaluate Habitats, Defining Action, What Did They Do Over There?, Caring to Act, Planning to Act	Composting , Where does Your Garbage Go? (MSW)	

f. Distinguish between hypothesis and theory as scientific terms.		Birds of Prey, Flip the Switch for Wildlife Aquatic WILD: Dam Design, The Edge of Home, The Glass Menagerie, Water Canaries, Where Have all the Salmon Gone?		
g. Recognize the usefulness and limitations of models and theories as scientific representations of reality.		Carrying Capacity, Flip the Switch for Wildlife, How Many Bears can Live in This Forest?, Improving Wildlife Habitat in the Community, My Kingdom for a Shelter, Planning for People and Wildlife, Polar Bears in Phoenix, Rainfall and the Forest, Spider Web Geometry Aquatic WILD: Blue Ribbon Niche, Dam Design, Designing a Habitat, Dragonfly Pond, Fashion a Fish, Hooks and Ladders, How Wet is Our Planet?, Migration Headache, Pond Succession, Turtle Hurdles, Watershed, Water's Going On?		
h. Read and interpret topographic and geologic maps.		Rainfall and the Forest Aquatic WILD: Dam Design, Fishy Who's Who, How wet is Our Planet?, Watershed Science & Civics: Getting Acquainted, Legal Eagles, Close to Home, Who Lives in Soil? Defining Actions, Planning to Act		

i. Analyze the locations, sequences, or time intervals that are characteristic of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem).		Birds of Prey, Habitrekking, How Many Bears Can Live in this Forest? Oh Deer!, Rainfall and the Forest, Spider Web Geometry Aquatic WILD: Alice in Waterland, Aquatic Roots, Blue Ribbon Niche, How Wet is Our Planet?, Migration Headache, Pond Succession, Turtle Hurdles, Watershed, Water Canaries, Where Does Water Run? Where Have All the Salmon Gone? Science & Civics: Color Me a Watershed, Close to Home, Where Does Water Run?, Can Water Get Through This?, Layering the Soil, Limits to Living Here, Who Lives in Soil?, A Place for Every Living Thing, How to Evaluate Habitats, Defining Actions, Planning to Act		
j. Recognize the issues of statistical variability and the need for controlled tests.		Eco-Enrichers Aquatic WILD: Dam Design, The Glass Menagerie, What's in the Air? Science & Civics: The Law: Before and After, Wild Bill's Fate, Do You Hear What I Hear, See What I See?, Is There a Feather in My Cap?		

k. Recognize the cumulative nature of scientific evidence.		Birds of Prey, Habitrekking, Rainfall and the Forest, Spider Web Geometry, Urban Nature Search Aquatic WILD: Alice in Waterland, Blue Ribbon Niche, Dam Design, Designing A Habitat, Fishy Who's Who, How Wet is our Planet?, Puddle Wonders, The Edge of Home, The Glass Menagerie, Watershed, Water Canaries, What in the Air, Where Does Water Run?, Where Have all the Salmon Gone? Science & Civics: Wild Bill's Fate, Is there a Feather in My Cap?, Feeding the Soil, What Did They Do Over There?		

l. Analyze situations and solve problems that require combining and applying concepts from more than one area of science.		Birds of Prey, Flip the Switch for Wildlife, Habitrekking, How many Bears can Live in This Forest? Improving Wildlife Habitat in the Community, Planning for People and Wildlife, Polar Bears in Phoenix, Rainfall and the Forest, Spider Web Geometry Aquatic WILD: Alice in Waterland, Dam Design, Designing a Habitat, Micro Odyssey, Puddle Wonders, The Glass Menagerie, To Dam or Not to Dam, Watershed, Water Canaries, What's in the Air?, What's in the Water?, Wetland Metphors Science & Civics: Give Wildlife a Break, Testing the Law, Do You Hear What I hear, See What I See>, Is There a feather in My Cap? Feeding the Soil, How to Evaluate Habitats, Defining Action, Planning, to Act, A Job Well Done		

m. Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.	· Back To The Future, (p: 293) · The Price Is Right, (p: 333) · Super Bowl Surge, (353) · Hot Water, (p: 388) · Water: Read All About It!, (p: 400) · Whose Problem s It?, (p: 429) · Color Me A Watershed, (p: 223) · Dust Bowls and Failed Levees, (303) · Choices and Preferences, (p: 367) · Dilemma Derby, (377) · Perspectives, (p: 397) · Pass The Jug, (p: 392)	Flip the Switch for Wildlife, Improving Wildlife Habitat in the Community, I'm Thirsty!, Planning for People and Wildlife, Rainfall and the Forest Aquatic WILD: Alice in Waterland, Aquatic Roots, Aquatic Times, Dam Design, Dragonfly Pond, How Wet is Our Planet?, Mermaids and Manatees, To Dam or Not to Dam, Wetlands Metaphors Science & Civics: Color Me a Watershed, Then and Now, Ecology Begins at Home, Structural Review, The Law: Before and After, Wild Bill's Fate, Give Wildlife a Break, Executive Prerogatives, Testing the Law, Do You Hear What I Hear, See What I See?, What's Their Difference?, Is There a Feather in My Cap?, Legal Eagles, Who Cares? Close to Home, Can Water Get Through This?, Layering the Soil, To Breathe or Not to Breathe, Change My pH and I'll Change Yours, Feeding the Soil, Limits to Living Here, Who Lives in Soil?, A place for Every Living Thing, How to Evaluate Habitats, Defining Action, What Do People Think?, What Did They Do Over There?, Caring To Act, Planning to Act, A Job Well Done, Telling the World	Source Reduction, Waste to Energy (MSW)	
m. (Continued)				
n. Know that when an observation does not agree with an accepted scientific theory, the observation is sometimes mistaken or fraudulent (e. g., the Piltdown Man fossil or unidentified flying objects) and that the theory is sometimes wrong (e.g., the Ptolemaic model of the movement of the Sun, Moon, and planets).	· Super Sleuths, (p: 107)			

Participants in the review of the "Project Learning Tree, Project WILD and Aquatic WILD, and Project WET materials and the development of a cross reference correlation to the Environmental Education Initiative's Environmental Principles and Concepts (EP&C) and Standards-based learning objectives included:

PROJECT LEARNING TREE

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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 -5 years
State Coordinator – Project Learning Tree, California Department of Forestry and Fire Protection -18 years
Project Learning Tree PreK-8 revisions team (1990-93, 2001-2005), Spanish translations, Secondary modules (reviewer)
Author: "Investigating the Oak Community" (grades 4-8)

Marianne Chang
B.A. International Relations
California Teaching Credential – multiple subjects (K-8)
Reading Certificate, CLAD
Classroom teacher (grades 1, 2, 5) -10 years
Reading Specialist, Reading Recovery teacher
Literacy Coach
Scorer – CA Subjects Examination for Teachers (CSET) multiple subject exam and Reading Instruction Competency Assessment (RICA)
PLT "Educator of the Year" award (1998)
Member - California PLT Advisory Committee
Author - Science Correlations and curriculum development for PLT's Energy and Society (2000)
Reviewer – PLT Correlations to National Social Studies Standards (1999)
Facilitator – Project Learning Tree
Writer – CA content standard correlation, Ag in the Classroom "What's Growin' On?" (5th edition)

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 - 15 years
PLT "Educator of the Year" award (2005)
Member - California PLT Advisory Committee
Facilitator – Project Learning Tree, Project WET, Project WILD programs
Correlated all Placer Nature Center curriculum materials to CA Standards

Dennis Mitchell

BA, Liberal Studies
California Teaching Credential (Life) Multiple Subjects
Science and Math teacher (grades 3, 8) - 28 years
Staff development and education consultant – 22 years
Staff developer – California Science Project – 5 years
Science in Rural California – 7 years
Science Project (Project ARISE) – 4 years
K12 Alliance (science) – 2 years
Thematic teaching, science curriculum specialist
Mentor Teacher, Master teacher for pre-service credential programs
PLT "Educator of the Year" (2000)
Education Staff – Forestry Institute for Teachers – 13 years
Facilitator – Project Learning Tree, Project WILD

CALIFORNIA PROJECT WET

Brian Brown

B. S. Forestry, B.A. Social Sciences- Humboldt State University
California Teaching Clear Credentials: Multiple Subjects, Single subject, Life Sciences and Social Sciences
Teacher, Residential Outdoor/Environmental Science – 14 years
Education Staff – Forestry Institute for Teachers - 14 years
State Coordinator, California Project WET - 2 years
Member - California PLT Advisory Committee
Member- California Foundation for Ag. In the Classroom Education Committee
Facilitator for Project Learning Tree, Project WET, Project WILD and BLM Fire Education programs

Ursula Heffernon

B. S. Biological Sciences, M. T. Medical Technology
California Teaching Credential (clear), Biological Sciences and Chemistry
Classroom teacher – middle and high school
Research and development – Atomic Energy Commission and Pharmaceuticals
Education Director – Burrowing Owl Preservation Society and Solano Co. Water Education Program (including curriculum development)
Facilitator for Project WET and Project WILD

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B.A./B.S. Biology/Anthropology
Water Education Program Specialist – teacher workshops, student instruction
Developed student journals (grades 4-6) used with water education program and aligned with California Science Standards.
CABAP(California Building a Presence for ScienceMember - Department of Water Resources Water and
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California Science Teachers Association's Informal Science Educator Award (2002)
Facilitator for Project WET, Project WILD, Wonders of Wetlands
Former Education Director at the Hawaii's Children's Museum and the Discovery Center of Sonoma County.

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B.A. Biological Sciences, M.A., Secondary Science Education
California Teaching Credential (life) Secondary Science
Classroom Teacher (grades 6-12) – 12 years
Master Teacher – California State University, Sacramento
Education Director – Water Education Foundation - 20 years
California Coordinator – Project WET -10 years
Writing Team for Project WET
National Project WET Advisory Council – 5 years
Other curricula written: "California Water Story" (grades 4-5), "Project Water Science (grades 5-8), "California Water Problems" (grades 9-14), "Groundwater Education" (grades 6-10), "Fountains of Columbia" (grades 4-5), "Water Recycling" (grades 4-6).

PROJECT WILD

Bobbie Winn

B.S. Design/Home Economics, minor Life Science- University of California, Davis
Graduate studies Art Education- California State University, Sacramento; Certified-Early Childhood Education
Classroom Resource Teacher - art and science (K-3) - 5 years
Teacher-Pre-school and extended day program - 8 years
California Project WILD Coordinator, Department of Fish and Game - 9 years
Project WILD Guide Revision Team -activity writer and reviewer for both WILD K-12 and Aquatic WILD (1999-2000)
Co-author of California Aquatic WILD Early Childhood Education Supplement
Development team and writer for the American River Salmon Festival Educator Activity Guide (grade K-8) and Be Bear Aware Curriculum Guide (grades 4-6)
Feature writer for Outdoor California magazine – Kids Opportunity section -5 years
Writing and program development team of the California 4-H Habitat Evaluation Program (developed the WHEP concepts and activity guide)

Diane Coventry

B. A. Geology, M. S. Science Education (in progress)
California Teaching Credential
Classroom Teacher – (grades 4, 5 and middle school math and science) – 15 years
District site science teacher leader
Chevron Geologic Assistant – 10 years
Facilitator – Project WILD

Natalie Schaefer

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California Teaching Credential, Administrative Services Credential (preliminary)
Classroom Teacher – (grades 4-12, science) - 25 years
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