

Inquiry Investigations™
Environmental Issues and Solutions MODULE - 1287226
Grades: 7-10

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California Content Standards
Science
Grade 7

CONTENT STANDARD	CA.1.	Life Science: Cell Biology: 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:
PERFORMANCE STANDARD	1.a.	Students know cells function similarly in all living organisms. <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
PERFORMANCE STANDARD	1.d.	Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis. <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	1.f.	Students know that as multicellular organisms develop, their cells differentiate. <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.2.	Life Science: Genetics: 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:
PERFORMANCE STANDARD	2.e.	Students know DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell. <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT STANDARD	CA.5.	Life Science: Structure and Function in Living Systems: The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept:
PERFORMANCE STANDARD	5.a.	Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism. <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet

		<ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
PERFORMANCE STANDARD	5.b.	<p>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.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
PERFORMANCE STANDARD	5.c.	<p>Students know how bones and muscles work together to provide a structural framework for movement.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
PERFORMANCE STANDARD	5.f.	<p>Students know the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants
CONTENT STANDARD	CA.7.	<p>Life Science: Investigation and Experimentation: 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:</p>
PERFORMANCE STANDARD	7.a.	<p>Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
<p>PERFORMANCE STANDARD</p>	<p>7.c.</p>	<p>Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
<p>PERFORMANCE STANDARD</p>	<p>7.d.</p>	<p>Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
PERFORMANCE STANDARD	7.e.	<p>Communicate the steps and results from an investigation in written reports and oral presentations.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1:

		<p>Modeling a Water Treatment Plant</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
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**California Content Standards
Science
Grade 8**

CONTENT STANDARD	CA.5.	Physical Science: Reactions: Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. As a basis for understanding this concept:
PERFORMANCE STANDARD	5.a.	<p>Students know reactant atoms and molecules interact to form products with different chemical properties.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis
PERFORMANCE STANDARD	5.c.	<p>Students know chemical reactions usually liberate heat or absorb heat.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
PERFORMANCE STANDARD	5.d.	<p>Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
PERFORMANCE STANDARD	5.e.	<p>Students know how to determine whether a solution is acidic, basic, or neutral.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants
CONTENT STANDARD	CA.7.	Physical Science: Periodic Table: The organization of the periodic table is based on the properties of the elements and reflects the structure of atoms. As a basis for understanding this concept:
PERFORMANCE STANDARD	7.c.	<p>Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.</p>

		<ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.8.	Physical Science: Density and Buoyancy: All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept:
PERFORMANCE STANDARD	8.a.	<p>Students know density is mass per unit volume.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
PERFORMANCE STANDARD	8.b.	<p>Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.9.	Physical Science: Investigation and Experimentation: 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:
PERFORMANCE STANDARD	9.c.	<p>Distinguish between variable and controlled parameters in a test.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
PERFORMANCE STANDARD	9.f.	<p>Apply simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed = distance/time, density = mass/volume, force = pressure x area, volume =</p>

		<p>area x height).</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
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California Content Standards

Science

Grade 9

CONTENT STANDARD	CA.3.	Physics: Heat and Thermodynamics: Energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat. As a basis for understanding this concept:
PERFORMANCE STANDARD	3.a.	<p>Students know heat flow and work are two forms of energy transfer between systems.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
CONTENT STANDARD	CA.4.	Physics: Waves: Waves have characteristic properties that do not depend on the type of wave. As a basis for understanding this concept:
PERFORMANCE STANDARD	4.a.	<p>Students know waves carry energy from one place to another.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.5.	Chemistry: Acids and Bases: Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept:
PERFORMANCE STANDARD	5.d.	<p>Students know how to use the pH scale to characterize acid and base solutions.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants
CONTENT STANDARD	CA.6.	Chemistry: Solutions: Solutions are homogenous mixtures of two or more substances. As a basis for understanding this concept:
PERFORMANCE STANDARD	6.b.	<p>Students know how to describe the dissolving process at the molecular level by using the concept of random molecular motion.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
PERFORMANCE	6.c.	Students know temperature, pressure, and surface area affect the

STANDARD		<p>dissolving process.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
CONTENT STANDARD	CA.7.	Chemistry: Chemical Thermodynamics: Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept:
PERFORMANCE STANDARD	7.b.	<p>Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
CONTENT STANDARD	CA.1.	Biology/Life Sciences: Cell Biology: 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:
PERFORMANCE STANDARD	1.f.	<p>Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD	CA.4.	Biology/Life Sciences: Genetics: Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. As a basis for understanding this concept:
PERFORMANCE STANDARD	4.c.	<p>Students know how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT STANDARD	CA.6.	Biology/Life Sciences: Ecology: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
PERFORMANCE STANDARD	6.a.	<p>Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.b.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1:

		<p>Modeling a Water Treatment Plant</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
<p>PERFORMANCE STANDARD</p>	<p>6.c.</p>	<p>Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3:

		<p>Evaluating the Health of an Ecosystem</p> <ul style="list-style-type: none"> • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
PERFORMANCE STANDARD	6.d.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.e.	<p>Students know a vital part of an ecosystem is the stability of its producers and decomposers.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.f.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.g.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.7.	Biology/Life Sciences: Evolution: 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:
PERFORMANCE STANDARD	7.c.	<p>Students know new mutations are constantly being generated in a gene pool.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT	CA.8.	Biology/Life Sciences: Evolution: Evolution is the result of genetic

STANDARD		changes that occur in constantly changing environments. As a basis for understanding this concept:
PERFORMANCE STANDARD	8.b.	<p>Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD	CA.10.	Biology/Life Sciences: Physiology: Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:
PERFORMANCE STANDARD	10.d.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Teacher Resource CD: Environmental Issues
CONTENT STANDARD	CA.4.	Earth Sciences: Energy in the Earth System: Energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:
PERFORMANCE STANDARD	4.b.	<p>Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	4.c.	Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse

		<p>effect.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
PERFORMANCE STANDARD	4.d.	<p>Students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climatic consequences of each.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD	CA.5.	<p>Earth Sciences: Energy in the Earth System: 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:</p>
PERFORMANCE STANDARD	5.a.	<p>Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming Teacher Resource CD: Air, Water, and Soils
PERFORMANCE STANDARD	5.e.	<p>Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
CONTENT STANDARD	CA.6.	<p>Earth Sciences: Energy in the Earth System: Climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:</p>
PERFORMANCE STANDARD	6.a.	<p>Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Environmental Issues
PERFORMANCE STANDARD	6.d.	<p>Students know how computer models are used to predict the effects of the increase in greenhouse gases on climate for the planet as a whole and for specific regions.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD	CA.7.	<p>Earth Sciences: Biogeochemical Cycles: 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:</p>
PERFORMANCE STANDARD	7.a.	<p>Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3:

		<p>Soil Testing For Nitrogen, pH, and Phosphates</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	7.b.	<p>Students know the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	7.c.	<p>Students know the movement of matter among reservoirs is driven by Earth's internal and external sources of energy.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	7.d.	<p>Students know the relative residence times and flow characteristics of carbon in and out of its different reservoirs.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD	CA.8.	<p>Earth Sciences: Structure and Composition of the Atmosphere: Life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:</p>
PERFORMANCE STANDARD	8.a.	<p>Students know the thermal structure and chemical composition of the atmosphere.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Air, Water, and Soils
PERFORMANCE STANDARD	8.c.	<p>Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
CONTENT STANDARD	CA.9.	<p>Earth Sciences: California Geology: The geology of California underlies the state's wealth of natural resources as well as its natural hazards. As a basis for understanding this concept:</p>
PERFORMANCE	9.a.	<p>Students know the resources of major economic importance in California</p>

STANDARD		<p>and their relation to California's geology.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Environmental Issues
PERFORMANCE STANDARD	9.c.	<p>Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant
CONTENT STANDARD	CA.1.	<p>Investigation and Experimentation: 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:</p>
PERFORMANCE STANDARD	1.a.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
<p>PERFORMANCE STANDARD</p>	<p>1.d.</p>	<p>Formulate explanations by using logic and evidence.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
PERFORMANCE STANDARD	1.e.	<p>Solve scientific problems by using quadratic equations and simple trigonometric, exponential, and logarithmic functions.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
PERFORMANCE STANDARD	1.g.	<p>Recognize the usefulness and limitations of models and theories as scientific representations of reality.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1:

		<p>Modeling Salt Runoff Discharge</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
PERFORMANCE STANDARD	1.i.	<p>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).</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
PERFORMANCE STANDARD	1.j.	<p>Recognize the issues of statistical variability and the need for controlled tests.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
PERFORMANCE STANDARD	1.m.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2:

		<p>Cleaning Up Shore Environments</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
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California Content Standards
Science
Grade 10

CONTENT STANDARD	CA.3. Physics: Heat and Thermodynamics: Energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat. As a basis for understanding this concept:
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PERFORMANCE STANDARD	3.a.	Students know heat flow and work are two forms of energy transfer between systems. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
CONTENT STANDARD	CA.4.	Physics: Waves: Waves have characteristic properties that do not depend on the type of wave. As a basis for understanding this concept:
PERFORMANCE STANDARD	4.a.	Students know waves carry energy from one place to another. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.5.	Chemistry: Acids and Bases: Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept:
PERFORMANCE STANDARD	5.d.	Students know how to use the pH scale to characterize acid and base solutions. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants
PERFORMANCE STANDARD	5.f.	Students know how to calculate pH from the hydrogen-ion concentration. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants
CONTENT STANDARD	CA.6.	Chemistry: Solutions: Solutions are homogenous mixtures of two or more substances. As a basis for understanding this concept:
PERFORMANCE STANDARD	6.c.	Students know temperature, pressure, and surface area affect the dissolving process. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
CONTENT STANDARD	CA.7.	Chemistry: Chemical Thermodynamics: Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept:
PERFORMANCE STANDARD	7.b.	Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1:

		Modeling Salt Runoff Discharge
CONTENT STANDARD	CA.1.	Biology/Life Sciences: Cell Biology: 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:
PERFORMANCE STANDARD	1.f.	Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD	CA.4.	Biology/Life Sciences: Genetics: Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. As a basis for understanding this concept:
PERFORMANCE STANDARD	4.c.	Students know how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT STANDARD	CA.6.	Biology/Life Sciences: Ecology: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
PERFORMANCE STANDARD	6.a.	Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.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. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
PERFORMANCE STANDARD	6.c.	Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
<p>PERFORMANCE STANDARD</p>	<p>6.d.</p>	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Teacher Resource CD: Air, Water, and Soils

		<ul style="list-style-type: none"> Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.e.	<p>Students know a vital part of an ecosystem is the stability of its producers and decomposers.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.f.	<p>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.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	6.g.	<p>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.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
CONTENT STANDARD	CA.7.	Biology/Life Sciences: Evolution: 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:
PERFORMANCE STANDARD	7.c.	<p>Students know new mutations are constantly being generated in a gene pool.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT STANDARD	CA.8.	Biology/Life Sciences: Evolution: Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:
PERFORMANCE STANDARD	8.b.	<p>Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1:

		<p>Modeling a Water Treatment Plant</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD	CA.10.	Biology/Life Sciences: Physiology: Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:
PERFORMANCE STANDARD	10.d.	<p>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.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution Teacher Resource CD: Environmental Issues
CONTENT STANDARD	CA.4.	Earth Sciences: Energy in the Earth System: Energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:
PERFORMANCE STANDARD	4.b.	<p>Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	4.c.	<p>Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
PERFORMANCE STANDARD	4.d.	<p>Students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climatic consequences of each.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD	CA.5.	Earth Sciences: Energy in the Earth System: 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:

PERFORMANCE STANDARD	5.a.	<p>Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Air, Water, and Soils
PERFORMANCE STANDARD	5.e.	<p>Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
CONTENT STANDARD	CA.6.	<p>Earth Sciences: Energy in the Earth System: Climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:</p>
PERFORMANCE STANDARD	6.a.	<p>Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Environmental Issues
PERFORMANCE STANDARD	6.d.	<p>Students know how computer models are used to predict the effects of the increase in greenhouse gases on climate for the planet as a whole and for specific regions.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD	CA.7.	<p>Earth Sciences: Biogeochemical Cycles: 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:</p>
PERFORMANCE STANDARD	7.a.	<p>Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	7.b.	<p>Students know the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	7.c.	<p>Students know the movement of matter among reservoirs is driven by</p>

		<p>Earth's internal and external sources of energy.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
PERFORMANCE STANDARD	7.d.	<p>Students know the relative residence times and flow characteristics of carbon in and out of its different reservoirs.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD	CA.8.	<p>Earth Sciences: Structure and Composition of the Atmosphere: Life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:</p>
PERFORMANCE STANDARD	8.a.	<p>Students know the thermal structure and chemical composition of the atmosphere.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Air, Water, and Soils
PERFORMANCE STANDARD	8.c.	<p>Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
CONTENT STANDARD	CA.9.	<p>Earth Sciences: California Geology: The geology of California underlies the state's wealth of natural resources as well as its natural hazards. As a basis for understanding this concept:</p>
PERFORMANCE STANDARD	9.a.	<p>Students know the resources of major economic importance in California and their relation to California's geology.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Environmental Issues
PERFORMANCE STANDARD	9.c.	<p>Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant
CONTENT STANDARD	CA.1.	Investigation and Experimentation: 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:
PERFORMANCE STANDARD	1.a.	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3:

		<p>Constructing a Predator-Prey Food Web</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
<p>PERFORMANCE STANDARD</p>	<p>1.d.</p>	<p>Formulate explanations by using logic and evidence.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2:

		<p>Identifying Owl Prey</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
PERFORMANCE STANDARD	1.e.	<p>Solve scientific problems by using quadratic equations and simple trigonometric, exponential, and logarithmic functions.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
PERFORMANCE STANDARD	1.g.	<p>Recognize the usefulness and limitations of models and theories as scientific representations of reality.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
PERFORMANCE STANDARD	1.i.	<p>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).</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3:

		<p>Constructing a Predator-Prey Food Web</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
PERFORMANCE STANDARD	1.j.	<p>Recognize the issues of statistical variability and the need for controlled tests.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
PERFORMANCE STANDARD	1.i.	<p>Analyze situations and solve problems that require combining and applying concepts from more than one area of science.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3:

		<p>Soil Testing For Nitrogen, pH, and Phosphates</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
<p>PERFORMANCE STANDARD</p>	<p>1.m.</p>	<p>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.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill • Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 2: Cleaning Up Shore Environments • Environmental Issues and Solutions: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens

		<ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 1: Soil Analysis • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 2: Soil Porosity and Permeability • Environmental Issues and Solutions: Unit 2 Lab 7 Activity 3: Soil Testing For Nitrogen, pH, and Phosphates • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1: How Water Pollutants Are Measured • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 2: Water Analysis • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 4: Observing the Effects of Acid Rain and Other Pollutants on Plants • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 1: Dissecting an Owl Pellet • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey • Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
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