

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

Frey Scientific
 80 Northwest Boulevard
 Nashua, NH 03063-4067
 1-800-225-3739
 www.freyscientific.com
 www.freyscientific.com/inquiryinvestigations

Washington D.C. Learning Standards
Science
Grade 7

CONTENT STANDARD / STRAND / DISCIPLINE	DC.7.1. Scientific Thinking and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	<p>7.1.4. Recognize testable hypotheses in investigations that pertain to the content under study, and write instructions others can follow in carrying out the investigation.</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

		<ul style="list-style-type: none"> 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
STANDARD / ESSENTIAL SKILL	7.1.6.	<p>Incorporate circle charts, bar and line graphs, diagrams, scatter plots, and symbols into writing, such as lab or research reports, to serve as visual displays of evidence for claims and/or conclusions.</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 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
CONTENT STANDARD / STRAND / DISCIPLINE	DC.7.3.	Biological Classification: Broad Concept: Similarities are used to classify organisms since they may be used to infer the degree of relatedness among organisms. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	7.3.1.	<p>Recognize and describe that a key distinction among organisms is between autotrophs, such as green plants (which use energy from sunlight to make their own food), and heterotrophs, such as animals and fungi (which consume other organisms as food and harvest energy from them).</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 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 Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	7.3.2.	Recognize and describe that biological classifications are based on how organisms are related: Organisms are classified into a hierarchy of groups and subgroups, with species the most fundamental unit.

		<ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
STANDARD / ESSENTIAL SKILL	7.3.3.	<p>Recognize and describe the definition of a species as a group or population of organisms closely resembling one another that can mate and breed to produce fertile offspring.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
CONTENT STANDARD / STRAND / DISCIPLINE	DC.7.4.	<p>Cell Biology: Broad Concept: All living things are composed of cells, from just one to many quadrillions, whose details usually are visible only through a microscope. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	7.4.1.	<p>Investigate and explain that all living things are composed of one or more cells; cells are organisms' basic units of structure and function; and cells come only from existing cells (Theodor Schwann's and Matthias Schleiden's cell theory).</p> <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
STANDARD / ESSENTIAL SKILL	7.4.2.	<p>Describe that the way in which cells function is similar in all living organisms.</p> <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
STANDARD / ESSENTIAL SKILL	7.4.5.	<p>Know intracellular bodies with specific functions are called organelles. Describe that important among them are mitochondria which liberate energy for the work that cells do, and chloroplasts which capture sunlight energy for photosynthesis.</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
STANDARD / ESSENTIAL SKILL	7.4.7.	<p>Observe and explain that about two-thirds of the mass of a typical cell is accounted for by water, and that water gives cells many of their properties.</p> <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
STANDARD / ESSENTIAL SKILL	7.4.8.	<p>Describe how the most basic chemical functions of organisms, such as extracting energy from food and getting rid of wastes, are started or carried out completely within the cell.</p>

		<ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
STANDARD / ESSENTIAL SKILL	7.4.10.	<p>Recognize that many organisms are single celled (e.g., bacteria, yeasts) and explain how this one cell must carry out all of the basic functions of life.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem
STANDARD / ESSENTIAL SKILL	7.4.11.	<p>Construct a chart and describe that multicellular organisms are organized hierarchically from cells to tissues to organs to organ systems to organisms.</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 / STRAND / DISCIPLINE	DC.7.5.	<p>Genetics: Broad Concept: Every organism requires information in the form of a set of instructions that specifies its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	7.5.1.	<p>Describe that heredity is the passage of information for developing and maintaining the organism's body from one generation to another, that genes are the basic units of heredity, and they are made of DNA, consisting of very long molecules located in the chromosomes of each cell.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT STANDARD / STRAND / DISCIPLINE	DC.7.7.	<p>Human Body: Broad Concept: Human beings have body systems for obtaining and providing energy, defense, reproduction, and the coordination of body functions. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	7.7.3.	<p>Explain how the amount of food energy (usually measured in Calories) that a person requires varies with body weight, age, sex, activity level, and metabolic rate.</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 Environmental Issues and Solutions: Unit 3 Lab 10 Activity 3: Constructing a Predator-Prey Food Web
STANDARD / ESSENTIAL SKILL	7.7.4.	<p>Research and explain that regular exercise is important to maintain a healthy heart/lung (cardiovascular) system, good muscle tone, and strong bone structure.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
STANDARD / ESSENTIAL SKILL	7.7.8.	<p>Recognize that the environment may contain dangerous levels of substances that are harmful to human beings. Therefore, the good health of individuals requires monitoring the soil, air, and water as well as</p>

		<p>taking steps to keep them safe.</p> <ul style="list-style-type: none"> • 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 • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 2: Biological Treatment of Pollution • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
CONTENT STANDARD / STRAND / DISCIPLINE	DC.7.8.	Ecology: Broad Concept: Organisms in ecosystems exchange energy and nutrients among themselves and with the physical environment. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	7.8.1.	<p>Recognize that in all environments, such as freshwater, marine, forest, desert, grassland, mountain, farms, cities, and others, organisms with similar needs and living strategies compete with one another for resources, including food, space, water, air, and shelter.</p> <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 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • 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 3: Determining the LD50 of a Water Pollutant • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	7.8.2.	<p>Describe how two types of organisms may interact in a competitive or cooperative relationship, such as producer/consumer, predator/prey, parasite/hosts, or as symbionts.</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 • 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 • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	7.8.3.	<p>Illustrate and explain how plants use the energy from light to make simple sugars, and more complex molecules, from carbon dioxide and water through a process called photosynthesis. Understand this produces</p>

		<p>food that can be used immediately or stored for later use.</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
STANDARD / ESSENTIAL SKILL	7.8.4.	<p>Create a food web to explain how energy and matter are transferred between producers and primary consumers and secondary consumers.</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 • 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 • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	7.8.5.	<p>Describe how organisms that eat plants break down the plant structures to produce the materials and energy that they need to survive, and in turn, other organisms consume them.</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 • 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 • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	7.8.6.	<p>Explain how dead plants and animals, broken down by other living organisms, especially microorganisms and fungi, contribute to the cycling of matter through the system as a whole.</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 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

		<p>Closer Look at Energy Pyramids</p> <ul style="list-style-type: none"> • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	7.8.8.	<p>Explain why in urban environments, a species (mostly human beings) settles in dense concentrations.</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: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	7.8.9.	<p>Describe that all organisms, including the human species, are part of and depend on two main interconnected global food webs: the ocean food</p>

		<p>web and the land food web.</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 • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
--	--	---

Washington D.C. Learning Standards
Science
Grade 8

CONTENT STANDARD / STRAND / DISCIPLINE	DC.8.1.	Scientific Thinking and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	8.1.5.	<p>Write clear step-by-step instructions (procedural summaries) for conducting investigations.</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

		<ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	8.1.6.	<p>Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.</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:

		<p>Observing the Effects of Acid Rain and Other Pollutants on Plants</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 • 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
STANDARD / ESSENTIAL SKILL	8.1.7.	<p>Use tables, charts, and graphs in making arguments and claims in presentations about lab work.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
STANDARD / ESSENTIAL SKILL	8.1.12.	<p>Apply simple mathematical models to problems (e.g., formulas such as $F = ma$).</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.8.2.	<p>Structure of Matter: Broad Concept: Elements have distinct macroscopic properties and atomic structures. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	8.2.9.	<p>Explain that the melting and/or boiling temperature of a substance (element or compound) depend on pressure and are independent of the amount of the sample. (Some materials don't melt and others don't boil because they decompose as the temperature is raised; other materials don't have a sharp melting point because they are not homogeneous.)</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge

CONTENT STANDARD / STRAND / DISCIPLINE	DC.8.3.	Reactions: Broad Concept: Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	8.3.1.	Discover and explain how elements and compounds (reactants) react with each other to form products with different properties. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
STANDARD / ESSENTIAL SKILL	8.3.4.	Investigate how and explain that during endothermic chemical reactions heat energy is absorbed from the surroundings and in exothermic reactions heat energy is released to the surroundings. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
STANDARD / ESSENTIAL SKILL	8.3.6.	Recognize that solutions can be acidic, basic, or neutral depending on the concentration of hydrogen ions in the solution. Understand that because this concentration can vary over a very large range, the logarithmic (each increase of one in the pH scale is an increase of 10 times in concentration) pH scale is used to describe how acidic or basic a solution is. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 4 Lab 12 Activity 1: Modeling a Water Treatment Plant
STANDARD / ESSENTIAL SKILL	8.3.7.	Recognize that indicators of chemical changes include temperature change, the production of a gas, the production of a precipitate, or a color change. <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 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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.8.4.	Density and Buoyancy: Broad Concept: All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	8.4.2.	Know density is mass per unit volume. <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
STANDARD / ESSENTIAL SKILL	8.4.3.	Investigate and explain that equal volumes of different substances usually have different masses and, therefore, different densities. <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
STANDARD / ESSENTIAL SKILL	8.4.5.	Determine the density of substances (regular and irregular solids, and liquids) from direct measurements of mass and volume, or of volume by water displacement. <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 / STRAND / DISCIPLINE	DC.8.5.	Conservation of Energy: Broad Concept: Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	8.5.8.	Investigate and explain that heat energy is a common product of an energy transformation, for example, in biological growth, the operation of machines, the operation of a light bulb, and the motion of people. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	8.5.11.	Compare and contrast how heat energy can be transferred through radiation, convection, or conduction. <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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.8.8.	Waves: Broad Concept: Waves have characteristic properties that are common to all types of wave. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	8.8.1.	Observe and explain how 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

Washington D.C. Learning Standards
Science
Grade 9

CONTENT STANDARD /	DC.ES.1.	Earth Science: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting
--------------------	----------	---

STRAND / DISCIPLINE		careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	ES.1.4.	<p>Recognize the use 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
STANDARD / ESSENTIAL SKILL	ES.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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

		<ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	ES.1.13.	<p>Apply mathematical relationships involving proportionalities, linear relations, quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	ES.1.14.	<p>Recognize the implications of statistical variability in experiments and explain the need for controls in experiments.</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
STANDARD / ESSENTIAL SKILL	ES.1.17.	<p>Construct and interpret a simple scale map and topographic cross-section.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.ES.4.	Earth Science: The Earth System: Broad Concept: Interactions among the solid Earth, hydrosphere, and atmosphere have resulted in ongoing evolution of the earth system over geologic time. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	ES.4.1.	<p>Examine and describe the structure, composition, and function of Earth's atmosphere, including the role of living organisms in the cycling of atmospheric gases.</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
STANDARD / ESSENTIAL SKILL	ES.4.5.	<p>Explain the possible mechanisms and effects of atmospheric changes brought on by things such as acid rain, smoke, volcanic dust, greenhouse gases, and ozone depletion.</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 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 3: Soil Testing For Nitrogen, pH, and Phosphates 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 Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	ES.4.7.	<p>Investigate and identify the causes and effects of severe weather.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill
STANDARD / ESSENTIAL SKILL	ES.4.8.	<p>Explain special properties of water (e.g., high specific and latent heats) and the influence of large bodies of water and the water cycle on heat transport and therefore weather and climate.</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:

		<p>How Water Pollutants Are Measured</p> <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 • Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	ES.4.10.	<p>Describe the nitrogen and carbon cycles and their roles in the improvement of soils for agriculture.</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 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 • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	ES.4.13.	<p>Use computer models to predict the effects of increasing 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 / STRAND / DISCIPLINE	DC.ES.5.	<p>Earth Science: Hydrologic Cycle: Broad Concept: Water is continually being recycled by the hydrologic cycle through the watersheds, oceans, and the atmosphere by processes such as evaporation, condensation, precipitation runoff, and infiltration. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	ES.5.2.	<p>Describe the processes of the hydrologic cycle, including evaporation, condensation, precipitation, surface runoff and groundwater percolation, infiltration, and transpiration.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD / STRAND / DISCIPLINE	DC.ES.6.	<p>Earth Science: Rock Cycle: Broad Concept: Rocks and minerals are continually being modified within the rock cycle. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	ES.6.1.	<p>Differentiate among the processes of weathering, erosion, transportation of materials, deposition, and soil formation.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.1.	<p>Biology: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own</p>

		questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	B.1.4.	<p>Recognize the use 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
STANDARD / ESSENTIAL SKILL	B.1.6.	<p>Plan and conduct scientific investigations to explore new phenomena, to check on previous results, to verify or falsify the prediction of a theory, and to use a crucial experiment to discriminate between competing theories.</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

		<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 • 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>STANDARD / ESSENTIAL SKILL</p>	<p>B.1.10.</p>	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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

		<ul style="list-style-type: none"> • 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>STANDARD / ESSENTIAL SKILL</p>	<p>B.1.11.</p>	<p>Formulate and revise explanations 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

		<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 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
STANDARD / ESSENTIAL SKILL	B.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	B.1.15.	<p>Explain that science discoveries can have both positive and negative implications, involve different decisions regarding ethics and allocation of resources (e.g., organ transplants, stem cell research, forest management and land use).</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

		<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
STANDARD / ESSENTIAL SKILL	B.1.16.	<p>Recognize and deal with the implications of statistical variability in experiments and explain the need for controls in experiments.</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

		<ul style="list-style-type: none"> 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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.2.	Biology: Chemistry of Living Things: Broad Concept: Living things are made of atoms bonded together to form molecules, some of the most important of which are large and contain carbon (i.e., 'organic' compounds). As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.2.2.	<p>Describe the structure and unique properties of water and its importance to living things.</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 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 / STRAND / DISCIPLINE	DC.B.3.	Biology: Cell Biology: Broad Concept: All living things are composed of cells. All the fundamental life processes of a cell are either chemical reactions or molecular interactions. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.3.2.	<p>Understand the function of cellular organelles and how the organelles work together in cellular activities (e.g., enzyme secretion from the pancreas).</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
STANDARD / ESSENTIAL SKILL	B.3.3.	<p>Observe and describe that within the cell are specialized parts for the transport of materials, energy capture and release, waste disposal, and motion of the whole cell or of its parts.</p> <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
STANDARD / ESSENTIAL SKILL	B.3.9.	<p>Explain that a complex network of proteins provides organization and shape to cells.</p> <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 Teacher Resource CD: Air, Water, and Soils

STANDARD / ESSENTIAL SKILL	B.3.10.	<p>Explain that complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
STANDARD / ESSENTIAL SKILL	B.3.11.	<p>Describe that all growth and development of organisms is a consequence of an increase in cell number, size, and/or products.</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 Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.4.	Biology: Genetics: Broad Concept: 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, students:
STANDARD / ESSENTIAL SKILL	B.4.2.	<p>Describe how the discovery of the structure of DNA by James D. Watson, Francis Crick made it possible to interpret the genetic code on the basis of a nucleotide sequence. Know the important contribution of Rosalind Franklin's data to this discovery, i.e., the careful X-ray crystallography on DNA that provided Watson and Crick the clue they needed to build the correct structure.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.4.	<p>Know every species has its own characteristic DNA sequence.</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 3 Lab 10 Activity 2: Identifying Owl Prey
STANDARD / ESSENTIAL SKILL	B.4.7.	<p>Understand that and describe how inserting, deleting, or substituting short stretches of DNA alters a gene. Recognize that changes (mutations) in the DNA sequence in or near a specific gene may (or may not) affect the sequence of amino acids in the encoded protein or the expression of the gene.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.8.	<p>Explain the mechanisms of genetic mutations and chromosomal recombinations, and when and how they are passed on to offspring.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.11.	<p>Explain that genetic variation can occur from such processes as crossing</p>

SKILL		<p>over, jumping genes, and deletion and duplication of genes.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.13.	<p>Investigate and describe how a biological classification system that implies degrees of kinship between organisms or species can be deduced from the similarity of their nucleotide (DNA) or amino acids (protein) sequences. Know that such systems often match the completely independent classification systems based on anatomical similarities.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.5.	<p>Biology: Biological Evolution: Broad Concept: Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	B.5.2.	<p>Explain how a large diversity of species increases the chance that at least some living things will survive in the face of large or even catastrophic 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 / STRAND / DISCIPLINE	DC.B.6.	<p>Biology: Plant Biology: Broad Concept: Plants are essential to animal life on Earth. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	B.6.4.	<p>Explain the photosynthesis process: Plants make food in their leaves and chlorophyll found in the leaves can make food the plant can use from carbon dioxide, water, nutrients, and energy from sunlight.</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
STANDARD / ESSENTIAL SKILL	B.6.5.	<p>Explain that during the process of photosynthesis, plants release oxygen into the air.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization

		<ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.8.	Biology: Ecosystems: Broad Concept: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.8.1.	<p>Illustrate and describe the cycles of biotic and abiotic factors (matter, nutrients, energy) in an ecosystem.</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
STANDARD / ESSENTIAL SKILL	B.8.2.	<p>Describe how factors in an ecosystem, such as the availability of energy, water, oxygen, and minerals and the ability to recycle the residue of dead organic materials, cause fluctuations in population sizes.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant 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 2: Biological Treatment of Pollution Teacher Resource CD: Ecosystems, Energy, and Biodiversity Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	B.8.3.	<p>Explore and explain how changes in population size have an impact on the ecological balance of a community and how to analyze the effects.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant 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 2: Biological Treatment of Pollution Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	B.8.4.	<p>Describe how the physical or chemical environment may influence the rate, extent, and nature of the way organisms develop within ecosystems.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1:

		<p>Biodegradation in a Landfill</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 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: 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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD /	B.8.5.	Describe how ecosystems can be reasonably stable over hundreds or

ESSENTIAL SKILL		<p>thousands of years.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	B.8.6.	<p>Explain that ecosystems tend to have cyclic fluctuations around a state of rough equilibrium, and change results from shifts in climate, natural causes, human activity, or when a new species or non-native species appears.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	B.8.7.	<p>Explain how layers of energy-rich organic material, mostly of plant origin, have been gradually turned into great coal beds and oil pools by the pressure of the overlying Earth and its internal heat.</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 • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	B.8.9.	<p>Investigate and describe how point and non-point source pollution can affect the health of a bay's watershed and wetlands.</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 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 • 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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	B.8.10.	<p>Assess the method for monitoring and safeguarding water quality, including local waterways such as the Anacostia and Potomac rivers, and know that macro-invertebrates can be early warning signs of decreasing water quality.</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 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: Air, Water, and Soils Teacher Resource CD: Environmental Issues Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.1.	Chemistry: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	C.1.4.	<p>Recognize the use 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
STANDARD / ESSENTIAL SKILL	C.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	C.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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

		<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
STANDARD / ESSENTIAL SKILL	C.1.14.	<p>Recognize and deal with the implications of statistical variability in experiments and explain the need for controls in experiments.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.2.	Chemistry: Properties of Matter: Broad Concept: Physical and chemical properties can be used to classify and describe matter. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.2.1.	<p>Investigate and classify properties of matter, including density, melting point, boiling point, and solubility.</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
STANDARD / ESSENTIAL SKILL	C.2.2.	<p>Determine the definitions of and use properties such as mass, volume, temperature, density, melting point, boiling point, conductivity, solubility, and color to differentiate between types of matter.</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
STANDARD / ESSENTIAL SKILL	C.2.5.	<p>Infer and explain that physical properties of substances, such as melting points, boiling points, and solubility are due to the strength of their various types (interatomic, intermolecular, or ionic) of bonds.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.3.	Chemistry: Acids and Bases: Broad Concept: Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.3.2.	Define pH as the negative of the logarithm of the hydrogen (hydronium) ion concentration, and calculate pH from concentration data. <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
STANDARD / ESSENTIAL SKILL	C.3.3.	Illustrate and explain the pH scale to characterize acid and base solutions: Neutral solutions have pH 7, acids are less than 7, and bases are greater than 7. <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 / STRAND / DISCIPLINE	DC.C.8.	Chemistry: Conservation of Matter: Broad Concept: The microscopic conservation of atoms in chemical reactions implies the macroscopic principle of conservation of matter and the ability to calculate the mass of products and reactants. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.8.3.	Classify reactions of various types such as single and double replacement, synthesis, decomposition, and acid/base neutralization. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.11.	Chemistry: Solutions: Broad Concept: Solutions are mixtures of two or more substances that are homogeneous on the molecular level. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.11.4.	Calculate the concentration units of solutions such as molarity, percent by mass or volume, parts per million (ppm), or parts per billion (ppb). <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
STANDARD / ESSENTIAL SKILL	C.11.8.	Use titration data to calculate the concentration of an unknown solution. <ul style="list-style-type: none"> Virtual Laboratory: The Effect of Temperature on Dissolved

		Oxygen
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.12.	Chemistry: Chemical Thermodynamics: Broad Concept: Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.12.2.	Determine and explain that chemical processes 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 / STRAND / DISCIPLINE	DC.P.1.	Physics: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	P.1.4.	Recognize the use and limitations of models and theories as scientific representations of reality. <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
STANDARD / ESSENTIAL SKILL	P.1.10.	Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.) <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

		<ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	P.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	P.1.14.	<p>Recognize and deal with the implications of statistical variability in experiments and explain the need for controls in experiments.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.P.4.	Physics: Mechanics of Fluids: Broad Concept: All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	P.4.3.	Identify that the pressure in an incompressible fluid (e.g., water) is a function of density; depth; and gravitational acceleration. <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 / STRAND / DISCIPLINE	DC.P.5.	Physics: Heat and Thermodynamics: Broad Concept: Energy cannot be created or destroyed; however, in many processes energy is transformed into the microscopic form called heat energy, that is, the energy of the disordered motion of atoms. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	P.5.1.	Recognize that heat flow and work are two forms of energy transfer between a system and its surroundings. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	P.5.4.	Explain that thermal energy (commonly called heat) consists of random motion and the vibrations and rotations of atoms, molecules, or ions. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	P.5.5.	Describe how in everyday practice, temperature is measured with a thermometer, a device containing a part that has a thermometric parameter (a quantity that changes with temperature). <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 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 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
STANDARD / ESSENTIAL SKILL	P.5.9.	Describe that when two objects at different temperatures are in contact, heat energy always flows from the object at a higher temperature to the object at a lower temperature by the process of conduction until the two are at the same (intermediate) temperature. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	P.5.10.	Explain the process of convection: Because the density of fluids varies with temperature, the warmer parts of a fluid tend to move into and mix with the cooler parts, resulting in a transfer of heat energy from place to place. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.1.	Environmental Science: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	E.1.4.	Recognize the use and limitations of models and theories as scientific representations of reality. <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
STANDARD / ESSENTIAL SKILL	E.1.6.	Plan and conduct scientific investigations to explore new phenomena, to check on previous results, to verify or falsify the prediction of a theory, and to use a crucial experiment to discriminate between competing theories. <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

		<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 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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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:

		<p>Biodegrading a Simulated Oil Spill</p> <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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.1.11.	<p>Formulate and revise explanations 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:

		<p>Observing Radiation Effects on Plants</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 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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.1.13.	Apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.

		<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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.2.	Environmental Science: Environmental Systems: Broad Concept: The environment is a system of interdependent components affected by natural phenomena and human activity. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.2.1.	<p>Understand and explain that human beings are part of Earth's ecosystems, and that human activities can, deliberately or inadvertently, alter ecosystems.</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:

		<p>Calculating a Biodiversity Index for Leaf Litter Ecosystems</p> <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 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
STANDARD / ESSENTIAL SKILL	E.2.3.	<p>Describe how the global environment is affected by national policies and practices relating to energy use, waste disposal, ecological management, manufacturing, and population growth.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.3.	Environmental Science: Ecosystems: Broad Concept: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.3.1.	<p>Explain that biodiversity is the sum total of different kinds of organisms in a given ecological community or system, 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 • Environmental Issues and Solutions: Unit 4 Lab 12 Activity 3: Evaluating the Health of an Ecosystem • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.2.	<p>Know and describe how ecosystems can be reasonably stable over hundreds or thousands of years.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL	E.3.3.	Understand and describe that if a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually results in

SKILL		<p>a system similar to the original one.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.4.	<p>Understand and explain that ecosystems tend to have cyclic fluctuations around a state of rough equilibrium, and change results from shifts in climate, natural causes, human activity, or when a new species or non-native species appears.</p> <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 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • 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 3: Determining the LD50 of a Water Pollutant • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.3.5.	<p>Know that organisms may interact in a competitive or cooperative relationship, such as producer/consumer, predator/prey, parasite/hosts, or as symbionts and explain how these interactions contribute to the stability of an ecosystem.</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 • 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 • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.6.	<p>Recognize and describe the difference between systems in equilibrium and systems in disequilibrium.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.7.	<p>Explain how water, carbon, phosphorus and nitrogen cycle between abiotic resources and organic matter in an ecosystem and how oxygen cycles via photosynthesis and respiration. Diagram the cycling of carbon, nitrogen, phosphorus, and water in an ecosystem.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1:

		<p>The Greenhouse Effect and Global Warming</p> <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 3 Lab 9 Activity 1: Food Web Organization • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.8.	<p>Describe the role of nitrogen and carbon cycles in the improvement of soils for agriculture.</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 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 • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.9.	<p>Locate, identify, and explain the role of the major Earth biomes (e.g., grasslands, rainforests, arctic tundra, deserts) and discuss how the abiotic and biotic factors interact within these ecosystems.</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 9 Activity 1: Food Web Organization • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.11.	<p>Describe how adaptations in physical structure or behavior may improve an organism's chance for survival and impact an ecosystem.</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
STANDARD / ESSENTIAL SKILL	E.3.12.	<p>Describe the concepts of niche and habitat and explain the effects of loss of habitat on a species' survivability.</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

		<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 3 Lab 9 Activity 1: Food Web Organization Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
STANDARD / ESSENTIAL SKILL	E.3.13.	<p>Explain how soil, water and pest management are achieved in various agricultural systems (conventional and organic). Describe the tenets of sustainable agriculture.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.4.	<p>Environmental Science: Populations: Broad Concept: The amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle organic materials from the remains of dead organisms. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	E.4.1.	<p>Explain the concept of carrying capacity.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.4.2.	<p>Demonstrate how resources, such as food supply, the availability of water, and shelter, influence populations.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant 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 2: Biological Treatment of Pollution Teacher Resource CD: Ecosystems, Energy, and Biodiversity Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.4.3.	<p>Demonstrate and explain how fluctuations in population size and population growth rates are determined by such factors as birth rate, death rate, and migration rate.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant 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 2: Biological Treatment of Pollution Teacher Resource CD: Ecosystems, Energy, and Biodiversity Teacher Resource CD: Environmental Issues
STANDARD /	E.4.4.	<p>Describe the effect of overpopulation (i.e., resource depletion and</p>

ESSENTIAL SKILL		<p>potential elimination of species), the role of predators in maintaining ecosystem stability, and methods of population management.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • 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 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 2: Determining the Carrying Capacity of a Population • 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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.5.	Environmental Science: Natural Resources: Broad Concept: Numerous Earth resources are used to sustain human affairs. The abundance and accessibility of these resources can influence their use. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.5.3.	<p>Give examples of the various forms and uses of fossil fuels and nuclear energy in our society and describe alternative sources of energy provided by water, the atmosphere, and the sun.</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 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.5.4.	<p>Demonstrate knowledge of the distribution of natural resources in the U.S. and the world, and explain how natural resources influence relationships among nations.</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 5 Activity 1: Modeling Salt Runoff Discharge • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 1: Identifying Airborne Pollutants

		<ul style="list-style-type: none"> • 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 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.5.6.	<p>Analyze the trade-offs among different fuels, such as how energy use contributes to the rising standard of living in the industrially developing nations, yet also leads to more rapid depletion of Earth's energy resources and to increased environmental risks associated with the use of fossil and nuclear fuels.</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 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.5.8.	<p>Understand and describe the concept of integrated natural resource management and the values of managing natural resources as an ecological unit.</p> <ul style="list-style-type: none"> • 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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.6.	<p>Environmental Science: Watersheds and Wetlands: Broad Concept: Water is continually being recycled by the hydrologic cycle through the watersheds, oceans, and the atmosphere by processes such as evaporation, condensation, precipitation runoff, and infiltration. This life-giving cycle is continually and increasingly impacted by human affairs. As a basis for understanding this concept, students:</p>

STANDARD / ESSENTIAL SKILL	E.6.1.	<p>Compare and contrast the processes of the hydrologic cycle, including evaporation, condensation, precipitation, surface runoff and groundwater percolation, infiltration, and transpiration.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	E.6.2.	<p>Describe the physical characteristics of wetlands and watersheds and explain how water flows into and through a watershed (e.g., precipitation, aquifers, wells, porosity, permeability, water table, capillary water, and run off).</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
STANDARD / ESSENTIAL SKILL	E.6.3.	<p>Describe how wetlands store excess water and filter sediments and excess nutrients.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
STANDARD / ESSENTIAL SKILL	E.6.6.	<p>Investigate and describe how point and non-point source pollution can affect the health of a bay's watershed and wetlands.</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 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 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: Air, Water, and Soils Teacher Resource CD: Environmental Issues Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.6.7.	<p>Collect, record and interpret data from physical, chemical and biological sources to evaluate the health of the Chesapeake Bay watershed and wetlands and describe how the Bay supports a wide variety of plant and animal life that interact with other living and non-living things.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
CONTENT STANDARD /	DC.E.7.	Environmental Science: Energy in the Earth System: Broad Concept: Energy and matter have multiple forms and can be changed from one

STRAND / DISCIPLINE		form to another. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.7.2.	<p>Explain the meaning of radiation, convection, and conduction (three mechanisms by which heat is transferred to, through, and out of the Earth's system).</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
STANDARD / ESSENTIAL SKILL	E.7.3.	<p>Understand and describe how layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth. Recognize that by burning these fossil fuels, people are passing stored energy back into the environment as heat and releasing large amounts of carbon dioxide.</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 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.7.4.	<p>Describe how energy derived from the sun is used by green plants to produce chemical energy in the form of sugars (photosynthesis), and this energy is transferred along a food chain from producers (plants) to consumers to decomposers.</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 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 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.7.5.	<p>Illustrate the flow of energy through various trophic levels of food chains and food webs within an ecosystem. Describe how each link in a food web stores some energy in newly made structures and how much of the energy</p>

		<p>is dissipated into the environment as heat. Understand that a continual input of energy from sunlight is needed to keep the process going.</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 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 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
<p>CONTENT STANDARD / STRAND / DISCIPLINE</p>	<p>DC.E.8.</p>	<p>Environmental Science: Environmental Quality: Broad Concept: Environmental quality is linked to natural and human-induced hazards, and the ability of science and technology to meet local, national, and global challenges. As a basis for understanding this concept, students:</p>
<p>STANDARD / ESSENTIAL SKILL</p>	<p>E.8.1.</p>	<p>Differentiate between natural pollution and pollution caused by humans and give examples of each.</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 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

		<ul style="list-style-type: none"> • 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 • 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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.8.2.	<p>Describe sources of air and water pollution and explain how air and water quality impact wildlife, vegetation, and human health.</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 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 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 • 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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.8.3.	<p>Describe the historical and current methods of water management and recycling, including the waste treatment practices of landfills, incineration, reuse/recycle and source reduction.</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 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 1:

		<p>How Water Pollutants Are Measured</p> <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 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • 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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.8.4.	<p>Understand and explain that waste management includes considerations of quantity, safety, degradability, and cost.</p> <ul style="list-style-type: none"> • 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 • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.8.6.	<p>Identify natural Earth hazards, such as earthquakes and hurricanes, and identify the regions in which they occur as well as the short-term and long-term effects on the environment and on people.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill

Washington D.C. Learning Standards
Science
Grade 10

CONTENT STANDARD / STRAND / DISCIPLINE	DC.ES.1.	<p>Earth Science: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:</p>
STANDARD / ESSENTIAL SKILL	ES.1.4.	<p>Recognize the use 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

		<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
STANDARD / ESSENTIAL SKILL	ES.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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:

		<p>Food Web Organization</p> <ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	ES.1.13.	<p>Apply mathematical relationships involving proportionalities, linear relations, quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	ES.1.14.	<p>Recognize the implications of statistical variability in experiments and explain the need for controls in experiments.</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
STANDARD / ESSENTIAL SKILL	ES.1.17.	<p>Construct and interpret a simple scale map and topographic cross-section.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.ES.4.	<p>Earth Science: The Earth System: Broad Concept: Interactions among the solid Earth, hydrosphere, and atmosphere have resulted in ongoing evolution of the earth system over geologic time. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	ES.4.1.	<p>Examine and describe the structure, composition, and function of Earth's atmosphere, including the role of living organisms in the cycling of atmospheric gases.</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

		<ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	ES.4.5.	<p>Explain the possible mechanisms and effects of atmospheric changes brought on by things such as acid rain, smoke, volcanic dust, greenhouse gases, and ozone depletion.</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 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 3: Soil Testing For Nitrogen, pH, and Phosphates • 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 • Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	ES.4.7.	<p>Investigate and identify the causes and effects of severe weather.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill
STANDARD / ESSENTIAL SKILL	ES.4.8.	<p>Explain special properties of water (e.g., high specific and latent heats) and the influence of large bodies of water and the water cycle on heat transport and therefore weather and climate.</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 • Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	ES.4.10.	<p>Describe the nitrogen and carbon cycles and their roles in the improvement of soils for agriculture.</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 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 Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	ES.4.13.	<p>Use computer models to predict the effects of increasing 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 / STRAND / DISCIPLINE	DC.ES.5.	<p>Earth Science: Hydrologic Cycle: Broad Concept: Water is continually being recycled by the hydrologic cycle through the watersheds, oceans, and the atmosphere by processes such as evaporation, condensation, precipitation runoff, and infiltration. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	ES.5.2.	<p>Describe the processes of the hydrologic cycle, including evaporation, condensation, precipitation, surface runoff and groundwater percolation, infiltration, and transpiration.</p> <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD / STRAND / DISCIPLINE	DC.ES.6.	<p>Earth Science: Rock Cycle: Broad Concept: Rocks and minerals are continually being modified within the rock cycle. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	ES.6.1.	<p>Differentiate among the processes of weathering, erosion, transportation of materials, deposition, and soil formation.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.1.	<p>Biology: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:</p>
STANDARD / ESSENTIAL SKILL	B.1.4.	<p>Recognize the use 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:

		<p>Food Web Organization</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids
<p>STANDARD / ESSENTIAL SKILL</p>	<p>B.1.6.</p>	<p>Plan and conduct scientific investigations to explore new phenomena, to check on previous results, to verify or falsify the prediction of a theory, and to use a crucial experiment to discriminate between competing theories.</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
STANDARD / ESSENTIAL SKILL	B.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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

		<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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	B.1.11.	<p>Formulate and revise explanations 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: 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

		<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 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
STANDARD / ESSENTIAL SKILL	B.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	B.1.15.	<p>Explain that science discoveries can have both positive and negative implications, involve different decisions regarding ethics and allocation of resources (e.g., organ transplants, stem cell research, forest management and land use).</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 • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	B.1.16.	<p>Recognize and deal with the implications of statistical variability in experiments and explain the need for controls in experiments.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.2.	<p>Biology: Chemistry of Living Things: Broad Concept: Living things are made of atoms bonded together to form molecules, some of the most important of which are large and contain carbon (i.e., 'organic' compounds). As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	B.2.2.	<p>Describe the structure and unique properties of water and its importance to living things.</p> <ul style="list-style-type: none"> • 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 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 / STRAND / DISCIPLINE	DC.B.3.	Biology: Cell Biology: Broad Concept: All living things are composed of cells. All the fundamental life processes of a cell are either chemical reactions or molecular interactions. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.3.2.	<p>Understand the function of cellular organelles and how the organelles work together in cellular activities (e.g., enzyme secretion from the pancreas).</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
STANDARD / ESSENTIAL SKILL	B.3.3.	<p>Observe and describe that within the cell are specialized parts for the transport of materials, energy capture and release, waste disposal, and motion of the whole cell or of its parts.</p> <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
STANDARD / ESSENTIAL SKILL	B.3.9.	<p>Explain that a complex network of proteins provides organization and shape to cells.</p> <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 Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	B.3.10.	<p>Explain that complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
STANDARD / ESSENTIAL SKILL	B.3.11.	<p>Describe that all growth and development of organisms is a consequence of an increase in cell number, size, and/or products.</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

		<ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
CONTENT STANDARD / STRAND / DISCIPLINE	DC.B.4.	Biology: Genetics: Broad Concept: 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, students:
STANDARD / ESSENTIAL SKILL	B.4.2.	<p>Describe how the discovery of the structure of DNA by James D. Watson, Francis Crick made it possible to interpret the genetic code on the basis of a nucleotide sequence. Know the important contribution of Rosalind Franklin's data to this discovery, i.e., the careful X-ray crystallography on DNA that provided Watson and Crick the clue they needed to build the correct structure.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.4.	<p>Know every species has its own characteristic DNA sequence.</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 3 Lab 10 Activity 2: Identifying Owl Prey
STANDARD / ESSENTIAL SKILL	B.4.7.	<p>Understand that and describe how inserting, deleting, or substituting short stretches of DNA alters a gene. Recognize that changes (mutations) in the DNA sequence in or near a specific gene may (or may not) affect the sequence of amino acids in the encoded protein or the expression of the gene.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.8.	<p>Explain the mechanisms of genetic mutations and chromosomal recombinations, and when and how they are passed on to offspring.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.11.	<p>Explain that genetic variation can occur from such processes as crossing over, jumping genes, and deletion and duplication of genes.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants
STANDARD / ESSENTIAL SKILL	B.4.13.	<p>Investigate and describe how a biological classification system that implies degrees of kinship between organisms or species can be deduced from the similarity of their nucleotide (DNA) or amino acids (protein) sequences. Know that such systems often match the completely independent classification systems based on anatomical similarities.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 10 Activity 2: Identifying Owl Prey
CONTENT	DC.B.5.	Biology: Biological Evolution: Broad Concept: Evolution and biodiversity

STANDARD / STRAND / DISCIPLINE		are the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.5.2.	<p>Explain how a large diversity of species increases the chance that at least some living things will survive in the face of large or even catastrophic 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 / STRAND / DISCIPLINE	DC.B.6.	Biology: Plant Biology: Broad Concept: Plants are essential to animal life on Earth. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.6.4.	<p>Explain the photosynthesis process: Plants make food in their leaves and chlorophyll found in the leaves can make food the plant can use from carbon dioxide, water, nutrients, and energy from sunlight.</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
STANDARD / ESSENTIAL SKILL	B.6.5.	<p>Explain that during the process of photosynthesis, plants release oxygen into the air.</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 / STRAND / DISCIPLINE	DC.B.8.	Biology: Ecosystems: Broad Concept: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	B.8.1.	<p>Illustrate and describe the cycles of biotic and abiotic factors (matter, nutrients, energy) in an ecosystem.</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:

		<p>Soil Porosity and Permeability</p> <ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	B.8.2.	<p>Describe how factors in an ecosystem, such as the availability of energy, water, oxygen, and minerals and the ability to recycle the residue of dead organic materials, cause fluctuations in population sizes.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • 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 2: Biological Treatment of Pollution • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	B.8.3.	<p>Explore and explain how changes in population size have an impact on the ecological balance of a community and how to analyze the effects.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • 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 2: Biological Treatment of Pollution • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	B.8.4.	<p>Describe how the physical or chemical environment may influence the rate, extent, and nature of the way organisms develop within ecosystems.</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

		<ul style="list-style-type: none"> • 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 • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	B.8.5.	<p>Describe how ecosystems can be reasonably stable over hundreds or thousands of years.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	B.8.6.	<p>Explain that ecosystems tend to have cyclic fluctuations around a state of rough equilibrium, and change results from shifts in climate, natural causes, human activity, or when a new species or non-native species appears.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity

STANDARD / ESSENTIAL SKILL	B.8.7.	<p>Explain how layers of energy-rich organic material, mostly of plant origin, have been gradually turned into great coal beds and oil pools by the pressure of the overlying Earth and its internal heat.</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 • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	B.8.9.	<p>Investigate and describe how point and non-point source pollution can affect the health of a bay's watershed and wetlands.</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 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 • 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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	B.8.10.	<p>Assess the method for monitoring and safeguarding water quality, including local waterways such as the Anacostia and Potomac rivers, and know that macro-invertebrates can be early warning signs of decreasing water quality.</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 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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.1.	Chemistry: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	C.1.4.	<p>Recognize the use 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
STANDARD / ESSENTIAL SKILL	C.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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
STANDARD / ESSENTIAL SKILL	C.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	C.1.14.	<p>Recognize and deal with the implications of statistical variability in experiments and explain the need for controls in experiments.</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

		<p>Plants</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.2.	Chemistry: Properties of Matter: Broad Concept: Physical and chemical properties can be used to classify and describe matter. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.2.1.	<p>Investigate and classify properties of matter, including density, melting point, boiling point, and solubility.</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
STANDARD / ESSENTIAL SKILL	C.2.2.	<p>Determine the definitions of and use properties such as mass, volume, temperature, density, melting point, boiling point, conductivity, solubility, and color to differentiate between types of matter.</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
STANDARD / ESSENTIAL SKILL	C.2.5.	<p>Infer and explain that physical properties of substances, such as melting points, boiling points, and solubility are due to the strength of their various types (interatomic, intermolecular, or ionic) of bonds.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.3.	Chemistry: Acids and Bases: Broad Concept: Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.3.2.	<p>Define pH as the negative of the logarithm of the hydrogen (hydronium) ion concentration, and calculate pH from concentration data.</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
STANDARD / ESSENTIAL SKILL	C.3.3.	<p>Illustrate and explain the pH scale to characterize acid and base solutions: Neutral solutions have pH 7, acids are less than 7, and bases are greater than 7.</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 / STRAND / DISCIPLINE	DC.C.8.	Chemistry: Conservation of Matter: Broad Concept: The microscopic conservation of atoms in chemical reactions implies the macroscopic principle of conservation of matter and the ability to calculate the mass of products and reactants. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.8.3.	<p>Classify reactions of various types such as single and double replacement, synthesis, decomposition, and acid/base neutralization.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 5 Activity 1: Modeling Salt Runoff Discharge
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.11.	Chemistry: Solutions: Broad Concept: Solutions are mixtures of two or more substances that are homogeneous on the molecular level. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.11.4.	<p>Calculate the concentration units of solutions such as molarity, percent by mass or volume, parts per million (ppm), or parts per billion (ppb).</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
STANDARD / ESSENTIAL SKILL	C.11.8.	<p>Use titration data to calculate the concentration of an unknown solution.</p> <ul style="list-style-type: none"> • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
CONTENT STANDARD / STRAND / DISCIPLINE	DC.C.12.	Chemistry: Chemical Thermodynamics: Broad Concept: Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	C.12.2.	<p>Determine and explain that chemical processes 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 / STRAND / DISCIPLINE	DC.P.1.	Physics: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own

		questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	P.1.4.	<p>Recognize the use 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
STANDARD / ESSENTIAL SKILL	P.1.10.	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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

		<p>Plants</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 • 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
STANDARD / ESSENTIAL SKILL	P.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
STANDARD / ESSENTIAL SKILL	P.1.14.	<p>Recognize and deal with the implications of statistical variability in experiments and explain the need for controls in experiments.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.P.4.	<p>Physics: Mechanics of Fluids: Broad Concept: All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL	P.4.3.	<p>Identify that the pressure in an incompressible fluid (e.g., water) is a</p>

SKILL		<p>function of density; depth; and gravitational acceleration.</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 / STRAND / DISCIPLINE	DC.P.5.	Physics: Heat and Thermodynamics: Broad Concept: Energy cannot be created or destroyed; however, in many processes energy is transformed into the microscopic form called heat energy, that is, the energy of the disordered motion of atoms. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	P.5.1.	<p>Recognize that heat flow and work are two forms of energy transfer between a system and its surroundings.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	P.5.4.	<p>Explain that thermal energy (commonly called heat) consists of random motion and the vibrations and rotations of atoms, molecules, or ions.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	P.5.5.	<p>Describe how in everyday practice, temperature is measured with a thermometer, a device containing a part that has a thermometric parameter (a quantity that changes with temperature).</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 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 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
STANDARD / ESSENTIAL SKILL	P.5.9.	<p>Describe that when two objects at different temperatures are in contact, heat energy always flows from the object at a higher temperature to the object at a lower temperature by the process of conduction until the two are at the same (intermediate) temperature.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 4 Activity 1: The Greenhouse Effect and Global Warming
STANDARD / ESSENTIAL SKILL	P.5.10.	<p>Explain the process of convection: Because the density of fluids varies with temperature, the warmer parts of a fluid tend to move into and mix with the cooler parts, resulting in a transfer of heat energy from place to place.</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 / STRAND / DISCIPLINE	DC.E.1.	Environmental Science: Scientific Investigation and Inquiry: Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations. Students:
STANDARD / ESSENTIAL SKILL	E.1.4.	<p>Recognize the use 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
STANDARD / ESSENTIAL SKILL	E.1.6.	<p>Plan and conduct scientific investigations to explore new phenomena, to check on previous results, to verify or falsify the prediction of a theory, and to use a crucial experiment to discriminate between competing theories.</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:

		<p>Water Analysis</p> <ul style="list-style-type: none"> • 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>STANDARD / ESSENTIAL SKILL</p>	<p>E.1.10.</p>	<p>Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</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
STANDARD / ESSENTIAL SKILL	E.1.11.	<p>Formulate and revise explanations 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

		<ul style="list-style-type: none"> • 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
STANDARD / ESSENTIAL SKILL	E.1.13.	<p>Apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.</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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.2.	Environmental Science: Environmental Systems: Broad Concept: The environment is a system of interdependent components affected by natural phenomena and human activity. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.2.1.	Understand and explain that human beings are part of Earth's ecosystems, and that human activities can, deliberately or inadvertently, alter ecosystems.

- 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: 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
STANDARD / ESSENTIAL SKILL	E.2.3.	Describe how the global environment is affected by national policies and practices relating to energy use, waste disposal, ecological management, manufacturing, and population growth. <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.3.	Environmental Science: Ecosystems: Broad Concept: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.3.1.	Explain that biodiversity is the sum total of different kinds of organisms in a given ecological community or system, 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
STANDARD / ESSENTIAL SKILL	E.3.2.	Know and describe how ecosystems can be reasonably stable over hundreds or thousands of years. <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.3.	Understand and describe that if a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually results in a system similar to the original one. <ul style="list-style-type: none"> Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.4.	Understand and explain that ecosystems tend to have cyclic fluctuations around a state of rough equilibrium, and change results from shifts in climate, natural causes, human activity, or when a new species or non-native species appears. <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 5 Activity 1:

		<p>Modeling Salt Runoff Discharge</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • 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 3: Determining the LD50 of a Water Pollutant • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.3.5.	<p>Know that organisms may interact in a competitive or cooperative relationship, such as producer/consumer, predator/prey, parasite/hosts, or as symbionts and explain how these interactions contribute to the stability of an ecosystem.</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 • 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 • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.6.	<p>Recognize and describe the difference between systems in equilibrium and systems in disequilibrium.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.7.	<p>Explain how water, carbon, phosphorus and nitrogen cycle between abiotic resources and organic matter in an ecosystem and how oxygen cycles via photosynthesis and respiration. Diagram the cycling of carbon, nitrogen, phosphorus, and water in an ecosystem.</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 • 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
STANDARD / ESSENTIAL SKILL	E.3.8.	<p>Describe the role of nitrogen and carbon cycles in the improvement of soils for agriculture.</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 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 Environmental Issues and Solutions: Unit 3 Lab 11 Activity 1: Calculating a Biodiversity Index for Leaf Litter Ecosystems Teacher Resource CD: Air, Water, and Soils Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.9.	<p>Locate, identify, and explain the role of the major Earth biomes (e.g., grasslands, rainforests, arctic tundra, deserts) and discuss how the abiotic and biotic factors interact within these ecosystems.</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 9 Activity 1: Food Web Organization Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.3.11.	<p>Describe how adaptations in physical structure or behavior may improve an organism's chance for survival and impact an ecosystem.</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
STANDARD / ESSENTIAL SKILL	E.3.12.	<p>Describe the concepts of niche and habitat and explain the effects of loss of habitat on a species' survivability.</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
STANDARD / ESSENTIAL SKILL	E.3.13.	<p>Explain how soil, water and pest management are achieved in various agricultural systems (conventional and organic). Describe the tenets of sustainable agriculture.</p> <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 1 Lab 2 Activity 1: Observing Radiation Effects on Plants

CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.4.	Environmental Science: Populations: Broad Concept: The amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle organic materials from the remains of dead organisms. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.4.1.	<p>Explain the concept of carrying capacity.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 11 Activity 2: Determining the Carrying Capacity of a Population • Teacher Resource CD: Ecosystems, Energy, and Biodiversity
STANDARD / ESSENTIAL SKILL	E.4.2.	<p>Demonstrate how resources, such as food supply, the availability of water, and shelter, influence populations.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • 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 2: Biological Treatment of Pollution • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.4.3.	<p>Demonstrate and explain how fluctuations in population size and population growth rates are determined by such factors as birth rate, death rate, and migration rate.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • Environmental Issues and Solutions: Unit 2 Lab 8 Activity 3: Determining the LD50 of a Water Pollutant • 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 2: Biological Treatment of Pollution • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.4.4.	<p>Describe the effect of overpopulation (i.e., resource depletion and potential elimination of species), the role of predators in maintaining ecosystem stability, and methods of population management.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens • 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 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 2: Determining the Carrying Capacity of a Population

		<ul style="list-style-type: none"> • 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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.5.	Environmental Science: Natural Resources: Broad Concept: Numerous Earth resources are used to sustain human affairs. The abundance and accessibility of these resources can influence their use. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.5.3.	<p>Give examples of the various forms and uses of fossil fuels and nuclear energy in our society and describe alternative sources of energy provided by water, the atmosphere, and the sun.</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 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.5.4.	<p>Demonstrate knowledge of the distribution of natural resources in the U.S. and the world, and explain how natural resources influence relationships among nations.</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 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:

		<p>Observing the Effects of Acid Rain and Other Pollutants on Plants</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 • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.5.6.	<p>Analyze the trade-offs among different fuels, such as how energy use contributes to the rising standard of living in the industrially developing nations, yet also leads to more rapid depletion of Earth's energy resources and to increased environmental risks associated with the use of fossil and nuclear fuels.</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 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.5.8.	<p>Understand and describe the concept of integrated natural resource management and the values of managing natural resources as an ecological unit.</p> <ul style="list-style-type: none"> • 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
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.6.	<p>Environmental Science: Watersheds and Wetlands: Broad Concept: Water is continually being recycled by the hydrologic cycle through the watersheds, oceans, and the atmosphere by processes such as evaporation, condensation, precipitation runoff, and infiltration. This life-giving cycle is continually and increasingly impacted by human affairs. As a basis for understanding this concept, students:</p>
STANDARD / ESSENTIAL SKILL	E.6.1.	<p>Compare and contrast the processes of the hydrologic cycle, including evaporation, condensation, precipitation, surface runoff and groundwater percolation, infiltration, and transpiration.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Air, Water, and Soils
STANDARD / ESSENTIAL SKILL	E.6.2.	<p>Describe the physical characteristics of wetlands and watersheds and explain how water flows into and through a watershed (e.g., precipitation, aquifers, wells, porosity, permeability, water table, capillary water, and run off).</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization

STANDARD / ESSENTIAL SKILL	E.6.3.	Describe how wetlands store excess water and filter sediments and excess nutrients. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
STANDARD / ESSENTIAL SKILL	E.6.6.	Investigate and describe how point and non-point source pollution can affect the health of a bay's watershed and wetlands. <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 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 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: Air, Water, and Soils Teacher Resource CD: Environmental Issues Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.6.7.	Collect, record and interpret data from physical, chemical and biological sources to evaluate the health of the Chesapeake Bay watershed and wetlands and describe how the Bay supports a wide variety of plant and animal life that interact with other living and non-living things. <ul style="list-style-type: none"> Environmental Issues and Solutions: Unit 3 Lab 9 Activity 1: Food Web Organization
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.7.	Environmental Science: Energy in the Earth System: Broad Concept: Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.7.2.	Explain the meaning of radiation, convection, and conduction (three mechanisms by which heat is transferred to, through, and out of the Earth's system). <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
STANDARD / ESSENTIAL SKILL	E.7.3.	Understand and describe how layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth. Recognize that by burning these fossil fuels, people are passing stored energy back into the environment as heat and

		<p>releasing large amounts of carbon dioxide.</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 4 Activity 1: The Greenhouse Effect and Global Warming • Teacher Resource CD: Environmental Issues
<p>STANDARD / ESSENTIAL SKILL</p>	<p>E.7.4.</p>	<p>Describe how energy derived from the sun is used by green plants to produce chemical energy in the form of sugars (photosynthesis), and this energy is transferred along a food chain from producers (plants) to consumers to decomposers.</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 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 9 Activity 1: Food Web Organization • Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids • Teacher Resource CD: Air, Water, and Soils • Teacher Resource CD: Ecosystems, Energy, and Biodiversity • Teacher Resource CD: Environmental Issues
<p>STANDARD / ESSENTIAL SKILL</p>	<p>E.7.5.</p>	<p>Illustrate the flow of energy through various trophic levels of food chains and food webs within an ecosystem. Describe how each link in a food web stores some energy in newly made structures and how much of the energy is dissipated into the environment as heat. Understand that a continual input of energy from sunlight is needed to keep the process going.</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 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 9 Activity 1: Food Web Organization Environmental Issues and Solutions: Unit 3 Lab 9 Activity 2: A Closer Look at Energy Pyramids Teacher Resource CD: Ecosystems, Energy, and Biodiversity Teacher Resource CD: Environmental Issues
CONTENT STANDARD / STRAND / DISCIPLINE	DC.E.8.	Environmental Science: Environmental Quality: Broad Concept: Environmental quality is linked to natural and human-induced hazards, and the ability of science and technology to meet local, national, and global challenges. As a basis for understanding this concept, students:
STANDARD / ESSENTIAL SKILL	E.8.1.	<p>Differentiate between natural pollution and pollution caused by humans and give examples of each.</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 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 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: Air, Water, and Soils Teacher Resource CD: Environmental Issues

		<ul style="list-style-type: none"> Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.8.2.	<p>Describe sources of air and water pollution and explain how air and water quality impact wildlife, vegetation, and human health.</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 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 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 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: Air, Water, and Soils Teacher Resource CD: Environmental Issues Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.8.3.	<p>Describe the historical and current methods of water management and recycling, including the waste treatment practices of landfills, incineration, reuse/recycle and source reduction.</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 2 Lab 6 Activity 2: Observing Air Pollution Indicators - Lichens 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 2: Determining the Carrying Capacity of a Population 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:

		<p>Biological Treatment of Pollution</p> <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: Air, Water, and Soils • Teacher Resource CD: Environmental Issues • Virtual Laboratory: The Effect of Temperature on Dissolved Oxygen
STANDARD / ESSENTIAL SKILL	E.8.4.	<p>Understand and explain that waste management includes considerations of quantity, safety, degradability, and cost.</p> <ul style="list-style-type: none"> • 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 • Teacher Resource CD: Environmental Issues
STANDARD / ESSENTIAL SKILL	E.8.6.	<p>Identify natural Earth hazards, such as earthquakes and hurricanes, and identify the regions in which they occur as well as the short-term and long-term effects on the environment and on people.</p> <ul style="list-style-type: none"> • Environmental Issues and Solutions: Unit 1 Lab 1 Activity 1: Biodegradation in a Landfill

© 2008, EdGate Correlation Services, LLC. All Rights reserved.