

## SIXTH GRADE SCIENCE CURRICULUM

<b>COURSE OUTLINE</b>		
<b>Unit One</b>	<p><b><u>Populations in Ecosystems 6.2 a &amp; 6.2 b</u></b>  <i>Food chains and food webs found in Connecticut</i>  <i>Ecosystems and environmental features</i>  <i>Adaptations and habitat requirements in populations</i>  <i>Energy levels</i></p>	6 weeks
<b>Unit Two</b>	<p><b><u>Energy Flow in Populations 6.2 a &amp; 6.2 b</u></b>  <i>Energy flow in energy pyramids</i>  <i>Interactions between abiotic and biotic factors</i>  <i>Competition and predator-prey relationships</i>  <i>Human impact and environmental changes</i></p>	4 weeks
<b>Unit Three</b>	<p><b><u>Water Availability 6.4 a</u></b>  <i>Water availability on the Earth</i>  <i>Septic and sewage systems effect on water quality</i>  <i>Factors affecting erosion</i>  <i>Point source and nonpoint source pollution in Connecticut</i></p>	6 weeks
<b>Unit Four</b>	<p><b><u>Weather Systems 6.3 a</u></b>  <i>Composition of Earth's atmospheric layers</i>  <i>Water Cycle</i>  <i>Weather on Earth affected by solar energy and proximity of large bodies of water</i>  <i>Movement and density of molecules in liquids, solids, and gases</i></p>	6 weeks
<b>Unit Five</b>	<p><b><u>Abiotic and Biotic Factors in Ecosystems 6.2 a</u></b>  <i>The effect of abiotic factors on biotic factors</i>  <i>Permeability and porosity of Earth materials</i>  <i>Photosynthesis</i></p>	4 weeks
<b>Unit Six</b>	<p><b><u>Weathering, Erosion, and Deposition 7.3 b</u></b>  <i>Weathering, erosion, and deposition</i>  <i>Factors affecting rate of weathering</i>  <i>River landforms</i></p>	3 weeks
<b>Unit Seven</b>	<p><b><u>Glaciers 7.3 b</u></b>  <i>Glacial erosion and glacial deposition</i>  <i>Glaciation and the effect on Connecticut's landscape</i>  <i>Glacial landforms</i></p>	3 weeks
<b>Unit Eight</b>	<p><b><u>Plate Tectonics 7.3 a</u></b>  <i>Layers of Earth's interior</i>  <i>Plate tectonics and the effect on Connecticut's landscape</i>  <i>Folded and faulted rock layers</i>  <i>Divergent, convergent, and transform boundaries</i></p>	4 weeks

School-wide Academic Expectations Taught in Sixth Grade Science:

- Write Effectively
- Read Effectively
- Speak Effectively
- Problem Solve Effectively
- Think Critically and Effectively

School-wide Social and Civic Expectations Taught in Sixth Grade Science:

- Honesty
- Responsibility
- Respect
- Safety

Common Core Standards Taught in Sixth Grade Science:

- Reading Standards for Science Literacy (RST): 1, 2, 3, 4, 5, 6, 7, 8 and 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 5, 6, 7, 8, 9 and 10

## Unit 1: Populations in Ecosystems

**Introduction and Established Goals:** The year begins with a study of plants and animals living in a Connecticut ecosystem. Students will be collecting and classifying specimens from Assekonk Brook and Assekonk Pond, along with exploring the inhabitants of their own backyards. Students will observe the organisms’ feeding habits in the classroom and then discuss their adaptations, habitat requirements, and predator-prey relationships. Students will be introduced to independent and dependent variables found in a bar graph, and learn how to analyze and interpret data.

**Desired Outcome:** Students will be able to label organisms in a Connecticut food web, classify their energy roles, and explain their interdependence. Students will be able to analyze and interpret data on a bar graph.

**CT State Standard:**

- 6.2 An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.
- 6.2 a Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply.
- 6.2 b Populations in ecosystems can be categorized as producers, consumers, and decomposers of organic matter.

**Common Core Standard(s):**

- RST: 1, 2, 4, 5, and 7
- WHST: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 2d, 2f, 4, 6, 9, and 10

**Essential Question(s):** What adaptations do plants and animals need in order to live in North Stonington, Connecticut? How do plants and animals living in Connecticut ecosystems interact with each other?

**Key Terms/Concepts:** Ecosystem, habitat, interdependency, biodiversity, organism, population, food chain, food web, predator, prey, vernal pool, indicator species, macro-invertebrate, adaptation, producer, biodiversity, consumer, and decomposer.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Matter and Energy in Ecosystems 6.2 a & 6. b	1. Compare and contrast the energy transfers and matter cycling among producers, consumers and decomposers in varied Connecticut ecosystems.	<ul style="list-style-type: none"> <li>● Pond Ecosystem Pre-assessment</li> <li>● KWL</li> <li>● Word knowledge chart</li> <li>● Live plant and animal observations</li> <li>● “Life in a pond” and “Life in a stream” puppet shows</li> <li>● “Frogs and Toads living in North Stonington” worksheet</li> <li>● Teacher-created PowerPoint presentation and note taking</li> <li>● Amphibian data collection</li> <li>● Frog bar graph reflective questions</li> <li>● Macro-invertebrate data collection</li> <li>● Excel bar graph tutorial</li> <li>● Macro-invertebrate reflection questions</li> <li>● Anticipation guide using e-books</li> <li>● Quizlet vocabulary activity</li> <li>● Edmodo quick write assignments</li> </ul>	Vocabulary Quiz Worksheets Amphibian bar graph Macro-invertebrate bar graph Excel bar graph Edmodo quick writes Pond Ecosystem Post-assessment Foldable graphic organizer

		<ul style="list-style-type: none"> <li>• Kid blog discussions</li> <li>• Prezi presentations with natural history background of animals</li> <li>• “Frog and Toad” Venn diagram</li> <li>• “Native and Exotic Frogs” T graph</li> <li>• “Classifying Energy Roles” worksheet from text</li> <li>• “List, Group and Label” vocabulary activity</li> <li>• “Between Land and Water” video and worksheet</li> <li>• “Magic School Bus Hops Home” video, worksheet and PowerPoint presentation</li> <li>• “Trout in the Classroom” activities</li> <li>• “Dirt Made My Lunch” lyrics worksheet</li> <li>• JENGA biodiversity game</li> <li>• Predator-prey card game</li> <li>• “Find someone who...” vocabulary review</li> <li>• “I have, who has?” vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• Word definition cards</li> <li>• “Fly Swatter” review</li> <li>• Alphaboxes</li> <li>• Vocabulary BINGO</li> </ul>	
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**Suggested Resources and Texts:** *Environmental Science* textbook by Prentice Hall including *All in One Teaching Resources, Reading and Study Workbook*, and *Adapted Tests* resource books, *Food Chains and Webs* by Delta Science Readers, *Project WILD* book, *Project Learning Tree Environmental Education Activity Guide*, *Hands-On Nature* by Jenepher Lingelbach, “Habitat Song” lyrics from Bill Oliver, “Dirt Made My Lunch” lyrics by the Banana Slug Band and “Trout in the Classroom” sponsored by Trout Unlimited.

**Suggested Technology:** PowerPoint, Edmodo, Glogster, Prezi, Animoto, Voki, Quizlet, Kid blog, Excel, Wordle, YouTube video clips, Scholastic trout web site, Bill Nye “Biodiversity” video, Magic School Bus “Hops Home” and “Gets Eaten” videos, “Between Land and Water” DVD, Puzzlemaker.com, *Food Chains* electronic book written by Carol Surges, and *Food Chains and Webs A Struggle to Survive* electronic book written by Andrew Solway.

## Unit 2: Energy Flow in Populations

**Introduction and Established Goals:** Students will extend their knowledge of food webs and energy roles by learning how organisms are classified in an energy pyramid. Then students will evaluate the impacts of environmental changes caused by nature and by humans, and learn how these factors increase and decrease plant and animal population sizes. They will understand that animals and plants compete for limited resources, and these relationships can be beneficial or harmful according to the interdependency of the food web. Students will learn how nonliving things in an ecosystem help living things survive, and how to identify the independent and dependent variables in a bar graph.

**Desired Outcome:** Students will be able to create, analyze, and interpret graphs that illustrate patterns between predator-prey populations over time. Students will be able to create a model to show the energy transfer between each of the energy roles in a Connecticut ecosystem, and be able to identify biotic and abiotic factors.

**CT State Standard:**

- 6.2 An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.
- 6.2 a Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply.
- 6.2 b Populations in ecosystems can be categorized as producers, consumers, and decomposers of organic matter.

**Common Core Standard(s):**

- RST: 1, 2, 4, 5, 7, and 9
- WHST: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f, 4, 6, 9, and 10

**Essential Question(s):** How do population sizes in Connecticut ecosystems change? How do nonliving things in an ecosystem help living things survive? How is matter cycled and energy transferred through populations living in Connecticut?

**Key Terms/Concepts:** Competition, predation, energy pyramid, limiting factor, carrying capacity, habitat fragmentation, habitat destruction, independent variable, dependent variable, abiotic factor, biotic factor, niche, herbivore, carnivore, omnivore, and scavenger.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENTS EVIDENCE
Matter and Energy in Ecosystems 6.2 a & 6.2 b	1. Explain the interdependence between biotic and abiotic factors within a given ecosystem.  2. Evaluate the impacts of environmental changes caused by nature and by humans.  3. Create and interpret graphs that illustrate relationships between predator-prey populations over time.	<ul style="list-style-type: none"> <li>• Word knowledge chart</li> <li>• “Analyzing Interactions Among Organisms” worksheet</li> <li>• “Pheasant Population Graph” worksheet</li> <li>• “Oh Deer” game from Project WILD</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• The “Rise of Black Wolf in Yellowstone” video, T-graph and concept map</li> <li>• Anticipation guides for e-book and textbook reading</li> <li>• “Every Tree for Itself” Project</li> </ul>	Vocabulary quiz Worksheets “Oh Deer” bar graph “Every Tree For Itself” RAFT writing activity Speak Effectively School-wide rubric Edmodo quick writes Kid blog posts Test

		<ul style="list-style-type: none"> <li>Learning Tree</li> <li>• RAFT letter</li> <li>• “Lynx and Hare Predator-prey Graph” worksheet</li> <li>• “Energy Flow in Ecosystems” worksheet and hands-on activity</li> <li>• “List, Group, and Label” activity</li> <li>• “Find someone who...”</li> <li>• “Vocabulary review</li> <li>• “I have, who has?” vocabulary review</li> <li>• Quizlet vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• “Fly Swatter” vocabulary review</li> <li>• Word definition cards</li> <li>• Alphaboxes</li> <li>• Vocabulary BINGO</li> <li>• “Finding Nemo” video and worksheet</li> </ul>	
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**Suggested Resources and Texts:** *Environmental Science* textbook by Prentice Hall including *All in One Teaching Resources*, *Reading and Study Workbook*, and *Adapted Tests* resource books, field guides, *Project WILD* book, and *Project Learning Tree Environmental Education Activity Guide*.

**Suggested Technology:** Edmodo, Kid blog, Quizlet, Glogster, Prezi, PowerPoint, Wordle, Voki, Animoto, “Finding Nemo” video, Puzzlemaker.com, “The Rise of Black Wolf in Yellowstone” DVD, *Food Chains* electronic book written by Carol Surges, and *Food Chains and Webs A Struggle to Survive* electronic book written by Andrew Solway.

### Unit 3: Water Availability

**Introduction and Established Goals:** Students will learn how frogs indicate the health of the environment by reading about frog deformities. Then, students will learn about the properties of water and how pollution affects water quality. Maps will be used to show students that we all live in a watershed, and how rivers and streams found in Connecticut drain into Long Island Sound. Students will be able to differentiate between nonpoint source and point source pollution, along with being able to examine how water travels through septic systems and water treatment plants. Students will also learn how pesticides and herbicides affect water quality, and the importance of keeping our drinking water clean.

**Desired Outcome:** Students will be able to construct an argument supported by evidence to explain how human activities impact water quality and affect living things. Students will be able to illustrate a diagram of an aquifer, and describe examples of nonpoint and point sources of pollution found in Connecticut.

**CT State Standard:**

6.4 Water moving across and through earth materials carries with it the product of human activities.  
6.4 a Most precipitation that falls on Connecticut eventually reaches Long Island Sound.

**Common Core Standard(s):**

RST: 1, 2, 3, 4, 5, 6, 7, 8, and 9

WHST: 1a, 1b, 1c, 1d, 1e, 1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f, 4, 5, 6, 9, and 10

**Essential Question(s):** How do human activities affect water quality and other living things? Why are scientists all around the world studying frogs?

**Key Terms/Concepts:** surface water, groundwater, freshwater, salt water, watershed, well, septic system, wastewater, eutrophication, permeable, impermeable, runoff, plume, pores, aquifer, point source pollution, bioaccumulation, nonpoint source pollution, threshold limits, maximum contaminant level, fertilizer, herbicide, and pesticide.

#### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Science and Technology 6.4 a	<ol style="list-style-type: none"> <li>Discuss and chart the reasons why water is essential for life.</li> <li>Observe, analyze and record the unique physical and chemical properties of water.</li> <li>Research the differences in quantities between fresh water (solid and liquid) and salt water covering the earth's surface and report on the impact to humans.</li> </ol>	<ul style="list-style-type: none"> <li>KWL</li> <li>Word knowledge chart</li> <li>"A Drop in the Bucket" adapted from Project WET</li> <li>pH lab and PowerPoint presentation</li> <li>Potter's Pond virtual lab</li> <li>Surface tension lab</li> <li>"Water Olympics" adapted from Project WET</li> <li><i>The Story Behind Water</i> e-book and anticipation guide</li> <li>"Water on Earth" worksheet</li> <li>Bill Nye "Lakes and Ponds"</li> </ul>	Worksheets Lab Reports Learning center activities Environmental Problem letter

	4. Compare and contrast the general structures, processes and limitations of a septic system to a secondary wastewater treatment plant.	<ul style="list-style-type: none"> <li>• Pfizer “Water Purification” lab</li> <li>• “Water to Drink” worksheet</li> <li>• “Water Underground” worksheet</li> <li>• Word definition cards</li> <li>• “Find someone who…” vocabulary review</li> <li>• “I have, who has?” vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• “Fly Swatter” vocabulary review</li> <li>• Quizlet vocabulary review</li> <li>• Alphaboxes</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• Vocabulary BINGO</li> </ul>	Quiz Worksheets Lab report Test
	5. Use appropriate maps to locate and identify the major watersheds that drain into Long Island Sound and analyze how the topography influences the way water moves in the Long Island Sound watershed  6. Investigate and explain in writing how substances, both harmful and beneficial, dissolve in and are carried by surface and ground water	<ul style="list-style-type: none"> <li>• “Four Rivers” Project WET worksheet</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• Long Island Sound Sea Grant worksheets</li> <li>• Bill Nye “Lakes and Ponds” worksheet</li> <li>• “Who Polluted the Pond?” Save the Bay</li> <li>• Watershed Activity Project WET</li> <li>• “DDT” worksheet</li> <li>• “DDT Test Preparation” activity</li> <li>• “Big Yellow Taxi” song lyric worksheet</li> <li>• “Sum of the Parts” from Project WET</li> <li>• Edmodo activity</li> <li>• “PPM Pre-lab” activity</li> <li>• “Fruitvale Well Contamination” lab</li> <li>• “We are the Watershed” worksheet from LIS Sea Grant Sound Fact Sheet #2</li> </ul>	Worksheets Lab Reports Environmental Problem letter Write Effectively School-wide rubric Edmodo quickwrite Test
	7. Research and evaluate in writing the effects of common point and nonpoint water pollutants in Connecticut.  8. Debate the effectiveness of a law designed to protect water resources.	<ul style="list-style-type: none"> <li>• Pfizer “Water Purification” lab</li> <li>• “Fruitvale Well Contamination” lab</li> <li>• “Trout in the Classroom” worksheet</li> <li>• “Freaky Frog” Web Quest</li> <li>• Eutrophication demonstration</li> <li>• Tyrone Hayes Prezi presentation</li> <li>• <i>The Frog Scientist</i> reading and writing activities</li> <li>• RAFT letter</li> <li>• Teacher-created PowerPoint presentation</li> <li>• “Thin Green Line” and “Frog Decline” Edmodo quick write activities</li> <li>• Prezi presentation of environmental problems</li> </ul>	Speak Effectively School-wide rubric RAFT letter Environmental Problem letter Write Effectively School-wide rubric Lab reports Edmodo quick write Kid blog posts Test

**Suggested Resources and Texts:** *Earth’s Waters* by Prentice Hall, *All in One Teaching Resources*, *Reading and Study Workbook*, and *Adapted Tests* resource books, Lab Aids applied science kit, Pond Water Tour curriculum, *Project WET* book, *The Frog Scientist* written by Pamela Turner, “Big Yellow Taxi” written by Carole King, persuasive letter rubric and peer editing checklist from readwritethink.org.

**Suggested Technology:** Edmodo, Glogster, Quizlet, Prezi, PowerPoint, Kid blog, Voki, Wordle, Animoto, PBS “Thin Green Line,” Bill Nye “Erosion” video, Puzzlemaker.com, and *The Story Behind Water* electronic book written by Christin Ditchfield, You Tube video links showing the effects of fertilizer, pesticide, and herbicide use, and Bill Nye “Lakes and Ponds” video.

## UNIT 4: Weather Systems

**Introduction and Established Goals:** Students will learn how weather forecasting has evolved into current day technology, and how weather differs from climate. They will learn how local weather conditions are related to the temperature, pressure and water content of the atmosphere and the proximity to a large body of water, such as Long Island Sound. Students will also understand how scientists make weather forecasts from weather data and why the weather changes each day.

**Desired Outcome:** Students will be able to apply and use scientific knowledge to describe factors that influence weather patterns in Connecticut. Students will also be able to create a model that demonstrates how solar energy influences the water cycle.

**CT State Standard:**

6.3 Variations in the amount of the sun’s energy hitting the earth’s surface affects daily and seasonal weather patterns.

6.3 a Local and regional weather are affected by the amount of solar energy the area receives and proximity to a large body of water.

**Common Core Standard(s):**

RST: 1, 2, 3, 4, 5, 7, 8, and 9

WHST: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f, 4, 5, 6, 7, 8, 9, and 10

**Essential Question(s):** How do scientists use technology to gather data and to determine weather patterns? What factors influence weather patterns?

**Key Terms/Concepts:** Weather, climate, molecule, dense, solid, liquid, gas, phase change, condense, evaporate, air pressure, humidity, air mass, cold/warm front, precipitation, global wind, sea breeze, and land breeze.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Energy in Earth’s Systems 6.3 a	1. Compare the composition and functions of the earth’s atmospheric layers.  2. Explain how changes in temperature, pressure, moisture and density of air create weather.  3. Describe differences between climate and weather.  4. Predict the type of weather that may result given certain cloud types, warm and cold fronts and air pressure	<ul style="list-style-type: none"> <li>• KWL</li> <li>• Word Knowledge chart</li> <li>• “Earth Model” worksheet</li> <li>• “The Air Around You” worksheet</li> <li>• “Air Masses and Fronts” worksheet</li> <li>• “Air Pressure” worksheet</li> <li>• Edmodo video</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• Bill Nye “Climate” interactive video and quiz</li> <li>• “Build a Barometer” activity</li> </ul>	Worksheets Quiz Edmodo quick write Kid blog posts Weather log Connecticut Weather Pattern Glog Test

		<ul style="list-style-type: none"> <li>• Weather log</li> <li>• Cloud condensation Prezi</li> <li>• “Interpreting Weather Maps”</li> <li>• Bill Nye “Storm” interactive video</li> <li>• “Predicting the Weather” worksheet</li> <li>• Word definition cards</li> <li>• Quizlet vocabulary review</li> <li>• “Find someone who…” vocabulary review</li> <li>• “I have, who has?” vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• “Fly Swatter” vocabulary review</li> </ul>	
	<p>5. Demonstrate the arrangement and motion of atoms or molecules in solids, liquids and gases.</p> <p>6. Predict the phase change that will result from the absorption or release of heat energy by solids, liquids or gases.</p>	<ul style="list-style-type: none"> <li>• “Water Density” activity</li> <li>• “Heat Transfer” worksheet</li> <li>• “Convection Currents” worksheet</li> <li>• Glogster tutorial</li> <li>• Teacher-created PowerPoint presentation and note taking</li> </ul>	Worksheets Weather log Connecticut Weather Patterns Glog Test
	<p>7. Create models or diagrams that demonstrate how solar energy drives different phases of the water cycle.</p> <p>8. Design, conduct and report in writing an investigation to compare the heat absorption and release rates of water and earth materials.</p>	<ul style="list-style-type: none"> <li>• Water cycle demonstration</li> <li>• “Water in the Atmosphere” worksheet</li> <li>• “Interpreting Graphs” worksheet</li> <li>• “Modeling a Humid Climate” activity</li> <li>• Edmodo video</li> <li>• Bill Nye “Climate” video</li> </ul>	Worksheets Edmodo quickwrite Weather log Connecticut Weather Patterns Glog Test
	<p>9. Compare and contrast conditions that cause local sea breezes/land breezes and global wind patterns.</p> <p>10. Explain the causes of temperature differences between coastal and inland areas.</p>	<ul style="list-style-type: none"> <li>• “Wind Pattern” Venn diagram</li> <li>• Anticipation guides for differentiated texts</li> <li>• Bill Nye “Wind” video</li> <li>• “Winds” worksheet</li> <li>• Edmodo activity</li> <li>• Quizlet vocabulary review</li> <li>• Alphaboxes</li> <li>• Vocabulary BINGO</li> <li>• Weather BINGO</li> </ul>	Worksheets Weather log Connecticut Weather Patterns Glog

**Suggested Resources and Texts:** *Weather and Climate* written by Rebecca Johnson, *Weather* textbook published by Prentice Hall including *All In One Resources*, *Reading and Study Workbook*, and *Adapted Tests* resource books, *Temperate Climate* written by Jasper Williams, *Polar Climate* written by Jasper Williams, *Tropical Climate* written by Jasper Williams, and *Desert Climate* written by Jasper Williams.

**Suggested Technology:** Glogster, Edmodo, Quizlet, Kid Blog, PowerPoint, Prezi, Voki, Wordle, Puzzlemaker.com, You Tube animated web sites, Animoto, NOAA web site, National Weather System web site, *The Story Behind Water* electronic book written by Christin Ditchfield, and Bill Nye “Climates,” “Storms,” and “Wind” videos.

## Unit 5: Abiotic and Biotic Factors in Ecosystems

**Introduction and Established Goals:** Students will compare and contrast different brands of potting soil to topsoil found in North Stonington, Connecticut. Then, they will design an experiment to test the permeability and porosity of two soil samples. After exploring the soils and reading about photosynthesis, students will select the soil they would like to use for their investigation. Next, small groups of students will design an inquiry-based lab to test how abiotic factors affect plant growth. Finally, students will identify independent and dependent variables, and those variables that are kept constant, when designing the inquiry-based lab.

**Desired Outcomes:** Students will design an experiment to investigate and report on the effects of abiotic factors on the ability of plants to carry out photosynthesis. Students will construct a testable hypothesis and collect, analyze, and interpret the data from the experiment, including the identification of the independent and dependent variables.

**CT State Standards:**

6.2 An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.  
 6.2 a Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply.

**Common Core Standard(s):**

RST: 1, 2, 3, 4, 5, 7, 8, and 9  
 WHST: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f, 3, 4, 5, 6, 7, 8, 9 and 10

**Essential Question(s):** How do abiotic factors affect plant growth?

**Key Terms/Concepts:** Photosynthesis, oxygen, carbon dioxide, nitrogen, transpiration, controlled variables, topsoil, and soil.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Matter and Energy in Ecosystems 6.2 a & 6.2 b	1. Design and conduct a scientific investigation to explore the porosity and permeability of soils and their ability to support different plant life.	<ul style="list-style-type: none"> <li>• KWL</li> <li>• Word knowledge chart</li> <li>• “Peanut Butter Sandwich” lab report</li> <li>• “Introduction to Using Variables in an Experiment” worksheet</li> <li>• “Design an Experiment” worksheet</li> <li>• “Dig In 1” soil exploration</li> <li>• “Dig In 2” inquiry experiment</li> <li>• Class demonstration of different permeable materials</li> <li>• Bill Nye “Rocks and Soil” interactive quiz</li> <li>• Anticipation guide with e-book</li> </ul>	Worksheets Lab reports Foldable graphic organizer
	2. Present a written argument to support the claim that “The sun is the source of energy to	<ul style="list-style-type: none"> <li>• “Little Green Food Factories” worksheet</li> <li>• “Abiotic Factors Affecting Plant Growth” inquiry lab</li> </ul>	Worksheets Problem-solving School-wide rubric Excel bar graph

	<p>support life on Earth.”</p> <p>3. Describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis.</p> <p>4. Investigate and report on the effects of abiotic factors on a plant’s ability to carry out photosynthesis.</p>	<ul style="list-style-type: none"> <li>• Excel bar graph</li> <li>• “Photosynthesis” reading and graphic organizer</li> <li>• Transpiration plant demonstration</li> <li>• Edmodo activity</li> <li>• Soil exploration with Digital Blue Microscopes</li> <li>• Lab Report Prezi</li> <li>• Photosynthesis foldable reflection questions</li> <li>• Alphaboxes</li> </ul>	<p>Lab report  Foldable graphic organizer  Glog  Edmodo quickwrite  Kid blog post</p>
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**Suggested Resources and Texts:** *Environmental Science* textbook by Prentice Hall including *All in One Teaching Resources, Reading and Study Workbook*, and *Adapted Tests* resource books, “Little Green Food Factories,” “Photosynthesis,” by Delta Science Readers, and “Dirt Made My Lunch” lyrics by the Banana Slug Band.

**Suggested Technology:** Edmodo, Glogster, Prezi, PowerPoint, Kid blog, Excel, Digital Blue Q5 Microscopes, video clips, Bill Nye “Rocks and Soil” video, Puzzlemaker.com, *Food Chains* electronic book written by Carol Surges, Photosynthesis music videos, and *Food Chains and Webs A Struggle to Survive* electronic book written by Andrew Solway.

## Unit 6: Weathering, Erosion, and Deposition

**Introduction and Established Goals:** Students will begin this unit by exploring how soil is formed and the major agents of erosion. Then, students will learn the differences between chemical and mechanical weathering, including the factors that influence the rate of weathering. Finally, students will learn how weathering, erosion, and deposition build up and break down Earth’s surface in a never-ending cycle creating new river landforms, and how these processes influence Connecticut’s landscape.

**Desired Outcome:** Students will be able to explain how soil is formed and describe the forces that move sediment from place to place. Students will be able to apply and use scientific knowledge to create a model of river landforms, and be able to categorize river landforms made by weathering, erosion and deposition.

**CT State Standard:**

7.3 Landforms are the result of the interaction of constructive and destructive forces over time.  
 7.3 b Glaciation, weathering, and erosion change the earth’s surface by moving earth’s surface by moving earth materials from materials from place to place.

**Common Core Standard(s):**

RST: 1, 2, 3, 4, 5, 7, 8, and 9  
 WHST: 2a, 2b, 2c, 2d, 2e, 2f, 4, and 10

**Essential Question(s):** What processes cause mountains to turn into rocks, rocks to turn into soil, and soil to move from place to place?

**Key Terms/Concepts:** Sediment, erosion, deposition, mechanical weathering, chemical weathering, ice wedging, abrasion, floodplain, tributary, meander, oxbow lake, delta, alluvial fan, mountain, V-shaped valley, creep, landslide, mudflow, slump, beaches, and river.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Energy in the Earth’s Systems 7.3 b	1. Distinguish between weathering and erosions  2. Compare and contrast the major agents of erosion and deposition of sediments: running water, moving ice, wave action, wind and mass movement due to gravity.	<ul style="list-style-type: none"> <li>• KWL</li> <li>• Word knowledge chart</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• Anticipation guide or SQ3R activity for text</li> <li>• “Mass movement” worksheet</li> <li>• “River Landform Map” worksheet</li> <li>• “Erosion by Rivers” worksheet from textbook</li> <li>• Stream table</li> <li>• “River Landform” video and worksheet</li> <li>• “Deposits by Rivers” worksheet from textbook</li> <li>• Word definition cards</li> </ul>	Worksheets Quiz Foldable graphic organizer Glog Test

		<ul style="list-style-type: none"> <li>• Quizlet vocabulary review</li> <li>• “Find someone who...” vocabulary review</li> <li>• “I have, who has?” vocabulary review</li> <li>• “List, Group, Label” vocabulary review</li> <li>• “Fly Swatter” vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• Vocabulary BINGO</li> <li>• Alphaboxes</li> </ul>	
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**Suggested Resources and Texts:** *Earth’s Changing Surface* textbook published by Prentice Hall including *All In One Resources, Reading and Study Workbook*, and *Adapted Tests* resource book.

**Suggested Technology:** Edmodo, Quizlet, Kidblog, Glogster, Prezi, Voki, Animoto, Wordle, Puzzlemaker.com, PowerPoint, animated web sites, and “River Landforms” video.

## Unit 7: Glaciers

**Introduction and Established Goals:** Students will begin this unit by watching a block of ice filled with sediment and rocks melt to learn about glacial erosion and deposition. Next, they will learn what conditions are needed in order for a glacier to form, and how the topography of the land creates valley or continental glaciers. Then, students will discover how glaciers combine the processes of weathering, erosion, and deposition to shape Earth’s surface, and how the ice age influenced Connecticut’s landscape.

**Desired Outcome:** The student will be able to apply and use scientific knowledge to create a model of glacial landforms created by weathering, erosion and deposition. Students will also be able to categorize glacial landforms shaped by weathering, erosion and deposition.

**CT State Standard:**

7.3 Landforms are the result of the interaction of constructive and destructive forces over time.  
 7.3 b Glaciation, weathering, and erosion change the earth’s surface by moving earth’s surface by moving earth materials from materials from place to place.

**Common Core Standard(s):**

RST: 1, 2, 3, 4, 5, 7, 8, and 9  
 WHST: 2a, 2b, 2c, 2d, 2e, 2f, 4, and 10

**Essential Question(s):** How do glaciers form, move, and shape the land?

**Key Terms/Concepts:** Valley glacier, continental glacier, ice age, glacier, U-shaped valley, plucking, abrasion, horn, drumlin, fiord, moraine, terminal moraine, kettle, glacial lake, glacial erosion, and glacial deposition.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Energy in the Earth’s Systems 7.3 b	1. Investigate and determine how glaciers form and affect the earth’s surface as they change over time.  2. Examine and compare geological features that result from constructive forces shaping the surface of the earth over time (e.g., mountains, ridges, volcanoes) with geological features that result from destructive forces shaping the surface of the earth over time.  3. Observe and report on the geological events that are responsible for having shaped Connecticut’s	<ul style="list-style-type: none"> <li>• KWL</li> <li>• Word knowledge chart</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• “Valley and Continental Glacier Ice Cube” demonstration and activity</li> <li>• “Glacier Measuring” activity</li> <li>• Anticipation guide with e-book</li> <li>• SQ3R worksheet</li> <li>• “How Glaciers Form and Move” worksheet</li> <li>• “Glacial Landform Map” worksheet</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• Word definition cards</li> <li>• Quizlet vocabulary review</li> <li>• “I have, who has?” vocabulary review</li> <li>• “Find Someone Who…” vocabulary review</li> </ul>	Worksheets Quiz Test Foldable graphic organizer Glog

	landscape.	<ul style="list-style-type: none"> <li>• “List, Group, Label” vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• “Fly Swatter” vocabulary review</li> <li>• Alphaboxes</li> <li>• Vocabulary BINGO</li> </ul>	
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**Suggested Resources and Texts:** *Earth’s Changing Surface* textbook published by Prentice Hall including *All In One Resources, Reading and Study Workbook*, and *Adapted Tests* resource book.

**Suggested Technology:** PowerPoint, Edmodo, Kid blog, Prezi, Edmodo, Quizlet, Voki, Animoto, Wordle, Puzzlemaker.com, animated web sites, and *Glaciers* electronic book written by Marcia Zappa.

## UNIT 8: Plate Tectonics

**Introduction and Established Goals:** Students will place ripped magazine pieces back together like a puzzle to learn the strategies that Alfred Wegener used to support his theory of continental drift. Looking for similar shapes and colors will show students how land features, fossils, and coastline shapes once lined up like a puzzle. They will learn how the three kinds of plate boundaries create different landforms such as mountains, ridges, and valleys, and how the Earth’s internal energy moves tectonic plates. Then, they will learn how volcanoes and earthquakes are related to plate tectonics, and how they have influenced Connecticut’s landscape.

**Desired Outcome:** The student will be able to construct a model of the Earth and use scientific evidence to describe how the plates interact with each other at the intersection of plate boundaries.

**CT State Standard:**

- 7.3 Landforms are the result of the interaction of constructive and destructive forces over time.  
 7.3 a Volcanic activity and the folding and faulting of rock layers during the shifting of the Earth’s crust affect the formation of mountains, ridges, and valleys.

**Common Core Standard(s):**

- RST: 1, 2, 3, 4, 5, 7, 8, and 9  
 WHST: 2a, 2b, 2c, 2d, 2e, 2f, 4, 9 and 10

**Essential Question(s):** How do moving tectonic plates shape Earth’s surface? What is the connection between plate movement, earthquakes, and volcanoes?

**Key Terms/Concepts:** Core, mantle, folds, fault/fault line, continent, tectonic plate, plate boundary, convection, volcano, earthquake, sea-floor spreading, convection currents, conduction, radiation, continental crust, oceanic crust, convergent boundary, divergent boundary, and transform boundary.

### LEARNING PLAN

STANDARD	LEARNING OBJECTIVES (CONTENT & SKILLS)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Energy in the Earth’s Systems 7.3 a & 7.3 b	<ol style="list-style-type: none"> <li>1. Illustrate and describe in writing the composition of the three major layers of the earth’s interior.</li> <li>2. Explain how Earth’s internal energy is transferred to move tectonic plates</li> </ol>	<ul style="list-style-type: none"> <li>• “Earth’s Layers” worksheet</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• “Earth Model” demonstration</li> <li>• Bill Nye “Volcano” and “Earthquake” interactive videos</li> <li>• <i>Violent Volcanoes</i> e-book and anticipation guide</li> <li>• “What is Sea-Floor Spreading?” worksheet</li> <li>• “Modeling Sea Floor Spreading” activity</li> <li>• Animated video clips</li> <li>• “Three Kinds of Plate Boundaries” worksheet</li> <li>• Alvin video clip</li> <li>• SQ3R activity</li> <li>• “Moving Plate” flip books</li> </ul>	Worksheets Foldable graphic organizer Glog Test

	<p>3. Correlate common geological features/events (deep sea trenches, mountains, earthquakes, volcanoes) with the location of plate boundaries.</p> <p>4. Analyze and interpret data about the location, frequency and intensity of earthquakes.</p>	<ul style="list-style-type: none"> <li>• Graham cracker and frosting activity</li> <li>• Shoebox of dirt demonstration</li> <li>• Alvin video clip of sea floor</li> <li>• Teacher-created PowerPoint slide show</li> <li>• “Ring of Fire” worksheet</li> <li>• Bill Nye “Volcano” and “Earthquake” interactive videos</li> <li>• Plate boundary worksheet</li> </ul>	<p>Worksheets Foldable graphic organizer Glog Test</p>
	<p>5. Demonstrate the processes of folding and faulting of the earth’s crust.</p> <p>6. Examine and compare geological features that result from constructive forces shaping the surface of the earth over time (e.g., mountains, ridges, volcanoes) with geological features that result from destructive forces shaping the surface of the earth over time.</p> <p>7. Observe and report on the geological events that are responsible for having shaped Connecticut’s landscape.</p>	<ul style="list-style-type: none"> <li>• “Graham Cracker and Frosting” activity</li> <li>• Teacher-created PowerPoint presentation and note taking</li> <li>• Bill Nye “Volcano” and “Earthquake” interactive videos</li> <li>• Edmodo activity</li> <li>• “I have, who has?” vocabulary review</li> <li>• “Find Someone Who…” vocabulary review</li> <li>• “List, Group, Label” vocabulary review</li> <li>• Quizlet vocabulary review</li> <li>• Vocabulary Pictionary</li> <li>• “Fly Swatter” vocabulary review</li> <li>• Alphaboxes</li> <li>• Vocabulary BINGO</li> </ul>	<p>Worksheets Vocabulary quiz Lab report Edmodo quick write Kid blog posts Foldable graphic organizer Glog Test</p>

**Suggested Resources and Texts:** *Earth’s Changing Surface* and *Inside Earth* textbooks including *All In One Resources, Reading and Study Workbook*, and *Adapted Tests* resource books.

**Suggested Technology:** Glogster, PowerPoint, Edmodo, Kid blog, Prezi, Quizlet, Wordle, Puzzlemaker.com, Voki, Animoto, *Violent Volcanoes electronic book* written by Louise Spilsbury, *Uncovering Earth’s Crust* electronic book written by Conrad Storad, Video clips of Alvin, “Earthquake” and “Volcano” Bill Nye videos, and animated video clips.

Activities and assessments listed may vary but will align to unit objectives and Connecticut Core Standards.

Updated: 1/8/2015