GRADE 6 SCIENCE

Description

Grade 6 Science is the study of Environmental Earth Science. It is concerned with the relationship between earth's systems and all living things. An understanding of these concepts is essential for individuals to make informed choices with regard to the environment and advancing scientific technology.

Course Overview

Course Objectives

Students should:

- describe the effect of heating on the movement of molecules in solids, liquids and gases.
- explain 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.
- explain how the uneven heating of the Earth's surface causes winds and affects the seasons.
- describe how folded and faulted rock layers provide evidence of the gradual up and down motion of the Earth's crust.
- explain how glaciation, weathering and erosion create and shape valleys and floodplains.
- explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.
- describe how abiotic factors such as temperature, water and sunlight affect plants' ability to create their own food through photosynthesis.
- explain how populations are affected by predator-prey relationships.
- describe common food webs in different Connecticut ecosystems.

Essential Questions

- How is scientific knowledge created and communicated?
- How do scientists use scientific inquiry in search of knowledge?
- How do external and internal sources of energy affect the Earth's systems?
- How do matter and energy flow through ecosystems?
- How do science and technology affect the quality of our lives?

Assessments

Common Assessments

Skill Assessments

Content Outline	**Standards**	**Grade Level Skills**
I. Scientific Inquiry Unit of Study **II. Weather Unit of Study** **III. Geology Unit of Study** **IV. Ecology Unit of Study**	State of Connecticut Science Curriculum Frameworks Connecticut State Standards are met in the following areas: • ***Scientific Inquiry*** • ***Scientific Literacy*** • ***Scientific Numeracy*** • ***Energy in the Earth's Systems*** • ***Matter and Energy in Ecosystems*** • ***Science and Technology in Society***	Students will: •

Pacing Guide										
1st Marking Period			2nd Marking Period			3rd Marking Period			4th Marking Period	
September	October	November	December	January	February	March	April	May	June	
Unit 1 **Scientific Inquiry Unit** 4-5 weeks			Unit 2 **Weather Unit** 8-9 weeks			Unit 3 **Geology Unit** 8-12 weeks			Unit 4 **Ecology Unit** 9 weeks	

Unit 1 - Scientific Inquiry Unit of Study (4-5 weeks)

Science Standards

SCIENTIFIC INQUIRY

- Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.
- Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.
- Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists.

SCIENTIFIC LITERACY

- Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science.
- Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media.

SCIENTIFIC NUMERACY

- Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

Performance Standards:

(The following standards will be introduced in the Inquiry Unit and then applied and extended in units subsequent.)

- Identify questions that can be answered through scientific investigation.
- Conduct appropriate types of scientific investigations to answer different questions.
- Use independent and dependent variables, and constants in science experiments.
- Use appropriate tools and techniques to make observations and gather data.
- Use mathematical operations to analyze and interpret data.
- Identify and present relationships between variables in appropriate graphs.
- Draw conclusions and identify sources of error.
- Provide explanations to investigated problems or questions.
- Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

Information and Technology Standards

Students will use content-specific technology tools.

Unit Objectives	**Essential Questions**	**Assessment**
Students will be able to: • identify types of scientific thinking • identify essential components of the scientific investigation • participate in a modeled inquiry-based	• How is scientific knowledge created and communicated? • How do scientists use scientific inquiry in search of knowledge?	• An Inquiry-based Lab: Choosing a Paper Towel Brand **Skill Objectives**

scientific investigation • participate in a directed inquiry-based scientific investigation.	**Focus Questions** • How does a scientist think? • How does a scientist test his thinking?	Students will:

Unit 2 – Weather Unit of Study (8-9 weeks)

Science Standards

Energy in the Earth's Systems

Variation in the amount of the sun's energy hitting the Earth's surface affects daily and seasonal weather patterns.

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

Students will:

- describe the effect of heating on the movement of molecules in solids, liquids and gases.
- explain 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.
- explain how the uneven heating of the Earth's surface causes winds and affects the seasons.

Information and Technology Standards

Students will use content-specific technology tools.

Unit Objectives

Students will be able to:

- describe the effect of heating on the movement of molecules in solids, liquids, and gases.
- define and demonstrate an understanding of the term heat energy.
- explain how heat can affect the volume of solids, liquids, and gases (thermal expansion).
- create a table comparing convection, conduction, and radiation.
- describe and illustrate solar heating by radiation, conduction and convection through the atmosphere (gas), oceans (liquid) and the soil (solid).
- explain 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.
- read, record and graph measurements of temperature using Fahrenheit and Celsius thermometers.
- explain how air pressure varies with altitude.
- relate a change in air pressure to a change in weather.
- compare humidity and relative humidity.
- give examples of factors that affect temperature, air

Essential Question

- How do external and internal sources of energy affect the Earth's systems?

Focus Questions

- How does heating and cooling affect the water molecule in it various states?
- What factors contribute to regional weather patterns?

Assessment

- Analysis of Doppler Weather Map: Future Regional Weather Predictions

Skill Objectives

Students will:

pressure and humidity. • explain how the uneven heating of the Earth's surface causes winds and affects the seasons. • show that the Earth is heated unevenly during the course of a year. • describe the gas composition of the atmosphere and its protective effects on Earth. • describe what happens to solar energy that reaches the Earth. • explain the difference between the greenhouse effect and global warming. • describe how local geographic features can produce winds. • explain how changes in the temperature of the atmosphere and the oceans affect the climate. • compare rainfall and temperature on about the same latitude in a single continent. • compare real weather rainfall and temperatures in local and regional areas. • describe the weather as a condition in the atmosphere and discuss the major components that determine weather (light, water, air flow, and land topography). • name the five layers that make up the earth's atmosphere and identify troposphere as the layer in which weather occurs. • accurately use a thermometer, wet dry bulb (humidity), barometer, wind, and cloud formations to predict the weather accurately. • describe the water cycle using the following terms: evaporation, condensation, transpiration, and precipitation. • identify a variety of states of weather (rain/sleet/snow). • describe the chemical and physical properties of water and how they influence the weather. • identify different violent storms and their impact on society.		

Unit 3 – Geology Unit of Study (8-12 weeks)

Science Standards

Energy in the Earth's Systems

Landforms are the result of the interaction of constructive and destructive forces over time.

- Volcanic activity and the folding and faulting of rock layers during the shifting of Earth's crust affect the formation of mountains, ridges and valleys.
- Glaciation, weathering and erosion change the Earth's surface by moving earth materials from place to place.

Students will:

- describe how folded and faulted rock layers provide evidence of the gradual up and down motion of the Earth's crust.
- explain how glaciation, weathering and erosion create and shape valleys and floodplains.
- explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.

Information and Technology Standards

Students will use content-specific technology tools.

Unit Objectives

Students will be able to:

- identify Earth's layers.
- describe the different properties of each layer.
- define the theory of tectonics.
- explain how plates move.
- describe continental drift.
- describe convention currents and how they affect plate tectonics.
- identify and describe parts of the ocean floor--shelf, slope, etc.
- explain the process of seafloor spreading.
- locate the identify the Ring of Fire.
- locate volcanoes and where most of them form.
- list types of volcanoes.
- describe types of eruptions.
- identify landforms resulting from volcanoes.
- describe landforms and how lava creates them.
- describe how magna that hardens creates landforms.
- compare the physical and chemical properties of magna.

Essential Question

- How do internal and external sources of energy affect the Earth's systems?

Focus Questions

- How does the heat flow and material move within the Earth to create mountains, ridges, valleys and ocean basins?
- How does movement of earth, glaciation, weathering and erosion change the Earth's surface over a long period of time?

Assessments

- Mapping Earthquakes and Volcanoes
- Convection Discovery Activity

Skill Objectives

Students will:

• describe the types of rocks and gases released as a result of eruption. • explain how volcanic eruptions affect earth's land, air, and water. • describe how folding of rocks can form mountains. • identify and describe how movement along faults can form mountains. • describe and define types of mountains, ridges, and valleys. • identify mountain belts/ranges within your geographical region (northeast). • explain why earthquakes occur. • identify where most earthquakes occur. • describe how rocks move during earthquakes. • model how movement occurs along the three main types of faults. • describe how glaciers form and move. • identify two kinds of glaciers. • describe how the valley glaciers form and move. • describe how glaciers shape the land. • describe how glaciers cause erosion and deposition. • identify the glacier that formed the US. • describe how glaciation creates valleys and floodplains. • explain how weathering and erosion affect the Earth's surface. • describe what determines how fast weathering occurs. • compare the causes of mechanical and chemical weathering. • describe how weathering creates valleys and floodplains. • explain what processes wear down and build up the Earth's surface. • compare the different types of mass movement. • identify and describe the mass movement--landslides, mudflow, slump, etc. • explain how erosion creates valleys and floodplains.		

Unit 4 – Ecology Unit of Study (9 weeks)

Science Standards

Matter and Energy in Ecosystems

An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.

- Populations in ecosystems are affected by biotic factors such as other populations and abiotic factors such as soil and water supply.
- Populations in ecosystems can be categorized as producers, consumers and decomposers

Students will:

- describe how abiotic factors such as temperature, water and sunlight affect plants' ability to create their own food through photosynthesis.
- explain how populations are affected by predator-prey relationships.
- describe common food webs in different Connecticut ecosystems.

Science and Technology in Society

Water moving across and through earth materials carries with it the products of human activities.

- Most precipitation that falls on Connecticut eventually reaches Long Island Sound.

Students will:

- explain the role of septic and sewage systems on quality of surface and ground water sources.
- explain how human activity may impact water resources in Connecticut such as local ponds, rivers and the Long Island Sound ecosystem.

Information and Technology Standards

Students will use content-specific technology tools.

Unit Objectives

Students will be able to:

- define and describe an estuary, its location, and label its component parts on a map.
- design a river basin system.
- describe factors of salinity, nutrient flow, and topography and how they determine the variety of habitats in an estuary.
- define photosynthesis.
- describe how abiotic factors affect photosynthesis.
- define producers, consumers, decomposers, predators, and prey.
- examine shared data to determine trends

Essential Questions

- How do matter and energy flow through ecosystems?
- How do science and technology affect the quality of our lives?

Focus Question

- How do different factors, including humans, affect a river basin system?

Assessment

- River System Scenario: Given a scenario students will be asked to predict and evaluate possible effects upon a river system and coastal environments.

Skill Objectives

Students will:

and patterns for the three Fairfield estuaries--salinity, air temp, water temp, fish population count, weather conditions, tide levels, and general observation. • examine a predator/prey relationship and determine the effects on their populations • given a food web, classify organisms in the web as producers, consumers, decomposers, predators, and prey. • given a food web, analyze the impact caused by a change to any part of the web. • distinguish between temporary and permanent residents of the estuary. • examine how coastal organisms use the estuary to support their life cycles. • define point and nonpoint sources of pollution and classify examples representing each. • given a scenario, predict and evaluate possible effects upon a river system and coastal environments. • visit an estuary to explore, observe, record and analyze interactions within the system.		