

Shrewsbury Borough School District
Science Curriculum Guide
Grade 6
September 2015

Mission Statement:

The mission of the Shrewsbury Borough School District, a system built on successful cooperation among family, school and community, is to prepare all students to achieve excellence and to become responsible citizens through rigorous educational programs consistent with New Jersey Core Content State Standards and which respect individual differences and diversity. Students will be prepared to meet the challenges presented in the regional high school and the world beyond.

Shrewsbury Borough School's Curriculum Writing Committee:

Laura Ehlers-Middle School Science Teacher

Approved by Shrewsbury Borough Board of Education:

August 2015

Administration:

Brent MacConnell-Superintendent

Debi Avento-Business Administrator

Erica Reynolds-Supervisor of Curriculum & Instruction

Jennifer Zona-Supervisor of Special Services

Shrewsbury Borough School District
Science Curriculum Guide
2015

Implementation: September 2015
Course Philosophy:

Students in middle school develop understanding of a wide range of topics in Earth and space sciences that build on science concepts from elementary school through more advanced content, practice, and crosscutting themes. There are three Earth and space science standard topics in grade six: Earth's Place in the Universe, Earth's Systems, and Climate. The content of the performance expectation is based on current community-based geoscience literacy efforts such as the Earth Science Literacy Principles1, and is presented with a greater emphasis on an Earth systems science approach. The performance expectations strongly reflect the many societally relevant aspects of Earth and space sciences (resources, hazards, environments impacts) and related connections to engineering and technology.

Shrewsbury Borough School District
Science Curriculum Guide
2015

Course Description:

The grade six Earth and Space sciences curriculum will focus on four main areas: Beyond Earth, Geologic History of Earth, Earth's Systems, and Weather and Climate. The performance expectations in Earth's Place in the Universe help students formulate answers to the questions: "What makes up our solar system and how can the motion of Earth explain seasons and eclipses?" Middle school students can examine Earth's place in relation to the solar system, Milky Way galaxy, and universe. Additional questions students will address include: "How do people figure out that Earth and life on Earth have changed over time?" and "How does the movement of tectonic plates impact the surface of Earth?" Students can examine geoscience data in order to understand the processes and event in Earth's history. The performance expectations in Earth's Systems help students formulate answers to the questions: "How do the materials in and on Earth's crust change over time?" and "How does water influence weather, circulate in the oceans, and shape Earth's surface?" Students understand how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems. Additionally, students will investigate the factors which interact and influence weather and climate. The performance expectations in Earth and Human Activity help students formulate answers to the questions: "How can natural hazards be predicted?" and "How do human activities affect Earth systems?" Students understand the ways that human activities impact Earth's other systems.

Shrewsbury Borough School District
 Science Curriculum Guide
 2015

Scope and Sequence

Course Title: Earth and Space Sciences	Grade Level: 6
Units:	
Unit 1 – Beyond Earth *The Solar System and Beyond *Exploring Space	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">September - October</div>
Unit 2 –Geologic History of Earth * Rocks & Minerals *Forces Shaping Earth *The Dynamic Earth	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">November - January</div>
Unit 3 - Earth's Systems *Weathering and Soil Formation *Erosion of Earth's Surface	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">February - March</div>
Unit 4 - Earth's Weather and Climate *The Atmosphere *Weather *Air Masses and Fronts *Oceans Currents and Climate *Waves *Life in the Ocean	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">April - June</div>

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 1 Overview

Unit Title: Beyond Earth

Grade Level: 6

Recommended Pacing: 3 months; block scheduling

Unit 1 Summary: Earth orbits the Sun as the solar system revolves with the Milky Way, which is among billions of galaxies that make up the universe. Even though scientists have learned a great deal about the Moon and planets from telescopes, they want to learn more by sending spacecraft.

Unit 1 NGSS:

MS-ESS1: Earth's Place in the Universe

MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 1

ISTE Standards:

1. a-d Creativity and Innovation-Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.
2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.
4. a-d Critical Thinking, Problem Solving, and Decision Making –Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Science and Engineering Practices:

- Developing and Using Models
- Analyzing and Interpreting Data
- Constructing Explanations and Designing Solutions

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 1 Essential Questions:

- How have people modeled the solar system?
- Why is gravity important in the solar system?
- What are the properties of the sun?
- What is known about the terrestrial planets?
- What is known about the gas giant planets?
- How are Earth's days, years, and seasons related to the way Earth moves in space?
- How do Earth, the moon, and the sun affect each other?
- What can we learn from space images?
- How do we explore space?
- What are some milestones of space exploration?

Unit 1 Learning Targets

Students will be able to...

- make sense of a given phenomenon, students develop a model of the Earth-moon-sun system in which they

Unit 1 Learning Targets

Students will do...

- develop and use a model to describe phenomena

Shrewsbury Borough School District
 Science Curriculum Guide
 2015

<p>identify the relevant components</p> <ul style="list-style-type: none"> • describe the relationships and interactions between components of the solar and galaxy systems using their model • use patterns observed from their model to provide causal accounts and make predictions for events, including: moon phases, eclipses, and seasons • how to use the model to describe what gravity is, the pattern it causes, why some objects do not orbit, and describe what a given phenomenon might look like without gravity • how to use quantitative analyses to describe similarities and differences among solar system objects by describing patterns of features of those objects at different scales and draw conclusions about the identifying characteristics of different categories of solar system objects based on their features, composition, and locations within the solar system • describe advances in solar system science made possible by improved engineering and new developments in engineering made possible by advances in science 	<ul style="list-style-type: none"> • read for content mastery • develop and use content related vocabulary • analyze and interpret data to determine similarities and differences in findings • cite specific textual evidence to support analysis of science and technical texts • complete a variety of laboratory activities to support the content • write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content • build and launch a model rocket • model Earth's seasons • model the Moon's phases and motions
---	--

Shrewsbury Borough School District
Science Curriculum Guide
2015

- view various content related videos
- construct a model of a constellation with an explanation of what it represents

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 1 - Evidence of Learning

Formative Assessments:

- Glencoe Level Red Textbook Entry-Level Assessments: Target Your Reading – (TB anticipation guide) Chapters 14 & 15
- Reading Checks and Section Reviews
- Exit tickets
- Lab work
- Homework
- Brain POP quizzes
- Various content related models
- Analyze and share evidence about a particular planet concentrating on data such as surface features, object layers, orbital radii, composition, structure, etc.

Summative Assessments:

- Glencoe Level Red Textbook Chapter tests: 14 & 15
- Lab work
- PBL assignment: - Could NASA set up a colony on the moon?
- Glencoe Level Red LAB: CH 15- Design Your Own – Space Colony

Lab Activities:

- Glencoe Level Red Launch Lab: How many stars are in the sky?
- Gizmos labs: Moonrise, Moonset, and Phases; Orbital Motion – Kepler’s Laws; Solar System Explorer; Seasons: Earth, Moon, and Sun
- Glencoe Level Red Virtual Lab: CH 14 - *How does an artificial satellite stay in orbit*; CH 15 - *What are the dimensions of the solar system?*
- Glencoe Level Red Video Lab: CH 14 - *Model Visible Light Seen Through Nebulae*; CH 15 - *Space Colony*
- Modeling the Moon’s Motions and Phases (Science Boreal Kit)
- Glencoe Level Red Mini Lab: CH 15 - *Modeling Earth’s Seasons*

Shrewsbury Borough School District
Science Curriculum Guide
2015

- Build and launch a model rocket using ESTES kits (Spring)

Unit 1 - Materials/Equipment:

Required Lab Materials: Estes model rocket kits, graph paper, rice, black construction paper, shaded lamp, globe, safety glasses

Materials/Equipment/Resources: Gizmos subscription, Quizlet subscription, Brain POP subscription, Glencoe Level Red series, Teachers Domain video clips, Science Fusion series – Space Science, Flocabulary subscription, Nasa.gov, Mr. Parr science songs, Science Boreal Modeling Motions of the Moon kit, Smart Board, student laptops

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 2 Overview

Unit Title: Geologic History of Earth

Grade Level: 6

Recommended Pacing:

3 months – block scheduling

Unit 2 Summary:

Only a small number of minerals make up most of Earth's rocks. Rock, fossils, and other types of natural evidence are used to study Earth's history and measure geologic time.

Unit 2 NGSS:

MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience.

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Shrewsbury Borough School District
Science Curriculum Guide
2015

ISTE Standards:

1. a-d Creativity and Innovation-Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.
2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.
4. a-d Critical Thinking, Problem Solving, and Decision Making –Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Science and Engineering Practices:

- Constructing Explanations and Designing Solutions
- Analyzing and Interpreting Data
- Developing and Using Models
- Asking Questions and Defining Problems

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 2 Essential Questions:

How do we learn about Earth's history?

How can minerals be identified using physical properties?

What are the main types of rocks?

What is the rock cycle?

How are the relative ages of rocks measured?

What is the geologic time scale?

What are the forces within Earth which cause movement of Earth's plates?

What are the four main types of mountains?

Shrewsbury Borough School District
Science Curriculum Guide
2015

<u>Unit 2 Learning Targets</u>	<u>Unit 2 Learning Targets</u>
<p data-bbox="1243 201 1281 600"><i>Students will be able to...</i></p> <ul data-bbox="209 348 1235 1041" style="list-style-type: none"><li data-bbox="1057 348 1235 1041">• articulate a statement that relates the given phenomenon to a scientific idea, including how events in the Earth's 4.6 billion-year-old history are organized relative to one another using the geologic time scale<li data-bbox="837 348 1016 1041">• construct an explanation to describe how the relative order of events is determined on the geologic time scale using rock strata and major events in the Earth's history and/or specific changes in fossils over time<li data-bbox="651 348 756 1041">• use reasoning to connect the evidence and support an explanation for how the geologic time scale is used to construct a timeline of the Earth's history<li data-bbox="391 348 610 1041">• develop and use a model in which they identify and describe the relationships between the relevant components including: general types of Earth materials, energy from the sun, energy from the Earth's hot interior, relevant earth processes, and the temporal and spatial scales for the system<li data-bbox="209 348 315 1041">• describe that these changes are consistently occurring but that landforms appear stable to humans because they are changing on time scales	<p data-bbox="1243 1073 1281 1360"><i>Students will do...</i></p> <ul data-bbox="233 1125 1200 1923" style="list-style-type: none"><li data-bbox="1170 1125 1200 1486">• read for content mastery<li data-bbox="1097 1125 1127 1730">• develop and use content related vocabulary<li data-bbox="984 1125 1053 1835">• cite specific textual evidence to support analysis of science and technical texts<li data-bbox="870 1125 940 1898">• complete a variety of laboratory activities to support the content<li data-bbox="724 1125 829 1923">• write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content<li data-bbox="651 1125 680 1629">• view various content related videos<li data-bbox="578 1125 607 1472">• model the fossil record<li data-bbox="505 1125 534 1472">• create a fossil flipbook<li data-bbox="431 1125 461 1373">• model Pangaea<li data-bbox="310 1125 380 1881">• model the process of deposition that forms sedimentary rock layers<li data-bbox="233 1125 263 1629">• make a model of a geologic column

Shrewsbury Borough School District
 Science Curriculum Guide
 2015

<p>much longer than human lifetimes</p> <ul style="list-style-type: none"> • articulate a statement that geoscience processes have changed the Earth's surface at varying time and spatial scales • identify and describe the evidence necessary to explain the motion of Earth's plates and the results of that motion • use reasoning to connect the evidence and support an explanation for how geoscience processes have changed the Earth's surface • organize, analyze, and interpret data that represents the distribution and ages of fossils and rocks, continental shapes, seafloor structures, and/or age of oceanic crust • develop a model to identify and describe the relevant components, including: water, energy, gravity, atmosphere, landforms, and plant and other living things • articulate a statement and use evidence and reasoning to construct a scientific explanation to support that past and current geoscience processes 	<ul style="list-style-type: none"> • create a timeline to describe the relationship between the geologic history of an area and the rock layers that form in the area
---	--

Shrewsbury Borough School District
Science Curriculum Guide
2015

<p>have caused the uneven distribution of the Earth's resources</p> <ul style="list-style-type: none">• examine a given claim and the supporting evidence to identify and clarify the relevant ways in which natural processes and/or human activities may have affected the pattern of change in global temperature over the past century, on a gradual or sudden change, and the changes in the concentration of carbon dioxide and other greenhouse gases in the atmosphere	
--	--

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 2 - Evidence of Learning

Formative Assessments:

- Glencoe Level Red Textbook CH 9 & 10 Section Entry-Level Assessments: Target Your Reading – (TB anticipation guide)
- Glencoe Level Red Textbook CH 9 & 10 Section Reading Checks and Section Reviews
- Fusion – The Dynamic Earth Module E Unit 2 Unit Pretest
- Fusion – The Dynamic Earth Module E Unit 2 Lesson Reviews
- Lab Work
- Homework
- Exit tickets
- Brain POP quizzes
- Various content related models

Summative Assessments:

- Glencoe Level Red Chapters 9& 10 assessments
- Fusion – The Dynamic Earth Module E Unit 2 Chapter assessments
- Fusion – The Dynamic Earth Module E Unit 2 Lesson quizzes
- Fusion – The Dynamic Earth Lab Manual Unit 2 Lesson 4 – Timeline of Earth's History
- Lab Reports

Lab Activities:

- Fusion – The Dynamic Earth Lab Manual Unit 2 Lesson 1 Quick Lab – Modeling the Fossil Record
- Fusion – The Dynamic Earth Lab Manual Unit 2 Lesson 1 Quick Lab – Fossil Flipbook
- Model Pangaea and research the related theories (binder activity)
- Fusion – The Dynamic Earth Lab Manual Unit 2 Lesson 2 Quick Lab – Layers of Sedimentary Rock
- Gizmos Lab – Building Pangaea

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 2 - Materials/Equipment:

Required Lab Materials:

2 L. plastic bottles w/caps, funnel, gravel, magnifying lens, mixing bowl, potting soil, coarse sand, safety goggles, colored pencils
unlined white paper, Pangaea cutouts

Materials/Equipment/Resources:

Flocabulary subscription, Quizlet subscription, Brain POP subscription, Gizmos subscription, Science Fusion Module E components, Mr. Parr Science songs, Glencoe Level Red series, Glencoe Earth Science series, Teachers Domain videos, Smart Board, student laptops, resources to provide descriptions of the geologic history of several areas

Unit 3 Overview

Unit Title: Weathering and Erosion

Grade Level: 6

Recommended Pacing:

2 months – block scheduling

Unit Summary:

Many natural features of Earth's surface, such as soil and landforms, are a result of weathering and erosion.

Unit 3 NGSS:

MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying times and spatial scales.

Unit 3 ISTE Standards:

1. a-d Creativity and Innovation-Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.
2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.
4. a-d Critical Thinking, Problem Solving, and Decision Making –Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 3 Science and Engineering Practices:

- Developing and Using Models
- Constructing Explanations and Designing Solutions

Unit 3 Essential Questions:

How do the factors such as weathering, climate, and time, affect soil formation?

How do the agents of erosions such as gravity, ice, wind, and water, change Earth's surface?

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 3 Learning Targets

Students will be able to...

- develop a model in which they identify the relevant components, including: general types of Earth materials that can be found in different locations, including: those located at the surface and/or in the interior and those that exist (ed) before and /or after chemical and/or physical changes that occur during Earth processes
- use the model to describe relationships between components, including different Earth processes which drive matter cycling through observable chemical and physical changes, the movement of energy that originates from the Earth's hot interior, energy flows from the sun, and the temporal and spatial scales over which the relevant Earth processes operate
- use their model to describe and account for the interactions that energy from the Earth's interior and the sun drive Earth processes that together cause matter cycling through different forms of Earth materials
- describe that these changes are consistently occurring but that landforms appear stable to humans because they are changing on times scales much longer than human lifetimes

Unit 3 Learning Targets

Students will do...

- read for content mastery
- develop and use content related vocabulary
- cite specific textual evidence to support analysis of science and technical texts
- complete a variety of laboratory activities to support the content
- write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content
- view various content related videos
- model the soil erosion caused by running water
- model chemical weathering to discover the effect of acids on certain types of rocks
- use a classification key to determine the texture of a soil sample
- make a model of one of the various types of mass movement

Shrewsbury Borough School District
Science Curriculum Guide
2015

<ul style="list-style-type: none">• articulate a statement and give evidence that geoscience processes have changed the Earth's surface at varying time and spatial scales• identify and describe the evidence necessary to explain the slow and large-scale motion of the Earth's plates and the results of that motion, surface weathering, erosion, movement, and the deposition of sediment, and rapid catastrophic events• identify the corresponding timescales for each identified geoscience process using multiple valid and reliable sources which may include students' own investigations, evidence from data, and observation from conceptual models• describe the following chain of reasoning for their explanations: motion of the Earth's plates, surface processes, catastrophic changes, and changes in surface features	<ul style="list-style-type: none">• design an experiment to measure soil loss from grass-covered soil and from soil without grass cover
--	---

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 3 - Evidence of Learning

Formative Assessments:

- Glencoe Level Red Chapter 11 Sections 1&2 Entry-Level Assessments: Target Your Reading – (TB anticipation guide)
- Glencoe Level Red Textbook CH 11 Sections 1&2 Reading Checks and Section Reviews
 - Lab work
 - Homework
 - Brain POP quizzes
- Various content related models

Summative Assessments:

- Glencoe Level Red Chapter 11 assessments
- Glencoe Level Red Chapter 11 Section quizzes
- Lab assignments
- Unit project

Lab Activities:

- Glencoe Level Red CH 11 Launch Lab: Water's Force
- Glencoe Level Red CH 11 Virtual Lab: How are Earth materials broken down?
- Glencoe Level Red CH 11 Video Lab: Classifying Soils
- Glencoe Level Red CH11 Section 1 Mini Lab: Dissolving Rock with Acids
- Glencoe Level Red CH 11 Section 1 Mini Lab: Analyzing Soils
- Glencoe Level Red CH 11 Section 1 Lab: Classifying Soils
- Section 2: Model types of Mass Movement (see teacher binder)
- Glencoe Level Red CH 11 Section 2: Model Glacial Erosion
- Glencoe Level Red CH 11 Section 2 Design Your Own Lab: Measuring Soil Erosion

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 3 - Materials/Equipment:

Required Lab Materials:

safety glasses, bread pans, sand, washtrub, brick or wood block, chalk, vinegar, soil samples, newspaper, stereomicroscopes, clay, pebbles, potting soil, plastic bins, gravel, ice cube trays, paint trays, soil, grass sod, 1,000ml beaker, triple-beam balance

Materials/Equipment/Resources:

Brain POP subscription, Flocabulary subscription, Quizlet subscription, Teachers Domain videos, Glencoe Level Red series components, student laptops, Smart Board

Unit 4 Overview

Unit Title: Earth's Weather and Climate

Grade Level: 6

Recommended Pacing:

2 months – block

Unit Summary:

Earth's atmosphere is constantly in motion, continually bringing changes in weather. Oceans affect all living things – even those far from the shore.

NGSS:

MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Shrewsbury Borough School District
Science Curriculum Guide
2015

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Unit 4 ISTE Standards:

1. a-d Creativity and Innovation-Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.
2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.
4. a-d Critical Thinking, Problem Solving, and Decision Making –Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 4 Essential Questions:

- What is the purpose of Earth’s atmosphere?
- How does weather describe the current conditions of the atmosphere?
- What causes weather to change?

Shrewsbury Borough School District
Science Curriculum Guide
2015

- How do ocean currents influence climate?
- What effect do waves have on shorelines?
- What types of organisms can be found in the oceans?

Unit 4 Learning Targets

Students will be able to...

- Develop a model to identify and describe the components and their relationships, including: water, energy in the form of sunlight, gravity, atmosphere, landforms, and plants and other living things
- Use the model to account for both energy from light and the force of gravity driving water cycling between oceans, the atmosphere, and land
- Use the model to describe that the transfer of energy between water and its environment drive the phase changes that drive water cycling through evaporation, transpiration, condensation, crystallization, and precipitation
- Use the model to describe how gravity interact with water indifferent phases and location to drive the water cycle

Unit 4 Learning Targets

Students will do...

- read for content mastery
- develop and use content related vocabulary
- cite specific textual evidence to support analysis of science and technical texts
- complete a variety of laboratory activities to support the content
- write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content
- view various content related videos
- make a model to observe and explain condensation and evaporation

Shrewsbury Borough School District
 Science Curriculum Guide
 2015

<ul style="list-style-type: none"> • from a given investigation plan, provide evidence to answer questions about how motions and complex interactions of air masses result in changes in weather conditions • from a given investigation plan, describe the data to be collected and the evidence to be derived from the data that would indicate relationships between air mass movement and changes in weather • describe the tools and methods used in the investigation, including how they are relevant to the purpose of the investigation • make observations and record data, either firsthand and/or from professional weather monitoring services • develop a model in which they identify the relevant components of Earth's systems, with inputs and outputs, including: radiation from the sun as an input, and thermal energy that exist in the atmosphere, water, land and ice • identify and describe the relationships between the components of the system, including: difference in the distribution of solar energy and temperature changes, motion of ocean waters and air masses, factors affecting the motion of wind and currents, and thermal energy transfer 	<ul style="list-style-type: none"> • make a model to demonstrate the effect of atmospheric pressure and how it relates to altitude • analyze a teacher demonstrated model of a low-pressure center • predict how meteorologist predict the weather by completing a virtual lab • interpret satellite images • determine the intensity of a storm through the use of the Saffir-Simpson Hurricane Scale • determine some characteristics of the ocean and the ocean floor • model desalination and assess its feasibility as a solution for areas in need of a fresh water supply • model and explain the impact of density currents • model and explain the importance of photosynthesis in the manufacture of food
--	--

Shrewsbury Borough School District
Science Curriculum Guide
2015

- use the model to describe: the general latitudinal patterns in varying climates
- organize given data that represents the type of natural hazard event and features associated with that type of event, including the location, magnitude, frequency, and any associated precursor event or geologic forces
- analyze data to identify and describe patterns in the datasets, including: location, frequency, severity, types of damage and location or timing of features and phenomena associated with natural hazard events
- analyze data to describe susceptible areas, how frequently the areas are at risk, type of damage, and features that can be used to predict a natural hazard event
- use patterns in the data to make a forecast for the potential of a natural hazard event to affect an area in the future and its potential severity
- give at least three examples of the technologies that engineers have developed to mitigate the effects of natural hazards
- given a problem related to human impact on the environment, use scientific information and principles to generate a design solution that addresses the results of the particular human activity and incorporates technologies that can be used to monitor and minimize negative effects

Shrewsbury Borough School District
Science Curriculum Guide
2015

<p>that human activities have on the environment</p> <ul style="list-style-type: none">• describe, quantify, and evaluate, when appropriate, criteria and constraints for the solution• address phenomena of the natural world by examining a given claim and the given supporting evidence as a basis for formulating questions• answer those questions by examining evidence for patterns in data that connect natural processes and human activities to changes in global temperatures over the past century	
---	--

Shrewsbury Borough School District
Science Curriculum Guide
2015

Unit 4 - Evidence of Learning

Formative Assessments:

- Glencoe Level Red Chapters 12 & 13 Section Entry-Level Assessments: Target Your Reading – (TB anticipation guide)
- Glencoe Level Red Textbook Chapter 12&13 Reading Checks and Section Reviews
- Lab work
- Homework
- Brain POP quizzes
- Various content related models

Summative Assessments:

- Glencoe Level Red Chapters 12 & 13 assessments
- Glencoe Level Red Chapters 12 & 13 Section quizzes
- Lab assignments
- Unit project

Lab Activities:

- Glencoe Level Red Chapter 12 Launch LAB – How does temperature affect gas molecules?
- Glencoe Level Red Chapter 12 Mini LAB – Observing Condensation and Evaporation
- Glencoe Level Red Chapter 12 Demo – Atmospheric Pressure
- Glencoe Level Red Chapter 12 Mini LAB – Creating a Low-Pressure Center
- Glencoe Level Red Chapter 12 Virtual Lab – How do meteorologists predict the weather?
- Glencoe Level Red Chapter 12 LAB – Interpreting Satellite Images
- Glencoe Level Red Chapter 12 Laboratory Manual: Lab 2 – Hurricanes
- Glencoe Level Red Chapter 13 Laboratory Manual: Lab 1 – Photosynthesis and Sunlight

Shrewsbury Borough School District
Science Curriculum Guide
2015

- Glencoe Level Red Chapter 13 Virtual Lab -- Ocean Characteristics
- Glencoe Level Red Chapter 13 LAB – Desalination
- Glencoe Level Red Chapter 13 Mini LAB – Modeling a Density Current

Unit 4 Materials/Equipment:

Required Lab Materials:

safety glasses, dishwashing liquid, narrow-necked plastic bottle, beaker, access to ice, birthday candles, pie pan, tall, narrow jar, clay, glass jars (2 per student) with an opening large enough to hold a funnel, funnel, balance, baking soda, *Elodea* (aquarium plant), test tubes (2 per student), gooseneck lamp with 150-watt bulb or plant light

Materials/Equipment/Resources:

Brain POP subscription, Flocabulary subscription, Quizlet subscription, Teachers Domain videos, Glencoe Level Red series components, student laptops, Smart Board, YouTube access