

Earth Space Science Curriculum

Fall 2018

Board Approval Date: January 28, 2019

Topic 1: Earth Systems

Topic Overview: Maps help us locate exact places on Earth and all forms of transportation rely on accurate maps for guidance. Few aspects of the environment have as much impact on our everyday decisions as weather does.

Standards:

3.3.10A1 Explain how the Earth is composed of a number of dynamic, interacting systems exchanging energy or matter.

3.3.10A2 Analyze the effects on the environment and the carbon cycle of using both renewable and nonrenewable sources of energy

3.3.10A3 Explain how the evolution of Earth has been driven by interactions between the lithosphere, hydrosphere, atmosphere, and biosphere.

3.3.10A6 Interpret meteorological data to describe and/or predict weather.

4.3.10A Evaluate factors affecting the use of natural resources.

Essential Question (Core Concepts)

How are maps made and what types of maps are best suited to particular purposes? What determines global weather patterns? What are the effects of severe weather?

Objectives (Skills/Knowledge)

- Compare and contrast the four systems of Earth.
- Describe the global positioning system.
- Compare and contrast different map projections.
- Recognize the dangers of severe thunderstorms, including lightning, hail, high winds and floods.
- Describe the types of natural disasters and identify how they originate.

Vocabulary

Meteorology

Cartography

Latitude

Longitude

Contour interval

Contour line

Conic projection

Mercator projection

Tornado

Tropical storm

Hurricane

Storm surge

Tsunami

Activities/Strategies/Study

- Earth's spheres activity
- Topographic Map interpretation lab
- Gizmos on the following topics:
 - Seasons: Earth, Moon and Sun
 - Reading Topographic Maps
 - Earthquakes: Determination of Epicenter
 - Weather Maps
 - Hurricane Motion
 - Relative Humidity
- Hurricane Tracking Lab
- Natural Disaster Lab
- Mapping Earthquakes and Volcanoes Lab
- Mapping with latitude and longitude
- Geocaching

Assessments

Unit 1 test

Vocabulary Review

On-going formative assessment

Additional Resources

Glencoe Earth Science; Geology, the Environment, and the Universe textbook

Topic 2: Rocks and Minerals

Topic Overview: Many products used in daily life are made directly or indirectly from minerals. Minerals also play a vital role in the processes that shape Earth. Rocks provide information about surface conditions and organisms that existed in Earth's past. The rock cycle provides evidence that Earth is a dynamic planet, constantly evolving and changing.

Standards:

4.3.10A Evaluate factors affecting the use of natural resources..

4.3.10B Analyze how humans manage and distribute natural resources.

Essential Question (Core Concepts)

Through what processes do minerals form, and which are most common in Earth's crust. How do the three types of rocks form and how do they continuously change from one type to another in the rock cycle.

Objectives (Skills/Knowledge)

- Describe how minerals form.
- Identify the most common elements in Earth's crust.
- Classify minerals according to their physical and chemical properties.
- Compare and contrast intrusive and extrusive igneous rocks.
- Describe the composition of magma.
- Explain the formation and classification of clastic sediments.
- Compare and contrast the different types and causes of metamorphism.
- Understand how rocks continually change from one type to another.
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Vocabulary

Mineral
Crystal
Luster
Streak
Hardness
Cleavage
Fracture
Lava
Magma
Extrusive
Intrusive
Cementation
Lithification
Deposition
Sediment
Porphyroblast
Rock Cycle
Metamorphism

Activities/Strategies/Study Skills

- Dynamic Earth Webquest
- Mineral Identification Lab
- Rock and Mineral Prezi project
- Gizmos
 - Mineral Identification
 - Rock Classification
 - Rock Cycle
 - Weathering
 - River Erosion
- Weathering Activity
- Rock identification Lab

Assessments

Unit 2 test
Vocabulary Quiz
On-going formative assessment

Additional Resources

Glencoe Earth Science; Geology, the Environment, and the Universe textbook

Topic 3: Our Solar System

Topic Overview: The laws of motion and universal gravitation explain how gravity governs the motions of the planets and other planetary bodies. Scientists base the model of our solar system on observations of the organization and nature of the planets and interplanetary bodies.

Standards:

3.3.10.B1: Explain how gravity is responsible for planetary orbits. Explain what caused the sun, Earth, and most of the other planets to form between 4 and 5 billion years ago.

3.3.10.B2: Describe changes in the universe over billions of years. Explain the scale used to measure the sizes of stars and galaxies and the distances between them.

Essential Question (Core Concepts)

How are gravity and orbits related? How does the Earth compare to the other planets of our solar system. What are the properties of the terrestrial and gas giant planets?

Objectives (Skills/Knowledge)

- Compare Earth to the other planets of our solar system.
- Describe the properties of the terrestrial and gas giant planets and identify the unique nature of Pluto.
- Identify the unique nature of Pluto.
- Describe the properties of the terrestrial planets.
- Describe the properties of the gas giant planets.
- Describe how the planets formed.

Vocabulary

Retrograde motion

Astronomical unit

Perihelion

Aphelion

Eccentricity

Terrestrial planet

Gas giant planet

Asteroid

Meteor

Comet

Coma

Meteor shower

Activities/Strategies/Study Skills

- Student made Planetary Travel Video
- Solar System Exploration Guide
- Gravity and Orbits Simulation
- Space Media Viewer Activity
- Tides Lab
- Gizmos on the following topics:
 - Phases of the Moon
 - Eclipse
 - Kepler's Laws
 - Tides
 - Moonrise, Moonset and phases

Assessments

Unit 3 test

Vocabulary Quiz

On-going formative assessment

Additional Resources

Glencoe Earth Science; Geology, the Environment, and the Universe textbook

Topic 4: Stars, Galaxies and the Universe

Topic Overview: The Sun is vital to life on Earth. To understand the Sun, which is a star, it is necessary to understand how all stars function and evolve. What are the characteristics of galaxies and how are they distributed.

Standards:

3.3.12.B1: Describe the life cycle of stars based on their mass. Analyze the influence of gravity on the formation and life cycles of galaxies, including our own Milky Way galaxy; stars; planetary systems; and residual material left from the creation of the solar system.

Essential Question (Core Concepts)

What do astronomers know about the origin and history of the universe? How do stars change during their lives and what is left when they die?

Objectives (Skills/Knowledge)

- Explore the structure of the Sun.
- Classify the types of stars.
- Explain how astronomers learn about the structure of stars.
- Describe how the Sun will change during its lifetime and how it will end up.
- Compare the evolutions of stars of different masses.
- Determine the size and shape of the Milky Way galaxy.
- Describe the expansion of the Universe.

Vocabulary

Photosphere

Chromosphere

Corona

Solar Wind

Sunspot

Solar flare

Apparent Magnitude

Absolute Magnitude

Hertzsprung-Russell diagram

Nebula

Supernova

Cosmology

Activities/Strategies/Study Skills

- Stars Lab
- Celestia Activity
- Hertzsprung-Russell Activity

Assessments

Unit 4 test

Vocabulary Quiz

On-going formative assessment

Additional Resources

Glencoe Earth Science; Geology, the Environment, and the Universe textbook