Honors Science 8 Unit 4: Earth Science 2019

Content Area: **Science**
Course(s): **Honors Life Science 8**
Time Period: **February**
Length: **1**
Status: **Published**

Enduring Understandings:

- Glaciations, weathering and erosion change the Earth's surface by moving earth materials from place to place.
- The Earth is in constant change
- The Earth is made up of several layers
- Volcanic activity and the folding and faulting of rock layers during the shifting of the Earth's crust affects the formation of mountains, ridges and valleys.

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Essential Questions:

- How do external and internal sources of energy affect the Earth's systems?
- How do weathering and erosion affect Earth's surface?
- How does the Earth today compare with the Earth of millions of years ago?
- How does water erosion and deposition change Earth's features?
- What processes are responsible for shaping the Earth?

Lesson Titles:

- The Rock Cycle (melting, crystallization, weathering, deformation, and sedimentation)
- Convection Currents Lab
- Escape the room review
- Geoscience Earthquakes and Volcano's (Ring of Fire)
- Graham Cracker Plate Tectonics
- Introduction to Earths Core (Energy) through Convection Currents
- Mapping Earthquakes and Volcano's Lab/Interactive

- Mystery Rock Lab
- Plate Tectonics and Continental Drift Lesson
- Sugar Cube Weathering Lab
- Unit Test
- Vocab Quiz
- Weathering and Erosion Lesson
- Webquest

Equity Considerations

LGBTQ and Disabilities Mandate

Lessons will include multiple perspectives from the LGBTQ and Disabilities population, including Ben Barres (researcher of brain cell development and disease).

STEM	LGBTQ: Sir Francis Bacon (1561–1626) Florence NightingaleFrancis Bacon | Philosophy, Scientific Method, & Facts | Britannica(1820-1910) George Washington Carver (1861-1943) Sara Josephine Baker (1873-1945) Alan Turing (1912-1954) Allan Cox (1926-1987) Sally Ride (1951-2012) Ben Barres (1954-2017) Ruth Gates (1962-2018) Tim Cook (1960) Disabilities: Leonardo da Vinci (1452-1519)- Dyslexia

Isaac Newton (1664-1727)- Epilepsy

Thomas Edison (1847-1931)- Hearing

Charles Darwin (1809-1882)- Stutter, Dyslexia

Alexander Graham Bell (1847-1922)- Deaf

Albert Einstein (1879-1955)- Aspergers

Florence B. Seibert (1897-1991)- Mobility

Stephen Hawking (1942-2019)- ALS

John Forbes Nash (1928-2015)- Schizophrenia

Temple Grandin (1947)- Autism

- Social

Asian American and Pacific Islander Mandate

Lessons will include multiple perspectives from the Asian American and Pacific Islander population.

https://ideas.ted.com/8-asian-americans-and-pacific-islanders-whose-innovations-have-changed-your-life-really/

- Social

Climate change

In this unit of study, students evaluate claims, analyze and interpret data, and develop and use models to explore the core ideas centered on the Earth's climate system.

https://www.nationalgeographic.org/lesson/our-change-make/

- Social

SCI.MS-ESS3-5	Ask questions to clarify evidence of the factors that have caused climate change over the past century.

Inter-Disciplinary Connections:

LA.RST.6-8	Reading Science and Technical Subjects
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.

LA.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.RST.6-8.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
LA.WHST.6-8	Writing History, Science and Technical Subjects
LA.WHST.6-8.1	Write arguments focused on discipline-specific content.
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Within this unit, students will use the geologic time scale to organize Earth's 4.6-billion-year-old history. They will cite specific textual evidence from science and technical texts to support analysis of rock strata to show how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. They will use analysis of rock formations and the fossils they contain to establish relative ages of major events in Earth's history. Examples of Earth's major events could include the Ice Age or the earliest fossils of Homo sapiens, or the formation of Earth and the earliest evidence of life. Emphasis should be on analyses of rock strata providing only relative dates, not an absolute scale. Students can use variables to represent numbers or quantities and write expressions when solving problems while constructing their explanations. Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions. [Note: Assessment does not include recalling the names of specific periods or epochs and events within them.]

- Students convey ideas, concepts, and information through the selection, organization, and analysis of relevant content, and they may use multimedia components and visual displays. Students can also compare and contrast the information gained from experiments, simulations, video, or multimedia sources showing evidence of past plate motion with that gained by reading a text on the same topic. They use informative/explanatory texts to examine evidence for how geoscience processes have changed and reason abstractly and quantitatively when analyzing this evidence. They may integrate quantitative or technical information expressed in a flowchart, diagram, model, graph, or table. They can also use variables to represent numbers or quantities and write expressions when solving problems while constructing their explanations

- Students will analyze and interpret data on the distribution of fossils and rocks, and they will look at the continental shapes and sea floor structures to provide evidence of past plate motions. Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. Examples of the data include

similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches). Students may use numerical relationships, symbols, and words while analyzing patterns in rates of change on Earth's crust. Students can use variables to represent numerical data and write expressions or construct simple equations and inequalities when solving a problems involved in the analysis of data about past plate motions. Applying interpreted data on the distribution of fossils and rocks, continental shapes, and sea floor structures, students can provide evidence of past plate motions. [Note: Students are not analyzing paleomagnetic anomalies in oceanic and continental crust in this unit].

- Students will construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions). Further emphasis is on how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Students can gather data and plot volcanoes and earthquakes in order to collect evidence to support the idea that these interactions among Earth's systems have shaped Earth's history and will determine its future. Additional examples can include changes on Earth's surface from weathering and deposition by the movements of water, ice, and wind. Emphasis is also on geoscience processes that shape local geographic features, such as New Jersey's Ridge and Valley Province, Highlands, Piedmont, and Coastal Plain

- Students will develop and use models to describe the cycling of Earth materials and the flow of energy that drives this process. This energy comes from the heat of the core of the Earth, which is transferred to the mantle. Convection currents within the mantle then drive the movement of tectonic plates. Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials. Students can generate models to demonstrate the rock cycle, with specific focus on the processes causing change. Students can analyze pictures and rock samples that demonstrate various processes of melting, crystallization, weathering, deformation, and sedimentation. [Note: Students are not identifying and naming minerals . within this unit].

- Tutoring during Academic Enrichment

Modifications

Formative Assessment:

- 3-2-1 Review
- Anticipatory Set
- Closure
- Kahoot (online game)
- Pair / Share
- Pass-out of Class
- Review Ball
- Survey Students using Technology (Edmodo, Google Classroom, ect.
- Thumps up/down
- Type 1 Writing Prompt (Brainstorm)
- Warm-Up

Benchmark Assessments

Skills-based assessment

Reading response

Writing prompt

Lab practical

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Summative Assessment:

- Alternate Assessment
- Benchmark
- Earth Science vocab quiz
- Marking Period Assessment
- Mystery Rock Lab
- Sugar Cube Lab
- Unit Assessment

Resources & Materials:

- Interactives-Dynamic Earth: Dynamic Earth is an interactive website where students can learn about the structure of the Earth, the movements of its tectonic plates, as well as the forces that create mountains, valleys, volcanoes and earthquakes. This site consists of four sections with both embedded assessments to check progress and a final summative assessment. Each section explores one aspect of the earth's structure and the movement of its tectonic plates. The instructions are simple and are located on each screen. Students will view animations, read explanations, and use their mouse to drag and drop the earth's continents into the correct places, highlight features on a map and cause earth's tectonic plates to move. At various points, students will check their knowledge by taking a quick quiz or playing a game to see how much they have learned about the Dynamic Earth. This website does have teacher information tabs located as related resources. http://www.learner.org/interactives/dynamicearth/index.html

- Dynamic Earth

- Earthquakes and Volcanoes Interactive Map (Real Time)

- http://earthquakes.volcanodiscovery.com/

- http://www.amnh.org/ology/features/plates/loader.swf

- https://ees.as.uky.edu/sites/default/files/elearning/module04swf.swf

- Plates on the Move

- Rock Cycle Journey

- Rock Cycle Journey: This is an activity out of one of the DLESE Teaching boxes. The Teaching Box is titled Mountain Building. This activity is from Lesson 4 Activity #2 called Rock Cycle Journey. Stations are set up to represent different parts of the rock cycle. There is a die at each station. Students begin at one point and roll the die. The students record on their data sheet what happens to them (the rock). The student may end up staying where they are at or going to another station. Students continue individually through a set number of rolls of the dice. Students then look at their data and answer some questions. At the very end they share their information with others. http://ngss.nsta.org/Resource.aspx?ResourceID=51

- Rocks found in NJ during time periods.....
http://www.state.nj.us/dep/njgs/enviroed/freedwn/psnjmap.pdf