MP2-Earth's Surface

Content Area: **Science**
Course(s): **Science 6**
Time Period: **Marking Period 2**
Length: **MP2**
Status: **Published**

Essential Questions

- What processes break down rock?
- What processes shape the surface of the land?
- How do scientists study Earth’s past?

Big Ideas

- Earth is a continually changing plant.
- Earth is 4.6 billion years old and the rock record contains its history.

Cross-Curricular Integration

Integration Area: Language Arts

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

W.6.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

Activity:

Students will use CERs (Claim, Evidence & Reason) on Fossils to convey their thinking and decision making in written form.

- Students will be answering the question, “Which rock layer(s) shows when the ground was no longer underwater?”.
- Students provide evidence that supports their claim.
- Students will then write a reasoning that explains what their claim is, state knowledge they have on the topic, evidence to prove their topic, and close their reasoning with their claim again.

Integration Area: Math

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

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form x+p=q and px=q for cases in which p, q, and x are all nonnegative rational numbers.

Activity:

Students will learn about the Half-Life of C-14 and use their computational skills to complete equations to understand Absolute Dating.

- Students read what a half-life is and how we use half-lives to determine dating of fossils and layers of rock.
- Students then get a table where they are to complete the mathematical equations to find out how much C-14 is left after 5 half-lives of C-14 has happened.

Language Arts Companion Standards:

WHST 6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

RST 6-8.2 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

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.

Activity:

Drought-The Dust Bowl: The Dust Bowl was an environmental disaster with dire consequences for many Americans at the time. Write an essay that explains The Dust Bowl in the 1930s including characteristics, causes and means by which the event could have been prevented. Use details and evidence from your research to develop the topic. Include text features, such as bold, classification, captions, graphics and headings.

Career Education Integration

9.2.8.B.4 Evaluate how traditional and nontraditional careers have evolved regionally, nationally, and globally.

9.2.8.B.5 Analyze labor market trends using state and federal labor market information and other resources available online.

Connection:

Focus on the question, “How do scientists study Earth’s past?” explain the role of a science career focused on studying the Earth’s history. Highlight scientists who have played an important role in studying and gathering information about Earth’s past.

Diversity Integration

Objective: Students will complete a graphic organizer on a chosen Scientist every month.

Activity:

1. Students are to make a copy of the graphic organizer that they are to complete on the scientists.
2. They will then need to complete the organizer by doing research on the person and their field of science that the scientists work in.
3. After finding information about the scientist, they will then need to write a paragraph on the person and explain to us “Why is this scientist famous? What have they done in their lifetime to help out the world?”

Science and Society

Charles Richter (April 26, 1900 – September 30, 1985),

Was an Ohioan seismologist and physicist. Richter is most famous as the creator of the Richter magnitude scale which, until the development of the moment magnitude scale in 1979, quantified the size of earthquakes.

Jack Horner (June 15, 1946)

Is an American paleontologist. He is one of the most well-known paleontologists in the United States

Technology Integration

8.1.8.DA.3 Identify the appropriate tool to access data based on its file format.

Activity:

Students will complete an interactive webquest using National Geographic to understand important events that happened during the main 3 prehistoric eras, and chart how the Earth has evolved into the way that it is today.

Enduring Understandings

Next Generation Standards

MS. Earth's Place in the Universe

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. Earth's Systems

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. Earth and Human Activity

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 geosciences processes.

MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale (MS-ESS1-4)

ESS2.A: Earth's Materials and Systems

- The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)

ESS2.B: Plate Tectonics and Large-Scale System Interactions

- 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. (MS-ESS2-3)

ESS3.A: Natural Resources

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources.

Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)

LS2.B: Cycle of Matter and Energy Transfer in Ecosystems

- Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)

Crosscutting Concepts

Scale Proportion and Quantity

Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS2-2), (MS-ESS1-4)

Patterns

Patterns in rates of change and other numerical relationships can provide information about natural and human designed systems. (MS-ESS2-3)

Stability and Change

Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (MS-ESS2-1)

Energy and Matter

Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4)

Focus Areas

Weathering and Soil

- Soil is a mixture of rock particles, minerals, decayed organic material, water, and air. Soil forms as rock is broken down by weathering and mixes with other material on the surface.
- Some soil organisms make humus, the material that makes soil fertile. Other soil organisms mix the soil and make spaces in it for air and water.

Erosion and Deposition

- Weathering, erosion and deposition act together in a cycle that wears down and builds up Earth's surfaces.
- The different types of mass movement include landslides, mudflows, slumps and creep.
- Moving water is the major agent of the erosion that has shaped Earth's land surface. Groundwater can cause erosion through a process of chemical weathering.

- Through erosion a river creates valleys, waterfalls, floodplains, meanders and oxbow lakes.
- Deposition creates landforms such as alluvial fans and deltas.
- Glaciers can form only in an area where more snow falls than melts.
- Continental glaciers can flow in all directions as they move. Gravity constantly pulls a glacier downhill.
- Glaciers erode the land through two processes plucking and abrasion. When a glacier melts, it deposits the sediment it eroded from the land creating landforms.
- Waves shape the coast through erosion by breaking down rock and moving sand and other sediment.
- Waves shape a coast when they deposit sediment, forming coastal features such as beaches, sandbars, barrier beaches, and spits.
- Wind erosion and deposition may form sand dunes and loess deposits.

A Trip through Geological Time

- Most fossils form when living things die and are buried by sediment. The sediment slowly hardens into rock and preserves the shape of the organisms.
- Fossils found in rock include molds and casts, petrified fossils, carbon films and trace fossils. Other fossils form when the remains of organisms are preserved in substances such as tar, amber, or ice.
- The fossil record provides evidence about Earth's history.
- According to the law of superposition, in horizontal sedimentary rock layers the oldest layer is at the bottom. Each higher layer is younger than the layers below it.
- Gaps in the geological record and folding can change the relative position in which rock layers appear.
- During radioactive decay, the atoms of one element break down to form atoms of another element.
- In radioactive dating, scientists compare the amount of radioactive element in a rock with the amount of the stable element into which the radioactive element decays.
- Because the time span of Earth's past is so great, geologists use the geological time scale to show Earth's history
- Scientists think that Earth began as a ball of dust, rock, and ice in space. Gravity pulled this mass together.
- During the Paleozoic Era, a great number of different kinds of organisms evolved.
- Reptiles spread widely during the Mesozoic Era.
- During the Cenozoic Era, mammals evolved to live in many different environments – on land, in water and even in the air.

Resources

Scientific Inquiry

MS-ESS2-1 (5.4.6.C.2) *How Does Pressure Affect Particles of Rock?,* p. 50
MS-ESS2-2 (5.4.6.C.3) *Moving the Continents*, p. 72