Lesson Topic: Unit 3 Part 3 Earth's Systems/History of Earth

Grade 6

Length of lesson: 10 days

Content Standards

Content Standard(s):
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 of history.

Big Ideas
Students will understand:
- How the geologic time scale is organized
- Fossil evidence provides data to age rock layers that allow scientists to map Earth's geological history

Essential Question(s):
- How do scientists know that Earth and life on Earth have changed through time?

Student objectives (outcomes):
Students will be able to:
- Create a timeline that positions index fossils relative to human history

Assessment Evidence

Performance Task(s):
Menu for Differentiated Performance Task:
- Museum exhibit
- Creative non-fiction (Narrative with scientific information)
- Time Capsule (Evidence from current date and from the time period student is researching)
- Board game

See District Shared Folder: Middle School Science: 6th grade folder (Draft from Jennier Hornung – Nikiski MS)
*Rubric needs to be developed (possible work for Assessment Literacy Class)

Other Evidence:
- Time Machine (see resource-Teacher Pay Teacher Gay Miller "Earth's Systems")
- Test (to be developed)

Learning Plan

Learning Activities:

- Teach Vocabulary Concepts: Absolute age, relative age, index fossil, carbon dating, Law of Superposition, Law of Original Horizontality
- Interactive Notebooks (Earth System's by Gay Miller TPT)
- Lab "Who's On First?" (includes teaching Powerpoint-see See District Shared Folder: Middle School Science:6th grade folder)
- Lab #39 Earth History Timeline
- Radioactive Dating Game Simulation

Resources:

- Teacher Pay Teacher Gay Miller "Earth's Systems" (Melissa-pending)
- www.enchanted learning.com/subjects/dinosaurs/glossary/indexfossils.shtml
- pubs.usgs.gov/gip/geotime/fossils.html
- Lab "Who's On First?" (usmp.berkeley.edu/fosrec/BarBar.html)
- Lab #39 Earth History Timeline (hmxearthscience.com)Search the website for this lab.
- Radioactive Dating Game Simulation (phet.colorado.edu)

Students who demonstrate understanding can:

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.** [Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [*Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.*]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-ESS1-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-ESS1-4)	**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)	**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-ESS1-3),(MS-ESS1-4)

Connections to other DCIs in this grade-band:
MS.LS4.A (MS-ESS1-4); **MS.LS4.C** (MS-ESS1-4);

Articulation of DCIs across grade-bands:
3.LS4.A (MS-ESS1-4); **3.LS4.C** (MS-ESS1-4); **4.ESS1.C** (MS-ESS1-4); **HS.PS1.C** (MS-ESS1-4); **HS.LS4.A** (MS-ESS1-4); **HS.LS4.C** (MS-ESS1-4); **HS.ESS1.C** (MS-ESS1-4); **HS.ESS2.A** MS-ESS1-4)