Pocatello/Chubbuck School District #25

Science: G7 2020 LS3

Grade: 7 **Unit 1: The History of Life on Earth** **Pacing: 4 WEEKS**

Science and Engineering Practices **Crosscutting Concepts** **Disciplinary Core Ideas**

Unit Overview: The purpose of this unit is to help learners understand the relationships between various sources of evidence that support the theory that organisms change throughout time. **New student learning includes constructing an explanation on anatomical difference between modern organisms and fossil organisms, analyzing pictorial data to compare relationships between organisms. Within this unit, students will use the Crosscutting Concepts of Patterns and Scientific Knowledge Assumes an Order and Consistency in Natural Systems and the Science and Engineering Practices of Constructing Explanations and Designing Solutions and Analyzing and Interpreting Data. Recommended Anchoring Phenomenon: Comparing and Contrasting the Fossil Record of the Hagerman Horse with modern horses.**

FOCUS SCIENCE STANDARD / CONCEPT PROGRESSION		
5th Grade LS2-5-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. LS2-5-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	7th Grade Life Science **LS4-MS-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.**	10th Grade Biology LS4-HS-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. LS4-HS-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

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FOCUS AND ACCOMPANYING STANDARDS The FOCUS and accompanying standards are clustered with Learning Intentions and Success Criteria (LI/SC) identified to provide coherence in teaching and learning. It is from these standards, LI/SC, and Tasks/Assessments that PLCs create weekly learning intentions, success criteria and lesson plans.	**Learning Intentions**
Performance Standards **LS4-MS-1.Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.** ● Further Explanation: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers. ● Content Limit: Assessment does not include the names of individual species or geological eras in the fossil record. **LS4-MS-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer relationships.** ● Further Explanation: Emphasis is on explanations of the relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures. **LS4-MS-3. Analyze displays of pictorial data to compare patterns of similarities in the anatomical structures across multiple species of similar classification levels to identify relationships.** ● Further Explanation: Emphasis is on inferring general patterns of relatedness among structures of different organisms by comparing the appearance of diagrams or pictures. ● Content Limit: Assessment of comparisons is limited to gross appearance of anatomical structures within genus and species levels. No memorization of classification levels is required. **Supporting Standards** **LS4.A: Classification of Organisms** • The collection of fossils and their placement in chronological order is known as the fossil record and documents the change of many life forms throughout the history of the Earth. Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record enable the classification of living things. **(LS4-MS-1, LS4-MS-2)**	In this unit, learners will understand how to analyze and interpret data for patterns in the fossil record.

• Scientific genus and species level names indicate a degree of relationship. (LS4-MS-3)	

IDAHO STANDARDS FOR LITERACY IN SCIENCE AND TECHNICAL SUBJECTS
● 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 ● 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 ● WHST.6-8.1c Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

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UNIT LEARNING INTENTIONS
● In this unit, learners will understand how to analyze and interpret data for patterns in the fossil record.

SUCCESS CRITERIA ALIGNED TO UNIT LEARNING INTENTIONS		
SURFACE ***Conceptual understanding and foundational information; Acquisition of content understanding and associated procedural skills*** Almarode, Fisher, Frey, and Hattie, *Visible Learning for Science*. Corwin. 2018 p. 53	**DEEP** ***Uncovering relationships between terms, concepts, and ideas within a topic; how concepts are related to other scientific phenomena. Utilizing science process skills to plan, investigate, communicate and elaborate on initial learning and extract generalizations about science content*** Almarode, Fisher, et al., *Visible Learning for Science*. Corwin. 2018 p. 82	**TRANSFER** ***Applying relevant scientific laws, principles, theories, and phenomena to construct solutions to problems and formulate new understandings within different contexts disciplines.*** Almarode, Fisher, et al., *Visible Learning for Science*. Corwin. 2018 p.128
The Fossil Record ● I can recognize the ways fossils can form. ● I can describe how the fossil record is constructed. **Patterns of Change in Life on Earth** ● I can identify patterns of change documented in the fossil record. **Evidence of Common Ancestry** ● I can recognize common ancestry between extinct and modern organisms.	**The Fossil Record** ● I can explain how fossil data can be used to provide evidence for the history of life on Earth. **Patterns of Change in Life on Earth** ● I can interpret the fossil record to explain patterns of change in the history of life on Earth. **Evidence of Common Ancestry** ● I can analyze fossil, anatomical, and embryological data to provide evidence for evolutionary relationships among organisms.	● I can evaluate patterns in the fossil record to determine relationships between organisms.

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LEARNING PROGRESSION (READING, WRITING, TALKING)		
SURFACE	**DEEP**	**TRANSFER**
Learners will: **The Fossil Record** ● Describe how fossils document the existence of life forms throughout the history of earth. ● Identify patterns in the rock layers across locations. ● Use models to analyze the time scale of Earth's history relative to the history of life on Earth. ● Identify patterns in the fossil record to provide evidence for the history of life on Earth. **Patterns of Change in Life on Earth** ● Identify the patterns of change in organisms throughout the history of life on Earth. **Evidence of Common Ancestry** ● Identify patterns of similarities in anatomical structures and embryological development to construct explanations about common ancestry	*Learners will:* **The Fossil Record** ● Analyze and interpret data for patterns in the fossil record. ● Construct an explanation related to the conditions necessary for fossilization ● Interpret data related to radioactive decay to understand how the age of a rock layer can be calculated using radiometric dating. ● Infer about the ages of fossils found within the layers of rock. ● Analyze fossil data to provide evidence for the anatomy, behavior, and environment of fossilized organisms. **Patterns of Change in Life on Earth** ● Compare anatomical similarities and differences of organisms. ● Analyze data to identify patterns in the number and diversity of life forms throughout the history of life on earth **Evidence of Common Ancestry** ● Analyze empirical evidence to identify patterns of similarities in the fossil record. ● Infer evolutionary relationships among species by identifying patterns of similarities	*Learners will:* ● Evaluate data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

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KEY ACADEMIC VOCABULARY
Fossil, Absolute age, Relative age, Radiometric Dating, Index Fossil, Geologic Time Scale, Fossil Record, Extinction, Uniformitarianism, Geologic Column, Transitional Fossils, Mass Extinction, Biodiversity, Carbon Stromatolites, Paleontologist, Arthropods, Adaptations, Evolution, Embryology, Anatomy, Common Ancestry

<table>
<tr><th colspan="2">REQUIRED SUMMATIVE ASSESSMENT (Administered ‘On Demand’)</th></tr>
<tr><td>Learning Intention</td><td>● In this unit, learners will understand how to analyze and interpret data for patterns in the fossil record.</td></tr>
<tr><td>Success Criteria</td><td>I can evaluate patterns in the fossil record to determine relationships between organisms.</td></tr>
<tr><td>Resource Options for Summative Assessment</td><td>
<table>
<tr><td>Assessment Options</td><td>Resources</td></tr>
<tr><td>Learners will explain how the Hagerman horse compares to the modern horse by comparing fossil records.</td><td>TBD</td></tr>
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VETTED MATERIALS/RESOURCES
Anchoring Phenomena: Hagerman Horse comparison to Modern Horses **Supporting Phenomena:** ● Access to various fossils for students to handle and interact with ● Hands-on labs in fossil formation of molds and casts ● Various pictures of fossils **SEP and CCC:** Science Dimensions Mod D: Unit 1; Lesson 1 ★ SEP ○ Constructing Explanations and Designing Solutions ★ CCC ○ Patterns ○ Scientific Knowledge Assumes an Order and Consistency in Natural Systems Science Dimensions Mod D: Unit 1; Lesson 2 ★ SEP ○ Analyzing and Interpreting data ○ Constructing Explanations and Designing Solutions ○ Scientific Knowledge Assumes an Order and Consistency in Natural Systems ★ CCC ○ Patterns ○ Scientific Knowledge Assumes an Order and Consistency in Natural Systems Science Dimensions Mod D: Unit 1; Lesson 3 ★ SEP ○ Analyzing and Interpreting data ○ Constructing Explanations and Designing Solutions ○ Scientific Knowledge Assumes an Order and Consistency in Natural Systems ★ CC ○ Patterns ○ Scientific Knowledge Assumes an Order and Consistency in Natural Systems