#### **GRADE 7**

### EPSD Unit 5: Evidence of a Common Ancestry (part I) Second Marking Period

Overview: In this unit of study, students analyze graphical displays and gather evidence from multiple sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors. The crosscutting concepts of cause and effect, patterns, and structure and function are called out as organizing concepts for these disciplinary core ideas. Students use the practices of analyzing graphical displays and gathering, reading, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas

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

Instructional Days: 20-25

#### **HMH Science Dimensions Program Resources Module D**

#### Unit 1: The History of Life on Earth

Unit Video (artist's impression of early Earth); Why it Matters p. 2; Unit Starter p. 3; Vocabulary p. 3G; Unit Project p. 3I; Unit Connections p. 66; Unit Review pp. 67-70; Unit Performance Task pp. 71-72

**Standard for all Units:** (D) Interactive Multilingual Glossary; (D/P) Unit Pretest; (D) Lesson Quizzes; (D/P) Unit Test

**Note:** Refer to the Curriculum Alignment Common Language (CACL) Guide to decipher acronyms.

Lesson 1: The Fossi
Record pp. 4-25

D/P- WIM Questions p. 2

D/P- CYEI (video) How can fossils help us learn about a whale that lived 40 million years ago? p. 5

P- ENB (prompt) Gather evidence to help explain how fossil data can be used to learn about an ancient whale species. p. 5

# **Lesson 2:** Patterns of Change in Life on Earth pp. 26-45

D/P- WIM Questions p. 2

D/P- CYEI (digital picture) What can explain the formation of a rock layer with no fossils in between rock layers with different types of fossils? p. 27

P- ENB (prompt) Gather evidence to help explain

**Lesson 3:** Evidence of Common Ancestry pp. 46-65

D/P- WIM Questions p. 2

D/P- CYEI (digital picture) Fossil of an extinct bird called What evidence supports a relationship between extinct and modern birds? p. 47

P- ENB (prompt) Gather evidence to help explain

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the past. (MS-LS4-2) Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. (MS-LS4-3) Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

Objective 1: Students will use graphs, charts, and images to identify patterns within the fossil record and determine similarities and differences in findings.

Objective 2: Students will: Make logical and conceptual connections between evidence in the fossil record and explanations about the existence, diversity, extinction, and change in many life forms throughout the history of life on Earth. Apply the patterns in gross anatomical structures among modern organisms and between modern organisms and fossil organisms to construct explanations of evolutionary relationships.

D/P- Explaining Fossil Formation (Students watch video to see how fossils can from and explore online to learn more about fossil formation.) pp. 6-7 D/P- HOL Activity Model Fossil Formation (Students model the process of fossil formation and make their own cast fossil out of clay.) pp. 9-10 P- ENB (prompt) The fossil shown at the beginning of the lesson is from an extinct whale. Under what environmental conditions

did the fossil probably form? What can be learned from that type of fossil? Students record evidence in their ENB. p. 10

D/P- Studying the Ages of Fossils: Absolute Ages of **Rock Layers (Students** interact with timeline online to better understand the breakdown of Uranium to why a fossil-free rock layer might exist between layers with fossils. p. 27 D/P- DTM Students write a formula for the calculations (using variables) to determine what percentage of Earth's history was without life, and then use formula to find out the answer. Students also think about the process of identifying the age of the earliest fossil and explain how it show how scientists use evidence and logic to answer scientific questions. p. 30 P- ENB (prompt) What does a rock layer with very few fossils suggest about conditions in that region when the rock laver formed? Record evidence. p. 30 D/P-Increasing Complexity of Fossils (Students interact with timeline online to find out

about the increase in the

the relationship between extinct and modern birds. p. 47 D/P- Identifying **Similarities Among** Organisms (Students view video about genetic recombination in elephants and their offspring.) p. 48 D/P- ENGIT Apply the Use of 3D Printing to Model Fossils (Students propose at least two ways that 3D printing could help students who are interested in studying fossils but cannot access actual fossils.) p. 51 D/P- Similarities in Anatomy (Students use interactive coloring tools online to color the bones of the cat.) p. 52 P- ENB (prompt) What anatomical structures do the Confuciusornis fossil and the Corvus (crow) share? Record evidence? p. 52

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**Objective 3:** Use diagrams or pictures to identify patterns and similarities in embryological development across multiple species.

**Topics:** The Fossil Record; Anatomical Similarities; Embryological Development; and Twenty-First Century Themes and Skills (TFCTS) to include: The Four C's, Life and Career Skills, and Information, Media, and ITC Literacy.

**Essential Questions**: How do we know that birds and dinosaurs are related? How do we know when an organism (fossil) was alive?

Lead over three half-lives.) p. 12 D/P-LS In their own words, students explain how scientists could estimate the ages of the other fossils in the diagram based on the index fossil in the diagram having an absolute age of 454 million years. p 14 D/P- DTM Using Models (Students use data to respond to and explain their answer to a math problem.) p. 15 P- ENB (prompt) Dorudon whales lived during the late Eocene Epoch. Where does that fall on the geologic timescale? How might the time at which the whale was alive have been determined? Students record responses in their ENB. p. 16 P- ENB (prompt) What kinds of inferences might be made about the extinct whale's behavior based on its fossils? Record evidence in ENB. p. 18

complexity of life on Earth over time. p. 31 D/P- DTM Analyze **Extinction Data (Students** use graphs to describe the trends they see in each graph; students identify the relationship between mass extinction and biodiversity over time.) p. 36 D/P- HOL Activity Model Analysis of the Fossil Record (Students analyze fossil data to identify evidence of extinction and the appearance of new species over time.) pp. 38-P- ENB (prompt) Why might different types of fossils be found in rock layers that come before and after a rock layer that contains no fossils? Record evidence. p. 39 D/P- ENGIT Students identify how CT scanners can solve the problem of damaging delicate fossils? p. 40

D/P- LS Explain Inferences

from Fossil Record

D/P- Early Stages of **Embryo Development** (Students take a closer look online to learn more about embryo development.) pp. 53-54 P- ENB (prompt) What types of similarities would you expect to find in the embryo development of extinct and modern birds? Record evidence, p. 55 D/P- DTM Interpret the Geometry of Body Plans (Students read text and identify the lines of symmetry present in organisms.) p. 55 D/P- DTM Analyze Growth Curve Data (Students use growth curve data to determine age difference between two fossilized dinosaurs. p. 56 D/P- HOL Activity Make Inferences from Evidence (Students make inferences based on visual observations and modify those inferences based on new information and data.) p. 57

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D/P- DTM Use Trace
Fossils to Describe an
Extinct Organism's
Behavior (Students
complete steps to find hip
height, stride length, and
whether the dinosaur was
walking or running. p. 19
D/P- ENGIT Students
identify which tools would
be best for the teacher to
take along on a class field
trip to collect fossil shark
teeth from a sandy beach.
p. 20

D/P- TIF (enrich) People in Science: Nicholas Steno, Anatomist and Geologist pp. 21-22 D- Hands-On Labs; Comparing Similarities and Differences between Fossils; Propose Your Own Path

D/P- Lesson Self Check pp. 23-25 D- Lesson Quiz D-Make Your Own Study Guide

P-DI (ELL/RTI) p. 3G

Evidence (Students read text and identify what modern organisms have an ecological role around ponds today that is similar to the role of Meganeura during the Carboniferous Period; students explain their answer.) p. 40

D/P- TIF (enrich)
Prediction of a Transitional
Organism pp. 41-42
D- Hands-On Labs;
Reconstruct the Past from
Physical Evidence; Propose
Your Own Path

D/P- Lesson Self Check pp. 43-45 D- Lesson Quiz D-Make Your Own Study Guide

P- DI (ELL/RTI) p. 3G P- Extension p. 3G P- COLLAB p. 3H P- Connections to Other Disciplines p. 3H

D-Science Safety HB D- CCC-HB D- ELA-HB

D/P- Relationships among Fossil Organisms and Living Organisms: Case Study: Evolution of Elephants (Students explore the teeth of four different animals and identify which extinct animal they believe is most closely related to the Asian elephant; students support their answer with evidence.) p. 58 P- ENB (prompt) What evidence from the extinct bird fossil supports an evolutionary relationship with living bird species? Students record evidence in their ENB. p. 59 D/P- LS Defend a Claim with Evidence (Students make a claim about which fossil, A or B, is the rhino and which fossil is the horse; students use anatomical evidence from the photos to defend their claim. p. 60

D/P- TIF (enrich) Careers in Science: Museum Exhibit Designer pp. 61-62

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P- Extension p. 3G P- COLLAB p. 3H P- Connections to Other Disciplines p. 3H  D-Science Safety HB D- CCC-HB D- ELA-HB D-M-HB D- SEP-HB D-ScienceSaurus Reference HB	D-M-HB D- SEP-HB D-ScienceSaurus Reference HB	D- Hands-On Labs; Classification of Living Things; Propose Your Own Path  D/P- Lesson Self Check pp. 63-65 D- Lesson Quiz D-Make Your Own Study Guide  P- DI (ELL/RTI) p. 3G P- Extension p. 3G P- COLLAB p. 3H P- Connections to Other Disciplines p. 3H  D-Science Safety HB D- CCC-HB D- ELA-HB D-M-HB D- SEP-HB D-ScienceSaurus Reference HB
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# EPSD Curriculum and HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

Curriculum Alignment Common Language (CACL) Guide 6-8				
Acronym	Word/Phrase	Description		
CER	Claims Evidence Reasoning	Students make a claim and gather evidence along the way (during EXPLORATORY activities) to support claim.		
ССС-НВ	Crosscutting Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.		
CYEI	Can You Explain It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.		
CYSI	Can You Solve It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.		
D	Digital	Program resources and features in interactive digital form.		
DI (ELL/RTI)	Differentiated Instruction (English Language			
Extension	Learner/Response to Intervention)	A page that lists all learning activities used to		
COLLAB	Collaboration	differentiate learning, engage students in collaborative		
Connections	Connections to Other Disciplines	activities and connect learning to other subjects.		
to Other				
Disciplines				
DTM	Do the Math	Integrated subject learning.		
ENB	Evidence Notebook	Student notebook or journal used to gather evidence during EXPLORATORY learning activities to support their claims.		
ENGIT	Engineer It	Integrated subject learning.		
ELA-HB	English Language Arts Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.		
HOL	Hands-On Lab	Activities or experiments that enable students to demonstrate scientific procedures and analysis.		
LS	Language SmArts	Integrated subject learning.		

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М-НВ	Math Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
Р	Print	Program resources and features in print form.
SEP-HB	Science and Engineer Practices Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
TIF	Take It Further (enrich)	Enrichment activities for students in digital or print.
VBP	Video Based Project	Real life videos related to science and/or engineering that enable students to demonstrate mastery of performance expectations.
VL	Virtual Lab	Fully interactive simulations in which students perform experiments, collect data and answer questions.
WIM	Why It Matters	Questions related to lessons within each unit that asks students to consider how science affects the world around them.
YSI	You Solve It (Simulation)	Open-ended simulation-based learning with multiple answer options.