

## THIRD GRADE : UNITY AND DIVERSITY

### Standards Bundle

*Standards* are listed within the bundle. Bundles are created with potential instructional use in mind, based upon potential for related phenomena that can be used throughout a unit.

3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. (SEP: 4; DCI: LS4.A; CCC: Scale/Prop.) [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. (SEP: 7; DCI: LS2.C, LS4.D; CCC: Systems, Technology) [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

### Content Overview

*This section provides a generic overview of the content or disciplinary core ideas as an entry point to the standards.*

Fossils provide us with evidence of organisms and the environment from the past in which they lived. We see differences in the system components of earth and types of organisms from a short period of time compared to a long period of time. We can see evidence of past components of our earth systems and the impact on plants and animals. Fossils help us see how earth has changed over time and help us solve problems that have impact on plants and animals today. Habitats can cause some organisms to survive well, less well, or not at all. As ecosystems change, changes within the animal and plant population can be observed. Changes in the physical features of the land, water distribution and availability, food, and population numbers can affect the entire ecosystem.

## Phenomena

*Phenomena can be used at varying levels of instruction. One could be used to anchor an entire unit, while another might be more supplemental for anchoring just a unit. Please remember that phenomena should allow students to engage in the SEP and use the CCC/DCI to understand and explain the phenomenon.*

- Fossil types and distribution in Badlands.
- Mammoth site in Hot Springs, SD.
- Disappearance and then reintroduction of the wolf to Yellowstone Park.
- Melting of ice around the North Pole.
- Invasive species such as Zebra Mussels, Purple Loosestrife, and Silver Carp.
- Sedimentation of the Missouri River near Springfield, SD.

## Storyline

*This section aims to decode not only the DCI connections, but also the SEP and CCC in a detailed account of how they possibly fit together in a progression for student learning, including both rationale and context for the bundle.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>● Analyze and interpret data to make sense of phenomena using logical reasoning.</li> </ul> <p><b>Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"> <li>● Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.</li> </ul>	<p><b>LS4.A: Evidence of Common Ancestry and Diversity</b></p> <ul style="list-style-type: none"> <li>● Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2)</li> <li>● Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.</li> </ul> <p><b>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</b></p> <ul style="list-style-type: none"> <li>● When the environment changes in ways that affect a place’s physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. (secondary)</li> </ul> <p><b>LS4.D: Biodiversity and Humans</b></p> <ul style="list-style-type: none"> <li>● Populations live in a variety of habitats, and change in those habitats affects the organisms living there.</li> </ul>	<p><b>Scale, Proportion, and Quantity</b></p> <ul style="list-style-type: none"> <li>● Observable phenomena exist from very short to very long-time periods.</li> </ul> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● A system can be described in terms of its components and their interactions.</li> </ul>

Students make observations of both plant and animal fossils and will record data to compare different fossils. Students should be exposed to different means of observation including digital media. Students observe fossils of both plants and animals from different ecosystems (terrestrial and marine). Students compare and analyze plant and animal fossils to plants and animals that live today. Students study types, sizes, and times of existence to make comparisons. Students infer the types of organisms that lived long ago are different than plants and animals that live today. Other inferences from students help them relate the different aspects of a variety of ecosystems. Students find the differences between terrestrial and marine ecosystems and the organisms and their fossils that live in aquatic and land ecosystems. Students interpret information about the different organisms that lived long ago and the nature of the environments in which they lived. Students should analyze how the organisms and environments have changed over time and that those changes had an impact on the living organisms within the different ecosystems. An example would be terrestrial areas have marine fossils. Conditions of habitats (terrestrial or aquatic, warm temperatures or cold temperatures, dry climate or moist climate) within an ecosystem aid in the survival of some organisms, while not as well for others. Students can argue why an animal would migrate to a new environment.

### **Formative Assessment**

*Formative assessment is crucial because all learners benefit from timely and focused feedback from others. It promotes self-reflection, self-explanation, and social learning. It can also make learning more relevant. Each of the questions below might be used throughout the formative assessment process. Specific prompts may focus on individual practices, core ideas, or crosscutting concepts, but, together, the components need to support inferences about students' three-dimensional science learning as described in a given bundle, standard or lesson-level performance expectation.*

#### **SEP Analyzing and Interpreting Data**

- Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
- Compare the type, size, and distribution of fossil organisms found in terrestrial ecosystems versus marine ecosystems
- Analyze data from extinct organisms to infer the environment in which they lived long ago.

#### **SEP Engaging in an Argument from Evidence**

- Construct an explanation of observed relationships between fossils from animals and plants.
- Using evidence, describe an environmental change that could include changes in land characteristics, water distribution, temperature, food, or other organisms, that affected the plants and animals that lived in that ecosystem.
- Make a claim about a proposed solution to a problem that occurred in an ecosystem due to an environmental change.

#### **CCC Scale, Proportion, and Quantity**

- Construct a timeline and map of when and where a plant or animal lived based upon its fossil record.
- Construct a timeline of existence of plants and animals based upon the fossils found within the layers of rock.
- How can the layers of rocks and fossils provide us with a timeline?

#### **CCC Systems, Technology**

- How can environmental changes lead to adaptations of animals and plants throughout time?
- Describe the changes that occurred in Yellowstone National Park due to the reintroduction of wolves into the area.

## Performance Outcomes

*These are statements of how students use knowledge and are similar to the standards in how they blend DCI, SEP, and CCC, but at a smaller grain-size. These are potential outcomes for instruction as it plays out in lessons and activities in the classroom. It is important to also think of these as smaller outcomes that build toward the larger goal of mastering the standards.*

- **Analyze and interpret** *patterns in the structure and function* of the traits of fossils to determine what types of habitats they once lived in.
- **Obtain information** regarding the *structure and function* of selected fossils using information in resources to determine relative ages.
- **Obtain information** regarding examples of environmental changes that could occur and *have an effect* on living things.