SOUTH CAROLINA
DEPARTMENT OF EDUCATION

Bundling Guide for Grade 3 Science

Purpose and Use

This document is intended to be a guide to provide examples of ways Performance Expectations (PEs) could be bundled. For this purpose, a bundle as defined by Pruit (2014), is, "a set of PEs that provide students with coherent connections among concepts within and across disciplines." This document is not intended to be read from cover to cover, but to be used, when needed, to support teacher professional learning and curriculum decisions. This is not intended for student use, and thus is not written in student-friendly language. This is not a curriculum or a means to limit instruction in the classroom. The bundles presented in this guide are not ordered for instruction. Although each PE states a dedicated Science and Engineering Practice (SEP) and Crosscutting Concept (CCC), students will need to use the full range of SEPs and CCCs to achieve success by the end of instruction.

The bundles in this document do not represent the only way the PEs can be bundled. PEs bundled together may change depending upon the selected anchoring phenomenon that students are working to explain. The bundles presented in this guide were developed using an iterative process informed by the work of Krajick and colleagues (2014). This process is summarized in the steps below:

1. Review bundles that already exist.
2. Build bundles around an anchoring phenomenon.
    a. The "Example anchoring phenomena to support 3D instruction" provided in this resource is just that, an example. There are myriad phenomena to support 3D instruction, and different phenomena may be more appropriate for different learning contexts.
3. Explore and look for unexpected relationships among the PEs, including bundling across disciplines (Earth and Space Science, Life Science, Physical Science) when appropriate. This can include identification of PEs that are only partially met in the bundle.
    a. PEs within a bundle marked with an asterisk (*) share an authentic connection with the bundle but may not fully met.
4. Make sure each PE in the grade/course is found in at least one bundle.

Life Cycles

Animals and plants have unique and variable life cycles. Generally, these cycles include birth or sprouting, growth, reproduction, and death. Many characteristics (traits) that animals and plants have are inherited from their parents. Different species have different inherited information, which leads to differences in their structures and how those structures function. Within a species, patterns of similarity and difference can be observed among parents, offspring, and siblings. After birth or sprouting, traits can also be influenced by an individual's interactions with the environment. For example, a plant may grow shorter than expected if it experiences limited access to resources, such as during a prolonged drought. These environmental impacts can cause an organism to thrive, struggle, or fail to survive. For those that thrive or survive, reproduction is essential to the continued existence of the species.

PEs aligned to this bundle:

- 3-LS1-1. Develop and use models to describe how organisms can change in predictable patterns during their unique and diverse life cycles.
- 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms.
- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive. *

Example anchoring phenomena to support 3D instruction:

- Life cycle and traits of plants in a garden
- Butterfly habitat and traits
- Puppies in a litter

Traits and Survival

Traits are passed from parents to offspring through inherited information. Within species, even within families, there is variation in these traits. Changes in a habitat can be beneficial, neutral, or harmful to an organism. Under certain environmental conditions, differences in traits between individuals of the same species can give some an advantage in surviving, finding mates, and reproducing while others may be at a disadvantage. Cooperative group behavior is one strategy organisms use to protect themselves from the impacts of environmental change. People can design solutions to reduce the negative effects of environmental change and help protect species and their trait variability.

PEs aligned to this bundle:

- 3-LS2-1. Constrict an argument that some animals form groups that help members survive.
- 3-LS4-2. Use evidence to construct an explanation for how the variations in traits among individuals of the same species may provide advantages in surviving and producing offspring.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive.
- 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms. *
- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. *
- 3-LS4-4. Make a claim about the effectiveness of a solution to a problem caused when the environment changes and affects organisms living there. *

Example anchoring phenomena to support 3D instruction:

- Peppered moths and tree bark color
- Meerkat behavior and evolution

History of Life on Earth

Life on Earth has a rich history that is preserved in the fossil record. Fossils provide evidence of animals and plants that lived long ago in habitats and environments that were very different from those today. For example, the fossil record indicates that some areas that are dry land today were once covered by oceans. When ancient environmental conditions changed, such as shifts in temperature or resource availability, some organisms were able to survive and reproduce, some moved to new locations, and others died out. These environmental changes affected which traits were helpful for survival. The fossil record reveals patterns in how life responded to environmental change over time.

PEs aligned to this bundle:

- 3-LS4-1. Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive. *
- 3-LS4-4. Make a claim about the effectiveness of a solution to a problem caused when the environment changes and affects the organisms living there. *

Example anchoring phenomena to support 3D instruction:

- Columbian Mammoth
- Seashell fossils in deserts and mountains

Contact Forces

The motion of an object is determined by the forces acting on it. Forces can be described as balanced or unbalanced. Balanced forces cancel each other out, resulting in no change in motion. For example, if two students push on opposite sides of a box with equal force, the box will not move. Even when an object is at rest (not moving), it may still have forces acting on it that are balanced. Unbalanced forces do not cancel out and can cause an object to start moving, stop moving, or change its motion (change direction). For example, if one student pushes harder than the other, the box will move in the direction of the stronger push. When objects are in motion, their movement often follows predictable patterns. These patterns can be observed and measured to predict how an object will move in the future. But if the forces acting on the object change, its motion may change too.

PEs aligned to this bundle:

- 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- 3-PS2-2. Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Example anchoring phenomena to support 3D instruction:

- Tug-of-war
- Motion of toy car

Distance Forces

The motion of objects is determined by the forces acting on them, including forces between objects that are not in contact. These forces, such as electric and magnetic forces, can cause objects to move without touching them. The size of these forces depends on several factors, including the properties of the objects, the distance between them, and for magnets, the orientation of their poles. For example, magnets can attract or repel each other depending on how their poles are aligned. People use these kinds of forces to solve problems in everyday life. For instance, a magnetic latch can keep a cabinet door closed without needing a physical lock.

PEs aligned to this bundle:

- 3-PS2-3. Ask questions to determine cause-and-effect relationships of electric interactions and magnetic interactions between two objects not in contact with each other.
- 3-PS2-4. Develop possible solutions to a simple design problem by applying scientific ideas about magnets.
- 3-PS2-2. Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. *

Example anchoring phenomena to support 3D instruction:

- Compass
- Using a magnet to move a metal object through a plastic maze
- Electric generators

Weather and Climate

Weather, the condition of the atmosphere at a given place and time, can change from day to day and across seasons. Meteorologists, scientists who study the atmosphere, collect and analyze weather data over time and across regions. They use this information to identify patterns and forecast what kind of weather is most likely to happen next. Climate describes the typical range of weather conditions in a region over many years. Different climates are more likely to experience certain natural hazards. For example, hurricanes and strong thunderstorms are common in the Southeastern United States during the summer and fall. By understanding patterns in weather and natural hazards, people can take steps to protect themselves and their property from potential impacts.

PEs aligned to this bundle:

- 3-ESS2-1. Represent data in tables and graphical displays of typical weather conditions during a particular season to identify patterns and make predictions.
- 3-ESS2-2. Obtain and combine information to describe climate patterns in different regions of the world.
- 3-ESS3-1. Make a claim about the effectiveness of a design solution that reduces the impacts of a weather related hazard.

Example anchoring phenomena to support 3D instruction:

- Hurricane/tropical storm mitigation for structures (hurricane shutters, elevated foundations)
- Climographs