SOUTH CAROLINA
DEPARTMENT OF EDUCATION

Bundling Guide for Kindergarten 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 entire 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.

Weather Patterns

Weather refers to the day-to-day conditions of the air and sky in a specific area at a specific time. These conditions include temperature, precipitation (rain, snow, sleet, hail), wind, cloud cover, and sunlight. For example, on a sunny day, the warmth from the sun can raise temperatures, while on a windy day, moving air can make it feel cooler. Meteorologists, scientists who study weather, look for patterns over time. They use these patterns to share weather information with the public, including forecasts and warnings about severe weather.

PEs aligned to this bundle:

- K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
- K-ESS3-2. Ask questions to understand the purpose of weather forecasting to prepare and respond to severe weather.
- K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. *

Example anchoring phenomena to support 3D instruction:

- Early-warning systems
- Observing local weather reports

Pushes and Pulls

Pushing or pulling on an object changes how fast the object moves and/or the direction of its motion. For example, pushing a swing harder will increase the speed of the swing or pulling a stationary wagon will start it moving in the direction of the pull. When two objects touch or collide, like bumper cars, they push on one another. After a collision, objects move depending on how hard and how fast they were hit, usually in the direction of the larger and/or faster object. Pushes and pulls can be different in strength and direction, which affects how objects move when they interact.

PEs aligned to this bundle:

- K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.

Example anchoring phenomena to support 3D instruction:

- Rube Goldberg Machines
- Newton's Cradle
- Marble run

Sunlight's Impact on Earth's Surfaces

Sunlight is the main source of energy for Earth. When sunlight hits a surface, natural or man-made, it is either reflected (bounces off) or absorbed (taken in). Lighter-colored surfaces reflect more sunlight, while darker surfaces absorb more. This understanding can help humans make smart design choices. For example, choosing lighter colors for cars and buildings in sunny areas can reduce heat absorption. Planting trees and adding shade in open spaces, for example, recess areas, can help reduce the warming effects of sunlight.

PEs aligned to this bundle:

- K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.
- K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
- K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
- K-ESS3-3. Obtain and communicate information to define problems related to human impacts on the local environment.

Example anchoring phenomena to support 3D instruction:

- Sunshades over playground equipment
- Rainbow Row houses in Charleston
- Blacktop surfaces versus concrete surfaces

Needs of Plants and Animals

Animals and plants need specific resources to survive, such as air, food, sunlight, and water. All living things need water. Plants use sunlight, water, and air to live and grow, and they can make their own food using these resources. Animals, however, cannot make their own food, so they rely on eating plants and other animals. Animals also need air and water to survive and grow. Because of these needs, living things live in places where those needs can be met. Sometimes, living things can change their environment to better meet their needs. For example, both humans and beavers can change the flow of a river to suit their needs.

PEs aligned to this bundle:

- K-LS1-1. Use observations to describe the patterns of what plants and animals (including humans) need to survive.
- K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
- K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
- K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface. *
- K-PS3-2 Use tools to design and build a structure that will reduce the warming effect of sunlight on an area. *

Example anchoring phenomena to support 3D instruction:

- Plant roots breaking through sidewalks
- Aquatic plants versus plants found in the desert
- Live feed of zoo or aquarium animals