

## Bundling Guide for Grade 1 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 Pruitt (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 whole 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.

## Seasonal Patterns

The amount of daylight changes in a predictable pattern throughout the year. In spring and summer, the Sun rises earlier and sets later, creating longer days with more sunlight. In fall and winter, the Sun rises later and sets earlier, resulting in shorter days with less sunlight. The Moon also follows a predictable pattern, rising and setting at different times over the course of about a month. Other celestial objects, like stars, are usually only visible when the Sun has set. These patterns can be observed and tracked over time, helping people predict changes in daylight and the positions of objects in the sky throughout the year.

### PEs aligned to this bundle:

- 1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.
- 1-ESS1-2. Make observations at different times of the year to relate the amount of daylight to the time of year.

### Example anchoring phenomena to support 3D instruction:

- Plant growth in summer
- Sundials
- Collect and analyze data across time (sun rise/set, moon rise/set, celestial objects)

## Continuity of Living Things

All animals and plants have external parts that help them survive. Animals use body parts to see, hear, move, find resources, and engage in behaviors like communication and protection. Plants have parts such as roots, stems, leaves, flowers, and fruits that help them grow and survive. When an organism survives to adulthood, it can reproduce and produce young. These young animals and plants will have external structures similar to their parents, but they may not look exactly the same. Members of the same species share common structures and behaviors, but each individual is unique. For example, all dog breeds have four legs, external ears, and tails, but they can look very different (small breeds vs. large breeds). A litter of puppies will share some traits with their parents and each other, but may differ in coat pattern, body size, and other features.

### PEs aligned to this bundle:

- 1-LS1-2. Obtain information from multiple sources to determine patterns in parent and offspring behavior that help offspring survive.
- 1-LS3-1. Make observations to support an evidence-based claim that most young are like, but not exactly like, their parents.
- 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. \*

### Example anchoring phenomena to support 3D instruction:

- Seedling and adult plants
- Chicks and adult chickens
- Vocal and/or visual predator warnings

## Exploring Light and Communication

Light is a type of energy that travels from one place to another. It interacts with objects and materials in different ways. Some materials, like glass, let some light pass through while scattering the rest. Other objects, like solid walls, block light and create shadows where the light cannot reach. Some objects, including some living things, are visible because they give off their own light. Humans have created tools and devices that use light to send information across long distances, such as fiber optics and lasers.

### PEs aligned to this bundle:

- 1-PS4-2. Make observations to support an evidence-based claim that objects in darkness can be seen only when illuminated by light sources.
- 1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.
- 1-PS4-4. Use tools and materials to design and build a device that uses light or sound to communicate over a distance. \*
- 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. \*
- 1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. \*

### Example anchoring phenomena to support 3D instruction:

- Lighthouses
- How light pollution affects sea turtle hatchlings along the coast
- Fire-fly inspired light signal (synchronous fireflies at Congaree National Park)

## Exploring Sound and Communication

Sound is a type of energy that some living things, including humans, can hear. It is created when an object vibrates, moving back and forth quickly. These vibrations travel through air (or other materials) and can be picked up by body structures like ears. For example, when a drum is struck it vibrates and produces sound. Living things use sound to communicate important information for growth and survival. Humans have developed tools and devices that allow sound to be shared across long distances, such as phones and radios.

### PEs aligned to this bundle:

- 1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
- 1-PS4-4. Use tools and materials to design and build a device that uses light or sound to communicate over a distance. \*
- 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. \*

### Example anchoring phenomena to support 3D instruction:

- Echolocation
- Musical instruments
- Owl-inspired sound amplifier