Is Soil Alive?

Performance Expectations	Connections Between EP&Cs, CCCs, and SEPS	Clarifications for DCIs	Relevant EEI Units
2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats. **3-LS4-3** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. **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. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival,	**Targeted Environmental Principles & Concept(s)** **Principle III: Natural Systems Change in Ways that People Benefit from and can Influence** Natural systems proceed through cycles that humans depend upon, benefit from, and can alter. Concept A. Natural systems proceed through cycles and processes that are required for their functioning. Concept B. Human practices depend upon and benefit from the cycles and processes that operate within natural systems. Concept C. Human practices can alter the cycles and processes that operate within natural systems. **Targeted Crosscutting Concept(s)** Cause and Effect Structure and Function Energy and Matter	**Targeted Disciplinary Core Idea(s)** **3-LS4-3 Adaptation** For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. **3-LS4-4 Biodiversity and Humans; Ecosystem Dynamics, Functioning, and Resilience** Populations live in a variety of habitats, and change in those habitats affects the organisms living there; 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. **3-5-ETS1-2 Developing Possible Solutions** Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions; At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.	3: Structures for Survival in a Healthy Ecosystem; Living Things in Changing Environments 4: Plants: The Ultimate Energy Source; The Flow of Energy Through Ecosystems; Life and Death with Decomposers; Microorganisms and the Human World 5: Earth's Water; Changing States: Water, Natural Systems, and Human Communities; Precipitation, People, and the Natural World

One Cool Earth (OCE) supports the integration of Next Generation Science Standards (NGSS) three dimensional learning and the Environmental Principles & Concepts (EP&Cs) in their lesson planning. In recognition of A Blueprint for Environmental Literacy and the California State Board of Education, OCE uses the *CA Science Framework*.

growth, behavior, and reproduction. **4-ESS2-1** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. **5-PS1-3** Make observations and measurements to identify materials based on their properties. **5-PS1-4** Conduct an investigation to determine whether the mixing of two or more substances results in new substances. **5-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	**Targeted Science and Engineering Practice(s)** Construct Explanations and Design Solutions Planning and Carrying Out Investigations Obtaining, Evaluating, and Communicating Information Engage in Argument from Evidence Analyzing and Interpreting Data	**4-LS1-1 Structure and Function** Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. **4-ESS2-1 Earth Materials and Systems; Biogeology** Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around; Living things affect the physical characteristics of their regions. **5-PS1-3 Structures and Properties of Matter** Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) **5-PS1-4 Chemical Reactions** When two or more different substances are mixed, a new substance with different properties may be formed. **5-LS1-1 Organization for Matter and Energy Flow in Organisms** Plants acquire their	

		material for growth chiefly from air and water. **5-LS2-1 Interdependent Relationships in Ecosystems; Cycles of Matter and Energy Transfer in Ecosystems** The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem; Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. **5-ESS2-1 Earth Materials and Systems** Earth's major systems are the geosphere (solid and molten rock, soil, and sediments),	

		the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.	