

Habitat Hike

Life Sciences

Grade 4

Focus: Introduction to Biodiversity and Healthy Habitats

NGSS & Environmental Principals

Relation to Program

Disciplinary Core Idea (DCI)

LS1.A Structure & Function: Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

LS1.C Organization of Matter and Energy Flow in Organisms: Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. Plants acquire their material for growth chiefly from air and water. (4-LS1-1)

LS2.A Interdependent Relationships 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. (4-LS2-1)

LS2.C Ecosystem Dynamics, Functioning, and Resilience: When the environment changes in ways that affects 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. (4-LS2-1)

LS4.C Adaptation: For any particular environment, some kinds of organisms survive well, some survive

During the walk, students will be introduced to the Garden’s many habitats. They will be encouraged to observe the different characteristics found in each habitat and how the organisms within them are affected by these traits.

Students will learn that all living things are connected by a food web. Species of insects and invertebrates act as decomposers and break down nutrients from dead organisms and release it back into the soil. Plants uptake these nutrients and pass them to the animals that feed upon them. When these organisms die, their nutrients are returned to the soil through decomposers and the cycle begins again. Students will be prompted to think about what happens to the species within a habitat if one or multiple events cause the creek –or any environment –to change (e.g. fire, mudslides, deforestation). Questions, observations, discussion and investigation will lead students to the conclusion that –over time –some species would thrive in the new environment, others would suffer and some would completely disappear and because everything is interconnected, organisms that are not directly affected by the change may still experience indirect effects. As a result, ecosystems with greater biodiversity and more complex food webs are less likely to collapse if an organism disappears since they have other organisms supporting them.

Throughout their walk, students will observe how changes plants and animals make to their environment to survive (e.g. build nests, make burrows, overgrow landscapes) can inadvertently alter the ecosystem. Docents will prompt students to think of examples of any human activity that could dramatically change a landscape. Students will be reminded that animals – including humans –rely on plants for food and services (e.g. shelter, wood, oxygen) and without them our

less well, and some cannot survive at all. (4-LS4-1)

way of life would dramatically change.

LS4.D Biodiversity and Humans: Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (4-LS4-1)

ESS2.E Biogeology: Living things affect the physical characteristics of their regions. (4-ESS2-1)

Crosscutting Concepts (CCC)

Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.
- Patterns of change can be used to make predictions.
- Patterns can be used as evidence to support an explanation.

Cause and Effect: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.

- Cause and effect relationships are routinely identified, tested, and used to explain change.
- Events that occur together with regularity might or might not be a cause and effect relationship.

Energy & Matter: Energy can be transferred in various ways and between objects.

Structure & Function: The way an object is shaped or structured determines many of its properties and functions.

- Different materials have different substructures, which can sometimes be observed.
- Substructures have shapes and parts that serve functions.

Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are elements to consider and understand.

- Change is measured in terms of differences over time and may occur at different rates.

During the walk, students are reminded that life in an ecosystem is connected in a cycle. Energy and nutrients transfer through the food web as organisms consume one another and decomposers break their bodies down back into the soil. Students will be able to recognize the reemerging pattern that plants and animals depend on the health of their habitat to survive and that the demise of one species can lead to the fall of another.

As students observe that plant characteristics vary between different habitats and ecosystems, they will discover that environments can affect the physical traits of an organism in order to help them survive better within it. When a change happens in the habitat, some organisms may thrive in the new environment while others suffer.

- Some systems appear stable, but over long periods of time will eventually change.

Science & Engineering Practices (SEP)

Asking Questions and Defining Problems: Asking questions and defining problems in grades 3-5 builds from grades K-2 experiences and progresses to specifying qualitative relationships.

- Ask questions about what would happen if a variable is changed.
- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
- Use prior knowledge to describe problems that can be solved.

Planning and Carrying Out Investigations: Planning and carrying out investigations to answer questions or test solutions to problems in 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or designed solutions.

- Make observations and/or measurements to produce data to serve as the basis of evidence for an explanation of a phenomenon or test a designed solution.
- .Make predictions about what would happen if a variable changes.

Constructing Explanations and Designing Solutions: Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard).
- Use evidence (e.g. measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- Identify the evidence that supports particular points in an explanation.

Engaging in Argument from Evidence: Engaging in argument from evidence in 4-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed

During the walk, students are encouraged to ask questions about their surroundings and why things are occurring in nature. These inquiries will lead to observations and investigations in the pursuit of answering these questions. Afterwards, students will use their findings to describe patterns that reoccur throughout the Garden and make predictions on an explanation of a phenomenon.

After the tour, students will have the relevant evidence to support an argument and construct an account and model of how environments can affect organisms and vice versa.

world(s).

- Construct an argument with evidence, data, and/or a model

Performance Expectations (PE)

4-LS1-1 From Molecules to Organisms: Structures & Processes: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

On the walk, students will observe how each plant part serves one or more functions for the plant and that they are necessary for their survival. Depending on their habitat, these plant parts may have varying traits in order to help it survive better in its environment.

California's Environmental Principle(s) & Concept(s)

Principle I: The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

- **Concept a:** Goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.
- **Concept b:** Ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

Principle II: The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies.

- **Concept b:** Methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Principle III: 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.

On the walk students are encouraged to make assumptions based on their observations about how the health of the ecosystems within the Garden will affect the health of its plants and animals. Students will get to walk down Mission Creek and see how the animals within it rely on plants for food which, in turn, rely on the water and nutrients from the creek.

Students are shown through examples how the condition of an environment affects the organisms living in it. As students come to understand these changes in the environment can alter natural cycles and lead to the prosperity, hardship, and demise of different organisms they will be prompted to wonder if human practices ever alter habitats. By the end of the tour, students will realize that human changes to an environment can have just as much of an effect as natural alterations do. Students will be reminded how humans depend on plants, animals, and natural cycles for resources and food and that these changes will have consequences on our way of life.

CA CCSS, ELA/ELD & Math

SL4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

- Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

W.4.1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

W.4.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

During the tour, students are engaged through inquiry-based learning and encouraged to ask why something is a certain way. These questions will lead to group investigation and discussion towards the discovery of the reason.

After this program, students will have the relevant evidence to describe plants' external structures, how they relate to their survival, how and why these parts may change over time, how organisms are interconnected with themselves and their environment, and how humans rely on plants and natural systems in order to live.