Habitat Hike (3rd-5th) – Energy & Matter

Cross Cutting Concept (CCC): Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

The material below encompasses the Next Generation Science Standard components that may be covered in your students' tour. **Subsequent grade levels build off of the DCI's that they learned the previous year.**

Disciplinary Core Idea (DCI)	Relation to Program
3rd Grade	
LS1.C Organization of Matter and Energy Flow in Organisms: Animals and plants alike generally need to take in air and water, animals must take in food, and plants need light and minerals; anaerobic life, such as bacteria in the gut, functions without air. 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 and process matter they have formed to maintain their internal conditions. **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. Either way, they are "consumers." Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil for plants to use. 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.	*During the walk*, students are reminded that plants and animals need food – or energy – for their survival. This energy is obtained from their environment whether from the sun, plants, or other animals. As students explore this concept, they will discover that there are interdependent relationships between plant and animals. Students will observe the interconnectedness of nature and 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 reflect on what would happen to the food web if one or more of these species disappeared.
4th Grade	
LS2.B Cycles of Matter and Energy Transfer in Ecosystems: Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, water, and minerals from the environment and release waste and matter (gas, liquid, or solid) back into the environment.	*During the walk*, students will observe food webs in action. They will be reminded that not only energy and matter travels through this web, but nutrients as well before cycling back into the soil. Students will see that a healthy environment includes a variety of species that support the food web.

LS4.D Biodiversity and Humans: Scientists have identified and classified many plants and animals. Populations of organisms live in a variety of habitats, and change in those habitats affects the organisms living there. Humans, like all other organisms, obtain living and nonliving resources from their environment.	Changes in the environment can cause some organisms to die off. This can have large effects on the species that depended on them, creating a ripple effect through this intricate web of life. Humans not only influence the environment but are affected by these changes to the food web.

5th Grade

LS2.D Social Interactions and Group Behavior: Groups can be collections of equal individuals, hierarchies with dominant members, small families, groups of single or mixed gender, or groups composed of individuals similar in age. Some groups are stable over long periods of time; others are fluid with members moving in and out. Some groups assign specialized tasks to each member; in others, all members perform the same or a similar range of functions.	*During the walk*, students will observe various animal species throughout the Garden. Some live in groups with complex social hierarchies. Docents will prompt students to reflect on and discuss the advantages and disadvantages of each social dynamic.

Science & Engineering Practices (SEP)

Asking Questions and Defining Problems: Asking questions and defining problems in 3-5 builds on prior experiences and progresses to simple descriptive questions. **Planning and Carrying Out Investigations:** Planning and carrying out investigations to answer questions or test solutions to problems in 3-5 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide date to support explanations or design solutions. **Analyzing and Interpreting Data:** Analyzing data in 3-5 builds on prior experiences and progresses to collecting, recording, and sharing observations.	*During the walk,* students are encouraged to ask questions about their surroundings and why things are occurring in nature. Docents will lead several inquiry-based activities that will engage students in nature and inspire curiosity. These inquiries will lead to observations and investigations in the pursuit of answering these questions. Docents will aid students in their investigations to help them analyze their own findings.

Performance Expectations (PE)

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	*On the walk,* students will observe real-life examples of food webs. *After the walk,* they have the knowledge and experience to support development of this model.

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. **Principle II:** The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies. **Principle IV:** The exchange of matter between natural systems and human societies affects the long-term functioning of both.	*Throughout the walk,* students are prompted to describe how humans rely on plants to survive. By the end of the tour, they will not only have an understanding on what plants provide humans but that our survival and way of life could not continue without them. In this discussion, students learn that human actions influence the natural environment with both immediate and long-term effects. Through continual inquiry and observation, students will draw connections that humans, plants, and animals rely on natural systems to continue to exist.