Seasonal Focus Lab (3rd-5th) – Structure & Function

Cross Cutting Concept (CCC): The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

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.A Structure & Function: Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. **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.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. **LS3.A Inheritance of Traits:** Many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.	*During the walk*, students are reminded that –like animals –plants need food and water to survive and have specific parts (roots, stems, leaves, flowers) that help them obtain these needs in order to survive. Processing these needs takes resources so species rarely have frivolous traits or parts. Students will be introduced to the Garden's many habitats. They will be encouraged to think about the different characteristics associated with each habitat and what traits species need to survive in them. Docents will prompt students to reflect on what would happen to a habitat's species if its environment changed. Students are encouraged to observe, inquire, and investigate various plants and animals and note differences they notice between individuals. They will be led to discover that, like humans, individuals differ from one another – even their own parents. Docents will begin a discussion on how – while these changes may start off minor – over time there may be huge differences between individuals of the same species over several generations. These changes may lead to a shift in the individual's ability to survive in its current environment. *In the lab,* students have an opportunity to examine plant specimens up close, using microscopes, models, dissecting tools and their own senses. They will get a recap on what all living things need to survive and receive a new perspective on some of the vital plant parts.

4th Grade

LS3.B Variation of Traits: Offspring acquire a mix of traits from their biological parents. Different organisms vary in how they look and function because they have different inherited information. In each kind of organism there is variation in the traits themselves, and different kinds of organisms may have different versions of the trait. The environment also affects the traits that an organism develops – differences in where they grow or in the food they consume may cause organisms that are related to end up looking or behaving differently. **LS4.B Natural Selection:** Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.	*During the walk*, students are reminded that individuals inherit traits from their parents and that over multiple generations this can lead to major differences in the species. Students will examine relative species, note the environments they live in, and make observations on their different characteristics and how that affects their survival in their particular habitats. *In the lab,* 3rd grade description.

5th Grade

LS4.C Adaptation: Changes in an organism's habitat are sometimes beneficial to it and sometimes harmful. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. **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 environments.	*During the walk*, students are reminded that species can only thrive in locations where they can gather the needs they need to survive. Docents will prompt students to figure out what would happen to an individual if its environment changed. Students are reminded that humans, like all other species, rely on nature for our survival and that if the environment changes it is possible our availability of resources will also be affected. *In the lab,* 3rd grade description.

Science & Engineering Practices (SEP)

Asking Questions and Defining Problems: Asking questions and defining problems in K-2 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 K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide date to support explanations or design solutions.	*During the walk,* students are encouraged to ask questions about their surroundings and why things are occurring in nature. Docents will lead several exploration and 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.

Analyzing and Interpreting Data: Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.	

Performance Expectations (PE)

3-LS3-1: Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	*On the walk,* students will learn examples and evidence for species inheriting traits from their parents and that variation within a population exists for both plants and animals. *In the lab,* students will discuss reproduction and learn the functions of various plant parts that aid in survival and increase the likelihood of passing an individual's genes on to the next generation. *After the walk,* they will have the knowledge and experience to support their argument that traits are inherited.

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.	*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. Through continual inquiry and observation, students will draw connections that humans, plants, and animals rely on natural systems to continue to exist.