Marine Science Institute: Kindergarten Shoreside

(***Stations available:*** *Plankton, Sharks, Fish, Benthic Invertebrates, Hydrology, Marine Mammals*)
(***Themes:*** *Human Impact, Food Web, Adaptations, Biodiversity and Endangered Species, Scientific Method*)
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K-LS1 From Molecules to Organisms: Structures and Processes

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

SEP Use observations to describe patterns in the natural world in order to answer scientific questions.

- Students observe marine organisms moving.
- Students observe organism shape, color, size, texture etc.
- Students observe where different organisms live.
- Students discuss at each station what the organisms consume to survive (Theme: **Food Web**)

LS1.C All animals need food in order to live and grow. They obtain food from plants or from other animals. Plants need water and light to live and grow.

- Students discuss at each station what the organisms consume to survive. (Theme: **Food Web**)
- Students discuss plants that photosynthesize. (Station: **Plankton**)
- Students observe marine animals, mouths, and bodies.

CCC Patterns in the natural and human designed world can be observed as used as evidence

- Students observe patterns in the needs of living things.
- Students observe patterns in animal behavior.
- Students observe physical patterns in animals and plankton (eyes, ears, mouth, etc.)

K-ESS2 Earth's Systems

K-ESS-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

SEP Use observations to describe patterns in the natural world in order to answer scientific questions.

- Students observe San Francisco Bay organisms moving.
- Students observe organisms shape, color, size, texture etc.

SEP Look for Patterns and order when making observations about the world.

- Students observe organisms and habitats within the San Francisco Bay.
- Students observe the structures and functions of animal's adaptations. (Theme: **Adaptations**)

ESS2.D Weather and Climate: Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time.

- Students discuss how rain and freshwater input affects the salinity of the San Francisco Bay.
- Students observe the temperature of the water by feeling the water that the animals inhabit.

ESS2.E Biogeology: Plants and animals can change their environment.

- Students discuss how plats get energy from the sun, and where we get oxygen from. (Theme: **Plankton**)
- Students discuss organisms that affect their environment (Theme: **Endangered Species and Biodiversity, Human Impact**)
- Students discuss the functions of animals within their habitats (example: invertebrates dig into mud for their habitat).

ESS3.C Human Impacts on Earth Systems: Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

- Students discuss pollution in the San Francisco Bay. (Theme: **Human Impact**)
- Students discuss the effects of non-native organisms. (Theme: **Human Impact, Endangered Species and Biodiversity**)
- Students discuss stresses on San Francisco Bay animals (example: trash from lunches). (Theme: **Human Impact**)
- Students discuss what they can do to help the animals and their habitat.

CCC Patterns in the natural and human designed world can be observed as used as evidence

- Students observe patterns in the needs of living things.
- Students observe patterns in animal behavior. (Theme: **Adaptations**)
- Students observe physical patterns in animals (eyes, ears, mouth, etc.).

CCC Systems in the natural and designed world have parts that work together.

- Students observe/discuss the San Francisco Bay habitat.
- Students observe food web system in the San Francisco Bay. (Theme: **Food Web**)
- Students observe how different organisms bodies function. (Theme: **Adaptations**)

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K-ESS3 Earth and Human Activity

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

SEP Ask questions based on observations to find more information about the designed world.

- Students observe San Francisco Bay animals moving. Questions include: how do animals move, what are the adaptations of the organisms, why do they have those adaptations, how do they eat, etc. (Theme: **Adaptations, Food Web**)
- Students observe animals shape, color, size, texture etc.

SEP Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, storyboard) that represent concrete events or design solutions.

- Student observe a poster San Francisco Bay Estuary and it's components.

ESS3.A Natural Resources**:** Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

- Students observe the animals living in the water and discuss how animals survive in their habitat.

ESS3.C Human Impacts on Earth Systems: Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

- Students discuss pollution in the Estuary (trash in the water). (Theme: **Human Impact**)
- Students discuss stresses on animals in the San Francisco Bay (example: humans overfishing). (Theme: **Human Impact**)
- Students discuss what they can do to help the animals and their habitat.

ETS1.A: Defining and Delimiting an Engineering Problem: Asking questions, making observations, and gathering information are helpful in thinking about problems.

- Students ask questions about San Francisco Bay organisms.
- Students are asked questions about organisms in the Estuary.
- Students learn to inquire about what they see by observing and asking questions.

CCC Systems in the natural and designed world have parts that work together.

- Students observe the food web system of the San Francisco Bay. (Theme: **Food Web**)
- Students observe/discuss the San Francisco Bay habitat.
- Students observe how different organisms bodies function. (Theme: **Adaptations**)

CCC People encounter questions about the natural world every day.

- Students ask questions about the Estuary and the organisms that live in it.
- Students are asked questions about Estuary and the organisms that live in it.
- Students learn to inquire about what they see by observing and asking questions.

K-PS2 Motion and Stability

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object

SEP With guidance, plan and conduct an investigation with peers

- Students use a mud grab by pulling and pushing a rope connected to the device in order to collect mud sample. (Station: **Benthic**)
- Students use a seine net by pulling ropes connect to the net to collect a fish sample. (Station: **Fish**)
- Students use a plankton net to collect plankton from the San Francisco Bay, and then observe the plankton underneath a microscope. (Station: **Plankton**)
- Students investigate all samples collected.

SEP Scientist use different ways to study the world

- Students use a mud grab by pulling and pushing a rope connected to the device in order to collect mud sample. (Station: **Benthic**)
- Students use a seine net by pulling ropes connect to the net to collect a fish sample. (Station: **Fish**)
- Students use a plankton net to collect plankton from the San Francisco Bay, and then observe the plankton underneath a microscope. (Station: **Plankton**)

PS2.A Pushes and Pulls can have different strengths and directions

- Students use a mud grab by pulling and pushing a rope connected to the device in order to collect mud sample. (Station: **Benthic**)
- Students use a seine net by pulling ropes connect to the net to collect a fish sample. (Station: **Fish**)
- Students use a plankton net to collect plankton from the San Francisco Bay, and then observe the plankton underneath a microscope. (Station: **Plankton**)

CCC Simple tests can be designed to gather evidence or refute student ideas about causes

- Students use a mud grab by pulling and pushing a rope connected to the device in order to collect mud sample. (Station: **Benthic**)
- Students use a seine net by pulling ropes connect to the net to collect a fish sample. (Station: **Fish**)
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K-PS3 Energy

K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface

SEP Make observations (firsthand or from media) to collect data that can be used to make comparisons.

- Students observe phytoplankton (who use the sun to photosynthesize) compared to zoo plankton. (Station: **Plankton**)

PS3.B Conservation of Energy and Energy Transfer: Sunlight warms Earth's surface.

- Students observe a San Francisco Bay Estuary poster, and discuss how shallow water in the Bay is warmer than deeper waters in the Pacific Ocean.

CCC Cause and Effect: Events have causes that generate observable patterns.

- Students observe Estuary poster, and discuss estuary habitats and its influences.

K-2 Engineering Design

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

SEP Ask questions based on observations to find more information about the natural and/or designed world(s).

- Students ask questions about the San Francisco Bay.
- Students are asked questions about the San Francisco Bay
- Students learn to inquire about what they see by observing and asking questions.

ETS1.A Defining and Delimiting Engineering Problems: Asking questions, making observations, and gathering information are helpful in thinking about problems.

- Students observe Estuary and posters and discuss how organisms survive.
- Students observe animals living in water and discuss how animals survive in their habitat (shape, size, adaptations).
- Students ask questions about the San Francisco Bay.
- Students are asked questions about the San Francisco Bay.
- Students learn to inquire about what they see by observing and asking questions.

CCC Structure and Function: The shape and stability of structures of natural and designed objects are related to their function(s).

- Students observe Estuary poster (system) and discuss what the effects the habitat.
- Students observe organisms living in water and discuss how organisms survive in their habitat (shape, size, adaptations).