

Ocean Adventures: K-8th

- Students learn scientific facts about the wildlife of the ocean and make observations of taxidermy, bio-facts, and photos to describe and compare patterns and answer questions about the natural world.
- Students will be able to describe and identify different habitats in the Ocean ecosystem.
- Students will learn to describe and identify the challenges and threats wildlife face in their habitats.
- Students learn about what animals need in their habitats and how their specific body parts and behaviors (*adaptations*) help them survive in their habitats.
- Students learn about human impact on the environment and share ideas of how we can have a positive impact and help wildlife.

Grade	NGSS Disciplinary Core Idea	Examples
K	<p>LS1.C: Organization for Matter and Energy Flow in Organisms - All animals need food in order to live and grow. They obtain their food from plants or from other animals. (K-LS1-1)</p> <p>ESS2.E: Biogeology - Animals can change their environment. (K-ESS2-2)</p> <p>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. (K-ESS3-3)</p>	<p>LS1.C: <i>Students are introduced to the relationship between predator and prey and the complex oceanic food web.</i></p> <p>ESS2.E: <i>Students learn how Sea Otters play an important role in keeping kelp forests healthy. They are a keystone species that consume sea urchins which prevents urchins from over consuming the kelp.</i></p> <p>ESS3.C: <i>Students learn how to help protect</i></p>

	<p>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. (K-ESS3-1)</p>	<p><i>oceanic ecosystems through individual choices like keeping pollution out of storm drains that lead to the ocean.</i></p> <p>ESS3.A: <i>Students learn how being mindful of water use is important to protecting the waters of the world.</i></p>
<p>1st</p>	<p>LS1.A: Structure and Function - All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. (1-LS1-1)</p> <p>LS1.B: Growth and Development of Organisms - Adult animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-1)</p> <p>LS1.D: Information Processing - Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive.</p> <p>LS3.A: Inheritance of Traits - Young animals are very much, but not exactly, like their parents. (1-LS3-1).</p>	<p>LS1.A: <i>Students learn that Brown Pelicans have adapted to have a large pouch that can hold up to 3 gallons of water when scooping up fish.</i></p> <p>LS1.B: <i>Students learn how Sea Otters wrap their young in kelp to keep them hidden from predators when they leave to hunt.</i></p> <p>LS1.D: <i>Students learn that sea stars have hundreds of sticky tube feet to move, grasp prey, and feel.</i></p> <p>LS3.A: <i>Students learn that sea turtles are born able to find their own food without much parental care and look like small versions of adult sea turtles.</i></p>
<p>2nd</p>	<p>LS4.D: Biodiversity and Humans - There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1)</p>	<p>LS4.D: <i>Students learn about a variety of oceanic wildlife like pelicans, otters, sea turtles, seals, whales, and sharks.</i></p>

<p>3rd</p>	<p>LS1.B: Growth and Development of Organisms - Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)</p> <p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience - 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. (secondary to 3-LS4-4)</p> <p>LS2.D: Social Interactions and Group Behavior - Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. (Note: Moved from K-2.) (3-LS2-1)</p> <p>LS3.A: Inheritance of Traits - Many characteristics of organisms are inherited from their parents. (3-LS3-1) Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)</p> <p>LS3.B: Variation of Traits - Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) The environment also affects the traits that an organism develops. (3-LS3-2)</p> <p>LS4.B: Natural Selection - Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)</p> <p>LS4.C: Adaptation - For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)</p> <p>LS4.D: Biodiversity and Humans - Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)</p>	<p>LS1.B: <i>Students learn about how Leopard Sharks hatch their eggs internally and give live birth; they are ovoviparous.</i></p> <p>LS2.C: <i>Students learn about the resilience of tide pool organisms to live under a variety of wetness, salinity, and wave conditions.</i></p> <p>LS2.D: <i>Students learn how Sea Otters live in groups to help protect themselves from predators.</i></p> <p>LS3.A: <i>Students learn how sea turtle eggs hatch different numbers of male and female offspring dependent on external temperature during development.</i></p> <p>LS3.B: <i>Students learn that sea stars have adapted to have hundreds of sticky tube feet to move and grasp prey. This also helps them hold on to rocks as the tides come in and out in their environment.</i></p> <p>LS4.B: <i>Students learn about the behavioral and physical adaptations that help seals to stay warm; seals with more blubber are more likely to survive than seals who have less.</i></p> <p>LS4.C: <i>Students learn how Leopard Sharks use their patterned skin to camouflage on the seafloor.</i></p> <p>LS4.D: <i>Students learn how human alterations to habitats have caused animals like gulls to have diets that include food they would never eat in the wild.</i></p>
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4th	<p>LS1.A: Structure and Function - Animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)</p> <p>LS1.D: Information Processing - Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)</p> <p>ESS2.E: Biogeology - Living things affect the physical characteristics of their regions. (4-ESS2-2)</p>	<p>LS1.A: <i>Students learn how some birds like sandpipers have specially adapted beaks to eat their prey.</i></p> <p>LS1.A: <i>Students learn how barnacles have adapted to have a strong exoskeleton for protection.</i></p> <p>LS1.D: <i>Students learn how Leopard Sharks use electroreceptors in their snouts to detect prey buried on the seafloor.</i></p> <p>ESS2.E: <i>Students learn how Sea Otters keep kelp forests thriving by controlling the population of sea urchins that eat the kelp.</i></p>
5th	<p>PS3.D: Energy in Chemical Processes and Everyday Life - The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)</p> <p>LS1.C: Organization for 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. (secondary to 5-PS3-1)</p> <p>LS2.A: Interdependent Relationships in Ecosystems - 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</p>	<p>PS3.D: <i>Students learn how energy moves in the oceanic food web starting with phytoplankton.</i></p> <p>LS1.C: <i>Students learn how Sea Otters use rocks as tools to help them eat hard shelled prey. Otters need to eat a large amount of prey, about 25% of their body weight, each day to meet their energy requirements and keep warm.</i></p> <p>LS2.A: <i>Students learn about predator prey relationships in the ecosystem and how complex the oceanic food web is.</i></p> <p>LS2.B: <i>Students learn how taking shells from</i></p>

	<p>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. (5-LS2-1)</p> <p>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 gasses, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)</p> <p>ESS3.C: Human Impacts on Earth Systems - Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)</p>	<p><i>the beach can negatively impact many organisms that rely on the breakdown of the shells to release calcium back into the ecosystem.</i></p> <p>LS2.B: <i>Students learn how “marine snow” cycles the nutrients in the ecosystem from the surface to the deep waters.</i></p> <p>ESS3.C: <i>Students learn how some organisms like Brown Pelicans once faced extinction from the use of DDT and now have rebounded due to laws passed to protect them.</i></p> <p>ESS3.C <i>Students learn how human garbage has a large impact on oceanic creatures like sea turtles who mistake plastic bags for jellyfish in the ocean.</i></p>
6th-8th	<p>LS1.B: Growth and Development of Organisms - Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)</p> <p>LS2.A: Interdependent Relationships in Ecosystems - Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)</p> <p>In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1). Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)</p> <p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems - Food webs demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic</p>	<p>LS1.B <i>Students learn about how Leopard Sharks hatch their eggs internally and give live birth; they are ovoviviparous. This makes it less likely their eggs will be consumed before they hatch.</i></p> <p>LS2.A <i>Students learn how barnacles that live on whales rely on the whales moving through nutrient rich waters to survive.</i></p> <p>LS2.B <i>Students learn how “marine snow” and upwelling help cycle nutrients in the ocean.</i></p> <p>LS2.C <i>Students learn about the variety of adaptations of tide pool organisms to live under a variety of wetness, salinity, and wave conditions.</i></p>

environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-1)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience - Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)

Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-4)

LS4.C: Adaptation - Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. (MS-LS1-4)

ESS3.C: Human Impacts on Earth Systems - Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)

LS2.C *Students learn about the biodiversity of different oceanic habitats and how it contributes to the food web complexity.*

LS4.C *Students learn how Leopard Sharks have adapted to have camouflage on the seafloor to stay safe from predators that may be lurking above.*

LS4.C *Students learn how pinnipeds are threatened by disturbances that force them back into the water while hauling out.*

ESS3.C: *Students learn how rising sea levels are destroying the habitats of creatures like sandpipers that primarily feed on mole crabs at the confluence of the ocean and sand.*