# Marvelous Mammals: K-8th

- Students learn scientific facts about mammals 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 the characteristics and features of the vertebrate class mammals.
- 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 |
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| **K** | **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)<br>**ESS2.E: Biogeology -** Animals can change their environment. (K-ESS2-2)<br>**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) | **LS1.C:** *Students are introduced to the concept of carnivores, omnivores, and herbivores and their relationships in the food web.*<br><br>**ESS2.E:** *Students learn about how some animals like beavers can change the ecosystem around them.* |

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| | **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) | **ESS3.A:** *Students learn that living things all have different habitats to best suit each of their needs.*<br><br>*Students learn how different mammals have different habitats that have to have food, water, shelter, and space just like humans need in their homes.* |
| **1st** | **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)<br>**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)<br>**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.<br>**LS3.A: Inheritance of Traits** - Young animals are very much, but not exactly, like their parents. (1- LS3-1). | **LS1.A:** *Students learn that nocturnal animals like bats use echolocation to help them navigate in the dark, they have larger ears than their bat counterparts that use sight.*<br><br>**LS1.B:** *Students learn that opossums spend their first weeks of life developing in a pouch and later go on to ride on the back of their mother to stay safe from predators and stay together.*<br><br>**LS1.D:** *Students learn how some mammals like raccoons have eyes adapted to see in the dark because they are nocturnal.*<br><br>**LS3.A:** *Students learn how prey animals like fawns stay safe from predators. Fawns have spots that they do not retain as adults that help them to camouflage.* |
| **2nd** | **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) | **LS4.D:** *Students learn about a variety of California's native wildlife like opossums, deer, skunks, and otters.* |

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| | **LS2.A: Interdependent Relationships in Ecosystems -** Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) | **LS2.A:** *Students learn about how deer can carry seeds from their diet and spread them when they defecate.* |
| **3rd** | **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)<br>**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)<br>**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)<br>**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)<br>**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)<br>**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)<br>**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)<br>**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) | **LS1.B:** *Students learn about how mammals feed their young through nursing.*<br><br>**LS2.C:** *Students learn how some invasive species can thrive in locations where habitat degradation is threatening native wildlife.*<br><br>**LS2.D:** *Students learn that sea Otters will hold hands in the ocean to stay together as a group.*<br><br>**LS3.A:** *Students learn how the Virginia Opossum keeps its young in a pouch and later allows its young to travel on its back to stay safe from predators.*<br><br>**LS3.B:** *Students learn how only Long-tailed Weasels in the northern parts of their ranges develop a white coat because there is snow in their habitats.*<br><br>**LS4.B:** *Students learn how Long-tailed Weasels have a white coat in the winter to help them camouflage in the snow. This evolved over time through natural selection, weasels that can camouflage better are more likely to survive.* |

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| | | **LS4.C:** *Students learn how Sea Otters have adapted to have thick, double layered fur to keep them warm in the cold Pacific.*<br><br>**LS4.D:** *Students learn how human alterations to habitats have caused animals like racoons, skunks, and opossums to have diets that include food they would never eat in the wild.* |
| **4th** | **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)<br>**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)<br>**ESS2.E: Biogeology -** Living things affect the physical characteristics of their regions. (4-ESS2-2) | **LS1.A:** *Students learn how Long-tailed Weasels have adapted to have a white coat in the winter to be able to camouflage in the snow.*<br><br>**LS1.D:** *Students learn how fawns hide from predators and have no scent to help increase their chances of surviving infancy.*<br><br>**LS1.D:** *Students learn how bats that use echolocation have larger ears than bats that use their sight.*<br><br>**ESS2.E:** *Students learn how Sea Otter populations control sea urchin populations which keeps the robust kelp forests growing.* |
| **5th** | **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) | **PS3.D:** *Students learn about herbivores, carnivores, and omnivores and how their interconnected relationship creates the food web of an environment.* |

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| | **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)<br>**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 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)<br>**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)<br>**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) | **LS1.C:** *Students learn how Sea Otters are voracious predators and need to eat up to 25% of their body weight in a day to survive in the cold oceans.*<br><br>**LS2.A:** *Students learn how some squirrels depend on deer antler sheds to chew on to help maintain their teeth.*<br><br>**LS2.B:** *Students learn how different mammals are connected to one another in the food web by predator/prey relationships.*<br><br>**ESS3.C:** *Students learn how human garbage has a large impact on creatures like racoons who often rely on garbage as a food source rather than their natural diet. They cannot get the nutrients and energy they need from human garbage alone.*<br><br>**ESS3.C:** *Students will learn ways they can help support wildlife at home and in their communities.* |
| **6th-8th** | **LS1.B: Growth and Development of Organisms -** Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)<br>**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)<br>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 | **LS1.B:***Students learn how bucks have antlers that they use to compete for mates.*<br><br>**LS2.A:** *Students learn the interconnected nature of some California food webs. Animals like coyotes and bobcats feed on similar foods and may compete in areas with a lack of resources.* |

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| | 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)<br>**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 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)<br>**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)<br>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)<br>**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)<br>**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.B:** *Students learn how some squirrels depend on deer antler sheds to chew on to help maintain their teeth.*<br><br>**LS2.C:** *Students learn how animals like badgers need a great deal of open ecosystem space to survive. Lots of their habitats are used for human developments.*<br><br>**LS4.C:** *Students learn how Sea Otters have adapted to have thick, double layered fur to keep them warm in the cold Pacific.*<br><br>**LS4.C:** *Students learn about the adaptations Mule Deer have to keep their young safe including camouflage and being odorless.*<br><br>**ESS3.C:** *Students learn about the threats facing various animals that come from human influences as well as the benefits to some animals.*<br><br>**ESS3.C:** *Students learn how animals within ecosystems altered by human influence will behave differently to adapt to the new conditions.* |