Birds of a Feather: K-8th

- Students learn scientific facts about birds 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 birds.
- 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	**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) **ESS2.E: Biogeology -** Animals can change their environment. (K-ESS2-2) **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) **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)	**LS1.C:** *Students learn how different birds need very different types of food and the interrelated concepts of carnivore, omnivore, and herbivore.* **ESS2.E:** *Students learn how birds can spread the seeds of plants they eat. This can change what plants grow where in a particular environment.* **ESS3.C:** *Students learn that Common Murres had eggs that were highly sought after for protein during the gold rush, severely diminishing their*

		populations. Murre populations have not returned to their pre-gold rush numbers. **ESS3.A:** *Students learn that birds like the Red winged Blackbird nest in wetlands, a dwindling habitat.*
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) **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) **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. **LS3.A: Inheritance of Traits** - Young animals are very much, but not exactly, like their parents. (1-LS3-1).	**LS1.A:** *Students learn that birds like owls and ospreys have specialized feet to help grip their prey.* **LS1.B:** *Students learn that birds can make a variety of nests to help raise their young.* **LS1.D:** *Students learn how Turkey Vultures have adapted to have an excellent sense of smell to better find their prey and a larger olfactory part of the brian to better identify scents.* **LS3.A:** *Students learn how some baby birds are more likely to be drab to blend in with their nests and camouflage from predators.*
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) **LS2.A: Interdependent Relationships in Ecosystems -** Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)	**LS4.D:** *Students learn about a variety of California's native birds like egrets, ravens, grebes, owls, vultures, and hummingbirds and the habitats they inhabit.* **LS2.A:** *Students learn how Anna's Hummingbirds are important pollinators for some flowers.*
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)	**LS1.B:** *Students learn how birds like grebes participate in complex mating dances to attract a mate.*

	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) **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) **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) **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) **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) **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) **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)	**LS2.C:** *Students learn about how some birds migrate to different locations seasonally to find food, mate, or escape adverse weather conditions.* **LS2.D:** *Students learn how California Quail live in groups and utilize a "lookout" to help protect themselves from predators.* **LS3.A:** *Students learn how Northern Flickers from different regions can have different colored feather shafts that correspond to their diet.* **LS3.B:** *Students learn about the many adaptations California wildlife have to survive including how some birds have waterproof feathers to keep them dry. Other birds that live in habitats without much water do not have waterproof feathers.* **LS4.B:** *Students learn that some species of male birds are very colorful and sometimes perform complex mating rituals to help them attract mates. Some males are more successful than others.* **LS4.C:** *Students learn how Turkey Vultures have adapted to have an excellent sense of smell to better find their prey.* **LS4.D:** *Students learn how human alterations to habitats have caused birds like gulls and ducks 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)	**LS1.A:** *Students learn that birds have specialized beaks for finding food in their habitats.*

	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) **ESS2.E: Biogeology -** Living things affect the physical characteristics of their regions. (4-ESS2-2)	**LS1.D:** *Students learn how owls have very large eyes to help them let in the most amount of light possible to better hunt their prey.* **ESS2.E:** *Students learn how birds can spread the seeds of plants they eat. This can change what plants grow where in a particular environment.*
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) **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) **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) **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) **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)	**PS3.D:** *Students learn how different birds need very different types of food and the interrelated concepts of carnivore, omnivore, and herbivore.* **LS1.C:** *Students learn how birds need to eat more food during migration to keep up with energetic demands.* **LS2.A:** *Students learn how clear cutting and fragmentation of Redwood Forests has impacted the Spotted Owl who now has very little Old Growth Redwood Forest to live in. The Barred Owl has moved in to occupy some of those areas as it is more adaptable to open spaces and damaged habitats.* **LS2.B:** *Students learn how owls do not digest some parts of their prey like bones, feathers, and fur. Instead, they regurgitate a pellet of indigestible materials.* **ESS3.C:** *Students learn how Brown Pelican populations were impacted by the usage of the pesticide DDT.*

6th-8th	**LS1.B: Growth and Development of Organisms -** Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) **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) 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) **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) **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)	**LS1.B:** *Students learn how some birds have sexual dimorphism, where males and females look distinct from one another. Some birds use bright feathers or mating dances to attract mates.* **LS2.A:** *Students learn how in areas that are facing deforestation and habitat loss the Barred Owl can outcompete the spotted Owl for food sources.* **LS2.B:** *Students learn how scavengers like Turkey Vultures play an important role in the ecosystem by recycling nutrients and removing dead organisms that can cause illness and disease.* **LS2.C:** *Students learn how rising sea levels are impacting shorebirds like sandpipers that rely on sandy beaches to find their prey. Rising sea levels additionally impact the food sandpipers seek, small crustaceans along the shore are impacted by this habitat loss as well.* **LS4.C:** *Students learn how murres have adapted to have eggs that when disturbed tend to rotate in a circle to help prevent eggs from falling off the edges of cliffs where they nest.* **ESS3.C:** *Students learn about the threats facing various birds that come from human influences as well as the benefits to some birds like crows and ravens.* **ESS3.C:** *Students learn about how some birds like the Brown Pelican were once more threatened by human influence and have since recovered.*

	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)	