

# 8<sup>th</sup> Grade Science

## Human Brain & Senses

### The Students will be able to:

- Discover their own best strategies for memorizing and learning, after being exposed to a wide range of learning strategies.
- Become familiar with the external and internal structures of the mammalian eye and consider the function of the various components.
- Investigate the properties of lenses and how these properties affect the function of their own eyes.
- Investigate the structure and function of the retina.
- Understand the structure, orientation, and function of the brain, using the connection between the eyes and the brain as a starting point.
- Understand the role of the brain in creating meaning out of the sensory signals it receives.
- Compare the structures and functions of the touch system to the visual system.
- Explore neurotransmission and the structures that support the process.
- Acquire vocabulary concerning these concepts: structure, function, perception, stimulus, response, learning, neurotransmission.
- Exercise language, social studies, and math skills in the context of science.
- Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, relating, and inferring.

## Overview of Human Brain & Senses

Instructional Objectives	Subject Matter Content	Standards	Activities
<p><b>Learning &amp; Memory:</b>Students investigate learning by trying to learn mirror writing. They test their ability to memorize a set of objects using various single and complex input modes- hearing, seeing, hearing and seeing, etc. They explore mnemonics to enhance memory.</p>	<p>Learning is a skill enhanced by repetition</p> <p>The sensory input that results in the most effective memory retention is different for different people</p> <p>Memory is enhanced by firsthand experience and associations</p>	<p><a href="#">5.1 Scientific Processes</a></p> <p><a href="#">5.2 Science and Society</a></p> <p><a href="#">5.4 Nature and Process of Technology</a></p> <p><a href="#">5.5 Life Science</a></p>	<p>Mirror writing as a way of training the brain to learn something new</p> <p>Accident Report</p> <p>Memory Tests to discover learning style</p> <p>Creating Mnemonics &amp; Associations</p> <p>Read &amp; view clips of “Helen Keller- The Miracle Worker”</p>
<p><b>Eyes: Inside &amp; Out:</b></p> <p>Students study the external and internal structures of the eye. They inspect their own eyes and that of their partner. They study the pupil’s response to light. They study the internal structures by performing a cow eye dissection.</p>	<p>The mammalian eye has predictable parts, like cornea, iris, pupil, lens, optic nerve, retina, and sclera.</p> <p>The cornea bulges out from the surface of the eye</p> <p>The pupil is an opening into the eye that changes size in response to light</p>	<p><a href="#">5.1 Scientific Processes</a></p> <p><a href="#">5.2 Science and Society</a></p> <p><a href="#">5.4 Nature and Process of Technology</a></p> <p><a href="#">5.5 Life Science</a></p>	<p><a href="#">Cow eye dissection website</a>, <a href="#">Foss Brain &amp; Senses</a> to diagram structure and function of the eye</p> <p>Investigate the pupil to discover if it is a hole or a dot.</p> <p>Cow eye dissection- virtual and real</p>

<p><b>Lenses:</b></p> <p>Students investigate the lens found in the eye. They examine different lenses (water, marbles, and commercial lenses) to discover the characteristics of lenses. Students then learn about how light travels and how lenses refract light. Students then learn about how convex and concave lenses are used to correct vision problems.</p>	<p>Lenses bend (refract) light; lenses with greater curvature bend light more</p> <p>Lenses can project images on screens and retinas</p> <p>The cornea and lens in the eye are convex lenses</p> <p>The number and shape of lenses affect where the image will focus</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Investigate objects and materials to determine lens characteristics</p> <p>Conduct experiments with lenses</p> <p>Discover the relationship between lens curvature and image focus distance</p> <p>Explain how the model eye is like a real eye</p>
<p><b>Retina:</b></p> <p>Students investigate the quality of vision in their field of vision. They observe motion, color, and detail regions, as well as the blind spot in each eye. They learn about photoreceptors and attribute visual variation to the rods and cones.</p>	<p>A receptor cell responds to a stimulus and sends an electric message to the brain</p> <p>Photoreceptors (rods and cones in the retina) are sensitive to different aspects of light. Rods function in dim light and cones in bright light.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Collect, organize, analyze data dealing with peripheral vision and field of view</p> <p>Relate retina structure to visual function</p> <p>Use mathematics to explain the blindspot on the retina</p>

<p><b>Into the Brain:</b></p> <p>Students study MRI images to determine the connection between the eye and the brain. They construct a model brain to explore the major structures and orientation.</p>	<p>The brain has three major parts</p> <p>The blind spot can be used to locate a connection of the optic nerve</p> <p>An MRI is a cross section picture showing the structure of the part of the body</p> <p>An EEG is an image of the electric activity on the surface of the brain.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Create a Letterhead to simulate an MRI analysis</p> <p><a href="#"><u>Nervous System Scavenger Hunt</u></a> to explore the Nervous system</p> <p><a href="#"><u>Teenage Brain Packet</u></a> to discover how the teenage brain differs from the adult brain</p> <p>Creating Brain Boxes: lobes of the brain, parts of the brain</p> <p>EEG Analysis</p> <p>The Storm Within: Video- Explore Nervous System Disorders</p>
<p><b>Sending a Message:</b></p> <p>Students test their reaction time to a visual stimulus. They are introduced to the neuron as the basic cell of the nervous system, and to the transmission of messages from neuron the neuron</p>	<p>Neurons are cells that convey messages to and from the brain</p> <p>Sensory neurons carry messages from the sense organs to the brain, Interneurons process information, and Motor neurons carry messages from the brain to the body.</p> <p>Messages travel through neurons as electricity and from neuron to neuron via neurotransmitter chemicals.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Reaction Timer Investigation- conduct experiments, organize data, and draw conclusion</p> <p>Sending a Message Investigation: relate a simulation to the functioning of the nervous system</p>

# Diversity of Life

## The Students will be able to:

- Consider characteristics that are common to all living organisms and develop an operational definition of life.
- Become familiar with the microscope as a tool used by scientists to study organisms in detail.
- Discover cells and begin to understand their importance as the basic units of life.
- Appreciate the diversity of cells that contribute to the diversity of life on Earth.
- Observe and describe the first developmental stages of a plant and recognize that seeds are living organisms in a dormant state.
- Conduct investigations to understand how the vascular system transports water throughout a plant and how stomates on leaves regulate the rate of water flow through a plant.
- Investigate the reproductive systems in flowers to understand the origin of seeds and explore plant adaptations for seed dispersal.
- Observe and analyze snail structures and behaviors in order to set up a secure and supportive habitat for them.
- Explore the concept of adaptation by studying the structures and behaviors of an insect, relating those adaptations to the roach's natural history and habitat.
- Explore the Monera (bacteria), Protista (algae), and Fungi kingdoms to understand their roles in the scheme of life.
- Become familiar with and acquire vocabulary concerning these concepts: cell, tissue, organism, structure, function, behavior, adaptation, system interaction, transpiration, development.
- Exercise language, social studies, and math skills in the context of science.
- Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, relating, and inferring.

# Overview of Diversity of Life

<b>Instructional Objectives</b>	<b>Subject Matter Content</b>	<b>Standards</b>	<b>Activities</b>
<p><b>What is life?:</b></p> <p>Students think about characteristics that are common to all living organisms to develop an operational definition of life that will be used throughout the course.</p>	<p>Any free- living thing- a plant, animal, or other is an organism</p> <p>All living organisms exhibit common characteristics; they grow, consume nutrients, exchange gases, respond to stimuli, reproduce, need water, eliminate waste, have a lifespan</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Categorize pictures of objects and organisms into living and nonliving</p> <p>Investigate unknown materials by placing them in aquatic environments and observing them for evidence of life the analyze the data generated</p>
<p><b>Introduction to the Microscope:</b></p> <p>Students develop their skills with a piece of scientific technology. They use a microscope to observe and study microorganisms.</p>	<p>Optical power is the product of the magnification of the eyepiece and the objective lens.</p> <p>A microscope image appears reversed and inverted.</p> <p>Focal plane is a thin plane at a fixed distance from the objective lens where the image is focused.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Use the microscope to study layers in a sample and structures of brine shrimp</p> <p>Draw scale representations of images seen in a microscope to estimate size accurately</p> <p>Explain how focal plane affects the image seen through a microscope</p>

<p><b>Microscopic Life:</b></p> <p>Students discover cells and begin to understand their importance as basic units of life. Elodea and Paramecium are studied in depth, and students search for other microorganisms in pond water.</p>	<p>The cell is the basic unit of life.</p> <p>Cells have the same needs and perform the same functions as more complex organisms.</p> <p>Paramecia have structures that have certain functions</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Observe single- celled microorganisms with a microscope and investigate structure- function relationships</p> <p>Generate evidence to support the idea that Paramecium are organisms</p> <p>Compare microorganisms: Ciliates, Flagellates, Amoeba</p>
<p><b>The Ribbon of Life:</b></p> <p>Students become familiar with biological structures and functions at different levels of organization: cells. Organs, tissues, organ systems, and whole organisms.</p>	<p>Humans and all other complex life forms, are made of cells.</p> <p>Cells have defining structures, such as membranes, cell walls, nuclei, chloroplasts, ribosomes, mitochondria, and cytoplasm</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Compare structure and function of cells from different organisms</p> <p>Relate the structure and function of cells, tissues, organs, systems, organisms</p> <p>Create a animal and plant cell model depicting the structures and functions of the organelles</p>

<p><b>Seeds of Life:</b></p> <p>Students recognize that seeds are living organisms in a dormant state. They observe and describe the first development stages of a plant.</p>	<p>Seeds contain the dormant. Living embryo of a plant</p> <p>Germination is the onset of growth and differentiation in plant seeds</p> <p>The cotyledon is the primary source of energy for seed germination</p>	<p><a href="#">5.1 Scientific Processes</a></p> <p><a href="#">5.2 Science and Society</a></p> <p><a href="#">5.4 Nature and Process of Technology</a></p> <p><a href="#">5.5 Life Science</a></p>	<p>Dissect seeds to discover their structures</p> <p>Investigate the effect of light on germinated seeds</p> <p>Compare the development of two groups of complex plants- monocots and dicots</p>
<p><b>Transpiration:</b></p> <p>Students conduct investigations to understand how the vascular system transports water through a plant and how leaves regulate the rate of water flow through a plant</p>	<p>Xylem is the tube-like system of tube-like connected cells that transport water from the roots to all structures of the plant. Phloem transport sugar to other parts of the plant.</p> <p>Stomates are openings on leaves that are controlled by guard cells</p>	<p><a href="#">5.1 Scientific Processes</a></p> <p><a href="#">5.2 Science and Society</a></p> <p><a href="#">5.3 Mathematical Applications</a></p> <p><a href="#">5.4 Nature and Process of Technology</a></p> <p><a href="#">5.5 Life Science</a></p>	<p>Design an experiment to determine what happens to water in a celery stalk</p> <p>Collect and analyze data to develop evidence for an explanation for how water enters a plant's roots and flows through the plant during transpiration.</p> <p>Relate transpiration to the water cycle</p>
<p><b>Plant Reproduction:</b></p> <p>Students investigate the reproductive systems in flowers to understand the origin of seeds. They explore the adaptations for seed dispersal.</p>	<p>Pollen from the anthers of stamens and eggs in the ovules of the pistil are the male and female cells that combine during sexual reproduction to develop into a seed..</p> <p>Sepals, petals, stamens, and pistils are the major structures of typical flowers.</p>	<p><a href="#">5.1 Scientific Processes</a></p> <p><a href="#">5.2 Science and Society</a></p> <p><a href="#">5.3 Mathematical Applications</a></p> <p><a href="#">5.4 Nature and Process of Technology</a></p> <p><a href="#">5.5 Life Science</a></p>	<p>Investigate the structure- function relationships of plant flowers.</p> <p>Make observations to develop to a general model of how seeds disperse.</p> <p>Explain how seed dispersal mechanisms contribute to a plant's survival.</p>

<p><b>Beetles:</b></p> <p>Students design and conduct an experiment to determine environmental preferences of an insect- the Beetle. They observe the structures and behaviors of a multicellular organism.</p>	<p>Adaptations are structures or behaviors of organisms that enhance their chances to survive and reproduce in their habit.</p> <p>Insects have three body parts, six legs, and two antennae.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Design and conduct an experiment safely and appropriately, using a living organism.</p> <p>Collect data and draw and draw conclusions</p> <p>Relate structure to function</p>
<p><b>Kingdoms of Life:</b></p> <p>Students are introduced to the great diversity of microorganisms found all around us- bacteria and fungi. They are introduced to the system of five kingdoms of living organisms.</p>	<p>Microbe is the general name for microscopic bacteria and fungi, especially those that cause disease and promote fermentation.</p> <p>Bacteria, fungi, and algae have the characteristics of living organisms.</p> <p>Bacteria( Prokaryotes) have a cell membrane but no internal organelles, while Eukaryotes have internal organelles.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Use lab procedures to inoculate agar plates with bacteria and fungi from natural sources.</p> <p>Make observations and collect data to draw conclusions</p> <p>Compare bacteria and fungi to plants, animals, and protists.</p>

# Populations and Ecosystems

## The Students will be able to:

- Study reproductive biology and population dynamics as they raise and observe milkweed bugs in a supportive habitat.
- Construct and observe aquatic and terrestrial ecosystems over time, focusing on the understand of ecosystem indicators involving biotic and abiotic factors.
- Study the functional roles of populations in an ecosystem as they construct a food web.
- Explore photosynthesis and the transfer of food energy from one trophic level to another through feeding relationships.
- Explore some of the factors in an ecosystem that impose limits on population size.
- Use their knowledge of populations and ecosystems to research and analyze specific ecosystems in the U.S.
- Delve into the concept of adaptation as any structural or behavioral characteristic of an organism that helps it survive and reproduce.
- Explore the concept that variation helps a population to survive environmental changes.
- Learn the basic genetic mechanisms that determine the traits expressed by individuals in a population.
- Study environmental pressures as a mechanism for producing change in the genetic makeup of a population.
- Become familiar with and acquire vocabulary concerning these concepts: species, population, community, ecosystem, food chain, limiting factor, biotic environment, abiotic environment, genetics, trait, adaptation, natural selection.
- Exercise language, social studies, and math skills in the context of science.
- Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, relating, and inferring.

<b>Overview of Populations and Ecosystems</b>			
<b>Instructional Objectives</b>	<b>Subject Matter Content</b>	<b>Standards</b>	<b>Activities</b>
<p><b>Milkweed Bugs:</b></p> <p>In an 8-week investigation, students raise milkweed bugs in a supportive habitat to study the insect's reproductive biology. The information from this study is used to study milkweed-bug population dynamics</p>	<p>An organism is any living thing.</p> <p>An organism's habitat is where it lives—the place where it can meet all of its requirements.</p> <p>Milkweed bugs have a predictable life cycle.</p> <p>A kind of organism that is different from other kinds is a species.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Observe milkweed-bug individuals and populations to monitor changes.</p> <p>Describe and communicate a sequence of events during a long-term study.</p>
<p><b>Sorting Out Life:</b></p> <p>Students use ecosystem sorting cards to reflect on organizing concepts in ecology and develop the vocabulary associated with those concepts. Through a Jane Goodall video, students become familiar with a specific population study of chimpanzees.</p>	<p>A population is all the interacting individuals of one kind in an area.</p> <p>A community is all the interacting populations in a specified area.</p> <p>An ecosystem is a system of interacting organisms and nonliving factors in a specified area.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Analyze and sort images on cards to determine which represent individuals, populations, communities, and ecosystems.</p> <p>Identify biotic and abiotic elements.</p> <p>Relate the characteristics of a population, community, and ecosystem.</p>

<p><b>Miniecosystems:</b></p> <p>Students construct aquatic and terrestrial ecosystems in the classroom and observe them over time to understand ecosystem interactions. They use a group scientific log to observe, describe, and monitor changes in biotic and abiotic factors.</p>	<p>An aquatic ecosystem functions in water.</p> <p>A terrestrial system functions on land.</p> <p>An ecosystem is a web of interactions and relationships among the organisms and abiotic factors in an area.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Use reference information about organisms to construct a classroom ecosystem.</p> <p>Observe, describe, and record changes to an ecosystem, using a scientific log.</p> <p>Describe the relationships among biotic and abiotic factors.</p>
<p><b>Mono Lake:</b></p> <p>Students use Mono Lake, an important alkaline lake, as a simple ecosystem case study. They study the functional roles of populations to construct a food web.</p>	<p>The sequence of organisms that eat one another is a food chain.</p> <p>All the feeding relationships in an ecosystem define the food web for that system.</p> <p>The Mono Lake ecosystem is defined by interactions among organisms and physical factors.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Research the functional roles of organisms in an ecosystem.</p> <p>Use data to construct feeding relationships (food web).</p>

<p><b>Finding the Energy:</b></p> <p>Students measure energy in food by burning it. They learn that food is produced by photosynthetic organisms and explore how food energy moves from one trophic level to another through feeding relationships.</p>	<p>Food is energy-rich organic matter that organisms need for life.</p> <p>Energy is measured in kilocalories.</p> <p>In photosynthesis, food is made from water and carbon dioxide with light.</p> <p>Feeding relationships define trophic levels: producers, consumers, and decomposers.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Investigate and measure the amount of energy from a food source.</p> <p>Determine the mass of production needed to support primary, secondary, and third-level consumers.</p> <p>Relate food webs to trophic levels.</p> <p>Infer how energy moves through an ecosystem.</p>
<p><b>Population Size:</b></p> <p>Students explore some of the variables in an ecosystem that limit population size. Based on their milkweed-bug study, they predict what the population would be in 12 months. Students use simulations to explore population interactions and outcomes.</p>	<p>Reproductive potential is the theoretical unlimited growth of a population over time.</p> <p>A limiting factor is any biotic or abiotic component of the ecosystem that controls the population size.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Calculate theoretical growth of a milkweed-bug population with no limits.</p> <p>Analyze results of experiments on abiotic factors and bug egg hatching.</p> <p>Relate abiotic and biotic factors to the growth or decline of populations.</p>

<p><b>Ecoscenarios:</b></p> <p>Working in groups, students use knowledge developed in previous investigations to analyze a specific ecosystem and prepare reports. The FOSS CD-ROM provides a tool to research ten ecosystems.</p>	<p>Similar ecosystems occur in areas of similar abiotic conditions on Earth</p> <p>An ecosystem is a group of interacting organisms and abiotic factors in a specified area.</p> <p>All ecosystems have characteristics in common, such as trophic levels.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Describe and communicate the abiotic and biotic components and their interrelations in a specific area.</p> <p>Apply understanding of ecological concepts to a new system.</p> <p>Describe ways that ecosystems are the same and different.</p>
<p><b>Adaptations:</b></p> <p>Students are introduced to adaptation first through a video and then by working with a multimedia simulation of a population of walkingsticks that exhibit color variation. Students study the impact of predation on the insects in different environments.</p>	<p>Variation is the range of expression of a feature in a population.</p> <p>An adaptation is any trait of an organism that helps it survive and reproduce in its environment.</p> <p>Variation in a population helps the population survive when the environment changes.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Use a multimedia simulation to investigate the adaptive value of protective coloration.</p> <p>Explain how adaptations help organisms survive in a specific environment.</p> <p>Describe how a population can change over time in response to environmental factors.</p>

<p><b>Genetic Variation:</b></p> <p>Students investigate the underlying mechanisms of change in population by breeding imaginary animals called larkeys. They learn how organisms inherit traits from their parents and how dominant and recessive alleles interact to produce traits in a population.</p>	<p>Genes are the basic units of heredity carried by chromosomes in the nucleus of every cell. Genes code for features of organisms.</p> <p>An organism's particular combination of paired alleles is its genotype; the traits produced by those alleles result in the phenotype.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Use a simulation to determine the transfer of genetic information during breeding and the traits that result.</p> <p>Explain how organisms inherit traits from parents. Describe the interaction of dominant and recessive alleles.</p> <p>Use Punnett squares to predict the proportion of offspring that will have certain traits.</p>
<p><b>Natural Selection:</b></p> <p>Students study natural selection with larkeys and take a video journey to the Galápagos Islands to revisit the location where Charles Darwin gathered data for his theory of natural selection.</p>	<p>Environmental factors put selective pressure on populations.</p> <p>Natural selection is the process by which the individuals best adapted to their environment tend to survive and pass their traits to subsequent generations.</p>	<p><a href="#"><u>5.1 Scientific Processes</u></a></p> <p><a href="#"><u>5.2 Science and Society</u></a></p> <p><a href="#"><u>5.3 Mathematical Applications</u></a></p> <p><a href="#"><u>5.4 Nature and Process of Technology</u></a></p> <p><a href="#"><u>5.5 Life Science</u></a></p>	<p>Describe how selective pressure can affect the genetic makeup of a population.</p> <p>Explain how the traits expressed by the members of a population can change naturally over time.</p>

[5.1 Scientific Processes](#)

[5.2 Science and Society](#)

[5.3 Mathematical Applications](#)

[5.4 Nature and Process of Technology](#)

[5.5 Life Science](#)

[5.6 Physical Science – Chemistry](#)

[5.7 Physical Science – Physics](#)

[5.8 Earth Science](#)

[5.9 Astronomy and Space Science](#)

[5.10 Environmental Studies](#)