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| |  | | --- | | https://peer.tamu.edu/curriculum_modules/Water_Quality/images/teach.jpg |  |  |  | | --- | --- | | **TEKS for Middle School Science** | **How the TEKS are Integrated into the Lesson** | | **6.1A, 7.1A, 8.1A** Demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency approved safety standards | During the **Activities,** students will be required to use safe practices. | | **6.1B, 7.1B, 8.1B** Practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials | During the **Activities,** students will practice appropriate use and conservation of resources. | | **6.2A, 7.2A, 8.2A**  Plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology | During the **Activities,** students will implement comparative and descriptive investigations. | | **6.2C, 7.2C, 8.2C** Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers | During the **Activities,** students will collect and record data. | | **6.2E, 7.2E, 8.2E** Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends | During the **Activities,** students will analyze data. | | **6.3A, 7.3A, 8.3A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student. | During the **What We Know** section of this unit**,**students will learn scientific explanations including the hypotheses, quoted along with examples, to simplify the scientific concepts. They will be asked to analyze and evaluate those explanations by the use of questions embedded in the unit. | | **6.3D, 7.3D, 8.3D** Relate the impact of research on scientific thought and society, including the history of science and contributions of scientists as related to the content | Throughout the unit and in the **Story Time** section, the history of science and contributions of scientists as related to the content is presented. | | **6.4A,B; 7.4A,B; 8.4A,B**  The student knows how to use a variety of tools. The student will use preventative safety equipment. | Throughout the **Activities,** students will use laboratory tools and safety equipment as needed. | | **6.12F** Diagram the levels of organization within an ecosystem, including organism, population, community, and ecosystem | This unit emphasizes the levels of organization within ecosystems and relates it to how species are adapted to specific ecosystems. | | **7.10A** Observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms | Throughout the unit, many different environments are illustrated and described, with the focus being on how different organisms fit in their niche in these environments. | | **7.10B** Describe how biodiversity contributes to the sustainability of an ecosystem | Throughout the unit, the importance of biodiversity is emphasized. | | **7.11C** Identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (Geospiza fortis) or domestic animals and hybrid plants | This unit primarily addresses and teaches the natural selection and includes selective breeding. Many examples of changes in genetic traits are presented. | | **7.12 A** Investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants. | This unit addresses the process of natural selection and how adaptations are a part of that process. | | **7.14A** Define heredity as the passage of genetic instructions from one generation to the next generation | In in **Introduction** and **What We Know** sections, heredity is defined and related to natural selection. | | **7.14B** Compare the results of uniform or diverse offspring from asexual or sexual reproduction. | In the **What We Know** section, there is a comparison of the differences in offspring diversity due to asexual and sexual reproduction. | | **7.14C** Recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus. | In the **Introduction**, the location and purpose of genes are addressed. | | **8.9A** Describe the historical development of evidence that supports plate tectonic theory | In the **How We Find Out** section, the fossil record and the theory of plate tectonics is illustrated and discussed. | | **8.11A** Investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as quantity of light, water, range of temperatures, or soil composition | Throughout the unit, different organisms are presented and their dependence on various biotic and abiotic factors are discussed. In the **Activities**, students are given the opportunity to investigate various aspects of ecosystems and how they contribute to the survival of organisms. | | **8.11B** Explore how short- and long-term environmental changes affect organisms and traits in subsequent populations | The overall objective of the unit is to show how changes in the environment affect organisms and traits in those organisms and how those traits are selected for in populations. |  |  |  | | --- | --- | | **Next Generation Science Standards**  **Disciplinary Core Ideas** | **How the NGSS are Integrated** **into the Lesson** | | **MS-LS1.B:** Growth and Development of Organisms  -Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. | In the **Introduction** and **What We Know** sections, heredity is defined and related to natural selection. | | **MS-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.  - 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.  - Growth of organisms and population increases are limited by access to resources. | This unit focuses on adaptations that favor certain environments. In the **Activities**, students model interactions and analyze and predict how changes in the environment and relationships with other organisms will affect individual species and overall populations. | | **MS-LS3.A**: Inheritance of Traits  -Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits.  -Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. | In the **Introduction**, the location and purpose of genes are addressed. Mutations are discussed as a source of genetic variability. Genetic variability is described and cited as a factor in natural selection. | | **MS-LS3.B:** Variation of Traits  - In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other.  -In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. | In the **Introduction**, the location and purpose of genes are addressed. Mutations are discussed as a source of genetic variability. Genetic variability is described and cited as a factor in natural selection. In the **What We Know** section, there is a comparison of the differences in offspring diversity due to asexual and sexual reproduction. In the **What We Know** section there is a discussion of the benefits of genetic variation. | | **MS-LS4.A:** Evidence of Common Ancestry and Diversity  -The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.  -Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent. | The **How We Know/How We Find Out** section includes a discussion of fossil formation and the fossil record. | | **MS-LS4.B:** Natural Selection  - Natural selection leads to the predominance of certain traits in a population, and the suppression of others.  - In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring. | The entire unit is devoted to explaining natural selection. | | **MS-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. | The entire unit is devoted to explaining natural selection and adaptation. | | **MS-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. | In the **What We Know** section, there is a discussion of selection forces on humans. This explores how human activities affect human survival. | |