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| **4th Grade: Environments** | | |
| **Content Area:** Science | | |
| **Unit Title:** Environments | | |
| **Target Course/Grade Level:** 4 | | |
| **Unit Summary:** The **Environments Module** has four investigations that focus on the concepts that organisms have structures and behaviors, including sensory receptors, that serve functions in growth, survival and reproduction, and living organisms depend on one another and on their environment for their survival and the survival of populations.  **Primary Interdisciplinary Connections**  **ELA/Literacy**  RI 1: Refer to details/examples when explaining what the text says and when drawing inferences from text.  RI 2: Determine the main idea of a text and explain how it is supported by key details; summarize the text.  RI 3: Explain procedures or concepts in a scientific text.  RI 4: Determine the meaning of general academic domain-specific words or phrases.  RI 5: Describe the overall structure of information in a text.  RI 6: Compare and contrast a firsthand and secondhand account of the same topic.  RI 7: Interpret information presented visually, and explain how the information contributes to an understanding of the text.  RI 8: Explain how an author uses reasons and evidence to support particular points in a text.  RI 9: Integrate information from two texts on the same topic.  ---  W 2: Write informative/explanatory text.  W 5: Strengthen writing by revising.  W 8: Gather relevant information from experiences and print, and categorize the information.  W 9: Draw evidence from informational texts to support reflection.  ---  SL 1: Engage in collaborative discussions.  SL 2: Paraphrase information presented orally.  SL 3: Identify the reasons and evidence a speaker provides.  SL 4: Report on a text in an organized manner, using appropriate facts and relevant details.  SL 5: Add visual displays to presentations.  ---  L 4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases.  L 5: Demonstrate understanding of word relationships.  **Math**  4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line symmetric  figures and draw lines of symmetry. | | |
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| **21st Century Themes:**  Digital media will be used incorporated in project presentations. This module will develop students’ abilities to do and understand scientific inquiry. Students will identify questions, design and conduct scientific investigations to answer those questions, employ tools to gather, analyze, and interpret data. They will use data to construct reasonable explanations, develop and communicate investigations and evidence and understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge. This module will develop and extend students’ understandings about science and technology. Students will work collaboratively in teams and use tools and scientific techniques to make better observations. | | |
| **Unit Rationale**  Students design investigations to study preferred environments, range of tolerance, and optimum conditions for growth and survival of specific organisms. They conduct controlled experiments by incrementally changing specific environmental conditions to determine the range of tolerance for early growth of seeds and hatching of brine shrimp, and use these data to develop and use models to understand the impact of changes to the environment. They graph and interpret data from multiple trials of experiments and build explanations from evidence. | | |
| **Learning Targets** | | |
| **Disciplinary Core Ideas**  *LS1.A: Structure and function*   * How do the structures of organisms enable life’s functions? [Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.]   *LS1.D: Information processing*   * How do organisms detect, process, and use information about the environment? [Different sense receptors are specialized for particular kinds of information, which may then be processed and integrated by an animal’s brain, with some information stored as memories. Animals are able to use their perceptions and memories to guide their actions. Some responses to information are instinctive—that is, animals’ brains are organized so that they do not have to think about how to respond to certain stimuli.]   *LS2.C: Ecosystem dynamics, functioning, and resilience*   * What happens to ecosystems when the environment changes? [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.]   *LS4.A: Evidence of common ancestry and diversity*   * What evidence shows that different species are related? [Fossils provide evidence about the types of organisms (both visible and microscopic) that lived long ago and also about the nature of their environments. Fossils can be compared with one another and to living organisms according to their similarities and differences.]   *LS4.B Natural selection*   * How does genetic variation among organisms affect survival and reproduction? [Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.]   *LS4.C: Adaptation*   * How does the environment influence populations of organisms over multiple generations? [Changes in an organism’s habitat are sometimes beneficial to it and sometimes harmful. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.]   *LS4.D: Biodiversity and humans*   * What is biodiversity, how do humans affect it, and how does it affect humans? [Scientists have identified and classified many plants and animals. Populations of organisms live in a variety of habitats, and change in those habitats affects the organisms living there. Humans, like all other organisms, obtain living and nonliving resources from their environment.]   *ESS3.A: Natural Resources*   * How do humans depend on Earth’s resources? [All materials, energy, and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.]   *ETS1.A: Defining and Delimiting Engineering Problems*  *ETS1.B: Developing Possible Solutions*  *ETS1.C: Optimizing The Design Solution*   * Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. | | |
| **PE #** | **Performance Expectations** | |
| 4-LS1-1 | Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. | |
| 4-LS1-2 | Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. | |
| 3-LS4-1 | Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. | |
| 3-LS4-2 | Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. | |
| 3-LS4-3 | Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. | |
| 3-LS4-4 | Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. | |
| 4-ESS3-1 | Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. | |
| **ETS #** | **Engineering, Technology, and Applications of Science** | |
| 3-5-ETS1-1 | Defining and delimiting engineering problems. | |
| 3-5-ETS1-2 | Developing possible solutions. | |
| 3-5-ETS1-3 | Optimizing the design solution. | |
| **Unit Essential Questions**  How do mealworm structures and behaviors help them grow and survive?  What moisture conditions do isopods prefer?  What light conditions do isopods prefer?  What are the characteristics of animals living in the leaf-litter environment?  What are the environmental factors in an aquatic system?  What are the roles of organisms in a food chain?  How does food affect a population in its home range?  How do animals use their sense of hearing?  How can we find out if salinity affects brine shrimp hatching?  How does salinity affect the hatching of brine shrimp eggs?  Does changing the environment allow the brine shrimp eggs to hatch?  What are some benefits of having variation within a population?  How much water is needed for early growth of different kinds of plants?  What is the salt intolerance of several common farm crops?  How does mapping the plants in the schoolyard help us to investigate environmental factors?  What are some examples of plant adaptations? | | **Unit Enduring Understandings**  Plants and animals have structures and behaviors that function in growth, survival, and reproduction.  Producers make their own food.  Animals obtain food from eating plants or eating other animals.  An ecosystem is the interactions of organisms with one another and the abiotic environment.  Organisms have ranges of tolerance for environmental factors.  Organisms interact in feeding relationships in ecosystems (food chains and food webs).  Individuals of the same kind differ in their characteristics; differences may give individuals an advantage in surviving and reproducing in changing environmental conditions.  Fossils provide evidence of organisms that lived long ago and the nature of their environments. |
| **Unit Learning Targets**  Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; energy and matter; structure and function; and stability and change. | | |
| **Evidence of Learning** | | |
| **Embedded Assessments:**   * Response Sheets * Performance Assessments * Science Notebook Entries   **Benchmark Assessments:**   * Investigation I-Checks * Surveys | | |
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