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**Next Generation Science Standards**

**Alignment with HMS Kestrel Webcam Curricula 2015**

**3-LS1 From Molecules to Organisms: Structures and Processes**

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| 3LS1-1. | Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] |

Disciplinary Core Idea:

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.

## 5-LS2 Ecosystems: Interactions, Energy, and Dynamics

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| 5LS2-1. | Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.[Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] |

Disciplinary Core Idea:

## LS2.A: Interdependent Relationships in Ecosystems

## The food of almost any kind of animal can be traced back to plants. 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.

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 gases, and water, from the environment, and **release waste matter (gas, liquid, or solid) back into the environment.**

## MS-LS1 From Molecules to Organisms: Structures and Processes

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| MS-LS1-4. | Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. |

Disciplinary Core Idea:

LS1.B: Growth and Development of Organisms

* Animals engage in characteristic behaviors that increase the odds of reproduction.

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| MS-LS1-7. | Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.]  Disciplinary Core Idea:  LS1.C: Organization for Matter and Energy Flow in Organisms   * Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. |
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## MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

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| MS-LS2-1. | Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.  Disciplinary Core Idea:  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. * Growth of organisms and population increases are limited by access to resources. * **Similarly, predatory interactions may reduce the number of organisms** or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments are shared. |
| MS-LS2-3. | Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] |

Disciplinary Core Idea:

LS2.B: Cycle of Matter and Energy Transfer in Ecosystems

* **Food webs are models that 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.