LIFE SCIENCE ALTERNATE CONTENT EXPECTATIONS – MIDDLE SCHOOL (GRADES 6-8)

Topic Bundle 1: Structure, Function, and Information Processing

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.			
EE.MS-LS1-1: Participate in an investigation to provide one or more pieces of evidence that living things are made of cells and there are many different types of cells.	**EE.MS-LS1-H.1:** Participate in an investigation to provide one or more pieces of evidence that living things are made of cells and there are many different types of cells.	**EE.MS-LS1-M.1:** Participate in an investigation to compare the difference between living and non-living things.	**EE.MS-LS1-L.1:** Identify things that are living and non-living.

Topic Bundle 1: Structure, Function, and Information Processing

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.			
EE.MS-LS1-2: Use a model to identify the similarities (nucleus and cell membrane) and differences (cell wall and chloroplast) between plant and animal cells.	**EE.MS-LS1-H.2:** Use a model to identify the similarities (nucleus and cell membrane) and differences (cell wall and chloroplast) between plant and animal cells.	**EE.MS-LS1-M.2:** Compare similarities and differences between plants and animals.	**EE.MS-LS1-L.2:** Identify an organism as a plant or an animal.

Topic Bundle 1: Structure, Function, and Information Processing

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.			
EE.MS-LS1-3: Use models to describe that body systems are made of cells, and cells form tissues, tissues form organs, and organs form systems that work together to support life.	**EE.MS-LS1-H.3:** Use models to describe that body systems are made of cells, and cells form tissues, tissues form organs, and organs form systems that work together to support life.	**EE.MS-LS1-M.3:** Use models to describe that body systems are made of organs, and organs form systems that work together to support life.	**EE.MS-LS1-L.3:** Identify major organs of the body that can be observed through hearing, feeling, touching, or seeing.

Topic Bundle 1: Structure, Function, and Information Processing

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.			
EE.MS-LS1-8: Participate in investigations to demonstrate that the five senses send information to the nervous system (brain), which results in a physical response and/or the creation of memories.	**EE.MS-LS1-H.8:** Participate in investigations to demonstrate that the five senses send information to the nervous system (brain), which results in a physical response and/or the creation of memories.	**EE.MS-LS1-M.8:** Participate in investigations to demonstrate that the five senses are used to collect information and send it to the brain to respond to our environment.	**EE.MS-LS1-L.8:** Participate in an investigation to use the five senses to collect information and identify the sense that was used from two choices.

Topic Bundle 2: Matter and Energy in Organisms and Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.			
EE.MS-LS1-6: Participate in investigations about photosynthesis to demonstrate what a plant needs to live and what it creates.	**EE.MS-LS1-H.6:** Participate in investigations about photosynthesis to demonstrate what a plant needs to live and what it creates.	**EE.MS-LS1-M.6:** Use models, simulations, and/or observations to identify that plants need sunlight, water, and carbon dioxide to create energy and oxygen.	**EE.MS-LS1-L.6:** Identify that plants need sunlight, water, and air to live.

Topic Bundle 2: Matter and Energy in Organisms and Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: 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.			
EE.MS-LS1-7: Use a model to describe how animals and people break down food to get energy and nutrients to live and grow.	**EE.MS-LS1-H.7:** Use a model to describe how animals and people break down food to get energy and nutrients to live and grow.	**EE.MS-LS1-M.7:** Use a model to describe that animals and people use energy and nutrients from food to live and grow.	**EE.MS-LS1-L.7:** Identify healthy foods that help the human body to live and grow.

Topic Bundle 2: Matter and Energy in Organisms and Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: 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.			
EE.MS-LS2-1: Use data to provide evidence that resources in an ecosystem impact the survival and population size of living things within that ecosystem.	**EE.MS-LS2-H.1:** Use data to provide evidence that resources in an ecosystem impact the survival and population size of living things within that ecosystem.	**EE.MS-LS2-M.1:** Use data or participate in an investigation to identify how resource availability or lack of availability affects individuals and populations.	**EE.MS-LS2-L.1:** Identify that organisms need space, food, water, (shelter when applicable) to live.

Topic Bundle 2: Matter and Energy in Organisms and Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.			
EE.MS-LS2-3: Use a model to describe how energy and matter are transferred between living and non-living parts of an ecosystem.	**EE.MS-LS2-H.3:** Use a model to describe how energy and matter are transferred between living and non-living parts of an ecosystem.	**EE.MS-LS2-M.3:** Use a food chain model to identify how energy transfers from one part of the ecosystem to another.	**EE.MS-LS2-L.3:** Use a simple food chain to identify a source of energy (what an organism eats).

Topic Bundle 2: Matter and Energy in Organisms and Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.			
EE.MS-LS2-4: Use one or more pieces of evidence from given data to explain how physical or biological changes to an ecosystem affect populations of organisms.	**EE.MS-LS2-H.4:** Use one or more pieces of evidence from given data to explain how physical or biological changes to an ecosystem affect populations of organisms.	**EE.MS-LS2-M.4:** Given before and after pictures/videos of an ecosystem that has changed, identify which can support a larger population of a specific organism.	**EE.MS-LS2-L.4:** Given before and after pictures of an ecosystem, identify which ecosystem experienced a major physical change.

Topic Bundle 3: Interdependent Relationships in Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.			
EE.MS-LS2-2: Use one or more pieces of evidence to describe competitive, predatory, and mutually beneficial relationships between organisms in an ecosystem.	**EE.MS-LS2-H.2:** Use one or more pieces of evidence to describe competitive, predatory, and mutually beneficial relationships between organisms in an ecosystem.	**EE.MS-LS2-M.2:** Given pictures of different relationships, identify competitive, predatory, or mutually beneficial interactions between organisms in an ecosystem.	**EE.MS-LS2-L.2:** Given pictures of different organisms in a predator/prey relationship, identify the roles of both organisms.

Topic Bundle 3: Interdependent Relationships in Ecosystems

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.			
EE.MS-LS2-5: Evaluate one or more solutions that help keep environments balanced and healthy.	**EE.MS-LS2-H.5:** Evaluate one or more solutions that help keep environments balanced and healthy.	**EE.MS-LS2-M.5:** Given an environment with a problem, identify which solutions help or do not help the environment from given options.	**EE.MS-LS2-L.5:** Given two environments, identify which one has a problem.

Topic Bundle 4: Growth, Development, and Reproduction of Organisms

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: 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.			
EE.MS-LS1-4: Use evidence to explain how animal and plant characteristics and/or behaviors affect ability to reproduce and survival of young.	**EE.MS-LS1-H.4:** Use evidence to explain how animal and plant characteristics and/or behaviors affect ability to reproduce and survival of young.	**EE.MS-LS1-M.4:** Given information, identify a characteristic of plants or animals that support successful continuation of the species.	**EE.MS-LS1-L.4:** Match a parent organism with its offspring.

Topic Bundle 4: Growth, Development, and Reproduction of Organisms

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	**Medium Range**	**Low Range**
Michigan K-12 Science Content Standards: MS-LS3-1 and MS-LS1-5. **MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.** **MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.**			
EE.MS-LS3-1_1-5: Use a model to describe how changes in physical traits of animals and plants can affect their survival or have no effect.	**EE.MS-LS3-1_1-H.5:** Use a model to describe how changes in physical traits of animals and plants can affect their survival or have no effect.	**EE.MS-LS3-1_1-M.5:** Given an organism with a physical characteristic that has changed, or an organism that has been placed in a different environment, identify whether the change will affect the survival of the organism.	**EE.MS-LS3-1_1-L.5:** Match an organism to its environment based on physical characteristics.

Topic Bundle 4: Growth, Development, and Reproduction of Organisms

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standards: MS-LS3-2 and MS-LS1-5. **MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.** **MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.**			
EE.MS-LS3-2_1-5: Use models to describe that asexual reproduction results in genetically identical offspring and sexual reproduction results in genetically varied offspring.	**EE.MS-LS3-2_1-H.5:** Use models to describe that asexual reproduction results in genetically identical offspring and sexual reproduction results in genetically varied offspring.	**EE.MS-LS3-2_1-M.5:** Given pictures of parents and offspring, identify similarities and/or differences between them.	**EE.MS-LS3-2_1-L.5:** Recognize there is variation within a species.

Topic Bundle 4: Growth, Development, and Reproduction of Organisms

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.			
EE.MS-LS4-5: Use information to identify ways that humans influence the traits of plants and animals.	**EE.MS-LS4-H.5:** Use information to identify ways that humans influence the traits of plants and animals.	**EE.MS-LS4-M.5:** Given a desired trait in an organism, identify which organism should be selected to reproduce.	**EE.MS-LS4-L.5:** Identify an organism that has or exhibits a given characteristic.

Topic Bundle 5: Natural Selection and Adaptations

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standards: MS-LS4-1 and MS-LS4-2 **MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.** **MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.**			
EE.MS-LS4-1-2: Use data to find patterns in the fossil record that demonstrate similarities and/or differences as life forms change over time.	**EE.MS-LS4-H.1-2:** Use data to find patterns in the fossil record that demonstrate similarities and/or differences as life forms change over time.	**EE.MS-LS4-M.1-2:** Given pictures of fossils of ancestors and their modern descendants, identify similarities or differences in their traits.	**EE.MS-LS4-L.1-2:** Given a fossil and two organisms, match the fossil to the organism that is related.

Topic Bundle 5: Natural Selection and Adaptations

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.			
EE.MS-LS4-3: Use pictures of embryos and fully formed animals to observe similarities in development and show relationships between three or more animals.	**EE.MS-LS4-H.3:** Use pictures of embryos and fully formed animals to observe similarities in development and show relationships between three or more animals.	**EE.MS-LS4-M.3:** Use pictures of embryos and fully formed animals to observe similarities in development or show relationships between two or more animals.	**EE.MS-LS4-L.3:** Match a fully formed embryo to a picture of the organism it will become, given another picture of something that is not an animal.

Topic Bundle 5: Natural Selection and Adaptations

Target Alternate Content Expectation	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan K-12 Science Content Standard: MS-LS4-4 and MS-LS4-6 **MS-LS4-4: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.** **MS-LS4-6: Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.**			
EE.MS-LS4-4-6: Use given data to show that different traits in animals or plants can affect the survival and reproduction of individuals and change the trait within the population over time.	**EE.MS-LS4-H.4-6:** Use given data to show that different traits in animals or plants can affect the survival and reproduction of individuals and change the trait within the population over time.	**EE.MS-LS4-M.4-6:** Given data about a beneficial trait that helps an organism survive and reproduce, identify the organism that has this trait and is more likely to survive and reproduce.	**EE.MS-LS4-L.4-6:** Given two individuals of a species with different traits, identify which organism has the advantage.