

### **COURSE INFORMATION**

Grade Level:	7
Length:	1 Year
Period(s) Per Day:	1

### **ESSENTIAL UNDERSTANDING**

Life Science is a course that will teach the application of the inquiry approach and the scientific method. The following topics will be taught as units: Scientific Method, Safety and Equipment, Relationships within Ecosystems, Taxonomy, Viruses, Bacteria, Cell Reproduction, Genetics, Body System Review, Growth Development and Reproduction of organisms, Natural Selection and Adaptations. Students will explore these topics with a variety of different labs, activities, readings, and guided studies.

### **Theme Samples :**

1. Life Structure/Function
2. From Bacteria to Plants
3. Animals
4. Human Body Systems
5. Interactions of Life

### **Course Objectives and Expectations:**

Students will apply the scientific method to further develop their understanding of the topics covered in Life Science. Students will develop skills such as planning, organization, analysis, problem solving, data collection, communication, and inference through participation in class activities, group/individual work, and daily assignments. They will use the inquiry process to ask questions and learn about science and its importance in the modern world.

### **Student Skills:**

- Problem solving
- Organization
- Time management
- Math skills
- Communication
- Safety
- Research
- Analyzing Data

- Technology implementation
- Observation
- Perseverance

### **Student Objectives**

1. I can conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.
2. I can develop and use a model to describe the structure and function of a cell as a whole and ways parts of cells contribute to the function.
3. I can use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
4. I can 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.
5. I can construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth and development of organisms.
6. I can 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.
7. I can develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth, release energy, or both, as this matter moves through an organism.
8. I can analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem, and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental sources.
9. I can construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
10. I can develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
11. I can evaluate competing design solutions for maintaining biodiversity and ecosystem services.
12. I can develop and use a model to describe why structural changes to genes, such as mutations, may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism

13. I can 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.
14. I can 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.
15. I can 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.
16. I can 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.
17. I can 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.
18. I can gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
19. I can use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

**Pacing**

**LIFE SCIENCE**

	Montana Content Standards	Units / Lessons
Quarter 2	Molecules to Organisms Structures & Processes <b>MS-LS1-1.</b> Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells. <b>MS-LS1-2.</b> Develop and use a model to describe the structure and function of a cell as a whole and ways parts of cells contribute to the function. <b>MS-LS 1-3.</b> Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	<b>Unit 1: Structure and Function</b> Cell Structure and Function 2.1 Cells and Life 2.2 The Cell 2.3 Moving Cellular Material 2.4 Cells and Energy <b>From Cell to an Organism</b> 3.1 The Cell Cycle and Cell Division 3.2 Levels of Organization

	Montana Content Standards	Units / Lessons
	<p><b>MS-LS 1-6.</b> 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.</p> <p><b>MS-LS 1-7.</b> Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth, release energy, or both, as this matter moves through an organism.</p>	<p><b>Unit 4 Human Body Systems</b></p>
Quarter 1	<p>Ecosystems, Interaction, Energy and Dynamics</p> <p><b>MS-LS2-1.</b> Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem, and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental sources.</p> <p><b>MS-LS2-3.</b> Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.</p> <p><b>MS-LS2-2.</b> Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.</p> <p><b>MS-LS2-5.</b> Evaluate competing design solutions for maintaining biodiversity and ecosystem services.</p> <p><b>MS-LS1-4</b> 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.</p> <p><b>MS-LS1-5</b> Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth and development of organisms.</p>	<p><b>Matter &amp; Energy in the Environment</b></p> <p>20.1 Abiotic Factors</p> <p>20.2 Cycles of Matter</p> <p>20.3 Energy in Ecosystems</p> <p><b>Populations &amp; Communities</b></p> <p>21.1 Populations</p> <p>21.2 Changing Populations</p> <p>21.3 Communities</p> <p><b>Biomes &amp; Ecosystems</b></p> <p>22.1 Land Biomes</p> <p>22.2 Aquatic Ecosystems</p> <p>22.3 How Ecosystems Change</p>
Quarter 3	<p>Heredity: Inheritance and Variation of Traits</p> <p><b>MS-LS3-1.</b> Develop and use a model to describe why structural changes to genes, such as mutations, may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism</p> <p><b>MS-LS3-2.</b> 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.</p>	<p><b>From Cell to an Organism</b></p> <p>3.1 The Cell Cycle and Cell Division</p> <p><b>Reproduction of Organisms</b></p> <p>4.1 Sexual Reproduction and Meiosis</p> <p>4.2 Asexual Reproduction</p> <p><b>Genetics</b></p>

	Montana Content Standards	Units / Lessons
		5.1 Mendel and His Peas 5.2 Understanding Inheritance 5.3 DNA and Genetics
Quarter 4	<p>Biological Evolution: Unity and Diversity</p> <p><b>MS-LS4-5.</b> Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.</p> <p><b>MS-LS4-1.</b> 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.</p> <p><b>MS-LS4-2.</b> 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.</p> <p><b>MS-LS4-3.</b> 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.</p> <p><b>MS-LS4-4.</b> 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.</p> <p><b>MS-LS4-6.</b> Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</p>	<p><b>Reproduction of Organisms</b></p> <p>4.1 Sexual Reproduction and Meiosis</p> <p>4.2 Asexual Reproduction</p> <p><b>The Environment and Change Over Time</b></p> <p>6.1 Fossil Evidence of Evolution</p> <p>6.2 Theory of Evolution by natural Selection</p> <p>6.3 Biological Evidence of Evolution</p>

**Montana Content Standards**

**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.

**MS-LS1-2.** Develop and use a model to describe the structure and function of a cell as a whole and ways parts of cells contribute to the function.

**MS-LS 1-3.** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

**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.

**MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth and development of organisms.

**MS-LS 1-6.** 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.

**MS-LS 1-7.** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth, release energy, or both, as this matter moves through an organism.

**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, and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental sources.

**MS-LS2-2.** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

**MS-LS2-3.** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

**MS-LS2-5.** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

**MS-LS3-1.** Develop and use a model to describe why structural changes to genes, such as mutations, may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism

**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-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.

**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.

**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-LS4-5.** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

**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.

### **Resources**

<https://betterlesson.com/>

<https://opi.mt.gov/Educators/Teaching-Learning/K-12-Content-Standards-Revision>