7th Grade Life Science

Scope & Sequence

All Units are aligned with the Montana State Science Standards and the Next Generation Science Standards.

The Core Curriculum Resource for the Helena School District is Amplify Science.

Year-at-a-Glance

Unit	Content Overview	Timeline	Content Details
I. The Nature of Science	what is science, what is a scientist, lab skills	September	pg 2-3
II. Cells	cell structure, organelles, photosynthesis, cellular respiration	October – November	pg 4-6
III. DNA Structure	nucleotides, genes	December	pg 7-8
IV. Evolution	natural selection, phylogenetic trees	January	pg 8-9
V. Microbiology	bacteria, viruses, microbiome, human diseases	February	pg 10-11
VI. Anatomy & Physiology	dissections & animal body systems	March	pg 12-14
VII. Cell Division & Genetics	mitosis & meiosis (formation of body cells and sperm/egg cells), Punnett Squares, genetic inheritance & disorders	April – mid-May	pg 14-16
VIII. Ecology	food webs, ecosystems	mid-May – June	pg 17-18

Unit I: The Nature of Science

Essential Performance Expectations

From the NGSS "Connections to the Nature of Science" Standards

Scientific investigations use a variety of methods.
Scientific knowledge is based on empirical evidence.
Scientific knowledge is open to revision in light of new evidence.
Science models, laws, mechanisms, and theories explain natural phenomena.
Science is a way of knowing.
Scientific knowledge assumes an order and consistency in natural systems.
Science is a human endeavor.
Science addresses questions about the natural and material world.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking. 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• Science investigations use a variety of methods and tools to make measurements and observations. • Science investigations are guided by a set of values to ensure accuracy of measurements, observations, and objectivity of findings. • Scientific values function as criteria in distinguishing between science and non-science. • Science knowledge is based upon logical and conceptual connections between evidence and explanations. • Science findings are frequently revised and/or reinterpreted based on new evidence. • Science theories are based on a body of evidence developed over time. • Science is both a body of knowledge and the processes and practices used to add to that body of knowledge. • Science knowledge is cumulative and many people, from many generations and nations, have contributed to science knowledge. • Science is a way of knowing used by many people, not just scientists. • Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. • Men and women from different social, cultural, and ethnic backgrounds work as scientists and engineers.
Cross Cutting Concepts • Stability & Change • Cause & Effect • Patterns • Scale, Proportion, & Quantity	

Unit I Question

What is science? Who uses science?

Essential Understandings ("I can" Statements)

- I can explain that science is both a body of knowledge and the process and practices used to add to that body of knowledge.
- I can design investigations to ensure accuracy of measurements, observations, and objectivity of findings.

Essential Vocabulary

- Science
- Scientist
- Engineering
- Engineer
- Life Science
- Biology
- Observation
- Data
- Specific
- Quantitative Observation
- Qualitative Observation
- Inferring
- Predicting
- Classifying
- Modeling
- Scientific Inquiry
- Scientific Procedure
- Replicate [Replicable]
- Hypothesis
- Variable
- Dependent Variable
- Independent Variable
- Controlled Experiment
- Scientific Conference
- Scientific Journal
- Peer-Reviewed

Unit I Assessments

Performance Task: "Draw a Scientist"

End of Unit Assessment: Jelly Side Down Inquiry (Procedures, Experiment, Data Analysis, Graphing, Reports, Posters, & Presentations)

Unit IIa: Cell Structure (Organelles)

Essential Performance Expectations

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 function of a cell as a whole and ways parts of cells contribute to the function.
MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• MS-LS1-1 All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). • MS-LS1-2 Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. • MS-LS1-3 In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.
Cross Cutting Concepts • Structure & Function • Stability & Change • Cause & Effect • Patterns • Scale, Proportion, & Quantity • Matter & Energy • Systems	

Unit IIa Question

What are cells and why are they important?

Essential Understandings ("I can" statements)

- I can conduct an investigation to show that living things are made of cells.
- I can use a model to describe the function of a cell and its organelles.

Essential Vocabulary

- Compound Light Microscope
- Objective Lens
- Magnification
- Eye Piece
- Base
- Arm
- Stage

- Diaphragm
- Coarse Adjustment
- Fine Adjustment
- Living Organism
- Cell
- Unicellular
- Multicellular
- Stimulus
- Response
- Prokaryote
- Eukaryote
- Organelle
- Cell Wall
- Cell Membrane
- Cytoplasm
- Nucleus
- DNA
- Mitochondria
- Chloroplast
- Ribosome
- Golgi Bodies
- Vacuole
- Lysosome

Unit IIa Assessments

Performance Task: "Is it made of cells?"

End of Unit Assessment: Cell Organelle Test (5 Fill in the Blank + 5 Written Response)

Unit IIb: Cell Energy (Photosynthesis & Cellular Respiration)

Essential Performance Expectations

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.

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.

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

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking.	• MS-LS1-6 Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.

6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information **Cross Cutting Concepts** • Structure & Function • Stability & Change • Cause & Effect • Patterns • Scale, Proportion, & Quantity • Matter & Energy • Systems	• MS-LS1-7 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. • MS-PS3-4 Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. • MS-PS3-5 The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen.

Unit IIb Question

Where does food come from? Why do we need it?

Essential Understandings ("I can" statements)

- I can explain the role of photosynthesis in the cycling of matter and the flow of energy in organisms.
- I can use a model to describe how food is rearranged through chemical reactions to form new molecules and release energy.

Essential Vocabulary

- Atom
- Element
- Molecule
- Compound
- Chemical Reaction
- Chemical Equation
- Photosynthesis
- Cellular Respiration
- Solar energy
- Cellular energy
- Autotroph
- Heterotroph
- Chlorophyl
- Stomata
- O2
- CO2
- H2O
- C6H12O6

Unit IIb Assessments

Performance Task: "Where does food come from?"

End of Unit Assessment: Cell Energy Test (9 Short Answer; 1 Constructed Response)

Unit III: DNA Structure

Essential Performance Expectations

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.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking. 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• MS-LS1-1 All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). • MS-LS3-1 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. • MS-LS3-1 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.
Cross Cutting Concepts • Structure & Function • Stability & Change • Cause & Effect • Patterns • Scale, Proportion, & Quantity • Systems	

Unit III Question

How do cells know what to do?

Essential Understandings ("I can" Statements)

- I can develop and use a model to explain the structure of DNA.
- I can apply my understanding of the structure of DNA to describe why structural changes to DNA may create mutations that can result in harmful, beneficial, or neutral effects to the structure and function of the organism.

Essential Vocabulary

- Deoxyribonucleic Acid
- Double Helix
- Nucleotide Bases
- Adenine
- Thymine
- Cytosine
- Guanine

- Sugar
- Phosphate
- Mutation
- Insertion
- Deletion
- Substitution

Unit III Assessments

Performance Task: DNA Model

End of Unit Assessment: DNA Structure Quiz (1 MC; 6 short answer)

Unit IV: Evolution

Essential Performance Expectations

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-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-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increases 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.

Science & Engineering Practices

1. Asking Questions
2. Developing & Using Models
3. Planning and Carrying out Investigations
4. Analyzing and Interpreting Data
5. Using Mathematics & Computational Thinking
6. Constructing Explanations
7. Engaging in Argument from Evidence
8. Obtaining, Evaluating, and Communicating Information

Cross Cutting Concepts

- Cause and Effect
- Patterns
- Scale, Proportion, and Quantity
- Structure and Function

Disciplinary Core Ideas

- MS-LS3-1 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.
- MS-LS3-1 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.
- MS-LS4-2 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.
- MS-LS4-4 Natural selection leads to the predominance of certain traits in a population, and the suppression of others.

	• MS-LS4-6 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.

Unit IV Question

How and why do populations of organisms change over time?

Essential Understandings ("I can" Statements)

- I can show that adaptive traits become more common while traits that are non-adaptive become less common in a population over many generations.
- I can explain how individuals with adaptive traits are more likely to live longer and pass on those traits to their offspring.
- I can use shared traits and phylogenetic trees to analyze evolutionary relationships between organisms.
- I can understand that mutations sometimes introduce new traits into a population.

Essential Vocabulary

- Genetic Variation
- Mutation
- Heritable Trait
- Fit
- Offspring
- Adaptive Trait
- Natural Selection
- Evolution
- Habitat
- Camouflage
- Predator
- Prey
- Competition
- Phylogenetic Tree
- Shared Trait
- Common Ancestry
- Branching
- Node
- Species
- Speciation

Unit IV Assessments

Performance Task: The Great Clade Race

End of Unit Assessment: Evolution Test (19 MC + 1 Constructed Response)

Unit V: Microbiology

Essential Performance Expectations

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-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
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.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking. 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• MS-LS1-1 All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). • MSLS3-2 Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. • MS-LS2-1 Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. • MS-LS2-1 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. • MS-LS2-1 Growth of organisms and population increases are limited by access to resources. • MS-LS2-4 Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. • MS-LS4-4 Natural selection leads to the predominance of certain traits in a population, and the suppression of others. • MS-LS4-5 In artificial selection, humans have the capacity to influence certain characteristics of organisms. One can choose desired parental traits determined by genes, which are then passed on to offspring.
Cross Cutting Concepts • Structure & Function • Stability & Change • Cause & Effect • Patterns • Scale, Proportion, & Quantity • Matter & Energy • Systems	

	• MS-LS4-6 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.

Unit V Questions

How do bacteria and viruses impact our health and well-being?
What role do antibiotics and vaccines play in keeping us healthy?

Essential Understandings ("I can" Statements)

- I can conduct an investigation to provide evidence that living things can be made of a single cell.
- I can describe and give specific examples of how variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment (antibiotic resistance).
- I can explain how vaccinations work, and I can analyze and interpret data to provide evidence of the benefits of vaccination vs natural infection.

Essential Vocabulary

- Scale
- Microscopic
- Microorganism
- Prokaryote
- Eukaryote
- Bacteria
- Virus
- Living Particle
- Bacteriophage
- Host
- Antibiotics
- Antibiotic Resistance
- Natural Selection
- Vaccine
- Asexual Reproduction
- Binary Fission
- Petri Plate
- Nutrient Agar
- Colony
- Sterile
- Normal Flora
- Transient Flora
- Microbiome

Unit V Assessments

Performance Task: Bacteria vs Viruses vs Antibiotics vs Vaccines (Concept Map)
End of Unit Assessment: Hand Washing Inquiry (Procedures, Experiment, Data Analysis, Graphing, Reports, Posters, & Presentations)

Unit VI: Comparative Anatomy & Physiology

Essential Performance Expectations

MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
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.
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.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking. 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• MS-LS1-3 In multicellular organisms, the body is a system of multiple interacting subsystems. • MS-LS1-3 These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. • MS-LS1-7 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. • MS-LS1-8 Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. • MS-LS4-2 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. • MS-LS4-3 Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy. • MS-LS4-6 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.
Cross Cutting Concepts • Structure & Function • Cause & Effect • Patterns • Matter & Energy • Systems	

Unit VI Question

How do the physical structures and organ systems of different animals compare to each other? Why are they similar? Why are they different?

Essential Understandings ("I can" Statements)

- I can use evidence gathered through experiments and dissections to explain how the body is a system of interacting subsystems.
- I can construct an explanation for the anatomical similarities and differences among organisms.
- I can show how traits that support successful survival and reproduction in the new environment become more common; those that do not become less common.

Essential Vocabulary

- Cell
- Tissue
- Organ
- Organ System
- Adaptation
- Habitat
- Sexual Reproduction
- Asexual Reproduction
- Fertilization
- Closed Circulatory System
- Open Circulatory System
- Herbivore
- Carnivore
- Omnivore
- Dorsal
- Ventral
- Anterior
- Posterior
- Hind leg
- Foreleg
- Tympanum
- Nictitating Membrane
- Gullet
- Maxillary Teeth
- Vomerine Teeth
- Stomach
- Small Intestine
- Large Intestine
- Cloaca
- Anus
- Heart
- Lung
- Liver
- Gall Bladder
- Bile
- Spleen
- Kidney
- Bladder
- Ureters
- Mesentery

- Brain

Unit VI Assessments

Performance Assessment: Worm Lab Test

End of Unit Assessment: Frog Lab Test

Unit VIIa: Cell Division (Mitosis & Meiosis)

Essential Performance Expectations

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-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information.

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.

MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 6. Constructing Explanations 7. Engaging in Argument from Evidence	• MS-LS1-1 All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). • MSLS3-2 Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.
Cross Cutting Concepts	
• Structure & Function • Stability & Change • Cause & Effect • Patterns • Scale, Proportion, & Quantity • Systems	

Unit VIIa Question

Where do cells come from?

Essential Understandings ("I can" statements)

- I can develop and use a model to explain why asexual reproduction results in offspring with identical genetic information.

Essential Vocabulary

- Mitosis
- Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase
- Cytokinesis
- DNA
- Chromosome
- Replication
- Spindle Fiber
- Centriole
- Centromere

Unit VIIa Assessments

Performance Task: "Sam's Puppy"

End of Unit Assessment: Mitosis Test (drawing & labeling a model of mitosis)

Unit IIVb: Genetics

Essential Performance Expectations

MS-LS3-2 Develop and use a model to describe why sexual reproduction results in offspring with genetic variation.

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.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking. 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• MSLS3-2 Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. • MS-LS3-1 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. • MS-LS3-2 Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. • MS-LS3-2 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
Cross Cutting Concepts	
• Structure & Function • Stability & Change • Cause & Effect	

• Patterns • Scale, Proportion, & Quantity • Systems	each gene, one acquired from each parent. These versions may be identical or may differ from each other. • MS-LS3-1 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.

Unit VIIb Question

How is DNA passed from generation to generation?

Essential Understandings ("I can" Statements)

- I can construct an argument supported by evidence to show that each parent contributes half of their genes to their offspring, resulting in individuals with two of each chromosome (in sexually reproducing organisms). [Meiosis]
- I can explain the role of chromosomes, genes, alleles, and proteins in the process of inheritance and the development of physical traits, and how those all relate to the structure of DNA.
- I can develop and use a model to describe why sexual reproduction results in offspring with genetic variation. [Punnett Squares]

Essential Vocabulary

- Meiosis
- Sister Chromatid
- Chromosome
- Gene
- DNA
- Protein Molecule
- Homologous
- Haploid
- Diploid
- Punnett Square
- Probability
- Genotype
- Phenotype
- Allele
- Dominant
- Recessive
- Co-Dominance
- Heterozygous
- Homozygous

Unit VIIb Assessments

Performance Task: "Baby Mice"

End of Unit Assessment: Genetics Test (7 short answer, 3 completion, 1 constructed response)

Unit VIII: Ecology

Essential Performance Expectations

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.
MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS 2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Science & Engineering Practices	Disciplinary Core Ideas
1. Asking Questions 2. Developing & Using Models 3. Planning and Carrying out Investigations 4. Analyzing and Interpreting Data 5. Using mathematics & computational thinking. 6. Constructing Explanations 7. Engaging in Argument from Evidence 8. Obtaining, Evaluating, and Communicating Information	• MS-LS2-1 Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. • MS-LS2-1 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. • MS-LS2-2 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, both living and nonliving, are shared. • MS-LS2-3 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. • MS-LS2-4 Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.
Cross Cutting Concepts	
Structure & Function Stability & Change Cause & Effect Patterns Scale, Proportion, & Quantity Matter & Energy Systems	

Unit VIII Question

How do interactions between organisms contribute to stability &/or change in the biotic and abiotic matter in an ecosystem?

Essential Understandings ("I can" Statements)

- I can create a model that demonstrates how matter and energy are transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. [Food Webs]
- I can analyze and interpret data to provide evidence that resource availability has measurable impacts on organisms and populations of organisms in an ecosystem.
- I can describe, predict, and analyze competitive, predatory, and mutually beneficial interactions between organisms in specific ecosystems.

Essential Vocabulary

- Organism
- Habitat
- Biotic Factor
- Abiotic Factor
- Photosynthesis
- Species
- Population
- Community
- Ecosystem
- Ecology
- Birth Rate
- Death Rate
- Population Density
- Limiting Factor
- Competition
- Predation
- Predator
- Prey
- Symbiosis
- Mutualism
- Commensalism
- Parasitism
- Parasite
- Host
- Producer
- Consumer
- Herbivore
- Carnivore
- Omnivore
- Scavenger
- Decomposer
- Food Chain
- Food Web
- Energy Pyramid

Unit VIII Assessments

Performance Task: Food Web Project

End of Unit Assessment: Populations & Resources Test (18 MC + 2 Written Response)