CKSD Curriculum
Life Science / Grade 7
Instructor: Sarah Gates

The Scientific Methods

- Students will review the process of the scientific method and international system of units (SI) of measurement. Please note that many of the standards addressed in this short unit are addressed further throughout the year with various different labs and applications of the scientific method.

Major Academic Standards Addressed

- S8.A.1.1.1 - Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data/information may change existing theories and practices
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design
- S8.A1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship
- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.1.3.1 - Use ratio to describe change (e.g. percents, parts per million, grams per cubic centimeter, mechanical advantage)
- S8.A.1.3.2 - Use evidence, observations, or explanations to make inferences about change in systems over time (e.g., carrying capacity, succession, population dynamics, loss of mass in chemical reactions, indicator fossils in geologic time scale) and the variables affecting these changes
- S8.A.1.3.3 - Examine systems changing over time, identifying the possible variables causing this change, and drawing inferences about how these variables affect this change.
- S8.A.2.1.1 - Use evidence, observations, or a variety of scales (e.g., mass, distance, volume, temperature) to describe relationships
- S8.A.2.1.2 - Use space/time relationships to define concepts operationally, raise testable questions, or formulate hypotheses.
- S8.A.2.1.3 - Design a controlled experiment by specifying how the independent variables will be manipulated, how the dependent variables will be measured, and which variables will be held constant.
- S8.A.2.1.4 - Interpret data/observations; develop relationships among variables based on data/observations to design models as solutions
- S8.A.2.1.5 - Use evidence from investigations tot clearly communicate and support conclusions.
- S8.A.2.1.6 - Identify a design flaw in a simple technological system and devise possible working solutions.

- S8.A.3.2.2 - Describe how engineers use models to develop new and improved technologies to solve problems.
- S8.D.2.2.3 - Describe ways technology (e.g., microscope, telescope, micrometer, hydraulics, barometer) extends and enhances human abilities for specific purposes

---

Concepts – Content ——**What students should know**

- Data and observations are used to explain events and shape ideas and theories.
- A process of actions used to solve problems of scientific basis.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Plan investigations to generate evidence supporting a claim.
- Given certain conditions select appropriate materials to be used to solve a problem.
- Plan and carry out investigations to determine the effects on a substance when an experiment is completed.

Essential Questions – meant to challenge study to ponder, question and query

- *How can one explain the structure, properties, and interactions of matter?*

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Exploring and Classifying Life

- This unit will delve into characteristics of all living things, biogenesis, and how living things are classified.

Major Academic Standards Addressed

- S8.A.1.1.1 - Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data/information may change existing theories and practices.
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship.
- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.3.1.1 - Describe a system (e.g., watershed, circulatory system, heating system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result.
- S8.A.3.1.2 - Explain the concept of order in system [e.g., (first to last: manufacturing steps, trophic levels); (simple to complex: cell, tissue, organ, organ system)].
- S8.B.1.1.1 - Describe the structures of living things that help them function effectively in specific ways (e.g., adaptations, characteristics)
- S8.B.1.1.2 - Compare similarities and differences in internal structures of organisms (e.g., invertebrate/vertebrate, vascular/nonvascular, single-celled/multi-celled) and internal structures (e.g., appendages, body segments, type of covering, size, shape).
- S8.B.1.1.3 - Apply knowledge of characteristic structures to identify or categorize organisms (e.g., plants, animals, fungi, bacteria, and protista).
- S8.B.1.1.4 - Identify the levels of organization from cell or organism and describe how specific structures (parts) underlie large systems, enable the system to function as a whole.

Concepts – Content ——**What students should know**

- 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).
- In multicellular organisms, there is a systems framework of organization from cells to tissues, to organs to organ systems are specialized for particular body functions of an organism.
- Anatomical similarities and differences among 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 decent.
- Explain how to use a dichotomous key to identify organisms.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Conduct investigations to provide evidence that living things are made of cells and cells can be differentiated.
- Provide evidence to support the concept of an organism is composed of interacting subsystems composed of a group of cells
- 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.
- Construct and utilize dichotomous keys to identify organisms.

Essential Questions – meant to challenge study to ponder, question and query

- *How do organisms live, grow, and respond to their environment and reproduce?*
- How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Cells

- This unit will closely examine types of cells, cell structures, viewing cels, viruses, and bacteriophage.

Major Academic Standards Addressed

- S8.A.1.1.1- Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data information may change existing theories and practices.
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship.

- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.2.1.2 - Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.
- S8.A.3.1.1- Describe a system (e.g., watershed, circulatory system, heating system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result.
- S8.A.3.1.2 - Explain the concept of order in a system [e.g., (first to last: manufacturing steps, trophic levels), (simple to complex: cell, tissue, organ, organ system)].
- S8.A.3.1.3 - Distinguish among system inputs, system processes, system outputs, and feedback (e.g., physical, ecological, biological, informational).
- S8.A.3.2.1 - Describe how scientists use models to explore relationships in natural systems (e.g., an ecosystem, river system, solar system)
- S8.B.1.1.2 - Compare similarities and differences in internal structures of organisms (e.g., invertebrate/vertebrate, vascular/nonvascular, single-celled/multi-celled) and external structures (e.g., appendages, body segments, type of covering, size, shape).
- S8.B.1.1.3 - Apply knowledge of characteristic structurers to identify or categorize organisms (I.e., plants, animals, fungi, bacteria, and protista).
- S8.B.1.1.4 - Identify the levels of organization from cell or organism and describe how specific structures (parts) which underlie larger systems, enable the system to function as a whole.

Concepts – Content ——**What students should know**

- 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)
- Within cells, special structures are responsible for particular functions.

<u>Objectives – also called competencies in the SAS</u>

What students should be able to do as a result of the instruction

- Conduct investigations to provide evidence that living things are made of cells and cells can be differentiated.
- Create and use models to describe the basic structures and functions of cells within a system framework.

Essential Questions – meant to challenge study to ponder, question and query

- *How do organisms live, grow, respond to their environment and reproduce?*

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Cell Processes

- Throughout this unit, students will learn about chemical compounds required for life, moving materials throughout the interior and exterior of cells, photosynthesis, and respiration.

Major Academic Standards Addressed

- S8.A.1.1.1- Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data information may change existing theories and practices.
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship.
- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.2.1.2 - Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.
- S8.A.3.1.4 - Distinguish between open loop (e.g., energy flow, food web) and closed loop (e.g., materials in the nitrogen and carbon cylces, closed-switch) systems.
- S8.B1.1.1 - Describe the structures of living things that help them function effectively in specific ways (e.g., adaptations characteristics).
- S8.B.1.1.2 - Compare similarities and differences in internal structures of organisms (e.g., invertebrate/vertebrate, vascular/nonvascular, single-celled/multi-celled) and external structures (e.g., appendages, body segments, type of covering, size, shape).

- S8.B.1.1.3 - Apply knowledge of characteristic structurers to identify or categorize organisms (I.e., plants, animals, fungi, bacteria, and protista).
- S8.B.3.1.3 - Explain relationships among organisms (e.g., producers/consumers, predator/prey)

Concepts – Content ——**What students should know**

- All living things have a common characteristic needs and functions that separate them from nonliving things such as: gas exchange, energy usage, water usage, response, reproduction, elimination of waste, growth, and made of one or more cells.
- Some organisms 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.
- 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.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Use evidence of characteristics of life to differentiate between living and nonliving things.
- Create a scientific, evidence-based explanation of the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- Create 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.

Essential Questions – meant to challenge study to ponder, question and query

- How do organisms live, grow, respond to their environment, and reproduce?

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Cell Reproduction

- Through this unit, students will learn about sexual and asexual cell division (meiosis and mitosis), DNA synthesis, transcription, and translation.

Major Academic Standards Addressed

- S8.A.1.1.1- Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data information may change existing theories and practices.
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship.
- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.2.1.2 - Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.
- S8.B.2.1.1 - Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.
- S8.B.2.1.2 - Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.
- S8.B.2.1.3 - Explain that mutations can alter a gene and are the original source of new variations.
- S8.B.2.2.1 - Identify and explain differences between inherited and acquired traits.
- S8.B.2.2.2 - Recognize that the gene is the basic unit of inheritance, that there are dominant and recessive genes, and that traits are inherited.

Concepts – Content ——**What students should know**

- Living organisms reproduce in a variety of ways that may involve sexual or asexual reproduction. Reproduction usually follows a cycle.
- Animals engage in characteristic behaviors that increase the odds of reproduction.
- Organisms reproduce, either sexually or asexually, and transfer their genetic information through inheritance to their offspring.

- Genetic contribution from each parent through sexual reproduction results in variation in offspring, and asexual reproduction results in offspring with genetically identical genetic information.
- 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.
- 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 are harmful, and some neutral to the organism.
- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Describe and distinguish between various types of reproductive methods of cells and organisms.
- Construct a model that demonstrates how gene mutations occur.
- Research and report on how gene structural changes may be beneficial or harmful to the organism.
- Use a model that demonstrates how genetic mutations can result in changes in the associated protein.
- Provide and explanation for the relationship among changes (mutations) to genes, changes to the formation of proteins, and the effect on the structure and function of the organism and thereby traits.

Essential Questions – meant to challenge study to ponder, question and query

- How do organisms live, grow, respond to their environment, and reproduce?
- How are characteristics of one generation passed to the next?
- How can individuals of the same species and even siblings have different characteristics?

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Heredity

- Throughout this unit, the students will look at Mendellian genetics, genes, and biotechnological applications of genetics.

Major Academic Standards Addressed

- S8.A.1.1.1- Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data information may change existing theories and practices.
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship.
- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.2.1.2 - Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.
- S8.B.2.1.1 - Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.
- S8.B.2.1.2 - Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.
- S8.B.2.1.3 - Explain that mutations can alter a gene and are the original source of new variations.
- S8.B.2.1.4 - Describe how selective breeding or biotechnology can change the genetic makeup of organisms.
- S8.B.2.1.5 - Explain that adaptations are developed over long periods of time and are passed from one generation to another.
- S8.B.2.2.1 - Identify and explain differences between inherited and acquired traits.
- S8.B.2.2.2 - Recognize that the gene is the basic unit of inheritance, that there are dominant and recessive genes, and that traits are inherited.

Concepts – Content ——**What students should know**

- All living things have adaptations that help them survive and reproduce in their environment.
- Genetic factors as well as local conditions affect the growth of organisms.
- 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 each gene, one acquired from each parent. These versions may be identical or may differ from each other.
- Humans can select for specific traits, using technology for genetic modification, which leads to selective breeding.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Use argument based evidence to support the notion that living things are able to survive and reproduce based on structural or behavioral adaptations.
- Provide a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- Demonstrate using a model illustrating how offspring acquire genes from each parent during sexual reproduction.
- Research and present a report that addresses the use of technologies allowing for the selection of specific genetic traits.

Essential Questions – meant to challenge study to ponder, question and query

- How do organisms live, grow, respond to their environment, and reproduce?
- How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Adaptations

- Throughout this unit, students will look at how adaptations occur within populations, and are passed through individuals in a population, and how adaptations can lead to the evolution of a new species, as well as the evidence supporting evolution.

Major Academic Standards Addressed

- S8.A.1.1.1- Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data information may change existing theories and practices.
- S8.A.1.1.2 - Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 - Use evidence, such as observations or experimental results, to support inferences about a relationship.
- S8.A.1.1.4 - Develop descriptions, explanations, predictions, and models using evidence.
- S8.A.2.1.2 - Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.
- S8.B.2.1.1 - Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.
- S8.B.2.1.2 - Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.
- S8.B.2.1.3 - Explain that mutations can alter a gene and are the original source of new variations.
- S8.B.2.1.4 - Describe how selective breeding or biotechnology can change the genetic makeup of organisms.
- S8.B.2.1.5 - Explain that adaptations are developed over long periods of time and are passed from one generation to another.
- S8.B.2.2.1 - Identify and explain differences between inherited and acquired traits.
- S8.B.2.2.2 - Recognize that the gene is the basic unit of inheritance, that there are dominant and recessive genes, and that traits are inherited.

Concepts – Content ——**What students should know**

- The collection of fossils and their placement in chronological order (e.g., through the location of sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, change, and extinction, of many life forms throughout the history of life on Earth.
- Anatomical similarities and differences among various organisms living today and between the and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary decent.

- Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully formed anatomy.
- Adaptations allow organisms to survive in their environment. Natural selection leads to the predominance of certain traits in a population, and the suppression of others.
- In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. Once choose desired parental traits determined by genes, which are then passed on to offspring.
- Adaptation by natural selection acting over generations is a process by which species change over time in response to changes in environmental conditions. Traits that support survival and reproduction in the new environment become more common; those that do not become less common.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- 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.
- 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.
- 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.
- 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.
- Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
- Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. If organisms cannot adapt to new environmental conditions, extinction can happen.

Essential Questions – meant to challenge study to ponder, question and query

- How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Interactions of Life

- Throughout the unit, students will learn about populations in nature and how those populations interact with the biotic and abiotic environment.

Major Academic Standards Addressed

- S8.B.3.1.1 - Explain the flow of energy through an ecosystem (e.g., food chains, foo webs).
- S8.B.3.1.3 - Explain relationships among organisms (e.g., producers/consumers, predator/prey) in an ecosystem.
- S8.B.3.2.1 - Use evidence to explain factors that affect changes in populations (e.g., deforestation, disease, land use, natural disaster, invasive species).
- S8.B.3.2.2 - Use evidence to explain how diversity affects the ecological integrity of natural systems.
- S8.B.3.2.3 - describe the response of organisms to environmental changes (e.g., changes in climate, hibernation, migration, coloration) and how those changes affect survival

Concepts – Content ——**What students should know**

- Organisms and populations of organisms are dependent on their environmental interactions, both biotic and abiotic factors.
- 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.
- Growth of organisms and population increases are limited by access to resources.
- 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.
- 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.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Analyze data to provide evidence for the impact of resource availability on organisms and populations in an ecosystem.
- Develop an explanation that describes patterns of interactions among organisms across multiple ecosystems.
- Design and/or construct a model to describe the cycling of matter and flow of energy and within the biotic and abiotic parts of an ecosystem.

Essential Questions – meant to challenge study to ponder, question and query

- *How and why do organisms interact with their environment and what are the effects of these interactions?*

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects.

Ecosystems

- Throughout the unit, students will look at changes in ecosystems, biomes, and aquatic ecosystems.

Major Academic Standards Addressed

- S8.B.3.1.1 - Explain the flow of energy through an ecosystem (e.g., food chains, food webs).
- S8.B.3.1.2 - Indentify major biomes and describe abiotic and biotic componenets (e.g., abiotic: different soil types, air, water, sunlight; biotic: soil microbes, decomposers).
- S8.B.3.1.3 - Explain relationships amoung organisms (e.g., producers/consumers, predator/prey) in an ecosystem

---

Concepts – Content ——**What students should know**

- 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.
- Biodiversity describes the variety of species found in Earth's terrestrial and aquatic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Construct an argument supported by evidence that changes to the physical or biological parts of an ecosystem impact populations.
- Design or evaluate solutions for maintaining biodiversity and/or ecosystems services.

Essential Questions – meant to challenge study to ponder, question and query

- *How and why do organisms interact with their environment and what are the effects of these interactions?*

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Lab
- Homework
- Quizzes/Tests
- Projects

*All are subject to change at instructor's discretions

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects. Recommend using a group project to cover each biome.

Conserving Resources and Life

- Throughout the unit, students will explore conservation biology concepts of limited resources, pollution, climate change, and the 3 R's of conservation.

Major Academic Standards Addressed

- S8.B.3.3.1 - Explain how human activities may affect local, regional, and global environments.
- S8.B.3.3.2 - Explain how renewable and nonrenewable resources provide for human needs (I.e., energy, food,, water, clothing, and shelter).
- S8.B.3.3.3 - Describe how waste management affects the environment (e.g., recycling, composting, landfills, incineration, sewage treatment).
- S8.B.3.3.4 - Explain the long term effects of using integrated pest management (e.g., herbicides, natural predators, biogenetics) on the environment.

Concepts – Content ——**What students should know**

- Growth of organisms and population increases are limited by access to resources.
- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem service that humans rely on – for example, water purification and recycling of matter.

Objectives – also called competencies in the SAS

What students should be able to do as a result of the instruction

- Analyze data to provide evidence for the impact of resource availability on organisms and populations in an ecosystem.
- Design or evaluate solutions for maintaining biodiversity and/or ecosystem services.

Essential Questions – meant to challenge study to ponder, question and query

- *How and why do organisms interact with their environment and what are the effects of these interactions.*

Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Labs
- Homework
- Tests/Quizzes

- Projects

*All are subject to change at the instructor's discretion.

Best Instructional Practice(s): Best practices will change year to year with the students' needs. Hands on assignments like labs will be provided as well as individual and group instruction, tests, quizzes, and projects