LARAMIE COUNTY
SCHOOL DISTRICT 2
Students First

Science Curriculum

Approved by the Laramie County School District #2
Board of Trustees

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Acknowledgements

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Introduction

The purpose of Laramie County School District #2's Science Curriculum is to provide a clear, organized framework on which to build instruction in the classroom. The curriculum includes clear outcomes and components of these outcomes which further clarify the skills necessary to achieve each outcome. Each outcome also describes the depth of knowledge and level of rigor required for students to demonstrate their conceptual understanding of the knowledge and skills outlined in the curriculum.

The *Outcomes and Components* are **grade-level specific**. These have been carefully aligned to the state standards and teachers are expected to align their instruction to these. Outcomes express the essential learning that all students in the grade level must know or be able to demonstrate in the content area. They make connections among separate concepts or skills described in the components. Outcomes require high cognitive levels and direct assessment. Components state simple and complex concepts or skills that students must know or do in order to perform each outcome. All outcomes and components are to be included within the course of instruction for the year. Assessments will be written at the outcome level.

Each outcome has been assigned a code number consisting of symbols for content area, grade level or course, and outcome number. In the example shown below, SC stands for Science (content area) – 2 stands for 2nd (grade) – 1 symbolizes that it is the first outcome in this grade level.
Example:

Outcome SC-2-1	**Students will plan and conduct an investigation involving the properties of matter.**	**State Standard**
SC-2-1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	2-PS1-1

Each component has also been given a code number consisting of symbols for the content area, grade level or course, outcome number, and component number. In the example shown above, SC stands for Science (content area) – 2 stands for second grade (grade) – 1 stands for the outcome number – and 1 symbolizes that it is the first component of the outcome.

At the end of each component, the code number indicates the Wyoming Common Core State Standard to which it aligns and includes the grade level, domain, and standard number. In the above example, the 2 stands for 2nd grade, PS1 stands for Physical Science standard 1, and 1 stands for benchmark 1 under this standard. The complete Wyoming Common Core State Standards document can be found on the WDE website by clicking on this link: https://1ddlxtt2jowkvs672myo6z14-wpengine.netdna-ssl.com/wp-content/uploads/2018/12/2016-WY-Science-CPS-10-9-18-sd_autotagged.pdf

The Science Subject Area Committee (SAC) performed a careful analysis of alignment between the previous years' science instruction and the current Wyoming Science Standards adopted in 2017 which expect full implementation of the Wyoming Science Content and Performance Standards.

Mission

Successful science students in LCSD2 will integrate their knowledge of life, earth, and physical science to identify, analyze, and apply solutions to real world problems.

Course/Grade Level Purposes

Kindergarten
Students in kindergarten will make observations, ask and answer questions, and demonstrate findings to describe patterns that represent the relationships between animals, plants, and their habitats. They will make observations of weather patterns and investigate the effects of pushes and pulls on the motion of objects. Students will design, create and communicate solutions to reduce the effect of the sun, severe weather, and man on the earth.

First Grade
Students in first grade will investigate light and sound waves. They will use what they learn about plant and animal features and behaviors to help solve a human problem. Students will observe the movement of objects in the sky in order to describe patterns that can be predicted.

Second Grade
Students in second grade will produce models to identify and represent land and bodies of water on Earth's surface. They will also compare and contrast the diversity of life in different habitats. They will plan and conduct an investigation involving the properties of matter.

Third Grade
Students in third grade will investigate and solve problems of motion and stability using forces and interactions between objects. They will make models of the life cycles of organisms and explain the role of heredity and environment in survival. Third-grade students will collect weather data and analyze weather and climate conditions, and evaluate solutions that reduce the impacts of weather-related hazards.

Fourth Grade
Students in fourth grade will analyze the effect of energy transfer and human influences to determine the effects on Earth and its systems. They will compare and contrast internal and external structures of plants and animal and their processes.

Fifth Grade
Students in fifth grade will investigate matter and provide evidence that regardless of change, mass is conserved. They will model the relationship between plant, animals, and the environment. Students will use science ideas to conserve Earth's resources and environment.

Sixth Grade
Students in sixth grade will distinguish between and determine relationships and interactions among thermal, kinetic, and potential energy. Students will evaluate the factors and effects of electricity and magnetism. They will describe and predict characteristic properties and behaviors of waves when the waves interact with matter. In addition, they will apply Newton's three laws to describe the motion of objects.

Seventh Grade Life Science
Students in seventh grade will analyze cell processes and cellular reproduction to determine how they relate to living systems. Students will use models to describe atoms, their place on the periodic table, and relationships with chemical reactions.

Eighth Grade Earth Science
Students in eighth grade will examine theories of past, present, and future events to explain changes in plate tectonics, space, and earth systems.

Physical Science
Students in Physical Science will apply scientific principles to solve problems involving force, motion, waves, and energy.

Biology I
Students in Biology I will analyze matter and cell processes to model and predict the relationship between inheritance and evolution. Students will construct models that represent the relationships between living things and their environment.

Biology II
Students in Biology II will apply principles of biology to the organization and functions of the human body systems and compare and contrast changes throughout the human lifespan.

Chemistry I
Students in Chemistry I will apply theories of transformations of matter and energy to develop and use models. They will plan and carry out investigations that use mathematics and computational thinking.

Chemistry II
Students in Chemistry II will apply scientific reasoning and processes to organize, analyze, and interpret transformations of matter and energy.

Environmental Science
Students in Environmental Science will apply natural principles to evaluate the organization of living systems, the exchange of energy, the cycles of matter, and the human impact on air, water, land, and living and nonliving resources.

Physics

Students in Physics will solve problems involving force, motion, and energy using higher level mathematical concepts such as vectors and trigonometric functions. Students will apply these concepts in laboratory investigations.

Kindergarten Science

Purpose Statement	Students in kindergarten will make observations, ask and answer questions, and demonstrate findings to describe patterns that represent the relationships between animals, plants, and their habitats. They will make observations of weather patterns and investigate the effects of pushes and pulls on the motion of objects. Students will design, create and communicate solutions to reduce the effect of the sun, severe weather, and man on the earth.	
Outcome SC-K-1	**Students will investigate the effects of different strengths or different directions of pushes and pulls in order to compare the motions of an object.**	**State Standard**
SC-K-1-1	Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.	K-PS2-1.
SC-K-1-2	Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.	K-PS2-2.
SC-K-1-3	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	K-2-ETS1-1.
Outcome SC-K-2	**Students will observe and determine the effects of sunlight on the Earth's surface. Students will apply their findings by designing a structure that will reduce the warming effect of sunlight.**	**State Standard**
SC-K-2-1	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	K-PS3-2.
SC-K-2-2	Make observations to determine the effect of sunlight on Earth's surface (rock, sand, soil, water).	K-PS3-1.
SC-K-2-3	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	K-2-ETS1-2.
SC-K-2-4	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	K-2-ETS1-3.

Outcome SC-K-3	**Students will observe and record local weather conditions to describe weather patterns over time. Students will identify that the purpose of weather forecasting is to prepare for and respond to severe weather.**	**State Standard**
SC-K-3-1	Use and share observations of local weather conditions to describe patterns over time.	K-ESS2-1.
SC-K-3-2	Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	K-ESS3-2
Outcome SC-K-4	**Students will use evidence to describe the interaction between animals (including humans) and their habitats in relationship to their need to survive.**	**State Standard**
SC-K-4-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.	K-LS1-1.
SC-K-4-2	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs (i.e. beavers build dams, birds build nests, squirrels bury nuts, etc.).	K-ESS2-2.
SC-K-4-3	Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	K-ESS3-1.
Outcome SC-K-5	**Students will present solutions which reduce the impact of humans on the land, water, air, and other living things in the local environment.**	**State Standard**
SC-K-5-1	Communicate solutions that will manage the impact of humans on the land, water, air, and/or other living things in the local environment (ie. reduce, reuse, recycle).	K-ESS3-3.
SC-K-5-2	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	K-2-ETS1-1.

First Grade Science

Purpose Statement	Students in first grade will investigate light and sound waves. They will use what they learn about plant and animal features and behaviors to help solve a human problem. Students will observe the movement of objects in the sky in order to describe patterns that can be predicted.	
Outcome SC-1-1	**Waves: Light** **Students will plan and conduct an investigation of light waves.**	**State Standard**
SC-1-1-1	Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated (could include those made in a completely dark room, in a pinhole box, and a video of a cave explorer with a flashlight, etc.; Illumination could be from an external light source or by an object giving off its own light).	PS4-2
SC-1-1-2	Plan and conduct investigations to determine the effect of placing objects made with different material (transparent, translucent, opaque, and reflective) in the path of a beam of light.	PS4-3
SC-1-1-3	Ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new tool using light to communicate.	ETS1-1
SC-1-1-4	Use tools and material to design and build a device that uses light to solve the problem of communicating over a distance. (Examples of devices could include a light source to send signals).	PS4-4
SC-1-1-5	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	ETS1-3
Outcome SC-1-2	**Waves: Sound** **Students will plan and conduct an investigation of sound waves.**	**State Standard**
SC-1-2-1	Plan and conduct investigations to provide evidence that vibrating material can make sound and that sound can make materials vibrate. (Examples of vibrating materials that make sound could	PS4-1

	include tuning forks or plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound or holding an object near a vibrating tuning fork.)	
SC-1-2-2	Ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new tool using sound to communicate.	ETS1-1
SC-1-2-3	Use tools and material to design and build a device that uses sound to solve the problem of communicating over a distance.	PS4-4
SC-1-2-4	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	ETS1-3
Outcome SC-1-3	**Organisms** **Students will design a solution to a human problem by mimicking plants and animals.**	**State Standard**
SC-1-3-1	Read texts and use media to determine patterns in the behavior of parents and offspring that help offspring survive. (Examples of behaviors could include the signals that offspring make such as crying, chirping, and other vocalizations, and the response of the parents such as feeding, comforting, and protecting the offspring).	LS1-2
SC-1-3-2	Make observations to construct an evidence-based account that young plants and animals are alike, but not exactly like their parents. (Examples of patterns could include features that plant or animals share; leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same).	LS3-1
SC-1-3-3	Use materials to design a solution to a human problem by mimicking how plants and /or animals use their external parts to help them survive, grow and meet their needs.	LS1-1
SC-1-3-4	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an animal or plant helps it function as needed to solve a given problem.	ETS1-2

SC-1-3-5	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	ETS1-3

Outcome SC-1-4	**Earth's Place in the Universe** **Students will use observations of the sun, moon, and stars to describe patterns that can be predicted.**	**State Standard**
SC-1-4-1	Observe patterns of the sun and moon as the appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.	ESS1-1
SC-1-4-2	Make observations at different time of the year to relate the amount of daylight to the time of the year. (emphasis is on relative comparisons of the amount of daylight tibn the winter to the amount in the spring or fall.)	ESS1-2
SC-1-4-3	Use observations of the sun, moon, and stars to describe patterns that can be predicted.	ESS1-1

Second Grade Science

Purpose Statement	Students in second grade will produce models to identify and represent land and bodies of water on Earth's surface. They will also compare and contrast the diversity of life in different habitats. They will plan and conduct an investigation involving the properties of matter.	
Outcome SC-2-1	**Students will plan and conduct an investigation involving the properties of matter.**	**State Standard**
SC-2-1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	2-PS1-1
SC-2-1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	2-PS1-2
SC-2-1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	K-2-ETS1-3
SC-2-1-4	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.	2-PS1-3
SC-2-1-5	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	K-2-ETS1-1
SC-2-1-6	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	2-PS1-4
Outcome SC-2-2	**Students will make observations of plants and animals to compare the diversity of life in different habitats.**	**State Standard**
SC-2-2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.	2-LS2-1
SC-2-2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	2-LS2-2
SC-2-2-3	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	K-2-ETS1-2

SC-2-2-4	Make observations of plants and animals to compare the diversity of life in different habitats.	2-LS4-1
Outcome SC-2-3	**Students will obtain, use and compare information from multiple sources to provide evidence, compare and create a model involving Earth events involving water or wind with the land and where water can be found in different states.**	**State Standard**
SC-2-3-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	2-ESS1-1
SC-2-3-2	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	2-ESS2-1
SC-2-3-3	Develop a model to represent the shapes and kinds of land and bodies of water in an area.	2-ESS2-2
SC-2-3-4	Obtain information to identify where water is found on Earth and that it can be solid, liquid, or gas.	2-ESS2-3

Third Grade Science

Purpose Statement	Students in third grade will investigate and solve problems of motion and stability using forces and interactions between objects. They will make models of the life cycles of organisms and explain the role of heredity and environment in survival. Third-grade students will collect weather data and analyze weather and climate conditions, and evaluate solutions that reduce the impacts of weather-related hazards.	
Outcome SC-3-1	**Students will plan and conduct an investigations involving force and motion.**	**State Standard**
SC-3-1-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	3-PS2-1.
SC-3-1-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	3-PS2-2.
SC-3-1-3	Ask question to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	3-PS2-3.
SC-3-1-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.	3-PS2-4
SC-3-1-5	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (connects to 3-PS2-4)	3-5-ETS1-1
SC-3-1-6	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (connects to 3-PS2-4)	3-5-ETS1-2
SC-3-1-7	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1-3
Outcome SC-3-2	**Students will construct a model of animal life cycles.**	**State Standard**

SC-3-2-1	Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	3-LS1-1
Outcome SC-3-3	**Students will use evidence to explain animals inherited traits.**	**State Standard**
SC-3-2-2	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	3-LS3-1
SC-3-2-3	Use evidence to support the explanation that observable traits can be influenced by the environment.	3-LS3-2
SC-3-2-4	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.	3-LS4-1
Outcome SC-3-4	**Students will explain animals' survival mechanisms and how the environment affects plants and animals.**	**State Standard**
SC-3-4-1	Construct an argument that some animals form groups that help members survive.	3-LS2-1
SC-3-4-2	Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	3-LS4-2
SC-3-4-3	Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	3-LS4-3
SC-3-4-4	Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	3-LS4-4
SC-3-4-5	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (connects to 3-LS4-4)	3-5-ETS1-1
SC-3-4-6	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (connects to 3-LS4-4)	3-5-ETS1-2

Outcome SC-3-5	Students will collect and represent weather data and evaluate solutions that reduce the impact of weather hazards.	State Standard
SC-3-5-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	3-ESS2-1
SC-3-5-2	Obtain and combine information to describe climates in different regions of the world.	3-ESS2-2
SC-3-5-3	Make a claim about the merit of a design solution that reduces the impacts of a weather related hazard.	3-ESS3-1
SC-3-5-4	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (connects to 3-ESS3-1)	3-5-ETS1-1
SC-3-5-5	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (connects to 3-ESS3-1)	3-5-ETS1-2

Fourth Grade

Purpose Statement	Students in 4th grade will analyze the effect of energy and human influences to determine the effects on Earth and it's systems. They will compare and contrast internal and external structures of plants and animals and their processes	
Outcome SC-4-1	**Students will explain that energy and fuels are derived from natural resources and how their use affects the environment.**	**State Standard**
SC-4-1-1	Define natural resources, renewable and nonrenewable resources and fossil fuels.	4-ESS3-1
SC-4-1-2	Classify renewable and nonrenewable natural resources (ie: wind energy, water behind dams, sunlight, natural gas, coal, oil).	4-ESS3-1
SC-4-1-3	Design a project communicating the use of preservation of natural resources and their positive or negative effect on the environment (ie: loss of habitat due to dams and surface mining, replanting trees to improve habitats).	4-ESS3-1 4-ESS3-2
Outcome SC-4-2	**Students will generate and evaluate multiple solutions to reduce the impacts of natural Earth processes on humans.**	**State Standard**
SC-4-2-1	List and discuss natural Earth processes (ie: earthquakes, volcanoes, floods, hurricanes, tsunamis).	4-ESS3-2
SC-4-2-2	Chart the impacts of natural Earth processes on humans (ie: earthquakes/buildings, volcanoes/air travel, hurricanes/coasts, etc.)	4-ESS3-2
SC-4-2-3	Formulate and present a solution to reduce the impact of a natural Earth process on humans. (earthquake resistant buildings, hurricane walls on coasts, etc.	4-ESS3-2
Outcome SC-4-3	**Students will identify evidence from patterns of rock formations and fossils in rock layers to justify changes in the Earth's surface over time.**	**State Standard**
SC-4-3-1	Identify the fact that Earth's surface has changed from land to water over time.	4-ESS2-1
SC-4-3-2	Describe erosion as the wearing away of a surface over time	4-ESS2-1

SC-4-3-3	Diagram the different levels of rock layers and fossils that indicate changes in the landscape (ie: aquatic fossils being found in Wyoming).	4-ESS2-1 4-ESS1-1
SC-4-3-4	Define weathering and erosion and evaluate the effect that various factors have on the weathering and erosion of the Earth's surface (ie: vegetation, volume of water flow, angle of slope, wind speed and temperature.	4-ESS2-2
SC-4-3-5	Use topographical maps of the Earth and ocean floor, formulate and support a hypothesis of what erosion or weathering processes occurred to produce a given land or water form.	4-ESS2-2
Outcome SC-4-4	**Students will describe internal and external structures of plants and animals that function to support growth, behavior, survival and reproduction**	**State Standard**
SC-4-4-1	Define internal and external structures of animals and plants.	4-LS1-1
SC-4-4-2	Compare structures in plants (ie: roots, stems, leaves, flowers) and animals (ie: muscles, bones, nerves) that serve different functions in survival.	4-LS1-1
SC-4-4-3	Give examples of and describe adaptations that allow plants and animals to survive (Camouflage - horned lizards, coyotes; mimicry - monarch and Viceroy butterflies, physical - cactus spines; mutualism-species of acacia that harbor ants, which repel other harmful insects.)	4-LS1-1
SC-4-4-4	List different growth patterns in plants and animals.	4-LS1-1
SC-4-4-5	Compare structures in plants (ie: roots, stems, leaves, flowers) and animals ie: muscles, bones, nerves) that serve different functions in growth.	4-LS1-1
SC-4-4-6	Predict how plants and animal structures support growth in adverse conditions. (plants: droughts, wind, rains, etc. Animals: droughts, heat, cold, injuries.)	4-LS1-1
SC-4-4-7	Define reproduction in plants and animals	4-LS1-1
SC-4-4-8	Develop a list of plants and animal reproduction and compare structures in plants (roots, stems, leaves, flowers) and animals (muscles, bones, nerves) that serve different functions in reproduction.	
Outcome SC-4-5	**Students will demonstrate an understanding that plants and animals have internal and external structures that function to support behavior.**	**State Standard**

SC-4-5-1	Define plant and animal behavior	4-LS1-2
SC-4-5-2	Develop a list of plants and animals that have distinctive behaviors	4-LS1-2
SC-4-5-3	Compare structures in plants (ie: roots, stems, leaves, flowers) and animals (ie: muscles, bones, nerves) that serve different functions in behavior.	4-LS1-2
SC-4-5-4	Create a chart of different plants and animals demonstrating an understanding of how their internal and external structures support their behavior.	4-LS1-2
SC-4-5-5	Define and create a list of sense receptors that animals have to live in their environment.	4-LS1-2
SC-4-5-6	Make a chart of the sense receptors animals have and the action that occurs with the brain's reception of the message.	4-LS1-2
Outcome SC-4-6	**Students will conduct experiments and describe how energy can be transferred from place to place by collisions, sound, light, heat and electric currents.**	**State Standard**
SC-4-6-1	Define energy and its various forms: heat, electric, sound, light	
SC-4-6-2	Plan, predict and execute an experiment demonstrating the speed and energy of an object and the changes in energy that occurs when objects collide (ie: a bowling ball moving slowly and colliding with the pins; a bowling ball moving quickly and colliding with the pins.)	4-PS3-1
SC-4-6-3	Formulate a conclusion from experiment data about the relationship between the speed and energy of an object and the changes in energy that occur when objects collide and what happens to that energy after the collision.	4-PS3-2
SC-4-6-4	Conduct experiments to show that energy is transferred by sound, light, heat, and electric currents.	4-PS3-3
SC-4-6-5	Design and build a device that converts energy from one form to another. (ie: lighting a bulb using electric current, musical instrument producing sound,	4-PS3-4
SC-4-6-6	Test, evaluate, and refine the device to assure its effectiveness of converting energy from one form to another.	4-PS3-4
Outcome SC-4-7	**Students will develop a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move.**	**State Standard**

SC-4-7-1	Define waves, amplitude and wavelength.	4-PS4-
SC-4-7-2	Observe classroom wave demonstrations and diagram a model of a wave demonstrating amplitude and wavelength (ie: slinky, jump rope, waves created in pans of water, videos.	4-PS4-1 4-PS4-2
SC-4-7-3	Evaluate the amplitude and wavelengths of the waves created and discuss any patterns found.	4-PS4-3

Fifth Grade

Purpose Statement	Students in fifth grade will investigate matter and provide evidence that regardless of change, mass is conserved. They will model the relationship between plant, animals, and the environment. Students will use science ideas to conserve Earth's resources and environment.	
Outcome SC-5-1	**Students will develop a model to demonstrate the relationships between plants, animals, decomposers, and the environment.**	**State Standards**
SC-5-1-1	Support an argument that plants get the materials they need for growth primarily from air and water.	5-LS1-1
SC-5-1-2	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	5-LS2-1
SC-5-1-3	Students will use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.	5-PS3-1
Outcome SC-5-2	**Students will describe and give examples of physical and chemical properties and conduct investigations to observe physical and chemical changes in matter.**	**State Standards**
SC-5-2-1	Develop a model to describe that matter is made of particles too small to be seen.	5-PS1-1
SC-5-2-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	5-PS1-2
SC-5-2-3	Make observations and measurements to identify materials based on their properties.	5-PS1-3
SC-5-2-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	5-PS1-4
SC-5-2-5	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	3-5-ETS1-3

Outcome SC-5-3	**Students will use evidence to support an argument that the gravitational force exerted by Earth on objects is directed down.**	**State Standards**
SC-5-3-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.	5-PS2-1
SC-5-3-2	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1.
Outcome SC-5-4	**Students will investigate and study patterns in the day and night sky.**	**State Standards**
SC-5-4-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	5-ESS1-1
SC-5-4-2	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	5-ESS1-2
Outcome SC-5-5	**Students will describe interactions between the Earth's systems and use science principles to solve problems involving Earth's resources.**	**State Standards**
SC-5-5-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	5-ESS2-1
SC-5-5-2	Describe and graph the amounts and percentages of water and freshwater in various reservoirs to provide evidence about the distribution of water on Earth.	5-ESS2-2
SC-5-5-3	Obtain and combine information about ways individual communities use science ideas to conserve Earth's resources and environment.	5-ESS3-1
SC-5-5-4	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	3-5-ETS1-1
SC-5-5-5	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	3-5-ETS1-2

Sixth Grade

Purpose Statement	Students in sixth grade will apply scientific principles to solve problems involving force, motion, waves, and energy.	
Outcome SC-6-1	**Students will develop models to demonstrate the properties of matter and conduct investigations to examine the effects of energy and interactions between substances.**	**State Standards**
SC-6-1-1	Students will develop models to describe the atomic composition of simple molecules and extended structures. (Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.)	MS-PS1-1
SC-6-1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	MS-PS1-2
SC-6-1-3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	MS-PS1-3
SC-6-1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	MS-PS1-4
SC-6-1-5	Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	MS-PS1-5
SC-6-1-6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	MS-PS1-6
SC-6-1-7	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	MS-ETS1-1

SC-6-1-8	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	MS-ETS1-2
SC-6-1-9	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	MS-ETS1-3
SC-6-1-10	Develop a model for a proposed object, tool or process and then use an iterative process to test the model, collect data, and generate modification ideas trending toward an optimal design.	MS-ETS1-4
SC-6-1-11	Ask questions about a common household appliance, collect data to reverse-engineer the appliance and learn how it's design has evolved, describe how scientific discoveries, technological advances, and engineering design played significant roles in its development, and explore how science, engineering and technology might be used together or individually in producing improved versions of the appliance.	MS-ETS2-1
SC-6-1-12	Develop a model defining and prioritizing the impacts of human activity on a particular aspect of the environment, identifying positive and negative consequences of the activity, both short and long-term, and investigate and explain how the ethics and integrity of scientists and engineers and respect for individual property rights might constrain future development.	MS-ETS2-2
Outcome SC-6-2	**Conduct investigations to explore and explain forces and motion.**	**State Standards**
SC-6-2-1	Apply Newton's third law to design a solution to a problem involving the motion of two colliding objects.	MS-PS2-1
SC-6-2-2	Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	MS-PS2-2
SC-6-2-3	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	MS-PS2-3
SC-6-2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	MS-PS2-4
SC-6-2-5	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	MS-PS2-5.

SC-6-2-6	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	MS-ETS1-1
SC-6-2-7	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	MS-ETS1-2
SC-6-2-8	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	MS-ETS1-3
SC-6-2-9	Develop a model for a proposed object, tool or process and then use an iterative process to test the model, collect data, and generate modification ideas trending toward an optimal design.	MS-ETS1-4
SC-6-2-10	Develop a model defining and prioritizing the impacts of human activity on a particular aspect of the environment, identifying positive and negative consequences of the activity, both short and long-term, and investigate and explain how the ethics and integrity of scientists and engineers and respect for individual property rights might constrain future development.	MS-ETS2-2
Outcome SC-6-3	**Students will conduct investigations that demonstrate different energy types and its ability to transfer between objects.**	**State Standards**
SC-6-3-1	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	MS-PS3-1
SC-6-3-2	Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	MS-PS3-2
SC-6-3-3	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	MS-PS3-3
SC-6-3-4	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	MS-PS3-4

SC-6-3-5	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	MS-PS3-5
SC-6-3-6	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	MS-ETS1-1
SC-6-3-7	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	MS-ETS1-2
SC-6-3-8	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	MS-ETS1-3
Outcome SC-6-4	**Students will identify wave properties and explain how they affect the energy of the wave.**	**State Standard**
SC-6-4-1	Use mathematical representations to describe a simple model for waves, which includes how the amplitude of a wave is related to the energy in a wave.	MS-PS4-1
SC-6-4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials	MS-PS4-2
SC-6-4-3	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	MS-PS4-3

Seventh Grade Life Science

Purpose Statement	Students in seventh grade will analyze cell processes and cellular reproduction to determine how they relate to living systems. Students will use models to describe atoms, their place on the periodic table, and relationships with chemical reactions.	
Outcome SC-LS-1	**Students will conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.**	**State Standard MS-LS1-1**
SC-LS-1-1	Use a microscope to investigate both plant and animal cells.	
Outcome SC-LS-2	**Students will develop and use models to describe the parts, functions, and basic processes of cells.**	**State Standard MS-LS1-2**
SC-LS-2-1	Differentiate between and label both a plant cell and animal cell.	
SC-LS-2-2	Describe the basic organelles.	
Outcome SC-LS-3	**Students will use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.**	**State Standard MS-LS1-3**
SC-LS-3-1	Create models of cells to tissue to organs to organ systems to organisms.	
SC-LS-3-2	Interpret Levels of Organization.	
Outcome SC-LS-4	**Students will 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.**	**State Standard MS-LS1-4**
SC-LS-4-1	Compare sexual reproduction and asexual reproduction.	
SC-LS-4-2	Describe and give examples of both physical and behavioral adaptations needed for reproduction.	
Outcome SC-LS-5	**Students will construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms**	**State Standard MS-LS1-5**
SC-LS-5-1	Compare environmental factors to genetic factors.	

Outcome SC-LS-6	**Students will 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.**	**State Standard MS-LS1-6**
SC-LS-6-1	Create a food chain/web/pyramid.	
SC-LS-6-2	Interpret the process of photosynthesis in plants.	
Outcome SC-LS-7	**Students will develop a model to describe how food molecules (sugar) are rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.**	**State Standard MS-LS1-7**
SC-LS-7-1	Interpret the process of cellular respiration in organisms.	
Outcome SC-LS-8	**Students will gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.**	**State Standard MS-LS1-8**
SC-LS-8-1	Compare the relationship between stimulus and response.	
SC-LS-8-2	Compare innate to learned behaviors.	
Outcome SC-LS-9	**Students will analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.**	**State Standard MS-LS2-1**
SC-LS-9-1	Analyze data on carrying capacity and its effects on the environment.	
Outcome SC-LS-10	**Students will construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.**	**State Standard MS-LS2-2**
SC-LS-10-1	Differentiate roles within an ecosystem.	
SC-LS-10-2	Identify examples of symbiosis (organism relationships).	
Outcome SC-LS-11	**Students will develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.**	**State Standard MS-LS2-3**
SC-LS-11-1	Develop a model of the energy pyramid.	
SC-LS-11-2	Investigate the basic laws of conservation.	

Outcome SC-LS-12	**Students will construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.**	**State Standard MS-LS2-4**
SC-LS-12-1	Compare biotic and abiotic factors.	
SC-LS-12-2	Describe the effect on a population of things such as drought, excess precipitation, invasive species or predators.	
Outcome SC-LS-13	**Students will evaluate competing design solutions for maintaining biodiversity and ecosystem services.**	**State Standard MS-LS2-5 MS-ETS1-2 MS-ETS1-3 MS-ETS1-4 MS-ETS2-2**
SC-LS-13-1	Infer the human impact, both positive and negative, on the ecosystem.	
Outcome SC-LS-14	**Students will 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.**	**State Standard MS-LS3-1**
SC-LS-14-1	Describe the effects of change of genes and its role in mutations.	
Outcome SC-LS-15	**Students will develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction result in offspring with genetic variation.**	**State Standard MS-LS3-2**
SC-LS-15-1	Develop and use Punnett squares to predict offspring outcomes.	
SC-LS-15-2	Describe the differences between mitosis and meiosis.	
SC-LS-15-3	Compare sexual vs. asexual reproduction.	
Outcome SC-LS-16	**Students will 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.**	**State Standard MS-LS4-1**
SC-LS-16-1	Analyze the evidence for evolution.	

Outcome SC-LS-17	**Students will 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.**	**State Standard MS-LS4-2**
SC-LS-17-1	Compare anatomical structures of related species.	
Outcome SC-LS-18	**Students will construct an explanation based on evidence that describes how genetic variations of traits in a population affects individuals' probability of surviving and reproducing in a specific environment.**	**State Standard MS-LS4-4**
SC-LS-18-1	Use explanations of Mendel's laws to describe genetic variations and natural selection.	
Outcome SC-LS-19	**Students will gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.**	**State Standard MS-LS4-5 MS-ETS2-1 MS-ETS2-2**
SC-LS-19-1	Imply the social implications of human influence on genetics/reproductions (cloning, genetic engineering, transgenic crops).	
Outcome SC-LS-20	**Students will use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.**	**State Standard MS-LS4-6**
SC-LS-20-1	Interpret data such as predator and prey relationships or resource availability, to predict future outcomes.	
SC-LS-20-2	Use data to show how populations change based on the environment and natural selection	

Eighth Grade Earth Science

Purpose Statement	Students in eighth grade will examine theories of past, present, and future events to explain changes in plate tectonics, space, and earth systems.	
Outcome SC-ES-1	**Students will develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.**	**State Standard MS-ESS1-1**
SC-ES-1-1	Create models of positions of objects during: seasons, phases of the moon, eclipses.	
SC-ES-1-	Describe how the Earth's tilt will affect seasons.	
Outcome SC-ES-2	**Students will develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.**	**State Standard MS-ESS1-2**
SC-ES-2-1	Explain the model of how gravitational pull, keeps the solar system in orbits.	
SC-ES-2-2	Develop a model to show the placement of objects in solar systems.	
Outcome SC-ES-3	**Students will analyze and interpret data to determine the scale properties of objects in the solar system.**	**State Standard MS-ESS1-3 MS-ETS2-1**
SC-ES-3-1	Interpret a scale of the objects in the solar system.	
SC-ES-3-2	Analyze the basic properties of each planet and its characteristics.	
Outcome SC-ES-4	**Students will construct a scientific explanation based on evidence from rocks and rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.**	**State Standard MS-ESS1-4**
SC-ES-4-1	Construct a timeline and story of the Earth's major events	
SC-ES-4-2	Explain how scientist use fossils and dating techniques to theorize geological events of the past.	

Outcome SC-ES-5	**Students will develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.**	**State Standard MS-ESS2-1**
SC-ES-5-1	Interpret the Rock Cycle model.	
SC-ES-5-2	Describe the processes that create each type of rock in the cycle (lithification, weathering, melting, etc.).	
Outcome SC-ES-6	**Students will construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.**	**State Standard MS-ESS2-2**
SC-ES-6-1	Explain the theory of plate tectonics and how it has changed Earth.	
SC-ES-6-2	Describe the cause and effect relationship between weathering/erosion/deposition.	
Outcome SC-ES-7	**Students will analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.**	**State Standard MS-ESS2-3**
SC-ES-7-1	Build a model of Pangaea and describe the theory based on fossils, rocks, and other data.	
SC-ES-7-2	Explain the relationship between seafloor spreading and plate tectonics.	
SC-ES-7-3	Predict future events based on current evidence of plate tectonics.	
Outcome SC-ES-8	**Students will develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.**	**State Standard MS-ESS2-4**
SC-ES-8-1	Create and describe a model of the water cycle (evaporation, precipitation, etc.).	
Outcome SC-ES-9	**Students will collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.**	**State Standard MS-ESS2-5**
SC-ES-9-1	Collect weather data (temp, pressure, humidity, precipitation, wind).	
SC-ES-9-2	Predict future weather based on data and the movement of air masses and fronts.	

Outcome SC-ES-10	**Students will develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.**	**State Standard MS-ESS2-6**
SC-ES-10-1	Develop and use a model to describe how patterns such as wind, oceans, location and other climate factors affect Earth and its biomes.	
Outcome SC-ES-11	**Students will construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.**	**State Standard MS-ESS3-1**
SC-ES-11-1	Describe renewable vs nonrenewable resources.	
SC-ES-11-2	Explain the use and misuse of resources and predict how they should be used in the future.	
Outcome SC-ES-12	**Students will analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.**	**State Standard MS-ESS3-2**
SC-ES-12-1	Explain how severe weather (tornadoes, hurricanes, etc) are predicted and tracked.	
SC-ES-12-2	Explain how patterns of natural hazards can help predict natural disasters including earthquakes, volcanoes, and other natural disasters.	
Outcome SC-ES-13	**Students will apply scientific principles to design a method for monitoring, evaluating, and managing a human impact on the environment.**	**State Standard MS-ESS3-3 MS-ETS1-1 MS-ETS1-2 MS-ETS1-3 MS-ETS1-4 MS-ETS2-2**
SC-ES-13-1	Examine human impact on the environment (pollution, land usage, water usage).	
SC-ES-13-2	Design a solution to solve the impacts of humans on earth’s resources.	
Outcome SC-ES-14	**Students will construct an argument supported by evidence for how changes in human population and per-capita consumption of natural resources impact Earth's systems.**	**State Standard MS-ESS3-4**

SC-ES-14-1	Explain how human population affects resources.	
SC-ES-14-2	Explain rates of usage of resources and their impact on Earth's systems.	
Outcome SC-ES-15	**Students will ask questions to clarify evidence of the factors that have caused changes in global temperatures over time.**	**State Standard MS-ESS3-5 MS-ETS1-2**
SC-ES-15-1	Analyze and interpret data involving climate change.	
SC-ES-15-2	Use graphs/tables/data about human activities over time vs temperatures/gases over time.	

Biology I

Purpose Statement	Students in Biology I will analyze matter and cell processes to model and predict the relationship between inheritance and evolution. Students will construct models that represent the relationships between living things and their environment.	
Outcome SC-BI-1	**Students will develop models of cells to demonstrate their ability to identify cell structures which they will use to explain cell function as it relates to homeostasis.**	**State Standard**
SC-BI-1-1	Differentiate between unicellular and multicellular organisms.	HS-LS1-2
SC-BI-1-2	Compare and contrast prokaryotic and eukaryotic organisms.	HS-LS1-2
SC-BI-1-3	Construct a model of an animal and plant cell.	HS-LS1-2
SC-BI-1-4	Identify the individual organelles within the models.	HS-LS1-3
SC-BI-1-5	Describe how cellular transport mechanisms maintain homeostasis.	HS-LS1-3
Outcome SC-BI-2	**Students will observe and diagram the stages of cell reproduction and predict the importance of cell division for growth and maintenance of multicellular organisms.**	**State Standard**
SC-BI-2-1	Summarize the primary stages of the cell cycle.	HS-LS1-4
SC-BI-2-2	Describe the events of each stage of mitosis.	HS-LS1-4
SC-BI-2-3	Describe the events of each state of meiosis.	HS-LS1-4
SC-BI-2-4	Compare and contrast mitosis and meiosis to show how each process provides for the growth of multicellular organisms.	HS-LS3-1
SC-BI-2-5	Analyze the importance of meiosis in providing genetic variation.	HS-LS3-1; HS-LS3-3; HS-LS3-2
Outcome SC-BI-3	**Students will analyze the structures of chloroplasts and mitochondria to develop an**	**State Standard**

	explanation of how sunlight is converted into chemical energy and how chemical energy is used by cells.	
SC-BI-3-1	Explain how sunlight is converted to chemical energy through the process of photosynthesis.	HS-LS1-5; HS-LS2-3
SC-BI-3-2	Assess the process of cellular respiration to explain how chemical energy is used by cells for maintenance and growth.	HS-LS1-7; HS-LS2-3
Outcome SC-BI-4	**Students will explain the organization of Earth's living and nonliving resources by diagramming the relationships between organisms and their living and nonliving environment and predicting the outcomes of specific changes to their environment.**	**State Standard**
SC-BI-4-1	Differentiate between the various relationships that exist between organisms and their environment.	HS-LS2-1; HS-ETS1-4; HS-LS2-4; HS-LS2-6
SC-BI-4-2	Diagram and label food chains and food webs.	HS-LS2-1; HS-ETS1-4; HS-LS2-4
SC-BI-4-3	Examine how climatic changes impact organisms now and predict how they will impact organisms in the future.	HS-LS2-1; HS-ETS1-4; HS-LS2-2; HS-LS2-6
SC-BI-4-4	Predict the consequences of continued human population growth.	HS-LS2-1; HS-LS2-2; HS-LS2-6; HS-LS2-7; HS-ETS1-1; HS-ETS1-2; HS-ETS1-4; HS-ESS3-6
Outcome SC-BI-5	**Students will show how matter is converted within the Earth's system by evaluating diagrams of the water, carbon, and nitrogen cycles to determine what living and nonliving factors are involved in these cycles.**	**State Standard**
SC-BI-5-1	Construct and manipulate models of carbon, hydrogen and oxygen to show how they can be combined to form the building blocks of proteins, lipids, carbohydrates, and nucleic acids.	HS-LS1-6

SC-BI-5-2	Examine the biochemical cycling of water and nutrients through an ecosystem.	HS-LS2-3; HS-LS2-4; HS-LS2-5
SC-BI-5-3	Describe energy flow through an ecosystem.	HS-LS2-1; HS-LS2-4; HS-LS2-5; HS-ETS1-4
Outcome SC-BI-6	**Students will evaluate the biodiversity of Earth's different biomes to determine the factors that increase and decrease biodiversity and form a plan to suggest ways that human practices could be changed to help conserve biodiversity.**	**State Standard**
SC-BI-6-1	Distinguish among terrestrial biomes based on climate and biotic factors.	HS-LS2-6; HS-ETS1-5
SC-BI-6-2	Identify the major factors that determine aquatic ecosystems.	HS-LS2-6; HS-ETS1-5
SC-BI-6-3	Explain the importance of biodiversity.	HS-LS2-2; HS-LS2-7; HS-ETS1-1; HS-ETS1-2; HS-ETS1-4; HS-ETS1-5
SC-BI-6-4	Design a plan that demonstrates how changes in human activities could help conserve biodiversity.	HS-LS2-2; HS-LS2-6; HS-LS2-7; HS-LS4-6; HS-ETS1-4; HS-ETS1-1; HS-ETS1-2; HS-ETS1-5; HS-ESS3-6
Outcome SC-BI-7	**Students will construct and manipulate models of DNA and RNA to show how DNA is organized, copied, and used to create a protein. Students will evaluate how changes (mutations) in DNA sequences can result in changes in the protein they code for and what effect these changes may have on the organism.**	**State Standard**
SC-BI-7-1	Diagram the basic structure of the double helical model of DNA.	HS-LS1-1; HS-LS3-1
SC-BI-7-2	Summarize the steps involved in DNA replication.	HS-LS3-2; HS-ETS1-5

SC-BI-7-3	Compare and contrast the structures and functions of DNA and RNA.	HS-LS1-1
SC-BI-7-4	Explain how the code of DNA is translated into messenger RNA and is utilized to synthesize a particular protein.	HS-LS1-1; HS-LS3-2; HS-ETS1-5
SC-BI-7-5	Summarize the various types of mutations and assess what effect these changes may have on an organism.	HS-LS3-2; HS-LS4-5; HS-ETS1-5
Outcome SC-BI-8	**Students will construct models that predict the possible results of a genetic cross. Students will create charts that represent the patterns of inheritance for dominant, recessive, and sex-linked traits.**	**State Standard**
SC-BI-8-1	Predict the possible offspring from a monohybrid, co-dominant, and hybrid cross using Punnett squares.	HS-LS3-2; HS-LS3-3; HS-ETS1-5
SC-BI-8-2	Distinguish between various complex inheritance patterns for dominant, recessive, and sex-linked traits.	HS-LS3-1; HS-LS3-3
Outcome SC-BI-9	**Students will use the principles of genetics and inheritance to examine complex human traits and formulate hypotheses that explain possible reasons or causes for the observed traits.**	**State Standard**
SC-BI-9-1	Identify the mutagens responsible for human mutations.	HS-LS3-2; HS-LS4-5; HS-ETS1-5
SC-BI-9-2	Compare and contrast body-cell and sex-cell mutations.	HS-LS3-2; HS-ETS1-5
SC-BI-9-3	Summarize examples of dominant and recessive human genetic disorders.	HS-LS3-2; HS-ETS1-5
Outcome SC-BI-10	**Students will demonstrate an understanding of natural selection by performing an activity that models variation and adaptations in different environments and show which variations are best to ensure survival.**	**State Standard**
SC-BI-10-1	Discuss the evidence that convinced Darwin that species could change over time.	HS-LS4-1
SC-BI-10-2	Identify the principles of natural selection.	HS-LS4-2; HS-LS4-4; HS-LS4-5; HS-ETS1-5

SC-BI-10-3	Explain how natural selection could change a population.	HS-LS4-2; HS-LS2-8
SC-BI-10-4	Evaluate data that provides evidence for how biotic and abiotic differences in ecosystems contribute to adaptations resulting in species survival.	HS-LS4-1; HS-LS2-8; HS-LS4-3; HS-LS4-4; HS-LS4-5; HS-ETS1-5
Outcome SC-BI-11	**Students will evaluate evidence for evolution to determine how changes in Earth's climate, surface composition, and natural cycles have led to changes in life's characteristics and make predictions about future changes.**	**State Standard**
SC-BI-11-1	Identify key pieces of evidence that support the Theory of Evolution.	HS-LS4-1
SC-BI-11-1	Discuss patterns observed in evolution.	HS-LS4-3; HS-LS4-5; HS-ETS1-5
SC-BI-11-1	Sequence the events that might have led to cellular life.	HS-LS4-4; HS-LS4-5; HS-ETS1-5
SC-BI-11-1	Make an inference about the evolution of man.	HS-LS4-1
Outcome SC-BI-12	**Students will use evolutionary traits and other anatomical evidence to classify living organisms according to the levels of modern classification.**	**State Standard**
SC-BI-12-1	Compare Aristotle's and Linnaeus methods of classifying organisms.	HS-LS4-1
SC-BI-12-2	Explain how to write a scientific name using Binomial nomenclature.	HS-LS4-1
SC-BI-12-3	Summarize the taxa in Biological classification.	HS-ESS2-7
SC-BI-12-4	Compare and contrast species concept.	HS-LS4-1
SC-BI-12-5	Compare major characteristics of the three domains.	HS-LS4-1
SC-BI-12-6	Differentiate among the six kingdoms.	HS-LS4-1
SC-BI-12-7	Classify organisms to the kingdom level.	HS-LS4-1
SC-BI-12-8	Explain how organisms in each of the six kingdoms impact or affect man.	

Biology II

Purpose Statement	Students in Biology II will apply principles of biology to the organization and functions of the human body systems and compare and contrast changes throughout the human lifespan.	
Outcome SC-BII-1	**Students will explain the organization of the human body using anatomical terminology to locate body regions, sections, and relative positions.**	**State Standard**
SC-BII-1-1	Identify the characteristics of life.	HS-LS1-2
SC-BII-1-2	Diagram anatomical position.	HS-LS1-2
SC-BII-1-3	Explain the biological levels of organization.	HS-LS1-2
SC-BII-1-4	Describe the locations of the major body cavities and list the organs located in each cavity.	HS-LS1-2
Outcome SC-BII-2	**Students will observe the four major categories of human tissue and provide example of where each occurs in the body.**	**State Standard**
SC-BII-2-1	List the four major categories of human tissues.	HS-LS1-2
SC-BII-2-2	Provide examples of where each tissue occurs in the body.	HS-LS1-2
SC-BII-2-3	Describe the general characteristics and functions of epithelial, connective muscle and nervous tissue.	HS-LS1-2
SC-BII-2-4	Name the types of epithelium and identify an organ in which each is found.	HS-LS1-2
SC-BII-2-5	Name the types of connective tissues and identify an organ in which each is found.	HS-LS1-2
SC-BII-2-6	Distinguish among the three types of muscle tissues.	HS-LS1-2
SC-BII-2-7	Distinguish among the types of nervous tissues.	HS-LS1-2
SC-BII-2-8	Describe the four major types of membranes.	HS-LS1-2
Outcome SC-BII-3	**Students will develop a model of the skin and its tissues to explain the regulation of body temperature and healing of wounds.**	**State Standard**
SC-BII-3-1	Describe the structure of the layers of the skin.	HS-LS1-2

SC-BII-3-2	List the general functions of each layer of skin.	HS-LS1-2
SC-BII-3-3	Summarize the factors that determine skin color.	HS-LS1-2; HS-LS1-3
SC-BII-3-4	Describe the accessory organs associated with the skin.	HS-LS1-2
SC-BII-3-5	Explain how the skin helps regulate body temperature.	HS-LS1-2; HS-LS1-3
SC-BII-3-6	Describe the tissues that are part of wound healing.	HS-LS1-2; HS-LS1-3
Outcome SC-BII-4	**Students will develop a model of the skeletal system to explain bone structure, bone development and growth, bone function, and skeletal organization.**	**State Standard**
SC-BII-4-1	Label a diagram of the human skeleton identifying bone location.	HS-LS1-2
SC-BII-4-2	Identify the active tissues in a bone.	HS-LS1-2
SC-BII-4-3	Describe the general structure of a bone and list the function of its parts.	HS-LS1-2; HS-LS1-3
SC-BII-4-4	Explain how endochondral and intramembranous bones develop and grow.	HS-LS1-2
SC-BII-4-5	Describe the major functions of bones.	HS-LS1-2
SC-BII-4-6	Explain skeletal organization by identifying the major parts of the axial and appendicular skeleton.	HS-LS1-2
SC-BII-4-7	List the three classes of joints, describe the characteristics and name an example of each.	HS-LS1-2
SC-BII-4-8	Explain how skeletal muscles produce movements at joints, and identify several types of joint movements.	HS-LS1-2
Outcome SC-BII-5	**Students will demonstrate an understanding of the human muscular system by labeling the structure of a skeletal muscle, explain the major events of skeletal muscle contraction, distinguishing between skeletal, cardiac, and smooth muscle and identifying major skeletal muscles and their actions.**	**State Standard**
SC-BII-5-1	Compare and contrast the structure and functions of skeletal, cardiac, and smooth muscle tissue.	HS-LS1-2

SC-BII-5-2	Diagram and label a skeletal muscle and neuromuscular function.	HS-LS1-2; HS-LS1-3
SC-BII-5-3	Explain the major events of skeletal muscle fiber contraction.	HS-LS1-2; HS-LS1-3
SC-BII-5-4	Explain how the types of muscular contractions produce body movements and help maintain posture.	HS-LS1-2
SC-BII-5-5	Describe the locations and actions of major skeletal muscles of each body region.	HS-LS1-2
Outcome SC-BII-6	**Students will develop an understanding of the human nervous system by describing the functions of the nervous system, differentiating between nervous and neuroglia, and describing the events that lead to the conducting of a nerve impulse.**	**State Standard**
SC-BII-6-1	Distinguish between the two types of cells that make up nervous tissue.	HS-LS1-2
SC-BII-6-2	Explain the general function of the nervous system.	HS-LS1-2
SC-BII-6-3	Diagram and label the general structure of a nerve.	HS-LS1-2
SC-BII-6-4	Describe the events that lead to the conduction of a nerve impulse.	HS-LS1-2; HS-LS1-3
SC-BII-6-5	Diagram and label a synapse.	HS-LS1-2; HS-LS1-3
SC-BII-6-6	Illustrate the synaptic transmission of a nerve impulse.	HS-LS1-2; HS-LS1-3
Outcome SC-BII-7	**Students will develop an understanding of the central and peripheral nervous systems by describing nerve pathways, the structure and functions of the brain and spinal cord and the structure and functions of the peripheral and autonomic nervous systems.**	**State Standard**
SC-BII-7-1	Describe the general ways in which the nervous system processes information.	HS-LS1-2
SC-BII-7-2	Label the parts of a reflex are and describe the function of each part.	HS-LS1-2; HS-LS1-3

SC-BII-7-3	Name the major parts and functions of the brain.	HS-LS1-2
SC-BII-7-4	Name the major parts and functions of the spinal cord.	HS-LS1-2
SC-BII-7-5	Name the major parts and functions of the peripheral nervous system.	HS-LS1-2
SC-BII-7-6	Name the major parts and functions of the autonomic nervous system.	HS-LS1-2
Outcome SC-BII-8	**Students will develop an understanding of somatic and special senses by describing the receptors and effectors associated with touch, pressure, temperature, pain, smell, taste, hearing and sight.**	**State Standard**
SC-BII-8-1	Distinguish between somatic senses and special senses.	HS-LS1-2
SC-BII-8-2	Identify five kinds of receptors and explain their functions.	HS-LS1-2; HS-LS1-3
SC-BII-8-3	Describe the receptors associated with the senses of touch, pressure, temperature, and pain.	HS-LS1-2
SC-BII-8-4	Explain the relationship between the senses of smell and taste.	HS-LS1-2
SC-BII-8-5	Explain the mechanism for smell.	HS-LS1-2
SC-BII-8-6	Explain the mechanism for taste.	HS-LS1-2
SC-BII-8-7	Name the parts of the ear, and explain the function of each part.	HS-LS1-2
SC-BII-8-8	Name the parts of the eye, and explain the function of each part.	HS-LS1-2
SC-BII-8-9	Describe the nerve pathways for hearing and vision.	HS-LS1-2
Outcome SC-BII-9	**Students will develop an understanding of the respiratory system by describing the locations and functions of the organs of the R.S., the breathing mechanisms and gas transport and exchange.**	**State Standard**
SC-BII-9-1	List the general functions of the respiratory system.	HS-LS1-2
SC-BII-9-2	Name and describe the locations and functions of the organs of the R.S.	HS-LS1-2
SC-BII-9-3	Explain the mechanisms of inspiration and expiration.	HS-LS1-2
SC-BII-9-4	Locate the respiratory center in the brain and explain how it controls normal breathing.	HS-LS1-2; HS-LS1-3

SC-BII-9-5	Describe the structure and function of the respiratory membrane.	HS-LS1-2
SC-BII-9-6	Explain how air and blood exchange gases and how blood transports these gases.	HS-LS1-2
Outcome SC-BII-10	**Students will develop an understanding of the cardiovascular system by describing the structure and function of blood, the structure and function of the organs and vessels of the C-V system and parts of circulation.**	**State Standard**
SC-BII-10-1	Describe the general characteristics of blood, and discuss its major functions.	HS-LS1-2
SC-BII-10-2	Distinguish among three formed elements and plasma of the blood.	HS-LS1-2
SC-BII-10-3	Explain the central of red blood cell production.	HS-LS1-2
SC-BII-10-4	Distinguish among the five types of white blood cells and give the functions of each type.	HS-LS1-2
SC-BII-10-5	Explain the mechanisms of homeostasis.	HS-LS1-2; HS-LS1-3
SC-BII-10-6	Name the organs of the cardiovascular system and discuss their functions.	HS-LS1-2
SC-BII-10-7	Identify and locate the major parts of the heart, and discuss the functions of each part.	HS-LS1-2
SC-BII-10-8	Compare the structures and functions of the major types of blood vessels.	HS-LS1-2
SC-BII-10-9	Trace the pathway of blood throughout the heart.	HS-LS1-2
SC-BII-10-10	Trace the pathway of blood through the pulmonary and systemic circuits of the cardiovascular system.	HS-LS1-2
Outcome SC-BII-11	**Students will develop an understanding of the digestive system by describing the general structure and function of each component of the alimentary canal and explain the mechanism for digestion.**	**State Standard**
SC-BII-11-1	Describe the general functions of the digestive system.	HS-LS1-2
SC-BII-11-2	Name the major organs of the digestive system and give their functions.	HS-LS1-2

SC-BII-11-3	Explain how the contents of the alimentary canal are mixed and moved.	HS-LS1-2
SC-BII-11-4	Explain how the products of digestion are absorbed and eliminated.	HS-LS1-2; HS-LS1-3

Chemistry I

Purpose Statement	Students will develop a conceptual and mathematical understanding of the structure and properties of matter as well as the interactions between matter and energy.	
Outcome SC-CI-1	**Students will use the scientific method to safely collect and analyze data in studying a problem.**	**State Standard**
SC-CI-1-1	Analyze data from an experiment both quantitatively and qualitatively.	Science and Engineering Practices #1-8
SC-CI-1-2	Safely and effectively apply laboratory techniques.	Science and Engineering Practices #3
Outcome SC-CI-2	**Students will use the quantities and units associated with the International System of Units (SI) to make measurements and solve problems in Chemistry.**	**State Standard**
SC-CI-2-1	Correctly use SI base units along with their prefixes to solve problems. Convert between various SI units using their prefixes.	Science and Engineering Practices #5
SC-CI-2-2	Convert quantities between the English system and the SI system.	Science and Engineering Practices #5
SC-CI-2-3	Apply concepts involving significant figures and scientific notation to Chemistry calculations.	Science and Engineering Practices #5
Outcome SC-CI-3	**Students will distinguish between physical and chemical properties and changes. They will apply the Law of Conservation of Mass.**	**State Standard**
SC-CI-3-1	Describe the physical states of matter and state changes by demonstrating an understanding of how energy affects the kinetic energy of their particles.	MS-PS1-4
SC-CI-3-2	Distinguish between physical and chemical changes. Explain evidence of chemical changes.	MS-PS1-2
SC-CI-3-3	Apply the Law of Conservation of Mass. Explain how that Law can be broken in nuclear reactions.	MS-PS1-5 HS-PS1-8

SC-CI-3-4	Using graphs and/or molecular-level diagrams, describe how chemical reactions can release or absorb energy and that this energy is dependent on the changes in total bond energy. Use photosynthesis and cellular respirations as examples.	HS-PS1-4 HS-LS1-5 HS-LS1-7
SC-CI-3-5	Conduct an investigation and perform calculations involving specific heat that demonstrate thermal energy transfers between two substances at different temperatures.	HS-PS3-4
Outcome SC-CI-4	**Students will describe the structure of the atom and how different models of the atom were developed.**	**State Standard**
SC-CI-4-1	Explain the evidence that led to various historical models of the atom. These can include the work of Democritus, Dalton, Thomson, Rutherford, Bohr, and the Quantum Mechanical model.	Science and Engineering Practices #2, 7, and 8.
SC-CI-4-2	Distinguish between the subatomic particles of an atom in terms of relative charge, mass in amu, and location.	Science and Engineering Practices #2.
SC-CI-4-3	Calculate the number of protons, neutrons, and electrons in an isotope of an atom using the periodic table and mass number. Explain why atomic masses on the periodic table are generally not whole numbers.	Science and Engineering Practices #2, 4.
SC-CI-4-4	Explain ways that unstable nuclei can go through radioactive decay. Describe the characteristics of alpha, beta, and gamma radiation.	HS-PS1-8
SC-CI-4-5	Use models (such as diagrams) to explain the difference between nuclear fusion and fission. Describe how very small amounts of mass can produce tremendous amounts of energy. Explain how nuclear fusion can produce energy from the sun that reaches the Earth in the form of radiation.	HS-PS1-8 HS-ESS1-1 Science and Engineering Practices #2.
Outcome SC-CI-5	**Students will express the arrangements of electrons in atoms using energy levels, electron configurations, and electron dot diagrams. They will also describe interactions of electrons with light.**	**State Standard**
SC-CI-5-1	Compare the wave and particle models of light. Describe historical experiments (such as the quantum concept, the photoelectric effect, and atomic emission spectra) that fit in each of these models of light.	HS-PS4-3 Science and Engineering Practices #2,7.

SC-CI-5-2	Describe characteristics of waves such as energy, frequency, wavelength, and speeds conceptually and mathematically. Compare and contrast electromagnetic waves and sound waves.	HS-PS4-1 Science and Engineering Practices #2,5.
SC-CI-5-3	Explain how various parts of the electromagnetic spectrum can be used.	HS-PS4-5
SC-CI-5-4	Explain ideas about the Quantum Mechanical view of the atom such as energy levels, sublevels, orbitals, and spin. Apply these ideas to write electron configurations, orbital diagrams (boxes and arrows), and electron dot diagrams of valence electrons.	HS-PS-1-2 Science and Engineering Practices #2,7,8.
Outcome SC-CI-6	**Students will describe the organization of the Periodic Table and relate it to trends seen in the elements.**	**State Standard**
SC-CI-6-1	Analyze evidence that led to the development of the periodic table. This can include the work of Lavoisier, Newlands, Meyer, Mendeleev, and Moseley.	Science and Engineering Practices #4,7.
SC-CI-6-2	Explain why elements in the same group have similar properties. Connect properties of elements to electron configurations.	HS-PS1-1
SC-CI-6-3	Compare period and group trends for ionization energy, electronegativity, electron affinity, atomic radius, and ionic radius.	HS-PS1-1 HS-PS1-2
SC-CI-6-4	Recognize the s, p, d, and f blocks on the periodic table.	HS-PS1-1
SC-CI-6-5	Describe differences between metals, nonmetals, and metalloids and possible uses for each along with their locations on the periodic table.	HS-PS1-1
Outcome SC-CI-7	**Students will describe various types of chemical bonds and relate those bonds to observed properties of chemical substances.**	**State Standard**
SC-CI-7-1	Explain how the relative strengths of forces such as hydrogen bonding, dipole-dipole forces, and electrical charges can affect the properties of chemical substances. Examples could include cohesion, adhesion, and surface tension.	HS-PS1-3 HS-PS2-6 HS-PS3-5

SC-CI-7-2	Explain why atoms form chemical bonds. Use electron configurations and models to demonstrate why atoms form these bonds.	HS-PS1-2
SC-CI-7-3	Make models (such as diagrams) showing how ionic bonds, covalent bonds, and metallic bonds form. Relate these bond formations to electron configurations.	HS-PS1-2 HS-PS1-3
SC-CI-7-4	Compare the properties of polar and nonpolar compounds. Explain why differences in polarity occur using periodic trends such as electronegativity differences.	HS-PS1-3 HS-PS2-6
SC-CI-7-5	Explain the properties of metals and connect those properties to metallic bonding.	HS-PS1-2 HS-PS2-6
SC-CI-7-6	Name and write formulas for binary and ternary chemical compounds by using oxidation numbers and ionic charges. These include compounds with and without polyatomic ions. Name and write formulas for hydrates.	HS-PS1-2
SC-CI-7-7	Name and write formulas for hydrocarbons and acids (including binary acids and oxyacids).	HS-PS1-2
SC-CI-7-8	Explain differences in the structural formulas for sugars, amino acids, proteins, lipids, and carbohydrates.	HS-LS1-6
SC-CI-7-9	Draw structural formulas and Lewis structures that show how various compounds can meet the octet rule to make molecules more stable.	HS-PS1-2 Science and Engineering Practices #2,6,8.
Outcome SC-CI-8	**Students will write, balance, and classify chemical reactions. They will also calculate the number of moles and mass of a reactant or product.**	**State Standard**
SC-CI-8-1	Classify and balance chemical reactions including synthesis, decomposition, single replacement, double replacement, and combustion. Identify solids, liquids, gases, aqueous solutions, and precipitates.	HS-PS1-7
SC-CI-8-2	Use the activity series to determine whether or not a single replacement reaction will proceed.	HS-PS1-6

Chemistry II

Purpose Statement	Students in Chemistry II will apply scientific reasoning and processes to organize, analyze, and interpret transformations of matter and energy.	
Outcome SC-CII-1	**Students will explain and recognize how the scientific method has been used in chemistry over history. Students will use the metric system and significant digits to solve many types of problems in chemistry.**	**State Standard**
SC-CII-1-1	Solve problems involving the metric system, significant figures, and conversions (within the metric system and between metric and English systems).	Science and Engineering Practices #3-8
SC-CII-1-2	Solve problems involving volume, density, temperature, heat, and specific heat.	Science and Engineering Practices #3-8
Outcome SC-CII-2	**Students will explain basic concepts of matter and energy.**	**State Standard**
SC-CII-2-1	Define and give examples of states of matter, elements, compounds, mixtures, metals, nonmetals, semimetals, chemical formulas, physical properties, chemical properties, physical changes, chemical changes, conservation of mass, potential energy, kinetic energy, and conservation of energy.	HS-PS1-7
SC-CII-2-2	Write chemical formulas for compounds. Find the total number of atoms in a compound if given the formula.	HS-PS1-2
SC-CII-2-3	Solve problems that demonstrate the Law of Conservation of Mass and the Law of Conservation of Energy.	HS-PS1-7
Outcome SC-CII-3	**Students will explain various models of the atom. This includes using correct notation to communicate about atoms. They will also analyze how light affects atoms.**	**State Standard**
SC-CII-3-1	Explain the evidence that lead to various historical models of the atom. These can include the work of Democritus, Dalton, Thomson, Rutherford, Bohr, and the Quantum Mechanical model.	Science and Engineering Practices

		#2, 7, and 8
SC-CII-3-2	Use atomic notation to show the mass number and atomic number of an atom. Define isotope and give examples. Find the number of protons and neutrons in various isotopes using atomic notation. Explain the difference between atomic mass and mass number.	Science and Engineering Practices #2, 4
SC-CII-3-3	Explain the wave nature of light. Relate wavelength, frequency, and energy of light. Explain the particle nature of light (photons) and how energy is quantized. Explain the Bohr model of the atom. Contrast the Bohr model with the Quantum Mechanical Model Give evidence for the energy levels in the Bohr model using emission spectra.	HS-PS4-3 HS-ESS1-3 Science and Engineering Practices #2,7
SC-CII-3-4	Use the idea of sublevels to write electron configurations. Relate electron configurations to the location of elements on the periodic table.	HS-PS1-2 HS-PS1-3
Outcome SC-CII-4	**Students will explain the arrangement of the periodic table and apply the table to explain periodic trends, blocks of elements, valence electrons, ionization energy, and ionic charges.**	**State Standard**
SC-CII-4-1	Analyze evidence that lead to the development of the periodic table. This can include the work of Lavoisier, Newlands, Meyer, Mendeleev, and Moseley.	Science and Engineering Practices #4,7
SC-CII-4-2	Explain why elements in the same group have similar properties. Connect properties of elements to electron configurations. Explain why elements are categorized into various groups and blocks (such as s, p, d, f).	HS-PS1-1
SC-CII-4-3	Compare period and group trends for ionization energy, electronegativity, electron affinity, atomic radius, and ionic radius.	HS-PS1-1 HS-PS1-2
Outcome SC-CII-5	**Students will classify and name various compounds, ions, and acids.**	**State Standard**
SC-CII-5-1	Name and write formulas for binary and ternary chemical compounds by using oxidation numbers and ionic charges. These include compounds with and without polyatomic ions. Name and write formulas for hydrates.	HS-PS1-2

SC-CII-5-2	Name and write formulas for hydrocarbons and acids (including binary acids and oxyacids).	HS-PS1-2
Outcome SC-CII-6	**Students will give evidence for chemical reactions, write and balance chemical equations, classify chemical reactions, and apply solubility rules to compounds.**	**State Standard**
SC-CII-6-1	Classify and balance chemical reactions including synthesis, decomposition, single replacement, double replacement, and combustion. Identify solids, liquids, gases, aqueous solutions, and precipitates.	HS-PS1-7
SC-CII-6-2	Use the activity series to determine whether or not a single replacement reaction will proceed. Use the solubility rules to identify soluble and insoluble compounds.	HS-PS1-6
SC-CII-6-3	Explain, using examples, how the amount of products made from chemical reaction can be affected by changing conditions such as temperature, pressure, pH, volume, and the amount of reactants/products (Application of Le Chatelier's Principle). Connect how changes at the macroscopic level can affect changes at the molecular level.	HS-PS1-6 Science and Engineering Practices #2-7
SC-CII-6-4	Solve Stoichiometric problems using mole ratios from balanced chemical equations.	HS-PS1-7 Science and Engineering Practices #4,5
SC-CII-6-5	Analyze data to identify limiting reactants in a chemical equation.	Science and Engineering Practices #4,5,7
Outcome SC-CII-7	**Students will use the mole concept to solve problems in chemistry.**	**State Standard**
SC-CII-7-1	Explain the concept of the mole using Avogadro's number. Perform calculations involving conversions between moles, mass, and number of representative particles. Find the molar mass of elements and compounds. Use Avagadro's theory to solve problems involving molar volume, STP, and gas density.	HS-PS1-7 Science and Engineering Practices #2,5
SC-CII-7-2	Use molar masses to calculate percent composition. Determine the empirical and molecular formulas of a compound using	HS-PS1-7 Science

	percent composition and actual mass data. Also perform these calculations for hydrates.	and Engineering Practices #4,5
SC-CII-7-3	Use balanced chemical equations to find the mole ratios of reactants and products. Solve mass-mass, mass-volume, and volume-volume problems using mole stoichiometry.	HS-PS1-7 Science and Engineering Practices #2,5
SC-CII-7-4	If given the initial amounts of reactants, find the limiting reactant and use it to solve stoichiometry problems. Solve percent yield problems in chemical reactions.	Science and Engineering Practices #4,5,7
Outcome SC-CII-8	**Students will explain properties of gases and use gas laws to solve problems.**	**State Standard**
SC-CII-8-1	Explain how changes in volume, temperature, and the number of molecules in a container affect pressure. Explain the concepts in the kinetic theory of gases.	Science and Engineering Practices #6
SC-CII-8-2	Analyze relationships between volume, temperature, pressure, and number of molecules using Boyle's Law, Charles' Law, Gay-Lussac's Law, the Combined Gas Law, and the Ideal Gas Law. Solve problems using these concepts.	Science and Engineering Practices #5, 6
SC-CII-8-3	Explain the concept of vapor pressure and Dalton's Law of Partial Pressures. Use both of those concepts in solving problems for labs involving collecting a gas over water.	Science and Engineering Practices #5, 6
Outcome SC-CII-9	**Students will explain different types of chemical bonding, such as ionic, covalent, polar covalent, nonpolar covalent, coordinate covalent, and hydrogen bonds.**	**State Standard**
SC-CII-9-1	Compare and contrast ionic and covalent bonds. Compare ionic radii and atomic radii for atoms in ionic bonds. Compare the bond length of atoms in a covalent bond with their atomic radii. Contrast bond energy changes in ionic vs. covalent bonds.	HS-PS1-2 HS-PS1-3

SC-CII-9-2	Draw electron dot formulas for molecules and polyatomic ions.	Science and Engineering Practices #2
SC-CII-9-3	Explain the idea of electronegativity and explain its trends on the periodic table. Write delta notation for polar covalent bonds.	HS-PS1-1 HS-PS1-2
SC-CII-9-4	Explain how electronegativity relates to determining the polarity of a bond.	HS-PS1-2
SC-CII-9-5	Explain how hydrogen bonding works and how it affects the properties of water.	HS-PS1-2 HS-PS1-3
SC-CII-9-6	Explain the VSEPR model. Give examples of molecules with different shapes caused by electron pair geometry.	Science and Engineering Practices #2
Outcome SC-CII-10	**Students will explain properties of liquids and solids, including intermolecular bonding, vapor pressure, boiling point, viscosity, surface tension, and energy changes associated with state changes. They will analyze the special properties of water and define hydrates.**	**State Standard**
SC-CII-10-1	Explain how intermolecular bonding works and how it affects properties at the macroscopic scale, such as vapor pressure and boiling point. Conduct an investigation to analyze these concepts.	HS-PS1-3
SC-CII-10-2	Compare the properties of ionic solids, molecular solids, and metallic solids using differences in their structures.	HS-PS1-3
SC-CII-10-3	Calculate the energy required to change a substance from a solid to a gas using the heat of fusion and heat of vaporization.	Science and Engineering Practices #5
Outcome SC-CII-11	**Students will give examples of various types of solutions and perform calculations on the concentrations of solutions**	**State Standard**
SC-CII-11-1	Explain how temperature can affect the concentrations of solutes in a solution and the rate of dissolving. Apply this concept to solubility graphs and unsaturated, saturated, and supersaturated solutions.	HS-PS1-5

SC-CII-11-2	Solve problems involving molarity, molality, mass-mass percent, dilutions of solutions, and solution stoichiometry.	HS-PS1-5
Outcome SC-CII-12	**Students will give examples of various types of acids and bases and apply the concept of pH in describing them.**	**State Standard**
SC-CII-12-1	Compare Arrhenius and Bronsted-Lowry definitions of acids and bases. Explain physical properties of acids and bases.	Science and Engineering practices #2
SC-CII-12-2	Explain concepts about acid-base titrations. Perform calculations and analyze data to solve titration problems.	Science and Engineering Practices #5
SC-CII-12-3	Perform calculations involving pH using the ionization constant of water. Convert from hydrogen ion concentrations to pH.	Science and Engineering Practices #5
SC-CII-12-4	Write and balance net ionic equations using the concepts of strong and weak acids and bases.	Science and Engineering Practices #2
Outcome SC-CII-13	**Students will explain concepts of chemical equilibrium. This includes collision theory, equilibrium constants, and shifts in equilibrium.**	**State Standard**
SC-CII-13-1	Explain the collision theory of chemical reactions, including the effects of concentration, temperature, and catalysts.	Science and Engineering Practices #2 HS-PS1-6
SC-CII-13-2	Analyze graphs of endothermic and exothermic reactions, including the effects of catalysts and the idea of transition states.	Science and Engineering Practices #2 and #5
SC-CII-13-4	Explain the idea of chemical equilibrium and calculate	Science

	equilibrium constants.	and Engineering Practices #5
SC-CII-13-5	Apply Le Chatelier's principle to explain various shifts in chemical equilibrium.	HS-PS1-6 HS-PS1-5
Outcome SC-CII-14	**Students will explain concepts of oxidation-reduction reactions and analyze examples of these reactions.**	**State Standard**
SC-CII-14-1	Explain the rules for finding oxidation numbers. Use these concepts to identify which species in a redox reaction are oxidized and which are reduced.	Science and Engineering Practices #2
SC-CII-14-2	Explain examples of redox reactions such as voltaic cells, electrolytic cells and batteries.	Science and Engineering Practices #6
Outcome SC-CII-15	**Students will analyze nuclear chemistry, including types of radioactivity, radioactive decay, half-lives, fusion, and fission.**	**State Standard**
SC-CII-15-1	Explain examples of alpha, beta, and gamma radiation. Balance nuclear reactions. Apply these concepts of nuclear decays to a radioactive decay series.	HS-PS1-8
SC-CII-15-2	Explain how half-lives can be used to perform radiocarbon dating and other types of dating.	Science and Engineering Practices #2 and #5
SC-CII-15-3	Explain how the processes of nuclear fission and fusion can work to release energy.	HS-PS1-8
Outcome SC-CII-16	**Students will explain basic concepts of Organic Chemistry.**	**State Standard**
SC-CII-16-1	Compare and contrast examples of alkanes, alkenes, and alkynes. This can include functional groups and branching. This can also include aromatic compounds and an analysis of how each functional group is involved in chemical reactions.	Science and Engineering Practices #2

Outcome SC-CII-17	**Students will explain various aspects of Biochemistry, including an analysis of proteins, enzymes, carbohydrates, lipids, and nucleic acids.**	**State Standard**
SC-CII-17-1	Categorize biological compounds as proteins, carbohydrates, lipids or nucleic acids based on their structures.	Science and Engineering Practices #2
SC-CII-17-2	Give examples of various dehydration synthesis reactions.	

Physical Science

Purpose Statement	Students will analyze natural laws to solve problems involving forces, motion, and energy. They will analyze the structure and properties of matter along with interactions between matter and energy.	
Outcome SC-PS-1	**Students will compare and contrast speed, velocity, and acceleration. Students will solve problems involving those 3 concepts using correct units of measurement. Students will describe the motion of an object using Newton's 3 Laws of Motion and concepts of momentum.**	**State Standard**
SC-PS-1-1	Analyze data to support Newton's 2nd Law.	HS-PS2-1
SC-PS-1-2	Explain mathematically and conceptually how momentum is conserved when objects collide.	HS-PS2-2
SC-PS-1-3	Design and refine a device to minimize force during a collision.	HS-PS2-3 HS-ETS1-2 HS-ET1-3
SC-PS-1-4	Describe how Newton's cannon demonstrates orbital motion for man-made satellites and planets.	HS-ESS1-4
Outcome SC-PS-2	**Students will explain examples of how energy is transferred and conserved.**	**State Standard**
SC-PS-2-1	Explain how energy flows and transfers.	HS-PS3-1
SC-PS-2-2	Describe how energy transfers among Kinetic Energy, Thermal Energy, Potential Energy, and Electrical Potential Energy.	HS-PS3-2
SC-PS-2-3	Design a device that uses energy conversions.	HS-PS3-3
SC-PS-2-4	Design an investigation showing thermal energy transfers.	HS-PS3-4
SC-PS-2-5	Explain the difference between exothermic and endothermic reactions using examples.	HS-PS1-4
Outcome SC-PS-3	**Students will describe and give examples of physical and chemical properties and physical and chemical changes in matter.**	**State Standard**

SC-PS-3-1	Tell the difference between physical and chemical changes.	MS-PS1-2
SC-PS-3-2	Explain how energy can affect state changes.	MS-PS1-4
SC-PS-3-3	Explain how the conservation of mass is shown in a chemical change.	MS-PS1-5
Outcome SC-PS-4	**Students will describe models of the atom and connect the properties of elements to patterns on the periodic table.**	**State Standard**
SC-PS-4-1	Draw Bohr Models and describe electron cloud model.	HS-PS1-1
SC-PS-4-2	Describe that groups on periodic table contain elements with similar properties.	HS-PS1-1
Outcome SC-PS-5	**Students will explain how atoms become more stable by forming chemical bonds and will analyze how atoms rearrange in chemical reactions.**	**State Standard**
SC-PS-5-1	Draw electron dot diagrams, showing how ionic and covalent bonds form.	HS-PS1-2
SC-PS-5-2	Write chemical formulas using oxidation numbers. Write chemical formulas using polyatomic ions.	HS-PS1-2
SC-PS-5-3	Write and balance chemical equations	HS-PS1-7
SC-PS-5-4	Explain that atoms do not pass through each other due to electromagnetic repulsion (when electrons on one atom repel the electrons on another atom).	HS-PS3-5
Outcome SC-PS-6	**Students will investigate and describe electricity and magnetism and explain applications of each.**	**State Standard**
SC-PS-6-1	Plan and conduct an investigation that demonstrates how electric currents and magnetic fields affect each other.	HS-PS2-5
Outcome SC-PS-7	**Students will use the scientific method to collect and analyze data in studying a problem.**	**State Standard**
SC-PS-7-1	Using a computer simulation (such as a PhET simulation) study an experiment related to a physical science topic.	HS-ETS2-4
Outcome SC-PS-8	**Students will evaluate the validity and reliability of claims in a variety of materials.**	**State Standard**

SC-PS-8-1	Create a research-based report, slides presentation, or article summary based on a local, regional, or global challenge. Discuss qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	HS-ETS1-1 HS-ETS1-5

Physics

Purpose Statement	Students will develop a conceptual and mathematical understanding of forces, motion, energy, momentum, gravity, electricity, and waves.	
Outcome SC-P-1	**Students will solve problems involving forces and motion in one dimension and apply their skills in laboratory investigations.**	**State Standard**
SC-P-1-1	Calculate the answers to force and motion problems using SI units and answers in significant digits. Conduct lab investigations, collect data, analyze data, and draw conclusions.	Science and Engineering Practices #3-8.
SC-P-1-2	Analyze linear and non-linear relationships between independent and dependent variables using graphs. Make a line of best fit (regression line) on a linear graph. Fit curves to non-linear graphs using technology.	Science and Engineering Practices #4-6.
SC-P-1-3	Differentiate between vector quantities and scalar quantities. Use example of each.	Science and Engineering Practices #5.
SC-P-1-4	Explain the differences between instantaneous speed, average speed, velocity, and acceleration. Solve problems using equations for these quantities. Perform conversions between various units for these quantities.	Science and Engineering Practices #4,5.
SC-P-1-5	Create and analyze graphs of distance, velocity, and acceleration vs. time. Explain how the slope of the graph relates to the motion of the object.	Science and Engineering Practices #2-8.
SC-P-1-6	Explain how objects in free fall accelerate due to gravity on Earth. Solve problems involving gravity.	Science and Engineering practices #4-6.
SC-P-1-7	Explain how forces affect objects using Newton's 1st Law of Motion. Explain how an object in equilibrium differs from an object experiencing a net force. Apply the concept of net force to solve problems involving Newton's 2nd Law of Motion. Relate changes in net force and changes in mass to changes in acceleration.	HS-PS2-1 Science and Engineering Practices #3-8.

SC-P-1-8	Explain an example of Newton's 3rd Law of Motion by describing the amounts of the forces involved and the objects the forces are acting upon. (For example, the action force acts on a different object than the reaction force).	Science and Engineering Practices #5-7.
SC-P-1-9	Explain the concept of normal force and connect it with the concept of equilibrium. Identify the direction in which normal force acts.	Science and Engineering Practices #5.
Outcome SC-P-2	**Students will solve problems involving forces and motion in two dimensions and apply their skills in laboratory investigations.**	**State Standard**
SC-P-2-1	Solve problems involving vectors in multiple dimensions by using the Pythagorean Theorem and sine/cosine/tangent.	Science and Engineering Practices #4-5.
SC-P-2-2	Distinguish between static and kinetic friction. Solve problems involving friction forces and coefficients of friction. Collect and analyze lab data involving friction.	Science and Engineering Practices #3-8.
SC-P-2-3	Solve for the components of force for an object on an incline. Use these concepts to solve problems on inclines involving friction, velocity, and acceleration.	Science and Engineering Practices #4-7.
SC-P-2-4	Solve problems involving projectiles launched horizontally or at an angle. Describe how horizontal and vertical motion are independent from each other.	Science and Engineering Practices #3-7.
SC-P-2-5	Describe how centripetal force and centripetal acceleration affect objects in circular or rotational motion. Solve problems involving circular motion. This could include torque, angular velocity, angular acceleration and center of mass.	Science and Engineering Practices #3-6.
Outcome SC-P-3	**Students will solve problems and explain concepts involving gravitation, planetary motion, and star life cycles.**	**State Standard**
SC-P-3-1	Explain how Kepler's 3 Laws of Motion work and use them to describe the motion of planets. Solve problems using Kepler's 3rd Law. Also apply Newtonian gravitational laws to study natural and man-made satellites.	HS-ESS1-4 Science and Engineering Practices #2,4,5,6,7.
SC-P-3-2	Explain how the masses of objects and the distances between them affect the force of gravity between objects.	HS-PS2-4

	Solve problems using Newton's Law of Universal Gravitation.	
SC-P-3-3	Explain how Cavendish's experiment found the value of the Universal Gravitational Constant, G.	Science and Engineering Practices #5.
SC-P-3-4	Deduce how Newton's cannonball thought experiment explains the ability of satellites to stay in orbit around the Earth. Compare the results of launching the cannonball at different speeds.	HS-ESS1-4
SC-P-3-5	Solve problems for the speed of a satellite and the period of a satellite orbiting Earth at a given radius.	HS-ESS1-4 Science and Engineering Practices #5.
SC-P-3-6	Explain why astronauts orbiting the Earth are not truly weightless, but have an apparent weight of zero.	HS-ESS1-4 Science and Engineering Practices #7.
SC-P-3-7	Explain how Einstein described gravity in his general theory of relativity.	HS-PS2-4.
Outcome SC-P-4	**Students will solve problems and apply concepts of energy, work, power, and momentum to real-world scenarios.**	**State Standard**
SC-P-4-1	Define momentum and impulse. Explain how force and time affect changes in momentum. Solve problems involving impulse (such as car crashes, seat belts, air bags).	HS-PS2-2
SC-P-4-2	Explain examples of the Law of Conservation of Momentum using collisions. Compare and contrast elastic and inelastic collisions as well as collisions involving bouncing vs. not bouncing. Solve problems involving one dimensional and two dimensional collisions.	HS-PS2-2 HS-PS2-3
SC-P-4-3	Design, evaluate, and refine a device that minimizes the force on an object during a collision.	HS-PS2-2 HS-PS2-3
SC-P-4-4	Give examples of types of potential energy such as gravitational, chemical, magnetic, and elastic. Calculate the gravitational potential energy of various objects. Explain the Law of Conservation of Energy and apply it to energy transfers between kinetic, potential, and thermal energy.	HS-PS3-1 HS-PS3-2

Outcome SC-P-5	Students will investigate how electricity and magnetism work, how electricity and magnetism interact, and how these forces are used.	State Standard
SC-P-5-1	Explain how like and unlike charges affect each other. Use Coulomb's Law to explain the relationships between charge, distance, and the forces acting. Calculate forces using Coulomb's Law.	HS-PS3-5 HS-PS2-4
SC-P-5-2	Give examples of conductors and insulators. Explain how differences in their microscopic structure can cause them to insulate or conduct.	HS-PS3-2
SC-P-5-3	Explain how objects can be charged by induction. Describe examples of how this causes electrostatic forces we see such as electricity and lightning.	HS-PS3-2
SC-P-5-4	Explain that electric and magnetic fields act on objects that are not in contact with each other. Describe how electric and magnetic fields have both magnitude and direction that can be shown with field lines.	HS-PS2-4 HS-PS2-5
SC-P-5-5	Define electrical potential energy. Explain that electric potential is electric potential energy per charge and is measured in volts, or Joules/Coulomb. Show how differences in electric potential can cause a flow of charge, or a current.	HS-PS3-2
SC-P-5-6	Define electric current, electric voltage, and electrical resistance. Use Ohm's Law to solve problems analyzing the relationships between voltage, current, and resistance.	Science and Engineering Practices #4-5
SC-P-5-7	Compare and contrast direct current and alternating current. Give examples of how each are used. Explain how a diode can convert AC to DC.	Science and Engineering Practices #2
SC-P-5-8	Define electric power. Calculate the power used by an appliance using the formula Power = current x voltage. Calculate the cost of using various electrical appliances for various amounts of time if given their watt ratings or amperage used.	Science and Engineering Practices #1,3,4,5,8
SC-P-5-9	Compare and contrast series and parallel circuits. Solve problems involving Ohm's Law with these circuits. Explain the functions of circuit breakers and fuses. Design circuits in the laboratory to test these ideas.	Science and Engineering Practices #1-8

SC-P-5-10	Explain how electric fields and magnetic fields interact in generators or electric motors. Describe how electricity is generated using examples.	HS-PS3-5 HS-PS2-5
Outcome SC-P-6	**Students will investigate structure and function of electromagnetic waves and sound waves.**	**State Standard**
SC-P-6-1	Explain how energy can be transferred through waves. Compare and contrast transverse and compressional waves and give examples of each. Explain the differences between electromagnetic waves and sound waves.	HS-PS4-1 Science and Engineering Practices #2
SC-P-6-2	Explain characteristics of waves such as crests, troughs, wavelength, frequency, amplitude, and velocity. Apply these concepts to describe differences in the waves in the electromagnetic spectrum. Also apply these concepts to sound waves (Such as volume is proportional to amplitude and pitch is proportional to frequency). Perform calculations involving the relationships between frequency, wavelength, and speed of waves traveling in various media.	HS-PS4-1 Science and Engineering Practices #2-5
SC-P-6-3	Explain how energy from a sound wave can be transferred into a radio wave and vice versa. (i.e. Using a microphone to change your voice into radio waves and using a radio to receive signals and change them back into sound waves through a speaker).	HS-PS4-5
SC-P-6-4	Evaluate the advantages and disadvantages of using digital transmission and storage of information. This could include a short research project involving using digital information.	HS-PS4-2 HS-ETS1-1 HS-ETS1-3 HS-ETS1-5
SC-P-6-5	Analyze how waves can affect other waves through interference and resonance. Describe how waves can interact with matter through diffraction, polarization, reflection, and refraction.	HS-PS4-3
SC-P-6-6	Explain what happens when an object producing waves is moving relative to an observer. This can include descriptions of the Doppler effect and red shift of light from galaxies.	HS-ESS1-2
SC-P-6-7	Evaluate evidence for the Big Bang Theory involving astronomical evidence of light spectra, motion of distant galaxies, and the composition of matter in the universe. Consider ideas such as red shift of light from galaxies, cosmic microwave background radiation, and the observed composition of matter in the universe. Compare this evidence to predictions made by the Big Bang Theory.	HS-ESS1-2 HS-ETS1-5

Environmental Science

Purpose Statement	Students in Environmental Science will apply natural principles to evaluate the organization of living systems, the exchange of energy, the cycles of matter, and the human impact on air, water, land, and living and nonliving resources.	
Outcome SC-ES-1:	**Students will develop models of Earth's surface and interior to demonstrate that they understand how the atmosphere, geosphere, hydrosphere, and biosphere interact to form a dynamic Earth.**	**State Standard**
SC-ES-1-1	Describe the composition and structure of Earth including tectonic plates.	HS-ESS1-5; HS-ESS1-6
SC-ES-1-2	Develop a model that demonstrates the composition, formation and movement of Earth's layers	HS-ESS1-5; HS-ESS1-6; HS-ESS2-1; HS-ESS2-3
SC-ES-1-3	Investigate the location and causes of earthquakes and volcanoes.	HS-ESS2-1; HS-ESS2-3
SC-ES-1-4	Identify the relationship between volcanic eruptions and climate change.	HS-ESS2-2; HS-ESS2-4
SC-ES-1-5	Describe how wind and water alter Earth's surface.	HS-ESS2-2
SC-ES-1-6	Demonstrate examples of the three mechanisms of heat transfer in Earth's atmosphere.	HS-ESS2-2; HS-PS3-4
SC-ES-1-7	Describe the greenhouse effect, and how changes in the composition of Earth's atmosphere are influencing it.	HS-ESS2-2; HS-ESS3-5
Outcome SC-ES-2:	**Students will explain the organization of Earth's living and nonliving resources by diagramming the relationships between organisms and their living and nonliving environment and predicting the outcomes of specific changes to their environment.**	**State Standard**
SC-ES-2-1	Differentiate between the various relationships that exist between organisms and their environment.	HS-LS2-1; HS-ETS1-4; HS-LS2-4; HS-LS2-6; HS-ESS2-7
SC-ES-2-2	Diagram and label food chains and food webs.	HS-LS2-1;

		HS-ETS1-4; HS-LS2-4
SC-ES-2-3	Examine how climatic changes impact organisms now and in the future.	HS-LS2-1; HS-ETS1-4; HS-LS2-2; HS-LS2-6
SC-ES-2-4	Predict the consequences of continued human population growth.	HS-LS2-1; HS-LS2-2; HS-LS2-6; HS-LS2-7; HS-ETS1-1; HS-ETS1-2; HS-ETS1-4; HS-ESS3-1; HS-ESS3-6
Outcome SC-ES-3:	**Students will show how matter is converted within the Earth's system by evaluating diagrams o the water, carbon, and nitrogen cycles to determine what living and nonliving factors are involved in these cycles.**	**State Standard**
SC-ES-3-1	Construct and manipulate models of carbon, hydrogen and oxygen to show how they can be combined to form the building blocks of proteins, lipids, carbohydrates, and nucleic acids.	HS-LS1-6; HS-ESS2-6
SC-ES-3-2	Examine the biochemical cycling of water and nutrients through an ecosystem.	HS-LS2-3; HS-LS2-4; HS-LS2-5; HS-ESS2-6; HS-ETS1-4
SC-ES-3-3	Describe energy flow through an ecosystem.	HS-LS2-1; HS-LS2-4; HS-LS2-5; HS-ETS1-4
Outcome SC-ES-4:	**Students will evaluate the biodiversity of Earth's different biomes to determine the factors that increase and decrease biodiversity and form a plan to suggest ways that human practices could be changed to help conserve biodiversity.**	
SC-ES-4-1	Distinguish among terrestrial biomes based on climate and biotic factors.	HS-LS2-6; HS-ETS1-5
SC-ES-4-2	Identify the major factors that determine aquatic ecosystems.	HS-LS2-6; HS-ETS1-5

SC-ES-4-3	Explain the importance of biodiversity .	HS-LS2-2; HS-LS2-7; HS-ETS1-1; HS-ETS1-2; HS-ETS1-4; HS-ETS1-5
SC-ES-4-4	Describe the potential impacts of biodiversity loss in terms of the economy and the overall quality of human populations	HS-LS2-2; HS-LS2-7; HS-ESS3-3; HS-ETS1-1; HS-ETS1-2; HS-ETS1-4; HS-ETS1-5
SC-ES-4-5	Design a plan that demonstrates how changes in human activities could help conserve biodiversity.	HS-LS2-2; HS-LS2-6; HS-LS2-7; HS-LS4-6; HS-ETS1-4; HS-ETS1-1; HS-ETS1-2; HS-ETS1-5; HS-ESS3-3; HS-ESS3-6
Outcome SC-ES-5:	**Students will examine the Earth's water supply to determine the importance of water in their environment, describe its uses, and develop a strategy for water conservation that will encourage sustainable practices.**	**State Standard**
SC-ES-5-1	Describe the distribution of Earth's water resources to determine why fresh water is a limited resource.	HS-ESS2-5
SC-ES-5-2	Examine how water is used by individuals, industry and agriculture.	HS-ESS2-5; HS-ESS3-1
SC-ES-5-3	Demonstrate how waste water management facilities and water diversion projects manage and conserve freshwater resources.	HS-ESS2-5
SC-ES-5-4	Describe the relationship between the different types of water pollution, the major sources and the human activities that contribute to them.	HS-ESS2-5; HS-ESS3-1
SC-ES-5-5	Use research to suggest practices that would protect both economic interests and freshwater resources.	HS-ESS2-5; HS-ESS3-1; HS-ESS3-3; HS-ETS1-1;

		HS-ETS1-5
Outcome SC-ES-6	**Students will explore the composition of Earth's atmosphere to describe its relationship to weather and climate, and to explain how natural and human related activities can create circumstances that alter stable atmospheric conditions.**	**State Standard**
SC-ES-6-1	Describe the chemical composition of air and how it influences weather and climate.	HS-ESS3-6
SC-ES-6-2	Examine sources of air pollution, and describe the type and effect of the pollutant on the environment.	HS-ESS3-6
SC-ES-6-3	Compare atmospheric and climate data to establish a relationship between the two.	HS-ESS3-6
SC-ES-6-4	Describe natural and human activities that are responsible for polluting and altering the composition of the atmosphere.	HS-ESS3-6
SC-ES-6-5	Examine models used for predicting the consequences of global climate change.	HS-ESS3-6; HS-ESS3-5
SC-ES-6-6	Develop and present solutions to help correct pollution and climate change.	HS-ESS3-6; HS-ESS3-4
Outcome SC-ES-7	**Students will model how land can be used to show how public use, development, agriculture and mining practices serve essential roles, and all land management practices must balance economic and conservation interests to achieve sustainability.**	**State Standard**
SC-ES-7-1	Describe the land resources and the ways that humans use them.	
SC-ES-7-2	Develop a land-use plan for developing land near an urban area that maximizes resources and conservation.	
SC-ES-7-3	Explain the importance land in agricultural practices.	
SC-ES-7-4	Compare the different mining practices to describe which are the most cost effective and which are the most environmentally friendly.	
SC-ES-7-5	Evaluate land use practices and explain how changes in human population size and energy consumption determine how land is used.	
SC-ES-7-6	Investigate sustainable alternative agricultural practices.	

SC-ES-7-7	Evaluate current land conservation efforts and suggest improvements.	
Outcome SC-ES-8	**Students will compare and contrast renewable energy resources and nonrenewable energy resources to develop a strategy for achieving sustainability both in energy production and environmental protection.**	**State Standard**
SC-ES-8-1	Differentiate between renewable and nonrenewable energy resources.	HS-ESS3-1
SC-ES-8-2	Describe the factors that make an energy resource valuable.	HS-ESS3-6; HS-ESS3-5
SC-ES-8-3	Evaluate the environmental impact of energy resources.	HS-ESS3-6
SC-ES-8-4	Research current levels of nonrenewable energy resources to determine how to manage their use.	HS-ESS3-2
SC-ES-8-5	Develop a model that uses renewable energy resources.	HS-ESS3-4; HS-ESS3-5
SC-ES-8-6	Compare and contrast the effectiveness and environmental impact of fossil fuels and renewables.	HS-ESS3-2
Outcome SC-ES-9	**Students will examine society's waste problem to identify the ways that waste is produced, determine how it is disposed of, and develop ideas that will help alleviate the waste problem**	**State Standard**
SC-ES-9-1	Explain biodegradability.	HS-ESS3-3
SC-ES-9-2	Describe how a landfill works, and what problems it creates.	HS-ESS3-3
SC-ES-9-3	Evaluate how much of an impact recycling can have on the amount of solid waste in a landfill.	HS-ESS3-3
SC-ES-9-4	Develop a plan for reusing biodegradable materials through composting.	HS-ESS3-3
SC-ES-9-5	Describe the pros and cons of alternative waste management practices.	HS-ESS3-3