

A Curriculum Guide for
Fillmore Central School District
K - 12

Science

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SCIENCE

Abbreviation Code:

SC = Derived from a Nebraska state standard

FC = Fillmore Central local curriculum standard

PS = Physical Science

LS = Life Science

ES = Earth and Space

At each course level the learner will conduct scientific inquiries using the scientific method (question, hypothesis, experiment, observation, conclusion)

When applicable the learner will recognize the contributions to science made by men and women from various cultures (Ex. Ben Franklin, Neil Armstrong, Sally Ride, Thomas Edison, Marie Curie, George Washington Carver, Anders Celsius, Louis Pasteur, Galileo, Albert Einstein, Sir Isaac Newton)

Physical ScienceStandard

TLW...Make observations and construct that objects can be seen only when illuminated.	SC.1.2.1.B
TLW...Determine the effect of placing objects made with different materials in the path of a beam of light.	SC.1.2.1.C
TLW...Build a device that uses light or sound to solve the problem of communicating over a long distance.	SC.1.2.1.D
TLW...Prove and explain how some things change by heating and/or cooling and that some can be reversed and some cannot.	SC 2.3.1.E
TLW...Illustrate and define how machines help to make people's lives easier.	FC.K.PS.1
TLW...Illustrate and define how community helpers use machines.	FC.K.PS.3
TLW...Demonstrate that some objects float on water and some sink.	FC.K.PS.2

Life Science

TLW...Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.	SC.K.7.2
TLW...Use observations to describe patterns of what plants and animals (including humans) need to survive.	SC.K.7.2.A
TLW...Distinguish between living and non-living things.	FC.K.LS.1
TLW...Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	SC.K.7.2.B
TLW...Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.	SC.K.7.2.C
TLW...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.	SC.1.6.2.A
TLW...Use different media to determine patterns in a behavior of parents and offspring that help offspring survive.	SC.1.6.2.C
TLW...Show how young plants and animals are alike but not exactly alike compared their parents.	SC.1.6.2.D
TLW...Plan and conduct an investigation to determine if plants need sunlight and water to grow.	SC 2.7.2.A

TLW...Explain that plant life begins with a seed, identify the parts of a seed, and list the ways seeds travel.

SC.2.7.2.A

TLW...Identify body parts.

FC.K.LS.2

Earth and Space Science

TLW...Gather, analyze, and communicate evidence of weather and climate.

SC.K.12.3

TLW...Use and share observations of local weather conditions to describe patterns over time.

SC.K.12.3.A

TLW...Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

SC.K.12.3.B

TLW...Make observations to determine the effect of sunlight on Earth's surface.

SC.K.12.3.C

TLW...Demonstrate reducing, reusing, and recycling.

FC.K.ES.1

Physical ScienceStandard

TLW...Explore the different properties of water and investigate how common materials will interact with various liquids. (solid, liquid, and gas) FC.1.PS.1

TLW...Use simple tools and equipment in the study of science. FC.1.PS.2

Life Science

TLW...Develop a model to show how the shape of an object helps its function. SC.1.6.2.B

TLW...Use different media to determine patterns in a behavior of parents and offspring that help offspring survive. SC.1.6.2.C

TLW...Plan and conduct an investigation to determine if plants need sunlight and water to grow. SC.2.7.2.A

TLW...Create a model of an animal dispersing seeds or pollinating plants. (create a model that demonstrates the function an animal plays in dispersing seeds or pollinating plants) SC.2.7.2.B

TLW...Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. SC.K.12.3.D

TLW...Make observations of plants and animals to compare the diversity of life in different habitats. SC.2.7.2.C

TLW...State the needs of plants (e.g. food/soil, water, air, space, light) and explain how roots, stems, and leaves serve different functions for plants. FC.1.LS.6

TLW...Recognize the contributions to science made by men and women from a variety of cultures. FC.1.LS.7

TLW...Define and identify characteristics of a mammal. FC.1.LS.1

TLW...Compare and contrast the similarities and differences in people and animals in relationship to their young. FC.1.LS.2

TLW...Illustrate the habitat of animals living in the wild compared to those in captivity and state the needs of animals. (e.g. food, water, air, space) FC.1.LS.5

TLW...List characteristics of an insect. FC.1.LS.3

TLW...Identify the functions and care of skeletal and digestive systems by creating models.

FC.1.LS.4

Earth and Space Science

TLW...Use and share observations of local weather conditions to describe patterns over time.

SC.K.12.3.A

TLW...Observe the weather conditions and measure the temperature using a thermometer and identify different types of precipitation.

FC.1.ES.2

TLW...Observe how the patterns of the sun, moon, and stars describe a pattern that can be predicted.

SC.1.11.3.A

TLW...Observe how at different times of the year, the amount of daylight differs.

SC.1.11.3.B

Physical ScienceStandard

TLW...Plan and carry out an investigation to describe and sort different kinds of materials based on what they look like(their properties).	SC. 2.3.1.A
TLW...Analyze information obtained from an investigation to determine which materials are best suited for an intended purpose.	SC. 2.3.1.B
TLW...Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	SC 2.3.1.C
TLW...Discover how to disassemble an object and make it into a new object.	SC 2.3.1.D
TLW...Identify the characteristics of a compound machine.	FC.2.PS.3
TLW...Investigate the causes of sound and explore how sound travels through solids, liquids, and gases.	FC.2.PS.4
TLW...Provide evidence that vibrating materials can make sound and cause it to vibrate	SC. 1.2.1.A
TLW...Construct a simple circuit and make a diagram of it.	FC.2.PS.5
TLW...Identify safe practices when around electricity.	FC.2.PS.6
TLW...Gather, analyze, and communicate evidence of forces and their interactions.	SC.K.1.1
TLW...Plan and conduct an investigation to compare the effects of different strengths or different direction of pushes and pulls on the motion of an object.	SC.K.1.1.A
TLW...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.	SC.K.1.1.B
TLW...Demonstrate that the position and motion of objects can be changed by pushing or pulling.	FC.2.PS.2

Life Science

TLW...Define predator and prey and create a food chain.	SC.2.7.2.C
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Earth and Space Science

TLW...Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	SC 2.13.3.A
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TLW...Identify forces that cause changes on the Earth's surface.	FC.2.ES.3
TLW...Compare multiple ways that are used to slow or prevent wind or water from changing the shape of the land.	SC.2.13.3.B
TLW...Develop a model to represent the shapes and kinds of land and bodies of water in an area.	SC.2.13.3.C
TLW...Give examples of the three kinds of rocks.	FC.2.ES.1
TLW...Analyze the three main types of soil.	FC.2.ES.2
TLW...Obtain information to identify where water is found on Earth and that it can be solid or liquid.	SC.2.13.3.D
TLW...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.	SC.K.12.3.E

Physical ScienceStandard

TLW...Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	SC.3.1.1.A
TLW...Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	SC.3.1.1.B
TLW...Ask questions to determine cause and effect relationships of electrical or magnetic interactions between two objects not in contact with each other.	SC.3.1.1.C
TLW...Define a simple design problem that can be solved by applying scientific ideas about magnets.	SC.3.1.1.D
TLW...Develop a visual representation of the particles of matter that are too small to be seen.	SC.5.3.1.A
TLW...Use observations and measurements to identify materials by their properties.	SC.5.3.1.C
TLW...Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	SC.5.3.1.D
TLW...Measure the weight of objects when heated, cooled, and mixed	SC.5.3.1.B
TLW...Prove and explain how some things change by heating and/or cooling and that some can be reversed and some cannot.	SC.2.3.1.E
TLW...Use evidence to construct an explanation relating the speed of an object to the energy of that object.	SC.4.4.2.A
TLW...Ask questions and predict outcomes about the changes in energy that occur when objects collide.	SC.4.4.2.C
TLW...Apply scientific ideas to design, test and refine a device that converts energy from one form to another.	SC.4.4.2.D
TLW...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.	SC.4.4.2.E
TLW...Demonstrate how heat moves from warmer objects to cooler ones through illustrations and writings.	FC.3.PS.1
TLW...Investigate the physical properties of matter.	FC.3.PS.2
TLW...Differentiate among the properties of the three states of matter.	FC.3.PS.3

TLW...Conduct experiments to observe, predict, and describe the changes in matter. FC.3.PS.4

TLW...Define heat and identify the sun as our most important source of heat FC.3.PS.5

Life Science

TLW...Construct an argument that some animals form groups that help members survive. SC.3.7.2.A

TLW...Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago. SC.3.7.2.B

TLW...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. SC.3.7.2.C

TLW...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. SC.3.7.2.D

TLW...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. SC.3.7.2.E

Earth and Space Science

TLW...Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. SC.4.13.4.A

TLW...Represent data in table, pictograph, and bar graph displays to describe typical weather conditions expected during a particular season. SC.3.12.4.A

TLW...Use observation to show how the gravitational force on earth is directed downward. SC.5.11.3.A

TLW...Support an argument in the differences of the brightness of the sun compared to other stars relative to their distance from earth. SC.5.11.3.B

TLW...Analyze and interpret data to reveal patterns of daily changes in length of: direction of shadows, day and night, and seasonal appearance of stars in the night sky. SC.5.11.3.C

TLW...Identify the phases of the moon. FC.3.ES.1

TLW...List the eight planets in order from the sun and write about the characteristics of each. FC.3.ES.2

Physical ScienceStandard

TLW...Develop a model of waves to describe patterns in the terms of amplitude and wavelength and that waves can cause objects to move.	SC.4.2.1.A
TLW...Generate and compare multiple solutions that use patterns to transfer information.	SC.4.2.1.B
TLW...Make Observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electrical currents.	SC.4.4.2.B
TLW...Apply scientific ideas to design, test and refine a device that converts energy from one form to another.	SC.4.4.2.D
TLW...Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.	SC.4.4.2.F
TLW...Recognize that the transfer of electricity in an electrical circuit requires a close loop.	FC.4.PS.1
TLW...Explore reflection and refraction, using a prism and discussing the spectrum.	FC.4.PS.2
TLW...Differentiate between a convex and concave lens.	FC.4.PS.3
TLW...Differentiate between opaque, translucent, and transparent.	FC.4.PS.4

Life Science

TLW...Develop a model to describe that light reflecting from objects and entering the eyes allows objects to be seen.	SC.4.6.3.A
TLW...Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information.	SC.4.6.3.C
TLW...Describe and identify the parts, function, and care of the sensory organ, eye, and relate how the parts affect the whole.	FC.4.LS.1

Earth and Space Science

TLW...Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	SC.4.13.4.D
TLW...Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	SC.3.12.4.C

TLW...Develop a model to describe how the geosphere, biosphere, hydrosphere and atmosphere interact. SC.5.13.4.A

TLW...Obtain and combine information ways communities use to protect Earth's resources and environment. S.C.5.13.4.C

TLW...Define a simple design problem to conserve fresh water on earth to be solved by applying scientific ideas. S.C.5.13.4.D

TLW...Describe what causes wind and what causes humidity. FC.4.ES.1

TLW...Compare and contrast and illustrate a warm front and a cold front and what happens when two fronts meet. FC.4.ES.2

TLW...Identify and use instruments that measure the weather, and create graphs and diagrams to record observation. FC.4.ES.3

TLW...identify pollution problems and explain how science and technology have helped communities to solve them - reduce, reuse, recycle. FC.4.ES.4

Physical ScienceStandard

TLW...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.

SC.4.4.2.E

Life Science

TLW...Develop a visual representation of how energy is originated from the sun and transfers through an ecosystem.

SC.5.8.2.A

TLW...Develop a model of the different parts of a plant and how materials they need to grow.

SC.5.8.2.B

TLW...Develop a visual representation of the movement of matter through an ecosystem.

SC.5.8.2.C

TLW...Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

SC.3.9.3.A

TLW...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.

SC.3.9.3.B

TLW...Use evidence to support the explanation that traits can be influenced by the environment.

SC.3.9.3.C

TLW...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.

SC.3.9.3.D

TLW...Construct an argument that plants and animals have internal and external structures that function to support growth, behavior, and reproduction.

SC.4.6.3.B

Earth and Space Science

TLW...Define a simple design problem reflecting a need or a want.

SC.5.13.4.E

TLW...Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

SC.4.13.4.B

TLW...Analyze and interpret data from maps to describe patterns of Earth's feature.

SC.4.13.4.C

TLW...Obtain and combine information to describe climates in different regions of the world.

SC.3.12.4.B

TLW...Develop a model to describe how the geosphere, biosphere, hydrosphere and atmosphere interact.

SC.5.13.4.A

TLW...Describe and graph the amounts of saltwater and fresh water in reservoirs on earth.

SC.5.13.4.B

Physical ScienceStandard

TLW...Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.

SC.8.1.1.A

TLW...Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

SC.8.1.1.B

TLW...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.

SC.8.1.1.C

TLW...Ask questions about data to determine the factors that affect the strength of electrical and magnetic forces.

SC.8.1.1.D

TLW...Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

SC.8.1.1.E

TLW...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.

SC.8.1.1.F

TLW...Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

SC.8.2.2.A

TLW...Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

SC.8.2.2.B

TLW...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.

SC.8.2.2.C

TLW...Develop models to describe the atomic composition of simple molecules.

SC.7.3.1.A

TLW...Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

SC.7.3.1.B

TLW...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.

SC.7.3.1.C

TLW...Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

SC.6.4.1.A

TLW...Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principle and potential impacts on people and the natural environment that may limit possible solutions.

SC.6.4.1.B

TLW...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.

SC.6.4.1.C

TLW...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

SC.6.4.1.D

TLW...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.

SC.8.4.3.A

TLW...Develop a model to describe that when the arrangement of objects interacting at a distance changes, then different amounts of potential energy are stored in the system.

SC.8.4.3.B

TLW...Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

SC.7.5.2.A

TLW...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.

SC.7.5.2.B

TLW...Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

SC.7.5.2.C

TLW...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.

SC.7.5.2.D

Earth and Space ScienceStandard

TLW...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.	SC.8.11.6.A
TLW...Develop and use a model to describe the role of gravity in the motions within the galaxy and the solar system.	SC.8.11.6.B
TLW...Analyze and interpret data to determine scale properties of objects in the solar system.	SC.8.11.6.C
TLW...Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	SC.8.14.7.A
TLW...Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.	SC.6.12.4.A
TLW...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.	SC.6.12.4.B
TLW...Ask questions to clarify evidence of the factors that have caused the change in global temperatures over thousands of years.	SC.6.12.4.C
TLW...Analyze and interpret data on weather and climate to forecast future catastrophic events and inform the development of technologies to mitigate their effect.	SC.6.12.4.D
TLW...Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	SC.6.13.5.A
TLW...Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	SC.7.13.5.A
TLW...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.	SC.7.13.5.B
TLW...Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	SC.7.13.5.C
TLW...Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	SC.7.14.6.A
TLW...Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.	SC.7.14.6.B

TLW...Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

SC.7.14.6.C

Life ScienceStandard

TLW...Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	SC.6.6.2.A
TLW...Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	SC.6.6.2.B
TLW...Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	SC.6.6.2.C
TLW...Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	SC.6.6.2.D
TLW...Construct an argument based on evidence for how plant and animal adaptations affect the probability of successful reproduction.	SC.6.9.3.A C
TLW...Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	SC.6.9.3.B
TLW...Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	SC.6.9.3.C
TLW...Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	SC.7.7.3.A
TLW...Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	SC.7.7.3.B
TLW...Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	SC.7.7.3.C
TLW...Apply scientific principles to design a method for monitoring and increasing positive human impact on the environment.	SC.7.7.3.D
TLW...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.	SC.7.8.4.A
TLW...Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism.	SC.7.8.4.B
TLW...Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	SC.7.8.4.C

TLW...Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. SC.7.8.4.D

TLW...Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations. SC.7.8.4.E

TLW...Develop and use a model to describe why structural changes to genes (mutations) may result in harmful, beneficial, or neutral effects to structure and function of organisms. SC.8.9.4.A

TLW...Gather and synthesize information about technologies that have changed the way humans influence inheritance of desired traits in organisms. SC.8.9.4.B

TLW...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. SC.8.10.5.A

TLW...Apply scientific ideas to construct an explanation for the anatomical similarities and differences among and between modern and fossil organisms to infer evolutionary relationships. SC.8.10.5.B

TLW...Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. SC.8.10.5.C

TLW...Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. SC.8.10.5.D

PHYSICAL SCIENCE

Nebraska Standard

TLW...Analyze data to support the claim that Newton's Second Law of Motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

SC.HS.1.1.A

TLW...Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

SC.HS.1.1.B

TLW...Apply science and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

SC.HS.1.1.C

TLW...Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

SC.HS.1.1.D

TLW...Plan and conduct an investigation to provide evidence that an electrical current can produce a magnetic field and that a changing magnetic field can produce an electrical current.

SC.HS.1.1.E

TLW...Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

SC.HS.2.2.A

TLW...Evaluate questions about the advantages of using digital transmission and storage of information.

SC.HS.2.2.B

TLW...Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

SC.HS.2.2.C

TLW...Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.

SC.HS.2.2.D

TLW...Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

SC.HS.2.2.E

TLW...Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

SC.HS.3.3.A

TLW...Plan and conduct an investigation to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles

SC.HS.3.3.B

TLW...Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

SC.HS.3.3.C

TLW...Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.	SC.HS.3.3.D
TLW...Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	SC.HS.4.4.A
TLW...Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).	SC.HS.4.4.B
TLW...Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.	SC.HS.4.4.C
TLW...Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	SC.HS.4.4.D
TLW...Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	SC.HS.4.4.E
TLW...Develop and use a model of two objects interacting through electrical or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.	SC.HS.4.4.F
TLW...Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	SC.HS.5.5.A
TLW...Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.	SC.HS.5.5.B
TLW...Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	SC.HS.5.5.C
TLW...Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.	SC.HS.5.5.D
TLW...Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	SC.HS.5.5.E
TLW...Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	SC.HS.5.5.F

TLW...Develop a model based on evidence to illustrate the stages of stars, like the sun, and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.

SC.HS.11.1.A

TLW...B Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.

SC.HS.11.1.B

TLW...Communicate scientific ideas about the way stars, throughout their stellar stages, produce elements.

SC.HS.11.1.C

TLW...Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

SC.HS.11.1.D

TLW...Construct an explanation based on evidence for how the sun's energy moves among Earth's systems.

SC.HS.12.2.A

BIOLOGY

Nebraska Standard

TLW...Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

SC.HS.6.1.A

TLW...Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

SC.HS.6.1.B

TLW...Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

SC.HS.6.1.C

TLW...Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

SC.HS.6.1.D

TLW...Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

SC.HS.7.2.A

TLW...Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

SC.HS.7.2.B

TLW...Evaluate the claims, evidence, and reasoning that the interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

SC.HS.7.2.C

TLW...Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

SC.HS.7.2.D

TLW...Design, evaluate, and refine a solution for increasing the positive impacts of human activities on the environment and biodiversity.

SC.HS.7.2.E

TLW...Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

SC.HS.7.2.F

TLW...Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

SC.HS.8.3.A

TLW...Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other molecules to form the four basic macromolecules.

SC.HS.8.3.B

TLW...Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules are broken and bonds in new compounds are formed resulting in a net transfer of energy.

SC.HS.8.3.C

TLW...Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	SC.HS.8.3.D
TLW...Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	SC.HS.8.3.E
TLW...Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	SC.HS.8.3.F
TLW...Develop and use a model to explain the relationships between the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	SC.HS.9.4.A
TLW...Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	SC.HS.9.4.B
TLW...Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	SC.HS.9.4.C
TLW...Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	SC.HS.10.5.A
TLW...Construct an explanation based on evidence that natural selection primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	SC.HS.10.5.B
TLW...Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	SC.HS.10.5.C
TLW...Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	SC.HS.10.5.D
TLW...Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	SC.HS.10.5.E
TLW...Construct an explanation based on evidence for how the sequence of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	SC.HSP.6.1.A

Biology II	Nebraska Standard
TLW...Communicate scientific information that explains the patterns of organization in the integumentary system.	SC.HSP.6.2.A
TLW...Ask questions to clarify the role of various proteins and integumentary system function.	SC.HSP.6.2.B
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the integumentary system.	SC.HSP.6.2.C
TLW...Construct a scientific explanation based on evidence for the role of cell division in integumentary system dysfunction.	SC.HSP.6.2.D
TLW...Develop and use a model to explain the relationship between the integumentary system and other body systems.	SC.HSP.6.2.F
TLW...Communicate scientific information that explains the patterns of organization in the skeletal system.	SC.HSP.6.3.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the skeletal system.	SC.HSP.6.3.B
TLW...Develop and use a model to explain the order of events necessary for bone formation.	
TLW...Communicate scientific information that explains the patterns of organization in the muscular system. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.4.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the muscular system.	SC.HSP.6.4.B
TLW...Construct an argument based on evidence that muscle contraction is the result of biochemical reactions.	SC.HSP.6.4.C
TLW...Develop and use a model to explain the relationship between the muscular system and other body systems.	SC.HSP.6.4.F
TLW...Communicate scientific information that explains the patterns of organization in the nervous system. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.5.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the nervous system.	SC.HSP.6.5.B
TLW...Construct an argument based on evidence that production of a nerve impulse is the result of biochemical reactions.	SC.HSP.6.5.C
TLW...Construct and present arguments using evidence to support claims about the causes of dysfunction in the nervous system. Evidence could include data obtained from case studies.	SC.HSP.6.5.E

TLW...Communicate scientific information that explains the patterns of organization in the nervous system. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.5.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the nervous system.	SC.HSP.6.5.B
TLW...Construct an argument based on evidence that production of a nerve impulse is the result of biochemical reactions.	SC.HSP.6.5.C
TLW...Construct and present arguments using evidence to support claims about the causes of dysfunction in the nervous system. Evidence could include data obtained from case studies.	SC.HSP.6.5.E
TLW...Develop and use a model to explain the relationship between the nervous system and other body systems. Including the endocrine, nervous, and other body systems.	SC.HSP.6.5.F
TLW...Communicate scientific information that explains the patterns of organization in the cardiovascular/respiratory systems. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.6.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the cardiovascular/respiratory systems.	SC.HSP.6.6.B
TLW...Construct and present arguments using evidence to support claims about causes of dysfunction in the muscular system. Evidence could include data obtained from case studies.	SC.HSP.6.6.D
TLW...Communicate scientific information that explains the patterns of organization in the digestive system. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.7.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the digestive system.	SC.HSP.6.7.B
TLW...Communicate scientific information that explains the patterns of organization in the urinary system. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.8.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the urinary system.	SC.HSP.6.8.B
TLW...Communicate scientific information that explains the patterns of organization in the reproductive system. Information could be gathered from dissections, models, simulations, and scientific texts.	SC.HSP.6.9.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the reproductive system. Include spermatogenesis, oogenesis, and menstruation.	SC.HSP.6.9.B

TLW...Obtain, evaluate, and communicate information related to health science careers.

SC.HSP.17.1.A

CHEMISTRY I

Nebraska Standard

TLW...Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

SC.HSP.3.1.A

TLW...Plan and conduct an investigation to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles.

SC.HSP.3.1.B

TLW...Develop and use models to predict and explain forces that are in and between molecules.

SC.HSP.3.1.C

TLW...Evaluate a solution to a complex, real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

SC.HSP.3.3.D

TLW...Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

SC.HSP.3.3.E

TLW...Develop and use models to describe and predict mechanisms of the quantum mechanical model of the atom.

SC.HSP.3.3.F

TLW...Evaluate the evidence supporting claims about how atoms absorb and emit energy in the form of electromagnetic radiation.

SC.HSP.3.3.G

TLW...Use mathematical representations to quantify matter through the analysis of patterns in chemical compounds at different scales.

SC.HSP.3.3.H

TLW...Use statistical and mathematical techniques to describe qualitative and quantitative thermodynamic relationships.

SC.HSP.4.2.A

TLW...Plan and conduct an investigation to gather evidence of how the Kinetic Molecular Theory and gas laws are related.

SC.HSP.4.2.B

TLW...Analyze and interpret data to explain changes in energy within a system and/or energy flows in and out of a system.

SC.HSP.4.2.C

TLW...Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

SC.HSP.4.2.D

TLW...Plan and conduct an investigation to generate evidence that answers scientific questions related to changes in solution chemistry.

SC.HSP.5.3.A

TLW...Use a model to identify electron transfer and balance a redox reaction.

SC.HSP.5.3.B

TLW...Use mathematical and/or computational representations to predict and explain relationships within chemical systems.

SC.HSP.5.3.C

TLW...Use mathematical representations to analyze the proportion and quantity of particles in solution.

SC.HSP.5.3.D

TLW...Plan and conduct an investigation to predict the outcome of a chemical reaction based on patterns of chemical properties.

SC.HSP.5.3.E

TLW...Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

SC.HSP.5.3.F

CHEMISTRY II

Nebraska Standard

TLW...Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

SC.HS.2.2.C

TLW...Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.

SC.HS.2.2.D

TLW...Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

SC.HS.2.2.E

TLW...Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

SC.HS.3.3.A

TLW...Plan and conduct an investigation to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles.

SC.HS.3.3.B

TLW...Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

SC.HS.3.3.C

TLW...Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

SC.HS.3.3.D

TLW...Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

SC.HS.5.5.A

TLW...Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.

SC.HS.5.5.B

TLW...Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

SC.HS.5.5.C

TLW...Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

SC.HS.5.5.D

TLW...Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

SC.HS.5.5.F

TLW...Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

SC.HSP.2.2.D

TLW...Use evidence to support explanations for causes of emission and absorption spectra of electromagnetic radiation.	SC.HSP.2.2.E
TLW...Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	SC.HSP.2.2.F
TLW...Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.	SC.HSP.3.1.A
TLW...Plan and conduct an investigation to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles.	SC.HSP.3.1.B
TLW...Develop and use models to predict and explain forces that are in and between molecules.	SC.HSP.3.1.C
TLW...Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	SC.HSP.3.3.E
TLW...Develop and use models to describe and predict mechanisms of the quantum mechanical model of the atom.	SC.HSP.3.3.F
TLW...Evaluate the evidence supporting claims about how atoms absorb and emit energy in the form of electromagnetic radiation.	SC.HSP.3.3.G
TLW...Use mathematical representations to quantify matter through the analysis of patterns in chemical compounds at different scales.	SC.HSP.3.3.H
TLW...Use statistical and mathematical techniques to describe qualitative and quantitative thermodynamic relationships.	SC.HSP.4.2.A
TLW...Plan and conduct an investigation to gather evidence of how the Kinetic Molecular Theory and gas laws are related.	SC.HSP.4.2.B
TLW...Analyze and interpret data to explain changes in energy within a system and/or energy flows in and out of a system.	SC.HSP.4.2.C
TLW...Plan and conduct an investigation to generate evidence that answers scientific questions related to changes in solution chemistry.	SC.HSP.5.3.A
TLW...Use a model to identify electron transfer and balance a redox reaction.	SC.HSP.5.3.B
TLW...Use mathematical and/or computational representations to predict and explain relationships within chemical systems.	SC.HSP.5.3.C
TLW...Use mathematical representations to analyze the proportion and quantity of particles in solution.	SC.HSP.5.3.D

TLW...Plan and conduct an investigation to predict the outcome of a chemical reaction based on patterns of chemical properties.	SC.HSP.5.3.E
TLW...Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	SC.HSP.5.3.F
TLW...Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	SC.HS.8.3.A
TLW...Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other molecules to form the four basic macromolecules.	SC.HS.8.3.B
TLW...Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules are broken and bonds in new compounds are formed resulting in a net transfer of energy.	SC.HS.8.3.C
TLW...Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	SC.HSP.8.3.A
TLW...Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other molecules to form amino acids and/or other large carbon-based molecules.	SC.HSP.8.3.B
TLW...Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	SC.HSP.8.3.C

PHYSICS

Nebraska Standard

TLW...Generate and interpret mathematical and graphical representations to describe the relationships between position, velocity, acceleration and time.

SC.HSP.1.1.A

TLW...Use mathematical and pictorial models as applied to Newton's second law of motion describing the relationship among the net force on a macroscopic object, its mass, and its acceleration.

SC.HSP.1.1.B

TLW...Use mathematical representations of momentum to predict the outcome of a collision.

SC.HSP.1.1.C

TLW...Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

SC.HSP.1.1.D

TLW...Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

SC.HSP.1.1.E

TLW...Use mathematical representations to describe the relationships among the frequency, wavelength, and speed of waves traveling in various media.

SC.HSP.2.2.A

TLW...Develop and use models to predict interactions of longitudinal and transverse waves in various media.

SC.HSP.2.2.B

TLW...Develop and use models to describe the behavior of light at the boundary of various media.

SC.HSP.2.2.C

TLW...Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

SC.HSP.2.2.D

TLW...Use evidence to support explanations for causes of emission and absorption spectra of electromagnetic radiation.

SC.HSP.2.2.E

TLW...Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

SC.HSP.2.2.F

TLW...Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

SC.HSP.4.3.A

TLW...Plan and conduct an investigation to rate the power and efficiency used in performing work on a system.

SC.HSP.4.3.B

TLW...Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

SC.HSP.4.3.C

TLW...Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	SC.HSP.4.3.D
TLW...Plan and conduct an investigation to provide evidence for the transfer of thermal energy within a system based on the Laws of Thermodynamics.	SC.HSP.4.3.E
TLW...Develop and use a model of two objects interacting through gravitational, electric, or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.	SC.HSP.4.3.F
TLW...Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	SC.HSP.16.4.A
TLW...Use models to visualize and describe gravitational, magnetic and electrical fields and predict resulting forces on nearby objects.	SC.HSP.16.4.B
TLW...Use mathematical representations to provide evidence that describes and predicts relationships between power, current, voltage, and resistance.	SC.HSP.16.4.C
TLW...Evaluate competing design solutions for construction and use of electrical consumer products accounting for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.	SC.HSP.16.4.D
TLW...Obtain and communicate technical information about how some technological devices use alternating current and others use direct current.	SC.HSP.16.4.E
TLW...Design a solution to a problem using the fact that an electric current can produce a magnetic field and/or that a changing magnetic field can produce an electric current.	SC.HSP.16.4.F
TLW...Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	SC.HSP.16.4.G

Environmental

Nebraska Standard

TLW...Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. Assessment does not include deriving mathematical equations to make comparisons.

SC.HS.7.2.A

TLW...Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. Assessment is limited to provided data.

SC.HS.7.2.B

TLW...Evaluate the claims, evidence, and reasoning that the interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

SC.HS.7.2.C

TLW...Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

SC.HS.7.2.D

TLW...Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. Assessment is limited to testing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.

SC.HS.7.2.F

TLW...Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.

SC.HS.8.3.E

TLW...Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Assessment does not include the specific chemical steps of photosynthesis and respiration.

SC.HS.8.3.F

TLW...Develop a model based on evidence to illustrate the stages of stars, like the sun, and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. Assessment does not include details of the atomic and sub-atomic processes involved with the sun's nuclear fusion.

SC.HS.11.1.A

TLW...Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.

SC.HS.11.1.B

TLW...Communicate scientific ideas about the way stars, throughout their stellar stages, produce elements. Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.

SC.HS.11.1.C

TLW...Construct an explanation based on evidence for how the sun's energy moves among Earth's systems.

SC.HS.12.2.A

TLW...Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.

SC.HS.12.2.B

TLW...Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate and scale of global or regional climate changes.	SC.HS.12.2.C
TLW...Evaluate the validity and reliability of past and present models of Earth conditions to make projections of future climate trends and their impacts.	SC.HS.12.2.D
TLW...Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	SC.HS.13.3.A
TLW...Develop a model based on evidence of Earth's interior to describe the cycling of matter.	SC.HS.13.3.B
TLW...Construct an argument based on evidence to explain the multiple processes that cause Earth's plates to move.	SC.HS.13.3.C
TLW...Plan and conduct an investigation of the properties of water and their effects on Earth materials, surface processes, and groundwater systems.	SC.HS.13.3.D
TLW...Develop a quantitative model to describe the cycling of carbon and other nutrients among the hydrosphere, atmosphere, geosphere, and biosphere, today and in the geological past.	SC.HS.13.3.E
TLW...Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the differences in age, structure, and composition of crustal and sedimentary rocks.	SC.HS.14.4.A
TLW...Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to reconstruct Earth's formation and early history.	SC.HS.14.4.B
TLW...Develop a model to illustrate how Earth's internal and surface processes operate over time to form, modify, and recycle continental and ocean floor features. Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.	SC.HS.14.4.C
TLW...Construct an argument based on evidence to validate coevolution of Earth's systems and life on Earth. Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.	SC.HS.14.4.D
TLW...Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	SC.HS.15.5.A
TLW...Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	SC.HS.15.5.B
TLW...Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.	SC.HS.15.5.C

TLW...Evaluate or refine a technological solution that increases positive impacts of human activities on natural systems.

SC.HS.15.5.D

TLW...Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

SC.HS.15.5.E

TLW...Use a computational representation to illustrate the relationships among Earth systems and the degree to which those relationships are being modified due to human activity. Assessment does not include running computational representations but is limited to using the published results of scientific computational models.

SC.HS.15.5.F

FORENSIC SCIENCE

Nebraska Standard

TLW...Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	SC.HS.6.1.A
TLW...Develop and use a model to explain the relationships between the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	SC.HS.9.4.A
TLW...Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	SC.HS.9.4.C
TLW...Construct an explanation based on evidence for how the sequence of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	SC.HSP.6.1.A
TLW...Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	SC.HSP.9.4.B
TLW...Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	SC.HSP.9.4.D
TLW...Construct an explanation based on evidence for the role of biotechnology in the research and understanding of biological systems.	SC.HSP.9.4.F
TLW...Communicate scientific information that explains the patterns of organization in the cardiovascular/respiratory systems.	SC.HSP.6.6.A
TLW...Construct and present arguments using evidence to support claims about the causes of dysfunction in the cardiovascular/respiratory systems.	SC.HSP.6.6.D
TLW...Develop and use a model to explain the relationship between the cardiovascular/respiratory systems and other body systems.	SC.HSP.6.6.E
TLW...Communicate scientific information that explains the patterns of organization in the digestive system.	SC.HSP.6.7.A
TLW...Develop and use a model to identify and describe the relationship between the structures and physiological processes of the digestive system.	SC.HSP.6.7.B
TLW...Develop and use a model to explain the relationship between the digestive system and other body systems.	SC.HSP.6.7.E
TLW...Communicate scientific information that explains the patterns of organization in the urinary system.	SC.HSP.6.8.A
TLW...Construct and present arguments using evidence to support claims about the causes of dysfunction in the urinary system.	SC.HSP.6.8.D
TLW...Develop and use a model to explain the relationship between the urinary system and other body systems.	SC.HSP.6.8.E
TLW...Obtain, evaluate, and communicate information related to health science careers.	SC.HSP.17.1.A

TLW...Analyze data to support the claim that Newton's Second Law of Motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.	SC.HS.1.1.A
TLW...Apply science and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.	SC.HS.1.1.C
TLW...Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	SC.HS.1.1.D
TLW...Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	SC.HS.2.2.A
TLW...Evaluate questions about the advantages of using digital transmission and storage of information.	SC.HS.2.2.B
TLW...Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	SC.HS.2.2.D
TLW...Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	SC.HS.2.2.E
TLW...Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.	SC.HS.3.3.A
TLW...Plan and conduct an investigation to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles.	SC.HS.3.3.B
TLW...Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	SC.HS.3.3.C
TLW...Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.	SC.HS.3.3.D
TLW...Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	SC.HS.4.4.E
TLW...Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	SC.HS.5.5.C
TLW...Generate and interpret mathematical and graphical representations to describe the relationships between position, velocity, acceleration and time.	SC.HSP.1.1.A
TLW...Use mathematical and pictorial models as applied to Newton's second law of motion describing the relationship among the net force on a macroscopic object, its mass, and its acceleration.	SC.HSP.1.1.B

TLW...Use mathematical representations of momentum to predict the outcome of a collision.

SC.HSP.1.1.C

TLW...Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

SC.HSP.1.1.D

TLW...Use mathematical representations to describe the relationships among the frequency, wavelength, and speed of waves traveling in various media.

SC.HSP.2.2.A

TLW...Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

SC.HSP.2.2.D

TLW...Use evidence to support explanations for causes of emission and absorption spectra of electromagnetic radiation.

SC.HSP.2.2.E

TLW...Evaluate the evidence supporting claims about how atoms absorb and emit energy in the form of electromagnetic radiation.

SC.HSP.3.3.G