Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL #1

Program Name	WYCA	Content Area	Science
Course ID	CASC62324	Grade Level	6
Course Name	Science 6 A	# of Credits	0.5
SCED Code	NoCourseSCED	Curriculum Type	Connections Academy

COURSE DESCRIPTION

Welcome to Science 6, an innovative course based on the framework for the Next Generation Science standards (NGSS). NGSS focuses on science and engineering practices; Earth, life and physical science core ideas; and fundamental crosscutting concepts vital to relating the various fields of science and developing a scientific world view. The course provides the student opportunities to engage in inquiry-based investigations, STEM (Science Technology Engineering Mathematics) projects, and other dynamic activities. Hands-on and online activities encourage the student to make connections, collaborate, and reflect on his or her learning. Because the course is designed to meet both national and state-based standards, the sequence of content will vary by state.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
MS-PS1-1	Develop models to describe the atomic composition of simple molecules and extended structures.
MS-PS1-3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
MS-PS1-5	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-PS2-1	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
MS-PS2-2	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-PS2-3	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
MS-PS2-5	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-PS3-1	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-PS3-2	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-PS3-3	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
MS-PS3-4	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-PS3-5	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-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-LS1-7	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.
MS-LS1-8	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS2-2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
MS-LS3-1	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
MS-LS3-2	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
MS-LS4-5	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
MS-ESS1-1	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.
MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

MS-ESS2-4	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS-ESS2-6	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.
MS-ESS3-1	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.
MS-ESS3-3	Apply scientific principles to design a method for monitoring, evaluating, and managing a human impact on the environment.
MS-ESS3-4	Construct an argument supported by evidence for how changes in human population and per-capita consumption of natural resources impact Earth's systems.
MS-ESS3-5	Ask questions to clarify evidence of the factors that have caused changes in global temperatures over time.
MS-ETS1-1	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-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3	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-ETS1-4	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.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
Unit 1: Introduction to Science 6 In this unit, you will explore what it means to think like a scientist and carry out scientific investigations using the scientific method, a process that is essential to scientific inquiry and problem solving. You will learn how to design and conduct a sound science experiment and how to use math skills to take measurements and collect and analyze data. As you work through the unit, you will gain an appreciation for the attitudes that scientists possess and for the reason behind using a standard system of measurement in science. You will identify scientific tools that are used to solve problems and why it is important to prepare and use caution when carrying out investigations in the laboratory and in the field.	MS-PS1-1, MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-4, MS-PS3-4, MS-PS4-2, MS-LS2-5, MS-ESS1-1, MS-ESS1-2, MS-ESS2-6, MS-LS3-1, MS-LS3-2,	•Explain what scientific inquiry is and describe the attitudes that are necessary for thinking scientifically •List the steps of the scientific method and apply the scientific processes that are important to science investigations •Identify the math skills and tools that scientists use in collecting data, making measurements, experimentation, and analyzing data •Describe the goal of technology and explain how technology relates to science •Explain why preparation is important to doing science experiments in the lab and in the field
Unit 2: Energy Energy is everywhere and in everything. In this unit, you will learn about energy by engaging in hands-on and virtual activities. You will investigate kinetic and potential energy. You will search your own house for examples of thermal energy transfer. You will figure out ways to increase or decrease friction in everyday machines, and even come up with plans for your own device that can operate without producing lots of waste heat.	MS-PS2-3, MS-PS2-4, MS-PS2-5, MS-PS3-1, MS-PS3-2, MS-PS3-3, MS-PS3-4, MS-PS3-5, MS-ESS2-4, MS-LS1-7, MS-PS1-5, MS-LS2-2	•Examine and explain the relationship between the kinetic energy of an object and its mass and speed •Estimate the amount of potential energy an object has based on its position within an electrical, gravitational, or magnetic field •Use and/or construct models that illustrate energy transfer by convection, conduction, and radiation •Determine possible ways to maximize or minimize friction and energy transfer in everyday machines •Devise plans for a device that can operate without generating large amounts of heat and justify your choice of materials
Unit 3: Energy and the Environment There are many sources of energy available on Earth, and humans use a lot of it! In this unit, you will investigate different sources and types of energy, the pros and cons of their use, and ways to conserve them. You will also research and critique the economic and environmental effects of using different energy sources, and discuss your findings with your classmates.	MS-PS1-3, MS-ESS3-1, MS-ESS3-3, MS-ESS3-4, MS-ESS3-5, MS-ETS1-1, MS-ETS1-3, MS-ESS3-5, MS-LS1-8, MS-LS4-5, MS-PS1-3, MS-ESS3-3,	•Categorize various types of energy resources •Determine how various nonrenewable resources are obtained and used •Determine how various renewable resources are obtained and used •Specify ways to sustain renewable resources and to reduce, reuse, and recycle •Determine the environmental and economic effects of the use of various energy sources

Unit 4: Interdependent Relationships in Ecosystems In this unit, you will explore, describe, discuss, and investigate the relationships between organisms in an ecosystem as you engage in hands-on and virtual activities. You will explore the effects of predation, competition, and social interactions on the survival of individual organisms and on larger populations, model an ecosystem to determine its carrying capacity, and evaluate how human activities and biodiversity affect one another.	MS-LS2-1, MS-LS2-2, MS-LS2-5, MS-ESS3-4, MS-LS2-4, MS-ETS1-2,	•Use models to illustrate and explain the factors that determine the number of organisms an ecosystem can support •Recognize competitive, predatory, and mutually beneficial interactions between organisms, and give an example of each •Describe biodiversity and its role in a healthy ecosystem •Evaluate and discuss the ways in which human activity and biodiversity affect one other