

# Wyoming Department of Education Required Virtual Education Course Syllabus

## BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Science
Course ID	CASC62895	Grade Level	7
Course Name	Science 7 A	# of Credits	0.5
SCED Code	NoCourseSCED	Curriculum Type	Connections Academy

### COURSE DESCRIPTION

Welcome to Science 7, 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-PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
MS-PS1-3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
MS-PS1-4	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-PS1-5	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-PS1-6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
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-PS2-4	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-PS3-4	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-PS4-3	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-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
MS-LS1-2	Develop and use models to describe the parts, functions, and basic processes of cells.
MS-LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
MS-LS1-4	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.
MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
MS-LS1-6	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
MS-LS1-7	Develop a model to describe how food 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-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-LS3-1	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
MS-LS4-4	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.
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-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-ESS3-3	Apply scientific principles to design a method for monitoring, evaluating, and managing a human impact on the environment.
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-ETS2-1	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.

#### SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
<p><b>Unit 1: Introduction to Science 7</b></p> <p>Science is a continuous and ongoing quest to understand the natural world through observation and experimentation. In this unit, you will be introduced to the nature of science as you engage in hands-on and virtual activities. Just like real scientists, you will outline an inquiry process and use it to guide you through an experiment. You will distinguish between the different variables in an experiment. You will also research and discuss scientific theories with your classmates and summarize ways in which science and technology have influenced society.</p>	MS-LS1-8, MS-LS4-5, MS-PS1-3, MS-ETS2-1	<ul style="list-style-type: none"> <li>•Defend the use of the inquiry process as an effective way to study science</li> <li>•Differentiate between the independent, dependent, and constant variables in an experiment</li> <li>•Justify why scientific theories are modified, but seldom discarded</li> <li>•Explain the nature of science, science research, and how scientific progress is made</li> <li>•Specify ways science and technology have influenced society</li> </ul>
<p><b>Unit 2: Structure, Function, and Information Processing</b></p> <p>In this unit, you will explore, describe, discuss, and investigate the characteristics and basic needs of living things as you engage in hands-on and virtual activities. You will model the basic building blocks of life, explore the body systems of plants and animals, and discover how these systems work together to keep organisms alive.</p>	MS-LS1-1, MS-LS1-2, MS-LS1-3, MS-LS1-6, MS-LS1-8, MS-ESS2-4, MS-LS1-7, MS-PS1-5, MS-PS3-2	<ul style="list-style-type: none"> <li>•Describe the composition of living things and investigate the tools scientists use to study them</li> <li>•Identify the resources needed for living things to survive and investigate the effects of limited resources</li> <li>•Use models to illustrate and explain how cell structure is related to cell function</li> <li>•Summarize the way in which body systems work together to keep an organism alive</li> <li>•Plan and conduct investigations that show how organisms sense and react to their surroundings</li> </ul>

<p><b>Unit 3: Introduction to Genetics</b>          In this unit, you will explore, describe, discuss, and investigate the passing of biological information from one generation to the next as you engage in hands-on and virtual activities. You will compare mitosis and meiosis, discuss the roles of environment and genetics in the development and growth of organisms, and assess the ways in which varying genes can affect characteristics.</p>	<p>MS-LS1-4, MS-LS1-5, MS-LS3-1, MS-LS4-4</p>	<ul style="list-style-type: none"> <li>•Use models to explain variation and duplication in offspring in sexual and asexual reproduction</li> <li>•Relate specific inherited traits to mutations of genes</li> <li>•Explain how mutations and changes to the formation of proteins affect traits</li> <li>•Illustrate how probability can be used to predict traits</li> </ul>
<p><b>Unit 4: Matter and Energy in Organisms and Ecosystems</b>          In this unit, you will explore, describe, discuss, and investigate the cycling of matter and energy through an ecosystem as you engage in hands-on and virtual activities. You will explore the roles of producers, consumers, and decomposers in an ecosystem, model their interactions, and discover how changes in an ecosystem affect the organisms that live there.</p>	<p>MS-LS2-3, MS-LS2-4, MS-ESS3-3, MS-ETS1-2, MS-PS2-2, MS-PS3-4, MS-ESS3-4, MS-LS2-4, MS-LS2-3, MS-ESS2-4, MS-LS1-7, MS-PS1-5, MS-PS3-2, MS-PS1-1, MS-PS4-3, MS-ESS3-3</p>	<ul style="list-style-type: none"> <li>•Describe photosynthesis and conduct investigations to determine how changing conditions affect the process</li> <li>•Use models to illustrate and explain the transfer of matter and energy through an ecosystem</li> <li>•Summarize the roles of producers, consumers, and decomposers in the transfer of matter and energy through an ecosystem</li> <li>•Conduct investigations and use models to illustrate and explain how matter is cycled through the living and nonliving parts of an ecosystem</li> <li>•Plan and conduct investigations into how changes in an ecosystem can affect organisms in the ecosystem</li> </ul>