

# Wyoming Department of Education Required Virtual Education Course Syllabus

## BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Science
Course ID	CASC63133	Grade Level	8
Course Name	Science 8 B	# of Credits	0.5
SCED Code	NoCourseSCED	Curriculum Type	Connections Academy

### COURSE DESCRIPTION

*Welcome to Science 8, 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-PS1-4	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-PS2-2	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-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-PS3-4	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-PS4-1	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-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-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-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
MS-LS4-1	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.
MS-LS4-2	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.
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-LS4-6	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
MS-ESS1-4	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.
MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
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-ESS3-2	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
MS-ESS3-3	Apply scientific principles to design a method for monitoring, evaluating, and managing a human impact on the environment.
MS-ESS3-5	Ask questions to clarify evidence of the factors that have caused changes in global temperatures over time.
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.

#### SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
<p><b>Unit 1: The Human Body</b></p> <p>In this unit, you will explore, describe, discuss, and investigate structures and functions of the human body as you engage in hands-on and virtual activities. You will analyze how the major systems in your body work individually and how all of the systems work together to maintain overall function of the body. You will also explore the nature of disease and infection, and how scientists' ideas about disease have changed over time. Finally, you will discuss the impact antibiotic resistant bacteria can have on human health.</p>	MS-LS1-7, MS-PS1-6, MS-LS1-4, MS-LS1-3	<ul style="list-style-type: none"> <li>•Identify the components and functions of the major systems of the human body</li> <li>•Explain how the major body systems interact and work together</li> <li>•Analyze the causes of infection and disease</li> <li>•Explore how humans can fight and prevent disease</li> <li>•Synthesize the information learned about the human body to promote good health</li> </ul>
<p><b>Unit 2: Chemical Reactions</b></p> <p>Have you ever seen a chemical reaction before? In this unit, you will perform and observe chemical reactions, and compare the physical and chemical properties of reactants and products. You will also design your own experiment to show that reactants and products are different substances. Finally, you will create a digital poster to model the events of the carbon cycle.</p>	MS-PS1-1, MS-PS1-2, MS-PS1-4, MS-PS1-5, MS-PS1-6, MS-LS1-6, MS-LS1-7, MS-ESS3-5, MS-ESS1-3, MS-ESS3-2, MS-LS4-1, MS-PS1-2, MS-ETS1-3, MS-ESS2-3, MS-LS2-1, MS-PS1-6, MS-LS1-4, MS-LS1-3, MS-LS1-5, MS-ESS2-2, MS-ESS1-4, MS-ESS3-1	<ul style="list-style-type: none"> <li>•Relate the principle of conservation of mass to chemical reactions</li> <li>•Verify that substances at the end of a reaction have different properties than the original substances</li> <li>•Explain why some reactions release energy while some others absorb energy</li> <li>•Construct models to show the movement of matter and energy through the carbon cycle</li> </ul>
<p><b>Unit 3: Interaction of Forces</b></p> <p>In this unit, you will continue your study of forces by investigating ways non-contact forces, like gravity and magnetism, interact with and affect matter. You will use your knowledge of forces to predict how objects should move in space and on Earth. You will discover ways to strengthen and weaken electric and magnetic forces. You will also design your own experiment to investigate ways to move objects without touching them. Finally, you will create a model to demonstrate the effect of gravitational attractions on the movements of objects in space.</p>	MS-PS2-3, MS-PS2-4, MS-PS1-1	<ul style="list-style-type: none"> <li>•Devise ways to change the strength of electric and magnetic forces</li> <li>•Construct and refine a model to illustrate how gravitational interactions among objects in space affect their motion</li> <li>•Describe the components of an electric circuit</li> <li>•Predict the stability of a physical system</li> </ul>

<p><b>Unit 4: Waves and Electromagnetic Radiation</b></p> <p>What do spear fishing, wireless devices, and rainbows have in common? In this unit, you will investigate and describe waves and electromagnetic radiation. You will investigate the causes of different colors and brightness of light, and determine if sound waves travel in space. You will also investigate the properties of light that make things like blue blocker sunglasses and wireless devices work.</p>	MS-PS4-1, MS-PS4-2, MS-PS4-3	<ul style="list-style-type: none"><li>• Investigate and interpret the relationship between properties of waves and various wave behaviors and characteristics</li><li>• Summarize various ways modern technology uses waves to enhance communication</li></ul>
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