

Wyoming Department of Education Required Virtual Education Course Syllabus

[District] County School District # X

Program Name	WYCA	Content Area	Science
Course ID	CASC63067	Grade Level	8
Course Name	Science 8 A	# 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-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-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-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-ESS2-3	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-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-ETS2-2	Develop a model defining and prioritizing the impacts of human activity on a particular aspect of the environment, identifying positive and negative consequences of the activity, both short and long-term, and investigate and explain how the ethics and integrity of scientists and engineers and respect for individual property rights might constrain future development.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
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<p>Unit 1: Introduction to Science 8</p> <p>In this unit, you will explore the branches of science and the scientists that study them as you engage in hands-on and virtual activities. You will discover how scientists think and work, investigate the tools they use and how to use them safely, and evaluate how science and technology influence everyday life.</p>	<p>MS-ESS2-3, MS-LS2-1, MS-PS2-2, MS-PS3-4, MS-PS1-1</p>	<ul style="list-style-type: none"> • Define science and give examples of what different scientists study • Evaluate, design, and explain the use of models and experimental design in science • Summarize the differences between a scientific theory and scientific law • Analyze the tools scientists use and when and how to use them appropriately • Explain how science and technology influences everyday life
<p>Unit 2: Earth's History</p> <p>In this unit, you will learn about Earth's history through actual evidence of Earth's past—fossils. You will learn how fossils are formed and how there are different types of fossils, depending on environmental conditions that were present during burial and fossilization. You will learn what it would be like to be a paleontologist and how geologists can use the rock record to determine the relative age of rock layers and radioactive dating to determine the absolute age of rock samples that contain radioactive elements. You will study the geologic time scale and construct your own timeline to get a better idea of how Earth's timeline highlights important events throughout history. Finally, you will learn about major time periods in Earth's history, including Precambrian time and the Paleozoic, Mesozoic, and Cenozoic eras, and some of the significant events that occurred during those time periods. By the end of the unit, you will be able to explain how some species survived changes throughout Earth's history, while others have become extinct.</p>	<p>MS-LS2-3, MS-ESS1-4, MS-LS2-3</p>	<ul style="list-style-type: none"> • Explain how different types of fossils form and describe what fossils tell about organisms of the past • Describe how geologists determine the relative age of rock layers using the law of superposition and explain how scientists can determine the absolute age of rocks using radioactive dating • Explain the importance of the geologic time scale and how it can be used to learn about Earth's history • Identify significant events during Precambrian time and the Paleozoic, Mesozoic, and Cenozoic eras and explain the factors that can cause the extinction of organisms • Explain how some species have survived, while others have become extinct, and explain the carbon cycle and its importance to nutrient cycling on Earth
<p>Unit 3: Natural Selection and Adaptation</p> <p>In this unit, you will explore, describe, discuss and investigate the role of natural selection in the adaptation of organisms to their environment, as you engage in hands-on and virtual activities. You will explore the effects of natural selection on a population, discover how two populations of the same species can develop into separate species, and evaluate the evidence of evolution.</p>	<p>MS-LS4-6, MS-LS4-4, MS-LS4-2, MS-ESS1-3, MS-ESS3-2, MS-LS4-1, MS-PS1-2, MS-ETS1-3, MS-LS4-1</p>	<ul style="list-style-type: none"> • Explain why fossils of some extinct organisms have been found while others have not • Describe how scientists use the fossil record, comparative anatomy, and similarities in development between species to understand the history of life on Earth • Summarize the way in which natural selection can change the characteristics of a population • Explain how two populations of the same species can develop into separate species

<p>Unit 4: Human Impact on the Environment</p> <p>In this unit, you will appraise the significant impact humans and their activities are having on Earth's systems and resources. You will design solutions to reduce human impacts that deplete resources. You will evaluate renewable energy resources and explore the positive impact these technologies can have. You will evaluate ways in which technology monitoring assists in creating a well-informed and environmentally responsible public.</p>	<p>MS-ESS3-1, MS-ESS1-3, MS-ESS3-2, MS-LS4-1, MS-PS1-2, MS-ETS1-3, MS-PS3-1, MS-ESS3-3, MS-ETS2-2</p>	<ul style="list-style-type: none"> • Describe renewable and nonrenewable resources • Explain how water, air, and land pollution impact the environment • Explain ways of conserving natural resources
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