Wyoming Department of Education
Required Virtual Education Course Syllabus

Washakie County School District # 1

Program Name	Washakie #1 Online	Content Area	SC
Course ID	WOL-SC4F1	Grade Level	4
Course Name	WOL-Science 4	# of Credits	N/A
SCED Code	N/A	Curriculum Type	Fuel Education

COURSE DESCRIPTION

Students develop scientific reasoning and perform hands on experiments in Earth, Life, and Physical Sciences. They construct an electromagnet, identify minerals according to their properties, use chromatography to separate liquids, and assemble food webs. Students will explore topics such as:

- The Interdependence of Life—producers, consumers, and decomposers; food webs
- Animal and Plant Interactions—populations; competition; predators and prey; symbiosis; animal behavior
- Invertebrates—sponges; worms; mollusks; arthropods; echinoderms
- Chemistry—mixtures vs. solutions; distillation, evaporation, and chromatography
- Forces and Fluids—pressure; forces in flight; density; buoyancy
- Human Body—nervous system (senses, reflexes, nerves, and brain); endocrine system (hormones, glands, growth, and digestion)
- Electricity and Magnetism—charges; magnets; static electricity; currents and circuits; electromagnetism
- Rocks and Minerals—the earth's interior; crystals; minerals; rock cycle; plate tectonics; volcanoes, earthquakes
- The Fossil Record and the History of Life—types of fossils; the Paleozoic, Mesozoic, and Cenozoic eras

WYOMING CONTENT AND PERFORMANCE STANDARDS	
STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.
4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4-LS1-2	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 in different ways.
4-ESS1-1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
4-ESS2-1	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from renewable and non-renewable resources and how their uses affect the environment.
4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	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.
3-5-ETS1-3	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.
3-LS1-1	Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
3-LS2-1	Construct an argument that some animals form groups that help members survive.
3-LS3-1	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.
3-LS3-2	Use evidence to support the explanation that observable traits can be influenced by the environment.
3-LS4-1	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
3-LS4-2	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.
3-LS4-3	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.
3-LS4-4	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.

WYOMING CONTENT AND PERFORMANCE STANDARDS	
STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
5-PS1-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
5-PS1-3	Make observations and measurements to identify materials based on their properties.
5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Scope and Sequence		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1 - Ecosystems: • Ecosystems and the Environment • Producers, Consumers, and Decomposers • Food Webs: Energy Flow in an Ecosystem • Cycles in Ecosystems • Changing Environmental Conditions • Unit Review and Assessment	4-LS1-1 4-LS1-2 3-LS1-1 3-LS2-1 3-LS3-1 3-LS3-2 3-LS4-1 3-LS4-2 3-LS4-3 3-LS4-4	View images and identify ways that organisms are interacting with each other and with nonliving parts of their environment. I can describe how organisms depend on each other for survival, such as using each other as sources for food and shelter. Identify connections between living things, their basic needs, and the environments. Recognize that conditions within an ecosystem are constantly changing, causing plants and animals to adapt, move or die. I can explain that ecosystems are characterized by both their living and nonliving parts. Explain how producers and consumers (herbivores, carnivores, omnivores, and decomposers.) Explain that living things cause both detrimental and beneficial changes in their ecosystems.
Unit 2 - Plant and Animal Interactions • Plant and Animal Interactions • Competition • Predators and Prey • Symbiosis • Animal Behavior • Plant and Animal Interactions Unit Review and Assessment	4-LS1-1 4-LS1-2 3-LS1-1 3-LS2-1 3-LS3-1 3-LS3-2 3-LS4-1 3-LS4-2 3-LS4-3 3-LS4-4 4-ESS3-2 3-5-ETS1-1 3-5-ETS1-2	View images and identify ways that organisms are interacting with each other and with nonliving parts of their environment. Describe how organisms depend on each other for survival, such as using each other as sources for food and shelter. Identify connections between living things, their basic needs, and the environments. Identify symbiotic relationships between organisms (mutualism, commensalism, and parasitism). Identify behaviors as innate or learned. State that a population is a group of individuals of the same type living in a certain area. Recognize that organisms in an ecosystem can compete for resources such as food, shelter, and water. Classify organisms as predators and prey. Describe factors that affect the growth of a population. Explain that living things cause changes in their ecosystems, and that some of these changes are detrimental to other organisms, and some are beneficial. Explain that an animal's behavior helps it survive.
Unit 3 - Chemistry of Solutions • Mixtures and Solutions • What's Dissolving? Solvents and Solutes • Separating Solutions • Dissolving Solutions Quickly • Solubility • Concentrations • Chemistry of Solutions: Unit Review and Assessment	4-PS4-3 5-PS1-1 5-PS1-2 5-PS1-3 5-PS1-4	Describe a mixture as a combination of two or more substances that maintain their individual properties and do not go through a chemical change when mixed. , Define a solution as a mixture in which the substances are completely and evenly mixed down to their individual molecules. Recognize that solutions can be made from combinations of gases, liquids, and solids. Define a solute as the substance that dissolves in a solution. Define a solvent as the substance that dissolves a solute to make a solution. Describe ways to separate solutions, such as evaporation, chromatography, and distillation. Describe two ways to increase the rate at which solids dissolve in liquids (by crushing them into smaller pieces and by stirring). Recognize that increasing the temperature of a solvent usually increases the rate at which a solute dissolves. Recognize that increasing the temperature of a solvent can change the solubility of a solid solute. , Recognize that not all substances dissolve in a given quantity of water in the same amounts. Classify substances as soluble, insoluble, and somewhat soluble. Compare the concentrations of different solutions and describe them as concentrated or dilute.

Scope and Sequence		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 4 - Forces In Fluids • Pressure • Forces in Flight • Density • Buoyancy • Shape and Buoyancy • Forces in Fluids Unit Review	4-PS3-1 3-5-ETS1-3	Explain that atmospheric pressure decreases with height above sea level and water pressure increases with depth below sea level. , Recognize that an object denser than water will sink unless it is shaped so that the total density of the object is less than an equal volume of water. Define pressure as the force exerted on a surface and recognize that pressure is measured in a unit called the pascal. Describe the forces present in flight: lift, weight, thrust, and drag. Measure the density of a substance or object and predict whether it will sink or float in water.
Unit 5 – The Human Body • Working Together • Under Control: Your Nervous System • Nerves • The Cerebrum, Cerebellum, and Brain Stem • More About the Brain / Other Brain Structures • Spinal Cord and Nerves • Endocrine System: Glands and Hormones • Growing Up • Daily Processes and Hormones • Unit Review and Assessment: The Mysterious Organism • Unit Review and Assessment	4-LS1-1 4-LS1-2 4-PS4-2	Explain that the various systems of the human body function because the cells, tissues, and organs all work together. Describe that the brain gets information about the outside world and the rest of the body through nerves, and uses nerves to direct actions by other parts of the body. Define senses, reflexes, voluntary nervous system, and involuntary nervous system. Identify various parts of the nervous system (such as the brain, spinal cord, nerves, nerve cells, and neurotransmitters), along with their structures and functions. Explain that the endocrine system is composed of glands and chemical messengers called hormones, and they function over a wide range of time scales. Identify locations of some major glands of the endocrine system (for example, adrenals, thyroid, pituitary, pancreas).
Unit 6 - Classification of Invertebrates • Classifying Animals • The World of Sponges • Cnidarians • The Diverse World of Worms • Mighty Mollusks • Arthropods • Echinoderms • Unit Review and Assessment	4-LS1-1 4-LS1-2	Identify different groups of invertebrates (sponges, cnidarians, worms, mollusks, arthropods, echinoderms) according to their common characteristics.
Unit 7 - Electricity and Magnetism • Electric Charges and Magnetic Poles • Magnet Madness • Static Electricity - Truly Shocking • Electric Currents • Resistance, Conductors, Insulators • Electromagnetism • Unit Review and Assessment	4-PS3-1 4-PS3-2 4-PS3-3 4-PS3-4 3-5-ETS1-3	Recognize that objects with the same electrical charges repel and objects with different electrical charges attract. Describe the Earth's magnetic field and identify magnetic north and south. Explain how to construct a temporary magnet. Explain that friction can build up static electrical charges when two objects are rubbed together and transfer electrons from one surface to the other. Identify the parts of a circuit: battery, light, wire, and switch. State that electric currents flow easily through materials that are conductors and do not flow easily through materials that are insulators. Recognize that electromagnets are used in electric motors, generators, and other devices, such as doorbells and earphones. Demonstrate that

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		magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other. State that electric currents produce magnetic fields and that an electromagnet can be made by wrapping a wire around a piece of iron and then running electricity through the wire. Differentiate between series and parallel circuits. Describe the earth's magnetic field and identify magnetic north and south.
Unit 8 - Rocks and Minerals • Rocks and Minerals • Crystal Shapes • Properties of Minerals • Mining of Minerals • The Rock Cycle • Drifting Continents • Volcanoes • Earthquakes • Rocks and Minerals Unit Review and Assessment	4-ESS1-1 4-ESS2-1 4-ESS2-2	Explain that rock is composed of different combinations of minerals. Recognize that you can identify minerals by their color, luster, hardness, streak, and specific gravity. Identify and describe the properties of the Earth's layers: crust, mantle, outer core, and inner core. Recognize that minerals have their own distinct crystal shape, determined by the arrangement of their atoms. Differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation. Explain that the surface of the Earth is made up of rigid plates that are in constant motion, and that the motion of these plates against, over, and under each other causes earthquakes, volcanoes, and the formation of mountains. Identify the various structures of volcanoes, describe the types of eruptions that form them, and explain how they change the landscape. Describe what happens during an earthquake and how the landscape can change as a result. Recognize that ore is rock with a high metal content, and that most metals come from minerals mined from the Earth's crust.
Unit 9 - Weathering, Erosion, and Deposition • Weathering • Soils • Erosion and Deposition: Gravity and Water • Erosion, Transport, and Deposition: Glaciers and Wind • Unit Review and Assessment	4-ESS1-1 4-ESS2-1 4-ESS2-2 4-PS4-1 4-PS4-3	Describe a soil profile and explain how different horizons are formed. Explain both the physical and the chemical weathering of rocks, and be able to classify examples of each. Explain that soil is a mixture of weathered rock, humus, air, and water. Describe how gravity, moving water, wind, and glaciers weather, erode, and shape the surface of the land by transporting sediment from one location to another, where it is deposited.
Unit 10 - Fossils and Geologic Time • Fossils and How They Form • Reading the Fossil Record • The Ever-Changing Earth • The Precambrian Time and Paleozoic Era • The Mesozoic and Cenozoic Eras • Unit Review and Assessment	4-ESS1-1 4-ESS2-1 4-ESS2-2	State that fossils provide evidence that many kinds of organisms that once lived on Earth are now extinct. Name one major event that occurred in each of the four geologic sections: Precambrian, Paleozoic, Mesozoic, and Cenozoic. Describe the conditions under which fossils may form and distinguish among the different types, such as petrified, mold, and cast. Explain that fossils provide information about organisms that lived long ago and help scientists reconstruct the history of life on Earth. Recognize that scientists divide geologic time into four main sections (Precambrian, Paleozoic, Mesozoic, and Cenozoic) and that each section covers one major stage in Earth's history.

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Unit 10 - Fossils and Geologic Time • Semester Review and Assessment	4-ESS1-1 4-ESS2-1 4-ESS2-2 4-ESS3-1 4-ESS3-2	Demonstrate mastery of the semester's content. Demonstrate mastery of the skills taught in this unit. Identify death and emigration as the two main factors that cause a decrease in a population. Explain that fossils provide information about organisms that lived long ago. State that a fossil is a trace, print, or remain of an organism preserved over time in a rock. Identify the conditions under which fossils may form. Explain that fossils help scientists reconstruct the history of life on Earth. State that fossils provide evidence that many kinds of organisms that once lived on Earth are now extinct. Identify the different types of fossils, such as petrified, cast, and mold. State that geologic time is divided into four sections: Precambrian, Paleozoic, Mesozoic, and Cenozoic. Recognize that scientists think that many kinds of organisms once lived on Earth have completely disappeared. Recognize that scientists think that some organisms alive today resemble organisms of the distant past. Name one major event that occurred during the Precambrian time. Name one major event that occurred during the Paleozoic era. Name one organism that lived on the Earth during the Precambrian time. Name one organism that lived on the Earth during the Paleozoic era. Name one major event that occurred during the Mesozoic era. Name one major event that occurred during the Cenozoic era. Name one organism that lived on the Earth during the Mesozoic era. Name one major event that occurred in each of the four geologic sections: Precambrian, Paleozoic, Mesozoic, and Cenozoic. Describe the conditions under which fossils may form and distinguish among the different types, such as petrified, mold, and cast. Explain that fossils provide information about organisms that lived long ago and help scientists reconstruct the history of life on Earth. Recognize that scientists divide geologic time into four main sections (Precambrian, Paleozoic, Mesozoic, and Cenozoic) and that each section covers one major stage in Earth's history.