Wyoming Department of Education Required Virtual Education Course Syllabus

Niobrara County School District # 1

Program Name	Wyoming Virtual Academy	Content Area	SC
Course ID	D-SCI-06AV2-K	Grade Level	6th Grade
Course Name	Summit Earth Science- Sem 1	# of Credits	
SCED Code		Curriculum Type	K12 Inc

COURSE DESCRIPTION

Offered 1st Semester. The Summit Earth Science curriculum builds on the natural curiosity of students. By connecting them to the beauty of geological history, the amazing landforms around the globe, the nature of the sea and air, and the newest discoveries about our universe, the curriculum gives students an opportunity to relate to their everyday world. Students will explore topics such as the fundamentals of geology, oceanography, meteorology, and astronomy; Earth's minerals and rocks; Earth's interior; plate tectonics, earthquakes, volcanoes, and the movements of continents; geology and the fossil record; the oceans and the atmosphere; and the solar system and the universe. Lesson assignments help students discover how scientists investigate the science of our planet.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
SC8.1.7	The Earth in the Solar System: Students describe Earth as the third planet in the Solar System and understand the effects of the sun as a major source of energy, gravitational forces, and motions of objects in the Solar System.
SC8.1.8	The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.
SC8.1.9	The Earth's History: Students systematize the Earth's history in terms of geologic evidence, comparing past and present Earth processes and identifying catastrophic events and fossil evidence.
SC8.1.10	The Structure and Properties of Matter: Students identify characteristic properties of matter such as density, solubility, and boiling point and understand that elements are the basic components of matter.
SC8.2.1	Students research scientific information and present findings through appropriate means.
SC8.2.2	Students use inquiry to conduct scientific investigations. • Ask questions that lead to conducting an investigation. • Collect, organize, and analyze and appropriately represent data. • Draw conclusions based on evidence and make connections to applied scientific concepts. Clearly and accurately communicate the result of the investigations.

SC8.2.3	Students clearly and accurately communicate the result of their own work, as well as information obtained from other sources.
SC8.2.4	Students recognize the relationship between science and technology in meeting human needs.
SC8.2.5	Students properly use appropriate scientific and safety equipment, recognize hazards and safety symbols, and observe standard safety procedures.
SC8.3.1	Students explore the nature and history of science. • Students explore how scientific knowledge changes and grows over time, and impacts personal and social decisions. Students explore the historical use of scientific information to make personal and social decisions.
SC8.3.2	Students explore how scientific information is used to make decisions. • The role of science in solving personal, local, and national problems. • Interdisciplinary connections of the sciences and connections to other subject areas and careers in science or technical fields. Origins and conservation of natural resources, including Wyoming examples.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit: Earth's Surface Lesson: Introduction to Earth Science	SC8.1.8	• Define topography as the physical features of an area of land, including mountains, valleys, plains, and bodies of water. • Demonstrate mastery of the skills and knowledge in this course. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Spheres of the Earth	SC8.1.8	• Describe features of the layers, or spheres, that make up the earth system (atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere). • Explain that the earth is made up of layers (internally and on the surface). • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface	SC8.1.8	• Describe features of the layers, or spheres, that

Lesson: Which Sphere?		make up the earth system (atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere). • Describe how the law of conservation of energy applies to a system. • Describe features of the layers, or spheres, that make up the earth system (atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere). • Reflect on what you have learned and prepare for the next lesson or assessment. • Take initiative to further your own learning.
Unit: Earth's Surface Lesson: Mapping the Earth	SC8.1.8	• Determine the scale of a map. • Interpret maps using scale, directional indicators, keys, and symbols to locate physical features. • Reflect on what you have learned and prepare for the next lesson or assessment. • Use latitude and longitude to locate places on a map.
Unit: Earth's Surface Lesson: Map Earth's Physical Features	SC8.1.8	• Analyze topographic maps. • Define topography as the physical features of an area of land, including mountains, valleys, plains, and bodies of water. • Identify a topographic map as a representation of the earth's surface. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Topo Challenge	SC8.1.8	• Analyze topographic maps. • Define topography as the physical features of an area of land, including mountains, valleys, plains, and bodies of water. • Identify a topographic map as a representation of the earth's surface.

		• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Cartography	SC8.1.8 SC8.3.1 SC8.3.2	• Describe situations in which topographic maps would be useful. • Explain how GIS can be used as a diagnostic tool to monitor environmental processes over time. • Explain how GIS is used to display geographic information in multiple layers. • Explain how satellite and remote-sensing devices have enabled cartographers to produce more accurate maps with specific purposes. • Explain that a topographic map represents some part of the Earth's surface, and interpret contour lines and symbols on a topographic map to infer physical geography. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Mapping Mystery Island	SC8.1.8	• Analyze topographic maps. • Define topography as the physical features of an area of land, including mountains, valleys, plains, and bodies of water. • Describe features on maps such as coordinate systems, scales, directional indicators, keys, symbols, and contour lines. • Describe major agents of mechanical weathering and of chemical weathering, how the agents cause each kind of weathering, and how mechanical weathering and chemical weathering interact to enhance each other's effects.

		• Describe major types of soil in terms of porosity, permeability, and climates in which they are found. • Describe specific uses of topographic maps. • Describe the basic components of the Earth's physical systems: the atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere. • Describe the major processes that break apart and move material around on the earth's surface to form soil from rock and organic material and to change the shape of the surface. • Explain latitude and longitude and recognize them as providing a primary coordinate system for reference to places on the earth. • Reflect on what you have learned and prepare for the next lesson or assessment. • Identify a topographic map as a representation of the earth's surface.
Unit: Earth's Surface Lesson: Weathering	SC8.1.8	• Define weathering. • Explain how climate differences influence the rate of weathering. • Explain that weathering produces sediments that contribute to soil formation (sand, silt, clay). • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Weathering in Action	SC8.1.8	• Define erosion. • Define weathering. • Explain how climate differences influence the rate of weathering. • Explain that weathering produces sediments that

		contribute to soil formation (sand, silt, clay). • Describe major agents of mechanical weathering and of chemical weathering, how the agents cause each kind of weathering, and how mechanical weathering and chemical weathering interact to enhance each other's effects. • Identify surface structures that show the effects of erosion. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Erosion Part	SC8.1.8	• Define erosion. • Describe major causes, processes, and consequences of erosion. • Identify surface structures that show the effects of erosion. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Erosion Part	SC8.1.8	• Define erosion. • Describe major causes, processes, and consequences of erosion. • Identify surface structures that show the effects of erosion. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Soils of the Earth	SC8.1.8	• Compare soil types to climate. • Describe the three major soil types: sand, silt, and clay. • Explain how soil is formed. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Working with Scientific Data	SCI.8.2.3	• Use graphs and charts to share experimental data.

		• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Soil Profiles	SC8.1.8	• Describe a soil profile, including soil horizons. • Describe a soil profile, including soil • Explain how plants use various components of soils (organic and inorganic). • Identify the composition of different soils. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Earth's Surface Lesson: Desertification	SCI8.2.2	• Conduct an experiment to determine the most effective method for reducing the advancement of sand dunes and deposition of sand in populated areas. • Explain how sand dunes are formed and recognize that they have two sides: leeward and windward. • Reflect on what you have learned and prepare for the next lesson or assessment. • Use charts, graphs, and/or written descriptions to record scientific data.
Unit: Earth's Surface Lesson: Module Review	SC8.1.8	• Demonstrate mastery of the skills and knowledge from previous lessons. • Describe features on maps such as coordinate systems, scales, directional indicators, keys, symbols, and contour lines. • Describe major agents of mechanical weathering and of chemical weathering, how the agents cause each kind of weathering, and how mechanical weathering and chemical weathering interact to enhance each other's effects.

		• Describe major types of soil in terms of porosity, permeability, and climates in which they are found. • Describe specific uses of topographic maps. • Describe the basic components of the Earth's physical systems: the atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere. • Describe the major processes that break apart and move material around on the earth's surface to form soil from rock and organic material and to change the shape of the surface. • Explain latitude and longitude and recognize them as providing a primary coordinate system for reference to places on the earth. • Reflect on what you have learned and prepare for the next lesson or assessment. • Review what you have learned and prepare for the Unit Test.
Unit: Earth's Surface Lesson: Module Exam	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this unit. • Describe features on maps such as coordinate systems, scales, directional indicators, keys, symbols, and contour lines. • Describe major agents of mechanical weathering and of chemical weathering, how the agents cause each kind of weathering, and how mechanical weathering and chemical weathering interact to enhance each other's effects. • Describe major types of soil in terms of porosity,

		permeability, and climates in which they are found. • Describe specific uses of topographic maps. • Describe the basic components of the Earth's physical systems: the atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere. • Describe the major processes that break apart and move material around on the earth's surface to form soil from rock and organic material and to change the shape of the surface. • Explain how sand dunes are formed and recognize that they have two sides: leeward and windward. • Explain latitude and longitude and recognize them as providing a primary coordinate system for reference to places on the earth.
Unit: Earth's Surface Lesson: Discussions: Unit	SC8.1.8	• Extend and deepen your understanding by discussing the content with your peers.
Unit: Rocks and Minerals Lesson: Rocks and Minerals	SC8.1.8	• Define mineral as a naturally occurring inorganic solid substance with a fixed chemical composition and crystal structure. • Describe how geologists classify rocks and minerals. • Differentiate between minerals and rocks.
Unit: Rocks and Minerals Lesson: Minerals and Crystals Part	SC8.1.8	• Define cleavage as the breaking up of a mineral, when struck, into pieces of characteristic shape for that mineral. • Define fracture as the breaking up of a mineral that, when struck, does not break along cleavage surfaces.

		• Define mineral as a naturally occurring inorganic solid substance with a fixed chemical composition and crystal structure. • Define mineral as a naturally occurring inorganic solid substance with a fixed chemical composition and crystal structure. • Describe characteristics used to identify minerals: color, luster, streak, hardness, specific gravity, crystal shape, and cleavage and describe unique testable properties that can aid in the identification of a small number of minerals. • Describe how geologists classify rocks and minerals. • Differentiate between minerals and rocks. • Explain that the arrangement of atoms or ions held together in a crystalline lattice determines the properties of minerals. • List that the three most abundant elements in the Earth's crust are oxygen, silicon, and aluminum. • List that the three most abundant elements in the Earth's crust are oxygen, silicon, and aluminum.
Unit: Rocks and Minerals Lesson: Minerals and Crystals Part	SC8.1.8 SCI8.1.10	• Define cleavage as the breaking up of a mineral, when struck, into pieces of characteristic shape for that mineral. • Define cleavage as the breaking up of a • Define fracture as the breaking up of a mineral that, when struck, does not break along cleavage surfaces.

		• Define mineral as a naturally occurring inorganic solid substance with a fixed chemical composition and crystal structure. • Demonstrate mastery of the skills and knowledge in this lesson. • Describe characteristics used to identify minerals: color, luster, streak, hardness, specific gravity, crystal shape, and cleavage and describe unique testable properties that can aid in the identification of a small number of minerals. • Describe how geologists classify rocks and minerals. • Differentiate between minerals and rocks. • Explain that the arrangement of atoms or ions held together in a crystalline lattice determines the properties of minerals. • List examples of observable properties used to identify minerals. • List that the three most abundant elements in the Earth's crust are oxygen, silicon, and aluminum. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Rocks and Minerals Lesson: Mineral Classification Part	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain that an ore contains usable amounts of an element, usually a metal. • Explain that minerals can be classified in two major ways: chemical makeup or how they can be used. • Explain that most of the minerals that make up the Earth's crust and mantle are

		silicates, compounds composed of silicon, oxygen, and one or more metals. • Explain that some nonmetallic minerals can be used for industrial processes and that some can be used for gems.
Unit: Rocks and Minerals Lesson: Mineral Classification Part	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain that an ore contains usable amounts of an element, usually a metal. • Explain that minerals can be classified in two major ways: chemical makeup or how they can be used. • Explain that most of the minerals that make up the Earth's crust and mantle are silicates, compounds composed of silicon, oxygen, and one or more metals. • Explain that some nonmetallic minerals can be used for industrial processes and that some can be used for gems.
Unit: Rocks and Minerals Lesson: Mineral Identification	SC8.1.8 SCI8.2.2	• Demonstrate mastery of the skills and knowledge in this lesson. • Identify minerals based on color, streak, hardness, and unique properties. • Use charts, graphs, and/or written descriptions to record scientific data.
Unit: Rocks and Minerals Lesson: Your Choice	SC8.1.8	• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Rocks and Minerals Lesson: Igneous Rocks	SC8.1.8	• Compare and contrast magma and lava. • Demonstrate mastery of the skills and knowledge in this lesson. • Explain how igneous rocks form and recognize how

		physical properties of an igneous rock reveal whether it had an intrusive or an extrusive origin.
Unit: Rocks and Minerals Lesson: Rocks Presentation, Part	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain how igneous rocks form and recognize how physical properties of an igneous rock reveal whether it had an intrusive or an extrusive origin. • Explain how igneous rocks form and recognize how physical properties of an igneous rock reveal whether it had an intrusive or an extrusive origin.
Unit: Rocks and Minerals Lesson: Sedimentary Rocks	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Describe features in sedimentary rocks, such as stratification, ripple marks, mud cracks, and fossils, that can help geologists determine the type of environment in which they formed. • Describe the processes by which sediment becomes sedimentary rock. • Explain how sediment is formed.
Unit: Rocks and Minerals Lesson: Rocks Presentation, Part	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain how sedimentary rocks are formed, describe the three classes of them, and identify features that help determine the type of environment in which they formed.
Unit: Rocks and Minerals Lesson: Metamorphic Rocks	SC8.1.8	• • Explain how metamorphic rocks are formed.

		• List examples of metamorphic rocks and describe how they formed. • Demonstrate mastery of the skills and knowledge in this lesson.
Unit: Rocks and Minerals Lesson: Rocks Presentation, Part		• List examples of metamorphic rocks and describe how they formed. • Demonstrate mastery of the skills and knowledge in this lesson.
Unit: Rocks and Minerals Lesson: The Rock Cycle	SC8.1.8	• Compare the rock cycle to the formation of layers of rock. • Demonstrate mastery of the skills and knowledge in this lesson. • Describe the arrangement of rocks in rock layers. • Summarize how the earth's surface materials are constantly formed, reformed, and transformed from one type of rock into another through the processes of the rock cycle.
Unit: Rocks and Minerals Lesson: Rocks Presentation, Part	SC8.1.8	• Define rocks as composed of minerals and identify that they are classified as igneous, sedimentary, or metamorphic based on how they were formed. • Demonstrate mastery of the skills and knowledge in this lesson. • Differentiate between minerals and rocks. • Compare the rock cycle to the formation of layers of rock. • Identify sources of information used in scientific research. • List examples of observable properties used to identify minerals. • Reflect on what you have learned and prepare for the next lesson or assessment.

Unit: Rocks and Minerals Lesson: Meteorites	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain the components of meteorites.
Unit: Rocks and Minerals Lesson: Module Review	SC8.1.8	• Explain how sedimentary rocks are formed, describe the three classes of them, and identify features that help determine the type of environment in which they formed. • Summarize the processes called the rock cycle. • Explain how metamorphic rocks are formed. • Identify the defining characteristics of a mineral. • Explain that physical and chemical properties of minerals are a result of the types and arrangements of their atoms. • Explain how properties of minerals can be used in their identification. • Define rocks as composed of minerals and identify that they are classified as igneous, sedimentary, or metamorphic based on how they were formed. • Explain how igneous rocks form and recognize how physical properties of an igneous rock reveal whether it had an intrusive or an extrusive origin. • Review what you have learned and prepare for the Unit Test. • Reflect on what you have learned and prepare for the next lesson or assessment. • Create a portfolio.
Unit: Rocks and Minerals Lesson: Module Exam	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this unit. • Summarize the processes called the rock cycle.

		• Explain how metamorphic rocks are formed. • Identify the defining characteristics of a mineral. • Explain that physical and chemical properties of minerals are a result of the types and arrangements of their atoms. • Explain how properties of minerals can be used in their identification. • Define rocks as composed of minerals and identify that they are classified as igneous, sedimentary, or metamorphic based on how they were formed. • Explain how igneous rocks form and recognize how physical properties of an igneous rock reveal its origin.
Unit: Rocks and Minerals Lesson: Discussions: Unit	SC8.1.8	• Extend and deepen your understanding by discussing the content with your peers.
Unit: Geologic History Lesson: Geologic History	SC8.1.9	• Define unconformity as a gap in the rock record. • Demonstrate mastery of the skills and knowledge in this lesson. • Explain how each of Steno's principles can be used to help explain the geologic history of the Grand Canyon. • List Steno's three basic principles related to the interpretation of sedimentary rock layers.
Unit: Geologic History Lesson: Steno's Principles	SC8.1.9	• Define unconformity as a gap in the rock record. • Demonstrate mastery of the skills and knowledge in this lesson. • Explain how each of Steno's principles can be used to help explain the geologic history of the Grand Canyon.

		• Explain that a fossil is identified as evidence of preexisting life in the form of shells, bones, plant structures, impressions of plant leaves, soft body parts, or trace fossils. • List Steno's three basic principles related to the interpretation of sedimentary rock layers.
Unit: Geologic History Lesson: Fossil Succession	SC8.1.9 SCI8.3.1	• Define the principle of uniformitarianism as the concept that the processes that have shaped the Earth through geologic time are the same today as they were in the past. • Demonstrate mastery of the skills and knowledge in this lesson. • Explain how the principle of faunal succession and the principle of fossil correlation are related to Nicolas Steno's principle of superposition. • Explain why William Smith's and Georges Cuvier's independent discoveries that rock layers could be identified by their fossils was a major breakthrough in the science of stratigraphy. • Identify James Hutton and Charles Lyell as the first geologists to realize that geologic changes are cyclical and that over time, ordinary processes, such as weathering and erosion, folding, and faulting, can effect great changes. • Identify that uniformitarianism is the underlying principle for interpreting the geologic record.
Unit: Geologic History	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson.

Lesson: Linking Past and Present	SCI8.3.1	• Explain that the processes that have shaped the earth through geologic time are the same today as they were in the past. • Summarize major findings of James Hutton and Charles Lyell.
Unit: Geologic History Lesson: Rates of Geological Processes	SC8.1.9 SCI8.3.1	• Demonstrate mastery of the skills and knowledge in this lesson. • Identify James Hutton and Charles Lyell as the first geologists to realize that geologic changes are cyclical and that over time, ordinary processes, such as weathering and erosion, folding, and faulting, can effect great changes.
Unit: Geologic History Lesson: Records in Rocks	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain how scientists use rock layers to gain information about earth's geologic past.
Unit: Geologic History Lesson: Rock Record	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Identify James Hutton and Charles Lyell as the first geologists to realize that geologic changes are cyclical and that over time, ordinary processes, such as weathering and erosion, folding, and faulting, can effect great changes.
Unit: Geologic History Lesson: Fossils	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Describe fossils as recognized remains or traces of preexisting life, which may exist in the form of shells, bones, or impressions of plant leaves and soft body parts.

		• Explain that fossils provide evidence of changes on earth over time.
Unit: Geologic History Lesson: Environments of Long Ago	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Use basic stratigraphic principles, as well as index fossils and absolute dating, to make geologic maps, correlate rock layers over a large geographic area, and make inferences about past environments.
Unit: Geologic History Lesson: Index Fossils	SC8.1.9	• Explain how fossil patterns in rock layers provide information about earth's geologic past. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Geologic History Lesson: Rock Layers and Index Fossils	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain how fossil patterns in rock layers provide information about earth's geologic past. • Use basic stratigraphic principles, as well as index fossils and absolute dating, to make geologic maps, correlate rock layers over a large geographic area, and make inferences about past environments.
Unit: Geologic History Lesson: American Geologic Tour Part	SC8.1.9	• Describe the geologic history of North America including mountain-building activity, climate, and organisms that dominated each of the periods of the geologic time scale • Demonstrate mastery of the skills and knowledge in this lesson.
Unit: Geologic History Lesson: American Geologic Tour Part	SC8.1.9	• Define unconformity as a gap in the rock record. • Explain that a fossil is identified as evidence of

		preexisting life in the form of shells, bones, plant structures, impressions of plant leaves, soft body parts, or trace fossils. • Explain how each of Steno's principles can be used to help explain the geologic history of the Grand Canyon. • List Steno's three basic principles related to the interpretation of sedimentary rock layers.
Unit: Geologic History Lesson: Earth's Age	SC8.1.9	• Compare half-lives of radioactive isotopes to determine which would be the most appropriate to date geological specimens. • Define geologic time scale as a timeline based on major evolutionary events reflected by fossils groups found in sedimentary rocks and on concurrent geologic events in Earth's history. • Demonstrate mastery of the skills and knowledge in this lesson. • Distinguish between absolute and relative dating techniques. • Explain how geologists use radiometric dating to date rocks and fossils and determine the age of a rock sample using radiometric data. • Interpret a chart of the geologic time scale, including eons, eras, periods, and approximate dates. • Summarize geologic evidence for estimating the age of the earth.
Unit: Geologic History Lesson: Determining Half-life	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson.

		• Distinguish between absolute and relative dating techniques. • Explain how geologists use radiometric dating to date rocks and fossils and determine the age of a rock sample using radiometric data. • Summarize geologic evidence for estimating the age of the earth.
Unit: Geologic History Lesson: Journey Through Geologic Time	SC8.1.9	• Compare half-lives of radioactive isotopes to determine which would be the most appropriate to date geological specimens. • Define geologic time scale as a timeline based on major evolutionary events reflected by fossils groups found in sedimentary rocks and on concurrent geologic events in Earth's history. • Demonstrate mastery of the skills and knowledge in this lesson. • Distinguish between absolute dating and relative dating. • Explain how geologists use radiometric dating to date rocks and fossils and determine the age of a rock sample using radiometric data. • Interpret a chart of the geologic time scale, including eons, eras, periods, and approximate dates.
Unit: Geologic History Lesson: Module Review	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this unit. • Describe the geologic time scale and provide examples of major geological and biological events of each era.

		• Describe the principle of uniformitarianism and its importance in determining historical events based on geological information. • Explain how fossils can be interpreted as evidence of preexisting life. • Explain methods by which scientists determine the sequence of geological events, and the life forms and environmental conditions that existed in past geologic eras. • Reflect on what you have learned and prepare for the next lesson or assessment. • Identify the major historic contributions to interpreting sedimentary rock layers made by James Hutton and Charles Lyell.
Unit: Geologic History Lesson: Module Exam	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this unit. • Describe the geologic history of North America including mountain-building activity, climate, and organisms that dominated each of the periods of the geologic time scale • Identify the major historical contributions to interpreting sedimentary rock layers made by Nicolas Steno, William Smith and Georges Cuvier, and James Hutton, and when those contributions were made. • Describe the geologic time scale and provide examples of major geological and biological events of each era. • Describe the principle of uniformitarianism and its importance in determining historical events based on geological information.

		• Explain how fossils can be interpreted as evidence of preexisting life. • Explain methods by which scientists determine the sequence of geological events, and the life forms and environmental conditions that existed in past geologic eras. • Interpret a diagram of geologic time scale, including eons, eras, periods, and the approximate time frame for these events. • Summarize geologic evidence for estimating the age of the earth.
Unit: Geologic History Lesson: Discussions: Unit	SC8.1.9	• Extend and deepen your understanding by discussing the content with your peers.
Unit: Plate Tectonics Lesson: Plate Tectonics	SCI8.1.8 SC8.1.9	• Compare motion at the boundaries of earth's plates to the formation of landforms and geologic events. • Demonstrate mastery of the skills and knowledge in this course. • Describe evidence that supported the theory of continental drift: complementary shapes of Earth's coastlines, similar fossils found on different continents, similar geologic makeup of rock structures in land now separated by oceans, and patterns of ancient climates and glaciers. • Describe key features of the theory of plate tectonics. • Describe observations that the theory of plate tectonics explained that the theory of continental drift did not explain as well.

		• Describe the names, locations, and main characteristics of the layers that make up earth's interior. • Explain that movements in the Earth's crust cause measurable seismic waves, called P and S waves, that scientists study to learn about the Earth's interior. • Explain the historical development of the theory of continental drift, emphasizing the role of Alfred Wegener. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Earth's Interior	SC8.1.8	• Compare temperature, pressure, and composition of earth's inner and outer cores. • Demonstrate mastery of the skills and knowledge in this lesson. • Interpret a diagram that depicts the structure of the earth's interior. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Mapping Earth's Interior	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Describe P waves, S waves, and L waves in • Explain how Earth scientists learn about the Earth's interior from seismic data collected from earthquakes. • Explain how Earth scientists learn about the Earth's interior from seismic data collected from earthquakes. • Explain how seismic instruments let scientists map earthquake zones around the world.

		• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Continental Drift	SC8.1.9	• Define and explain Pangaea. • Demonstrate mastery of the skills and knowledge in this lesson. • Reflect on what you have learned and prepare for the next lesson or assessment. • Summarize continental drift as an example of a scientific theory that changed in response to new evidence.
Unit: Plate Tectonics Lesson: Supercontinent	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this course. • Describe evidence that supported the theory of continental drift: complementary shapes of Earth's coastlines, similar fossils found on different continents, similar geologic makeup of rock structures in land now separated by oceans, and patterns of ancient climates and glaciers. • Explain that the theory of continental drift proposed that the world's landmasses were originally joined together in a giant supercontinent Wegener called Pangaea. • Reflect on what you have learned and prepare for the next lesson or assessment. • Recall that German meteorologist Alfred Wegener first developed extensively the theory of continental drift in 1915. • Recall that Laurasia broke apart to form the present-day northern continents of North America, Europe, and most of Asia and that Gondwanaland broke apart

		to form the present-day southern continents of Africa, South America, Antarctica, Australia, and the subcontinent of India. • Recall that Pangaea broke apart into two major continents about 200 million years ago. • Recall that the two major continents, Laurasia and Gondwanaland continued to break apart and shift to form the present-day continents in their current positions.
Unit: Plate Tectonics Lesson: Seafloor Geography	SC8.1.9 SCI8.3.1	• Explain how ocean floor mapping led to information that advanced the theory of continental drift. • Identify features of the ocean floor. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Mapping the Ocean Floor	SCI8.1.8 SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Explain how ocean floor mapping led to information that advanced the theory of continental drift. • Identify features of the ocean floor. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Seafloor Spreading	SC8.1.9	• Demonstrate mastery of the skills and knowledge in this lesson. • Describe how seafloor spreading results in the formation of new crust. • Explain how magnetism in rocks was used as evidence to support the concept of seafloor spreading. • Reflect on what you have learned and prepare for the next lesson or assessment.

Unit: Plate Tectonics Lesson: Calculating Seafloor Spreading	SC8.1.9 SCI8.2.2	• Demonstrate mastery of the skills and knowledge in this lesson. • Describe how seafloor spreading results in the formation of new crust. • Describe how seafloor spreading results in the formation of new crust. • Measure, record, calculate, and report results, using metric units. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Moving Plates	SC8.1.8 SC8.1.9	• Explain that nuclear energy released during decay of radioactive isotopes in the mantle and crust is a major source of heat energy deep in the Earth and helps maintain the high temperatures there. • Explain that scientists think that the mechanism for movement of plates involves convection in the mantle and gravity acting on the edges of the plate. • Explain that the theory of plate tectonics accounts for the continental movements that were hypothesized by the theory of continental drift. • Explain that the theory of plate tectonics describes how Earth's lithospheric plates have moved and deformed over millions of years resulting in the present arrangement of continents, oceans, and landforms. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Earth's Plates	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson.

		• Explain the relationship between geologic activity and plate motion. • Explain the relationship between geologic activity and plate motion. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Energy of Convection	SC8.1.8	• Explain that heat from the earth's interior reaches the surface through convection. • Summarize the role of convection and gravity in the movement of plates.
Unit: Plate Tectonics Lesson: Sources of Plate Motion	SC8.1.8	• Describe key features of the theory of plate tectonics. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Plate Boundaries Part	SC8.1.8	• Compare the properties of continental and oceanic crust such as density and thickness. • Define divergent plate boundaries as those moving apart from one another forming mid-ocean ridges and undersea volcanic mountains. • Define transform plate boundaries as those moving or sliding in opposite directions alongside one another. • Explain how volcanic mountains may form in the middle of a continent as the plate moves over a hot spot. • Explain that the boundaries of plates on Earth's surface are best defined by the occurrence of frequent earthquakes, along with volcanoes, mountain systems, deep-sea trenches, and mid-ocean ridges. • Reflect on what you have learned and prepare for the next lesson or assessment.

Unit: Plate Tectonics Lesson: Plate Boundaries Part	SC8.1.8	• Define convergent plate boundaries as those moving toward each other. • Explain that at convergent boundaries, mountains are built when two continental plates collide. • Explain that frequent, large earthquakes, volcanic activity, and the formation of deep-ocean trenches occur where an oceanic plate moves beneath another oceanic plate or a continental plate. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Plates and Structural Geography	SC8.1.8	• Compare convergent, divergent, and transform plate boundaries. • Identify the landforms that result from different types of motion at plate boundaries. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Plate Tectonics Lesson: Module Review	SC8.1.8 SCI8.1.9	• Compare motion at the boundaries of earth's plates to the formation of landforms and geologic events. • Create a portfolio. • Describe evidence that supported the theory of continental drift: complementary shapes of Earth's coastlines, similar fossils found on different continents, similar geologic makeup of rock structures in land now separated by oceans, and patterns of ancient climates and glaciers. • Describe key features of the theory of plate tectonics. • Describe observations that the theory of plate tectonics

		explained that the theory of continental drift did not explain as well. • Describe the names, locations, and main characteristics of the layers that make up earth's interior. • Explain that movements in the Earth's crust cause measurable seismic waves, called P and S waves, that scientists study to learn about the Earth's interior. • Explain the historical development of the theory of continental drift, emphasizing the role of Alfred Wegener. • Identify that nuclear energy is a major source of heat energy deep in the Earth and explain how this heat energy results in the movement of plates. • Reflect on what you have learned and prepare for the next lesson or assessment. • Review what you have learned and prepare for the Unit Test.
Unit: Plate Tectonics Lesson: Module Exam	SC8.1.8 SC8.1.9	• Compare temperature, pressure, and composition of earth's inner and outer cores. • Demonstrate mastery of the skills and knowledge in this unit. • Describe the names, locations, and main characteristics of the layers that make up earth's interior. • Explain that the theory of plate tectonics describes how Earth's lithospheric plates have moved and deformed over millions of years resulting in the present arrangement of

		continents, oceans, and landforms. • Recognize that movements in the earth's crust create seismic waves that scientists study to learn about earth's interior.
Unit: Plate Tectonics Lesson: Discussions: Unit	SC8.1.8 SC8.1.9	• Extend and deepen your understanding by discussing the content with your peers.
Unit: Forces Shaping Earth's Surface Lesson: Forces Shaping Earth's Surface	SC8.1.8	• Explain the relationship between geologic activity and plate motion.
Unit: Forces Shaping Earth's Surface Lesson: Landforms	SC8.1.8	• • Explain the relationship between geologic activity and plate motion. • Identify the landforms that result from different types of motion at plate boundaries. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Volcanos	SC8.1.8	• Demonstrate mastery of the skills and knowledge in this course. • Identify the landforms that result from different types of motion at plate boundaries. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Folding and Faulting	SC8.1.8	• Compare joints and faults. • Define fault as a fracture in the Earth's crust across which the land on each side has been displaced relative to the other. • Describe the three main types of stresses that cause deformation in the Earth's crust: compression, tension, and shear. • Identify two basic types of rock folding: anticlines and synclines.

		• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Too Much Stress	SC8.1.8	• Define divergent plate boundaries as those moving apart from one another forming mid-ocean ridges and undersea volcanic mountains. • Define fault as a fracture in the Earth's crust across which the land on each side has been displaced relative to the other. • Describe the three main types of stresses that cause deformation in the Earth's crust: compression, tension, and shear. • Identify two basic types of rock folding: anticlines and synclines. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Earthquakes	SC8.1.8 SCI8.2.4 SCI8.3.2	• Explain causes of earthquakes. • Explain causes of earthquakes. • Explain how scientists use seismic data to identify earthquake zones around the world. • Explain how seismic data collected from earthquakes provide information about the earth's interior. • Explain the relationship between the speed of released energy waves in an earthquake and the material through which the waves move. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Locating the Epicenter	SC8.1.8 SCI8.2.1	• Demonstrate mastery of the skills and knowledge in this lesson.

	SCI8.2.2	• Explain causes of earthquakes. • Explain how seismic data collected from earthquakes provide information about the earth's interior. • Explain the relationship between the speed of released energy waves in an earthquake and the material through which the waves move. • Draw conclusions about the relationship between hypotheses and results in an investigation. • Use charts, graphs, and/or written descriptions to record scientific data.
Unit: Forces Shaping Earth's Surface Lesson: Years of Earthquakes	SC8.1.8	• Explain the relationship between the speed of released energy waves in an earthquake and the material through which the waves move. • Explain causes of earthquakes.
Unit: Forces Shaping Earth's Surface Lesson: Using Seismographs	SCI8.1.8 SCI8.2.4 SCI8.3.2	• Analyze the importance of construction material and building shape in determining a building's performance and stability during an earthquake. • Construct a seismograph and explain how this device can detect earthquakes and other movements in the lithosphere. • Construct a seismograph and explain how this device can detect earthquakes and other movements in the lithosphere. • Draw conclusions based on data gathered in an experiment. • Reflect on what you have learned and prepare for the next lesson or assessment.

Unit: Forces Shaping Earth's Surface Lesson: Tsunamis	SCI8.1.8	• Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Demonstrate mastery of the skills and knowledge in this course. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Hurricanes	SCI8.1.8	• Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Demonstrate mastery of the skills and knowledge in this course. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Floods and Landslides	SCI8.1.8	• Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Demonstrate mastery of the skills and knowledge in this course. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Wildfires	SCI8.1.8	• Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Demonstrate mastery of the skills and knowledge in this course.

		• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Tornadoes	SCI8.1.8	• Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Demonstrate mastery of the skills and knowledge in this course. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Natural Disaster Research	SCI8.1.8	• Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Forces Shaping Earth's Surface Lesson: Module Review	SCI8.1.8	• Demonstrate mastery of the skills and knowledge in this lesson. • Reflect on what you have learned and prepare for the next lesson or assessment. • Analyze the causes and effects of natural disasters, including volcanic eruptions, earthquakes, Tsunamis, hurricanes, floods and landslides, wildfires, and tornadoes. • Explain that movements in the Earth's crust cause measurable seismic waves, called P and S waves, that scientists study to learn about the Earth's interior. • Recognize that movements in the earth's crust create seismic waves that scientists study to learn about earth's interior.

Unit: Forces Shaping Earth's Surface Lesson: Module Exam	SCI8.1.8	• Explain that movements in the Earth's crust cause measurable seismic waves, called P and S waves, that scientists study to learn about the Earth's interior. • Recognize that movements in the earth's crust create seismic waves that scientists study to learn about earth's interior.
Unit: Forces Shaping Earth's Surface Lesson: Discussions: Unit	SCI8.1.8	• Extend and deepen your understanding by discussing the content with your peers.
Unit: Virtual Labs for Fueled Use Lesson: Lab: Desertification	SCI8.1.8 SCI8.2.1 SCI8.2.2 SCI8.2.3 SCI8.2.4 SCI8.2.5	• Conduct an experiment to determine the most effective method for reducing the advancement of sand dunes and deposition of sand in populated areas. • Explain how sand dunes are formed and recognize that they have two sides: leeward and windward. • Explain how sand dunes are formed and recognize that they have two sides: leeward and windward. • Use charts, graphs, and/or written descriptions to record scientific data. •
Unit: Virtual Labs for Fueled Use Lesson: Lab: Mineral Identification	SCI8.1.8 SCI8.2.1 SCI8.2.2 SCI8.2.3 SCI8.2.5	• Identify minerals based on color, streak, hardness, and unique properties. • Use charts, graphs, and/or written descriptions to record scientific data.
Unit: Virtual Labs for Fueled Use Lesson: Lab: Rock Cycle	SCI8.1.8 SCI8.2.1 SCI8.2.2 SCI8.2.3 SCI8.2.5	• Differentiate between minerals and rocks. • Identify sources of information used in scientific research. • List examples of observable properties used to identify minerals.

		• Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Virtual Labs for Fueled Use Lesson: Lab: Index Fossils and Paleoenvironments	SCI8.1.9 SCI8.2.1 SCI8.2.2 SCI8.2.3 SCI8.2.5	• Explain how fossil patterns in rock layers provide information about earth's geologic past.
Unit: Virtual Labs for Fueled Use Lesson: Lab: Plate Boundaries and Structural Geography	SCI8.1.8 SCI8.2.1 SCI8.2.2 SCI8.2.3 SCI8.2.5	• Compare convergent, divergent, and transform plate boundaries. • Identify the landforms that result from different types of motion at plate boundaries. • Reflect on what you have learned and prepare for the next lesson or assessment.
Unit: Virtual Labs for Fueled Use Lesson: Lab: Using Seismographs	SCI8.1.8 SCI8.2.1 SCI8.2.2 SCI8.2.3 SCI8.2.5	• Analyze the importance of construction material and building shape in determining a building's performance and stability during an earthquake. • Construct a seismograph and explain how this device can detect earthquakes and other movements in the lithosphere.