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-114AV2-K	Grade Level	9-12
Course Name	Summit Honors Earth Science - Semester 1	# of Credits	0.5
SCED Code	03001H0.5012	Curriculum Type	K12 Inc

COURSE DESCRIPTION

This course is an advanced course that provides students with a solid earth science curriculum, focusing on geology, oceanography, astronomy, weather, and climate. The program consists of online lessons, an associated reference book, collaborative activities, virtual laboratories, and hands-on laboratories students can conduct at home. The course provides a base for further studies in geology, meteorology, oceanography, and astronomy, and gives practical experience in implementing scientific methods. This course works at an accelerated pace. There two honors projects throughout the course of the semester.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
HS-ESS2-2	Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
HS-ESS2-4	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
HS-ESS2-5	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
HS-ESS2-6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
HS-ESS2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.
HS-ESS3-5	Analyze data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impact s to Earth systems.
HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
HS-ETS1-5	Evaluate the validity and reliability of claims in a variety of materials.
HS-PS1-6	Evaluate the design of a chemical system by changing conditions to produce increased amounts of products at equilibrium, and refine the design, as needed.
HS-PS1-7	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
HS-PS4-1	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
SCOPE AND SEQUENCE	

UNIT OUTLINE	STANDARD#
Unit 1: Earth Science and Systems Lesson 1: Semester Introduction	
Unit 1: Earth Science and Systems Lesson 2: Why Study Earth Science?	

Unit 1: Earth Science and Systems Lesson 3: Historical Contributions in Earth Science 1		
Unit 1: Earth Science and Systems Lesson 4: Historical Contributions in Earth Science 2		OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1: Earth Science and Systems Lesson 5: Spheres as Earth Systems		Give examples of advances in earth science. Explore and explain the concepts discussed in this semester of Earth Science. Define earth science, and explain its importance to life and society. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works. Define earth science, and explain its importance to life and society. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works.

Unit 1: Earth Science and Systems Lesson 6: Laboratory: Topographic Maps		Give examples of advances in earth science. Define earth science, and explain its importance to life and society. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works. Describe the disciplines that make up earth science. Describe how advances in earth science contribute to society. Define earth science, and explain its importance to life and society. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works
Unit 1: Earth Science and Systems Lesson 7: Earth Systems and Interactions		Give examples of advances in earth science. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works. Identify two to three prominent figures in the historical development of an earth science theory such as the age of the earth, and explain how the contributions and ideas of these individuals followed scientific methods. Discuss one to two examples from the theory that show how old ideas are modified or discarded as new evidence becomes available. Give examples of how discoveries in earth science have resulted in advances in technology. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works.

Unit 1: Earth Science and Systems Lesson 8: Laboratory: Modeling Earth Science Processes 1		Give examples of advances in earth science. Define earth science, and explain its importance to life and society. Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works. Discuss one to two examples from the theory that show how old ideas are modified or discarded as new evidence becomes available. Give examples of how discoveries in earth science have resulted in advances in technology. Identify two to three prominent figures in the historical development of an earth science theory (i.e., the motions of the planets), and explain how the contributions and ideas of these individuals used models. Define earth science, and explain its importance to life and society. Give examples of how earth scientists find and incorporate new information to explain how the earth works.
Unit 1: Earth Science and Systems Lesson 9: Laboratory: Modeling Earth Science Processes 2		Define earth science, and explain its importance to life and society. Describe how earth systems interact to produce planetary changes. Identify and define the spheres that make up the earth system (atmosphere, cryosphere, hydrosphere, geosphere, and biosphere). Explain the interactions between the atmosphere, cryosphere, hydrosphere, geosphere, and biosphere.
Unit 1: Earth Science and Systems Lesson 10: Your Choice		Read and interpret a topographic map. Make a map profile from a topographic map. Model a topographic map using a potato. Describe ways that an earth scientist would use a topographic map.

Unit 1: Earth Science and Systems Lesson 11: Unit Test	HS-PS1-7	Describe how earth systems interact to produce planetary changes. Give examples of how earth scientists find and incorporate new information to explain how the earth works. Explain how interactions among the various spheres have led to continuous changes in earth systems. Give examples that show how life on earth has influenced gradual changes in earth systems. Define earth science, and explain its importance to life and society. Give examples of how earth scientists find and incorporate new information to explain how the earth works.
Unit 2: Dynamic Earth Lesson 1: Introduction to Plate Tectonics		Describe how earth systems interact to produce planetary changes. Use scientific methods to investigate a problem. Define earth science, and explain its importance to life and society.
Unit 2: Dynamic Earth Lesson 2: Pangaea and Continental Drift		Use scientific methods to investigate a problem.
Unit 2: Dynamic Earth Lesson 3: Moving Plates		
Unit 2: Dynamic Earth Lesson 4: Plate Boundaries 1		

Unit 2: Dynamic Earth Lesson 5: Plate Boundaries 2		Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Recognize that plate tectonics is the framework for understanding earthquakes, mountain building, volcanoes, and features of the ocean floor. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Interpret a diagram that shows the earth's tectonic plates and the present arrangement of continents and oceans. Explain how plate tectonics influences continental movement and seafloor changes. Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Recognize that plate tectonics is the framework for understanding earthquakes, mountain-building, volcanoes, and features of the ocean floor.
Unit 2: Dynamic Earth Lesson 6: Plate Tectonics: Historical Perspective		Discuss evidence that supports Wegener's theory of continental drift. Interpret diagrams that show Pangaea as a supercontinent and the process of continental drift over time.
Unit 2: Dynamic Earth Lesson 7: Where Earthquakes and Volcanoes Occur		Relate the movement of earth's plates to the most likely cause of plate movement: energy transfer by convection in the asthenosphere (upper mantle, below earth's crust). Explain how thermal energy transfer processes in the earth's interior (conduction and convection) influence plate movement. Analyze temperature and density data from earth's interior layers and relate these data to plate movement.

Unit 2: Dynamic Earth Lesson 8: Structure of Earth's Interior		Give examples of specific geological features associated with these types of plate boundaries. Interpret a diagram of geologic features at plate boundaries. Describe what happens when plates move apart (diverge) and come together (converge).
Unit 2: Dynamic Earth Lesson 9: Laboratory: Island Chain Formation	HS-ESS1-5, HS-ESS2-1, HS-ESS2-3	Describe geologic features that form at transform plate boundaries. Interpret a diagram of geologic features at plate boundaries, and relate these features to information about past, present, and future geologic events (for example, seafloor spreading). Explain the type of plate actions that cause earthquakes and volcanic features.
Unit 2: Dynamic Earth Lesson 10: How Earthquakes Happen	HS-ESS1-5, HS-ESS2-1, HS-ESS2-3	Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Recognize that plate tectonics is the framework for understanding earthquakes, mountain building, volcanoes, and features of the ocean floor. Explain key discoveries that led to the theory of plate tectonics. Explain how the theory of plate tectonics is an example of how scientists revise theories over time. Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Recognize that plate tectonics is the framework for understanding earthquakes, mountain-building, volcanoes, and features of the ocean floor.

Unit 2: Dynamic Earth Lesson 11: Your Choice		Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Recognize that plate tectonics is the framework for understanding earthquakes, mountain building, volcanoes, and features of the ocean floor. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Using plate tectonic theory, explain the occurrence of earthquakes, volcanoes, and other landforms. Relate the location of the Ring of Fire to earth's crustal plate boundaries. Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Recognize that plate tectonics is the framework for understanding earthquakes, mountain-building, volcanoes, and features of the ocean floor.
Unit 2: Dynamic Earth Lesson 12: Mid-Unit Test	HS-ESS1-5, HS-ESS2-1, HS-ESS2-3	Describe the composition and changes in temperature and pressure for each layer. Explain the sources of heat for earth's interior. Explain how scientists know about earth's interior. Identify the four major layers of earth's interior.
Unit 2: Dynamic Earth Lesson 13: Locating Earthquakes		Make a hypothesis based on observations. Plot and analyze scatter-plot data to test a hypothesis. Describe data that supports the hot-spot model for the Hawaiian island chain formation.

Unit 2: Dynamic Earth Lesson 14: Earthquakes and Waves		Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter. Learn how earthquakes form. Investigate the relationship between deformation and earthquakes. Model earthquake formation with the bending and subsequent breaking of a ruler. Explain the relationship between elastic rebound and earthquakes. Predict the type of earthquakes that can occur at different plate boundaries. Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter.
Unit 2: Dynamic Earth Lesson 15: Laboratory: Earthquake Epicenter	HS-ESS1-5, HS-ESS2-1, HS-ESS2-3	
Unit 2: Dynamic Earth Lesson 16: How Volcanoes Form		
Unit 2: Dynamic Earth Lesson 17: Volcanic Zones		Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter. Distinguish between seismic waves (S waves and P waves) and surface waves. Describe how to determine earthquake epicenters (location, focus, and distance) using S waves and P waves. Apply data about waves to analyze the internal structure of the earth. Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter.
Unit 2: Dynamic Earth Lesson 18: Mountain Building		Correlate the location of the majority of the earthquakes on earth with the major plate boundaries. Understand how data reveals information about the earth's interior. Explore how earthquakes characterize plate boundaries.

Unit 2: Dynamic Earth Lesson 19: Impact of Geologic Events		Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter. Use the distance from the epicenter of three seismograph stations to triangulate the location of the epicenter. Translate the difference of arrival times into a distance. Interpret seismograms for the arrival times of P waves and S waves. Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter.
Unit 2: Dynamic Earth Lesson 20: Unit Test	HS-ESS1-5, HS-ESS2-1, HS-ESS2-3, HS-PS4-1,	Describe how different types of volcanoes (shield, cinder cone, and composite cone) form, the parts of a composite-cone volcano, and the impacts of volcanoes. Describe how different types of volcanoes form when magma rises to the surface: shield, cinder cone, and composite cone. Explain the processes that lead to the formation of each type of volcano. Interpret a diagram of a composite cone volcano and explain its formation. Describe how different types of volcanoes (shield, cinder cone, and composite cone) form, the parts of a composite-cone volcano, and the impacts of volcanoes.
Unit 3: Composition of the Earth Lesson 1: Minerals on Earth		Recognize that plate tectonics is the framework for understanding earthquakes, mountain building, volcanoes, and features of the ocean floor. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Explain how the location of volcanoes results from geologic activity at different plate boundaries. Differentiate hot-spot volcanoes from those that result from subduction, and explain the processes in their development.

		Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Recognize that plate tectonics is the framework for understanding earthquakes, mountain-building, volcanoes, and features of the ocean floor.
Unit 3: Composition of the Earth Lesson 2: Mineral Properties		Recognize that plate tectonics is the framework for understanding earthquakes, mountain building, volcanoes, and features of the ocean floor. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Explain how plate tectonics provides the framework for mountain building. Identify the processes that formed specific mountain chains (e.g., Himalayas, Sierra Nevada, Andes, or Alps). Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Recognize that plate tectonics is the framework for understanding earthquakes, mountain-building, volcanoes, and features of the ocean floor.

Unit 3: Composition of the Earth Lesson 3: Valuable Minerals		Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Recognize that plate tectonics is the framework for understanding earthquakes, mountain building, volcanoes, and features of the ocean floor. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter. Gather data to assess the impact of specific geologic events (e.g., earthquakes and volcanoes), in terms of physical changes and biological effects. Explain plate tectonics as the theory that states that earth's surface is broken into pieces called plates that move and interact with each other. Apply the theory of plate tectonics to explain the occurrence and interaction of earthquakes, volcanoes, and other landforms (for example, mid-ocean ridges and deep-sea trenches). Explain the causes of earthquakes, the seismic waves they make, and how to use seismic waves to locate an earthquake's epicenter. Recognize that plate tectonics is the framework for understanding earthquakes, mountain-building, volcanoes, and features of the ocean floor.
Unit 3: Composition of the Earth Lesson 4: Crystal Structures		
Unit 3: Composition of the Earth Lesson 5: Rocks and Their Mineral Composition		Investigate the properties and characteristics of minerals. Investigate the characteristics of a mineral. Classify two substances as a mineral or nonmineral. Examine some of the common uses for minerals. Explore the importance of minerals in earth's crust.

Unit 3: Composition of the Earth Lesson 6: Three Kinds of Rocks		Investigate the properties and characteristics of minerals. Discuss mineral properties. Differentiate between color and streak. Differentiate between cleavage and fracture. Use the Mohs hardness scale to identify an unknown mineral.
Unit 3: Composition of the Earth Lesson 7: Laboratory: Rocks and Minerals 1	HS-ESS2-7	Investigate the properties and characteristics of minerals. Evaluate the difference between a gem and an industrial mineral. Decide on the properties of an ore. Discover the process of prospecting. Evaluate the pros and cons of the three different types of mining. Identify the different uses of minerals.
Unit 3: Composition of the Earth Lesson 8: Laboratory: Rocks and Minerals 2	HS-ESS2-7	Investigate the properties and characteristics of minerals. Identify minerals as compounds or elements. Describe the properties of ionic and covalent bonds. Identify the six crystal systems. Learn the basic shape of all silicates. Infer the connection between crystal shape and physical properties.
Unit 3: Composition of the Earth Lesson 9: Mid-Unit Test	HS-ESS2-6, HS-ESS2-7	Investigate the properties and characteristics of minerals. Explore the formation and composition of the three different rock types. Predict the progression of rocks through the rock cycle. Differentiate between minerals and rocks. Explore the characteristics of the three rock types. Investigate the formation and mineral composition of each rock type. Relate uniformitarianism to the formation of rocks.
Unit 3: Composition of the Earth Lesson 10: Rock Origins 1		Investigate the properties and characteristics of minerals. Explore the formation and composition of the three different rock types. Predict the progression of rocks through the rock cycle. Differentiate between intrusive and extrusive rock, as well as felsic and mafic magma. Identify igneous rocks based on composition and texture. Define the three types of sediment. Identify features unique to sedimentary rocks. Review the formation of metamorphic rocks. Identify metamorphic textures.

		Infer the properties and composition of metamorphic rock based on the original rock.
Unit 3: Composition of the Earth Lesson 11: Rock Origins 2		Investigate the properties and characteristics of minerals. Perform tests for hardness, color, streak, and special properties on mineral samples. Use the results of these tests to identify several mineral samples.
Unit 3: Composition of the Earth Lesson 12: The Rock Cycle		Investigate the properties and characteristics of minerals. Perform tests for hardness, color, streak, and special properties on mineral samples. Use the results of these tests to identify several mineral samples.
Unit 3: Composition of the Earth Lesson 13: Earth Materials Change		
Unit 3: Composition of the Earth Lesson 14: Weathering and Erosion		Explore the formation and composition of the three different rock types. Predict the progression of rocks through the rock cycle. Explain the formation of intrusive and extrusive igneous rocks. Identify places where igneous, sedimentary, and metamorphic rocks may form. Discover the link between sedimentary rock and plate movement. Predict the type of metamorphic rock that will form from a convergent plate boundary.
Unit 3: Composition of the Earth Lesson 15: Land Use and Its Effects		Identify features found only in sedimentary rocks. Infer the environment of deposition for these sedimentary rocks. Explain the formation of igneous rocks with unique textures. Identify metamorphic characteristics for regional and contact metamorphism.

Unit 3: Composition of the Earth Lesson 16: Your Choice		Investigate the properties and characteristics of minerals. Explore the formation and composition of the three different rock types. Describe the relationship between different types of rock and how one kind of rock changes into another. Interpret a diagram of the rock cycle and relate these processes and changes to plate tectonic events.
Unit 3: Composition of the Earth Lesson 17: Unit Test	HS-ESS2-5,HS-ESS2-6, HS-ESS2-7, HS-ETS-1-5,	Describe how water, ice, waves, and wind erode, transport, and reshape the earth's land surfaces. Explain how the following occur: weathering, erosion, sedimentation, and deposition. Relate these processes to the changing topography of earth's surface and the redistribution of earth materials: weathering, erosion, mass movement caused by gravity, running water, moving groundwater, glaciers, wind, waves, and currents.
Unit 4: Geologic History Lesson 1: Earth's History		Explore the formation and composition of the three different rock types. Predict the progression of rocks through the rock cycle. Explain how weathering and erosion shape the surface of earth. Infer how weathering, erosion, and rock type influence land use. Differentiate mechanical weathering from chemical weathering, and give examples of each. Interpret a series of diagrams that illustrate erosion and deposition processes on earth's surface.
Unit 4: Geologic History Lesson 2: Earth's History and Change		Explore the formation and composition of the three different rock types. Relate land use to soil characteristics, erosion, and weathering. Describe the effects of erosion before and after a conservation plan is implemented, and explain the impact of changes that have been implemented.
Unit 4: Geologic History Lesson 3: The Fossil Record		
Unit 4: Geologic History Lesson 4: Age of Geologic Features		

Unit 4: Geologic History Lesson 5: Earth's History Written in Rocks		Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use the fossil record to interpret the past. Interpret the rock record of an area. Use relative and absolute dating methods to determine the geologic history of an area. Apply the theory of uniformitarianism while discussing earth's geologic history.
Unit 4: Geologic History Lesson 6: Laboratory: Interpreting Geology 1	HS-ESS1-6	Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use the fossil record to interpret the past. Interpret the rock record of an area. Use relative and absolute dating methods to determine the geologic history of an area. Review the time line of life on earth. Compare the time line of life on earth with the geologic periods of earth's history. Explain how relative and absolute dating methods led to the geologic time scale.
Unit 4: Geologic History Lesson 7: Laboratory: Interpreting Geology 2	HS-ESS1-6	Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use the fossil record to interpret the past. Interpret the rock record of an area. Use relative and absolute dating methods to determine the geologic history of an area. Understand how an organism can be preserved. Infer the connection between the fossil record and the geologic history of an area. Explain how fossils can provide clues to the major events and abiotic factors in an area.

Unit 4: Geologic History Lesson 8: Your Choice		Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use the fossil record to interpret the past. Interpret the rock record of an area. Use relative and absolute dating methods to determine the geologic history of an area. Identify relative ages of rocks and geologic features. Calculate the absolute age of rocks using your knowledge of radioactive decay, half-life, and parent-daughter ratios. Compare absolute and relative age techniques.
Unit 4: Geologic History Lesson 9: Unit Test	HS-ESS1-6	Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use the fossil record to interpret the past. Interpret the rock record of an area. Use relative and absolute dating methods to determine the geologic history of an area. Determine the relative ages of rocks based on a geologic cross section. Determine how relative dating techniques work in practice. Determine the geologic events, such as deformation, earthquakes, or erosion, that may have occurred in a place. Determine how the environment of deposition changed over time at that location.

Unit 5: Earth's Atmosphere Lesson 1: Layers in the Atmosphere		Define and use the theory of uniformitarianism. Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use the fossil record to interpret the past. Interpret the rock record of an area. Use relative and absolute dating methods to determine the geologic history of an area. Determine the relative ages of rocks based on a geologic cross section. Determine how relative dating techniques work in practice. Determine the geologic events, such as deformation, earthquakes, or erosion, that may have occurred in a place. Determine how the environment of deposition changed over time at that location.
Unit 5: Earth's Atmosphere Lesson 2: Composition of the Atmosphere		Study the geologic time scale to learn how major biologic events correspond to earth's geologic history. Use relative and absolute dating methods to determine the geologic history of an area. Determine the relative ages of rocks based on a geologic cross section. Determine how relative dating techniques work in practice. Determine the geologic events, such as deformation, earthquakes, or erosion, that may have occurred in a place. Determine how the environment of deposition changed over time at that location.
Unit 5: Earth's Atmosphere Lesson 3: History of Earth's Atmosphere		
Unit 5: Earth's Atmosphere Lesson 4: Atmosphere and Life on Earth		

Unit 5: Earth's Atmosphere Lesson 5: Laboratory: Barometer 1	HS-ESS2-2, HS-ESS2-4	Interpret a diagram of the layers of the atmosphere, including temperature and air pressure data for each layer. Describe the structure and composition of earth's atmosphere. Identify and describe the properties of each atmospheric layer.
Unit 5: Earth's Atmosphere Lesson 6: Laboratory: Barometer 2	HS-ESS2-2, HS-ESS2-4	Describe the composition and structure of the earth's atmosphere. Describe the consequences of the heat energy that is taken up by the atmosphere and what the atmosphere does with it. Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Explain temperature inversions and how they occur. Associate atmospheric layers (troposphere) with weather and human activities
Unit 5: Earth's Atmosphere Lesson 7: Mid-Unit Test	HS-ESS2-2, HS-ESS2-4	Describe the composition and structure of the earth's atmosphere. Explain how the earth's atmosphere originated and describe any changes that have occurred over time. Explain how heat energy is transferred from the sun to the earth and the atmosphere. Describe the consequences of the heat energy that is taken up by the atmosphere and what the atmosphere does with it. Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Describe how the earth's atmosphere has changed over time. Identify and discuss the effects of the following on earth's atmosphere: outgassing, carbon-dioxide concentration, and water. Explain the origin of atmospheric oxygen and how oxygen has affected earth.
Unit 5: Earth's Atmosphere Lesson 8: The Sun and Energy		Describe the composition and structure of the earth's atmosphere. Explain how the earth's atmosphere originated and describe any changes that have occurred over time. Explain how heat energy is transferred from the sun to the earth and the atmosphere. Describe the consequences of the heat energy that is taken up by the atmosphere and what the atmosphere does with it. Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Explain the relationship between living

		organisms and the composition of the earth's atmosphere. Describe how living organisms and the composition of the earth's atmosphere influence each other.
Unit 5: Earth's Atmosphere Lesson 9: Solar Radiation		Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Define barometric pressure. Build and use a barometer to make barometric pressure measurements. Explain the relationship between barometric pressure and types of weather. Use wind and barometric data to predict weather.
Unit 5: Earth's Atmosphere Lesson 10: Temperature and Air Pressure		Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Define barometric pressure. Build and use a barometer to make barometric pressure measurements. Explain the relationship between barometric pressure and types of weather. Use wind and barometric data to predict weather.
Unit 5: Earth's Atmosphere Lesson 11: Air Circulation Patterns 1		
Unit 5: Earth's Atmosphere Lesson 12: Air Circulation Patterns 2		Explain how heat energy is transferred from the sun to the earth and the atmosphere. Describe the consequences of the heat energy that is taken up by the atmosphere and what the atmosphere does with it. Describe how heat energy enters the earth's system by way of radiation from the sun and is transferred from earth's surface to the atmosphere by way of conduction, and how heat is then transported through the atmosphere by convection. Explain how radiation, conduction, or convection can transfer heat energy.

Unit 5: Earth's Atmosphere Lesson 13: Air Movement and Weather		Explain how heat energy is transferred from the sun to the earth and the atmosphere. Describe the consequences of the heat energy that is taken up by the atmosphere and what the atmosphere does with it. Interpret a diagram showing the distribution of incoming solar radiation (insolation) on the earth. Discuss incoming solar radiation and its impact on photosynthesis, energy absorption, and reflection. Explain how earth maintains a constant temperature over time, by radiating an equal amount of heat received from the sun back into space.
Unit 5: Earth's Atmosphere Lesson 14: Wind and Human Activity		Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Explain the connection between temperature and air pressure. Generalize the impact that air pressure has on the changing weather. Relate the connection, both globally and locally, between air pressure and air circulation patterns.
Unit 5: Earth's Atmosphere Lesson 15: Laboratory: Energy Absorption/Reflection 1	HS-ESS2-2, HS-ESS2-4	Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Predict the movement of air in global winds around earth's surface. Examine a map of the sun's energy hitting earth's surface and predict the areas of greatest energy. Describe the formation of a sea breeze and a land breeze. Differentiate between local and global winds. Predict the movement of air from an area of high temperature to an area of low temperature.
Unit 5: Earth's Atmosphere Lesson 16: Laboratory: Energy Absorption/Reflection 2	HS-ESS2-2, HS-ESS2-4	Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Explain what causes winds. Describe the role that earth's rotation has on air circulation. Predict the movement of objects based on the Coriolis effect. Interpret a map of the global wind systems. Describe the major wind belts and where they are located.

Unit 5: Earth's Atmosphere Lesson 17: Your Choice		Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Describe the movement of heat in the atmosphere. Summarize the movement of water in the atmosphere. Analyze the connection between the movement of heat and water in the atmosphere and local weather conditions. Explain phenomena such as wind, precipitation, cloud formation, and storms in the context of heat and water.
Unit 5: Earth's Atmosphere Lesson 18: Unit Test	HS-ESS2-2, HS-ESS2-4, HS-PS1-6	Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Review air circulation patterns on a local level and global level. Predict the role local winds had on trade and exploration. Describe routes taken by early explorers based on global circulation and wind patterns.
Unit 6: Weather 1 Lesson 1: What Makes the Weather?		Explain how air temperature, air pressure, air density, and the earth's rotation interact to produce air circulations locally and globally. Predict that different materials will absorb or reflect sunlight. Design an experiment to test your prediction. Explain how the absorption or reflection of sunlight may affect natural settings. Explain how heat energy is transferred from the sun to the earth and the atmosphere. Describe the consequences of the heat energy that is taken up by the atmosphere and what the atmosphere does with it.
Unit 6: Weather 1 Lesson 2: Gathering Weather Data		Predict that different materials will absorb or reflect sunlight. Design an experiment to test your prediction. Explain how the absorption or reflection of sunlight may affect natural settings.
Unit 6: Weather 1 Lesson 3: Weather Maps		
Unit 6: Weather 1 Lesson 4: Laboratory: Weather Map Interpretation 1	HS-ESS2-2	
Unit 6: Weather 1 Lesson 5: Laboratory: Weather Map Interpretation 2	HS-ESS2-2	Define climate as the average atmospheric conditions of a region, as described by weather observations made over time. Explain the atmospheric conditions that lead to the greenhouse effect. Define weather as the physical state of the atmosphere at a particular time and place.

		Describe the following atmospheric variables that influence weather patterns and how they interact: air pressure, temperature, moisture, wind, precipitation, and cloud conditions.
Unit 6: Weather 1 Lesson 6: Cloud Formation		Define climate as the average atmospheric conditions of a region, as described by weather observations made over time. Explain that climate, weather, and currents are the result of uneven distribution of solar energy over earth's surface. Describe some of the instruments used in earth science investigations. Identify the tools used to gather data about atmospheric conditions and explain how they are used.
Unit 6: Weather 1 Lesson 7: How Storms Develop		Accurately read keys and symbols on a weather map. Analyze the weather page in a newspaper. Analyze weather data and maps to develop appropriate weather forecasts.
Unit 6: Weather 1 Lesson 8: Determining Level of Risk		Read and interpret symbols from a surface weather map. Construct surface maps of temperature, pressure, dew points, and wind directions from surface data. Identify regions of specific temperatures, pressures, and moisture.
Unit 6: Weather 1 Lesson 9: Preparing for Severe Weather		Read and interpret symbols from a surface weather map. Construct surface maps of temperature, pressure, dew points, and wind directions from surface data. Identify regions of specific temperatures, pressures, and moisture. Compare surface maps with other weather images.
Unit 6: Weather 1 Lesson 10: Your Choice		Interpret a diagram that shows cloud formation. Identify examples of clouds associated with different types of weather. Describe how fog forms.
Unit 6: Weather 1 Lesson 11: Unit Test	HS-ESS2-2, HS-PS1-6, HS-ESS3-5, HS-ETS1-5	Identify examples of severe weather (e.g., hurricanes, tornadoes, and thunderstorms). Describe the specific conditions that lead to severe weather events.

Unit 7: Semester Review and Test Lesson 1: Semester Review		Define climate as the average atmospheric conditions of a region, as described by weather observations made over time. Relate geographic location and topographic features to the level of risk for occurrence of severe weather (e.g., Tornado Alley and lake-effect snow), using maps as reference tools. Analyze data to correlate time of year with the frequency of severe weather in specific geographic areas.
Unit 7: Semester Review and Test Lesson 2: Your Choice		Explain that climate, weather, and currents are the result of uneven distribution of solar energy over earth's surface. Discuss methods used to determine the severity of storms such as hurricanes and tornadoes. Describe safety precautions recommended for emergency preparedness before and during severe weather.
Unit 7: Semester Review and Test Lesson 3: Your Choice		
Unit 7: Semester Review and Test Lesson 4: Semester Test		
Unit 8: Honors Project 1: Research Paper Lesson 1: Planning Your Research Paper		
Unit 8: Honors Project 1: Research Paper Lesson 2: Finding and Using Information for Your Paper		
Unit 8: Honors Project 1: Research Paper Lesson 3: Organizing Notes and Developing an Outline		
Unit 8: Honors Project 1: Research Paper Lesson 4: Writing Your Paper		
Unit 8: Honors Project 1: Research Paper Lesson 5: Creating a Works Cited Page		Respond to a research paper. Choose a topic for a research paper. Make a list of questions about a research topic.

Unit 8: Honors Project 1: Research Paper Lesson 6: Revising and Proofreading Your Paper	HS-ETS1-4, HS-ETS1-5	Evaluate research sources and conduct research. Use the library and the Internet for research. Evaluate Internet sources. Use index cards, create bibliography cards, and take notes. Create bibliography cards. Identify instances of plagiarism. Take notes on index cards. Understand plagiarism.
Unit 9: Honors Project 2: Laboratory: Spectroscopy Lesson 1: Laboratory: Spectroscopy 1	HS-ETS1-5	Write a thesis statement. Organize note cards. Determine a pattern of organization. Make a formal outline.