

	Earth in the Universe	Earth Systems, Structures and Processes	Earth History
		K.E.1 Understand change and observable patterns of weather that occur from day to day and throughout the year.	
		K.E.1.1 Infer that change is something that happens to many things in the environment based on observations made using one or more of their senses. K.E.1.2 Summarize daily weather conditions noting changes that occur from day to day and throughout the year. K.E.1.3 Compare weather patterns that occur from season to season.	
	1.E.1 Recognize the features and patterns of the earth/moon/sun system as observed from Earth. 1.E.1.1 Recognize differences in the features of the day and night sky and apparent movement of objects across the sky as observed from Earth. 1.E.1.2 Recognize patterns of observable changes in the Moon's appearance from day to day.	1.E.2 Understand the physical properties of Earth materials that make them useful in different ways. 1.E.2.1 Summarize the physical properties of Earth materials, including rocks, minerals, soils and water that make them useful in different ways. 1.E.2.2 Compare the properties of soil samples from different places relating their capacity to retain water, nourish and support the growth of certain plants.	
		2.E.1 Understand patterns of weather and factors that affect weather. 2.E.1.1 Summarize how energy from the sun serves as a source of light that warms the land, air and water. 2.E.1.2 Summarize weather conditions using qualitative and quantitative measures to describe: temperature, wind direction, wind speed, precipitation 2.E.1.3 Compare weather patterns that occur over time and relate observable patterns to time of day and time of year. 2.E.1.4 Recognize the tools that scientists use for observing, recording, and predicting weather changes from day to day and during the seasons.	
	3.E.1 Recognize the major components and patterns observed in the earth/moon/sun system. 3.E.1.1 Recognize that the earth is part of a system called the solar system that includes the sun (a star), planets, and many moons and the earth is the third planet from the sun in our solar system. 3.E.1.2 Recognize that changes in the length and direction of an object's shadow indicate the apparent changing position of the Sun during the day although the patterns of the stars in the sky, to include the Sun, stay the same.	3.E.2 Compare the structures of the Earth's surface using models or three-dimensional diagrams. 3.E.2.1 Compare Earth's saltwater and freshwater features (including oceans, seas, rivers, lakes, ponds, streams, and glaciers). 3.E.2.2 Compare Earth's land features (including volcanoes, mountains, valleys, canyons, caverns, and islands) by using models, pictures, diagrams, and maps.	
	4.E.1 Explain the causes of day and night and phases of the moon. 4.E.1.1 Explain the cause of day and night based on the rotation of Earth on its axis. 4.E.1.2 Explain the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.		4.E.2 Understand the use of fossils and changes in the surface of the earth as evidence of the history of Earth and its changing life forms. 4.E.2.1 Compare fossils (including molds, casts, and preserved parts of plants and animals) to one another and to living organisms. 4.E.2.2 Infer ideas about Earth's early environments from fossils of plants and animals that lived long ago. 4.E.2.3 Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.
		5.E.1 Understand weather patterns and phenomena, making connections to the weather in a particular place and time.	

		<p>5.E.1.1 Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns.</p> <p>5.E.1.2 Predict upcoming weather events from weather data collected through observation and measurements.</p> <p>5.E.1.3 Explain how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.</p>	
6	<p>6.E.1 Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.</p> <p>6.E.1.1 Explain how the relative motion and relative position of the sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses.</p> <p>6.E.1.2 Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.</p> <p>6.E.1.3 Summarize space exploration and the understandings gained from them.</p>	<p>6.E.2 Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the Earth over time and the effects of the lithosphere on humans.</p> <p>6.E.2.1 Summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.</p> <p>6.E.2.2 Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the earth.</p> <p>6.E.2.3 Explain how the formation of soil is related to the parent rock type and the environment in which it develops.</p> <p>6.E.2.4 Conclude that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship.</p>	
7		<p>7.E.1 Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans.</p> <p>7.E.1.1 Compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.</p> <p>7.E.1.2 Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.</p> <p>7.E.1.3 Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.</p> <p>7.E.1.4 Predict weather conditions and patterns based on information obtained from: weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure); weather maps, satellites and radar; cloud shapes and types and associated elevation.</p> <p>7.E.1.5 Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.</p>	

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		7.E.1.6 Conclude that the good health of humans require: monitoring the atmosphere, maintaining air quality and stewardship.	
8	Intentionally left blank.	<p>8.E.1 Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans.</p> <p>8.E.1.1 Explain the structure of the hydrosphere including: water distribution on earth, local river basin and water availability.</p> <p>8.E.1.2 Summarize evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: estuaries, marine ecosystems, upwelling, behavior of gases in the marine environment, deep ocean technology and understandings gained.</p> <p>8.E.1.3 Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: temperature, dissolved oxygen, pH, nitrates and phosphates, turbidity, bio-indicators.</p> <p>8.E.1.4 Conclude that the good health of humans requires: monitoring of the hydrosphere, water quality standards, methods of water treatment, maintaining safe water quality, stewardship.</p>	<p>8.E.2 Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms.</p> <p>8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rocks layers (relative dating and radioactive dating).</p> <p>8.E.2.2 Explain the use of fossils, ice cores, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms.</p>
9	<p>EEn.1.1 Explain the Earth's role as a body in space.</p> <p>EEn.1.1.1 Explain the Earth's motion through space, including precession, nutation, the barycenter, and its path about the galaxy.</p> <p>EEn.1.1.2 Explain how the Earth's rotation and revolution about the Sun affect its shape and is related to seasons and tides.</p> <p>EEn.1.1.3 Explain how the sun produces energy which is transferred to the Earth by radiation.</p> <p>EEn.1.1.4 Explain how incoming solar energy makes life possible on Earth.</p>	<p>EEn.2.1 Explain how processes and forces affect the lithosphere.</p> <p>EEn.2.1.1 Explain how the rock cycle, plate tectonics, volcanoes, and earthquakes impact the lithosphere.</p> <p>EEn.2.1.2 Predict the locations of volcanoes, earthquakes, and faults based on information contained in a variety of maps.</p> <p>EEn.2.1.3 Explain how natural actions such as weathering, erosion (wind, water and gravity), and soil formation affect Earth's surface.</p> <p>EEn.2.1.4 Explain the probability of and preparation for geohazards such as landslides, avalanches, earthquakes and volcanoes in a particular area based on available data.</p> <p>EEn.2.2 Understand how human influences impact the lithosphere.</p> <p>EEn.2.2.1 Explain the consequences of human activities on the lithosphere (such as mining, deforestation, agriculture, overgrazing, urbanization, and land use) past and present.</p> <p>EEn.2.2.2 Compare the various methods humans use to acquire traditional energy sources (such as peat, coal, oil, natural gas, nuclear fission, and wood).</p> <p>EEn.2.3 Explain the structure and processes within the hydrosphere.</p> <p>EEn.2.3.1 Explain water as an energy agent (currents and heat transfer).</p> <p>EEn.2.3.2 Explain how ground water and surface water interact.</p> <p>EEn.2.4 Evaluate how humans use water.</p> <p>EEn.2.4.1 Evaluate human influences on freshwater availability</p> <p>EEn.2.4.2 Evaluate human influences on water quality in North Carolina's river basins, wetlands and tidal environments.</p> <p>EEn.2.5 Understand the structure of and processes within our atmosphere.</p>	

		<p>EEn.2.5.1 Summarize the structure and composition of our atmosphere.</p> <p>EEn.2.5.2 Explain the formation of typical air masses and the weather systems that result from air mass interactions.</p> <p>EEn.2.5.3 Explain how cyclonic storms form based on the interactions of air masses.</p>	
Earth/Environmental Science		<p>EEn.2.5.4 Predict the weather using available weather maps and data (including surface, upper atmospheric winds, and satellite imagery).</p> <p>EEn.2.5.5 Explain how human activities affect air quality.</p> <p>EEn.2.6 Analyze patterns of global climate change over time.</p> <p>EEn.2.6.1 Differentiate between weather and climate.</p> <p>EEn.2.6.2 Explain changes in global climate due to natural processes.</p> <p>EEn.2.6.3 Analyze the impacts that human activities have on global climate change (such as burning hydrocarbons, greenhouse effect, and deforestation).</p> <p>EEn.2.6.4 Attribute changes in Earth systems to global climate change (temperature change, changes in pH of ocean, sea level changes, etc.).</p> <p>EEn.2.7 Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere.</p> <p>EEn.2.7.1 Explain how abiotic and biotic factors interact to create the various biomes in North Carolina.</p> <p>EEn.2.7.2 Explain why biodiversity is important to the biosphere.</p> <p>EEn.2.7.3 Explain how human activities impact the biosphere.</p> <p>EEn.2.8 Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth.</p> <p>EEn.2.8.1 Evaluate alternative energy technologies for use in North Carolina.</p> <p>EEn.2.8.2 Critique conventional and sustainable agriculture and aquaculture practices in terms of their environmental impacts.</p> <p>EEn.2.8.3 Explain the effects of uncontrolled population growth on the Earth's resources.</p> <p>EEn.2.8.4 Evaluate the concept of “reduce, reuse, recycle” in terms of impact on natural resources.</p>	