



## North Carolina Essential Standards Earth/Environmental Science

The North Carolina Science Essential Standards maintain the respect for local control of each Local Education Authority (LEA) to design the specific curricular and instructional strategies that best deliver the content to their students. Nonetheless, engaging students in inquiry-based instruction is a critical way of developing conceptual understanding of the science content that is vital for success in the twenty-first century. The process of scientific inquiry, experimentation and technological design should not be taught nor tested in isolation of the core concepts drawn from physical science, earth science and life science. A seamless integration of science content, scientific inquiry, experimentation and technological design will reinforce in students the notion that “what” is known is inextricably tied to “how” it is known. A well-planned science curriculum provides opportunities for inquiry, experimentation and technological design. Teachers, when teaching science, should provide opportunities for students to engage in “hands-on/minds-on” activities that are exemplars of scientific inquiry, experimentation and technological design.

### Science as Inquiry

Traditional laboratory experiences provide opportunities to demonstrate how science is constant, historic, probabilistic, and replicable. Although there are no fixed steps that all scientists follow, scientific investigations usually involve collections of relevant evidence, the use of logical reasoning, the application of imagination to devise hypotheses, and explanations to make sense of collected evidence. Student engagement in scientific investigation provides background for understanding the nature of scientific inquiry. In addition, the science process skills necessary for inquiry are acquired through active experience. The process skills support development of reasoning and problem-solving ability and are the core of scientific methodologies.

### Earth in the Universe

	Essential Standard	Clarifying Objectives	
<b>EEn.1.1</b>	<b>Explain the Earth’s role as a body in space.</b>	EEn.1.1.1	Explain the Earth’s motion through space, including precession, nutation, the barycenter, and its path about the galaxy.
		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.
		EEn.1.1.3	Explain how the sun produces energy which is transferred to the Earth by radiation.
		EEn.1.1.4	Explain how incoming solar energy makes life possible on Earth.

### Earth: Systems, Structures and Processes

	Essential Standard	Clarifying Objectives	
<b>EEn.2.1</b>	<b>Explain how processes and forces affect the lithosphere.</b>	EEn.2.1.1	Explain how the rock cycle, plate tectonics, volcanoes, and earthquakes impact the lithosphere.
		EEn.2.1.2	Predict the locations of volcanoes, earthquakes, and faults based on information contained in a variety of maps.

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	Essential Standard	Clarifying Objectives	
		EEn.2.1.3	Explain how natural actions such as weathering, erosion (wind, water and gravity), and soil formation affect Earth's surface.
		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.
EEn.2.2	Understand how human influences impact the lithosphere.	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.
		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).
EEn.2.3	Explain the structure and processes within the hydrosphere.	EEn.2.3.1	Explain how water is an energy agent (currents and heat transfer).
		EEn.2.3.2	Explain how ground water and surface water interact.
EEn.2.4	Evaluate how humans use water.	EEn.2.4.1	Evaluate human influences on freshwater availability.
		EEn.2.4.2	Evaluate human influences on water quality in North Carolina's river basins, wetlands and tidal environments.
EEn.2.5	Understand the structure of and processes within our atmosphere.	EEn.2.5.1	Summarize the structure and composition of our atmosphere.
		EEn.2.5.2	Explain the formation of typical air masses and the weather systems that result from air mass interactions.
		EEn.2.5.3	Explain how cyclonic storms form based on the interaction of air masses.
		EEn.2.5.4	Predict the weather using available weather maps and data (including surface, upper atmospheric winds, and satellite imagery).
		EEn.2.5.5	Explain how human activities affect air quality.
EEn.2.6	Analyze patterns of global climate change over time.	EEn.2.6.1	Differentiate between weather and climate.
		EEn.2.6.2	Explain changes in global climate due to natural processes.
		EEn.2.6.3	Analyze the impacts that human activities have on global climate change (such as burning hydrocarbons, greenhouse effect, and deforestation).
		EEn.2.6.4	Attribute changes in Earth systems to global climate change (temperature change, changes in pH of ocean, sea level changes, etc.).
EEn.2.7	Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere.	EEn.2.7.1	Explain how abiotic and biotic factors interact to create the various biomes in North Carolina
		EEn.2.7.2	Explain why biodiversity is important to the biosphere.
		EEn.2.7.3	Explain how human activities impact the biosphere.
EEn.2.8	Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth.	EEn.2.8.1	Evaluate alternative energy technologies for use in North Carolina.
		EEn.2.8.2	Critique conventional and sustainable agriculture and aquaculture practices in terms of their environmental impacts.
		EEn.2.8.3	Explain the effects of uncontrolled population growth on the Earth's resources.
		EEn.2.8.4	Evaluate the concept of "reduce, reuse, recycle" in terms of impact on natural resources.