NORTH CAROLINA STANDARD COURSE OF STUDY
Crosswalk
Grade 6 Science

The purpose of this document is to provide a general comparison of the 2009 Grade 6 Science Standard Course of Study and the 2023 Grade 6 Science Standard Course of Study. It provides initial insight into similarities and differences between these two sets of standards. This document is not intended to answer all questions about the nuances of the new 2023 standards versus the previous 2009 standards..

Grade 6 Science Standards

Note: The 2023 Grade 6 standards and objectives are not intended to be the curriculum, nor do they indicate the whole of a curriculum which will be written by a local public-school unit (PSU) or school. The standards for this course have been developed to serve as the framework which will guide each PSU in the development of the curriculum for Grade 6.

Matter and its Interactions		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
PS.6.1 Understand the structure, states, and physical properties of matter.	***6.P.2 Understand the structure, classifications and physical properties of matter.***	
PS.6.1.1 Use models to illustrate that matter is made of atoms and elements, and are distinguished from each other by the types of atoms that compose them.	6.P.2.1 Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.	
PS.6.1.2 Use models to explain the relationship between changes in thermal energy in a substance and the motion of its particles (including phase changes).	6.P.2.2 Explain the effect of heat on the motion of atoms and molecules through a description of what happens to particles during a change in phase.	
PS.6.1.3 Carry out investigations to compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.	6.P.2.3. Compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.	

Energy		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
PS.6.2 Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy.	*6.P.3 Understand characteristics of energy transfer and interactions of matter and energy.*	
PS.6.2.1 Use models to compare the directional transfer of heat energy of matter through convection, radiation, and conduction.	6.P.3.1 Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.	
PS.6.2.2 Use models to explain how the transfer of heat and resulting change of temperature impacts the behavior of matter to include conduction, expansion, and contraction.	6.P.3.2 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature. 6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).	New Objective Created from Combining *6.P.3.2* and *6.P.3.3.*
PS.6.2.3 Carry out investigations to compare the transfer of thermal energy in insulated and non-insulated materials (examples could include insulated box, solar cooker, or styrofoam cup).	6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).	
PS.6.2.4 Engage in argument from evidence to classify materials as conductors and insulators of energy (both thermal and electrical).		New
PS.6.2.5 Carry out investigations to explain the transfer of electrical energy in electrical circuits, to include how a circuit requires a complete loop through which an electrical current can pass.	7.P.2.3 Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.	Content from 7.P.2.3 about electricity was used to create the new 2023 objective.

Waves and Their Applications		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
PS.6.3 Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves.	*6.P.1 Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound waves.*	
PS.6.3.1 Use models of a simple wave to explain wave properties in seismic, light, and sound waves that include: waves having a repeating pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave.	6.P.1.1 Compare the properties of waves to the wavelike property of energy in earthquakes, light and sound.	
PS.6.3.2 Carry out investigations to conclude the relationship between the electromagnetic spectrum (including visible light) and sight.	6.P.1.2 Explain the relationship among visible light, the electromagnetic spectrum, and sight.	
PS.6.3.3 Carry out investigations to conclude the relationship between sound waves (including rate of vibration, the medium through which vibrations travel) and hearing.	6.P.1.3 Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing.	
PS.6.3.4 Use models to explain that various waves (seismic, sound, electromagnetic, including visible light) are reflected, absorbed or transmitted through various materials.	6.P.3.2 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature.	

From Molecules to Organisms - Structures and Processes		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
LS.6.1 Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce.	*6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.*	
LS.6.1.1 Use models to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.	6.L.1.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.	
LS.6.1.2 Construct an explanation to compare how vascular and nonvascular plants obtain, transport, and use nutrients and water necessary for survival.		New
LS.6.1.3 Use models to summarize structural adaptations, processes, and responses that flowering plants use for defense, survival and reproduction.	6.L.1.2.Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms.	

Ecosystems - Interactions, Energy, and Dynamics		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
LS.6.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.	*6.L.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.*	
LS.6.2.1 Use models to summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred to consumers and decomposers.	6.L.2.1 Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and food webs (terrestrial and aquatic) from producers to consumers to decomposers.	

LS.6.2.2 Analyze and interpret data to predict how the abiotic factors (such as temperature, water, sunlight, and soil quality) and biotic factors affect the ability of organisms to grow and survive in different biomes (freshwater, marine, temperate forest, rainforest, grassland, desert, taiga, tundra).	6.L.2.3 Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grassland, desert, Tundra) affect the ability of organisms to grow, survive and/or create their own food through photosynthesis.	

Earth's Place in the Universe		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
ESS.6.1 Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.	*6.E.1 Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.*	
ESS.6.1.1 Use models to explain how the relative motion and relative position of the Sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses.	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.	
ESS.6.1.2 Analyze and interpret data to compare the planets in our solar system in terms of: size and gravitational force relative to Earth, surface and atmospheric features, relative distance from the sun, and ability to support life.	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.	
ESS.6.1.3 Use models to explain how the gravitational forces of the Sun and planets impact the structure of our solar system.		New
ESS.6.1.4 Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe.	6.E.1.3 Summarize space exploration and the understandings gained from them.	

Earth's Systems		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
ESS.6.2 Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time.	*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.*	
ESS.6.2.1 Use models to summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.	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.	
ESS.6.2.2 Construct an explanation to illustrate how the movement of lithospheric plates can create geologic landforms and cause major geologic events such as earthquakes and volcanic eruptions.	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.	
ESS.6.2.3 Use models to explain the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks).	6.E.2.3 Explain how the formation of soil is related to the parent rock type and the environment in which it develops.	

Earth and Human Activity		
2023 Standards/Objectives	**2009 Essential Standards/Clarifying Objectives**	Notes
ESS.6.3 Understand the reciprocal relationship between the lithosphere and humans.	*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.*	

ESS.6.3.1 Engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the lithosphere, maintaining soil quality and stewardship.	6.E.2.4 Conclude that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship.	
ESS.6.3.2 Obtain, evaluate, and communicate information to compare the implications of sustainable and unsustainable land use practices (including agriculture and deforestation) and the importance of stewardship.		New