



This document is designed to help North Carolina educators teach the Essential Standards (Standard Course of Study). NCDPI staff are continually updating and improving these tools to better serve teachers.

Sixth Grade Science
 2009-to-2004 Standards Crosswalk

This document is a general comparison of the current 2004 Science Standard Course of Study and the new 2009 Science Essential Standards. It provides initial insight into sameness and difference between these two sets of standards. This document is not intended to answer all questions about the nuance of the new standards versus the old - in fact, we imagine you will develop questions as you do a close reading of the new standards. Please send the science section of NC DPI any thoughts, feedback, questions and ideas about additional resources that would help you start preparing to teach the Essential Standards. Email Beverly Vance at bvance@dpi.state.nc.us.

Important Note: The current 2004 SCOS will continue to be the operational standards in the 2010-11 and 2011-12 school years as resource materials are developed to support the new Science Essential Standards, professional development is conducted and assessments are designed to align to the new Science Essential Standards. We expect the new Essential Standards to be taught and assessed in schools for the first time in the 2012-13 school year. That said, we are providing Essential Standards resources now and over the next two-years so that schools and teachers can get a head start on internalizing and planning to teach the new standards.

2009 Essential Standards		2004 NC SCOS		Comments
Strand	Objective	Goal	Objective	
	Essential Standard Text of Clarifying objective		Text of objective	
Physical Science: Forces and Motion	Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound.			
	6.P.1.1 Compare the properties of waves to the wavelike property of energy in earthquakes, light and sound.			
	6.P.1.2 Explain the relationship among visible light, the electromagnetic spectrum, and sight.			

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	6.P.1.3	Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing.	Characteristics of Energy	6.03	Analyze sound as an example that vibrating materials generate waves that transfer energy. <ul style="list-style-type: none"> • Frequency • Amplitude • Loudness • How sound travels through different material 	<ul style="list-style-type: none"> • Form and function of the human ear May be addressed at the classroom level, more information in the content description.
Physical Science: Matter: Properties and Change	Understand the structure, classifications and physical properties of matter.					
	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.				
	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.				
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.				8 th Grade 4.05	
Physical Science: Energy: Conservation and Transfer	Understand characteristics of energy transfer and interactions of matter and energy.		Characteristics of Energy Transfer and/or	6.01	Determine how convection and radiation transfer energy.	
	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.		6.02	Analyze heat flow through materials or across space from warm objects to cooler objects until both objects are at equilibrium.	
	6.P.3.2	Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature.		6.05	Analyze the physical interactions of light and matter: <ul style="list-style-type: none"> • Absorption • Scattering 	

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		Text of Clarifying objective					
	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).		6.06	<ul style="list-style-type: none"> • Color perception Analyze response to heat to determine the suitability of materials for use in technological design: <ul style="list-style-type: none"> • Conduction • Expansion • Contraction 		
Earth Science: Earth in the Universe	Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.		Solar System	5.01	Analyze the components and cycles of the solar system including: <ul style="list-style-type: none"> • Sun • Planets and moons • Asteroids and meteors • Comets • Phases • Seasons • Day/year • 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.			5.03		Relate the influence of the sun and the moon's orbit to the gravitational effects produced on Earth. <ul style="list-style-type: none"> • Solar storms • Tides
	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.			5.02		Compare and contrast the Earth to other planets in terms of: <ul style="list-style-type: none"> • Size • Composition • Relative distance from the sun • Ability to support life

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	6.E.1.3	Summarize space exploration and the understandings gained from them.		5.04	Describe space explorations and the understandings gained from them including: <ul style="list-style-type: none"> • N.A.S.A. • Technologies used to explore space • Historic timeline • Apollo mission to the moon • Space Shuttle • International Space Station • Future goals 	Removed as a topic, but may be addressed in 6.E.1.3 at classroom level.
				5.05	Describe the setting of the solar system in the universe including: <ul style="list-style-type: none"> • Galaxy • Size • The uniqueness of Earth 	Only partial alignment to 6.E.1.2.
				5.06	Analyze the spin-off benefits generated by space exploration technology including: <ul style="list-style-type: none"> • Medical • Materials • Transportation • Processes • Future research 	
Earth Science: Earth Systems, Structures		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.	Geological Cycles, Forces, Processes, and	3.01	Evaluate the forces that shape the lithosphere including: <ul style="list-style-type: none"> • Crustal plate movement • Folding and faulting • Deposition • Volcanic Activity • Earthquakes 	
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.					

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	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.		3.02	Examine earthquake and volcano patterns.	
				3.03	Explain the model for the interior of the earth.	
	6.E.2.3	Explain how the formation of soil is related to the parent rock type and the environment in which it develops.		3.04	Describe the processes which form and the uses of earth materials. <ul style="list-style-type: none"> • Rock cycle • Minerals • Characteristics of rocks • Economic use of rocks and minerals • Value of gems and precious metals • Common gems, minerals, precious metals and rocks found in N.C. 	
				3.05	Analyze soil properties that can be observed and measured to predict soil quality including: <ul style="list-style-type: none"> • Color • Horizon profile • Infiltration • Soil temperature • Structure • Consistency • Texture • Particle size • pH • Fertility • Soil moisture 	
6.E.2.4	Conclude that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship.	3.06	Evaluate ways in which human activities have affected Earth's pedosphere and the measures taken to control the impact: <ul style="list-style-type: none"> • Vegetative cover • Agriculture • Land use 	Also 8 th grade 5.04 and 5.05		

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					<ul style="list-style-type: none"> Nutrient balance Soil as a vector 	
				3.07	Assess the use of technology and information systems in monitoring lithospheric phenomenon.	Removed as standard but may be addressed in the classroom.
				3.08	Conclude that the good health of environments and organisms requires: <ul style="list-style-type: none"> Monitoring of the pedosphere Taking steps to maintain soil quality Stewardship 	
Earth Science: Earth History						
Life Science: Structures and Functions of Living Organisms		Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.				
	6.L.1.1	Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.				
	6.L.1.2	Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms.	Cycling of Matter	4.03	Examine evidence that green plants make food. <ul style="list-style-type: none"> Photosynthesis is a process carried on by green plants and other organisms containing chlorophyll. During photosynthesis, light energy is converted into stored energy which the plant, in turn, uses to carry out its life processes. 	

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				4.04	Evaluate the significance of photosynthesis to other organisms: <ul style="list-style-type: none"> • The major source of atmospheric oxygen is photosynthesis. • Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis. Green plants are the producers of food that is used directly or indirectly by consumers.	
Life Science: Ecosystems	Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.		Cycle of Matter	4.01	Describe the flow of energy and matter in natural systems: <ul style="list-style-type: none"> • Energy flows through ecosystems in one direction, from the sun through producers to consumers to decomposers. • Matter is transferred from one organism to another and between organisms and their environments. • Water, nitrogen, carbon dioxide, and oxygen are substances cycled between the living and non-living environments. 	
	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.		4.02	Evaluate the significant role of decomposers.	
		Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment.		4.05	Evaluate designed systems for ability to enable growth of certain plants and animals.	
	6.L.2.2		Population Dynamics	7.01	Describe ways in which organisms interact with each other and with nonliving parts of the environment: <ul style="list-style-type: none"> • Coexistence/Cooperation/Competition • Symbiosis • Mutual dependence 	
				7.03	Explain how changes in habitat may affect organisms.	

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Life Science: Evolution and Genetics	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.		7.04	Evaluate data related to human population growth, along with problems and solutions: <ul style="list-style-type: none"> • Waste disposal • Food supplies • Resource availability • Transportation • Socio-economic patterns 	Emphasis of human impact on environment has moved to 8 th grade.
				7.02	Investigate factors that determine the growth and survival of organisms including: <ul style="list-style-type: none"> • Light • Temperature range • Mineral availability • Soil/rock type • Water • Energy 	
				7.05	Examine evidence that overpopulation by any species impacts the environment.	Moved to 8 th grade
				7.06	Investigate processes which, operating over long periods of time, have resulted in the diversity of plant and animal life present today: <ul style="list-style-type: none"> • Natural selection • Adaptation 	Moved to 8 th grade

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Life Science: Molecular Biology						

Goals 1 and 2 from 2004 SCOS are now embedded in the Standards.

Objective 6.04 not addressed

Objective 6.07, partially addressed in Essential Standard 6.P.3