

Connecticut State Department of Education

Core Science Curriculum Framework

MATRIX OF K-10 CONCEPT DEVELOPMENT

**SCIENCE INQUIRY & CONCEPTUAL THEMES IN
PHYSICAL, LIFE, EARTH SCIENCES
& SOCIETAL APPLICATIONS**

Approved: October 2004 (edited January 2005)

Progressive Development of Science Inquiry, Literacy & Numeracy Standards

preK-2	Grades 3-5	Grades 6-8	Grades 9-10
<p>I. SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas. 	<p>I. SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas. 	<p>I. SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. ◆ Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. ◆ Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. ◆ Scientific literacy includes also the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas. 	<p>I. SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. ◆ Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. ◆ Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. ◆ Scientific literacy includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

Overview of Science and Technology in Society Content Standards

Conceptual Theme	preK-K	1	2	3	4	5	6	7	8	9-10
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p>	<p>K.4 Some objects are natural, while others have been designed and made by people to improve the quality of life.</p>	<p>1.4 The properties of materials and organisms can be described more accurately through the use of standard measuring units.</p>	<p>2.4 Human beings, like all other living things, have special nutritional needs for survival.</p>	<p>3.4 Earth materials provide resources for all living things, but these resources are limited and should be conserved.</p>	<p>4.4 Electrical and magnetic energy can be transferred and transformed.</p>	<p>5.4 Humans have the capacity to build and use tools to advance the quality of their lives.</p>	<p>6.4 Water moving across and through earth materials carries with it the products of human activities.</p>	<p>7.4 Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.</p>	<p>8.4 In the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.</p>	<p>9.3 Various sources of energy are used by humans and all have advantages and disadvantages.</p> <p>9.6 Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.</p> <p>9.8 The use of resources by human populations may affect the quality of the environment.</p> <p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.</p> <p>10.2 Microorganisms have an essential role in life processes and cycles on Earth.</p> <p>10.3 Similarities in the chemical and structural properties of DNA in all living organisms allow the transfer of genes from one organism to another.</p> <p>10.6 Living organisms have the capability of producing populations of unlimited size, but the environment can support only a limited number of individuals from each species.</p>

Progressive Development of Conceptual Themes in Physical Science

Conceptual Themes	preK-K	1	2	3	4	5	6	7	8	9-10
II. Properties of Matter - <i>How does the structure of matter affect the properties and uses of materials?</i>	K.1 - Objects have properties that can be observed and used to describe similarities and differences.		2.1 Materials can be classified as solid, liquid or gas based on their observable properties.	3.1 Materials have properties that can be identified and described through the use of simple tests.			6.1 Materials can be classified as pure substances or mixtures, depending on their chemical and physical properties.			9.4 Atoms react with one another to form new molecules. 9.5 Due to its unique chemical structure, carbon forms many organic and inorganic compounds.
III. Energy Transfer and Transformations – <i>What is the role of energy in our world?</i>					4.4 Electrical and magnetic energy can be transferred and transformed.	5.1 Sound and light are forms of energy.		7.1 Energy provides the ability to do work and can exist in many forms.		9.1 Energy cannot be created or destroyed; however, energy can be converted from one form to another. 9.2 The electrical force is a universal force that exists between any two charged objects.
IV. Forces and Motion – <i>What makes objects move the way they do?</i>		1.1 The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons.			4.1 The position and motion of objects can be changed by pushing or pulling.				8.1 An object's inertia causes it to continue moving the way it is moving unless it is acted upon by a force to change its motion.	

Progressive Development of Conceptual Themes in Life Science

Conceptual Themes	preK-K	1	2	3	4	5	6	7	8	9-10
V. Matter and Energy in Ecosystems – <i>How do matter and energy flow through ecosystems?</i>					4.2 All organisms depend on the living and non-living features of the environment for survival.		6.2 An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.			
VI. Structure and Function – <i>How are organisms structured to ensure efficiency and survival?</i>		1.2 Living things have different structures and behaviors that allow them to meet their basic needs. 1.3 Organisms change in form and behavior as part of their life cycles.	2.2 Plants change their forms as part of their life cycles.			5.2 Perceiving and responding to information about the environment is critical to the survival of organisms.		7.2 Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.		10.1 The fundamental life processes depend on the physical structure and the chemical activities of the cell.
VII. Heredity and Evolution – <i>What are the processes responsible for life's unity and diversity?</i>	K.2 Many different kinds of living things inhabit the earth.			3.2 Organisms can survive and reproduce only in environments that meet their basic needs.					8.2 Reproduction is a characteristic of living systems and it is essential for the continuation of every species.	10.4. In sexually reproducing organisms, each offspring contains a mix of characteristics inherited from both parents. 10.5 Evolution and biodiversity are the result of genetic changes that occur over time in constantly changing environments.

Progressive Development of Conceptual Themes in Earth Science

Conceptual Themes	preK-K	1	2	3	4	5	6	7	8	9-10
<i>VIII. The Changing Earth - How do materials cycle through the Earth's systems?</i>			2.3 - Earth materials have varied physical properties which make them useful in different ways.	3.3 - Earth materials have different physical and chemical properties.						9.7 Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles.
<i>IX. Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems?</i>	K.3 - Weather conditions vary daily and seasonally.				4.3 Water has a major role in shaping the Earth's surface.		6.3 Variation in the amount of the sun's energy hitting the Earth's surface affects daily and seasonal weather patterns.	7.3 Landforms are the result of the interaction of constructive and destructive forces over time.		
<i>X. Earth in the Solar System – How does the position of Earth in the solar system affect the conditions on our planet?</i>						5.3 Most objects in the solar system are in a regular and predictable motion.			8.3 The solar system is composed of planets and other objects that orbit the sun.	