

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

**Overview of Science and Technology in Society Content Standards**

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

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

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

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