

# ENVIRONMENTAL LITERACY INFUSION IN SCIENCE & SOCIAL STUDIES CURRICULA

## Standard 3: Flow of Matter and Energy

The student will analyze and explain the movement of matter and energy through interactions of earth's systems (*biosphere, geosphere, hydrosphere, atmosphere, and cryosphere*) and the influence of this movement on weather patterns, climatic zones, and the distribution of life.

A. CONSERVATION OF MATTER WITHIN EARTH SYSTEMS				
Indicator 1. Demonstrate that matter cycles through and between living systems and the physical environment, constantly being recombined in different ways.				
PK-2	3-5	6-8	9-12	Supporting Curriculum
<ul style="list-style-type: none"> <li>Develop an awareness of the relationship of features of living things and their ability to satisfy basic needs that support their growth and survival. SCI 3(K)E1</li> <li>Describe some of the ways in which animals depend on plants and on each other. SCI 3(1)E1</li> <li>Provide evidence from investigations that things can be done to materials to change some of their properties. SCI 4(2)B1</li> </ul>	<ul style="list-style-type: none"> <li>Recognize that materials continue to exist even though they change from one form to another. SCI 3(3)E1</li> <li>Recognize food as the source of materials that all living things need to grow and survive. SCI 3(4)E1</li> <li>Recognize that some source of energy is needed for all organisms to grow and survive. SCI 3(5)E1</li> </ul>	<ul style="list-style-type: none"> <li>Explain that the transfer and transformation of matter and energy links organisms to one another and to their physical setting. SCI 3(7)E1</li> </ul>	<ul style="list-style-type: none"> <li>Describe how energy and matter transfer affect Earth systems. SCI 2.3.1</li> <li>Explain how global conditions are affected when natural and human-induced change alter the transfer of energy and matter. SCI 2.3.2</li> <li>Compare the transfer and use of matter and energy in photosynthetic and non-photosynthetic organisms. SCI 3.1.3</li> <li>Analyze the relationships between biotic diversity and abiotic factors in environments and the resulting influence on ecosystems. SCI 3.5.1</li> <li>Demonstrate that matter cycles through and between living systems and the physical environment constantly being recombined in different ways. SCI 6.1.1</li> </ul>	<p><b>English Language Arts</b>            RI.K.3,10            RI.1.3,10            RI.2.3,10            RI.3.3,7,10            RI.4-5.3,7,10            W.3-5.2,7            RST.6-8. 4,5,7,8,9,10            W.6-8.1,2,7,8,9            RST.6-8.4,5,7,8,9,10            W.6-8.1,2,7,8,9            RST.9-12. 4,5,7,8,9,10            W.9-12 1,2,7,8,9,10</p> <p><b>Mathematics</b>            SMP 1-8</p>

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<b>B. ENERGY DISTRIBUTION THROUGH EARTH SYSTEMS</b>				
<b>Indicator 1: Analyze how the position and movement of the Earth in space determine distribution of heat and light.</b>				
PK-2	3-5	6-8	9-12	Supporting Curriculum
<ul style="list-style-type: none"> <li>Identify ways that the sun affects the earth including that the sun warms the earth and provides light. SCI 2(1)D2a</li> </ul>	<ul style="list-style-type: none"> <li>Recognize and describe that each season has different weather conditions. SCI 2(4)E2</li> </ul>	<ul style="list-style-type: none"> <li>Recognize and describe that as Earth orbits the sun, the tilt of Earth's axis causes                             <ul style="list-style-type: none"> <li>Changes in the angle of the sun in the sky during the year</li> <li>Seasonal differences in the northern and southern latitudes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Explain the role of forces in the formation and operation of the universe. SCI 2.2.1</li> <li>Explain the role and interaction of revolution, rotation and gravity on the Sun-Earth-Moon system. SCI 2.2.2</li> </ul>	<b>English Language Arts</b> RI.K.3,8,9,10 RI.1.3,8,9,10 RI.2.1,3,8,9,10 RI.3.1,2,3,8,9,10 RI.4.1,2,3,5,7,8,9,10 RI.5.1,2,3,5,7,8,9,10 W.3.2,7 W.4.2,7,9 W.5.2,7,9 RST.6-8 1,5,6,7,8,9,10 W.6-8.1,2,7,8,9 RST.9-12. 4,5,7,8,9,10 W.9-12 1,2,7,8,9,10  <b>Mathematics</b> SMP 1-8
<b>Indicator 2. Explain that transfer of thermal energy between the atmosphere and the land or oceans produces temperature and density gradients in the atmosphere and the oceans.</b>				
PK-2	3-5	6-8	9-12	Supporting Curriculum
<ul style="list-style-type: none"> <li>Describe observable changes in water on the surface of the Earth. SCI 2(1)E1</li> </ul>	<ul style="list-style-type: none"> <li>Explain that the sun is the main source of energy that causes the changes in the water on Earth SCI 2(5)E1b</li> </ul>	<ul style="list-style-type: none"> <li>Cite evidence to explain the relationship between the hydrosphere and atmosphere. SCI 2(8)E1</li> </ul>	<ul style="list-style-type: none"> <li>Describe how energy and matter transfer affect Earth systems. SCI 2.3.1</li> <li>Explain how global conditions are affected when natural and human-induced change alter the transfer of energy and matter. SCI 2.3.2</li> <li>Analyze how the transfer of energy between atmosphere, land masses and oceans results in areas of different temperatures and densities that produce weather patterns and establish climate zones around the earth. SCI 6.1.2</li> </ul>	<b>English Language Arts</b> RI.K.3,10 RI.1.3,10 RI.2.3,10 RI.-53.3,7,10 RI.4.3,7,10 W.3.2,7 W.4.2,7,9 W.5.2,7,9 RST.6-8 4,5,7,8,9,10 W.6-8.1,2,7,8,9 RST.6-8.4,5,7,8,9,10 W.6-8.1,2,7,8,9 RST.9-12. 4,5,7,8,9,10 W.9-12 1,2,7,8,9,10  <b>Mathematics</b> SMP 1-8
<b>Indicator 3: Explain that transfer of thermal energy between the atmosphere and the land or oceans influences climate patterns.</b>				

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PK-2	3-5	6-8	9-12	Supporting Curriculum
<ul style="list-style-type: none"> <li>Describe that some events in nature have repeating patterns. SCI 2(1)E2</li> </ul>	<ul style="list-style-type: none"> <li>Recognize and describe that each season has different weather conditions. SCI 2(4)E2</li> </ul>	<ul style="list-style-type: none"> <li>Recognize and describe the various factors that affect climate. SCI 2(8)E2</li> <li>Recognize and explain how human activities can accelerate or magnify many naturally occurring changes. SCI 6(8)B1</li> </ul>	<ul style="list-style-type: none"> <li>Explain how global conditions are affected when natural and human-induced change alter the transfer of energy and matter. SCI 2.3.2</li> <li>Analyze how the transfer of energy between atmosphere, land masses and oceans results in areas of different temperatures and densities that produce weather patterns and establish climate zones around the earth. SCI 6.1.2</li> </ul>	<p><b>English Language Arts</b> RI.K-2.3,10 RI.3-5.3,7,10 W.3.2,7 W.4.2,7,9 W.5.2,7,9 RST.6-8. 4,5,7,8,9,10 W.6-8.1,2,7,8,9 RST.9-12. 4,5,7,8,9,10 W.9-12 1,2,7,8,9,10</p> <p><b>Mathematics</b> SMP 1-8</p>

### C. INTERACTION OF PHYSICAL SYSTEMS AND THE BIOSPHERE

#### Indicator 1. Analyze and explain the movement of matter and energy through earth's systems and the influence of this movement on the distribution of life.

PK-2	3-5	6-8	9-12	Supporting Curriculum
<ul style="list-style-type: none"> <li>Investigate a variety of familiar places where plants and animal live to describe the place and the living things found there. SCI 3(K)F1</li> <li>Explain that organisms can grow and survive in many very different habitats. SCI 3(2)F1</li> </ul>	<ul style="list-style-type: none"> <li>Explain ways that individuals and groups of organisms interact with each other and their environment. SCI 3(4)F1</li> </ul>	<ul style="list-style-type: none"> <li>Give reasons supporting the fact that the number of organisms an environment can support depends on the physical conditions and resources available. SCI 3(6)F1</li> </ul>	<ul style="list-style-type: none"> <li>Analyze the relationships between biotic diversity and abiotic factors in environments and the resulting influence on ecosystems. SCI 3.5.1</li> <li>Investigate how natural and man-made changes in environmental conditions will affect individual organisms and the dynamics of populations. SCI 3.5.3</li> <li>Illustrate how all organisms are part of and depend on two major global food webs that are positively or negatively influenced by human activity and technology. SCI 3.5.4</li> <li>Demonstrate that matter cycles through and between living systems and the physical environment constantly being recombined in different ways. SCI 6.1.1</li> <li>Analyze how the transfer of</li> </ul>	<p><b>English Language Arts</b> RI.K.3,8,9,10 RI.1.3,8,9,10 RI.2.1,3,8,9,10 RI.3.1,2,3,8,9,10 RI.4.1,2,3,5,7,8,9,10 RI.5.1,2,3,5,7,8,9,10 W.3.2,7 W.4.2,7,9 W.5.2,7,9 RST.6-8.4,5,7,8,9,10 W.6-8.1,2,7,8,9 RST.9-12 1,5,6,7,8,9,10 <i>RI.11-12.5</i> W.9-12.1,2,7,8,9</p> <p><b>Mathematics</b> SMP 1-8</p>

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			<p>energy between atmosphere, land masses and oceans results in areas of different temperatures and densities that produce weather patterns and establish climate zones around the earth.</p> <p>SCI 6.1.2</p> <ul style="list-style-type: none"> <li>• Explain why interrelationships &amp; interdependencies of organisms contribute to the dynamics of ecosystems.</li> </ul> <p>SCI 6.2.2</p>	
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Science: PK-8: 6(5)B2a-c = Standard,(Grade),Topic, Indicator, Objectives  
 CLG: 1.1.1 = Goal, Expectation, Indicator  
 Math: SMP3 = Standards for Mathematical Practice, Standard  
 3.NBT = Grade, Content Domain, Standard  
 CTE: GTT(3.1)2-3 = Course Lesson Concepts

Social Studies: 1(PK-2)A1a,b = Standard, (Grade), Topic, Indicator, Objectives  
 Health: 3(5)D1a-c = Standard, (Grade), Topic, Indicator ,Objectives  
 English Language Arts: W.1.8 = Strand. Grade. Standard  
 Fine Arts: PK-8: Standard, (Grade), Indicator, Objectives  
 HS: Subject, Outcome, Expectation, Indicator

# ENVIRONMENTAL LITERACY INFUSION IN SCIENCE & SOCIAL STUDIES CURRICULA

## KEYS

### English Language Arts

RST: Reading, Science & Technical Subjects

W: Writing

WHST: Writing in History, Science, & Technical Subjects

### CTE

GTT: Gateway To Technology, the middle school program

POE: Principles of Engineering, a foundation course in the high school engineering program

CEA: Civil Engineering and Architecture, a specialty course in the high school engineering program

MI: Medical Interventions, the third course in the biomedical sciences program

BI: Biomedical Innovation, the fourth and capstone course in the biomedical sciences program

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CLG: 1.1.1 = Goal, Expectation, Indicator

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CTE: GTT(3.1)2-3 = Course Lesson Concepts

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Social Studies: 1(PK-2)A1a,b = Standard, (Grade), Topic, Indicator, Objectives

Health: 3(5)D1a-c = Standard, (Grade), Topic, Indicator ,Objectives

English Language Arts: W.1.8 = Strand. Grade. Standard

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## Mathematics

### Standards for Mathematical Practices

- 1: Make sense of problems and persevere in solving them.
- 2: Reason abstractly and quantitatively.
- 3: Construct viable arguments and critique the reasoning of others.
- 4: Model with mathematics.
- 5: Use appropriate tools strategically.
- 6: Attend to precision.
- 7: Look for and make use of structure.
- 8: Look for and express regularity in repeated reasoning.

### Content Standards

- OA: Operations and Algebraic Thinking (K-5)
- NBT: Number and Operations in Base Ten (PK-5)
- MD: Measurement and Data (PK-5)
- G: Geometry (PK-8)
- CC: Counting and Cardinality (PK-K)
- NF: Number and Operations-Fractions (3-5)
- RP: Ratio and Proportional Relationships (6-7)
- NS: The Number System (6-8)
- EE: Expressions and Equations (6-8)
- SP: Statistics and Probability (6-8)
- F: Functions (8)

### High School

- N-RN: The Real Number System
- N-Q: Quantities
- N-CN: The Complex Number System
- N-VM: Vector and Matrix Quantities
- A-SSE: Seeing Structure in Expressions
- A-APR: Arithmetic with Polynomials and Rational Expressions
- A-CED: Creating Equations
- A-REI: Reasoning with Equations and Inequalities
- F-IF: Interpreting Functions
- F-BF: Building Functions
- F-LE: Linear, Quadratic and Exponential Models
- F-TF: Trigonometric Functions
- G-MG: Modeling with Geometry
- S-ID: Interpreting Categorical and Quantitative Data
- S-IC: Making Inferences and Justifying Conclusions

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