

## MARYLAND ENVIRONMENTAL LITERACY STANDARDS

### STANDARD 1 ENVIRONMENTAL ISSUES

The student will investigate and analyze environmental issues ranging from local to global perspectives and develop and implement a local action project that protects, sustains, or enhances the natural environment.

#### **Topic A: Environmental Issue Investigation**

Indicator 1: Identify an environmental issue.

Indicator 2: Develop and write research questions related to an environmental issue.

Indicator 3: Given a specific issue, communicate the issue, the stakeholders involved and the stakeholders' beliefs and values.

Indicator 4: Design and conduct the research.

Indicator 5: Use data and references to interpret findings to form conclusions.

#### **Topic B: Action Component**

Indicator 1: Use recommendation(s) to develop and implement an environmental action plan.

Indicator 2: Communicate, evaluate and justify personal views on environmental issue and alternate ways to address them.

Indicator 3: Analyze the effectiveness of the action plan in terms of achieving the desired outcomes.

### STANDARD 2 INTERACTIONS OF EARTH'S SYSTEMS

The student will analyze and apply the properties of systems thinking and modeling to the study of Earth's systems.

#### **Topic A: Earth Systems**

Indicator 1: The student will analyze and explain the interactions of earth's systems.

#### **Topic B: Systems Thinking**

Indicator 1: Analyze, explain and apply the properties of systems thinking to earth systems interactions.

Indicator 2: Use models and computer simulations to extend his/her understanding of scientific concepts.

### 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.

#### **Topic 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.

#### **Topic B: Energy Distribution through Earth Systems**

Indicator 1: Analyze how the position and movement of the Earth in space determine distribution of heat and light.

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.

Indicator 3: Explain that transfer of thermal energy between the atmosphere and the land or oceans influences climate patterns.

#### **Topic 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.

#### **STANDARD 4                    POPULATIONS, COMMUNITIES AND ECOSYSTEMS**

**The student will use physical, chemical, biological, and ecological concepts to analyze and explain the interdependence of humans and organisms in populations, communities and ecosystems.**

##### **Topic A: Cycling of Matter and Energy**

Indicator 1: Explain how organisms are linked by the transfer and transformation of matter and energy at the ecosystem level.

##### **Topic B: Population Dynamics**

Indicator 1: Analyze the growth or decline of populations and identify a variety of responsible factors.

##### **Topic C: Community and Ecosystem Dynamics**

Indicator 1: Explain how the interrelationships and interdependencies of organisms and populations contribute to the dynamics of communities and ecosystems.

##### **Topic D: Stability in Populations, Communities and Ecosystems**

Indicator 1: Use models and provide examples to show how the interaction and interdependence of populations contribute to the stability of populations, communities and ecosystems.

Indicator 2: Use models and provide examples to show how species' interactions may generate ecosystems that are stable for hundreds or thousands of years.

##### **Topic E: Diversity**

Indicator 1: Provide examples and evidence to show that a greater diversity of genes, species and/or environments increases the chance that at least some living things will survive in the face of large changes in the environment.

#### **STANDARD 5                    HUMANS AND NATURAL RESOURCES**

**The student will use concepts from chemistry, physics, biology, and ecology to analyze and interpret both positive and negative impacts of human activities on earth's natural systems and resources.**

##### **Topic A: Human Impact on Natural Processes**

Indicator 1: Analyze the effects of human activities on earth's natural processes.

Indicator 2: Analyze the effects of human activities that deliberately or inadvertently alter the equilibrium of natural processes.

##### **Topic B: Human Impact on Natural Resources**

Indicator 1: Analyze, from local to global levels, the relationship between human activities and the earth's resources.

#### **STANDARD 6                    ENVIRONMENT AND HEALTH**

**The student will use concepts from science, social studies and health to analyze and interpret both positive and negative impacts of natural events and human activities on human health.**

##### **Topic A: Natural Changes and Human Health**

Indicator 1: Identify and describe natural changes in the environment that may affect the health of human populations and individuals.

##### **Topic B: Human-Induced Changes and Human Health**

Indicator 1: Describe and explain that many changes in the environment designed by humans bring benefits to society as well as cause risks.

##### **Topic C: Hazards and Risk Analysis**

Indicator 1: Analyze and explain that human activities, products, processes, technologies and inventions can involve some level of risk to human health.

## **STANDARD 7                    ENVIRONMENT & SOCIETY**

**The student will analyze how the interactions of heredity, experience, learning and culture influence social decisions and social change.**

### **Topic A: Environmental Quality**

Indicator 1: Investigate factors that influence environmental quality.

### **Topic B: Individual and Group Actions and the Environment**

Indicator 1: Examine the influence of individual and group actions on the environment and explain how groups and individuals can work to promote and balance interests through:

### **Topic C: Cultural Perspectives and the Environment**

Indicator 1: Investigate cultural perspectives and dynamics and apply their understanding in context to:

### **Topic D: Political Systems and the Environment**

Indicator 1: Understand how different political systems account for, manage, and affect natural resources and environmental quality.

### **Topic E: Economics and Environment**

Indicator 1: Analyze and explain global economic and environmental connections.

### **Topic F: Technology and Environment**

Indicator 1: Investigate and examine the social and environmental impacts of various technologies and technological systems on the environment including how:

Indicator 2: Investigate a decision involving the implementation of a new technology and present an assessment of risks, costs and benefits, identification of those who suffer, those who pay, those who gain, what the risks are, and who bears them.

## **STANDARD 8                    SUSTAINABILITY**

**The student will make decisions that demonstrate understanding of natural communities and the ecological, economic, political, and social systems of human communities, and examine how their personal and collective actions affect the sustainability of these interrelated systems.**

### **Topic A: Intergenerational Responsibility**

Indicator 1: Understand and apply the basic concept of sustainability to natural and human communities.

### **Topic B: Interconnectedness of Systems**

Indicator 1: Recognize the concept of sustainability as a dynamic condition characterized by the interdependency among ecological, economic, and social systems and how these interconnected systems affect individual and societal well-being.

### **Topic C: Influence of Economic Systems on Sustainability**

Indicator 1: Investigate and make decisions that demonstrate understanding of how the dynamics of economic systems affect the sustainability of ecological and social systems.

### **Topic D: Influence of Social and Cultural Systems on Sustainability**

Indicator 1: Investigate and make decisions that demonstrate understanding of how the dynamics of social and cultural systems affect the sustainability of ecological and economic systems.

### **Topic E: Limits of Ecological Systems**

Indicator 1: Investigate and make decisions that demonstrate understanding of how the dynamics of ecological systems affect the sustainability of social, cultural systems and economic systems.

### **Topic F: Action Component**

Indicator 1: Apply knowledge and skills to investigate and implement personal and collective decisions and actions on an individual, local community, national, and global levels in order to achieve sustainability.