

**The MISSISSIPPI DEPARTMENT of ENVIRONMENTAL QUALITY
ENVIRONMENTAL & OUTREACH MOBILE CLASSROOM**

SCIENCE ALIGNMENT

The following subject matter has been determined to be provided verbally or visually in the performance of the Mobile Classroom K-2 “The River Town Story”, the Mobile Classroom 3 – 5 “All the Water in the World”, and the Water Quality Steward Youth Workshop and Teacher’s Workshop. This material has been included in the Water Quality Steward Study Guide (companion curriculum) or has been referenced enough to provoke classroom discussion for kindergarten through eighth grade students. Please find the above-mentioned resources and more at www.bayoutown.com by clicking onto the “Curriculum” or the “MDEQ Mobile Classroom” buttons in the navigation bar.

**MISSISSIPPI DEPARTMENT of EDUCATION
2018 MISSISSIPPI COLLEGE and CAREER-READINESS STANDARDS for SCIENCE**

This alignment is directly quoted from the MDE website.

https://www.mdek12.org/sites/default/files/documents/Secondary%20Ed/2018-ms_ccrs---sci_k-12_final_20171006.pdf

KINDERGARTEN: Life Science

L.K.3 Ecology and Interdependence

Conceptual Understanding: Interdependence exists between plants and animals within an environment. Living things can only survive in areas where their needs for air, water, food, and shelter are met.

L.K.3B Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.

L.K.3B.1 Observe and communicate that animals get food from plants or other animals. Plants make their own food and need light to live and grow.

L.K.3B.2 Create a model habitat which demonstrates interdependence of plants and animals using an engineering design process to define the problem, design, construct, evaluate, and improve the habitat.*

L.K.4 Adaptations and Diversity

Conceptual Understanding: When animals do not get what they need to survive, they will die. Some types of plants and animals are now extinct because they were unable to adapt when the environment changed. There are similarities between some present-day animals and extinct animals.

L.K.4 Students will demonstrate an understanding that some groups of plants and animals are no longer living (extinct) because they were unable to meet their needs for survival.

KINDERGARTEN: Earth and Space Science

E.K.10 Earth's Resources

Conceptual Understanding: Humans use Earth's resources for everything they do. Choices that humans make to live comfortably can affect the world around them. Recycling, reusing, and reducing consumption of natural resources is important in protecting our Earth's environment. Humans can make choices that reduce their impact on Earth's environment.

E.K.10 Students will demonstrate an understanding of how humans use Earth's resources.

E.K.10.1 Participate in a teacher-led activity to gather, organize and record recyclable materials data on a chart or table using technology. Communicate results.

E.K.10.2 With teacher guidance, develop questions to conduct a structured investigation to determine ways to conserve Earth's resources (i.e., reduce, reuse, and recycle) and communicate results.

GRADE ONE: Earth and Space Science

E.1.10 Earth's Resources

Conceptual Understanding: Water is essential to life on earth. Humans and other living things are dependent on clean water to survive. Water is an Earth material, and like all of Earth's resources, the amount of water is limited. Continued health and survival of humans are dependent on solutions that maintain clean water sources.

E.1.10 Students will demonstrate an understanding of human dependence on clean and renewable water resources.

E.1.10.1 Obtain and evaluate informational texts and other media to generate and answer questions about water sources and human uses of clean water.

E.1.10.2 Communicate solutions that will reduce the impact of humans on the use and quality of water in the local environment.

GRADE TWO: Life Science

L.2.3 Ecology and Interdependence

Conceptual Understanding: Animals thrive in environments where their needs (air, water, food, and shelter) are met. The environment where plants and animals live sometimes changes slowly and sometimes changes rapidly. If living things are unable to adapt to changes in the environment, they may not survive.

L.2.3A Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.

L.2.3A.1 Evaluate and communicate findings from informational text or other media to describe how animals change and respond to rapid or slow changes in their environment (fire, pollution, changes in tide, availability of food/water)

GRADE TWO: Physical Science

P.2.5 Organization of Matter and Chemical Interactions

Conceptual Understanding: Matter exists in different states, including solid, liquid, and gas forms. Solids have a definite shape, weight, and size (length). Liquids have a definite size (volume) but not a definite shape. A gas has neither definite shape nor size (volume). Changes to matter can result from changes in temperature. Some changes may or may not be reversible (i.e., melting or freezing versus burning a cake).

P.2.5 Students will demonstrate an understanding of the properties of matter.

P.2.5.1 Conduct a structured investigation to collect, represent, and analyze categorical data to classify matter as solid, liquid, or gas. Report findings and describe a variety of materials according to observable physical properties (e.g., size, color, texture, opacity, solubility).

GRADE TWO: Earth and Space Science

E.2.10 Earth's Resources

Conceptual Understanding: Earth is made of different materials, including rocks, sand, soil, and water. An Earth material is a resource that comes from Earth. Earth materials can be classified by their observable properties. Human life and health are heavily dependent on these materials. Understanding how to best conserve these resources will continue to be a major challenge for humans.

E.2.10 Students will demonstrate an understanding of how humans use Earth's resources.

E.2.10.4 Use informational text, other media, and first-hand observations to investigate and communicate the process and consequences of soil erosion.

E.2.10.5 With teacher guidance, investigate possible solutions to prevent or repair soil erosion.

GRADE THREE: Life Science

L.3.4 Adaptations and Diversity

Conceptual Understanding: When the environment or habitat changes, some plants and animals survive and reproduce, some move to new locations, and some die. Scientists can obtain historical information from fossils to provide evidence of both the organism and environments in which they lived.

L.3.4 Students will demonstrate an understanding of how adaptations allow animals to satisfy life needs and respond both physically and behaviorally to their environment.

L.3.4.1 Obtain data from informational text to explain how changes in habitats (both those that occur naturally and those caused by organisms) can be beneficial or harmful to the organisms that live there.

L.3.4.2 Ask questions to predict how natural or man-made changes in a habitat cause plants and animals to respond in different ways, including hibernating, migrating, responding to light, death, or extinction (e.g., sea turtles, the dodo bird, or nocturnal species).

L.3.4.4 Define and improve a solution to a problem created by environmental changes and any resulting impacts on the types of density and distribution of plant and animal populations living in the environment (e.g., replanting sea oats in coastal areas or developing or preserving wildlife corridors and green belts). Use an engineering design process to define the problem, design, construct, evaluate, and improve the environment.*

GRADE THREE: Physical Science

P.3.5 Organization of Matter and Chemical Interactions

Conceptual Understanding: Matter is made up of particles that are too small to be seen. Even though the particles are very small, the movement and spacing of these particles determine the basic properties of matter. Matter exists in several different states and is classified based on observable and measurable properties. Matter can be changed from one state to another when heat (i.e., thermal energy) is added or removed.

P.3.5 Students will demonstrate an understanding of the physical properties of matter to explain why matter can change states between a solid, liquid, or gas dependent upon the addition or removal of heat.

P.3.5.1 Plan and conduct scientific investigations to determine how changes in heat (i.e., an increase or decrease) change matter from one state to another (e.g., melting, freezing, condensing, boiling, or evaporating).

GRADE THREE: Earth and Space Science

E.3.9 Earth's Systems and Cycles

Conceptual Understanding: The Earth's land can be situated above or submerged below water. Water in the atmosphere changes states according to energy levels driven by the sun and its interactions with various Earth components, both living and non-living. The downhill movement of water as it flows to the ocean shapes the appearance of the land.

E.3.9 Students will demonstrate an understanding of how the Earth's systems (i.e., geosphere, hydrosphere, atmosphere, and biosphere) interact in multiple ways to affect Earth's surface materials and processes.

E.3.9.2 Construct explanations of how different landforms and surface features result from the location and movement of water on Earth's surface (e.g., watersheds, drainage basins, deltas, or rivers).

E.3.9.3 Use graphical representations to communicate the distribution of freshwater and saltwater on Earth (e.g., oceans, lakes, rivers, glaciers, groundwater, or polar ice caps)

GRADE THREE: Earth and Space Science

E.3.10 Earth's Resources

Conceptual Understanding: Earth is made of materials that provide resources for human activities, and their use affects the environment in multiple ways. Some resources are renewable and others are not.

E.3.10 Students will demonstrate an understanding that all materials, energy, and fuels that humans use are derived from natural sources.

E.3.10.1 Identify some of Earth's resources that are used in everyday life such as water, wind, soil, forests, oil, natural gas, and minerals and classify as renewable or nonrenewable. **E.3.10.2** Obtain and communicate information to exemplify how humans attain, use, and protect renewable and nonrenewable Earth resources.

E.3.10.3 Use maps and historical information to identify natural resources in the state connecting (a) how resources are used for human needs and (b) how the use of those resources impacts the environment.

E.3.10.4 Design a process for cleaning a polluted environment (e.g., simulating an oil spill in the ocean or a flood in a city and creating a solution for containment and/or cleanup). Use an engineering design process to define the problem, design, construct, evaluate, and improve the environment.*

GRADE FOUR: Life Science

L.4.1 Hierarchical Organization

Conceptual Understanding: All organisms need energy for growth and development. Animals have specialized structures and systems for obtaining and processing energy. These structures and systems cannot function properly without adequate nourishment. Living organisms can be adversely affected by environmental conditions or disease.

L.4.1 Students will demonstrate an understanding of the organization, functions, and interconnections of the major human body systems.

L.4.1.1 Use technology or other resources to research and discover general system function (e.g., machines, water cycle) as they relate to human organ systems and identify organs that work together to create organ systems.

GRADE FOUR: Earth and Space Science

E.4.9 Earth's Systems and Cycles

Conceptual Understanding: Earth's atmosphere is a mixture of gases, including water vapor and oxygen. Water, which is found almost everywhere on Earth, including the atmosphere, changes form and cycles between Earth's surface to the air and back again. This cycling of water is driven by energy from the sun. The movement of water in the water cycle is a major process that influences weather conditions. Clouds form during this cycle and various types of precipitation result.

E.4.9A Students will demonstrate an understanding of how the water cycle is propelled by the sun's energy.

E.4.9A.1 Develop and use models to explain how the sun's energy drives the water cycle. (e.g., evaporation, condensation, precipitation, transpiration, runoff, and groundwater).

Conceptual Understanding: Earth's oceans and landforms can be affected in various ways by natural processes in one or more of Earth's spheres (i.e., atmosphere, biosphere, geosphere, and hydrosphere). Humans cannot eliminate natural hazards caused by these processes but can take steps to reduce their impacts. Human activities can affect the land and oceans in positive and negative ways.

E.4.9C Students will demonstrate an understanding of how natural processes and human activities affect the features of Earth's landforms and oceans.

E.4.9C.1 Analyze and interpret data to describe and predict how natural processes (e.g., weathering, erosion, deposition, earthquakes, tsunamis, hurricanes, or storms) affect Earth's surface.

E.4.9C.3 Construct scientific arguments from evidence to support claims that human activities, such as conservation efforts or pollution, affect the land, oceans, and atmosphere of Earth.

GRADE FIVE: Life Science

L.5.3 Ecology and Interdependence

Conceptual Understanding: A major role an organism serves in an ecosystem can be described by the way in which it obtains its energy. Energy is transferred within an ecosystem by producers, consumers, or decomposers. A healthy ecosystem is one in which a diverse population of life forms can meet their needs in a relatively stable web of life.

L.5.3B Students will demonstrate an understanding of a healthy ecosystem with a stable web of life and the roles of living things within a food chain and/or food web, including producers, primary and secondary consumers, and decomposers.

L.5.3B.2 Develop and use a food chain model to classify organisms as producers, consumers, or decomposers. Trace the energy flow to explain how each group of organisms obtains energy.

L.5.3B.3 Design and interpret models of food webs to justify what effects the removal or the addition of a species (i.e., introduced or invasive) would have on a specific population and/or the ecosystem as a whole.

GRADE FIVE: Physical Science

P.5.6 Motions, Forces, and Energy

Conceptual Understanding: Gravity is a force that draws objects to Earth. This force acting on an object near Earth's surface pulls that object toward the planet's center. The motion of an object can be described in terms of its position, direction, and speed. Multiple factors determine the rate and motion of an object. Other than Earth, any celestial objects will exert varying gravitational pulls on other objects according to their mass and density.

P.5.6 Students will demonstrate an understanding of the factors that affect the motion of an object through a study of Newton's Laws of Motion.

P.5.6.1 Obtain and communicate information describing gravity's effect on an object.

P.5.6.2 Predict the future motion of various objects based on past observation and measurement of position, direction, and speed.

P.5.6.3 Develop and use models to explain how the amount or type of force, both contact and noncontact, affects the motion of an object.

GRADE FIVE: Earth and Space Science

E.5.10 Earth's Resources

Conceptual Understanding: Human activities can impact natural processes and availability of resources. To reduce impacts on the environment (including humans), various best practices can be used. New and improved conservation practices are constantly being developed and tested.

E.5.10 Students will demonstrate an understanding of the effects of human interaction with Earth and how Earth's natural resources can be protected and conserved.

E.5.10.1 Collect and organize scientific ideas that individuals and communities can use to conserve Earth's natural resources and systems (e.g., implementing watershed management practices to conserve water resources, utilizing no-till farming to improve soil fertility, reducing emissions to abate air pollution, or recycling to reduce landfill waste).

GRADE SIX: Life Science

L.6.3 Ecology and Interdependence

Conceptual Understanding: All organisms depend on biotic and abiotic factors for survival. When any environmental factor changes, a corresponding change in diversity and population of organisms will also occur. The environment and the organism in which it lives are therefore interdependent.

L.6.3 Students will demonstrate an understanding of the relationships among survival, environmental changes, and diversity as they relate to the interactions of organisms, populations, and the environment.

L.6.3.1 Use scientific reasoning to explain differences between biotic and abiotic factors that demonstrate what living organisms need to survive.

L.6.3.3 Analyze cause and effect relationships to explore how changes in the physical environment (limiting factors, natural disasters) can lead to population changes within an ecosystem.

GRADE SEVEN: Life Science

L.7.3 Ecology and Interdependence

Conceptual Understanding: The emphasis is on predicting consistent patterns of interactions among different cycling systems in terms of the relationships between organisms and abiotic components within ecosystems. Preservation of biodiversity and consideration of human impacts are themes in maintaining ecosystem services.

L.7.3 Students will demonstrate an understanding of the importance that matter cycles between living and nonliving parts of the ecosystem to sustain life on Earth.

L.7.3.1 Analyze diagrams to provide evidence of the importance of the cycling of water, oxygen, carbon, and nitrogen through ecosystems to organisms.

GRADE SEVEN: Physical Science

P.7.5 Organization of Matter and Chemical Interactions

Conceptual Understanding: Matter and its interactions can be distinguished by investigating physical properties (e.g., mass, density, solubility) using chemical processes and experimentation. Changes to substances can either be physical or chemical.

P.7.5B Students will demonstrate an understanding about the effects of temperature and pressure on physical state, molecular motion, and molecular interactions.

P.7.5B.3 Ask questions to explain how density of matter (observable in various objects) is affected by a change in heat and/or pressure.

P.7.5C.3 Collect, organize, and interpret data from investigations to identify and analyze the relationships between the physical and chemical properties of elements, atoms, molecules, compounds, solutions, and mixtures.

P.7.5C.6 Using the periodic table, make predictions to explain how bonds (ionic and covalent) form between groups of elements (e.g., oxygen gas, ozone, water, table salt, and methane).

GRADE SEVEN: Earth and Space Science

E.7.9 Earth's Systems and Cycles

Conceptual Understanding: Complex patterns in the movement of air and water in the atmosphere are major determinants of local weather. Global movements of water and its changes in form are propelled by sunlight and gravity. Variations in temperature drive a global pattern of interconnected currents. Interactions between sunlight, oceans, atmosphere, ice, landforms, and living things vary with latitude, altitude, and local and regional geography. Weather is difficult to predict; however, large scale patterns and trends in global climate, such as the gradual increase in average temperature, are more easily observed and predicted.

E.7.9A Students will demonstrate an understanding of how complex changes in the movement and patterns of air and water molecules caused by the sun, winds, landforms, ocean temperatures, and currents in the atmosphere are major determinants of local and global weather patterns.

E.7.9A.2 Analyze evidence to explain the weather conditions that result from the relationship between the movement of water and air masses.

E.7.9A.5 Analyze models to explain the cause and effect relationship between solar energy and convection and the resulting weather patterns and climate conditions.

E.7.9B Students will demonstrate an understanding of the relationship between natural phenomena, human activity, and global climate change.

GRADE EIGHT: Earth and Space Science

E.8.9 Earth's Systems and Cycles

Conceptual Understanding: Earth systems and cycles are characterized by cause and effect relationships. All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. Landforms and water distribution result from constructive and destructive processes. Physical and chemical interactions among rocks, sediments, water, air, and organisms produce soil. Water's movements—both on the land and underground—cause weathering and erosion. Plate tectonics is the unifying theory that explains the past and current crustal movements at the surface. This theory provides a framework for understanding geological history. Mapping land and water patterns based on investigations of rocks and fossils can help forecast the proximity and probability of future events.

E.8.9A Students will demonstrate an understanding that physical processes and major geological events (e.g., plate movement, volcanic activity, mountain building, weathering, erosion) are powered by the Sun and the Earth's internal heat and have occurred over millions of years.

E.8.9A.7 Explain the interconnected relationship between surface water and groundwater. **Conceptual Understanding:** Natural processes can cause sudden or gradual changes to Earth's systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events.

GRADE EIGHT: Earth and Space Science

E.8.10 Earth's Resources

Conceptual Understanding: Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources, both renewable and nonrenewable. Human activities have significantly altered the biosphere, sometimes damaging, or destroying natural habitats that could cause extinction or the threat of extinction of many species. Past and present geological events have distributed resources unevenly around the planet; therefore, there has been an increase in, and continued need for, technology to harness available resources and develop alternatives.

E.8.10.1 Read and evaluate scientific information about advancements in renewable and nonrenewable resources. Propose and defend ways to decrease national and global dependency on nonrenewable resources.

E.8.10.2 Create and defend a proposal for reducing the environmental effects humans have on Earth (e.g., population increases, consumer demands, chemical pollution, deforestation, and change in average annual temperature).