

## SCIENCE – UNIFYING STANDARDS

THE NATURE OF SCIENCE

- 1.0 **Research and Investigation:** Students understand that science is a way of learning about the natural world. They use scientific inquiry and develop ideas based on data collected from investigations they design.
- 2.0 **Communication:** Students understand that the universe can be described by principles derived through scientific inquiry. They effectively communicate their understanding of ideas developed in scientific investigation through a variety of media.
- 3.0 **Connections and Implications:** Students review the consequences of the process and products of scientific inquiry. They understand the role that scientific advances have had throughout history.

EARTH SCIENCE

- 1.0 **Characteristics of the Universe:** Students understand Earth-based and space-based astronomy reveals the structure, scale, and dynamic nature of the solar system, stars, galaxies, and the universe.
- 2.0 **The Dynamic Earth:** Students understand that the Earth is constantly changing and being shaped due to a variety of natural events, processes, and human activity. The Earth is a collection of interacting cycles, structures, and processes that can be described in terms of space, time, energy, and matter.

LIFE SCIENCE

- 1.0 **Diversity and Interdependence:** Students understand that living things are diverse and interdependent. They recognize the relationship between cooperation and competition among organisms in ecosystems.
- 2.0 **Cellular Structures and Functions:** Students understand that cells are the basic structures of all living systems. They understand the complementary relationship between the structure and function of cells, organs, organ systems, whole organisms, and ecosystems.
- 3.0 **Change and Evolution:** Students understand that living things grow, develop, change, and evolve through time, depending on environmental influences. They know that traits of species can change through generations and that instruction of traits is contained in the genetic material of organisms.

PHYSICAL SCIENCE

- 1.0 **Forces and Motion:** Students understand the nature of forces and the relationship between forces and motion. They recognize that the relationship is described by one set of laws. They understand that all matter is in motion and that motion changes as a result of forces between matter. They realize that these forces affect everyday life, and that the effects can be identified, measured, and predicted.
- 2.0 **Energy, Momentum and Transformation:** Students understand that when matter interacts with matter, energy and momentum can be transferred or distributed, and that energy may be transformed. When matter interacts the total amount of matter, energy, and momentum remain the same.
- 3.0 **Structure and Properties of Matter:** Students understand that all matter is made up of particles. They understand the relationship between the structure and properties of matter. They know that a finite number of basic elements combine in various ways which determine all properties, characteristics, and behaviors of matter.

## THE NATURE OF SCIENCE Level 2

**1.0 Research and Investigation:** Students understand that science is a way of learning about the natural world. They use scientific inquiry based on data collected from investigations they design.

### Focus Goals

1.1 Make predictions based on patterns of observation rather than on random guessing.

**2.0 Communication:** Students understand that the universe can be described by principles derived through scientific inquiry. They effectively communicate their understanding of ideas developed in scientific investigation through a variety of media.

### Focus Goals

2.1 Use data to explain the results of an investigation.

2.2 Write or draw descriptions of a sequence of steps, events, and observations.

**3.0 Connections and Implications:** Students review the consequences of the process and products of scientific inquiry. They understand the role that scientific advances have had throughout history.

### Focus Goals

1.1 Consider how science impacts everyday life.

1.2 Apply Literacy skills to make scientific connections.

## THE NATURE OF SCIENCE

### Level 2

**1.0 Research and Investigation:** Students understand that science is a way of learning about the natural world. They use scientific inquiry based on data collected from investigations they design.

- 1.1 Make predictions based on patterns of observation rather than on random guessing.**  
 θ Compare and sort common objects based on two or more physical attributes, including color, shape, texture, size and weight. (c4c)  
 θ Use magnifiers or microscopes for observations. (c4f)

**2.0 Communication:** Students understand that the universe can be described by principles derived through scientific inquiry. They effectively communicate their understanding of ideas developed in scientific investigation through a variety of media.

- 2.1 Use data to explain the results of an investigation.**  
 θ Measure weight, temperature, and liquid volume with appropriate tools using standard and non-standard units. (c46)
- 2.2 Write or draw descriptions of a sequence of steps, events and observations.**  
 θ Construct bar graphs to report data using appropriate labeled axes. (c4e)  
 θ Follow verbal instructions. (c4g)

**3.0 Connections and Implications:** Students review the consequences of the process and products of scientific inquiry. They understand the role that scientific advances have had throughout history.

- 3.1 Consider how science impacts daily life.** (p)  
 θ Identify examples of science in daily life at home, school, and in the community.
- 3.2 Apply Literacy skills to make scientific connections.** (p-Literacy Standards)  
 θ Learn science vocabulary encountered through reading. (R-1.0)  
 θ Read, view, and interpret informational science material. (R-2.0)  
 θ Use technology and reference sources to locate and interpret information on science topics. (W-3.0)  
 θ Write descriptions, narratives and/or notes based on scientific knowledge. (W-2.0)  
 θ Deliver an informative presentation on a scientific topic. (L/S-2.0)

**EARTH SCIENCE**  
**Level 2**

**1.0 Characteristics of the Universe:** Students understand Earth-based and space-based astronomy reveals the structure, scale, and dynamic nature of the solar system, stars, galaxies, and the universe.

Focus Goals

1.0 Not addressed at this level.

**2.0 The Dynamic Earth:** Students understand that the Earth is constantly changing and being shaped due to a variety of natural events, processes, and human activity. The Earth is a collection of interacting cycles, structures, and processes that can be described in terms of space, time, energy, and matter.

Focus Goals

2.1 Understand that changes over time affect the Earth.

2.2 Understand that the materials of the Earth have distinct properties and provide human resources.

## EARTH SCIENCE Level 2

**1.0 Characteristics of the Universe:** Students understand Earth-based and space-based astronomy reveals the structure, scale, and dynamic nature of the solar system, stars, galaxies, and the universe.

**1.0 Not addressed at this level.**

**2.0 The Dynamic Earth:** Students understand that the Earth is constantly changing and being shaped due to a variety of natural events, processes, and human activity. The Earth is a collection of interacting cycles, structures, and processes that can be described in terms of space, time, energy and matter.

**2.1 Understand that changes over time affect the Earth.**

θ Describe how scientists learn about the history of Earth by studying fossils of plants and animals that lived long ago. (c3d)

θ Explain how smaller rocks come from the breakage and weathering of larger rocks over time. (c3b)

θ Know that soil comes from rock and organic materials that have weathered over time. (c3c)

**2.2 Understand that the materials of the Earth have distinct properties and provide human resources.**

θ Recognize that rocks are composed of different combinations of minerals. (c3a)

θ Compare the physical properties of different kinds of rocks. (c3a)

θ Describe how soils differ in their color, texture, and ability to retain water and to support plant growth. (c3c)

θ Explain how the materials of the Earth (rock, water, plants, and soil) provide human resources such as food, fuel, and building materials. (c3c)

**LIFE SCIENCE**  
**Level 2**

**4.0 Diversity and Interdependence:** Students understand that living things are diverse and interdependent. They recognize the relationship between cooperation and competition among organisms in ecosystems.

Focus Goals

1.1 Understand that plants and animals depend on each other for survival.

**5.0 Cellular Structures and Functions:** Students understand that cells are the basic structures of all living systems. They understand the complimentary relationship between the structure and function of cells, organs, organ systems, whole organisms, and ecosystems.

Focus Goals

2.1 Understand that plants and animals have specific structures used for reproduction.

**3.0 Change and Evolution:** Students understand that living things grow, develop, change, and evolve through time, depending on environmental influences. They know that traits of species can change through generations and that instruction of traits is contained in the genetic material of organisms.

Focus Goals

3.1 Understand that plants and animals have predictable life cycles.

**LIFE SCIENCE**  
**Level 2**

**1.0 Diversity and Interdependence:** Students understand that living things are diverse and interdependent. They recognize the relationship between cooperation and competition among organisms in ecosystems.

**1.1 Understand that plants and animals depend on each other for survival.**

- θ Know that many plants and animals depend on each other for pollination, seed dispersal, food, and shelter. (\*)
- θ Understand that interdependency between plants and animals can be associated with reproduction. (c2f)

**2.0 Cellular Structures and Functions:** Students understand that cells are the basic structures of all living systems. They understand the complimentary relationship between the structure and function of cells, organs, organ systems, whole organisms, and ecosystems.

**2.1 Understand that plants and animals have specific structures used for reproduction.**

- θ Know that the flowers and fruits of plants are associated with reproduction. (c2f)

**3.0 Change and Evolution:** Students understand that living things grow, develop, change, and evolve through time, depending on environmental influences. They know that traits of species can change through generations and that instruction of traits is contained in the genetic material of organisms.

**3.1 Understand that plants and animals have predictable life cycles.**

- θ Describe the life stage for different animals (e.g., butterflies, frogs, and mice). (c2b)
- θ Identify variations among individual plants or animals within a population. (c2d)
- θ Explain how germination, growth and development of plants can be affected by light, gravity, touch or environmental stress. (c2e)
- θ Recognize that plants and animals reproduce offspring of their own kind, and with similar characteristics. (c2a)

**PHYSICAL SCIENCE**  
**Level 2**

**1.0 Forces and Motion:** Students understand the nature of forces and the relationship between forces and motion. They recognize that the relationship is described by one set of laws. They understand that all matter is in motion and that motion changes as a result of forces between matter. They realize that these forces affect everyday life, and that the effects can be identified, measured, and predicted.

Focus Goals

1.0 Understand and demonstrate how forces act upon matter to cause motion or change.

**2.0 Energy, Momentum and Transformation:** Students understand that when matter interacts with matter, energy, and momentum can be transferred distributed, and that energy may be transformed. When matter interacts the total amount of matter, energy, and momentum remain the same.

Focus Goals

2.1 Understand that sound is a form of energy.

**3.0 Structure and Properties of Matter:** Students understand that all matter is made up of particles. They understand the relationship between the structure and properties of matter. They know that a finite number of basic elements combine in various ways which determine properties, characteristics, and behaviors of matter.

Focus Goals

3.0 Not addressed at this level.

**PHYSICAL SCIENCE**  
**Level 2**

**2.0 Forces and Motion:** Students understand the nature of forces and the relationship between forces and motion. They recognize that the relationship is described by one set of laws. They understand that all matter is in motion and that motion changes as a result of forces between matter. They realize that these forces affect everyday life, and that the effects can be identified, measured, and predicted.

**1.1 Understand and demonstrate how forces act upon matter to cause motion or change.**

- θ Understand motion is the change in position of an object. (c1a)
- θ Explain that motion can be observed, measured, and recorded over time. (c1b)
- θ Demonstrate how a push or pull can change the movement of an object.
- θ Demonstrate that the amount of change is related to the force of the pull or push. (c1c)
- θ Identify tools and machines that can be used to apply force. (c1d)
- θ Explain that due to the force of gravity, objects near Earth fall to the ground unless something holds them up. (c1e)
- θ Demonstrate how magnets have a force that can move some objects without touching them. (c1f)

**3.0 Energy, Momentum and Transformation:** Students understand that when matter interacts with matter, energy, and momentum can be transferred or distributed, and that energy may be transformed. When matter interacts, the total amount of matter, energy, and momentum remain the same.

**2.1 Understand that sound is a form of energy.**

- θ Demonstrate that sound is made by vibrating objects. (c1g)
- θ Explain how sound can be described by pitch and volume. (c1g)

**4.0 Structure and Properties of Matter:** Students understand that all matter is made up of particles. They understand the relationship between the structure and properties of matter. They know that a finite number of basic elements combine in various ways which determine properties, characteristics, and behaviors of matter.

**3.0 Not addressed at this level.**