

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 3

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.

Focus Goals

1.1 Understand and use the scientific process to ask meaningful questions and conduct careful investigations.

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 Communicate hypotheses, results, and conclusions of scientific investigations.

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

3.1 Understand how people contribute to science in ways that impact future resources.
3.2 Apply Literacy skills to make scientific connections.

THE NATURE OF SCIENCE

Level 3

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.

1.1 Understand and use the scientific process to ask meaningful questions and conduct careful investigations.

- θ Follow a set of written instructions for a scientific investigation. (*)
- θ Repeat observations to improve accuracy. (c5a)
- θ Know that the results of similar investigations may differ because of differences in the things being investigated, methods used, or uncertainty in the observation. (c5a)
- θ Differentiate evidence from opinion, and know that scientists only rely on claims or conclusions backed by observations that can be confirmed. (c5b)
- θ Predict the outcome of a simple investigation, and compare the result to the prediction. (c5d)

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 Communicate hypotheses, results, and conclusions of scientific investigations.

- θ Formulate and justify predictions based on cause and effect relationships. (*)
- θ Collect and analyze data in an investigation to develop a logical conclusion. (c5e)
- θ Use numerical data in describing and comparing objects, events, and measurements. (c5c)

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 Understand how people contribute to science in ways that impact future resources.

- θ Predict effects of human interaction with the environment. (n)
- θ Develop plans for conserving resources and recycling basic materials. (n)
- θ Identify examples of the impact and consequences of changes in the environment. (n)

3.2 Apply Literacy skills to make scientific connections. (p-Literacy Standards)

- θ Read, view, interpret, and use scientific information. (R-2.0)
- θ Learn science vocabulary encountered through reading and discussions. (R-1.0)
- θ Use technology and reference sources to locate and interpret information on science topics. (W-3.0)
- θ Write narratives and/or notes based on scientific topics. (W-2.0)
- θ Deliver a narrative, description, and/or informative presentation on a science topic. (L/S-3.0)

EARTH SCIENCE
Level 3

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

- 1.1 Understand that celestial bodies move in regular and predictable patterns.
- 1.2 Recognize that the solar system consists of planets and other bodies that orbit the sun.

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.

- 2.0 Not addressed at this level.

EARTH SCIENCE
Level 3

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.

1.1 Understand that celestial bodies move in regular and predictable patterns.

θ Describe how the appearance of the moon changes during the four-week lunar cycle and that the moon orbits the earth. (c4b)

θ Explain how the position of the sun changes during the course of the day and from season to season. (c4e)

θ Know that the apparent star movement is actually consistent and predictable. (c4a)

θ Explain how telescopes magnify the appearance of celestial bodies, including stars. (c4c)

1.2 Recognize that the solar system consists of planets and other bodies that orbit the sun.

θ Describe basic features and relationships of planets, the moon, and the sun. (c4d/p)

θ Describe characteristics of the sun; average star, largest body in the solar system, made of helium and hydrogen. (c5a)

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.

2.0 Not addressed at this level.

LIFE SCIENCE
Level 3

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

Focus Goals

1.1 Understand and explain the diversity of living things.

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.

Focus Goals

2.1 Understand that the structures of organisms serve a variety of functions.

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 physical or behavioral adaptations may improve an organism's chance for survival.

LIFE SCIENCE
Level 3

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

1.1 Understand and explain the diversity of living things.

θ Know that diverse life forms live in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands. (c3b/n)

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 the structures of organisms serve a variety of functions.

θ Know that plants and animals have structures that serve different functions in growth, survival, and reproduction. (c3a/n)

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 physical or behavioral adaptations may improve an organism's chance for survival.

θ Understand that when the environment changes, some plants and animals survive and reproduce, and others die or move to new locations. (c3d/n)

θ Understand that living things cause harmful and beneficial changes in their environment. (c3c/n)

θ Know that some organisms that once lived on Earth have disappeared, but a resemblance can be observed in others that are alive today. (c3e)

PHYSICAL SCIENCE
Level 3

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 Not addressed at this level.

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.

Focus Goals

2.1 Understand that different forms of energy can change.

2.2 Understand that light 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 all properties, characteristics, and behaviors of matter.

Focus Goals

3.1 Understand that different forms of matter can change.

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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.

2.1 Understand that different forms of energy can change.

θ Know that energy comes from the sun to the earth in the form of light. (c1a)

θ Recognize that sources of stored energy take many forms, such as food, fuel, and batteries. (c1b)

θ Identify ways that energy is converted to motion and heat. (c1c)

θ Describe how energy can be carried from one place to another by waves (such as water and sound), by electrical current, and by moving objects. (c1d)

2.2 Understand that light is a form of energy.

θ Describe various characteristics of light. (c1a/n)

θ Explain that light has a source and travels in a direction. (p)

θ Explain how light can be reflected or refracted. (c2/2b/n)

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.

3.1 Understand that different forms of matter can change.

θ Understand that matter has three forms: solid, liquid and gas. (c1e/n)

θ Understand that all matter is made of small particles called atoms, which are too small to see with our eyes. (c1h)

θ Demonstrate that when two or more substances are combined, a new substance may be formed that can have properties that are different from those of the original materials. (c1g)

θ Demonstrate how evaporation and melting occur when objects are heated. (cli)

θ Understand that science experiments show that there are different types of elements, which are displayed on the Periodic Table of elements. (c1j)