

Grade 4 : Embedded Inquiry

Conceptual Strand

Understandings about scientific inquiry and the ability to conduct inquiry are essential for living in the 21st century.

Guiding Question

What tools, skills, knowledge, and dispositions are needed to conduct scientific inquiry?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.Inq.1 Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data.</p> <p>GLE 0407.Inq.2 Select and use appropriate tools and simple equipment to conduct an investigation.</p> <p>GLE 0407.Inq.3 Organize data into appropriate tables, graphs, drawings, or diagrams.</p> <p>GLE 0407.Inq.4 Identify and interpret simple patterns of evidence to communicate the findings of multiple investigations.</p> <p>GLE 0407.Inq.5 Recognize that people may interpret the same results in different ways.</p> <p>GLE 0407.Inq.6 Compare the results of an</p>	<p>✓0407.Inq.1 Identify specific investigations that could be used to answer a particular question and identify reasons for this choice.</p> <p>✓0407.Inq.2 Identify tools needed to investigate specific questions.</p> <p>✓0407.Inq.3 Maintain a science notebook that includes observations, data, diagrams, and explanations.</p> <p>✓0407.Inq.4 Analyze and communicate findings from multiple investigations of similar phenomena to reach a conclusion.</p>	<p>SPI 0407.Inq.1 Select an investigation that could be used to answer a specific question.</p>

investigation with what scientists already accept about this question.		
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Grade 4 : Embedded Technology & Engineering

Conceptual Strand

Society benefits when engineers apply scientific discoveries to design materials and processes that develop into enabling technologies.

Guiding Question

How do science concepts, engineering skills, and applications of technology improve the quality of life?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.T/E.1 Describe how tools, technology, and inventions help to answer questions and solve problems.</p> <p>GLE 0407.T/E.2 Recognize that new tools, technology, and inventions are always being developed.</p> <p>GLE 0407.T/E.3 Identify appropriate materials, tools, and machines that can extend or enhance the ability to solve a specified problem.</p> <p>GLE 0407.T/E.4 Recognize the connection between scientific advances, new knowledge, and the availability of new tools and technologies.</p>	<p>✓0407.T/E.1 Explain how different inventions and technologies impact people and other living organisms.</p> <p>✓0407.T/E.2 Design a tool or a process that addresses an identified problem caused by human activity.</p> <p>✓0407.T/E.3 Determine criteria to evaluate the effectiveness of a solution to a specified problem.</p> <p>✓0407.T/E.4 Evaluate an invention that solves a problem and determine ways to improve the design.</p>	<p>SPI 0407.T/E.1 Select a tool, technology, or invention that was used to solve a human problem.</p> <p>SPI 0407.T/E.2 Recognize the connection between a scientific advance and the development of a new tool or technology.</p>

<p>GLE 0407.T/E.5 Apply a creative design strategy to solve a particular problem generated by societal needs and wants.</p>		
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Grade 4 - Life Science

Grade 4 : Standard 1 - Cells

Conceptual Strand 1

All living things are made of cells that perform functions necessary for life.

Guiding Question 1

How are plant and animals cells organized to carry on the processes of life?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.1.1 Recognize that cells are the building blocks of all living things.</p>	<p>✓0407.1.1 Use illustrations or direct observations to compare and contrast the basic structures of plant and animal cells.</p> <p>✓0407.1.2 Create a basic model of the cell that illustrates different cell structures and describes their functions.</p>	<p>SPI 0407.1.1 Compare basic structures of plant and animal cells.</p>

Grade 4 : Standard 2 - Interdependence

Conceptual Strand 2

All life is interdependent and interacts with the environment.

Guiding Question 2

How do living things interact with one another and with the non-living elements of their environment?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
GLE 0407.2.1 Analyze the effects of changes in the environment on the stability of an ecosystem.	✓0407.2.1 Analyze how an increase or decrease in competition or predation affects an ecosystem. ✓0407.2.2 Design a simple experiment to illustrate the effects of competition, predation, and interdependency among living things.	SPI 0407.2.1 Recognize the impact of predation and competition on an ecosystem.

Grade 4 : Standard 3 - Flow of Matter and Energy

Conceptual Strand 3

Matter and energy flow through the biosphere.

Guiding Question 3

What scientific information explains how matter and energy flow through the biosphere?

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Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.3.1 Demonstrate that plants require light energy to grow and survive.</p> <p>GLE 0407.3.2 Investigate different ways that organisms meet their energy needs.</p>	<p>✓0407.3.1 Create a food web that illustrates the energy relationships between plants and animals and the key issues or assumptions found in the model.</p> <p>✓0407.3.2 Classify organisms as carnivores, herbivores, or omnivores.</p> <p>✓0407.3.3 Identify how a variety of organisms meet their energy needs.</p>	<p>SPI 0407.3.1 Determine how different organisms function within an environment in terms of their location on an energy pyramid.</p>

Grade 4 : Standard 4 - Heredity

Conceptual Strand 4

Plants and animals reproduce and transmit hereditary information between generations.

Guiding Question 4

What are the principal mechanisms by which living things reproduce and transmit information between parents and offspring?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.4.1 Recognize the relationship between reproduction and the continuation of a species.</p> <p>GLE 0407.4.2 Differentiate between complete</p>	<p>✓0407.4.1 Design a simple demonstration that illustrates the relationship between reproduction and survival of a species.</p> <p>✓0407.4.2 Study the life cycles of a variety of</p>	<p>SPI 0407.4.1 Draw conclusions about the relationship between reproduction and the survival of a species.</p> <p>SPI 0407.4.2 Distinguish between complete</p>

and incomplete metamorphosis.	organisms and determine whether these processes illustrate complete or incomplete metamorphosis.	and incomplete metamorphosis.
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Grade 4 : Standard 5 - Biodiversity and Change

Conceptual Strand 5

A rich variety of complex organisms have developed in response to a continually changing environment.

Guiding Question 5

How does natural selection explain how organisms have changed over time?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.5.1 Analyze physical and behavioral adaptations that enable organisms to survive in their environment.</p> <p>GLE 0407.5.2 Describe how environmental changes caused the extinction of various plant and animal species.</p>	<p>✓0407.5.1 Classify animals according to their physical adaptations for obtaining food, oxygen, and surviving within a particular environment.</p> <p>✓0407.5.2 Describe how animal behaviors such as migration, defense, means of locomotion, and hibernation enable them to survive in an environment.</p> <p>✓0407.5.3 Investigate tropisms that plants exhibit in response to changes in their environment.</p>	<p>SPI 0407.5.1 Determine how a physical or behavioral adaptation can enhance the chances of survival.</p> <p>SPI 0407.5.2 Infer the possible reasons why a species became endangered or extinct.</p>

	<p>✓0407.5.4 Gather fossil information to draw conclusions about organisms that exist today.</p> <p>✓0407.5.5 Analyze the common causes of extinction and explain how human actions sometimes result in the extinction of a species.</p>	
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Grade 4 - Earth and Space Science

Grade 4 : Standard 6 - The Universe

Conceptual Strand 6
The cosmos is vast and explored well enough to know its basic structure and operational principles.

Guiding Question 6
What big ideas guide human understanding about the origin and structure of the universe, Earth’s place in the cosmos, and observable motions and patterns in the sky?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.6.1 Analyze patterns, relative movements, and relationships among the sun, moon, and earth.</p>	<p>✓0407.6.1 Chart the movements of the sun, moon, and earth to develop an explanation for the phases of the moon and solar and lunar eclipses.</p>	<p>SPI 0407.6.1 Organize the phases of the moon in the correct sequence.</p> <p>SPI 0407.6.2 Infer that the moon’s phases are caused by the revolution of the moon and</p>

	✓0407.6.2 Sequence the major phases of the moon during a lunar cycle.	earth around the sun.
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Grade 4 : Standard 7 – The Earth

Conceptual Strand 7

Major geologic events that occur over eons or brief moments in time continually shape and reshape the surface of the Earth, resulting in continuous global change.

Guiding Question 7

How is the earth affected by long-term and short term geological cycles and the influence of man?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.7.1 Investigate how the Earth’s geological features change as a result of erosion (weathering and transportation) and deposition.</p> <p>GLE 0407.7.2 Evaluate how some earth materials can be used to solve human problems and enhance the quality of life.</p>	<p>✓0407.7.1 Prepare a demonstration to illustrate how wind and water affect the earth’s surface features.</p> <p>✓0407.7.2 Design an investigation to demonstrate how erosion and deposition change the earth’s surface.</p> <p>✓0407.7.3 List factors that determine the appropriate use of an earth material.</p> <p>✓0407.7.4 Use data from a variety of informational texts to analyze and evaluate man’s impact on non-renewable resources.</p>	<p>SPI 0407.7.1 Design a simple model to illustrate how the wind and movement of water alter the earth’s surface.</p> <p>SPI 0407.7.2 Analyze how different earth materials are utilized to solve human problems or improve the quality of life.</p>

Grade 4 : Standard 8 - The Atmosphere

Conceptual Strand 8

The earth is surrounded by an active atmosphere and an energy system that controls the distribution life, local weather, climate, and global temperature.

Guiding Question 8

How do the physical characteristics and the chemical makeup of the atmosphere influence surface processes and life on Earth?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.8.1 Recognize the major components of the water cycle.</p> <p>GLE 0407.8.2 Differentiate between weather and climate.</p>	<p>✓0407.8.1 Prepare a model that illustrates the basic features of the water cycle.</p> <p>✓0407.8.2 Use long term weather data to distinguish between weather and climate.</p> <p>✓0407.8.3 Use an illustration to predict and draw conclusions about how weather and climate affect the water cycle.</p>	<p>SPI 0407.8.1 Identify the basic features of the water cycle and describe their importance to life on earth.</p> <p>SPI 0407.8.2 Distinguish between weather and climate.</p>

Grade 4 - Physical Science

Grade 4 : Standard 9 - Matter

<p>Conceptual Strand 9 <i>The composition and structure of matter is known, and it behaves according to principles that are generally understood.</i></p>		
<p>Guiding Question 9 <i>How does the structure of matter influence its physical and chemical behavior?</i></p>		
<p>Grade Level Expectations</p>	<p>Checks for Understanding</p>	<p>State Performance Indicators</p>
<p>GLE 0407.9.1 Collect data to illustrate that the physical properties of matter can be described with tools that measure weight, mass, length, and volume.</p> <p>GLE 0407.9.2 Explore different types of physical changes in matter.</p>	<p>✓0407.9.1 Use appropriate tools to measure and compare the physical properties of various solids and liquids.</p> <p>✓0407.9.2 Compare the causes and effects of various physical changes in matter.</p>	<p>SPI 0407.9.1 Choose an appropriate tool for measuring a specific physical property of matter.</p> <p>SPI 0407.9.2 Determine the mass, volume, and temperature of a substance or object using proper units of measurement.</p> <p>SPI 0407.9.3 Interpret the causes and effects of a physical change in matter.</p>

<p>Grade 4 : Standard 10 - Energy</p>		
<p>Conceptual Strand 10 <i>Various forms of energy are constantly being transformed into other types without any net loss of energy from the system.</i></p>		
<p>Guiding Question 10 <i>What basic energy related ideas are essential for understanding the dependency of the natural and man-made worlds on energy?</i></p>		

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0407.10.1 Distinguish among heat, radiant, and chemical forms of energy.</p> <p>GLE 0407.10.2 Investigate how light travels and is influenced by different types of materials and surfaces.</p>	<p>✓0407.10.1 Design an investigation to demonstrate how different forms of energy release heat or light.</p> <p>✓0407.10.2 Design an experiment to investigate how different surfaces determine if light is reflected, refracted, or absorbed</p> <p>✓0407.10.3 Gather and organize information about a variety of materials to categorize them as translucent, transparent, or opaque.</p>	<p>SPI 0407.10.1 Identify different forms of energy, such as heat, light, and chemical.</p> <p>SPI 0407.10.2 Determine which surfaces reflect, refract, or absorb light.</p> <p>SPI 0407.10.3 Determine whether a material is transparent, translucent, or opaque.</p>

Grade 4 : Standard 11 - Motion

Conceptual Strand 11

Objects move in ways that can be observed, described, predicted, and measured.

Guiding Question 11

What causes objects to move differently under different circumstances?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
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<p>GLE 0407.11.1 Recognize that the position of an object can be described relative to other objects or a background.</p> <p>GLE 0407.11.2 Design a simple investigation to demonstrate how friction affects the movement of an object.</p> <p>GLE 0407.11.3 Investigate the relationship between the speed of an object and the distance traveled during a certain time period.</p>	<p>✓0407.11.1 Identify the position of objects relative to fixed reference points.</p> <p>✓0407.11.2 Design an investigation to identify factors that affect the speed and distance traveled by an object in motion.</p> <p>✓0407.11.3 Complete a coordinate graph to describe the relative positions of objects.</p> <p>✓0407.11.4 Plan and execute an investigation that demonstrates how friction affects the movement of an object.</p> <p>✓0407.11.5 Design and implement an investigation to determine that the speed of an object is equal to the distance traveled over time.</p>	<p>SPI 0407.11.1 Describe the position of an object relative to fixed reference points.</p> <p>SPI 0407.11.2 Identify factors that influence the motion of an object.</p> <p>SPI 0407.11.3 Determine the relationship between speed and distance traveled over time.</p>
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Grade 4 : Standard 12 - Forces in Nature

Conceptual Strand 12

Everything in the universe exerts a gravitational force on everything else; there is an interplay between magnetic fields and electrical currents.

Guiding Question 12

What are the scientific principles that explain gravity and electromagnetism?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
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<p>GLE 0407.12.1 Explore the interactions between magnets.</p> <p>GLE 0407.12.2 Observe that electrically charged objects exert a pull on other materials.</p> <p>GLE 0407.12.3 Explain how electricity in a simple circuit requires a complete loop through which current can pass.</p>	<p>✓0407.12.1 Explore the interactions between an electrically charged object and other materials.</p> <p>✓0407.12.2 Design an experiment to investigate how a simple electromagnet affects common objects.</p> <p>✓0407.12.3 Describe how electricity passes through a simple circuit that includes a battery, wire, switch, and bulb.</p>	<p>SPI 0407.12.1 Identify how magnets attract or repel one another.</p> <p>SPI 0407.12.2 Determine how an electrically charged material interacts with other objects.</p> <p>SPI 0407.12.3 Determine the path of an electrical current in a simple circuit.</p>
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