

Tennessee Science Standards

Grade 5 : 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 0507.Inq.1 Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data.</p> <p>GLE 0507.Inq.2 Select and use appropriate tools and simple equipment to conduct an investigation.</p> <p>GLE 0507.Inq.3 Organize data into appropriate tables, graphs, drawings, or diagrams.</p> <p>GLE 0507.Inq.4 Identify and interpret simple patterns of evidence to communicate the findings of multiple investigations.</p> <p>GLE 0507.Inq.5 Recognize that people may interpret the same results in different ways.</p>	<p>✓0507.Inq.1 Identify specific investigations that could be used to answer a particular question and identify reasons for this choice.</p> <p>✓0507.Inq.2 Identify tools needed to investigate specific questions.</p> <p>✓0507.Inq.3 Maintain a science notebook that includes observations, data, diagrams, and explanations.</p> <p>✓0507.Inq.4 Analyze and communicate findings from multiple investigations of similar phenomena to reach a conclusion.</p>	<p>SPI 0507.Inq.1 Select an investigation that could be used to answer a specific question.</p>

GLE 0507.Inq.6 Compare the results of an investigation with what scientists already accept about this question.		
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Grade 5 : 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 0507.T/E.1 Describe how tools, technology, and inventions help to answer questions and solve problems.</p> <p>GLE 0507.T/E.2 Recognize that new tools, technology, and inventions are always being developed.</p> <p>GLE 0507.T/E.3 Identify appropriate materials, tools, and machines that can extend or enhance the ability to solve a specified problem.</p> <p>GLE 0507.T/E.4 Recognize the connection between scientific advances, new knowledge, and the availability of new tools and</p>	<p>✓0507.T/E.1 Explain how different inventions and technologies impact people and other living organisms.</p> <p>✓0507.T/E.2 Design a tool or a process that addresses an identified problem caused by human activity.</p> <p>✓0507.T/E.3 Determine criteria to evaluate the effectiveness of a solution to a specified problem.</p> <p>✓0507.T/E.4 Evaluate an invention that solves a problem and determine ways to improve the design.</p>	<p>SPI 0507.T/E.1 Select a tool, technology, or invention that was used to solve a human problem.</p> <p>SPI 0507.T/E.2 Recognize the connection between a scientific advance and the development of a new tool or technology.</p>

technologies.		
GLE 0507.T/E.5 Apply a creative design strategy to solve a particular problem generated by societal needs and wants.		

Grade 5 - Life Science

Grade 5 : 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
GLE 0507.1.1 Distinguish between the basic structures and functions of plant and animal cells.	<p>✓0507.1.1 Label drawings of plant and animals cells.</p> <p>✓0507.1.2 Compare and contrast the basic structures and functions of plant and animal cells.</p>	<p>SPI 0507.1.1 Identify the major parts of plant and animal cells such as, the nucleus, cell membrane, cell wall, and cytoplasm.</p> <p>SPI 0507.1.2 Compare and contrast basic structures and functions of plant and animal cells.</p>

Grade 5 : 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
<p>GLE 0507.2.1 Investigate different nutritional relationships among organisms in an ecosystem.</p> <p>GLE 0507.2.2 Explain how organisms interact through symbiotic, commensal, and parasitic relationships.</p> <p>GLE 0507.2.3 Establish the connections between human activities and natural disasters and their impact on the environment.</p>	<p>✓0507.2.1 Evaluate producer/consumer, predator/prey, and parasite/host relationships.</p> <p>✓0507.2.2 Classify interspecific relationships within an ecosystem as mutualism, commensalism, or parasitism.</p> <p>✓0507.2.3 Create a simple model illustrating the interspecific relationships within an ecosystem.</p> <p>✓0507.2.4 Analyze basic information from a body of text to identify key issues or assumptions about the relationships among organisms in an ecosystem.</p> <p>✓0507.2.5 Create a poster to illustrate how human activities and natural disasters affect the environment.</p>	<p>SPI 0507.2.1 Describe the different types of nutritional relationships that exist among organisms.</p> <p>SPI 0507.2.2 Distinguish among symbiotic, commensal, and parasitic relationships.</p> <p>SPI 0507.2.3 Use information about the impact of human actions or natural disasters on the environment to support a simple hypothesis, make a prediction, or draw a conclusion.</p>

Grade 5 : 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?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
GLE 0507.3.1 Demonstrate how all living things rely on the process of photosynthesis to obtain energy.	✓0507.3.1 Identify the cell structures that enable plants to conduct photosynthesis. ✓0507.3.2 Design a graphic organizer that illustrates the difference between plants and animals in the movement of food energy through an ecosystem.	SPI 0507.3.1 Identify photosynthesis as the food manufacturing process in plants. SPI 0507.3.2 Compare how plants and animals obtain energy.

Grade 5 : 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 0507.4.1 Describe how genetic information is passed from parents to offspring during reproduction.</p> <p>GLE 0507.4.2 Recognize that some characteristics are inherited while others result from interactions with the environment.</p>	<p>✓0507.4.1 Explain how genetic information is transmitted from parents to offspring.</p> <p>✓0507.4.2 Create a chart that compares hereditary and environmental traits.</p> <p>✓0507.4.3 Distinguish between a scar and a birthmark in terms of their origins.</p>	<p>SPI 0507.4.1 Recognize that information is passed from parent to offspring during reproduction.</p> <p>SPI 0507.4.2 Distinguish between inherited traits and those that can be attributed to the environment.</p>

Grade 5 : 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
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<p>GLE 0507.5.1 Investigate physical characteristics associated with different groups of animals.</p> <p>GLE 0507.5.2 Analyze fossils to demonstrate the connection between organisms and environments that existed in the past and those that currently exist.</p>	<p>✓0507.5.1 Classify animals according to their physical characteristics.</p> <p>✓0507.5.2 Design a model to illustrate how an animal’s physical characteristics enable it to survive in a particular environment.</p> <p>✓0507.5.3 Identify the processes associated with fossil formation.</p> <p>✓0507.5.4 Use fossil evidence to describe an environment from the past.</p> <p>✓0507.5.5 Use fossils to match a previously existing organism with one that exists today.</p>	<p>SPI 0507.5.1 Identify physical and behavioral adaptations that enable animals such as, amphibians, reptiles, birds, fish, and mammals to survive in a particular environment.</p> <p>SPI 0507.5.2 Explain how fossils provide information about the past.</p>
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Grade 5 - Earth and Space Science

Grade 5 : 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?

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Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0507.6.1 Compare planets based on their known characteristics.</p> <p>GLE 0507.6.2 Recognize that charts can be used to locate and identify star patterns.</p>	<p>✓0507.6.1 Develop a chart that communicates the major characteristics of each planet.</p> <p>✓0507.6.2 Use images of the night sky to identify different seasonal star patterns.</p> <p>✓0507.6.3 Research a star pattern using a chart.</p>	<p>SPI 0507.6.1 Distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion.</p> <p>SPI 0507.6.2 Select information from a complex data representation to draw conclusions about the planets.</p> <p>SPI 0507.6.3 Identify methods and tools for identifying star patterns.</p>

Grade 5 : 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 0507.7.1 Compare geologic events responsible for the earth’s major geological features.</p>	<p>✓0507.7.1 Create a model to illustrate geologic events responsible for changes in the earth’s crust.</p>	<p>SPI 0507.7.1 Describe internal forces such as volcanoes, earthquakes, faulting, and plate movements that are responsible for the earth’s</p>

	✓ 0507.7.2 Prepare a chart to compare how volcanoes, earthquakes, faulting, and plate movements affect the earth's surface features.	major geological features such as mountains, valleys, etc.
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Grade 5 : Standard 8 - The Atmosphere		
Conceptual Strand 8 <i>The earth is surrounded by an active atmosphere and an energy system that controls the distribution life, local weather, climate, and global temperature.</i>		
Guiding Question 8 <i>How do the physical characteristics and the chemical makeup of the atmosphere influence surface processes and life on Earth?</i>		
Grade Level Expectations	Checks for Understanding	State Performance Indicators
GLE 0507.8.1 Analyze and predict how major landforms and bodies of water affect atmospheric conditions.	<p>✓0507.8.1 Compare the climates of coastal and inland areas at similar latitudes to demonstrate the ocean's impact on weather and climate.</p> <p>✓0507.8.2 Use land maps to demonstrate how mountain ranges affect weather and climate.</p> <p>✓0507.8.3 Use weather maps of the United States to graph temperature and precipitation for inland and coastal regions.</p> <p>✓0507.8.4 Use local environmental</p>	<p>SPI 0507.8.1 Describe the effects of the oceans on weather and climate.</p> <p>SPI 0507.8.2 Explain how mountains affect weather and climate.</p>

information to analyze how weather and climate are affected by landforms and bodies of water.

Grade 5 - Physical Science

Grade 5 : Standard 9 - Matter

Conceptual Strand 9

The composition and structure of matter is known, and it behaves according to principles that are generally understood.

Guiding Question 9

How does the structure of matter influence its physical and chemical behavior?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0507.9.1 Observe and measure the simple chemical properties of common substances.</p> <p>GLE 0507.9.2 Design and conduct an experiment to demonstrate how various types of matter freeze, melt, or evaporate.</p> <p>GLE 0507.9.3 Investigate factors that affect the rate at which various materials freeze, melt, or evaporate.</p>	<p>✓0507.9.1 Compare the simple chemical properties of common substances.</p> <p>✓0507.9.2 Investigate how different types of materials freeze, melt, evaporate, or dissipate.</p> <p>✓0507.9.3 Use data from a simple investigation to determine how temperature change affects the rate of evaporation and condensation.</p>	<p>SPI 0507.9.1 Distinguish between physical and chemical properties.</p> <p>SPI 0507.9.2 Describe the differences among freezing, melting, and evaporation.</p> <p>SPI 0507.9.3 Describe factors that influence the rate at which different types of material freeze, melt, or evaporate.</p>

Grade 5 : Standard 10 - Energy

Conceptual Strand 10

Various forms of energy are constantly being transformed into other types without any net loss of energy from the system.

Guiding Question 10

What basic energy related ideas are essential for understanding the dependency of the natural and man-made worlds on energy?

Grade Level Expectations	Checks for Understanding	State Performance Indicators
<p>GLE 0507.10.1 Design an experiment to illustrate the difference between potential and kinetic energy.</p> <p>GLE 0507.10.2 Conduct experiments on the transfer of heat energy through conduction, convection, and radiation.</p>	<p>✓0507.10.1 Design and conduct an investigation to demonstrate the difference between potential and kinetic energy.</p> <p>✓0507.10.2 Create a graphic organizer that illustrates different types of potential and kinetic energy.</p> <p>✓0507.10.3 Describe the differences among conduction, convection, and radiation.</p> <p>✓0507.10.4 Create a poster to illustrate the major forms of energy.</p> <p>✓0507.10.5 Demonstrate different ways that energy can be transferred from one object to another.</p>	<p>SPI 0507.10.1 Differentiate between potential and kinetic energy.</p> <p>SPI 0507.10.2 Use data from an investigation to determine the method by which heat energy is transferred from one object or material to another.</p>

Grade 5 : 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
GLE 0507.11.1 Design an investigation, collect data and draw conclusions about the relationship among mass, force, and distance traveled.	✓0507.11.1 Predict how the amount of mass affects the distance traveled given the same amount of applied force. ✓0507.11.2 Prepare statements about the relationship among mass, applied force, and distance traveled. ✓0507.11.3 Design and conduct experiments using a simple experimental design to demonstrate the relationship among mass, force, and distance traveled.	SPI 0507.11.1 Explain the relationship that exist among mass, force, and distance traveled.

Grade 5 : 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
<p>GLE 0507.12.1 Recognize that the earth attracts objects without directly touching them.</p> <p>GLE 0507.12.2 Investigate how the shape of an object influences the way that it falls toward the earth.</p> <p>GLE 0507.12.3 Provide examples of how forces can act at a distance.</p>	<p>✓0507.12.1 Explain and give examples of how forces act at a distance.</p> <p>✓0507.12.2 Demonstrate how the shape of an object affects how it falls toward the earth.</p> <p>✓0507.12.3 Design and explain an investigation exploring the earth's pull on objects.</p>	<p>SPI 0507.12.1 Recognize that the earth attracts objects without touching them.</p> <p>SPI 0507.12.2 Identify the force that causes objects to fall to the earth.</p> <p>SPI 0507.12.3 Use data to determine how shape affects the rate at which a material falls to earth.</p>