



Dynamic Curriculum Science

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Jefferson County Schools

Challenging Individuals to
Achieve Excellence
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Sixth Grade Science

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Grade 6 : 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

- **GLE 0607.Inq.1** Design and conduct open-ended scientific investigations.
- **GLE 0607.Inq.2** Use appropriate tools and techniques to gather, organize, analyze, and interpret data.
- **GLE 0607.Inq.3** Synthesize information to determine cause and effect relationships between evidence and explanations.
- **GLE 0607.Inq.4** Recognize possible sources of bias and error, alternative explanations, and questions for further exploration.
- **GLE 0607.Inq.5** Communicate scientific understanding using descriptions, explanations, and models.

Checks for Understanding

- **0607.Inq.1** Design and conduct an open-ended scientific investigation to answer a question that includes a control and appropriate variables.

- **0607.Inq.2** Identify tools and techniques needed to gather, organize, analyze, and interpret data collected from a moderately complex scientific investigation.
- **0607.Inq.3** Use evidence from a dataset to determine cause and effect relationships that explain a phenomenon.
- **0607.Inq.4** Review an experimental design to determine possible sources of bias or error, state alternative explanations, and identify questions for further investigation.
- **0607.Inq.5** Design a method to explain the results of an investigation using descriptions, explanations, or models.

State Performance Indicators

- **SPI 0607.Inq.1** Design a simple experimental procedure with an identified control and appropriate variables.
- **SPI 0607.Inq.2** Select tools and procedures needed to conduct a moderately complex experiment.
- **SPI 0607.Inq.3** Interpret and translate data into a table, graph, or diagram.
- **SPI 0607.Inq.4** Draw a conclusion that establishes a cause and effect relationship supported by evidence.
- **SPI 0607.Inq.5** Identify a faulty interpretation of data that is due to bias or experimental error.

Grade 6 : 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

- **GLE 0607.T/E.1** Explore how technology responds to social, political, and economic needs.
- **GLE 0607.T/E.2** Know that the engineering design process involves an ongoing series of events that incorporate design constraints, model building, testing, evaluating, modifying, and retesting.
- **GLE 0607.T/E.3** Compare the intended benefits with the unintended consequences of a new technology.
- **GLE 0607.T/E.4** Describe and explain adaptive and assistive bioengineered products.

Checks for Understanding

- **0607.T/E.1** Use appropriate tools to test for strength, hardness, and flexibility of materials.
- **0607.T/E.2** Apply the engineering design process to construct a prototype that meets certain specifications.
- **0607.T/E.3** Explore how the unintended consequences of new technologies can impact society.
- **0607.T/E.4** Research bioengineering technologies that advance health and contribute to improvements in our daily lives.
- **0607.T/E.5** Develop an adaptive design and test its effectiveness.

State Performance Indicators

- **SPI 0607.T/E.1** Identify the tools and procedures needed to test the design features of a prototype.
- **SPI 0607.T/E.2** Evaluate a protocol to determine if the engineering design process was successfully applied.
- **SPI 0607.T/E.3** Distinguish between the intended benefits and the unintended consequences of a new technology.
- **SPI 0607.T/E.4** Differentiate between adaptive and assistive bioengineered products (e.g., food, biofuels, medicines, integrated pest management).

Grade 6 : Standard 1 -Cells (Not Addressed at this level)

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 6 : 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

- **GLE 0607.2.1** Examine the roles of consumers, producers, and decomposers in a biological community.
 - **GLE 0607.2.2** Describe how matter and energy are transferred through an ecosystem.
 - **GLE 0607.2.3** Draw conclusions from data about interactions between the biotic and abiotic elements of a particular environment.
 - **GLE 0607.2.4** Analyze the environments and the interdependence among organisms found in the world's major biomes.
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- **0607.2.1** Compare and contrast the different methods used by organisms to obtain nutrition in a biological community.
 - **0607.2.2** Create a graphic organizer that illustrates how biotic and abiotic elements of an environment interact.
 - **0607.2.3** Use a food web or energy pyramid to demonstrate the interdependence of organisms within a specific biome.
 - **0607.2.4** Create poster presentations to illustrate differences among the world's major biomes.

State Performance Indicators

- **SPI 0607.2.1** Classify organisms as producers, consumers, scavengers, or decomposers according to their role in a food chain or food web.
- **SPI 0607.2.2** Interpret how materials and energy are transferred through an ecosystem.
- **SPI 0607.2.3** Identify the biotic and abiotic elements of the major biomes.
- **SPI 0607.2.4** Identify the environmental conditions and interdependencies among organisms found in the major biomes.

Grade 6 : Standard 3 -Flow of Matter and Energy (Not Addressed at this level)

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 6 : Standard 4 - Heredity (Not Addressed at this level)

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 6 : Standard 5 -Biodiversity and Change (Not Addressed at this level)

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 6 - Earth and Space Science

Grade 6 : 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

- **GLE 0607.6.1** Analyze information about the major components of the universe.
- **GLE 0607.6.2** Describe the relative distance of objects in the solar system from earth.
- **GLE 0607.6.3** Explain how the positional relationships among the earth, moon, and sun control the length of the day, lunar cycle, and year.
- **GLE 0607.6.4** Describe the different stages in the lunar cycle.
- **GLE 0607.6.5** Produce a model to demonstrate how the moon produces tides.
- **GLE 0607.6.6** Illustrate the relationship between the seasons and the earth-sun system.
- **GLE 0607.6.7** Describe the causes of lunar and solar eclipses.

Checks for Understanding

- **0607.6.1** Use data to draw conclusions about the major components of the universe.
- **0607.6.2** Construct a model of the solar system showing accurate positional relationships and relative distances.
- **0607.6.3** Investigate how the earth, sun, and moon are responsible for a day, lunar cycle, and year.
- **0607.6.4** Explain why the positions of the earth, moon, and sun were used to develop calendars and clocks.
- **0607.6.5** Illustrate the positions of the earth, moon, and sun during specific tidal conditions.
- **0607.6.6** Diagram the relationship of the earth and sun that accounts for the seasons.

- **0607.6.7** Model the positions of the earth, moon, and sun during solar and lunar eclipses.

State Performance Indicators

- **SPI 0607.6.1** Use data to draw conclusions about the major components of the universe.
- **SPI 0607.6.2** Explain how the relative distance of objects from the earth affects how they appear.
- **SPI 0607.6.3** Distinguish among a day, lunar cycle, and year based on the movements of the earth, sun, and moon.
- **SPI 0607.6.4** Explain the different phases of the moon using a model of the earth, moon, and sun.
- **SPI 0607.6.5** Predict the types of tides that occur when the earth and moon occupy various positions.
- **SPI 0607.6.6** Use a diagram that shows the positions of the earth and sun to explain the four seasons.
- **SPI 0607.6.7** Explain the difference between a solar and a lunar eclipse.

Grade 6 : Standard 7 – The Earth (Not Addressed at this level)

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 6 : 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

- **GLE 0607.8.1** Design and conduct an investigation to determine how the sun drives atmospheric convection.
- **GLE 0607.8.2** Describe how the sun's energy produces the wind.
- **GLE 0607.8.2** Investigate the relationship between currents and oceanic temperature differences.
- **GLE 0607.8.4** Analyze meteorological data to predict weather conditions.

Checks for Understanding

- **0607.8.1** Recognize how convection currents in the atmosphere produce wind.
- **0607.8.2** Design an experiment to investigate differences in the amount of the sun's energy absorbed by a variety of surface materials.
- **0607.8.3** Design an experiment to demonstrate how ocean currents are associated with the sun's energy.
- **0607.8.4** Analyze ocean temperature data to demonstrate how these conditions affect the weather in nearby land masses.
- **0607.8.5** Interpret data found on ocean current maps.

0607.8.6 Use data collected from instruments such as a barometer, thermometer, psychrometer, and anemometer to describe local weather conditions.

State Performance Indicators

- **SPI 0607.8.1** Analyze data to identify events associated with heat convection in the atmosphere.
- **SPI 0607.8.2** Recognize the connection between the sun's energy and the wind.
- **SPI 0607.8.3** Describe how temperature differences in the ocean account for currents.
- **SPI 0607.8.4** Interpret meteorological data to make predictions about the weather.

Grade 6 : Standard 9 -Matter (Not Addressed at this level)

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 6 : 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

- **GLE 0607.10.1** Compare and contrast the three forms of potential energy.
- **GLE 0607.10.2** Analyze various types of energy transformations
- **GLE 0607.10.3** Explain the principles underlying the Law of Conservation of Energy.

Checks for Understanding

- **0607.10.1** Compare potential and kinetic energy.
- **0607.10.2** Create a poster that illustrates different forms of potential energy.
- **0607.10.3** Design a model that demonstrates a specific energy transformation.
- **0607.10.4** Explain why a variety of energy transformations illustrate the Law of Conservation of Energy.

State Performance Indicators

- **SPI 0607.10.1** Distinguish among gravitational potential energy, elastic potential energy, and chemical potential energy.
- **SPI 0607.10.2** Interpret the relationship between potential and kinetic energy.
- **SPI 0607.10.3** Recognize that energy can be transformed from one type to another.
- **SPI 0607.10.4** Explain the Law of Conservation of Energy using data from a variety of energy transformations.

Grade 6 : Standard 11 -Motion (Not Addressed at this level)

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 6: 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

- **GLE 0607.12.1** Describe how simple circuits are associated with the transfer of electrical energy.
- **GLE 0607.12.2** Explain how simple electrical circuits can be used to determine which materials conduct electricity.

Checks for Understanding

- **0607.12.1** Prepare a poster that illustrates how electricity passes through a simple circuit to produce heat, light, or sound.
- **0607.12.2** Determine a material's electrical conductivity by testing it with a simple battery/bulb circuit.
- **0607.12.3** Compare and contrast the characteristics of objects and materials that conduct electricity with those that are electrical insulators.

State Performance Indicators

- **SPI 0607.12.1** Identify how simple circuits are associated with the transfer of electrical energy when heat, light, sound, and chemical changes are produced.
- **SPI 0607.12.2** Identify materials that can conduct electricity.

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