

Science – Technology/Engineering Curriculum Guide

Preface

Grade 6

Unifying Concepts and Processes	Content	Science Applications
<p>Systems, Order, & Organization Laws of force, motion, classification of organisms, planetary motion.</p> <p>Evidence, Models, Explanation Prediction, probability, hypotheses, models, laws.</p> <p>Constancy, Change, Measurement Rate, scale, patterns, trends, cycles.</p> <p>Evolution & Equilibrium Changes in environment, populations, ecosystems, conservation of energy, natural- and human- induced hazards.</p> <p>Form & Function Diversity and adaptation of organisms, interaction of energy and matter, behavior of organisms.</p>	<p><u>Earth/Space Science:</u> <u>Structure of the Earth System</u></p> <ul style="list-style-type: none"> • Identify and interpret features of contour maps. • Discuss and compare aerial photographs and topographic maps to show relationship between the earth’s surface and features on the maps. • Develop contour maps based on a topographical model and visa versa. • Identify and describe the layers in the earth's structure. • Identify common examples of conduction, convection, and radiation. • Identify various ways that energy enters and leaves the earth system. • Identify global patterns of atmospheric movement that influence local weather. 	<p>Identify a problem or design an opportunity. Propose designs and choose between alternative solutions. Implement a proposed solution. Evaluate the solution and its proposed consequences. Communicate the problem, process, and solution.</p> <p>Science: Personal & Social Perspectives</p> <hr/> <p>Personal and community health. Population growth. Natural resources. Environmental quality. Natural- and Human-induced hazards.</p>

<p style="text-align: center;">Science as Inquiry</p> <hr/> <p>Identify questions and concepts that guide scientific investigation.</p> <p>Design and conduct scientific investigation.</p> <p>Use technology and mathematics to improve investigation and communication.</p> <p>Formulate and revise scientific explanations and models using logic and evidence</p>	<ul style="list-style-type: none"> • Explain how the atmosphere, land, and water transfer energy to effect changes in temperature. <p><u>Earth's History</u></p> <ul style="list-style-type: none"> • Explain how movement of the earth's crustal plates results in changes of the earth's topography over a period of time (formation of mountains and ocean basins-a slow process; earthquakes and volcanic eruptions-a fast process). • Compare past and present factors that have caused erosion, plate movement (tectonics), and changes in the atmosphere of the earth. • Compare/contrast the effects of erosion on rocks, landforms, and plants. • Describe the interaction of constructive and destructive forces that create landforms. • Relate weather, chemical reaction, and plate motion stages of the rock cycle. • Describe how fossils provide evidence of life and environmental conditions in the past. • Explain how living things have changed or evolved over geologic time. 	<p style="text-align: center;">History and Nature of Science</p> <hr/> <p>Science as Human Endeavor Requiring reasoning, insight, energy, skill, and creativity, as well as habits of mind, i.e., intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.</p> <p>Nature of Scientific Knowledge Including evaluation of experiments, observations, theoretical models, proposed explanations, evidence, reasoning, and alternate conclusions.</p> <p>Historical Perspectives Including the study of famous scientists and discoveries.</p>
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Earth in the Solar System

- Describe and discuss the concept of gravity.
- Describe the role of gravity as a force. Explain how gravity governs motion and keeps planets in orbit.
- Describe the role of gravity in the formation of objects in the solar system.
- Relate tides to moon and earth movements.
- Relate the regular and predictable motion of the earth and its moon in the solar system to solar and lunar eclipses.
- Discuss and compare shape, size, and period of orbit of each planet in our solar system as it relates to the planet's location relative to the sun.
- Discuss and compare the length of a day and of a year of each planet in our solar system as it relates to the planet's location relative to the sun.
- Discuss and compare the temperature and atmosphere of each planet in our solar system as it relates to the planet's location relative to the sun.

- Discuss and compare the force of gravity on each planet in our solar system as it relates to the planet's size (mass and diameter).
- Relate the axis/tilt of the earth's rotation and revolution to the seasons.
- Describe how the sun and the tilt of the earth on its axis create changes in the earth's surface: plant growth, wind, ocean current, and the water cycle.
- Discuss and explain the composition of the universe.
- Discuss and explain the composition of a galaxy.
- Discuss the magnitude of our solar system to the Milky Way galaxy and the universe.

Technology/Engineering:

Materials and Tools

- Given a design task, identify appropriate materials (wood, paper, plastic, aggregates, ceramics, metals, solvents, and adhesives) based on scientific properties and conduct tests form some material characteristics (weight, strength, hardness, and flexibility).

- Use a variety of tools and materials to find the solution to a design problem.

Engineering Design Process

- Introduce the steps of the engineering design process: identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.
- Describe and communicate the purpose of a given prototype that has been constructed by the student.
- Introduce and explain the five elements of universal systems model: goal, inputs, processes, outputs, and feedback.
- Identify and compare examples of transportation systems and vehicles that operate on land, air, water, and space.
- Given a transportation problem, design and construct a possible solution using the design process.

	<ul style="list-style-type: none">• Identify and describe three subsystems of a transportation vehicle or device (structural, propulsion, guidance, suspension, control, and support).• Identify lift, drag, friction, thrust, and gravity and explain how these forces affect vehicles or devices (cars, boats, airplanes, and rockets).	
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