Nazareth Area School District
Essential *Science and Technology* Curriculum

Science and Technology - Grade 5

Planned Instructional Content Standard	Performance Objective Grade 5	Time/ Qtr	Content and Learning Experiences (Topics, Strategies, Activities)	Materials/ Resources	Assessment
3.1.5 Unifying Themes	A. Explain the parts of a simple system and their relationship to each other • Describe the component parts of a natural system (e.g. excretory) • Use technology (microscopes and software) to develop an awareness of order in a system. • Describe a system as a group of related parts that work together to achieve a desired result (e.g. excretory system). B. Describe the use of models as an application of scientific or technological concepts. • Identify parts of different models (e.g. body systems, cells, atoms, and molecules). • Identify and describe different types of models and their functions. C. Identify patterns as repeated processes or recurring elements in science and technology • Identify different forms of patterns and use them to group and classify specific objects. D. Explain scale as a way of relating concepts and ideas to one another by some measure • Create a model showing an object to scale (e.g. floor plan of classroom, scale drawing of body) • Describe scale as a form of ratio and apply to a life situation E. Identify change as a variable in describing natural and physical systems • Explain how ratio is used to describe change • Describe the effect of making a change in one part of a system on the system as a whole		Systems • Find out about parts of an ecosystem. • Learn about the carbon dioxide-oxygen cycle. • Find out how nitrogen cycles through an ecosystem. • Learn how water cycles through an ecosystem • Explain what happens in the water cycle. • Learn how models of the solar system have changed. • Find out about other objects in the solar system. • Learn how other objects in the solar system affect Earth. • Learn how your cells produce and get rid of wastes. • Determine how cell wastes are removed from your blood. • Learn the reasons why your body excretes water. Models • Explore the motion of a model roller coaster. • Explore the relative sizes of the different layers of the earth by constructing a model. • Explore the relative sizes of the different planets of the solar system through a model. Patterns • Explain what happens in the water cycle. • Discover how offspring inherit traits. • Find out how mutations affect traits in organisms. • Learn how people use what is known about inheritance.	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports
3.2.5 Inquiry and Design	A. Explain and apply scientific and technological knowledge. • Distinguish between a scientific theory and a		Life Science • Design an experiment to show how the amount of light affects the growth of a plant.	- Text: Scott Foresman Science - Equipment Kits	- Teacher Observations - Peer Observations

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	belief. • Recognize that scientific theory is supported by evidence (observation and data). • Recognize that observations can change based on differing circumstances B. Apply process knowledge to make and interpret observations. • Select and use appropriate scientific tools (e.g. balances, metric rulers, graduated cylinders, thermometers) to describe materials in metric terms (e.g. weight, length, volume, temperature). C. Identify and use the elements of scientific inquiry to solve problems. • Generate and refine questions so that they may be answered through a scientific investigation. • Design an investigation with limited variables to investigate a question. • Conduct an experiment to answer a question. • Conduct an experiment to answer a question. • Write a conclusion based on the results of the experiment. D. Know and use the technological design process to solve problems. * Identify aspects of a problem that must be addressed in proposed solutions. * Try a variety of solutions. Identify the best solution to a problem.		• Experiment to determine the frequency of inherited traits. • Experiment to find how light affects the ability of a plant to use carbon dioxide. Physical Science • Experiment to show how the show how the size of the opening of a balloon used to propel a rocket affects how far the rocket travels. • Experiment to find the effectiveness of various sunscreens in blocking radiant energy. Earth Science • Experiment to determine how the rate at which crystals form affects their size. Human Body • Experiment to determine how the body's activity level affects the amount of carbon dioxide exhaled.	- Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources	- Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports
3.3.5 Biological Sciences	A. Describe the similarities and differences that characterize diverse living things. • Describe how the structures of living things help them function in unique ways • Account for adaptations among organisms that live in a particular environment B. Describe the cell as the basic structural and functional unit of living things. • Identify the levels of organization from cell to organism. • Compare life processes at the organism level with life processes at the cellular level		Living Things • Learn what the life processes are. • Discover how scientists classify living things. • Learn what the five kingdoms are and how they are divided into smaller groups. • Understand how ideas about classifying organisms can change. • Learn what invertebrates and invertebrates are. • Explore how scientists classify plants. • Discover what mosses, ferns, and conifers are. • Learn what flowering plants are.	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments

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	with life processes at the cellular level. • Explain that cells and organisms have particular structures that underlie their functions.			- Instructional Resources	- Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports
3.4.5. Physical Science, Chemistry, and Physics	A. Describe concepts about the structure and properties of matter. • Explore atoms and their structure. • Explain the relationship between atoms and elements. • Explore the characteristics of the Periodic Table of Elements (e.g. symbol, atomic number). • Identify elements as basic building blocks of matter that cannot be broken down chemically. • Explain the relationship between molecules and compounds. • Distinguish compounds from mixtures. B. Relate energy sources and transfers to heat and temperature. • Identify and describe sound changes in moving objects. • Know that the sun is a major source of energy that emits wavelengths of visible light, infrared and ultraviolet radiation. • Explain the conversion of one form of energy to another by applying knowledge of each form of energy. • Explain the parts and functions in an electrical circuit. C. Identify and explain the principles of force and motion. • Investigate various types of motion (e.g. periodic, circular). • Use quantitative descriptions of motion. (e.g. distance/time = speed.)		Matter • Explore what matter is made of. • Learn how elements are classified through the periodic table. • Find out about atoms and molecules. • Explore how compounds are different from elements. • Discover what mixtures are. • Find out what physical and chemical properties are. • Explore what physical and chemical changes are Motion • Learn how speed is measured. • Discover the difference between speed and velocity. • Learn about inertia and the way forces that work in pairs affect motion. • Learn how an object's mass affects its motion. • Explore how the distance between objects affects their motion. • Discover the way gravity affects the velocity of falling objects. • Examine the way friction affects how objects move. • Learn how friction between moving objects can be controlled. • Explore how air resistance affects moving objects. • Learn, measure, and graph Newton's Three Laws of Motion. Forms of Energy • Discover what kinetic and potential energy are.	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources - World of Motion (Resource people and programs) www.chemfourkids.com www.webelements.com www.chemicalelements.com	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports

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	• Graphically represent motion. • Explore the Laws of Motion by examining factors that affect motion (e.g. how mass/inertia and forces such as friction affect speed). • Describe the motion of an object based on its position, direction and speed D. Describe essential ideas about the composition and structure of the universe and the earth's place in it. • Compare various planets' characteristics • Describe basic star types and identify the sun as a star type • Identify equipment and instruments that explore the universe		• Understand how energy changes between kinetic and potential energy. • Learn how energy is classified including the electromagnetic spectrum. • Explore how energy changes form. • Learn how radiant energy moves and is used. • Learn how sound energy moves and is used. • Investigate how a spectroscope separates white light into the colors of the spectrum. Electrical Energy • Learn how electrons cause objects to attract and repel • Discover what causes electrons to jump from one object to another • Explore how electric current flows in an electric circuit • Learn how circuits are used in the home • Find out how electricity is measured • Learn how electricity and magnetism are related • Discover how generators use magnets to produce electricity • Find out what energy sources generators use		
3.5.5 Earth Sciences	A. Describe earth features and processes. • Describe major layers of the Earth. • Describe and illustrate the rock cycle. • Explain how the rock cycle affected rock formations in the state of Pennsylvania. • Identify how fossils indicate how the earth has changed. • Distinguish between examples of rapid surface changes (landslides, earthquakes) and slow surface changes (weathering, erosion) B. Recognize earth resources and how they affect everyday life. • Identify and locate significant earth resources (e.g. rock types, oil, gas, coal deposits) in Pennsylvania. • Describe the processes involved in creating Earth's resources. • Explain the processes involved in the formation of oil and coal in Pennsylvania.		The Changing Earth • Explore the relative sizes of the different layers of the earth. • Learn about the atmosphere, hydrosphere, and lithosphere. • Learn about the crust, mantle, and core. • Describe how the earth's crust moves and the results of that movement. • Learn how weathering, erosion, and deposition change the earth. • Learn how rocks change form. • Learn how fossils indicate how the earth has changed. Astronomy • Learn how models of the solar system have changed. • Discover what makes up our solar system including planets and other celestial objects.	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities

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	• Describe and locate significant Earth's resources (e.g. fossil fuels, water, timber, rock types). • Identify and locate significant earth resources (e.g. rock types, oil, gas, coal deposits) in Pennsylvania • Explain the value and uses of different Earth resources (e.g. selected minerals, ores, fuel sources, agricultural uses).		• Learn about the properties of the stars compared to our sun. • Explain how scientists measure distances in space. • Discover what constellations and galaxies are. • Learn how scientists use spectroscopes and telescopes to analyze light		- Lab Reports
3.6.5 Technology	A. Explain biotechnologies that relate to propagating, growing, maintaining, adapting, treating, and converting. • Identify and explain the impact that a specific medical advancement has had on society. • Explain the factors that were taken into consideration when a specific object was designed**.** B. Explain information technologies of encoding, transmitting, receiving, storing, retrieving and decoding • Apply the appropriate method of communications technology to communicate a thought. • Demonstrate the effectiveness of image generating technique to communicate a story (photography, video) C. Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design. • Use knowledge of material effectiveness to solve specific construction problems (e.g. steel vs. wood bridges). • Differentiate among the different types of construction applications (e.g. microwave tower, power plants, aircrafts). • Evaluate a construction activity by specifying task analyses and ***necessary resources.*** • Explain the difference between design engineering and production engineering processes. • Explain transportation technologies of		Living Things • Investigate the growth of mold on food. Reproduction and Change • Investigate the life cycle of a flowering plant by growing and pollinating radish plant. Adaptations • Explore the effects of protective coloring. • Investigate the strength of eggshells • Investigate a model of fat insulation. Ecology • Experiment to find how light affects the ability of a plant to use carbon dioxide. Earth's resources • Investigate how pollution can spread into underground water. • Investigate how levels of air pollution vary in different locations. Climate • Investigate how a greenhouse traps heat. Human Body • Make a Breathing Model Astronomy • Investigate how a spectroscope separates white light into the colors of the spectrum. • Investigate how lenses are used to magnify objects. Motion • Explore ways to control and change the motion of a pendulum. • Experiment to show how the size of the opening of a balloon used to propel a rocket affects how far the rocket travels. Energy	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports

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	propelling, structuring, suspending, guiding, controlling, and supporting. • Identify and explain the workings of several mechanical power systems. • Model and explain examples of vehicular propulsion, control, guidance, structure, and suspension systems. • Explain the limitations of land, marine, air and space transportation systems.		• Explore the motion of a model roller coaster. • Experiment to find the effectiveness of various sunscreens in blocking radiant energy. Electrical Energy • Investigate how the magnetic needle of a compass can be used to detect electric current.		
3.7.5 Technology Devices	A. Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems. • Describe safe procedures for using tools and materials • Assess materials for appropriateness of use B. Use appropriate instruments and apparatus to study materials • Select appropriate instruments to measure size, weight, and temperature of living and non-living objects • Apply knowledge of different measurements systems to measure and record objects' properties E. Explain basic computer communications systems. • Apply basic e-mail functions. • Apply basic on-line research techniques to solve a specific problem.		Internet • www.sfscience.com • www.kz.com • Software • CD Rom Components • Other appropriate software Tools • Use scientific tools to do activities/experiments.	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources	Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports
3.8.5 Science, Technology, and Human Endeavors	A. Explain how sciences and technologies are limited in their effects and influences on society. • Create an invention and explain its usefulness. • Identify changes in society as a result of a technological development. • Identify and explain improvements in transportation, health, sanitation and communications and how they affect our lives. B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life • Identify interrelationships between systems and resources		Reproduction and Change • Find out how mutations affect traits in organisms. • Learn how people use what is known about inheritance. Adaptations • Explore what scientists learn by studying fossils. Matter • Learn uses of new materials scientists have developed. Energy • Understand how radiant energy is used. • Experiment to find the effectiveness of various sunscreens in blocking radiant energy.	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers

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	• Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life. C. Identify the pros and cons of applying technological and scientific solutions to address problems and the effect upon society. • Compare and contrast the impacts of technological change (positive and negative).		Earth Resources • Discover how water resources are used • Learn how water can be conserved and water pollution reduced. • Learn how land resources are used. • Discover how land resources can be preserved. • Discover what the sources of air pollution are. • Learn what the effects of air pollution are. • Explain how air quality can be protected. Climate • Learn about the greenhouse effect. • Learn what global warming is.	Resources	- Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports
10.1.5 Concepts of Health	A. Describe growth and development changes that occur between childhood and adolescence and identify factors that can influence these changes. • Education/ Socioeconomic B. Identify and describe the structure and function of the major body systems. • Integumentary/ Urinary • Endocrine/ Reproductive/ Immune D.Explain factors that influence childhood and adolescent drug use. • Peer influence • Body image (e.g., steroids, enhancers) • Social acceptance/ Stress • Media influence/ Decision-making/refusal skills • Rules, regulations and laws/ Consequences		Respiration and Excretion • Learn about the parts of the respiratory system and how they are able to exchange air into usable oxygen. • Determine how oxygen travels to the cells where it releases energy from food. • Learn how your body produces and gets rid of wastes	- Text: Scott Foresman Science - Equipment Kits - Teacher Demonstration Kits - Literature Library - Activity Videos - Interactive Transparencies - Scott Foresman Science Instructional Resources - Instructional Resources - D.A. R.E.	- Teacher Observations - Peer Observations - Projects - Oral Presentations - Research Reports - Chapter Assessments - Portfolio Ideas - Individual Lesson Assessments - Unit Assessments - Graphic Organizers - Investigate Activities - Explore Activities - Performance Activities - Process Skill Activities - Lab Reports