SCIENCE OVERVIEW
GRADE: FOURTH
Lemont-Bromberek CSD 113A

What is the story a fourth grader is able to tell by the end of the year?
We live in a dynamic world. Changes occur all around us. Scientists investigate patterns and processes to better explain their world. Engineers apply their knowledge of processes to generate and compare multiple solutions to solve problems. Both scientists and engineers engage in argumentation based on evidence to both evaluate and communicate information.

UNITS of STUDY	SCIENTIFIC & ENGINEERING PRACTICES *The actual doing of science and engineering piques student interest*	DISCIPLINARY CORE IDEAS *Key ideas that build conceptually throughout the K-8 experience*	CROSSCUTTING CONCEPTS *Important themes that pervade science, engineering and mathematics*
LIFE SCIENCE *Structure, Function, and Information Processing*	**Developing and Using Models** Develop a model to describe phenomena. **Planning and Carrying Out an Investigation** Design a test to determine animal responses to stimuli. **Engaging in Argument from Evidence** Construct an argument with evidence, data, and/or a model.	**Structure and Function** Plants and animals have both internal and external structures that serve various functions in behavior, growth and survival. **Information Processing** Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.	**Cause and Effect** Cause and effect relationships are routinely identified. **Systems and System Models** A system can be described in terms of its components and their interactions.
PHYSICAL SCIENCE *Energy* *Waves and Information*	**Asking Questions and Defining Problems** Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. **Planning and Carrying Out Investigations** Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. **Constructing Explanations and Designing Solutions** Use evidence (e.g., measurements, observations, patterns) to construct an	**Definitions of Energy** The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects or through sound, light, or electric currents. **Conservation of Energy and Energy Transfer** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another,	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change. **Energy and Matter** Energy can be transferred in various ways and between objects. **Connections to Engineering Interdependence of Science, Engineering, and Technology** Knowledge of relevant scientific concepts and research findings is important in engineering.

	explanation. Apply scientific ideas to solve design problems. **Obtaining, Evaluating, and Communicating Information** Obtain and combine information from books and other reliable media to explain phenomena.	thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. Light also transfers energy from place to place. Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. **Relationship Between Energy and Forces** When objects collide, the contact forces transfer energy so as to change the objects' motions. **Energy in Chemical Processes and Everyday Life** The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. **Natural Resources** Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. **Wave Properties** Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).	**Influence of Science, Engineering and Technology on Society and the Natural World** Engineers improve existing technologies or develop new ones. Over time, people's needs and wants change, as do their demands for new and improved technologies.

EARTH/SPACE SCIENCE *Earth Systems: Processes That Shape the Earth*	**Planning and Carrying Out Investigations** Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. **Analyzing and Interpreting Data** Analyze and interpret data to make sense of phenomena using logical reasoning. **Constructing Explanations and Designing Solutions** Identify the evidence that supports particular points in an explanation. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.	**The History of Planet Earth** Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. **Earth Materials and Systems** Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. **Plate Tectonics and Large-Scale System Interactions** The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. **Biogeology** Living things affect the physical characteristics of their regions. **Natural Hazards** A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts.	**Patterns** Patterns can be used as evidence to support an explanation. **Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change. **Connections to Engineering, Technology, and Applications of Science Influence of Engineering, Technology, and Science on Society and the Natural World** Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. **Connections to Nature of Science Scientific Knowledge Assumes an Order and Consistency in Natural Systems** Science assumes consistent pattern