SCIENCE OVERVIEW
GRADE: SIXTH
Lemont-Bromberek CSD 113A

What is the story a sixth grader is able to tell by the end of the year?
Scientists apply their understanding of the relationships between structure and function as they investigate phenomena. They recognize that often the first step in deciphering how a complex system works is to examine in detail what it is made of and the properties of its parts. Engineers apply relationships of structure and function as critical elements in design. Scientists use models to describe phenomena on various scales from the unobservable to the very large.

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 and use a model to describe phenomena. **Planning and Carrying Out Investigations** Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. **Engaging in Argument from Evidence** Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. **Obtaining, Evaluating, and Communicating Information** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.	**Structure and Function** All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. **Information Processing** Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.	**Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. **Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural and designed structures/systems can be analyzed to determine how they function. **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.

PHYSICAL SCIENCE *Structure and Properties of Matter* *Chemical Reactions*	**Developing and Using Models** Develop a model to predict and/or describe phenomena. Develop a model to describe unobservable mechanisms. **Obtaining, Evaluating, and Communicating Information** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. **Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **Constructing Explanations and Developing Solutions** Undertake a design project, engaging in the design cycle, to construct and/or implement a design solution that meets specific design criteria	**Structure and Properties of Matter** Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. **Chemical Reactions** Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. **Definitions of Energy** The term "heat" as used in everyday language refers both to thermal motion (the motion of atoms or molecules within a substance) and radiation (particularly	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. **Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. **Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. **Patterns** Macroscopic patterns are related to the microscopic and atomic-level structure. **Energy & Matter** Matter is conserved because atoms are conserved in physical and chemical processes. The transfer of energy can be tracked as energy flows through a designed or natural system.

Physical Science Continued		infrared and light). In science, heat is used only for this second meaning; it refers to energy transferred when two objects or systems are at different temperatures. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.	
EARTH/SPACE SCIENCE *Weather and Climate* *Earth's Systems*	**Asking Questions and Defining Problems** Ask questions to identify and clarify evidence of an argument. **Developing and Using Models** Develop and use a model to describe phenomena. **Planning and Carrying Out Investigations** Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.	**The Roles of Water in Earth's Surface Processes** The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. Global movements of water and its changes in form are propelled by sunlight and gravity. **Weather and Climate** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can only be predicted probabilistically. The ocean exerts a major influence on weather and climate by absorbing energy	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. **Systems and System Models** Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. **Stability and Change** Stability might be disturbed either by sudden events or gradual changes that accumulate over time.

Earth/Space Science Continued		from the sun, releasing it over time, and globally redistributing it through ocean currents. **Global Climate Change** Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.	