Appendix I: Learning Standards by Grade Span, Grades PreK-5

Earth and Space Science	Life Science	Physical Sciences	Technology/Engineering
GRADES PreK-2			
• Recognize that water, rocks, soil, and living organisms are found on the earth's surface. • Understand that air is a mixture of gases that is all around us and that wind is moving air. • Describe the weather changes from day to day and over the seasons. • Recognize that the sun supplies heat and light to the earth and is necessary for life. • Identify some events around us that have repeating patterns, including the seasons of the year, day and night.	• Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water. • Differentiate between living and nonliving things. Group both living and nonliving things according to the characteristics that they share. • Recognize that plants and animals have life cycles, and that life cycles vary for different living things. • Describe ways in which many plants and animals closely resemble their parents in observed appearance. • Recognize that fossils provide us with information about living things that inhabited the earth years ago. • Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste. • Recognize changes in appearance that animals and plants go through as the seasons change. • Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).	• Sort objects by observable properties such as size, shape, color, weight, and texture. • Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container. • Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow. • Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object. • Recognize that under some conditions, objects can be balanced.	• Identify and describe characteristics of natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam). • Identify and explain some possible uses for natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam). • Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures. • Identify tools and simple machines used for a specific purpose, e.g., ramp, wheel, pulley, lever. • Describe how human beings use parts of the body as tools (e.g., teeth for cutting, hands for grasping and catching), and compare their use with the ways in which animals use those parts of their bodies.

Earth and Space Science	Life Science	Physical Sciences	Technology/Engineering
Grades 3-5			
• Give a simple explanation of what a mineral is and some examples, e.g., quartz, mica. • Identify the physical properties of minerals (hardness, color, luster, cleavage, and streak), and explain how minerals can be tested for these different physical properties. • Identify the three categories of rocks (metamorphic, igneous, and sedimentary) based on based on how they are formed, and explain the natural and physical processes that create these rocks. • Explain and give examples of the ways in which soil is formed (the weathering of rock by water and wind and from the decomposition of plant and animal remains). • Recognize and discuss the different properties of soil, including color, texture (size of particles), the ability to retain water, and the ability to support the growth of plants. • Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time. • Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.	• Classify plants and animals according to the physical characteristics that they share. • Identify the structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transport, reproduction, growth, and protection. • Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death. • Describe the major stages that characterize the life cycle of the frog and butterfly as they go through metamorphosis. • Differentiate between observed characteristics of plants and animals that are fully inherited (e.g., color of flower, shape of leaves, color of eyes, number of appendages) and characteristics that are affected by the climate or environment (e.g., browning of leaves due to too much sun, language spoken). • Give examples of how inherited characteristics may change over time as adaptations to changes in the environment that enable organisms to survive, e.g., shape of beak or feet, placement of eyes on head, length of neck, shape of teeth, color.	• Differentiate between properties of objects (e.g., size, shape, weight) and properties of materials (e.g., color, texture, hardness). • Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter. • Describe how water can be changed from one state to another by adding or taking away heat. • Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or create change. • Give examples of how energy can be transferred from one form to another. • Recognize that electricity in circuits requires a complete loop through which an electrical current can pass, and that electricity can produce light, heat, and sound. • Identify and classify objects and materials that conduct electricity and objects and materials that are insulators of electricity. • Explain how electromagnets can be made, and give examples of how they can be used. • Recognize that magnets have poles that repel and attract each other. • Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will not attract.	• Identify materials used to accomplish a design task based on a specific property, i.e. weight, strength, hardness, and flexibility. • Identify and explain the appropriate materials and tools (e.g., hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) to construct a given prototype safely. • Identify and explain the difference between simple and complex machines, e.g., hand can opener that includes multiple gears, wheel, wedge gear, and lever. • Identify a problem that reflects the need for shelter, storage, or convenience. • Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists. • Identify relevant design features (e.g., size, shape, weight) for building a prototype of a solution to a given problem. • Compare natural systems with mechanical systems that are designed to serve similar purposes, e.g., a bird's wings as compared to an airplane's wings.

• Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation. • Differentiate between weather and climate. • Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere. • Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate. • Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes. • Recognize that the earth is part of a system called the "solar system" that includes the sun (a star), planets, and many moons. The earth is the third planet from the sun in our solar system. • Recognize that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.	• Give examples of how change in the environment (e.g., drought, cold) have caused some plants and animals to die or move to new locations (migration). • Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. Recognize that some animal behaviors are instinctive (e.g., turtles burying their eggs), and others are learned (e.g., humans building fires for warmth, chimpanzees learning how to use tools). • Recognize plant behaviors, such as the way seedlings' stems grow toward light and their roots grow downward in response to gravity. Recognize that many plants and animals can survive harsh environments because of seasonal behaviors, e.g., in winter, some trees shed leaves, some animals hibernate, and other animals migrate. • Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.	• Recognize that sound is produced by vibrating objects and requires a medium through which to travel. Relate the rate of vibration to the pitch of the sound. • Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.	

• Describe the changes that occur in the observable shape of the moon over the course of a month.	• Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.		