Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 1: Use the scientific method, scientific tools, and safe lab procedures to solve problems.		
Standards: • **Make purposeful observations using the appropriate senses.** • **Generate questions based on observations.** • **Identify strategies for gathering information (expert in field, books, observations, investigations, videos)** • **Conduct simple investigations.** • **Construct simple charts from data and observations.** • **Share ideas through purposeful conversation.** • **Communicate and present findings of observations (illustrations, models, writing).** • **Manipulate simple tools that aid in observation and data collection.** • **Make accurate measurements with appropriate units for the measurement tool.** **A. The Scientific Method is the way that scientists learn and study the world around them. The steps include:**	**ACTIVITY:** • Create a science handbook including Scientific Method & Scientific Process Skills • Observe objects using the appropriate senses • Classify items • Make a chart with data • Have students and parents sign a Lab Safety Contract • Include lab safety rules in science handbook • Include scientific instruments and tools, and their uses, in science handbook **LAB:** • The first lab should be a step by step practice using the Scientific Method of something they know (brushing teeth) • All labs should utilize the Scientific Method and Scientific Process Skills • Review safety rules at the beginning of every lab • Review instrument and tool name and use during every lab **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Hypothesis: an educated guess • Procedure: the steps in an experiment • Experiment: a fair test designed to answer a question • Observations: noting and recording information • Conclusion: the result of outcome	

1. **Observe and ask a question** 2. **Form a hypothesis** 3. **Identify the procedure (materials and steps)** 4. **Follow the procedure to conduct the experiment** 5. **Tell what was learned from the experiment (conclusion)** **B. Scientists use Scientific Process Skills to solve problems.** 1. **Observing** 2. **Classifying** 3. **Measuring** • **Length (inches, centimeters)** • **Mass (ounces, grams)** 4. **Communication** 5. **Interdisciplinary Skills** **C. Lab Safety is a set of rules that scientists practice to safely learn and study the world around them. These rules include:** 1. **I will follow directions** 2. **I will listen carefully** 3. **I will keep myself and others safe**	• Observing: ability to identify properties, structures, etc. through use of all senses • Classifying: ability to group, match, compare by commonality • Measuring: ability to find quantitative differences, to estimate, to calculate, etc. (standard & metric) • Communication: ability to verbally relate experiences, information and procedures with clarity • Wafting: waving a hand over a substance to draw a scent toward the nose • Scientist: a person who asks questions and tries different ways to answer them	

4. **I will clean my area after lab activities** 5. **I am a responsible scientist** 6. **Do not enter Science Lab without an adult** 7. **Do not eat or drink in the lab** 8. **Do not inhale; wafting permitted with teacher approval** **D. Scientific Instruments and Tools help scientists observe, describe and record the world around them. Instruments and tools include:** 1. **Ruler** 2. **Pencil** 3. **Balance** 4. **Magnifying Lens** 5. **Safety Goggles** 6. **Flashlight** 7. **Globe**		

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Enduring Knowledge 2: *The solar system consists of planets and other bodies that orbit the Sun in predictable paths.*		
A. Recognize that the sun is a star at the center of our solar system. **B. Understand planetary movements are dynamic; orbiting in paths** **C. Identify names and characteristics of each of the planets in our solar system**	**ACTIVITY** • Compare similarities and differences between the sun and stars. • Identify similar star patterns or groups from night photographs of the same location at different times of the year. • Formulate a general description of the daily motion of the Sun across the sky based on shadow observations. Explain how shadows could be used to tell the time of day. • Demonstrate through modeling that motion is a change in position over a period of time. • Creating a model of the planets and their correct order from the sun. • Use scales to emphasize size dynamics **VOCABULARY** • Solar System-the Sun and all the objects that orbit around it. • Planet- large sphere in space that orbits a star. • Gravity– a force of attraction, or pull, between all objects. • Telescope- a device that collects light and makes distant objects appear closer and larger. • Comet- a chunk or ice, rock, and dust that orbits the Sun. • Asteroid- A chunk or rock or metal that orbits the Sun. • Meteor- a piece of rock, ice or metal that burns up in Earth's atmosphere, causing a streak of light to appear in the sky. • Meteorite- a meteor that hits Earth's surface. • Star- a hot sphere of gases in space that makes its own light.	

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Enduring Knowledge 3: *The Earth has motional cycles as does Earth's moon.*		
A. **Distinguish between rotation and revolution** B. **Understand the seasons** C. **Understand basis of moon phases**	**ACTIVITY** • Drawing or building and then explaining a model of the earth rotating on its axis in relation to the sun and moon (i.e., day and night). • Connect these seasonal changes in sunlight to the tilt of Earth's axis with respect to the plane of its orbit around the Sun. • Have students chart a lunar month and demonstrate their understanding of terms and phases. **VOCABULARY** • Axis- a real or imaginary line that a spinning object turns around. • Orbit- the path an object takes as it travels around another object. • Rotation- the act of spinning around an axis. • Revolution- one complete trip around an object in a circular or nearly circular path. • Phase- a temporary state of being, often used to describe the change in the appearance of the Moon. • Lunar Eclipse- a blocking of the moon's light when the moon passes into Earth's shadow; happens when the Earth is directly between the Sun and the Moon. • Solar Eclipse-a blocking of the Sun's light that happens when Earth passes through the Moon's shadow; at that time the Moon is between Earth and the Sun. • Crater- a hollow area or pit in the ground.	

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Enduring Knowledge 4: *The Earth is old and scientists learn about the past history of living things by studying fossils.*		
A. Explore Earth theories regarding origin and age **B. Identify the crust, mantle and core.** **C. Define a fossil and understand conditions for fossil formation.**	**ACTIVITY** • Compare several theories relating to the origin of the Planet Earth • Discuss the composition and state of matter of each layer. Model the interactions between the layers of Earth. • Examine Fossils or imprints and use data gathered from observations to argue the origin (terrestrial or marine). **VOCABULARY** • Crust-rock that makes up the Moon's and Earth's outermost layers. • Mantle- the layer of rock below the Earth's crust. • Core- the innermost layer of the Earth made of iron and nickel. • Fossil-any evidence of an organism that lived in the past.	

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Enduring Knowledge 5: *Features, processes, and changes occur in Earth's land and oceans.*		
A. Introduce the theory of Pangaea and Plate Tectonics. **B. Understand the differences between converging, diverging and transformational plate boundaries** **C. Understand earthquakes and volcanos as results of plate motion.** **D. Introduce other types of landforms and their formation.**	**ACTIVITY** • Present evidence to support arguments for the theory of plate motion. • Investigate geographic examples, including the Ring of Fire • Research recent occurrences and how scientists predict and measure Earthquakes and volcanos. • Determine if landforms were created by processes of erosion (e.g., wind, water, and/or ice) based on evidence in pictures, video, and/or maps. Use models created in classrooms. Locate areas that are being created (deposition) and destroyed (erosion) using maps and satellite images. **VOCABULARY** • Fault- a crack in Earth's crust along which movement has taken place. • Plateau- a high landform with a flat top • Fold- a bend in layers of rock • Volcano- a mountain that builds up around an opening in Earth's surface. • Mountain- a tall landform that rises to a peak. • Earthquake- a sudden shaking of the rock that makes up Earth's crust. • Seismic Wave- a vibration caused by an earthquake. • Seismograph- an instrument that detects and records earthquakes; shows seismic waves and jagged lines along a graph.	

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Enduring Knowledge 6: *Earth materials reflect the processes that formed them.*		
A. Rocks have properties of color, texture and hardness. Rocks can be classified by their physical properties. **B. Rock is composed of different combinations of minerals that have formed under different conditions.** **C. Understand basis for crystal formation**	**ACTIVITY** • Observe and compare the properties of rocks. • Illustrate the rock cycle demonstrating how Igneous, Metamorphic and Sedimentary rocks are changed to create the cycle. • Distinguish physical properties of sedimentary, igneous, or metamorphic rocks and explain how one kind of rock could eventually become a different kind of rock. • Observe, identify and compare components of soils and rocks. • Create a model to represent how soil is formed. • Make and compare crystals and their properties. **VOCABULARY** • Weathering- the breaking down of rocks into smaller pieces. • Erosion- the weathering and removal of rock and soil. • Deposition- the dropping off of eroded soil and bits of rock. • Terminus- a downhill end of a glacier where glacial till and other debris are deposited. • Moraine- a large body of weathered rock deposited by the edge of a glacier. • Sedimentary Rock- a rock that forms when small bits of matter are pressed together in layers. • Metamorphic Rock- rock formed from another kind of rock under heat and pressure. • Igneous Rock- rock that forms when melted rock cools and hardens. • Rock Cycle- the process by which rocks continuously change from one type to another.	

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Enduring Knowledge 7: *Earth materials provide resources for all living things but these resources are limited and should be conserved.*		
A. Identify a variety of minerals **B. Explore sources of minerals, including local ones, and commercial uses of several minerals.** **C. Identify natural and agricultural products people use.** **D. Know that different products and different ways of handling products have environmental and human impact.**	**ACTIVITY** • Introduce Moh's scale, the streak test, cleavage, and understanding how colors are interpreted. • Students can conduct independent research reports or presentations. Information can be pooled and used to build a study guide. • Identify the natural resources used in the process of making various manufactured products. • Distinguish between renewable and non-renewable sources. • Identify and collaborate with local resources **VOCABULARY** • Minerals- a natural, non-living, solid material found in rock. • Color-a perception of light • Luster- the ability for an object to be shiny • Streak- the ability for a rock or mineral to be scratched. • Hardness- the quality of condition for an object to be hard.	

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Enduring Knowledge 8: *All things on Earth can be classified as non-living or living.*		
A. Define life. **B. Identify components of ecosystems that are living and non-living.** **C. Compare larger non-living and living things with smaller (microscopic) non-living and living things.**	**ACTIVITY** • Identify and categorize the basic needs of living organisms as they relate to the environment. • Practice looking at different ecosystems and identifying abiotic (climate) and biotic factors (predator and prey) in each. • Introduce varying types of microscopic life and conditions such as bacteria. **VOCABULARY** • Biotic- a living part of an ecosystem • Abiotic- a non-living part of an ecosystem • Ecosystem- the living and non-living things in an ecosystem and all of their interactions. • Population- all members of a species that live in an ecosystem • Community- all the populations in an ecosystem • Food Chain- energy that passes from one organism to another • Predator- an organism that hunts for food • Prey- an organism hunted by others for food • Producer- organisms that make their own food using energy and sunlight • Consumer- organisms who cannot make their own food • Decomposers- organisms that break down waste and the remains of other organisms into simpler substances • Carnivore- animal that eats other animals • Omnivore- animal that eats plants and animals • Herbivore- animal that eats plants	

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Enduring Knowledge 9: *Living things are made of cells.*		
A. Describe how larger living things are made up of systems that are made up of organs; made up of tissues; made up of cells. **B. Understand that cells are the basic working component of all living things.** **C. Recognize parts and functions of a basic animal cell including DNA, nucleus, cytoplasm, and cell membrane.** **D. Introduce a compound light microscope and examine a cell.**	**ACTIVITY** • Introduce magnification and the basic parts and functions of the compound light microscope. • Have students make cell models. • Compare plants and animal cells; introduce mitochondria in animal cells and chloroplasts in plant cells. • Use any variety of cell types from human and animal to plants and microscopic organisms. **VOCABULARY** • Cell- the smallest living unit of matter. • Oxygen- a gas found in the air and water that plants and animals need to live. • Organism- a living thing that that carries out basic functions on its own. • Tissues- a group of similar cells that that work together to carry out a job. • Organ- a group of tissues that work together to carry out a job. • Organ System- a group of organs that work together to carry out a job.	

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Enduring Knowledge 10: *Living things can be classified into two domains or six kingdoms.*		
A. Recognize a need to classify objects. **B. Introduce a classification system that is based on two domains or six kingdoms.** **C. Compare and contrast invertebrates and vertebrates.**	**ACTIVITY** • Have student's group screws, nails, etc….into characteristic groups. • Conduct activities or projects that allow for individual or group explorations of different phyla invertebrates and vertebrates. **VOCABULARY** • Traits- a characteristic of a living thing. • Kingdom- the largest group into which an organism can be classified. • Classification- grouping organisms by their traits • Microorganism- an organism that cannot be seen with the naked eye.	

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Enduring Knowledge 11: *Living things undergo changes throughout their life cycle.*		
A. Review the human life cycle. **B. Recognize life cycle stages of other living things.** **C. Introduce that some creatures can be produced by one parent whereas for others, like humans, it takes two parents.**	**ACTIVITY** • Include infancy, childhood, adolescence and adulthood. • Determine the characteristic changes that occur during the life cycle of plants and animals by examining a variety of species, and distinguish between growth and development. • Mealworms can be used for the beetle, caterpillars for butterflies, etc…can discuss incomplete and complete metamorphosis • Show examples of cells arising from cells **VOCABULARY** • Growth- the process of changing in physical size • Development- a changing process that occurs over time where new adaptations aid in survival. • Reproduction- the process of passing down genetic material to keep a species alive. • Metamorphosis- a series of separate body forms during an animals development • Heredity- the passing of traits from parent to offspring. • Endoskeleton- an internal support system. • Exoskeleton- an external support system. • Inherited Behavior- behaviors that are natural • Learned Behaviors- behaviors that are learned	

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Enduring Knowledge 12: *Plants and animals have structures for digestion, respiration, waste disposal, and transport of materials.*		
A. Recognize that every organism needs energy derived from food. **B. Compare heterotrophs and autotrophs.** **C. Recognize structures for the digestive system in humans.** **D. Recognize structures for a respiratory system in humans.** **E. Recognize structures for the human circulatory system.**	**ACTIVITY** • Create a list of examples for both groups • Create a human body project illustrating the systems and their parts. • Create a human body project illustrating the systems and their parts. • Create a human body project illustrating the systems and their parts. **VOCABULARY** • Skeletal System- system of the body, made from bones, that supports the body. • Muscular System- system of the body that controls the muscles • Nervous System- system of the body that controls the senses and other systems. • Respiratory System- system of the body that exchanges gasses • Circulatory System- system of the body that pumps blood through the body • Excretory System- system of the body that eliminates waste • Digestive System- system of the body that breaks down food • Heterotrophs- an organism that eats other living organisms for nutrition • Autotrophs- an organism that makes its own food	

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Enduring Knowledge 13: *Perceiving and responding to information about the environment is critical to the survival of organisms.*		
A. Understand what a reflex is; stimulus and response **B. Recognize structures of the human nervous system.**	**ACTIVITY** • Brainstorm human/animal reflexes important for survival • Create a human body project illustrating the systems and their parts. **VOCABULARY** • Reflex- a muscle response to a stimulus • Stimulus- senses that the body receives and responds to. • Response- the reaction to a stimulus.	

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Enduring Knowledge 14: *Plants carry out reproduction in a variety of ways.*		
A. Plants can reproduce through the production of seed. Some seed is hidden within fruit and some are exposed as in cones. **B. Seeds are built for dispersal.** **C. Discuss basic plant life cycles.**	**ACTIVITY** • Investigate illustrations of various plants and their seeds • Demonstrate how certain seeds travel • Discover and observe by planting sunflower seeds **VOCABULARY** • Photosynthesis- chemical process that converts light energy into sugars • Chlorophyll- pigment in plants that give it a green color and collect energy • Root- part of the plant that holds it into the ground and takes in water and minerals • Spore- a cell in a seeded plant that can grow into a new plant. • Stem- part of the plant that holds the plant up and carries food, water, and other minerals to and from the plants leaves. • Stomata- pores on the bottom of leaves that open and close to exchange gases. • Pollination- the transfer of a flower's pollen from anther to pistil. • Plant Life Cycle- the complete change from seed to flowering plant. • Transpiration- the release of water vapor through the stomata of a plant.	

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Enduring Knowledge 15: *Characteristics in structure and behavior may improve an organism's chance of survival.*		
A. Traits are characteristics that are inherited through DNA from parent to offspring. **B. Changes in DNA, called mutations, can lead to changes in traits.** **C. Know mutations can be bad for an organism.** **D. Know mutations can be good for an organism.**	**ACTIVITY** • Have students discuss certain traits that can be inherited from their parents • Explore how certain species have changed over time through evolution (ex: changes in color coats) • Have students investigate how certain mutations have negatively affected an organism. • Discuss animals camouflaging in their environment **VOCABULARY** • Adaptation- a change that helps an organism survive • Hibernate- a period of sleep or rest through a winter • Camouflage- an adaptation where animals blend in with their surroundings • Mimicry- an adaptation where animals look like other organisms to aid in survival • Extinct- when the last of a species dies.	