

# K-5 - Updated Version 11/24/08

The Science Course Level Expectations document is an **updated** version to the April, 2005 K-12 Science Grade Level Expectations.

The GLEs will provide the framework for instruction and assessment for elementary and intermediate science courses.

## **Science Grade Level Expectations:** *A Framework for Instruction and Assessment*

The *Science Course Level Expectations* outline related ideas, concepts, skills and processes that form the foundation for understanding and learning science. It includes updates to the April, 2005 K-12 *Science Grade Level Expectations*. In addition, it provides a framework to bring focus to teaching, learning, and assessing science.

Since the Outstanding Schools Act of 1993, several documents have been developed prior to the 2005 K-12 *Grade Level Expectations* to aid Missouri school districts in creating curriculum that will enable all students to achieve their maximum potential. Those include:

- The *Show-Me Standards* which identify broad content knowledge and process skills for all students to be successful as they continue their education, enter the workforce, and assume civic responsibilities
- The *Framework for Curriculum Development* which provides districts with a “frame” for building curricula using the *Show-Me Standards* as a foundation
- The *Assessment Annotations for the Curriculum Frameworks* which identify content and processes that should be assessed at the local and state level

Essential content, aligned to state and national documents that support inquiry-based instruction, included in the Grade Level Expectations should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. Each Grade and Course Level Expectation is aligned to the Show-Me Content and Process Standards (1996). A Depth-of-Knowledge level will be assigned to each grade or course level expectation before formal adoption of this document. The Depth of Knowledge identifies the highest level at which the expectation will be assessed, based upon the demand of the GLE. Depth-of-Knowledge levels include: Level 1-recall; Level 2-skill/concept; Level 3-strategic thinking; and Level 4-extended thinking.

\* Indicates that an item is essential to the curricula of the Course but will not be assessed at the State level. The indicated expectations should be taught and assessed locally.

Sources: National Science Education Standards (NRC); Project 2061 (AAAS) Benchmarks for Science Literacy and Atlas: Research related to science education (e.g., Driver’s work re: misconceptions); Show Me Standards, Framework for Curriculum Development in Science, and MAP documents; National Assessment of Education Progress (NAEP) Science Framework; Curriculum documents from school districts and other states.

Important resources for districts’ use as they develop curriculum and assessments and plan instruction include: the Project 2061 (AAAS) Benchmarks (online at <http://www.project2061.org/tools/benchol/bolintro.htm>) and ATLAS (a compendium of concept maps showing grade-level appropriateness, sequencing of expectations in order to build conceptual understanding, and connections across science strands); Young People’s Images of Science and Making Sense of Secondary Science by Rosalind Driver et al. (both present research related to student misconceptions K-12); The National Science Education Standards (online at <http://www.nap.edu/readingroom/books/nses/html/>); How Students Learn Science (available from the National Research Council (The National Academies Press))

## SCOPE AND SEQUENCE

This is one model of a curriculum scope and sequence. Grade level expectations are clustered into suggested units and arranged to support development of conceptual understanding. School district personnel are encouraged to adapt this model as necessary in order to better meet the needs of their students. The Expectations described in Strand 7: Inquiry and Strand 8: Science/Technology/Human Activity should be made a priority and integrated throughout every teaching unit in each of the other strands. Science assessments based from GLE 2.0 will begin 2009-2010 school year.

	Kindergarten	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
<b>Strand 1 Matter &amp; Energy</b>	Properties of Matter  Investigating Sound	Properties of Matter: Mass and Temperature	Properties of Rocks and Soil  Forms of Energy: Sound	Investigating States of Matter  Earth, Sun and Moon	Mixtures and Solutions  Forms of Energy: Electrical Circuits		Properties of and Changes in Matter  Forms of Energy: Light and Sound	Forms of Energy: Heat, Electricity, and Magnetism  Energy Transformations	Physical and Chemical Properties and Changes of Matter
<b>Strand 2 Force &amp; Motion</b>	Change in Position	Investigating Motion	Forces and Motion		Laws of Motion	Work and Simple Machines		Force, Motion, and Work	
<b>Strand 3 Living Organisms</b>	Plants and Animals  Parent-Offspring Relationships	Characteristics of Plants and Animals	Life Cycles of Animals	Plants		Classification of Plants and Animals	Characteristics of Living Organisms		Cells and Body Systems  Disease  Reproduction and Heredity
<b>Strand 4 Ecology</b>	Weather and Seasons			Food Chains	Interactions among Organisms and their Environments		Ecosystems and Populations		
<b>Strand 5 Earth Systems</b>	Weather and Seasons	Observing Water and Weather	Earth Materials: Rocks and Soil	Investigating States of Matter	Changes in the Earth's Surface	Water Cycle and Weather	Internal Processes and External Events  Earth's Resources	Weather and Climate	Rock Cycle and Plate Tectonics
<b>Strand 6 Universe</b>	Objects in the Sky			Earth, Sun, and Moon		Solar System		Objects and Their Motion in the Solar System	
<b>Strand 7 Scientific Inquiry</b>	Inquiry	Inquiry	Inquiry	Inquiry	Inquiry	Inquiry	Inquiry	Inquiry	Inquiry
<b>Strand 8 Science, Technology, &amp; Human Activity</b>	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity	Science, Technology, and Human Activity

# Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter						
A	Kindergarten	First	Second	Third	Fourth	Fifth
<p><b>Objects, and the materials they are made of, have properties that can be used to describe and classify them</b></p>	<p><i>Scope and Sequence – Properties of Matter</i></p> <p>a. Describe physical properties of objects (i.e., size, shape, color, mass) by using the senses, simple tools (e.g., magnifiers, equal arm balances), and/or nonstandard measures (e.g., bigger/smaller; more/less)</p> <p>b. Identify materials (e.g., cloth, paper, wood, rock, metal) that make up an object and some of the physical properties of the materials (e.g., color, texture, shiny/dull, odor, sound, taste, flexibility)</p> <p>c. Sort objects based on observable physical properties (e.g., size, material, color, shape, mass)</p>	<p><i>Scope and Sequence – Mass and Temperature</i></p> <p>a. Given an equal-arm balance and various objects, illustrate arrangements in which the beam is balanced</p> <p>b. Measure and compare the mass of objects (more/less)</p> <p>c. Order objects according to mass</p>	<p><i>Scope and Sequence – Properties of Rocks and Soil</i></p> <p>a. Describe and compare the physical properties of objects by using simple tools (i.e., thermometer, magnifier, centimeter ruler, balance, magnet)</p> <p>b. Classify objects/substances as <b>“one kind of material”</b> or a mixture (e.g. m &amp; m’s® vs. trail mix, water vs. kool aid®)</p>		<p><i>Scope and Sequence – Mixtures and Solutions</i></p> <p>a. Describe and compare the masses (the amount of matter in an object) of objects to the nearest gram using balances</p> <p>b. Describe and compare the volumes (the amount of space an object occupies) of objects using a graduated cylinder</p> <p>c. Identify situations where no two objects can occupy the same space at the same time (e.g. water level rises when an object or substance such as a rock is placed in a quantity of water)</p> <p>d. Classify types of materials (e.g., water, salt, sugar, iron filings, salt water) into <b>“like”</b> substances (materials that have specific physical properties) or mixtures of substances by using their characteristic properties</p>	<p><i>Note that NAEP acknowledges the confusion between mass and weight and does not expect students to differentiate between the two (accepting either mass/weight interchangeably) until after grade 4</i></p>
<b>DOK</b>					<b>a – 2, b – 2, c – 1, d – 2</b>	

## Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>B</b>						
<b>Properties of mixtures depend upon the concentrations, properties, and interactions of particles</b>			<p><i>Scope and Sequence – Properties of Rocks and Soil</i></p> <p>a. Observe and describe how mixtures are made by combining solids</p> <p>b. Describe ways to separate the components of a mixture by their physical properties (e.g., sorting, magnets, screening)</p>		<p><i>Scope and Sequence – Mixtures and Solutions/ Changes on the Earth's Surface</i></p> <p>a. Identify water as a solvent that dissolves materials (Do NOT assess the term solvent)</p> <p>b. Observe and describe how mixtures are made by combining solids or liquids, or a combination of these</p> <p>c. Distinguish between the components in a mixture/solution (e.g., trail mix, conglomerate rock, salad, soil, salt water)</p> <p>d. Describe ways to separate the components of a mixture/solution by their properties (i.e., sorting, filtration, magnets, screening)</p>	
<b>DOK</b>					<b>a – 1, b – 1, c – 1, d – 1</b>	

# Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b>						<i>Scope and Sequence – Water Cycle and Weather</i>  a. Describe how changes in state (i.e., freezing/melting, condensation/evaporation/boiling) provide evidence that matter is made of particles too small to be seen
<b>Properties of matter can be explained in terms of moving particles too small to be seen without tremendous magnification</b>						
<b>DOK</b>						<b>a – 1</b>

# Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>D</b>				<i>Scope and Sequence – Investigating States of Matter</i>		<i>Scope and Sequence – Water cycle and Weather</i>
<b>Physical changes in the state of matter that result from thermal changes can be explained by the Kinetic Theory of Matter</b>				<ul style="list-style-type: none"> <li>a. Compare the observable physical properties of solids, liquids, or gases (air) (i.e., visible vs. invisible, changes in shape, changes in the amount of space occupied)</li> <li>b. Identify everyday objects/substances as solid, liquid, or gas (e.g., air, water)</li> <li>c. Observe and identify that water evaporates (liquid water changes into a gas as it moves into the air)</li> <li>d. Measure and compare the temperature of water when it exists as a solid to its temperature when it exists as a liquid</li> <li>e. Investigate and observe that water can change from a liquid to a solid (freeze), and back again to a liquid (melt), as the result of temperature changes</li> <li>f. Describe the changes in the physical properties of water (i.e., shape, volume) when frozen or melted</li> <li>g. Predict and investigate the effect of heat (thermal energy) (i.e., change in temperature, melting, evaporation) on objects and materials</li> </ul>		<ul style="list-style-type: none"> <li>a. Classify matter as a solid, a liquid, or a gas, as it exists at room temperature, using physical properties (i.e., volume, shape, ability to flow)</li> <li>b. Predict the effect of heat (thermal energy) on the physical properties of water as it changes to and from a solid, liquid, or gas (i.e., freezes/melts, evaporates/condenses/boils)</li> </ul>
<b>DOK</b>				<b>a-2, b-1, c-1, d-2, e-1, f-1, g-2</b>		<b>a-1, b-2</b>
<b>E</b>	Not assessed at this level					
<b>The atomic model describes the electrically neutral atom</b>						
<b>DOK</b>						

# Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>F</b>	Not assessed at this level					
The periodic table organizes the elements according to their atomic structure and chemical reactivity						
DOK						
<b>G</b>	Not assessed at this level					
Properties of objects and states of matter can change chemically and/or physically						
DOK						
<b>H</b>	Not assessed at this level					
Chemical bonding is the combining of different pure substances (elements, compounds) to form new substances with different properties						
DOK						
<b>I</b>					<i>Scope and Sequence – Mixtures and Solutions</i>	<i>Scope and Sequence – Water Cycle and Weather</i>
Mass is conserved during any physical or chemical change					a. Observe that the total mass of a material remains constant whether it is together, in parts, or in a different state	a. Observe the mass of water remains constant as it changes state (as evidenced in a closed container)
DOK					<b>a – 1</b>	<b>a – 1</b>

## Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be stored, and can be transferred but is conserved within a system						
A	Kindergarten	First	Second	Third	Fourth	Fifth
<b>Forms of energy have a source, a means of transfer (work and heat), and a receiver</b>	<p><i>Scope and Sequence – Investigating Sound</i></p> <p>a. Identify the sounds and their source of vibrations in everyday life (e.g., alarms, car horns, animals, machines, musical instruments)</p> <p>b. Compare different sounds (i.e., loudness, pitch, rhythm)</p> <p>c. Identify the ear as a receiver of vibrations that produce sound</p>	<p><i>Scope and Sequence – Properties of Matter: Mass and Temperature</i></p> <p>a. Identify the source of energy that causes an increase in the temperature of an object (e.g., Sun, stove, flame, light bulb)</p> <p>b. Compare the temperature of hot and cold objects using a simple thermometer</p> <p>c. Describe the change in temperature of an object as warmer or cooler</p>	<p><i>Scope and Sequence – Forms of Energy: Sound</i></p> <p>a. Identify air, water, and solids as mediums that sound travels through</p> <p>b. Describe different ways to change the pitch of a sound (i.e., changes in size, such as length or thickness, and in tightness/tension of the source)</p> <p>c. Describe how the ear serves as a receiver of sound (i.e., sound vibrates eardrum)</p> <p>d. Describe how to change the loudness of a sound (i.e., increase or decrease the force causing vibrations)</p>	<p><i>Scope and Sequence – Investigating States of Matter</i></p> <p>a. Identify sources of thermal energy (e.g., Sun, stove, fire, body) that can cause solids to change to liquids, and liquids to change to gas</p> <p><i>Scope and Sequence – Earth, Sun, and Moon</i></p> <p>b. Identify sources of light energy (e.g., Sun, bulbs, flames)</p> <p>c. Observe light being transferred from the source to the receiver (eye) through space</p> <p>d. Identify the three things (light source, object, and surface) necessary to produce a shadow</p>	<p><i>Scope and Sequence – Forms of Energy: Electrical Circuits</i></p> <p>a. Construct and diagram a complete electric circuit by using a source (e.g., battery), means of transfer (e.g., wires), and receiver (e.g., resistance bulbs, motors, fans)</p> <p>b. Observe and describe the evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan)</p> <p>c. Classify materials as conductors or insulators of electricity when placed within a circuit (e.g., wood, pencil lead, plastic, glass, aluminum foil, lemon juice, air, water)</p>	<p><i>Scope and Sequence – Solar System</i></p> <p>a. Observe and explain light being transferred from the source to the receiver (eye) through space in straight lines</p> <p>b. Observe and explain how an object (e.g., moon, mirror, objects in a room) can only be seen when light is reflected from that object to the receiver (eye)</p>
<b>DOK</b>				<b>a – 1, b – 1, c – 1</b>	<b>a – 2, b – 2, c – 1</b>	<b>a – 1, b – 1</b>
<b>B</b>	Not assessed at this level					
<b>Mechanical energy comes from the motion (kinetic energy) and/or relative position (potential energy) of an object</b>						
<b>DOK</b>						

## Strand 1: Properties and Principles of Matter and Energy

<b>2. Energy has a source, can be stored, and can be transferred but is conserved within a system -- Continued</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>C</b>						
<b>Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth</b>		<i>Scope and Sequence – Characteristics of Plants and Animals</i>  a. Identify light from the Sun as a basic need of most plants		<i>Scope and Sequence – Earth, Sun, and Moon/Food Chains</i>  a. Identify the Sun as the primary source of light and food energy on Earth		<i>Scope and Sequence – Water Cycle and Weather/Solar System</i>  a. Identify the Sun as the primary source of energy for temperature change on Earth
<b>DOK</b>				<b>a – 1</b>		<b>a – 1</b>
<b>D</b>	Not assessed at this level					
<b>Chemical reactions involve changes in the bonding of atoms with the release or absorption of energy</b>	Not assessed at this level					
<b>DOK</b>						
<b>E</b>	Not assessed at this level					
<b>Nuclear energy is a major source of energy throughout the universe</b>	Not assessed at this level					
<b>DOK</b>						
<b>F</b>						
<b>Energy can be transferred within a system as the total amount of energy remains constant (i.e., Law of Conservation of Energy)</b>					<i>Scope and Sequence – Forms of Energy: Electrical Circuits</i>  a. Identify the evidence of energy transformations (temperature change, light, sound, motion, and magnetic effects) that occur in electrical circuits	
<b>DOK</b>					a – 1	

## Strand 2: Properties and Principles of Force and Motion

1. The motion of an object is described by its change in position relative to another object or point						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>	<b>The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference)</b>					
DOK	<i>Scope and Sequence – Changes in Position</i>	<i>Scope and Sequence – Investigating Motion</i>			<i>Scope and Sequence – Laws of Motion</i>	
	a. Describe an object's position relative to another object (e.g., above, below, in front of, behind)	a. Compare the position of an object relative to another object (e.g., left of or right of) b. Describe an object's motion as straight, circular, vibrating (back and forth), zigzag, stopping, starting, or falling c. Compare the speeds (faster vs. slower) of two moving objects			a. Classify different types of motion [straight line, curved, vibrating (back and forth)] b. Describe an object's motion in terms of distance and time	
<b>B</b>	<b>An object that is accelerating is speeding up, slowing down, or changing direction</b>					
DOK			<i>Scope and Sequence – Forces and Motion</i>			
			a. Describe Earth's gravity as a force that pulls objects on or near the Earth toward the Earth without touching the object			
<b>C</b>	<b>Magnetic forces are related to electrical forces as different aspects of a single electromagnetic force</b>					
DOK	Not assessed at this level					

## Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion						
A	Kindergarten	First	Second	Third	Fourth	Fifth
<b>Forces are classified as either contact (pushes, pulls, friction, buoyancy) or non-contact forces (gravity, magnetism), that can be described in terms of direction and magnitude</b>	<i>Scope and Sequence – Changes in Position</i>  a. Identify ways (push, pull) to cause some objects to move by touching them b. Identify magnets cause some objects to move without touching them	<i>Scope and Sequence – Investigating Motion</i>  a. Identify the force (i.e., push or pull) required to do work (move an object)	<i>Scope and Sequence – Forces and Motion</i>  a. Identify magnets attract and repel each other and certain materials b. Describe magnetism as a force that can push or pull other objects without touching them c. Measure (using non-standard units) and compare the force (i.e., push or pull) required to overcome friction and move an object over different surfaces (i.e., rough, smooth)		<i>Scope and Sequence – Laws of Motion</i>  a. Identify the forces acting on the motion of objects traveling in a straight line (specify that forces should be acting in the same line as the motion, provide examples) b. Describe and compare forces (measured by a spring scale in <b>Newton's</b> ) applied to objects in a single line. c. Observe and identify friction as a force that slows down or stops a moving object that is touching another object or surface d. Compare the forces (measured by a spring scale in <b>Newton's</b> ) required to overcome friction when an object moves over different surfaces (i.e., rough/smooth)	<i>Scope and Sequence – Work and Simple Machines</i>  a. Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load
	<b>DOK</b>					<b>a – 1, b – 2, c – 1, d – 2</b>

## Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>B</b>			<i>Scope and Sequence – Forces and Motion</i>		<i>Scope and Sequence – Laws of Motion</i>	
<b>Every object exerts a gravitational force on every other object</b>			a. Describe Earth's gravity as a force that pulls objects on or near the Earth toward the Earth without touching the object		a. Determine the gravitational pull of the Earth on an object (weight) using a spring scale	
<b>DOK</b>					<b>a – 1</b>	
<b>C</b>	Not assessed at this level					
<b>Magnetic forces are related to electrical forces as different aspects of a single electromagnetic force</b>						
<b>DOK</b>						

## Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>D</b>		<i>Scope and Sequence – Investigating Motion</i>	<i>Scope and Sequence – Forces and Motion</i>		<i>Scope and Sequence – Laws of Motion</i>	<i>Scope and Sequence – Work and Simple Machines</i>
<b>Newton’s Laws of Motion explain the interaction of mass and forces, and are used to predict changes in motion</b>		<p>a. Describe ways to change the motion of an object (i.e., how to cause an object to go slower, go faster, go farther, change direction, stop)</p>	<p>a. Describe the direction and amount of force (i.e., direction of push or pull, strong/weak push or pull) needed to <b>change an object’s</b> motion (i.e., faster/slower, change in direction)</p> <p>b. Describe and compare the distances traveled by heavier/lighter objects after applying the same amount of force (i.e., push or pull) in the same direction</p> <p>c. Describe and compare the distances traveled by objects with the same mass after applying different amounts of force (i.e., push or pull) in the same direction</p>		<p>a. Observe that balanced forces do <b>not affect an object’s</b> motion (need to clarify that balanced forces means no change in forces acting on an object)</p> <p>b. Describe how unbalanced forces acting on an object changes its speed (faster/slower), direction of motion, or both (need to clarify that unbalanced forces means any change in forces acting on an object)</p> <p>c. Predict how the change in speed of an object (i.e., faster/slower/remains the same) is affected by the amount of force applied to an object and the mass of the object</p> <p><i>Scope and Sequence - Energy: Electrical Circuits</i></p> <p>d. Predict the effects of an electrostatic force (static electricity) on the motion of objects (attract or repel)</p>	<p>a. Describe how friction affects the amount of force needed to do work over different surfaces or through different media</p>
<b>DOK</b>					<b>a – 1, b – 2, c – 2, d – 1</b>	<b>a – 2</b>

## Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>E</b>	Not assessed at this level					
<b>Perpendicular forces act independently of each other</b>						
DOK						<b>a - 1, b - 1, c - 1, d - 1</b>
<b>F</b>						
<b>Work transfers energy into and out of a mechanical system</b>						
DOK			<p><i>Scope and Sequence – Forces and Motion</i></p> <p>a. Compare and describe the amount of force (i.e., more, less, or same push or pull) needed to raise an object to a given height, with or without using inclined planes (ramps) of different slopes</p> <p>b. Compare and describe the amount of force (i.e., more, less, or same push or pull) needed to raise an object to a given height, with or without using levers</p> <p>c. Apply the use of an inclined plane (ramp) and/or lever to different real life situations in which objects are raised</p>			<p><i>Scope and Sequence – Work and Simple Machines</i></p> <p>a. Explain how work can be done on an object (force applied and distance moved) (No formula calculations at this level)</p> <p>b. Identify the simple machines in common tools and household items</p> <p>c. Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines</p> <p>d. Observe and explain that simple machines change the amount of effort force and/or direction of force</p>
DOK						<b>a - 1, b - 1, c - 1, d - 1</b>

## Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>						
Organisms have basic needs for survival		<p><i>Scope and Sequence – Characteristics of Plants and Animals</i></p> <p>a. Identify the basic needs of most animals (i.e., air, water, food, shelter)</p> <p>b. Identify the basic needs of most plants (i.e., air, water, light)</p> <p>c. Predict and investigate the growth of plants when growing conditions are altered (e.g., dark vs. light, water vs. no water)</p>		<p><i>Scope and Sequence – Plants</i></p> <p>a. Describe the basic needs of most plants (i.e., air, water, light, nutrients, temperature)</p>		
DOK				a – 1		
<b>B</b>						
Organisms progress through life cycles unique to different types of organisms			<p><i>Scope and Sequence – Life Cycles of Animals</i></p> <p>a. Identify and sequence life cycles (birth, growth, and development, reproduction and death) of animals (i.e., butterfly, frog, chicken, snake, dog)</p> <p>b. Record observations on the life cycle of different animals (e.g., butterfly, dog, frog, chicken, snake)</p>	<p><i>Scope and Sequence – Plants</i></p> <p>a. Describe and sequence the stages in the life cycle (for a plant) of seed germination, growth and development, reproduction, and death (i.e., a flowering plant)</p>		
DOK				a – 1		

## Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b>	Not assessed at this level					
Cells are the fundamental units of structure and function of all living things						
<b>DOK</b>						

## Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms -- Continued						
D	Kindergarten	First	Second	Third	Fourth	Fifth
<b>Plants and animals have different structures that serve similar functions necessary for the survival of the organism</b>	<i>Scope and Sequence – Plants and Animals</i>  a. Observe and compare the structures and behaviors of different kinds of plants and animals	<i>Scope and Sequence – Characteristics of Plants and Animals</i>  a. Identify and compare the physical structures of a variety of plants (e.g., stem, leaves, flowers, seeds, roots) b. Identify and compare the physical structures of a variety of animals (e.g., sensory organs, beaks, appendages, body covering) (Do NOT assess terms: sensory organs, appendages) c. Identify the relationships between the physical structures of plants and the function of those structures (e.g., absorption of water, absorption of light energy, support, reproduction) d. Identify the relationships between the physical structures of animals and the function of those structures (e.g., taking in water, support, movement, obtaining food, reproduction)		<i>Scope and Sequence – Plants</i>  a. Identify the major organs (roots, stems, flowers, leaves) and their functions in vascular plants (e.g., absorption, transport, reproduction) (Do NOT assess the term vascular)		<i>Scope and Sequence – Classification of Plants and Animals</i>  a. Compare structures (e.g., wings vs. fins vs. legs; gills vs. lungs; feathers vs. hair vs. scales) that serve similar functions for animals belonging to different vertebrate classes
	<b>DOK</b>			<b>a - 1</b>		<b>a - 2</b>

## Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>E</b>		<i>Scope and Sequence – Characteristics of Plants and Animals</i>				<i>Scope and Sequence – Classification of Plants and Animals</i>
<b>Biological classifications are based on how organisms are related</b>		a. Distinguish between plants and animals based on observable structures and behaviors				a. Explain how similarities are the basis for classification b. Distinguish between plants (which use sunlight to make their own food) and animals (which must consume energy-rich food) c. Classify animals as vertebrates or invertebrates d. Classify vertebrate animals into classes (amphibians, birds, reptiles, mammals, fish) based on their characteristics e. Identify plants or animals using simple dichotomous keys
<b>DOK</b>						<b>a – 2, b – 1, c – 1, d – 1, e – 1</b>

## Strand 3: Characteristics and Interactions of Living Organisms

2. Living organisms carry out life processes in order to survive						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>	Not assessed at this level					
The cell contains a set of structures called organelles that interact to carry out life processes through physical and chemical means						
DOK						
<b>B</b>	Not assessed at this level					
All living organisms have genetic material (DNA) that carries hereditary information						
DOK						
<b>C</b>						
Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means						
DOK				<i>Scope and Sequence – Plants</i>  a. Illustrate and trace the path of water and nutrients as they move through the transport system of a plant		<i>Scope and Sequence – Classification of Plants and Animals</i>  a. Compare the major organs/organ systems (e.g. support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes
DOK				<b>a – 1</b>		<b>a – 1</b>

## Strand 3: Characteristics and Interactions of Living Organisms

<b>2. Living organisms carry out life processes in order to survive -- Continued</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>D</b>	Not assessed at this level					
Cells carry out chemical transformations that use energy for the synthesis or breakdown of organic compounds						
<b>DOK</b>						
<b>E</b>	Not assessed at this level					
Protein structure and function are coded by the DNA (Deoxyribonucleic acid) molecule						
<b>DOK</b>						
<b>F</b>	Not assessed at this level					
Cellular activities and responses can maintain stability internally while external conditions are changing (homeostasis)						
<b>DOK</b>						
<b>G</b>	Not assessed at this level					
Life processes can be disrupted by disease (intrinsic failures of the organ systems or by infection due to other organisms)						
<b>DOK</b>						

## Strand 3: Characteristics and Interactions of Living Organisms

3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through productive processes						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>	Not assessed at this level					
Reproduction can occur asexually or sexually						
DOK						
<b>B</b>	Not assessed at this level					
All living organisms have genetic material (DNA) that carries hereditary information						
DOK						
<b>C</b>	Not assessed at this level					
Chromosomes are components of cells that occur in pairs and carry hereditary information from one cell to daughter cells and from parent to offspring during reproduction						
DOK						
<b>D</b>	<i>Scope and Sequence – Parent-Offspring Relationships</i>		<i>Scope and Sequence – Life Cycles of Animals</i>	<i>Scope and Sequence – Plants</i>		
There is heritable variation within every species of organism	a. Identify that living things have offspring based on the organisms' physical similarities and differences		a. Identify and relate the similarities and differences among animal parents and their offspring or multiple offspring	a. Identify and relate the similarities and differences between plants and their offspring (i.e., seedlings)		
DOK				<b>a – 2</b>		

## Strand 3: Characteristics and Interactions of Living Organisms

3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through productive processes -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>E</b>	Not assessed at this level					
The pattern of inheritance for many traits can be predicted by using the principles of Mendelian genetics						
<b>DOK</b>						

# Strand 4: Changes in Ecosystems and Interactions of Organisms with their Environments

1. Organisms are interdependent with one another and with their environment						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b> All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem	<i>Scope and Sequence – Weather and Seasons</i>  a. Describe how the seasons affect the behavior of plants and animals.  b. Describe how the seasons affect the everyday life of humans (e.g., clothing, activities)	<i>Scope and Sequence – Characteristics of Plants and Animals</i>  a. Identify ways man depends on plants and animals for food, clothing, and shelter			<i>Scope and Sequence – Interactions Among Organisms and Their Environment</i>  a. Identify the ways a specific organism may interact with other organisms or with the environment (e.g., pollination, shelter, seed dispersal, camouflage, migration, hibernation, defensive mechanism)  b. Identify and describe different environments (i.e. pond, forest, prairie) support the life of different types of plants and animals	
	DOK				a – 1, b – 1	
<b>B</b> Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite	Not assessed at this level					
DOK						

# Strand 4: Changes in Ecosystems and Interactions of Organisms with their Environments

1. Organisms are interdependent with one another and with their environment -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b> All organisms, including humans, and their activities cause changes in their environment that affect the ecosystem	Not assessed at this level					
<b>DOK</b> <b>D</b> The diversity of species within an ecosystem is affected by changes in the environment, which can be caused by other organisms or outside processes					<i>Scope and Sequence – Interactions among Organisms and their Environment</i>  a. Identify examples in Missouri where human activity has had a beneficial or harmful effect on other organisms (e.g., feeding birds, littering vs. picking up trash, hunting/conservation of species, paving/restoring green space)	
<b>DOK</b>					<b>a – 1</b>	

## Strand 4: Changes in Ecosystems and Interactions of Organisms with their Environments

2. Matter and energy flow through an ecosystem						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b> As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use				<i>Scope and Sequence – Food Chains</i>  a. Identify sunlight as the primary source of energy plants use to produce their own food b. Classify populations of organisms as producers or consumers by the role they serve in the ecosystem c. Sequence the flow of energy through a food chain beginning with the Sun d. Predict the possible effects of removing an organism from a food chain	<i>Scope and Sequence – Interactions among Organisms and their Environment</i>  a. Classify populations of organisms as producers and consumers by the role they serve in the ecosystem b. Differentiate between the types of consumers (herbivore, carnivore, omnivore, and detritivore/decomposer) c. Categorize organisms as predator or prey in a given ecosystem	
DOK				<b>a – 1, b – 1, c – 1, d – 2</b>	<b>a – 1, b – 1, c – 2</b>	
<b>B</b> Matter is recycled through an ecosystem	Not assessed at this level					
DOK						

# Strand 4: Changes in Ecosystems and Interactions of Organisms with their Environments

3. Genetic variation sorted by the natural selection process explains evidence of biological evolution						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>					<i>Scope and Sequence – Change's in the Earth's Surface</i>  a. Compare and contrast common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, mastodons) to organisms present on Earth today	
Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics of organisms and in the fossil record						
DOK					a – 2	
<b>B</b>	Not assessed at this level					
Reproduction is essential to the continuation of every species						
DOK						

# Strand 4: Changes in Ecosystems and Interactions of Organisms with their Environments

3. Genetic variation sorted by the natural selection process explains evidence of biological evolution -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b> Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem					<i>Scope and Sequence – Interactions among Organisms and their Environment</i>  a. Identify specialized structures and describe how they help plants survive in their environment (e.g., root, cactus needles, thorns, winged seed, waxy leaves)  b. Identify specialized structures and senses and describe how they help animals survive in their environment (e.g., antennae, body covering, teeth, beaks, whiskers, appendages)  c. Identify internal cues (e.g., hunger) and external cues (e.g., changes in the environment) that cause organisms to behave in certain ways (e.g., hunting, migration, hibernation)  d. Predict which plant or animal will be able to survive in a specific environment based on its special structures or behaviors.	
	<b>DOK</b>					<b>a – 2, b – 2, c – 1, d – 2</b>

## Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

<b>1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>A</b>						
<b>The Earth's crust is composed of various materials, including soil, minerals, and rocks, with characteristic properties</b>			<p><i>Scope and Sequence - Earth Materials: Rocks and Minerals</i></p> <p>a. Observe and describe the physical properties (e.g., odor, color, appearance, relative grain size, texture, absorption of water) and different components (i.e., sand, clay, humus) of soils</p> <p>b. Observe and describe the physical properties of rocks (e.g., size, shape, color, presence of fossils)</p>		<p><i>Scope and Sequence – Changes in the Earth's Surface</i></p> <p>a. Identify and describe the components of soil (e.g., plant roots and debris, bacteria, fungi, worms, types of rock) and its properties (e.g., odor, color, resistance to erosion, texture, fertility, relative grain size, absorption rate)</p> <p>b. Compare the physical properties (i.e., size, shape, color, texture, layering, presence of fossils) of rocks (mixtures of different Earth materials, each with observable physical properties)</p>	
<b>DOK</b>					<b>a – 1, b – 2</b>	

## Strand 5: Processes and Interactions of the Earth’s Systems (Geosphere, Atmosphere, and Hydrosphere)

<b>1. Earth’s systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures -- Continued</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>B</b> The hydrosphere is composed of water (a material with unique properties) and other materials						<i>Scope and Sequence – Water Cycle and Weather</i>  a. Classify major bodies of surface water (e.g., rivers, lakes, oceans, glaciers) as fresh or salt water, flowing or stationary, large or small, solid or liquid, surface or groundwater
<b>DOK</b>						<b>a – 1</b>
<b>C</b> The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles	<i>Scope and Sequence – Weather and Seasons</i>  a. Observe wind as moving air that is felt			<i>Scope and Sequence – Investigating States of Matter</i>  a. Identify that liquid water can be changed into a gas (vapor) in the air. b. Identify that clouds are composed of tiny droplets of water c. Identify air as a substance that surrounds us, taking up space and moves around us as wind		<i>Scope and Sequence – Water Cycle and Weather</i>  a. Recognize the atmosphere is composed of a mixture of gases, water, and minute particles
<b>DOK</b>				<b>a – 1, b – 1, c – 1</b>		<b>a – 1</b>

## Strand 5: Processes and Interactions of the Earth's Systems

(Geosphere, Atmosphere, and Hydrosphere)

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>D</b>	Not assessed at this level					
Climate is a description of average weather conditions in a given area over time						
DOK						

## Strand 5: Processes and Interactions of the Earth’s Systems

(Geosphere, Atmosphere, and Hydrosphere)

2. Earth’s systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>						
The Earth’s materials and surface features are changed through a variety of external processes			<p><i>Scope and Sequence – Earth Materials: Rocks and Minerals</i></p> <p>a. Observe and identify examples of slow changes in <b>the Earth’s surface</b> and surface materials (e.g., rock, soil layers) due to processes such as decay (rotting), freezing, thawing, breaking, or wearing away by running water or wind</p>		<p><i>Scope and Sequence- Changes in the Earth’s Surface</i></p> <p>a. Observe and describe the breakdown of plant and animal material into soil through decomposition processes (i.e., decay/rotting, composting, digestion)</p> <p>b. Identify the major landforms/bodies of water on Earth (i.e., mountains, plains, river valleys, coastlines, canyons)</p> <p>c. Describe how weathering agents (e.g., water, chemicals, temperature, wind, plants) cause surface changes that create and/or change <b>Earth’s surface materials</b> and/or landforms/ bodies of water</p> <p>d. Describe how erosion processes (i.e., action of gravity, waves, wind, rivers, glaciers) cause surface changes that create and/or change <b>Earth’s surface materials</b> and/or landforms/ bodies of water</p> <p>e. Relate the type of landform/water body to the process by which it was formed</p>	
<b>DOK</b>					<b>a – 1, b – 1, c – 1, d – 1, e – 2</b>	

## Strand 5: Processes and Interactions of the Earth's Systems

(Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>B</b>	Not assessed at this level					
There are internal processes and sources of energy within the geosphere that cause changes in Earth's crustal plates						
DOK						
<b>C</b>	Not assessed at this level					
Continual changes in Earth's materials and surface that result from internal and external processes are described by the rock cycle						
DOK						
<b>D</b>	Not assessed at this level					
Changes in the Earth over time can be inferred through rock and fossil evidence						
DOK						

## Strand 5: Processes and Interactions of the Earth's Systems

(Geosphere, Atmosphere, and Hydrosphere)

<b>2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes -- Continued</b>						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>E</b>						
Changes in the form of water as it moves through Earth's systems are described as the water cycle				<i>Scope and Sequence – Investigating States of Matter</i>  a. Describe clouds and precipitation as forms of water		<i>Scope and Sequence – Water Cycle and Weather</i>  a. Describe and trace the path of water as it cycles through the hydrosphere, geosphere, and atmosphere (i.e., the water cycle: evaporation, condensation, precipitation, surface run-off/ groundwater flow) b. Identify the different forms water can take (e.g., snow, rain, sleet, fog, clouds, dew) as it moves through the water cycle
<b>DOK</b>						<b>a – 1, b – 1</b>

## Strand 5: Processes and Interactions of the Earth’s Systems (Geosphere, Atmosphere, and Hydrosphere)

<b>2. Earth’s systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes -- Continued</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>F</b>	<i>Scope and Sequence – Weather and Seasons</i>	<i>Scope and Sequence – Observing Water and Weather</i>				<i>Scope and Sequence Water Cycle and Weather</i>
<b>Climate is a description of average weather conditions in a given area due to the transfer of energy and matter through Earth’s systems</b>	<p>a. Observe and describe daily weather: precipitation (e.g., snow, rain, sleet, fog), wind (i.e., light breezes to strong wind), cloud cover, temperature</p> <p>b. Observe and describe the general weather conditions that occur during each season</p>	<p>a. Observe, measure, record weather data throughout the year (i.e., cloud cover, temperature, precipitation, wind speed) by using thermometers, rain gauges, wind socks</p> <p>b. Compare temperatures in different locations (e.g., inside, outside, in the sun, in the shade)</p> <p>c. Compare weather data observed at different times throughout the year (e.g., hot vs. cold, cloudy vs. clear, types of precipitation, windy vs. calm)</p> <p>d. Identify patterns indicating relationships between observed weather data and weather phenomena (e.g., temperature and types of precipitation, clouds and amounts of precipitation)</p>				<p>a. Identify and use appropriate tools (i.e., thermometer, anemometer, wind vane, rain gauge, satellite images, weather maps) to collect weather data( i.e., temperature, wind speed and direction, precipitation, cloud type and cover.)</p> <p>b. Identify and summarize relationships between weather data (e.g., temperature and time of day, cloud cover and temperature, wind direction and temperature) collected over a period of time.</p>
<b>DOK</b>						<b>a – 2, b – 3</b>

## Strand 5: Processes and Interactions of the Earth's Systems

(Geosphere, Atmosphere, and Hydrosphere)

<b>3. Human activity is dependent upon and affects Earth's resources and systems</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>A</b>		<i>Scope and Sequence – Observing Water and Weather</i>	<i>Scope and Sequence – Earth materials: Rocks and Soil</i>		<i>Scope and Sequence – Changes in the Earth's Surface</i>	<i>Scope and Sequence – Water Cycle and Weather</i>
<b>Earth's materials are limited natural resource's affected by human activity</b>		a. Observe and describe ways water, both as a solid and liquid, is used in everyday activities at different times of the year (e.g., bathe, drink, make ice cubes, build snowmen, cook, swim)	a. Observe and describe ways <b>humans use Earth's materials</b> (e.g., soil, rocks) in a daily life		a. Identify the ways humans affect the erosion and deposition of <b>Earth's materials</b> (e.g., clearing of land, planting vegetation, paving land construction of new buildings) b. Propose ways to solve simple environmental problems (e.g., recycling, composting, ways to decrease soil erosion) that result from human activity	a. Explain how major bodies of water are important natural resources for human activity(e.g., food recreation, habitat, irrigation, solvent, transportation) b. Describe how human needs and activities (e.g., irrigation damming of rivers, waste management, sources of drinking water) have affected the quantity and quality of major bodies of fresh water c. Propose solutions to problems related to water quality and availability that result from human activity
<b>DOK</b>					<b>a – 1, b – 2</b>	<b>a – 2, b – 3, c – 3</b>

## Strand 6: Composition and Structure of the Universe and the Motion of the Objects Within It

1. The universe has observable properties and structure						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>	<i>Scope and Sequence – Objects in the Sky</i>					
<b>The Earth, Sun, and Moon are part of a larger system that includes other planets and smaller celestial bodies</b>	<p>a. Observe and describe the presence of the Sun, Moon, and stars in the sky</p> <p>b. Observe there are more stars in the sky than anyone can count and that they are scattered unevenly and vary in brightness</p>			<p><i>Scope and Sequence – Earth, Sun, and Moon</i></p> <p>a. Describe our Sun as a star because it provides light energy to the solar system</p> <p>b. Observe and identify the Moon as a reflection of light</p>		<p><i>Scope and Sequence – Solar System</i></p> <p>a. Observe and identify the Earth is one of several planets within a solar system that orbits the Sun</p> <p>b. Observe and identify the Moon orbits the Earth in about a month</p> <p>c. Identify that planets look like stars and appear to move across the sky among the stars</p>
<b>DOK</b>				<b>a – 1, b – 1</b>		<b>a – 1, b – 1, c – 1</b>
<b>B</b>	<i>Scope and Sequence – Solar System</i>					
<b>The Earth has a composition and location suitable to sustain life</b>						<p>a. Describe physical features of the planet Earth that allows life to exist (e.g., air, water, temperature) and compare these to the physical features of the Sun, the Moon, and other planets</p>
<b>DOK</b>						<b>a – 2</b>

## Strand 6: Composition and Structure of the Universe and the Motion of the Objects Within It

1. The universe has observable properties and structure -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b>	Not assessed at this level					
Most of the information we know about the universe comes from the electromagnetic spectrum						
DOK						

## Strand 6: Composition and Structure of the Universe and the Motion of the Objects Within It

<b>2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>A</b>	<i>Scope and Sequence – Objects in the Sky</i>			<i>Scope and Sequence – Earth, Sun, and Moon</i>		
<b>The apparent position of the Sun and other stars, as seen from Earth, change in observable patterns</b>	a. Describe the Sun as only being seen in the daytime and appears to move across the sky from morning to night			a. Illustrate and describe how the Sun appears to move slowly across the sky from east to west during the day		
<b>DOK</b>				<b>a – 1</b>		
<b>B</b>	<i>Scope and Sequence – Objects in the Sky</i>			<i>Scope and Sequence – Earth, Sun, and Moon</i>		<i>Scope and Sequence – Solar System</i>
<b>The apparent position of the moon, as seen from Earth, and its actual position relative to Earth change in observable patterns</b>	a. Observe the Moon can be seen sometimes at night and sometimes during the daytime b. Observe that the Moon appears to change shape over the course of a month			a. Illustrate and describe how the Moon appears to move slowly across the sky from east to west during the day and/or night b. Describe the pattern of change that can be observed in the <b>Moon’s appearance</b> relative to time of day and month as it occurs over several months (Do NOT assess moon phases)		a. Sequence images of the lit portion of the Moon seen from Earth as it cycles day-to-day in about a month in order of occurrence
<b>DOK</b>				<b>a – 1, b – 2</b>		<b>a – 2</b>

## Strand 6: Composition and Structure of the Universe and the Motion of the Objects Within It

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b>	<i>Scope and Sequence – Weather and Seasons</i>					
<b>The regular and predictable motions of the Earth and Moon relative to the Sun explain natural phenomena on Earth, such as day, month, year, shadows, moon phases, eclipses, tides, and seasons</b>	a. Observe and describe the characteristics of the four seasons as they cycle through the year (summer, fall, winter, spring)			<i>Scope and Sequence – Earth, Sun, and Moon</i>  a. Observe and identify there is a day/night cycle every 24 hours b. Describe the changes in length and position (direction) of shadows from morning to midday to afternoon c. Describe how the <b>Sun's position</b> in the sky changes the length and position of shadows		<i>Scope and Sequence – Solar System</i>  a. Identify that the Earth rotates once every 24 hours b. Relate changes in the length and position of a shadow to the time of day and apparent position of the Sun in the sky, as determined by <b>Earth's rotation</b> c. Relate the apparent motion of the Sun, Moon, and stars in the sky to the rotation of the Earth (Do not assess apparent motion of polar constellations)
DOK				<b>a – 1, b – 1, c – 1</b>		<b>a – 1, b – 2, c – 2</b>
<b>D</b>	Not assessed at this level					
<b>Gravity is a force of attraction between objects in the solar system that governs their motion</b>						
DOK						

## Strand 7: Scientific Inquiry

1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>A</b> <b>Scientific inquiry includes the ability of students to formulate a testable question and explanation, and to select appropriate investigative methods in order to obtain evidence relevant to the explanation</b>	<i>Scope and Sequence - All Units</i>  a. Pose questions about objects, materials, organisms and events in the environment  b. Conduct a simple investigation (fair test) to answer a question	<i>Scope and Sequence - All Units</i>  a. Pose questions about objects, materials, organisms, and events in the environment  b. Plan and conduct a simple investigation (fair test) to answer a question	<i>Scope and Sequence - All Units</i>  a. Pose questions about objects, materials, organisms and events in the environment  b. Plan and conduct a simple investigation (fair test) to answer a question	<i>Scope and Sequence - All Units</i>  a. Pose questions about objects, materials, organisms, and events in the environment  b. Plan and conduct a fair test to answer a question	<i>Scope and Sequence - All Units</i>  a. Formulate testable questions and explanations (hypotheses) b. Recognize the characteristics of a fair and unbiased test c. Conduct a fair test to answer a question	<i>Scope and Sequence - All Units</i>  a. Formulate testable questions and explanations (hypotheses) b. Recognize the characteristics of a fair and unbiased test c. Conduct a fair test to answer a question d. Make suggestions for reasonable improvements or extensions of a fair test
<b>DOK</b>				<b>a – 2, b – 3</b>	<b>a – 3, b – 2, c – 2</b>	<b>a – 3, b – 2, c – 2, d – 3</b>

## Strand 7: Scientific Inquiry

<b>1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking --Continued</b>						
<b>B</b>	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations</b>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>
	a. Make qualitative observations using the five senses b. Make observations using simple tools and equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers) c. Measure length and mass using non-standard units d. Compare amounts/measurements	a. Make qualitative observations using the five senses b. Make observations using simple tools and equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers) c. Measure length, mass, and temperature using standard and non-standard units d. Compare amounts/measurements	a. Make qualitative observations using the five senses b. Make observations using simple tools and equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers) c. Measure length, mass, and temperature using standard and non-standard units d. Compare amounts/measurements	a. Make qualitative observations using the five senses b. Make observations using simple tools and equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers) c. Measure length, mass, and temperature using standard and non-standard units d. Compare amounts/measurements	a. Make qualitative observations using the five senses b. Make observations using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders) c. Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume using liters d. Compare amounts/measurements e. Judge whether measurements and computation of quantities are reasonable	a. Make qualitative observations using the five senses b. Make observations using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scale) c. Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume to the nearest milliliter, force/weight to the nearest Newton d. Compare amounts/measurements e. Judge whether measurements and computation of quantities are reasonable
<b>DOK</b>				<b>a - 2, b - 1, c - 1, d - 2, e - 2</b>	<b>a - 2, b - 1, c - 1, d - 2, e - 2</b>	<b>a - 1, b - 2, c - 1, d - 1, e - 2, f - 3</b>

## Strand 7: Scientific Inquiry

1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking --Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<p><b>C</b></p> <p><b>Scientific inquiry includes evaluation of explanations (laws/principles, theories /models) in light of evidence (data) and scientific principles (understandings )</b></p> <p><b>See CLEs: This concept became C, as the previous concept was eliminated and the GLEs were moved to this concept, and redundancy was eliminated</b></p>	<p><i>Scope and Sequence - All Units</i></p> <p>a. Use observations as support for reasonable explanations</p> <p>b. Use observations to describe relationships and patterns and to make predictions to be tested</p> <p>c. Compare explanations with prior knowledge</p>	<p><i>Scope and Sequence - All Units</i></p> <p>a. Use observations as support for reasonable explanations</p> <p>b. Use observations to describe relationships and patterns and to make predictions to be tested</p> <p>c. Compare explanations with prior knowledge</p>	<p><i>Scope and Sequence - All Units</i></p> <p>a. Use observations as support for reasonable explanations</p> <p>b. Use observations to describe relationships and patterns and to make predictions to be tested</p> <p>c. Compare explanations with prior knowledge</p>	<p><i>Scope and Sequence - All Units</i></p> <p>a. Use quantitative and qualitative data as support for reasonable explanations</p> <p>b. Use data as support for observed patterns and relationships, and to make predictions to be tested</p> <p>c. Evaluate the reasonableness of an explanation</p> <p>d. Analyze whether evidence supports proposed explanations</p>	<p><i>Scope and Sequence - All Units</i></p> <p>a. Use quantitative and qualitative data as support for reasonable explanations</p> <p>b. Use data as support for observed patterns and relationships, and to make predictions to be tested</p> <p>c. Evaluate the reasonableness of an explanation</p> <p>d. Analyze whether evidence supports proposed explanations</p>	<p><i>Scope and Sequence - All Units</i></p> <p>a. Use quantitative and qualitative data as support for reasonable explanations</p> <p>b. Use data as support for observed patterns and relationships, and to make predictions to be tested</p> <p>c. Evaluate the reasonableness of an explanation</p> <p>d. Analyze whether evidence supports proposed explanations</p>
<b>DOK</b>				<b>a-3, b-3, c-3, d-3</b>	<b>a-3, b-3, c-3, d-3</b>	<b>a-3, b-3, c-3, d-3</b>

## Strand 7: Scientific Inquiry

<b>1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking --Continued</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>D</b>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>	<i>Scope and Sequence - All Units</i>
<b>The nature of science relies upon communication of results and justification of explanations</b>	a. Communicate observations using words, pictures, and numbers	a. Communicate simple procedures and results of investigations and explanations through: ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, pictograph) ⇒ writings	a. Communicate simple procedures and results of investigations and explanations through: ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, pictograph) ⇒ writings	a. Communicate simple procedures and results of investigations and explanations through: ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, single line, pictograph) ⇒ writings	a. Communicate the procedures and results of investigations and explanations through: ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, single line, pictograph) ⇒ writings	a. Communicate the procedures and results of investigations and explanations through: ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, single line, pictograph) ⇒ writings
<b>See CLEs: This concept became D, as the original C concept was eliminated</b>						
<b>DOK</b>				<b>a – 2</b>	<b>a – 2</b>	<b>a – 2</b>

## Strand 8: Impact of Science, Technology and Human Activity

<b>1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>A</b>	<i>Scope and Sequence – Properties of Matter/Weather and Seasons</i>	<i>Scope and Sequence – Properties of Matter/Weather and Seasons</i>	<i>Scope and Sequence – Forms of Energy: Sound</i>	<i>Scope and Sequence – Investigating States of Matter/ Earth, Sun, and Moon</i>	<i>Scope and Sequence – Forms of Energy: Electrical Circuits</i>	<i>Scope and Sequence – Work and Simple Machines</i>
<b>Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all</b>	a. Observe and identify that some objects occur in nature (natural objects); others have been designed and made by people	a. Observe and identify that some objects occur in nature (natural objects); others have been designed and made by people	a. Design and construct a musical instrument using materials (e.g., cardboard, wood, plastic, metal) and/or existing objects (e.g., toy wheels, gears, boxes, sticks) that can be used to perform a task (Assess Locally)	a. Observe and identify that some objects or materials (e.g., Sun, fire, ice, snow) occur in nature (natural objects); others (e.g., stoves, refrigerators, bulbs, candles, lanterns) have been designed and made by people to solve human problems and enhance the quality of life (human-made objects)	a. Design and construct an electrical device, using materials and/or existing objects, that can be used to perform a task (Assess Locally)	a. Design and construct a machine, using materials and/or existing objects, that can be used to perform a task (Assess Locally)
<b>DOK</b>				<b>a – 1</b>	<b>a – 3</b>	<b>a – 3</b>

## Strand 8: Impact of Science, Technology and Human Activity

<b>1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs -- Continued</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>B</b>	<i>Scope and Sequence – Properties of Matter/Plants and Animals</i>	<i>Scope and Sequence – Properties of Matter/Characteristics of Plants and Animals</i>	<i>Scope and Sequence – Forms of Energy: Sound/Properties of Rocks and Soil</i>	<i>Scope and Sequence – Investigating States of Matter/ Earth, Sun, and Moon/Plants</i>	<i>Scope and Sequence – Mixtures and Solutions/Forms of Energy: Electrical Circuits</i>	<i>Scope and Sequence – Work and Simple Machines/Water Cycle and Weather/Solar System/Classification of Plants and Animals</i>
<b>Advances in technology often result in improved data collection and an increase in scientific information</b>	a. Describe how tools have helped scientists make better observations (i.e., magnifiers)	a. Describe how tools have helped scientists make better observations (e.g., magnifiers, balances, thermometers)	a. Describe how tools have helped scientists make better observations, measurements, or equipment for investigations (e.g., magnifiers, balances, stethoscopes, thermometers)	a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, magnifiers, balances, microscopes, computers, stethoscopes, thermometers)	a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, magnifiers, balances, microscopes, computers, stethoscopes, thermometers)	a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, electronic balances, electronic microscopes, x-ray technology, computers, ultrasounds, computer probes such as thermometers)
<b>DOK</b>				<b>a – 2</b>	<b>a – 2</b>	<b>a – 2</b>

## Strand 8: Impact of Science, Technology and Human Activity

1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b>					<i>Scope and Sequence – Forms of Energy: Electrical Circuits/Laws of Motion/Interactions among Organisms and Their Environments</i>	<i>Scope and Sequence – Simple Machines/Water Cycle and Weather/Solar System/Classification of Plants and Animals</i>
<b>Technological solutions to problems often have drawbacks as well as benefits</b>					a. Identify how the effects of inventions or technological advances (e.g., different types of light bulbs, semiconductors/integrated circuits and electronics, satellite imagery, robotics, communication, transportation, generation of energy, renewable materials) may be helpful, harmful, or both (Assess Locally)	a. Identify how the effects of inventions or technological advances (e.g., complex machinery, technologies used in space exploration, satellite imagery, weather observation and prediction, communication, transportation, robotics, tracking devices) may be helpful, harmful, or both (Assess Locally)
<b>DOK</b>					<b>a – 3</b>	<b>a – 3</b>

## Strand 8: Impact of Science, Technology and Human Activity

2. Historical and cultural perspectives of scientific explanations help to improve understanding of the nature of science and how science knowledge and technology evolve over time						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>A</b>						
<b>People of different gender and ethnicity have contributed to scientific discoveries and the invention of technological innovations</b>				<i>Scope and Sequence – All units</i>  a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (Assess Locally)	<i>Scope and Sequence – All units</i>  a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (Assess Locally)	<i>Scope and Sequence – All units</i>  a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (Assess Locally)
DOK				a – 3	a – 3	a – 3
<b>B</b>	Not assessed at this level					
<b>Scientific theories are developed based on the body of knowledge that exists at any particular time and must be rigorously questioned and tested for validity</b>						
DOK						

## Strand 8: Impact of Science, Technology and Human Activity

<b>3. Science and technology affect, and are affected by, society</b>						
	<b>Kindergarten</b>	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Fifth</b>
<b>A</b>	<i>Scope and Sequence - All Units</i>					
<b>People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done</b>	a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of individuals solving everyday problems or learning through discovery)	a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of individuals solving everyday problems or learning through discovery)	a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of individuals solving everyday problems or learning through discovery)	a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)	a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)	a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)
	b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)	b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)	b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)	b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)	b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)	b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)
<b>DOK</b>				<b>a – 3, b – 3</b>	<b>a – 3, b – 3</b>	<b>a – 3, b – 3</b>
<b>B</b>	Not assessed at this level					
<b>Social, political, economic, ethical and environmental factors strongly influence, and are influenced by, the direction of progress of science and technology</b>						
<b>DOK</b>						

## Strand 8: Impact of Science, Technology and Human Activity

3. Science and technology affect, and are affected by, society -- Continued						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>C</b>	Not assessed at this level					
Scientific ethics require that scientists must not knowingly subject people or the community to health or property risks without their knowledge and consent						
DOK						
<b>D</b>	Not assessed at this level					
Scientific information is presented through a number of credible sources, but is at times influenced in such a way to become non-credible						
DOK						