

# Calendar-Based Curriculum Map: Science

## 6<sup>th</sup> Grade

	<b>August/September</b>	<b>October</b>	<b>November</b>
<b>Essential Question</b>	How will students use science understanding to develop through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking?	How do you explain that Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures?	How do changes in properties and states of matter provide evidence of the atomic theory of matter?
<b>Content</b>	<p>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.</p> <p>Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations.</p> <p>Scientific inquiry includes evaluation of explanations (laws/principles, theories/models) in light of evidence (data) and scientific principles (understandings) .</p> <p>The nature of science relies upon communication of results and justification of explanations.</p>	<p>The Earth's crust is composed of various materials, including soil, minerals, and rocks, with characteristic properties.</p> <p>The hydrosphere is composed of water (a material with unique properties), gases, and other materials.</p> <p>The Earth's materials and surface features are changed through a variety of external processes.</p> <p>There are internal processes and sources of energy within the geosphere that cause changes in Earth's crustal plates.</p> <p>Changes in the Earth over time can be inferred through rock and fossil evidence.</p>	<p>Objects, and the materials they are made of, have properties that can be used to describe and classify them.</p> <p>Properties of mixtures depend upon the concentrations, properties, and interactions of particles.</p> <p>Properties of matter can be explained in terms of moving particles too small to be seen without tremendous magnification.</p>
<b>Skills</b>	<p>Formulate testable questions and hypotheses.</p> <p>Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment.</p> <p>Design and conduct a valid experiment .</p> <p>Evaluate the design of an experiment</p>	<p>Describe the components of soil and other factors that influence soil texture, fertility, and resistance to erosion (e.g., plant roots and debris, bacteria, fungi, worms, rodents). GLE Strand 5 1A</p> <p>Identify and describe the properties of water that make it an essential component of the Earth system (e.g.,</p>	<p>Identify matter is anything that has mass and volume.</p> <p>Describe and compare the volumes (the amount of space an object occupies) of objects or substances directly, using a graduated cylinder, and/or indirectly, using displacement methods.</p> <p>Describe and compare the masses (amounts of matter) of objects to the</p>

	<p>and make suggestions for reasonable improvements or extensions of an experiment.</p> <p>Recognize different kinds of questions suggest different kinds of scientific investigations (e.g., some involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve making observations in nature; some involve discovery of new objects and phenomena; some involve making models) GLE Strand 7 1A</p> <p>Make qualitative observations using the five senses.</p> <p>Determine the appropriate tools and techniques to collect data.</p> <p>Use a variety of tools and equipment to gather data (e.g., microscopes, thermometers, computers, spring scales, balances, magnets, metric rulers, graduated cylinders, stopwatches).</p> <p>Measure length to the nearest millimeter, mass to the nearest gram, volume to the nearest milliliter, temperature to the nearest degree Celsius, force (weight) to the nearest Newton, time to the nearest second.</p> <p>Compare amounts/measurements .</p> <p>Judge whether measurements and computation of quantities are reasonable. GLE Strand 7 1B</p> <p>Use quantitative and qualitative data as support for reasonable explanations (conclusions).</p> <p>Use data as support for observed patterns and relationships, and to make predictions to be tested.</p> <p>Determine the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusions).</p>	<p>its ability to act as a solvent, its ability to remain as a liquid at most Earth temperatures). GLE Strand 5 1B</p> <p>Make inferences about the formation of sedimentary rocks from their physical properties (e.g., layering and the presence of fossils indicate sedimentation).</p> <p>Explain how the formation of sedimentary rocks depends on weathering and erosion.</p> <p>Describe how weathering agents and erosional processes (i.e., force of water as it freezes or flows, expansion/contraction due to temperature, force of wind, force of plant roots, action of gravity, chemical decomposition) slowly cause surface changes that create and/or change landforms.</p> <p>Describe how the Earth's surface and surface materials can change abruptly through the activity of floods, rock/mudslides, or volcanoes. GLE Strand 5 2A</p> <p>Identify events (earthquakes, volcanic eruptions) and the landforms created by them on the Earth's surface that occur at different plate boundaries. GLE Strand 5 2B</p> <p>Explain the types of fossils and the processes by which they are formed (i.e., replacement, mold and cast, preservation, trace) .</p> <p>Use fossil evidence to make inferences about changes on Earth and in its environment (i.e., superposition of rock layers, similarities between fossils in different geographical locations, fossils of seashells indicate the area was once underwater). GLE Strand 5 2D</p>	<p>nearest gram using a balance. Classify the types of matter in an object into pure substances or mixtures using their specific physical properties. GLE Strand 1 1A</p> <p>Describe the properties of each component in a mixture/solution and their distinguishing properties (e.g., salt water, oil and vinegar, pond water, Kool-Aid).</p> <p>Describe appropriate ways to separate the components of different types of mixtures (sorting, evaporation, filtration, magnets, boiling, chromatography, screening).</p> <p>Predict how various solids (soluble/insoluble) behave (e.g., dissolve, settle, float) when mixed with water. GLE Strand 1 1B</p> <p>Describe evidence (e.g., diffusion of food coloring in water, light reflecting off of dust particles in the air, condensation of water vapor by increased pressure or decreased temperature) that supports the theory that matter is composed of small particles (atoms, molecules) that are in constant, random motion. GLE Strand 1 1C</p>
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	<p>Evaluate the reasonableness of an explanation (conclusion). Analyze whether evidence (data) and scientific principles support proposed explanations (hypotheses, laws, theories. GLE Strand 7 1C</p> <p>Communicate the procedures and results of investigations and explanations through:</p> <ul style="list-style-type: none"> <li>⇒ oral presentations</li> <li>⇒ drawings and maps</li> <li>⇒ data tables (allowing for the recording and analysis of data relevant to the experiment, such as independent and dependent variables, multiple trials, beginning and ending times or temperatures, derived quantities)</li> <li>⇒ graphs (bar, single line, pictograph)</li> </ul> <p>writings GLE Strand 7 1D</p>	<p>Relate the comparative amounts of fresh water and salt water on the Earth to the availability of water as a resource for living organisms and human activity. Describe the affect of human activities (e.g., landfills, use of fertilizers and herbicides, farming, septic systems) on the quality of water. Analyze the ways humans affect the erosion and deposition of soil and rock materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings, building or removal of dams) and propose possible solutions. GLE Strand 5 3A</p>	
<b>Assessments</b>	Teacher created, publisher provided materials, observations, and oral assessments. Individual and group projects and presentations.	Teacher created, publisher provided materials, observations, and oral assessments. Individual and group projects and presentations.	Teacher created, publisher provided materials, observations, and oral assessments. Individual and group projects and presentations.
<b>Activities/Resources</b>	<p>Lecture, discussion, experiments, projects,</p> <p>Textbook, internet, science magazines, videos, library, encyclopedias, various persons</p>	<p>Lecture, discussion, experiments, projects,</p> <p>Textbook, internet, science magazines, videos, library, encyclopedias, various persons</p>	<p>Lecture, discussion, experiments, projects,</p> <p>Textbook, internet, science magazines, videos, library, encyclopedias, various persons</p>

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## 6<sup>th</sup> Grade

	<b>December</b>	<b>January</b>	<b>February</b>
<b>Essential Question</b>	How do changes in properties and states of matter provide evidence of the atomic theory of matter?	What is the fundamental unity underlying the diversity of all living organisms?	What is the fundamental unity underlying the diversity of all living organisms?
<b>Content</b>	<p>Physical changes in the state of matter that result from thermal changes can be explained by the Kinetic Theory of Matter.</p> <p>Properties of objects and states of matter can change chemically and/or physically.</p> <p>Mass is conserved during any physical or chemical change.</p>	<p>Organisms have basic needs for survival.</p> <p>Cells are the fundamental units of structure and function of all living things.</p> <p>Biological classifications are based on how organisms are related.</p>	<p>The cell contains a set of structures called organelles that interact to carry out life processes through physical and chemical means.</p> <p>Photosynthesis and cellular respiration are complementary processes necessary to the survival of most organisms on Earth</p>
<b>Skills</b>	<p>Describe the relationship between the change in the volume of water and changes in temperature as it relates to the properties of water (i.e., water expands and becomes less dense when frozen). GLE Strand 1 1D</p> <p>Identify and classify changes in matter as chemical and/or physical. Identify chemical changes (i.e., rusting, oxidation, burning, decomposition by acids, decaying, baking) in common objects (i.e., rocks such as limestone, minerals, wood, steel wool, plants) as a result of interactions with sources of energy or other matter that form new substances with different characteristic properties.</p> <p>Identify physical changes in common objects (e.g., rocks, minerals, wood, water, steel wool, plants) and describe</p>	<p>Describe the common life processes necessary to the survival of organisms (i.e., growth, reproduction, life span, response to stimuli, energy use, exchange of gases, use of water, elimination of waste). GLE Strand 3 1A</p> <p>Recognize all organisms are composed of cells, the fundamental units of life, which carry on all life processes. GLE Strand 3 1C</p> <p>Recognize most of the organisms on Earth are unicellular (e.g., bacteria, protists) and other organisms, including humans, are multicellular . Identify examples of unicellular (e.g., bacteria, some protists, fungi) and multicellular organisms (e.g., some fungi, plants, animals). GLE Strand 3 1E</p>	<p>Compare and contrast the following plant and animal cell structures: cell membrane, nucleus, cell wall, chloroplast, and cytoplasm Recognize the chloroplast as the cell structure where food is produced in plants and some unicellular organisms (e.g., algae, some protists). GLE Strand 3 2A</p> <p>Describe how plants use energy from the Sun to produce food and oxygen through the process of photosynthesis. GLE Strand 3 2B</p>

	<p>the processes which caused the change (e.g., weathering, erosion, cutting, dissolving. GLE Strand 1 1G</p> <p>Demonstrate and provide evidence that mass is conserved during a physical change. GLE Strand 1 1A</p>		
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## 6<sup>th</sup> Grade

	<b>March</b>	<b>April/May</b>	
<b>Essential Question</b>	How are organisms interdependent with one another and with their environment?	How does matter and energy flow through an ecosystem?	
<b>Content</b>	<p>All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem.</p> <p>Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite.</p> <p>The diversity of species within an ecosystem is affected by changes in the environment, which can be caused by other organisms or outside processes.</p>	<p>As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use.</p> <p>Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics of organisms and in the fossil record.</p> <p>Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem.</p>	
<b>Skills</b>	<p>Identify the biotic factors (populations of organisms) and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition) that make up an ecosystem. GLE Strand 4 1A</p> <p>Identify populations within a community that are in competition with one another for resources.</p> <p>Identify the factors that affect the number and types of organisms an</p>	<p>Diagram and describe the transfer of energy in an aquatic food web and a land food web with reference to producers, consumers, decomposers, scavengers, and predator/prey relationships.</p> <p>Classify populations of unicellular and multicellular organisms as producers, consumers, and decomposers by the role they serve in the ecosystem. GLE Strand 4 2A</p>	

	<p>ecosystem can support (e.g., food availability, abiotic factors such as quantity of light and water, temperature and temperature range, soil composition, disease, competitions from other organisms, predation) .</p> <p>Predict the possible effects of changes in the number and types of organisms in an ecosystem on the populations of other organisms within that ecosystem. GLE Strand 4 1B</p> <p>Describe beneficial and harmful activities of organisms, including humans (e.g., deforestation, overpopulation, water and air pollution, global warming, restoration of natural environments, river bank/coastal stabilization, recycling, channelization, reintroduction of species, depletion of resources), and explain how these activities affect organisms within an ecosystem. Predict the impact (beneficial or harmful) of a natural environmental change (e.g., forest fire, flood, volcanic eruption, avalanche) on the organisms in an ecosystem. Describe possible solutions to potentially harmful environmental changes within an ecosystem. GLE Strand 4 1D</p>	<p>Identify fossils as evidence some types of organisms (e.g., dinosaurs, trilobites, mammoths, giant tree ferns) that once lived in the past, and have since become extinct, have similarities with and differences from organisms living today. GLE Strand 4 3A</p> <p>Relate examples of adaptations (specialized structures or behaviors) within a species to its ability to survive in a specific environment (e.g., hollow bones/flight, hollow hair/insulation, dense root structure/compact soil, seeds/food, protection for plant embryo vs. spores, fins/movement in water). Predict how certain adaptations, such as behavior, body structure, or coloration, may offer a survival advantage to an organism in a particular environment. GLE Strand 3C</p>	
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