

## SCIENCE 21 CURRICULUM MAP

### Grade Level: 4th

#### Essential Questions for Grade Level:

- \*How are individuals and living organisms and groups of living things organized to get food?
- \*How are machines organized to do work?
- \*How is the Earth organized and how does that organization change?

Unit/Timeframe	Unit Essential Questions	Unit Objectives	Concepts/Major Understandings	NYS Performance Indicators
<p>Unit 1: Organizing Ourselves for Doing Science</p> <p>Sept. – Oct.</p>	<p>*How can we identify problems to solve in science?</p> <p>*How can we investigate a problem we select?</p> <p>*Why is it important to make and follow a written plan or procedure when doing an investigation?</p> <p>*How do we communicate the results of our investigations to others?</p>	<p><b>Students will be able to organize themselves for doing science. (Unit 1)</b></p> <ol style="list-style-type: none"> <li>1. Be able to engage in the process of science that includes observing, questioning, predicting, hypothesizing, conducting investigations, analyzing data and communicating their findings in a variety of ways.</li> <li>2. Be able to list and demonstrate safety procedures in doing science activities in the classroom.</li> <li>3. Be able to follow written and oral procedures in observing and describing results from an investigation.</li> <li>4. Be able to connect prior knowledge to science experiences and solve problems using the inquiry process.</li> <li>5. Be able to communicate data orally and in writing, using student journals.</li> <li>6. Be able to use and read metric measuring tools (thermometer, balance scale, graduated cylinder, metric tape or ruler).</li> </ol>	<p>*The process of scientific inquiry includes observing of natural phenomena, conducting investigations to answer questions, analyzing results of investigations, developing explanations and hypotheses, and sharing the findings with others.</p> <p>*Scientists develop explanations of natural phenomena using evidence from their investigations and what scientists already known about the world.</p> <p>*Scientists investigate questions and proposed explanations using a controlled experiment or ‘fair test’, an experiment in which all the variables are kept the same, except the variable that is being investigated.</p> <p>*Scientists use tools such as thermometers, rulers, graduated cylinders and balances to measure quantities, such as length, mass, volume, and temperature. These simple scientific instruments provide more information than scientists can obtain by using only their senses.</p>	<p>SI 1, 2 MA 3.1 SI 1,2 MA 3.1 SI 3.1 MA 3.1</p>

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Unit 2: Digestion, Nutrients, Food Chains and Food Webs  Nov. – Jan.	<p>*What is a food chain and where do we find them? What is a food web and where do we find them?</p> <p>*How does energy flow within an organism, a food chain, and a food web?</p> <p>*What nutrients are essential for our growth and well-being and how do we use them?</p> <p>*What is a food pyramid and why is it important?</p> <p>*How does the structure of the digestive system help you survive?</p>	<p><b>Students will be able to investigate the relationship of organisms in terms of food chains and food webs.</b></p> <ol style="list-style-type: none"> <li>1. Be able to recognize and explain food chains, food webs and food pyramids in terms of producers and consumers.</li> <li>2. Be able to measure, dissect and analyze an owl pellet to make connections to food chains and food webs.</li> </ol> <p><b>Students will be able to explore the human digestive tract and its role in digestion.</b></p> <ol style="list-style-type: none"> <li>1. Be able to identify, label and describe the role of the major organs of the digestive tract.</li> <li>2. Be able to examine the physical and chemical changes of food into nutrients that occur in the digestive tract.</li> </ol> <p><b>Students will be able to identify nutrients essential for our body and its growth and maintenance.</b></p> <ol style="list-style-type: none"> <li>1. Be able to identify the six major nutrients needed by the body. (proteins, carbohydrates, fats, vitamins, minerals, water).</li> <li>2. Be able to research and evaluate the USDA Food Guide Pyramid and what constitutes a healthy diet.</li> <li>3. Be able to analyze and read food ingredient labels and nutrition fact labels to determine the healthiness of foods.</li> </ol>	<p>*Using water, air, and energy from sunlight, plants make the food they need for their life processes; they are producers.</p> <p>*Animals cannot make their own food and get their food they need for their life processes from the environment by eating plants, animals, or both; they are consumers.</p> <p>*In a food chain, energy from the sun is transferred from plants to the animals that eat the plants for food, and then to the animals that eat other animals.</p> <p>*The complex relationships between plants and animals are depicted in food webs, and in food pyramids, showing the flow of energy within an ecosystem.</p> <p>*The digestive system consists of several organs that work together to break food down into molecules that can be absorbed by the cells.</p>	<p>LE 6.1c,d LE 6.1c,d</p> <p>LE 6.1a,c,d LE 6.1a,c,d</p> <p>LE 6.1a,c LE 6.1 a,c</p> <p>PS 6.1c, 6.2b, 6.2c</p>

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Unit 3: Simple Machines  Feb. – March	*What are simple machines and how do they make work easier?  *How do you make a simple machine and how do you use it make work easier?  *How have simple machines affected the development of human civilizations?	<p><b>Students will be able to explore what simple machines are and how they make work easier. (Unit 3)</b></p> <ol style="list-style-type: none"> <li>1. Be able to observe and describe six simple machines. (lever, inclined plane, wedge, screw, wheel and axle, pulley)</li> <li>2. Be able to explain and demonstrate how each of the simple machines is used to make work easier.</li> <li>3. Be able to identify the fulcrum, load and effort of a lever.</li> <li>4. Be able to investigate and explain what factors will affect the force of an object placed on an inclined plane (ramp).</li> <li>5. Be able to identify and list simple machines used by early settlers to meet their daily needs.</li> <li>6. Be able to identify and label simple machines found in a grist mill during colonial times.</li> <li>7. Be able to design and develop a simple machine and demonstrate how it makes work easier.</li> <li>8. Be able to create, read and interpret graphs and tables based on the data they collect about simple machines.</li> <li>9. Be able to create a group presentation on the history and uses of simple machines.</li> </ol>	*Mechanical energy can be transferred from one object to another and cause a change in motion, through the use of simple machines.  *Simple machines have a moving part and can do work. They include pulleys, levers and inclined planes.  *Machines cannot change the amount of work for a task, but they can make the work ‘easier’ by changing the direction or amount of force, or the distance or speed of force required to do the work.  *Machines can be made more efficient by reducing friction between moving parts.  *A lever makes work easier by reducing the amount of force needed, with the force being applied over a greater distance; it takes less force to move an object up an inclined plane, but the smaller force must be applied over a greater distance; a simple pulley changes the direction of an applied force; a compound pulley increases force, but at the expense of distance.	PS 5.2F PS 5.2F PS 5.2F PS 5.2F PS 5.2F PS 5.2F PS 5.2F PS 5.2F

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<p>Unit 4: Organization of the Earth (constructive and destructive forces, rocks and minerals)</p> <p>April - June</p>	<p>*What are the forces that build landforms?</p> <p>*What are the forces that break down landforms?</p> <p>*What is the relationship between air, water, and land?</p> <p>*How does the study of rocks give us clues about the composition of the Earth?</p>	<p><b>Students will be able to understand the constructive and destructive forces of the Earth.</b></p> <ol style="list-style-type: none"> <li>1. Be able to identify and describe the main layers of the Earth by creating a clay model (crust, mantle, core).</li> <li>2. Be able to explain the theory of plate tectonics.</li> <li>3. Be able to relate earthquakes, volcanoes and mountains to one of three types of movement of the Earth's plates.</li> <li>4. Be able to describe and demonstrate constructive forces in mountain formations (folding, faulting, doming, volcanic action).</li> <li>5. Be able to describe and demonstrate changes of Earth's surface due to destructive forces of weathering and erosion.</li> <li>6. Be able to use a diagram of the rock cycle to explain the formation of igneous, metamorphic and sedimentary rocks.</li> <li>7. Be able to examine, sort and classify rocks of the Earth's crust into igneous, metamorphic and sedimentary.</li> </ol>	<p>*The properties of rocks are determined by the way they were formed and the minerals in them. The recurring series of events that rocks undergo, over time, that transforms them from one type to another is called the rock cycle.</p> <p>*Rocks can be sorted and classified as igneous, sedimentary and metamorphic based on their properties. The properties of rocks include color, mineral composition, and texture.</p> <p>*The earth's outer shell is composed of tectonic plates which move relative to each other and interact at plate boundaries. Plate movement and faults are a cause of earthquakes, volcanoes, and mountain formation.</p> <p>*Catastrophic events, such as volcanoes and earthquakes, provide information about the earth's interior. Patterns in earthquake locations reveal plate boundaries.</p> <p>*The wearing away and moving of soil and rock is erosion; the settling of eroded materials is deposition. Chemical weathering is one cause of the wearing away of rock. The flow of water over the land also affects erosion and deposition.</p>	<p>PS 7.1a, 7.1c PS 7.1a, 7.1c PS 7.1a, 7.1c PS 7.1a, 7.1c PS 7.1a, 7.1c PS 7.1a, 7.1c PS 7.1a, 7.1c</p>