

## Scope and Sequence

### Pre-K Science

Unit Title	Unit Topic and Goals
Let's Be Scientists	<p>What is a scientist?</p> <ul style="list-style-type: none"> <li>• How can we become scientists at school?</li> <li>• What tools do scientists use to observe objects?</li> <li>• How do we use our five senses to observe how each object looks, sounds, feels, tastes or smells.</li> </ul>
Colors and Mixing	<p>What happens when colors are mixed together?</p> <ul style="list-style-type: none"> <li>• Which colors are primary?</li> <li>• What does this mean?</li> <li>• What happens when I mix two colors?</li> <li>• What does it mean if a color is secondary?</li> </ul>
Weather and Seasons	<p>What are the four seasons?</p> <ul style="list-style-type: none"> <li>• What happens when the weather changes?</li> <li>• What do we wear?</li> <li>• What activities do we participate in?</li> <li>• How do our surroundings change? (What do the trees like?)</li> </ul>
Five Senses	<p>How do our senses help us explore, investigate and understand the world around us?</p> <ul style="list-style-type: none"> <li>• How do we use our sense of sight?</li> <li>• How do we use our sense of hearing?</li> <li>• How do we use our sense of taste?</li> <li>• How do we use our sense of smell?</li> <li>• How do we use our sense of touch?</li> </ul>
Nutrition and My Body	<p>How do we take care of our body?</p> <ul style="list-style-type: none"> <li>• What foods are healthy?</li> <li>• How do we stay healthy?</li> <li>• What are the four food groups?</li> <li>• Which foods are good to eat from each food group?</li> <li>• Why is food important?</li> <li>• Why is exercise important?</li> <li>• Why is it important to get proper rest?</li> <li>• How do we feel when we are hungry?</li> <li>• Where does our food come from?</li> </ul>
Farm and Planting	<p>What happens on a farm?</p> <ul style="list-style-type: none"> <li>• What is a farm?</li> <li>• How do machines help farmers?</li> <li>• Why do farmers have animals?</li> <li>• How does food get from a farm to your house?</li> </ul>

	<p>How do plants grow and why are they important?</p> <ul style="list-style-type: none"> <li>• What are plants?</li> <li>• What do plants need and where do we find them?</li> <li>• What are some different kinds of plants?</li> <li>• Why are plants important?</li> </ul>
Earth and Sky	<p>What changes on the Earth and the sky?</p> <ul style="list-style-type: none"> <li>• What happens when day changes to night?</li> <li>• What happens when the weather changes?</li> <li>• What changes in each season?</li> <li>• How can we take care of the Earth?</li> <li>• What does it mean to recycle? What types of things do we recycle to keep the Earth clean?</li> </ul>
Shadows and Reflections	<p>What are shadows and reflections?</p> <ul style="list-style-type: none"> <li>• Why do we see shadows?</li> <li>• What makes shadows change?</li> <li>• What is a reflection?</li> <li>• Why can't we hold on to shadows and reflections?</li> </ul>
Jungle and Desert	<p>What is it like to live in a jungle or in a desert?</p> <ul style="list-style-type: none"> <li>• What is a jungle?</li> <li>• What are jungle animals?</li> <li>• What is a desert?</li> <li>• What are desert animals like?</li> </ul>
Make it Move(Transportation)	<p>How do things move?</p> <ul style="list-style-type: none"> <li>• What are the different ways things move?</li> <li>• What can we do to make things move?</li> <li>• How does wind make things move?</li> <li>• How do machines help us move things?</li> </ul>

## *Scope and Sequence: Kindergarten Science*

Unit Title & Timeframe	Unit Topics & Goals
September: 4 weeks	<ul style="list-style-type: none"> <li>• What is a scientist?</li> <li>• How do scientist observe and collect data (daily weather charting)</li> <li>• Writing like a scientist and science tools</li> <li>• Safety rules and routines</li> </ul>
October: 4 weeks	<ul style="list-style-type: none"> <li>• 5 senses</li> <li>• Mystery Boxes</li> <li>• 5 senses centers</li> <li>• Journal writing about experience with the 5 senses</li> </ul>
November: 4 weeks	<ul style="list-style-type: none"> <li>• What is weather?</li> <li>• Energy from the sun as heat</li> <li>• Engineering sun protection (“sunbrellas”)</li> </ul>
December: 3 weeks	<ul style="list-style-type: none"> <li>• What is a meteorologist?</li> <li>• Patterns in weather (daily recording from Sept)</li> <li>• Severe weather vs. normal weather (snow globes)</li> </ul>
January and February: 7 weeks	<ul style="list-style-type: none"> <li>• Introduction to push and pull forces (push/pull sort cards)</li> <li>• Science 21 Forces book and journal response</li> <li>• The Push experiment</li> <li>• The Pull experiment</li> <li>• The Robot Direction experiment (show direction)</li> <li>• Collision experiment</li> <li>• Collide the Cup experiment</li> <li>• Push/Pull the car experiment</li> </ul>
March/April: 7 weeks	<ul style="list-style-type: none"> <li>• Wants and Needs to survive; humans, plants and animals</li> <li>• Earth Day: reducing human waste in the environment (recycling art project)</li> <li>• Let’s Get Growing</li> </ul>

	<ul style="list-style-type: none"> <li>• Parts of a bean (dissection and exploration of parts)</li> <li>• Plant experiment providing water and light vs. withholding water and light</li> <li>• Recording and comparing growth of plant</li> </ul>
<p>May/June: 7 weeks</p>	<ul style="list-style-type: none"> <li>• Habitats: How plants and animals are dependent on each other and their habitats</li> <li>• Environment: river, dessert, ocean</li> <li>• What is a ladybug?</li> <li>• Ladybug anatomy: diagram with labels</li> <li>• Lifecycle of a ladybug</li> <li>• How to prepare a habitat for a Ladybug: students will identify what a ladybug needs to survive and create it</li> <li>• Observe and record ladybugs in their environment</li> <li>• Release ladybugs into their natural environment</li> </ul>

## SCIENCE: GRADE 1

Unit Title & Timeframe	Unit Topics & Goals
<b>Unit 1: Organizing Ourselves To Do Science Investigations</b>	<p><b>Unit Objectives</b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"><li>• observe the characteristics of an object.</li><li>• observe, describe and discriminate the attributes of common objects.</li><li>• order serially and classify objects by shape, size, length, weight, color, and texture.</li><li>• organize their ideas to set up a classroom where they can investigate science.</li><li>• contribute to and understand the importance of classroom rules, and science safety rules.</li><li>• describe what a scientist does.</li><li>• work cooperatively and collaboratively to answer questions.</li><li>• contribute to the inquiry process by learning what a question is, and participate in asking inquiry questions.</li><li>• observe, classify, collect and process data about themselves.</li><li>• report to their peers orally, by drawing (and possibly writing), and with graphs what they have discovered in their science investigations.</li></ul> <p>Lesson 1: Why do we need to organize ourselves and our materials? Lesson 2: How are the materials in the classroom organized and why? Lesson 3: What do scientist do? (What is an ...ologist and an ...ist?) Lesson 4: How do we behave when we are doing science activities? Lesson 5: How and why do scientists collaborate? Lesson 6: How and why do scientists observe? Lesson 7: How and why do scientists ask good questions? Lesson 8: How can we collect and record information? Lesson 9: How and why do Scientists tell others what they have done and found out?</p>

<p><b>Unit 2: Investigating Attributes and Properties Of Objects</b></p>	<p><b>Unit Objectives</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>• observe and describe the properties of objects.</li> <li>• sort and re-sort objects or people according to particular attributes.</li> <li>• develop and implement plans for collecting and analyzing data in order to answer questions.</li> <li>• create, read and interpret concrete graphs, picture graphs and tally charts.</li> </ul> <p>Lesson 1: What is a Property? Lesson 2: Sorting Objects Using Their Properties Lesson 3: Sort and Compare Ourselves Using Properties Lesson 4: Sort and Compare Ourselves with a Venn Diagram Lesson 5: Describing the Properties of Different Materials Lesson 6: Sorting Objects by Sinking or Floating Lesson 7: Designing and Building Boats Lesson 8: (Optional) Does This Plastic Sink or Float?</p>
<p><b>Unit 3: Identifying the States Of Matter</b></p>	<p><b>Unit Objectives</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>• Observe and describe the properties of solids, liquids and gases.</li> <li>• Classify solids, liquids and gases by their attributes.</li> <li>• Observe and describe the three states of water.</li> <li>• Give an example of an experiment that they have done which demonstrates how matter can change its state.</li> <li>• Observe, classify and describe the properties of various foods by preparing and relating the concept of states of matter to familiar foods.</li> </ul> <p>Lesson 1: What Properties Do All Liquids Have In Common? Lesson 2: What Properties Do All Solids Have In Common? Lesson 3: What Are The Properties Of A Common Gas (air)? Lesson 4: How Does The Temperature Affect States Of Matter (liquid to solid, solid to liquid)? Extension Lesson 4: How Can We Cause Water (a liquid) To Change Into Water Vapor (a gas)? Extension Lesson 4: How Can We Cause A Liquid To Change Into A Gas? Extension Lesson 4: What Other Changes Can We Observe When a Container Of Liquid Is Placed Under Different Conditions? Lesson 5: What Foods Can We Make In Class That Demonstrate Changes In The States Of Matter? Lesson 6: How Can We Grow Crystals?</p>

**Unit 4:  
Investigating  
Living Things**

**Unit Objectives**

Students will be able to:

- Create an environment for a hermit crab.
- Describe the properties of a hermit crab.
- Describe the properties of all living things.
- Classify all living and non-living things according to properties.
- Describe the structure and function of the parts of a plant.
- Use journal pages to record their observations.

Lesson 1: Can We Find An Object, Given A List Of Properties?

Lesson 2: Is Your “Pet” Alive?

Lesson 3: How Can We Set Up An Environment To Meet The Needs Of Our Living Thing?

Lesson 4: How Can We Set Up A Small Environment To Meet The Needs Of Individual Living Things?

Lesson 5: What Observations Can We Make About Our Living Things?

Lesson 6: How Do Our Living Things React to Different Stimuli?

How Do These Reactions Explain How Our Living Things Interact with the Environment?

Lesson 7: What And How Do Our Living Things Eat?

Lesson 8: Which Parts of Plants Can We Identify?

Which Parts of the Cucumber Plants Will Our Living Things Like to Eat?

Lesson 9: What Are The Differences Between The “Pet” Object And Our Living Thing?

Lesson 10: How Are Our Living Things Like Us? How Are They Different?

## SCIENCE: GRADE 2

Unit Title & Timeframe	Unit Topics & Goals
Unit 1: Tools to Measure Our World	<p><b>Objectives:</b> Students will be able to use tools to measure changes in our world. (Unit 1)</p> <ol style="list-style-type: none"> <li>1. Be able to describe suitable behavior and rules for working safely when carrying out science activities.</li> <li>2. Be able to identify tools that they use in their daily lives.</li> <li>3. Be able to define a tool as an implement that makes work easier.</li> <li>4. Be able to identify the properties that a tool will measure (length, volume, weight and temperature).</li> <li>5. Be able to choose and use an appropriate tool for measuring size (linear, volume), weight and temperature.</li> <li>6. Be able to use thermometers, measuring cups, scales and rulers to record changes that occur throughout their experiments.</li> </ol> <p><b>Activities:</b>            Safety Contract            Journal cover            Tool Riddle            Cut out paper without scissors            Gro-Beasts - dinosaurs in water            Measure the weight of socks and shoelaces</p>
Unit 2: Observing and Measuring Changes in Energy	<p><b>Process Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Develop abilities in science.               <ol style="list-style-type: none"> <li>A. Think clearly and solve problems about science (classify, decide, estimate, solve, compare).</li> <li>B. Talk and write clearly about science (present, persuade, collaborate, explain, recommend).</li> <li>C. Make careful plans and use them (brainstorm, envision, research, plan, organize, persist).</li> <li>D. Use the quality process (plan, draft, analyze, and revise when producing products).</li> </ol> </li> <li>2. Be able to apply science knowledge and skills to a variety of purposes.               <ol style="list-style-type: none"> <li>A. Be able to solve problems using the scientific method (research, hypothesis, experimentation, findings, conclusion).</li> <li>B. Be able to conduct research (field research, library research and experimentation).</li> <li>C. Be able to use scientific equipment appropriately (safety, effectively, efficiently, accurately).</li> <li>D. Know how to preserve the earth (reuse, reduce, recycle, refuse).</li> </ol> </li> <li>E Possess technical skills:                -Listen/read/write/present: instructions, chart, report, proposal, letter of request,</li> </ol>



	<p>summary  - Technology: word processing, Internet, AV production  Content Objectives: Students will be able to observe and sometimes measure changes in energy.</p> <ol style="list-style-type: none"> <li>1. Be able to explore, observe and identify different forms of energy.</li> <li>2. Be able to describe a variety of forms of energy (sound, chemical, light, magnetic, heat, solar, electrical, wind, etc.).</li> <li>3. Be able to explore, observe and explain how energy affects their lives/environment.</li> <li>4. Be able to identify sources of light in the environment.</li> <li>5. Be able to construct their own musical instruments at home and at school.</li> <li>6. Be able to observe, demonstrate and select objects that are attracted by magnets.</li> <li>7. Be able to design, build and discuss an invention related to energy.</li> </ol> <p><b>Activities:</b>  Flashlight (opaque, transparent, translucent) handwarmers  ice in a bag  rubber band on cup  popcorn activity</p>
<p>Unit 3: Observing and Measuring changes in Living things.</p>	<p><b>Objectives:</b> Students will be able to observe and measure changes in living things. (Unit 3)</p> <ol style="list-style-type: none"> <li>1. Be able to observe the studied plants and animals accurately, describing their properties.</li> <li>2. Be able to state the requirements of plants and animals to grow, stay healthy and thrive.</li> <li>3. Be able to compare and describe a bulb and a seed.</li> <li>4. Be able to measure and record the changes in flowers and bulbs that take place as they germinate and grow from seeds, to seedlings, and to mature plant.</li> <li>5. Be able to describe the function of a bulb.</li> <li>6. Be able to define life span and life cycle.</li> <li>7. Be able to describe the life span and life cycle of tadpoles.</li> <li>8. Be able to set up a habitat for tadpoles.</li> <li>9. Be able to measure and record changes of animal growth for tadpoles.</li> <li>10. Be able to identify the main features (properties and structures) of the tadpoles.</li> <li>11. Be able to compare and contrast the animal of study to humans</li> </ol> <p><b>Activities:</b>  grow tadpoles  planting and gardening</p>
<p>Unit 4: Observing and Measuring Changes In the Environment</p>	<p><b>Objectives:</b> Students will be able to observe and measure changes in the environment. (Unit 4)</p> <ol style="list-style-type: none"> <li>1. Be able to measure and collect data for each of the seasons of the year.</li> <li>2. Be able to observe, recognize and record seasonal changes and adaptations.</li> <li>3. Be able to recognize animal and human adaptations to changing conditions through the seasons.</li> </ol>

	<p>4.Be able to build a tool to measure shadows.</p> <p>5.Be able to make and use a sundial.</p> <p>6.Be able to describe the appearance of the moon changing as it moves around the earth to complete a single cycle.</p> <p>7.Be able to compare insulation and relate it to animal characteristics and behavior.</p> <p>8.Be able to compare waterproof properties of fabrics.</p> <p>9.Be able to construct a tool to collect heat energy from the sun.</p> <p>10.Be able to observe the changes in trees and clothing through the seasons.</p> <p>Activities: observe and record tree</p> <p>Measure time and sunset sunrise</p>

**THIRD GRADE SCIENCE**  
*Scope and Sequence*

Unit Title & Timeframe	Unit Topics & Goals
Unit 1 – How a scientist investigates Plant Cycles September - December	<p><b>Students will be able to describe how a scientist investigates plant cycles. (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 develop a science journal in order to record the questions, processes, and progress of their investigations.</li> <li>3. Be able to investigate the germination process of seeds.</li> <li>4. Be able to investigate and identify the parts and functions of plants (seeds, roots, stem, leaves, flower).</li> <li>5. Be able to summarize the life cycle of a typical plant.</li> </ol>
Unit 2 – How a scientist investigates electricity December - February	<p><b>Students will be able to describe how a scientist investigates electricity. (Unit 2)</b></p> <ol style="list-style-type: none"> <li>1. Be able to identify two forms of electricity as static electricity and current electricity.</li> <li>2. Be able to investigate the flow and control of electricity.</li> <li>3. Construct, draw, identify, and label a simple circuit and its parts.</li> <li>4. Trace and illustrate the path or flow of electricity through a circuit.</li> <li>5. Construct, observe, and explore how switches control electrical flow (open and closed circuits).</li> <li>6. Be able to observe, describe, draw and label a light bulb and its parts.</li> <li>7. Be able to investigate and identify conductors and non-conductors.</li> <li>8. Be able to construct, explore, identify and compare series and parallel circuits.</li> <li>9. Be able to explore the application and safe use of electricity.</li> <li>10. Be able to construct a circuit board.</li> </ol>
Unit 3 – How a Scientist Investigates Water Cycles March – April	<p><b>Students will be able to describe how a scientist investigates water cycles. (Unit 3)</b></p> <ol style="list-style-type: none"> <li>1. Be able to determine uses of water and identify sources of water.</li> <li>2. Be able to explore how water changes states (solid, liquid, and gas)</li> </ol>

<p>(Unit 3 Water Cycle – continued)</p>	<p>from one form to another).</p> <ol style="list-style-type: none"> <li>3. Read a thermometer in both Fahrenheit and Celsius units</li> <li>4. Determine the relationship between temperature and the different states of water.</li> <li>5. Be able to create a model of a water molecule.</li> <li>6. Be able to create a model of the water cycle to learn about evaporation, condensation, and precipitation.</li> <li>7. Be able to describe the role of water in some weather phenomena.</li> <li>8. Be able to explore the relationship of the water cycle to weather.</li> <li>9. Observe and record data on the different types of clouds and their relationship to weather.</li> <li>10. Identify the various types of precipitation.</li> <li>11. Create a cloud.</li> <li>12. Be able to analyze methods of water purification and conservation.</li> </ol>
<p>Unit 4 – How a Scientist investigates Animal Cycles April - June</p>	<p><b>Students will be able to describe how a scientist investigates animal cycles. – Unit 4</b></p> <ol style="list-style-type: none"> <li>1. Be able to identify the characteristics of living organisms and what they need to survive.</li> <li>2. Be able to investigate the life cycle of a butterfly.</li> <li>3. Identify the different stages of its life cycle.</li> <li>4. Identify the different body parts of an adult butterfly and relate them to other insects.</li> <li>5. Observe, measure, and record data for the caterpillar as it grows and progresses through its life cycle.</li> <li>6. Be able to investigate how butterflies interact with their environment.</li> <li>7. Be able to explore the interdependence of humans and butterflies, and the similarities and differences with the life cycle of both organisms.</li> </ol>

## SCIENCE: GRADE 4

Unit Title & Timeframe	Unit Topics & Goals
Unit 1:  Organizing Ourselves for Doing Science	<p>Students will be able to organize themselves for doing science. (Unit 1)</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>
Unit 2:  Digestion, Nutrients, Food Chains and Food Webs	<p>Students will be able to investigate the relationship of organisms in terms of food chains and food webs.</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</li></ol>

	<p>to make connections to food chains and food webs. Students will be able to explore the human digestive tract and its role in digestion.</p> <p>Digestion:</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>Students will be able to identify nutrients essential for our body and its growth and maintenance.</p> <p>Nutrition:</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>Unit 3: Simple Machines</p>	<p>Students will be able to explore what simple machines are and how they make work easier. (Unit 3)</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> </ol>

	<p>3. Be able to identify the fulcrum, load and effort of a lever.</p> <p>4. Be able to investigate and explain what factors will affect the force of an object placed on an inclined plane (ramp).</p> <p>5. Be able to identify and list simple machines used by early settlers to meet their daily needs.</p> <p>6. Be able to identify and label simple machines found in a grist mill during colonial times.</p> <p>7. Be able to design and develop a simple machine and demonstrate how it makes work easier.</p> <p>8. Be able to create, read and interpret graphs and tables based on the data they collect about simple machines.</p> <p>9. Be able to create a group presentation on the history and uses of simple machines.</p>
<p>Unit 4:</p> <p>Organization of the Earth</p> <p>(constructive and destructive forces, rocks and minerals)</p>	<p>Students will be able to understand the constructive and destructive forces of the Earth.</p> <p>1. Be able to identify and describe the main layers of the Earth by creating a clay model (crust, mantle, core).</p> <p>2. Be able to explain the theory of plate tectonics.</p> <p>3. Be able to relate earthquakes, volcanoes and mountains to one of three types of</p>

movement of the Earth's plates.

4. Be able to describe and demonstrate constructive forces in mountain formations (folding, faulting, doming, volcanic action).

5. Be able to describe and demonstrate changes of Earth's surface due to destructive forces of weathering and erosion.

6. Be able to use a diagram of the rock cycle to explain the formation of igneous, metamorphic and sedimentary rocks.

7. Be able to examine, sort and classify rocks of the Earth's crust into igneous, metamorphic and sedimentary.



## SCIENCE: GRADE 5

Unit Title & Timeframe	Unit Topics & Goals
Unit 1: Interactions of Chemical Matters (Focus on Controlled Studies)	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Summarize the steps of the “scientific method”</li> <li>● Define and describe what variables are</li> <li>● Design a controlled study and use that model for investigation.</li> <li>● Observe, describe, and record the properties of materials using controlled studies.</li> </ul>
Unit 2: Interactions in the Micro world (Cells Leads Into)	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Use magnifying tools to study living and non-living things</li> <li>● Determine the differences between living and non-living things</li> <li>● Determine the differences between plant and animal cells</li> <li>● Develop an explanation of how cells function to enable an organism to survive</li> <li>● Explore how one cell’s or one organism’s survival may impact its environment and possibly the life and environment of another organism</li> </ul>
Unit 3: Interactions In the Human Body (Respiratory, Circulatory, Skeletal, Muscular)	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Analyze how a simple human activity illustrates the overlapping functions of both the respiratory and circulatory systems</li> <li>● Determine the role of the human respiratory system</li> <li>● Determine the role of the human circulatory system</li> <li>● Investigate how the respiratory and circulatory system interact.</li> <li>● Analyze how a simple human activity illustrates the overlapping functions of both the muscular and skeletal system</li> <li>● Determine the role of the human muscular system</li> <li>● Determine the role of the human skeletal system</li> <li>● Investigate how the muscular and skeletal system interact</li> <li>● Explore how human inheritance operates and investigates the role of genetics in our life</li> </ul>
Unit 4: Interactions In the Environment- Energy Transfer	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Communicate their knowledge about scientists and what they do.</li> <li>● Engage in the processes of science which include observing, questioning, predicting, hypothesizing, conducting investigations, analyzing data and communicating their findings in a variety of ways.</li> <li>● Develop an attitude of respect for the work of scientists</li> </ul>

	<ul style="list-style-type: none"><li>• Develop a science journal in order to record the questions, processes and progress of their investigations.</li><li>• Identify the characteristics of living organisms and what they need to survive.</li><li>• Investigate chemical reactions and how photosynthesis (as a chemical reaction) is so crucial to all living things,</li><li>• Investigate how energy transfer in the environment is necessary for plants to grow and develop.</li><li>• Explore the energy transfers that occur in weather systems</li><li>• Draw relationships between weather and climate factors and the characteristics of an ecosystem</li><li>• Identify the characteristics of their own local ecosystems and relate that to larger ecosystems</li><li>• Research the role of energy transfer on ecosystems, on a global scale.</li></ul>
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## SCIENCE: GRADE 6

Unit Title & Timeframe	Unit Topics & Goals
<b>Unit 1: Investigating the Nature of Science and Technology (Focus on Controlled Studies)</b> 1 <sup>st</sup> quarter	Students will be able to: <ul style="list-style-type: none"> <li>● Lesson 1: How Can We Identify the Processes for Doing Science?</li> <li>● Lesson 2: What Are the Processes of Science and Engineering Design?</li> <li>● Lesson 3: The Black Box with A Twist</li> <li>● Lesson 4: Investigating A Scientific Problem (Ramp and Ball)</li> <li>● Lesson 5: What Is Scientific Inquiry? What Do Scientists Do?</li> </ul>
<b>Unit 2: Investigating Energy (Electromagnetism, Potential / Kinetic)</b> 2 <sup>nd</sup> quarter	Students will be able to: <ul style="list-style-type: none"> <li>● Lesson 1: What Is the Difference Between Energy and Matter? What Are the Different Types of Energy?</li> <li>● Lesson 2: How Does Energy Change from One Form to Another?</li> <li>● Lesson 3: What Are the Variables That Affect an Object's Potential Energy?</li> <li>● Lesson 4: What Are the Variables That Affect an Object's Kinetic Energy?</li> <li>● Lesson 5: How Can We Demonstrate the Law of Conservation of Energy?</li> <li>● Lesson 6: What Are the Parts of An Electric Circuit? What Is the Difference Between an Insulator and A Conductor of Electricity?</li> <li>● Lesson 7: How Can We Make Bulbs Light Independently Of Each Other?</li> <li>● Lesson 8: How Can We Determine If Objects Are Magnetic or Non-magnetic? How Can We Determine Which Materials Affect a Magnetic Field?</li> <li>● Lesson 9: How Can We Build an Electromagnet and Determine Its Strength?</li> <li>● Lesson 10: Can We Investigate the Use of Electricity at Home and Develop a Plan for Greater Efficiency?</li> <li>● Extension Lesson: What Are the Variables That Affect the Strength of An Electromagnet?</li> </ul>
<b>Unit 3: Investigating Earth In Space</b> 3 <sup>rd</sup> quarter	Students will be able to: <ul style="list-style-type: none"> <li>● Lesson 1: What Are the Significant Events That Occur in The Study of Astronomy?</li> <li>● Lesson 2: What Changes Take Place on Earth During A 24-hour Period?</li> <li>● Lesson 3: What Causes the Seasons During a Year On Earth?</li> <li>● Lesson 4: Exploring the Phases of the Moon</li> <li>● Lesson 5: Eclipses: Solar and Lunar</li> </ul>

	<ul style="list-style-type: none"> <li>● Lesson 6: How Can We Differentiate Between the Eight Planets in The Solar System?</li> <li>● Lesson 7: Can We Make a Scaled Model of the solar System?</li> <li>● Lesson 8: Can You Demonstrate How Telescopes Use Lenses and Mirrors?</li> <li>● Lesson 9: How Have Humans Used Technology to Explore Space?</li> <li>● Extension Lesson: Spectroscopes; Constellations</li> <li>● Extension Lesson: Space Travel Survival Task.....</li> </ul>
<p>Unit 4: Investigating the Environment (Ecosystems, Human Interactions with the Environment) 4<sup>th</sup> quarter</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Lesson 1: Balanced Tangle</li> <li>● Watershed partnership with Teatown</li> <li>● Our home in the watershed, health of waterways in our neighborhood.</li> <li>● Salamanders; Indicator species</li> <li>● Lesson 2: Human Impact on The Ecosystem?</li> <li>● Lesson 3: Clover Hunt Game.</li> <li>● Lesson 4: Predator/Prey.</li> <li>● Lesson 5: Acid/Bases</li> <li>● Lesson 6: Effects of Acids and Bases on Substances</li> <li>● Lesson 7: Acid Rain Debate.</li> <li>● Lesson 8: Let's Look at Garbage</li> <li>● Lesson 9: Plastics: The Benefits and Challenges</li> <li>● Lesson Landfills</li> <li>● Lesson 11: Oil Spills</li> </ul>

*SCIENCE: GRADE 7*

Unit	Topics and Goals
Introduction to the Science Lab	<ol style="list-style-type: none"><li>1) Make accurate and appropriate measurements of length using a ruler</li><li>2) Use measurements of length in calculations of volume.</li><li>3) Calculate and identify objects based on density.</li><li>4) Safely and correctly use a compound light microscope to observe objects.</li><li>5) Determine the motion of an organism as it moves on a microscope slide.</li><li>6) Determine the field of view, as objective lenses magnifications change.</li><li>7) Graph and interpret data sets.</li><li>8) Scientific Method and Project-based Learning.</li></ol>
Matter and Elements	<ol style="list-style-type: none"><li>1) Utilize the basic properties of matter to identify types of matter.</li><li>2) Differentiate between the three states of matter based on properties and heat exchanges.</li><li>3) Differentiate between mixtures, solutions and elements and compounds.</li><li>5) Model and predict the phases of the moon with a simulation.</li><li>4) Use models to demonstrate and differentiate atomic structures.</li><li>5) Utilize the periodic table to identify characteristics of elements.</li><li>6) Differentiate different types of reactions.</li><li>7) Illustrate how reactions are transitions of energy</li><li>8) Differentiate acids and bases through pH and reaction characteristics.</li></ol>

<p>Motion, Speed and Acceleration</p>	<ol style="list-style-type: none"> <li>1) Illustrate and demonstrate objects in motion.</li> <li>2) Differentiate types of motion based on frames of reference.</li> <li>3) Calculate and graph speed of various objects.</li> <li>4) Calculate and interpret acceleration scenarios with math and data graphing.</li> <li>5) Interpret relative motion of large scale objects such as continents and planets.</li> </ol>
<p>Forces and Work</p>	<ol style="list-style-type: none"> <li>1) Describe how forces are made and their characteristics.</li> <li>2) Utilize vector diagrams to analyze and calculate net force from multiple forces.</li> <li>3) Interpreting Newton's first in the real world.</li> <li>4) Work with the second law to determine the interdependence of force, mass, and acceleration.</li> <li>5) Describe how inertia and momentum influence forces and motion.</li> <li>6) Analyze motion and the impact of friction.</li> <li>7) Investigate friction and determine how to minimize its impact.</li> </ol>
<p>Work and Simple Machines</p>	<ol style="list-style-type: none"> <li>1) Build and explore simple machines.</li> <li>2) Differentiate between the types of simple machines.</li> <li>3) Calculate the Mechanical advantage for simple machines.</li> <li>4) Describe how friction reduces machine work comparing ideal MA vs. actual MA.</li> <li>5) Create complex machines from combining simple machines.</li> <li>6) Determine the mechanical advantage for a complex machine.</li> </ol>

<p>Wave Energy, Sound and Light</p>	<ol style="list-style-type: none"> <li>1) Describe and define what makes a wave.</li> <li>2) Differentiate and identify types of waves based on characteristics.</li> <li>3) Describe common wave characteristics, such as reflection and refraction</li> <li>4) Illustrate the density / speed relationship.</li> <li>5) Illustrate how electromagnetic waves travel across space and in our atmosphere.</li> <li>6) Compare and contrast longitudinal sound waves and electromagnetic waves.</li> <li>7) Demonstrate the affect media transitions have on light. (i.e. a pencil in water)</li> </ol>
<p>Magnetism and Electricity</p>	<ol style="list-style-type: none"> <li>1) Describe and define the characteristics of a magnet.</li> <li>2) Illustrate magnetic field lines.</li> <li>3) Demonstrate how magnets interact.</li> <li>4) Use a magnet to create a flux current in a wire.</li> <li>5) Build and utilize and electromagnet.</li> <li>6) Describe the characteristics of and create a fundamental charge.</li> <li>7) Illustrate the characteristics of static electricity.</li> <li>8) Describe the properties of direct current circuits and how they are used in the world today.</li> <li>9) Design, build and troubleshoot series and parallel circuits.</li> <li>10) To describe how AC works and hoe it is used today to transfer electricity.</li> </ol>
<p>Weather and Energy in the Atmosphere</p>	<ol style="list-style-type: none"> <li>1) Identify gases in the Earth's atmosphere and why they are important to life.</li> <li>2) Describe the properties of air. Utilize instruments to measure air properties.</li> </ol>

	<ol style="list-style-type: none"> <li>3) Explain how properties of air change with altitude.</li> <li>4) Illustrate and describe the energy transition from the sun to the Earth.</li> <li>5) Explain why the greenhouse affect sustains life on Earth.</li> <li>6) Demonstrate how heat creates winds and air masses.</li> <li>7) Explain how clouds are formed, interaction between air masses and frontal systems.</li> <li>8) Differentiate between types of storms and their impacts.</li> <li>9) Investigate the human impact on weather and climate.</li> </ol>
<p style="text-align: center;">Weathering, Rocks, Topography and Plate Tectonics</p>	<ol style="list-style-type: none"> <li>1) Differentiate and describe types of weathering.</li> <li>2) Illustrate the factors that influence weathering.</li> <li>3) Identify the constructive and destructive forces that create land masses.</li> <li>4) Explain how water is the primary force in land shaping.</li> <li>5) Create and interpret topographic maps, determine relief and land mass features.</li> <li>6) Describe the forces that drive plate tectonics.</li> <li>7) Illustrate how the Earth's surface has evolved over time.</li> <li>8) Interpret geologic events and their connection to plate motion.</li> <li>9) Investigate methods for mitigating the impacts of plate movement.</li> </ol>
<p style="text-align: center;">Life and Cellular Structure</p>	<ol style="list-style-type: none"> <li>1) Utilize the characteristics of life to differentiate between living and nonliving.</li> <li>2) Model cell structure and cell functions.</li> <li>3) Differentiate between plant and animal cells.</li> <li>4) Illustrate how life depends on the Sun's energy.</li> </ol>



	<p>5) Investigate the processes of photosynthesis and respiration.</p>
<p>Ecosystems</p>	<ol style="list-style-type: none"><li>1) Identify the needs for an organism in an environment.</li><li>2) Describe the levels of organization in an environment,</li><li>3) Differentiate between biotic and abiotic factors.</li><li>4) Illustrate the flow of energy through a biome.</li><li>5) Describe the characteristics of organisms in different trophic levels.</li><li>6) Model food webs with various food chains.</li><li>7) Describe and illustrate three types of symbiotic relationships.</li></ol>

**SCIENCE: GRADE 8**

Unit	Topics and Goals
Introduction to the Science Lab	<ol style="list-style-type: none"><li>1) Make accurate and appropriate measurements of length using a ruler</li><li>2) To use measurements of length in calculations of volume.</li><li>3) Safely and correctly use a compound light microscope to observe objects.</li><li>4) To determine the motion of an organism as it moves on a microscope slide.</li><li>5) Predict the field of view, as objective lenses magnifications change.</li></ol>
Earth In Space	<ol style="list-style-type: none"><li>1) Describe / model planetary motion in the solar system.</li><li>2) Illustrate and predict the movement of the Earth.</li><li>3) Correlate the movement of Earth and the changing of seasons and energy changes in the atmosphere.</li><li>5) Model and predict the phases of the moon with a simulation.</li><li>4) Use a model to demonstrate and differentiate solar and lunar ellipses.</li><li>5) Predict the location of Planets based on time of revolution.</li><li>6) Arrange celestial objects in the universe by size.</li><li>7) Describe the beginning of the solar system and differentiate it from the big bang.</li><li>8) Describe how the specific characteristics of Earth make it an ideal location for life to exist.</li></ol>

<p style="text-align: center;">Evolution and Plate Tectonics</p>	<ol style="list-style-type: none"> <li>1) Model the changing surface of the planet through the mechanism of continental drift.</li> <li>2) Illustrate the dependence of environment as it relates to latitude.</li> <li>3) Model the convection currents needed to cause plates to move across the globe.</li> <li>4) Correlate the movement of continents to changing climates which drive natural selection.</li> <li>5) Describe how Darwin used variations in species to show linkage in the past but changed to adapt to the local environment.</li> <li>6) How does a changing environment impact species survival?</li> <li>7) Demonstrate adaptations a species can make, as it is geologically isolated from other members, creating a new species.</li> <li>8) Describe the mechanism for the transfer of genetic information from one generation to another.</li> </ol>
<p style="text-align: center;">Genetics and Biotechnology</p>	<ol style="list-style-type: none"> <li>1) What are the roles of DNA and RNA in protein synthesis?</li> <li>2) Illustrate how the environment can impact gene expression.</li> <li>3) Model how genes are formed and translated into functional proteins.</li> <li>4) Model and illustrate the difference between asexual and sexual reproduction and adaptation to the environment.</li> <li>5) Illustrate the impact of DNA on the growth of an organism. Correlate mutation of genes to specific diseases.</li> <li>6) Demonstrate artificial and natural selection of genes and characteristics.</li> <li>7) Differentiate between various methods of gene manipulation and gene therapy.</li> <li>8) Describe both the positive and negative impacts of gene manipulation.</li> </ol>

<p>Forms of Energy/ Weather</p>	<ol style="list-style-type: none"> <li>1) Differentiate between the different forms of energy.</li> <li>2) Describe how energy can be transferred through a wave.</li> <li>3) Differentiate between longitudinal and transverse waves</li> <li>4) Describe the mechanism by which energy enters the Earths' atmosphere.</li> <li>5) Demonstrate the importance of the greenhouse effect in making this a habitable planet.</li> <li>6) Illustrate how energy in the atmosphere creates convection cells, which create air masses.</li> <li>7) Demonstrate how the movement of air masses creates front.</li> <li>8) Model the interaction of frontal systems to create Mid latitude lows and other selected storm systems.</li> <li>9) Illustrate the impact of large masses of water on climate and local weather.</li> </ol>
<p>Energy Transitions and Homeostasis</p>	<ol style="list-style-type: none"> <li>1) Illustrate the processes of photosynthesis and respiration.</li> <li>2) Differentiate and identify the products and wastes from the Photo and Resp.</li> <li>3) Illustrate through selected organelles the conversion of energy to food and food to energy in plants and animals. (ATP)</li> <li>4) Illustrate the role of osmosis and diffusion in the transfer of energy in organisms.</li> <li>4) How does the expression of enzymes and catalysts impact these processes?</li> <li>5) Model the roles of the digestive and circulatory system in transferring energy and wastes in an organism.</li> <li>6) How does the immune system help an organism maintain homeostasis</li> <li>7) Differentiate between mitosis and meiosis. How does mitosis support growth</li> </ol>

	<p>and homeostasis, how does meiosis provide genetic material for species propagation.</p> <p>8) Illustrate the interaction of the Muscular and Nervous systems in maintaining homeostasis.</p>
Ecology	<ol style="list-style-type: none"><li>1) Utilize various ecosystem mechanisms to illustrate the movement of energy through the environment.</li><li>2) Describe the abiotic and biotic factors that shape an ecosystem.</li><li>3) Illustrate the flexibility of an ecosystem due to changes in biotic and abiotic factors.</li><li>4) Demonstrate how organisms in an ecosystem interact with one another.</li><li>5) Model the three types of symbiotic relationships often found in ecosystems.</li><li>6) Differentiate limiting factors in an ecosystem as biotic or abiotic.</li><li>7) Describe how an ecosystem and a habitat can change over time.</li></ol>