

**GRADE 3**

**State Goal 11:** Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments, and solve problems.

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p><b>Critical to Understand and Master at Grade 3:</b> 3.11.01 Formulate and ask questions on a specific science topic and outline ideas for steps to answer the questions.</p>	<ul style="list-style-type: none"> <li>• Develop questions about magnetism.</li> <li>• Discuss with your class ways to explore magnetism to learn more about it.</li> </ul>	<p>Language Arts: Create an outline of questions and conduct an interview about a scientific topic.</p> <p>Language Arts: Sequence steps in a set of directions and identify important information that is missing.</p> <p>Social Studies: Identify a country about which you would like to learn more, develop a list of questions to answer, and discuss ways to answer your questions (e.g., conduct interviews, read books, search the Internet).</p>
<p>3.11.02 Plan a simple investigation, design a valid experiment (a “fair test”) to answer the question, and predict what might happen in the investigation.</p>	<ul style="list-style-type: none"> <li>• Design an investigation to find out about magnetism. Include materials you will need, activities you will do, and how you will make a fair test (e.g., control variables).</li> <li>• Predict objects that are attracted to magnets and how many items a magnet can pick up.</li> <li>• Predict what will happen if a balloon is attached to the top of a container of carbonated water, using regular water as a control. Design an investigation to test your ideas.</li> </ul>	<p>Math: Calculate probability using a spinner. Create a “fair” and “unfair” spinner, test them, and discuss the difference in your results.</p> <p>Language Arts: Predict the outcome of stories or situations.</p> <p>Physical Education: Create a new game and write down all the directions (e.g., goals, rules, and strategies). Play the game and make adjustments to your directions.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>3.11.03</p> <p>Collect data from investigations with plants, animals, rocks, or other materials using skills such as observing, estimating, and measuring, and somewhat more sophisticated tools such as scales, microscopes, computers, and calculators.</p>	<ul style="list-style-type: none"> <li>• Systematically test objects to see if they can be picked up by a magnet. Use the same magnet for all trials to control the variables.</li> <li>• Quantify the number of items picked up by counting them and by measuring their weight on a scale.</li> <li>• Figure out how to measure the volume of carbon dioxide in the balloon by immersing it in water.</li> </ul>	<p>Math: Use skills such as comparing, estimating, and graphing.</p> <p>Technology: Complete a project that includes a graph made using Excel.</p> <p>Social Studies: Study population data for your area.</p>
<p>3.11.04</p> <p>Arrange data and observations into logical patterns, describe the patterns, and compare the data with predictions.</p>	<ul style="list-style-type: none"> <li>• Find a pattern in the type and amount of objects picked up by a magnet.</li> <li>• Compare your predictions to your observations to determine how logical your predictions were.</li> </ul>	<p>Math: Create a pattern using pattern blocks and ask a partner to decipher and describe the pattern.</p> <p>Language Arts: Write a paper that compares and contrasts two scientific ideas.</p> <p>Social Studies: Study tables of population data and describe how they are organized.</p> <p>Health: Compare data on a health issue over a period of time for different types of people (e.g., smoking rates, weight issues).</p>
<p>3.11.05</p> <p>Use evidence, observations, and logic to develop scientific explanations for student investigations.</p>	<ul style="list-style-type: none"> <li>• Make a statement about the kinds of objects attracted to a magnet that is based on evidence from your investigation.</li> <li>• Use logic to add to the list of objects before you test them. Check to see if your logic led you in the right direction by testing the new objects. Adjust your explanation if necessary.</li> </ul>	<p>Language Arts: Use context clues to predict the outcome of a story.</p> <p>Math: Do logic and reasoning problems.</p> <p>Social Studies: Hold a debate or class discussion involving an issue of historical significance (e.g., women's right to vote, vaccination against disease) and use evidence and logic to support your point of view.</p>

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<p>3.11.06 Use evidence, observations, and logic to evaluate respectfully the explanations of other students and other teams.</p>	<ul style="list-style-type: none"> <li>• Question explanations about magnetism that cannot be supported by evidence.</li> <li>• Suggest that additional tests be made so that you can be more certain of your explanation.</li> </ul>	<p>Language Arts: Write a letter to your principal outlining why you believe 3rd graders should have a particular right at school. Use evidence, logic, and observations to make your case.</p> <p>Math: Help another student understand what he or she is doing to arrive at an incorrect answer on a math problem.</p>
<p>3.11.07 Report and display the results of individual and group investigations.</p>	<ul style="list-style-type: none"> <li>• Write a lab report using the format suggested by your teacher.</li> <li>• Share lab reports with your classmates to compare your predictions, procedures, data collection, and conclusions.</li> <li>• Record observations of mineral properties in a table format.</li> </ul>	<p>Art: Draw a picture following instructions from your teacher. Display your picture and compare it to those of your classmates to see the differences in interpretation from one artist to another.</p> <p>Math: Create charts and graphs and post them on the board.</p> <p>Language Arts: Give oral presentations of the results of investigations.</p>
<p>3.11.08 Identify a design problem and propose possible solutions to the problem with words and design sketches.</p>	<ul style="list-style-type: none"> <li>• Propose to solve a problem, such as creating a way to light a bulb or developing a healthy and affordable lunch menu for the class.</li> <li>• Discuss ways to accomplish your goal that make sense to you based on everyday experiences.</li> <li>• Draw and write about your ideas for lighting a bulb or designing a menu.</li> </ul>	<p>Math: Make up a word problem that involves making a drawing in order to solve it; exchange problems with a partner and solve them.</p> <p>Religion: Role-play scenarios in which you engage in conflict resolution.</p> <p>Business: Identify a product that other 3rd graders would like to have.</p>

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<p>3.11.09 Develop a plan, design a procedure to address the problem, and identify constraints (e.g., cost, time, materials, space, technology, safety).</p>	<ul style="list-style-type: none"> <li>• Work in a team to design a way to light a bulb that uses the least amount of materials, is safe, and can be accomplished in your classroom.</li> <li>• Write about your plan to light a bulb and list materials, steps, and the intended results.</li> <li>• Develop a menu for your class for a lunch at school and make a list of ingredients that would have to be purchased at the store.</li> </ul>	<p>Business/Economics: Invite a representative from Junior Achievement to speak to your class. Conduct an Invention Convention. Social Studies: Plan a community-wide event for Earth Day or Clean and Green Day.</p>
<p>3.11.10 Build a prototype of the design using available tools and materials.</p>	<ul style="list-style-type: none"> <li>• Use materials available to construct a simple circuit.</li> <li>• Try several configurations so that you can develop an idea of what works and what doesn't work in the circuit.</li> </ul>	<p>Art: Use everyday materials to create an item that appeals to your classmates. Social Studies: Build a scale model of a city using recyclable materials.</p>
<p>3.11.11 Test the prototype using suitable instruments, techniques, and quantitative measurements to record data.</p>	<ul style="list-style-type: none"> <li>• Test the circuit for completeness. Check to see that it works to light a bulb.</li> <li>• Use a voltmeter to measure the amount of electricity reaching the bulb.</li> <li>• Take the menu and list of ingredients to a store and find out the cost of your plan.</li> </ul>	<p>Business: Hold a sale of items you created; keep track of cost of manufacturing, sales revenues, and total profit. Technology: Build a tower and use a fan to test the tower for stability.</p>

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<p>3.11.12</p> <p>Assess test results and the effectiveness of the design using the given criteria and noting possible sources of error.</p>	<ul style="list-style-type: none"> <li>• If your design worked, explain why you think this is so. If your design did not work, explain why you think it did not.</li> <li>• Ask a nutritionist to assess your menu and make suggestions.</li> </ul>	<p>Math: Check the accuracy of your answers on a math test of subtraction by using addition.</p> <p>Business: Discuss how car manufacturers test car performances and issue recall notices.</p> <p>Social Studies: Trace the improvement of a common machine through history (e.g., automobiles, washing machines, irons, telephones) and discuss the reasons for the design changes.</p>
<p>3.11.13</p> <p>Report the test design, the test process, and the test results, as would a team of scientists and engineers.</p>	<ul style="list-style-type: none"> <li>• Share your design and test results with your class. Determine what was similar among the designs that worked.</li> <li>• Develop an explanation of what makes a bulb light that can be applied to more complex electrical systems.</li> <li>• Use the results of your lunch menu planning to suggest a menu for a week of healthy, affordable meals.</li> </ul>	<p>Language Arts: Give an oral report on a scientific investigation, working with your team to provide visuals.</p> <p>Art: Design an original cover and binding for a report of your test results; share the report with your classmates.</p> <p>Technology: Use a Power Point presentation to report the results of a scientific investigation.</p>
<p>3.11.14</p> <p>Use numbers to describe and compare scientific objects and events.</p>	<ul style="list-style-type: none"> <li>• Include measurements whenever possible and avoid describing observations only in qualitative ways.</li> <li>• Be able to read tables of data to draw conclusions about what the data suggest.</li> <li>• Measure heights of students in your class and record results in a science notebook.</li> <li>• Describe the amount of rain your school receives in a year and develop an accurate mathematical description for this amount of rain (e.g., number of centimeters of rain per year).</li> </ul>	<p>Math: Represent data using bar, line, and circle graphs.</p> <p>Religion: Discuss how the Church determines the date on which Easter will fall each year; contrast the date of Easter to the dates on which other holidays fall each year.</p> <p>Physical Education: Make measurements of distance and time to calculate the average rate of speed when you run.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>3.11.15</p> <p>Apply math skills to measure, record, and organize scientific data; apply several types of operations to compare the data and observations (e.g., multiplication, division).</p>	<ul style="list-style-type: none"> <li>• Use mathematics to help you do science (e.g., quantifying data, using formulas).</li> <li>• Use a graph to compare the changes in 2 variables in order to see a pattern.</li> </ul>	<p>Math: Participate in the Metric Olympics and record results on data sheet.</p> <p>Math: Calculate your average grade in each of your classes.</p> <p>Business: Calculate the profit you made selling your handmade items after figuring in the cost of materials.</p>
<p>3.11.16</p> <p>Identify shapes and patterns that are found in nature and in things that people make (e.g., circles, rectangles, triangles, cubes); identify how measurements can be displayed with simple graphs.</p>	<ul style="list-style-type: none"> <li>• Read graphs illustrating relationships and be able to state the relationships in a sentence.</li> <li>• Use the presence of patterns in nature to make a prediction about something in your environment (e.g., temperatures, seasons, phases of the moon, growth of a plant, life cycle of an animal).</li> <li>• Go to a ditch, gutter, or stream near your school, describe and measure ripple patterns, and discuss their significance.</li> </ul>	<p>Art: Create a scene or picture using circles, rectangles, triangles, and cubes.</p> <p>Social Studies: Look at neighborhood objects and identify different shapes among them.</p> <p>Math: Graph the incidence of occurrence in your neighborhood park of each shape (circle, triangle, rectangle) to illustrate which occurs in nature most often.</p>
<p>3.11.17</p> <p>Use communication and dialogue (e.g., reading, writing, speaking, listening) to conduct investigations, report results, and learn others' discoveries.</p>	<ul style="list-style-type: none"> <li>• Conduct research to find out what other people know about a topic in which you are interested (e.g., volcanoes, rain forests).</li> <li>• Share questions you have about the natural world with your teacher and your class. Discover who else is interested in answering your questions. Work together to answer some of your questions through research, questioning, and experimentation.</li> </ul>	<p>Language Arts: Read about recent scientific discoveries in an age-appropriate scientific magazine or in the newspaper.</p> <p>Language Arts: Write a brief explanation of what you learned from your reading.</p> <p>Social Studies: Interview a grandparent or a member of an older generation to learn about how science and technology have changed over their lifetimes.</p>

**State Goal 12:** Understand fundamental concepts, principles, and interconnections of the life, physical, and earth and space sciences.

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p><b>Critical to Understand and Master at Grade 3:</b>  <b>Life Sciences</b>            3.12.01            Describe different structures of organisms that serve specific functions in growth and survival (e.g., birds have feathers; fish have fins; mammals have bones, blood, hair, and skin; humans have structures for walking, thinking, seeing, and talking).</p>	<ul style="list-style-type: none"> <li>• Expand on your earlier understanding of the function of structures for growth and survival and give a number of new examples.</li> <li>• Write about and diagram 3 key features for survival found in a pet at home or at school or in an organism in a nearby park.</li> </ul>	<p>Social Studies/Reading: Read <i>Three Little Pigs</i> aloud and then discuss the types of materials used to create shelters or structures in different places around the world.</p> <p>Physical Education: Match equipment to the sport in which it is used and discuss the reasons why some specialized equipment is needed (e.g., face masks for hockey, cleats for soccer, baseball hats with brims for baseball).</p>
<p>3.12.02            Identify similar structures in organisms that have different purposes for different animals (e.g., arms, wings, fins; hair, feathers, scales).</p>	<ul style="list-style-type: none"> <li>• Compare structures designed for locomotion.</li> <li>• Compare coloring to determine if it is used for defense, camouflage, attraction, or other purposes.</li> </ul>	<p>Social Studies: Discuss various means of transportation in the city and how each is powered (e.g., walking is powered by legs, cars are powered by gasoline).</p> <p>Art: Draw a picture of animals camouflaged in their environments.</p>



LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>3.12.03 Group and classify plants and animals (e.g., mammals, reptiles) based on their similarities and differences.</p>	<ul style="list-style-type: none"> <li>• Use a dichotomous key to classify organisms.</li> <li>• Describe a fictitious organism that fits into a selected group based on its similarity to real organisms within the group.</li> </ul>	<p>Math: Sort objects into categories based on like characteristics.</p> <p>Social Studies: Discuss various cultures and their similarities and differences.</p> <p>Geography: Discuss or learn about examples of other animals that fascinate you from other continents — what animals are they like in North America?</p>
<p><b>Physical Sciences</b> 3.12.04 List some observable properties of objects that can be measured and described (e.g., size, weight, mass, shape, color, temperature, odor).</p>	<ul style="list-style-type: none"> <li>• Expand on your earlier understanding of properties of objects to include density, states of matter, solubility, buoyancy, and magnetism.</li> </ul>	<p>Religion: List some observable characteristics in each other.</p> <p>Math: Collect a number of pumpkins of different shapes and sizes; describe what is similar and what is different about them; make measurements of circumference, volume, and weight to further differentiate among them.</p>
<p>3.12.05 Demonstrate that tools can be used to extend the senses, such as in measuring the properties of objects with simple tools (e.g., rulers, timers, balances, thermometers).</p>	<ul style="list-style-type: none"> <li>• Compare the density of 2 objects by measuring the mass of the same volume of each (e.g., lead ball compared with a plastic ball).</li> <li>• Time how fast the same volumes of different substances dissolve and use the results to classify the substances.</li> </ul>	<p>Math: Estimate the weight of an object and then use a balance to determine which is heavier.</p> <p>Physical Education: Conduct races and measure distance traveled in a given amount of time.</p> <p>Technology: Compare measurements taken with an alcohol thermometer and a digital thermometer; describe the pros and cons of each technology.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p><b>Earth and Space Sciences</b> 3.12.06 Describe the physical and chemical properties used to classify Earth materials used in communities (e.g., building materials, fuel and energy, agriculture).</p>	<ul style="list-style-type: none"> <li>• List Earth materials used in the construction of your home or school.</li> <li>• Make a chart that lists Earth materials, their use, and the property of the materials that makes them good for that use in buildings or roads.</li> <li>• Describe the changes in your community if there were no stone, wood, cement, or asphalt available for buildings or roads.</li> </ul>	<p>Social Studies: Compare Chicago building structures before and after the Chicago fire. Language Arts: Write a story describing life in prehistoric time, including descriptions of how people heated their homes, cooked their food, moved from place to place, and so on. Art: Visit a museum and observe the different types of stone used in large buildings (e.g., marble, polished granite, slate).</p>
<p><b>Significant to Develop at Grade 3:</b> 3.12.07 Describe several human body systems and their functions. (12A)</p>	<ul style="list-style-type: none"> <li>• Answer questions about human body systems (e.g., Why do humans eat? Why do humans breathe? Why does the human heart beat? Why do humans eliminate wastes?).</li> <li>• Use an analogy (e.g., a machine, a community) to describe how the human body is a group of related systems that must work together for the organism to survive.</li> </ul>	<p>Social Studies: Describe how early Americans worked together to survive. Physical Education: Practice teamwork when playing games.</p>
<p>3.12.08 Diagram how electricity must form a closed circuit (loop) to produce light, heat, sound, or magnetic effects. (12C)</p>	<ul style="list-style-type: none"> <li>• Construct and test simple electrical circuits (open and closed) to light a bulb or sound a buzzer.</li> <li>• Experiment with loops of wire around an iron bar to create varying strengths of magnets.</li> <li>• Draw and discuss the results of your investigations.</li> </ul>	<p>Language Arts: Read about Thomas Edison. Business: Discuss Com Ed and other power providers.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>3.12.09</p> <p>Identify several rocks and minerals based on their properties. (12E)</p>	<ul style="list-style-type: none"> <li>• Use the Mohs scale of hardness to differentiate among similar-looking minerals.</li> <li>• Be able to identify limestone by looking for fossils, scratching with metal to make powder, and causing a fizzing reaction with a dilute acid (e.g., acetic acid in vinegar).</li> <li>• Distinguish pumice from other light-colored or porous rocks due to its buoyancy.</li> <li>• Use texture as a property to sort rocks (e.g., large or small crystals in igneous rocks, large or small grains in sedimentary rocks).</li> </ul>	<p>Math: Use a Venn diagram to illustrate similarities and differences among objects.</p> <p>Language Arts: Write a description of rocks and minerals using adjectives; exchange descriptions with a partner to see if your partner can match rocks and minerals to your descriptions.</p> <p>Social Studies: Read about the civilization of Pompeii to learn about the effect of a volcanic eruption on people in the past.</p> <p>Religion: Examine the types of geologic materials used to construct the church and buildings in your parish.</p>
<p>3.12.10</p> <p>Give examples of how fossils are evidence of the plants and animals that lived long ago and the nature of their environment. (12E)</p>	<ul style="list-style-type: none"> <li>• Describe the different types of fossils and how they are made.</li> <li>• Look at a sample fossil and determine what it says about the environment in which it was formed, demonstrating an understanding that present environments are a key to past environments.</li> </ul>	<p>Art: Use plaster to create fossils; make casts of shells and tracks.</p> <p>Social Studies: Visit the Field Museum to observe plant and animal fossils.</p> <p>Language Arts: Observe a fossil and write a story about the organism and its life before it became a fossil.</p>

**State Goal 13:** Understand the relationships among science, technology, and society in historical and contemporary contexts.

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p><b>Critical to Understand and Master at Grade 3:</b>  <b><i>Safety in science</i></b>            3.13.01            Demonstrate ways to perform science investigations safely at home and at school (e.g., wearing goggles, using fire extinguishers).</p>	<ul style="list-style-type: none"> <li>• Follow safety rules posted in the classroom (e.g., never taste materials, wash hands after working with objects and materials, pick up after yourself, use tools safely).</li> <li>• Describe the procedure for evacuation in case of a fire or other emergency.</li> <li>• Explain why the safety rules are important (e.g., wear goggles to protect eyes from splashes, keep work space clean to avoid accidents).</li> </ul>	<p>Social Studies: Identify community safety officials (e.g., police, firefighter, lifeguard) and discuss the safety equipment they use.            Health: Discuss how to keep your body healthy at school and at home.</p>
<p><b><i>Science as a human endeavor</i></b>            3.13.02            Describe examples of women and men using science to learn about objects and the history of the natural world and recognize that much still remains to be understood.</p>	<ul style="list-style-type: none"> <li>• Report on a new science discovery, name the scientists involved, and describe the question they are trying to answer.</li> <li>• Interview a professional in science and technology and ask questions about their childhood hobbies, interests in school, and educational and professional steps to their current position.</li> <li>• Research a topic in science that is better understood in the last 10 years and write about a conversation with a parent or caregiver about this topic (e.g., new computer technologies, cloning, new objects in astronomy, fossil finds in geology).</li> <li>• Consider professions of people working in a hospital, how they use science and technology, and the level of education needed by each.</li> </ul>	<p>Language Arts: Write a report about a famous scientist and his or her contributions to the field of science.            Social Studies: Make a timeline of major inventions dating back 300 years.            Geography: Place pushpins on a world map at locations where each of the inventions on the timeline were invented.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p><b><i>Science, technology, and society</i></b> 3.13.03 Describe from everyday experiences (e.g., the grocery store) how science and technology relate to things like improved food quality, transportation, health practices, sanitation, and communication (e.g., imported fruit in winter).</p>	<ul style="list-style-type: none"> <li>• Identify foods from the grocery store that come from other countries, describe how the foods get to your store, and explain how they can still be fresh when you buy them.</li> <li>• Interview your school nurse to find out what is done to keep disease from spreading in your school.</li> <li>• With information from public utilities, diagram the path of water from nature to a faucet at your school; discuss what happens to the water after it comes out of the faucet and goes down the drain.</li> <li>• Write about how you get to school and diagram 3 parts of the trip that rely on technology.</li> </ul>	<p>Social Studies: Discuss living in the 1700s and 1800s and compare life then with life today. Language Arts: Write about one thing in your life that you couldn't live without and describe why. Technology: Learn a new skill using a computer and apply it to your work at school or at home (e.g., design a greeting card, send an e-mail, develop a table).</p>
<p><b>Significant to Develop at Grade 3:</b> 3.13.04 Explain with examples scientists who have used creativity, curiosity, imagination, and new approaches. (13A)</p>	<ul style="list-style-type: none"> <li>• Research a scientist to learn about his or her process of discovery (e.g., Alexander Graham Bell, Jacques Cousteau, Marie Curie, Mary Leakey, Othniel Marsh, Alfred Wegener).</li> <li>• Use the Internet to find out how Post-it notes and Teflon plastics were developed as the result of mistakes in the laboratory.</li> <li>• Use your creativity to make a model or diagram of a pontoon bridge that could cross the center of Lake Michigan (e.g., determine which towns you would connect, discuss the problems that might arise and solutions you would offer).</li> <li>• Use your creativity to make a map view diagram of an airplane that could seat and serve 700 people (e.g., design seat arrangements, food service stations, bathroom locations, entertainment technology).</li> </ul>	<p>Language Arts: Design an invention that will help with everyday life; write about what the invention will do and who it will help. Language Arts: Read about the lives of Marie Curie and George Washington Carver. Religion: Imagine how you might creatively help people around the world by using a new approach to a problem.</p>