

## Fifth Grade Science

- Children will understand the necessity for standard units of measurement.
  - Children will develop an understanding and intuitive feel for the metric system.
  - Children will measure length and distance in meters and centimeters with a meter tape.
  - Children will measure mass in grams with a balance and mass pieces.
  - Children will measure liquid volume and capacity of containers in liters and milliliters with 50-ml syringes and graduated cylinders.
  - Children will measure temperature of liquids and air in degrees Celsius with a thermometer.
  - Children will acquire the vocabulary associated with metric measurement.
  - Children will exercise language and math skills in the context of metric measurement.
  - Children will apply appropriate measuring skills in everyday situations.
  - Children will develop and refine the manipulative skills required for making and using measuring tools.
  - Children will use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, and organizing.
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- Children will observe and investigate properties of foods.
  - Children will become aware of carbohydrates, proteins, fats, and vitamins as components of food.
  - Children will gain experience with indicators.
  - Children will use indicators to test for acid, vitamin C, sugar, and fat in foods.
  - Children will relate the results of investigations and experiments to the amount of chemicals in foods.
  - Children will become aware of guides for healthy nutrition.
  - Children will become informed consumers, able to gather information about food products.
  - Children will apply mathematics in the context of science.
  - Children will acquire vocabulary associated with nutrition.

- Children will gain experience with models and maps.
- Children will gain experience with the concepts of erosion and deposition.
- Children will observe the effect of water on surface features of the land, using stream tables.
- Children will plan and conduct stream-table investigations.
- Children will relate processes that they observe in the stream-table models to processes that created famous landforms.
- Children will become familiar with topographic maps and some of the techniques used to create them.
- Children will gain experience with the concepts of contour and elevation.
- Children will use measurement in the context of scientific investigations.
- Children will apply mathematics in the context of science.

- Children will gain experience with the concepts of mixture and solution.
- Children will gain experience with the concepts of concentration and saturation.
- Children will gain experience with the concept of chemical reaction.
- Children will apply an operational definition to determine the relative concentrations of solutions.
- Children will use group problem-solving techniques to plan investigations.
- Children will use measurement in the context of scientific investigations.
- Children will apply mathematics in the context of science.
- Children will acquire vocabulary associated with chemistry and the periodic table.
- Children will be introduced to the concept that all matter is made of very small particles called atoms and that atoms combine to form molecules.
- Children will use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, and relating.

# 5<sup>th</sup> Grade Science

<b>INSTRUCTIONAL OBJECTIVES</b>	<b>SUBJECT MATTER CONTENT</b>	<b>STANDARDS</b>	<b>ACTIVITIES</b>
<ul style="list-style-type: none"> <li>•Students will explain the necessity for standard units of measurement.</li> <li>•Students will examine how people measured before there were standard measurements.</li> <li>•Students will explain the metric system and how it works.</li> <li>•Students will read about jobs that use the metric system and how measurement is used around them.</li> <li>•Students will be able to define a Kilometer, Hectometer, Deckameter, Decimeter, Centimeter and</li> </ul>	<p><b>Measuring Length/Width using the Metric System</b></p> <ul style="list-style-type: none"> <li>•The meter (m) is the standard metric unit of linear measurement; the centimeter (cm) is 0.01 m.</li> <li>• Length is how far it is from one point to another.</li> </ul>	<p>5.3B, 5.1B, 5.5, 5.2</p>	<ul style="list-style-type: none"> <li>•Students learn the need for standard units of linear measurement. They measure objects with nonstandard units, straws, and then use a meter tape to measure objects in meters, centimeters and millimeters.</li> <li>•Students create and utilize a meter tape out of paper.</li> <li>•Students measure and compare body dimensions in the metric system.</li> <li>•Students will measure certain objects in the classroom and at home using Metric measurements.</li> </ul>

<p>Millimeter.</p>			<ul style="list-style-type: none"> <li>•Students will create paper airplanes, fly them and measure the distance that they flew using the metric system.</li> </ul>
<ul style="list-style-type: none"> <li>•Children will measure mass in grams with a balance and mass pieces.</li> <li>•Students will get an understanding that the Standard measurement for mass is the gram.</li> </ul>	<p><b>Measuring Mass using the Metric System</b></p> <ul style="list-style-type: none"> <li>•Students learn the need for standard units for measuring mass and use the FOSS balance and mass pieces to weigh objects.</li> <li>•Students prepare 100-g bags of gravel and cooperate to make a kilogram mass piece. They discover that a sponge can soak up many times its own mass in water.</li> </ul>	<p>5.3B, 5.1B, 5.5,5.2</p>	<ul style="list-style-type: none"> <li>•Students will measure different objects using paper clips. Student will discover the need for a standard measurement in measuring mass.</li> <li>•Students will practice weighing objects in the classroom.</li> <li>•Students will discover how to weigh an object that weighs more than all the mass pieces that they have. They will use gravel.</li> <li>•Students will create a bag of gravel that weighs a kilogram, so they can understand the measurement.</li> <li>•Students will be able to discover how much water a sponge can pick up when soaked in water.</li> </ul>

<ul style="list-style-type: none"> <li>•Children will measure liquid volume and capacity of containers in liters and milliliters with 50-ml syringes and graduated cylinders.</li> <li>•Students will calculate volume and capacity</li> <li>•Students will learn about water on the planet and ways that they can conserve water.</li> </ul>	<p><b>Measuring Volume and Capacity using the Metric System</b></p> <ul style="list-style-type: none"> <li>•Students learn the need for standard units of volume. They use syringes and graduated cylinders calibrated in milliliters to measure fluids accurately.</li> <li>•After learning how to use the volume measuring tools, students measure the capacity (maximum volume)of several common containers.</li> </ul>	<p>5.3B, 5.1B, 5.5, 5.2</p>	<ul style="list-style-type: none"> <li>•Students will measure using vials and discover the need for a standard measurement.</li> <li>•Students will measure the capacity of a variety of bottles, cups and containers using a syringe, graduated cylinder, eye dropper and liter.</li> <li>•Students will measure the capacity of a soda can and conclude why the companies would leave air space in the can. Students will write letters to Soda Company.</li> <li>•Students will create posters on way to conserve water.</li> </ul>
<ul style="list-style-type: none"> <li>•Children will measure temperature of liquids and air in degrees Celsius with a thermometer.</li> <li>•Students will learn about Gabriel D. Fahrenheit and Anders Celsius and will be able to compare their</li> </ul>	<p><b>Measuring temperature using the Metric System</b></p> <ul style="list-style-type: none"> <li>•Students compare the temperatures of 4 cups of water using their fingers, which leads to the need for a measuring tool and a standard unit. Students use alcohol thermometers and measure in</li> </ul>	<p>5.3B, 5.1B, 5.2</p>	<ul style="list-style-type: none"> <li>•Students will try to line up the cups in order from hottest to coldest using their finger. They will observe a discrepant event in order to communicate the need for a standard unit for measuring temperature.</li> <li>•Students will take the room</li> </ul>

<p>theremometers.</p>	<p>degrees Celsius.</p> <ul style="list-style-type: none"><li>•They measure the temperatures of warm and cold water and find out how cold a mixture of ice and water gets in 10 minutes.</li></ul>		<p>temperature each day of the classroom for a week in Celsius and Fahrenheit to get an idea how the scales compare.</p> <ul style="list-style-type: none"><li>•Students will convert Fahrenheit temperatures into Celsius temperatures using the given formulas.</li><li>•Students will measure temperature using a thermometer calibrates in degrees Celsius.</li><li>•Students will take the temperature of water with ice every two minutes. Students will discuss the results and graph them.</li><li>•Students will play games using the Metric System in the Metric Field Day.</li><li>•Students will create their own meter to measure something that interests them.</li></ul>
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<ul style="list-style-type: none"> <li>•Children will observe and investigate properties of foods.</li> <li>•Children will become aware of carbohydrates, proteins, fats, and vitamins as components of food.</li> <li>•Students will be able to identify the Six Main Nutrients needed for good nutrition.</li> <li>•Students will be able to identify the importance of fat in a diet and will be able to distinguish from unsaturated fat and saturated fat.</li> </ul>	<p><b>Food/ Nutrition, Properties of Food/ Fat</b></p> <ul style="list-style-type: none"> <li>•Students are introduced to fats in the human diet and conduct a fat search using the brown-paper technique. Equal weights of different food samples are spread on a specific area and allowed to soak into the paper. The area of spread for each food is compared to a sample of 100% fat.</li> </ul>	<p>5.2, 5.1,5.5</p>	<ul style="list-style-type: none"> <li>•Students will conduct investigations with common foods to discover fat. Students will conduct fat tests using a brown paper bag. Students will investigate the food that they eat every day.</li> <li>•Students will be able to conduct a fat test on their favorite foods from home.</li> <li>•Students will discover the need of the food guide pyramid and will classify certain foods into its food group.</li> </ul>
<ul style="list-style-type: none"> <li>•Children will be able to read and create food webs. They will be able to distinguish between an autotroph and a heterotroph.</li> </ul>	<p><b>Food/ Nutrition, Food Chains/Webs</b></p>	<p>5.2,5.1,5.5</p>	<ul style="list-style-type: none"> <li>•Students will examine and discover what animals eat what food.</li> <li>•Students will create their own food chain.</li> </ul>
<ul style="list-style-type: none"> <li>•Children will be able to identify the organs that make up the digestive system and</li> </ul>	<p><b>Food/ Nutrition, The</b></p>	<p>5.2,5.1, 5.5</p>	<ul style="list-style-type: none"> <li>•Students will view pictures of the organs in the Digestive</li> </ul>

<p>their function.</p>	<p><b>Digestive system</b></p> <ul style="list-style-type: none"> <li>•Develop students’ understanding of functions of living systems.</li> <li>• One of the systems of the human organism is the digestive system. This system interacts with the other systems in the human body.</li> <li>• Disease is a breakdown in structures or functions of an organism and can be caused by improper nutrition.</li> </ul>		<p>System.</p> <ul style="list-style-type: none"> <li>•Students will create their own diagrams of the Digestive system labeling each organ and its function.</li> <li>•Students will be able to explore the Digestive System virtually.</li> <li>•Students will watch the movie, Magic School Bus, “What’s for Lunch” a movie that explores the Digestive System.</li> </ul>
<ul style="list-style-type: none"> <li>•Children will discover that sugar is a simple carbohydrate which is a nutrient in foods.</li> <li>•Students will discover the different types of sugar and how it is harvested.</li> <li>•Students will learn the history of sugar in this country.</li> </ul>	<p><b>Food/ Nutrition, Sugar</b></p> <ul style="list-style-type: none"> <li>• Yeast can be used to indicate sugar in foods.</li> <li>• A product of yeast metabolism is carbon dioxide, the same gas produced by most organisms.</li> <li>• Sugar is a simple carbohydrate, which is a nutrient found in foods.</li> <li>• Some foods contain more sugar than others do.</li> </ul>	<p>5.2,5.1,5.5</p>	<ul style="list-style-type: none"> <li>• Children will use indicators to test for sugar in foods. Students will use yeast to see if cookies have sugar in them.</li> <li>• Students will use yeast to determine what cereal contains the most sugar.</li> <li>• Students will use yeast to determine what candies/ snacks have the most sugar.</li> <li>• Students will use a volume</li> </ul>

			tube to test if the yeast metabolized due the presence of sugar using a volume tube.
<ul style="list-style-type: none"> <li>• Students will discuss the disease of Diabetes and how it is a disease that affects the body's ability to use glucose correctly.</li> </ul>	<b>Food/ Nutrition, Diabetes</b>	5.2,5.1,5.5	<ul style="list-style-type: none"> <li>• Students will do a project on Diabetes.</li> <li>• Students will watch and respond to the video, Kids Speak Out About Living With Diabetes</li> </ul>
<ul style="list-style-type: none"> <li>• Students will observe that acid and baking soda react to form carbon dioxide. Students will discover acid in their foods.</li> <li>• Students will be able to use the indicator baking soda to test for acid in different juices.</li> </ul>	<b>Food/ Nutrition, Acid</b> <ul style="list-style-type: none"> <li>• Students use baking soda as an indicator of acid. In a closed system, the volume of gas produced by the acid/ baking soda reaction is related to the concentration of acid in the sample.</li> <li>• The sour taste of foods is due to acid.</li> </ul>	5.2, 5.1, 5.5	<ul style="list-style-type: none"> <li>• Students will test different juices, drinks, and chemicals to see if they contain acid.</li> <li>• Students will label the tongue and the taste buds that detect foods containing acid.</li> <li>• Students will conduct a taste test to see if holding your nose and closing your eyes will affect the taste of a certain food.</li> </ul>
<ul style="list-style-type: none"> <li>• Students will study the 13 vitamins essential to good human health. Children will learn that Vitamin C deficiency can lead to scurvy.</li> </ul>	<b>Food/Nutrition, Vitamins</b> <ul style="list-style-type: none"> <li>• Students test foods for general acid content and for a specific acid, vitamin C, using indophenol.</li> </ul>	5.2,5.1,5.5	<ul style="list-style-type: none"> <li>• Students will use Indophenol Indicator to test different juices and drinks in search in Vitamin C.</li> </ul>

<ul style="list-style-type: none"> <li>•Students will study the disease Scurvy and identify the symptoms from lack of vitamin C.</li> <li>•Students will study the disease Rickets and indentify the symptom from lack of vitamin D.</li> </ul>			
<ul style="list-style-type: none"> <li>• Students will be able to read labels on packages for nutritional information Students will plan hypothetical lunches based on nutritional information.</li> <li>• Students will be able to discuss the eating patterns of people in other countries.</li> </ul>	<p><b>Food/ Nutrition Free Lunch</b></p> <ul style="list-style-type: none"> <li>•Students learn that foods often combine different kinds of nutrients. They guess the identity of lunch items from lists of ingredients. They assemble hypothetical lunches and analyze them in terms of their fat, carbohydrate, and protein content. They calculate the number of calories contributed by each nutrient group and assess the nutritional value of their lunches.</li> </ul>	5.2,5.1,5.5	<ul style="list-style-type: none"> <li>• Students will create their own lunch menus calculating grams of Fat, Protein and Carbohydrates</li> <li>• Students will read labels to locate certain information on the label.</li> <li>• Students will analyze the menus of Wendy’s and McDonalds.</li> </ul>
<ul style="list-style-type: none"> <li>• Children will gain experience with models and maps.</li> </ul>	<p><b>Landforms/ Maps</b></p> <ul style="list-style-type: none"> <li>• Models represent objects that are very large or processes that occur over long periods of time.</li> <li>• Models and maps are ways of</li> </ul>	5.1,5.2, 5.8,5.10	<ul style="list-style-type: none"> <li>• Students will create a map of the inside of the school.</li> <li>• Students will create a map and model of the Walter T. Bergen Middle School’s</li> </ul>

	<p>representing landforms and human structures.</p> <ul style="list-style-type: none"> <li>• Maps can be made from models.</li> </ul>		<p>ground.</p> <ul style="list-style-type: none"> <li>• Students will transfer their models of the school ground into a map.</li> <li>• Students will read and be exposed to the Four Different types of Maps. Students will be able to view the different types of maps.</li> <li>• Students will be able to use legends to read maps.</li> </ul>
<ul style="list-style-type: none"> <li>• Students will investigate water flow over earth materials in a stream table. They will observe the process of erosion, deposition, and stream flow.</li> <li>• Students will relate the stream tables to the creation of the Grand Canyon.</li> </ul>	<p><b>Landforms/ Stream Tables</b></p> <ul style="list-style-type: none"> <li>• Water is an important agent in shaping landforms.</li> <li>• The wearing away of earth is erosion; the settling of eroded material is deposition.</li> <li>• Landforms that result from running water include canyons, deltas, and alluvial fans.</li> <li>• The slope of the land over which a river flows affects the processes</li> </ul>	<p>5.1,5.2, 5.8,5.10</p>	<ul style="list-style-type: none"> <li>• Students will use stream tables to create landforms. Students will identify different landforms that were created.</li> <li>• Students will create a model of the Grand Canyon in their stream tables.</li> <li>• Students will place stream tables on a slope.</li> <li>• Students will manipulate the stream tables to create a flash</li> </ul>

	<p>of erosion and deposition.</p> <ul style="list-style-type: none"> <li>• During flooding, the rate of erosion and deposition increases.</li> <li>• Humans affect the processes of erosion and deposition.</li> </ul>		<p>flood, beach and plateau.</p> <ul style="list-style-type: none"> <li>• Students will attempt to make a town that can sustain the erosion in their stream table.</li> </ul>
<ul style="list-style-type: none"> <li>• Students will be able to read and understand topographic maps.</li> <li>• Students will be able to identify different landforms on maps.</li> <li>• Students will be able to use the map key and contour lines to understand topographic maps.</li> </ul>	<p><b>Landforms/Topographic Map</b></p> <ul style="list-style-type: none"> <li>• Students learn to read USGS topographic maps and compare them to aerial photographs. They study Death Valley, Mt. Shasta, and Grand Canyon maps and photographs, and make landform maps from the aerial photographs.</li> <li>• Cartographers use aerial photographs as one tool in constructing topographic maps.</li> <li>• Landform maps can be generated from photographs.</li> <li>• Observe and describe the types of information represented on a topographic map.</li> </ul>	<p>5.1,5.2, 5.8,5.10</p>	<ul style="list-style-type: none"> <li>• Students will build a foam mountain model and compare to the real mountain.</li> <li>• Students will draw a topographic map and profile of the model mountain.</li> <li>• Students will relate topographic features to symbolic representations on maps.</li> <li>• Students will explore Topographic maps of Mt. Shasta, the Grand Canyon and Death Valley.</li> <li>• Students will do a report on a landform in the world and present it to the class.</li> </ul>

	<ul style="list-style-type: none"> <li>• Compare the Mt. Shasta foam mountain to the topographic map.</li> <li>• Interpret aerial photographs.</li> <li>• Relate information on maps and aerial photographs to the actual landforms.</li> </ul>		
<ul style="list-style-type: none"> <li>• Children will be able to gain experience with the concepts of mixture and solution. Students will be able to discuss and label the water cycle.</li> <li>• Students will be able to acquire vocabulary associated with chemistry and the periodic table.</li> <li>• Children will be able to be introduced to the concept that all matter is made of very small particles called atoms and that atoms combine to form molecules.</li> </ul>	<p><b>Mixtures and Solutions/ Separating Mixtures and Solutions</b></p> <ul style="list-style-type: none"> <li>• A mixture combines two or more materials that retain their own properties.</li> <li>• A solution forms when a material dissolves in a liquid (solvent) and cannot be retrieved with a filter.</li> <li>• Evaporation can separate a liquid from a solid in a solution.</li> <li>• The solid material separated by evaporation from a solution forms distinctive crystal patterns.</li> </ul>	5.1, 5.2, 5.6	<ul style="list-style-type: none"> <li>• Students make mixtures of water and solid materials (salt, gravel, and diatomaceous earth) and separate the mixtures with screens and filters.</li> <li>• They find that water and salt make a special kind of mixture, a solution that cannot be separated with a filter but only through evaporation.</li> <li>• Students will be able to see if the process of evaporation will work with salt and water.</li> <li>• Students will watch Bill Nye's video, The Water Cycle</li> <li>• Students will be able to test</li> </ul>

			<p>if saltwater in a closet will evaporate, if food coloring will evaporate with the water and if the saltwater will evaporate quicker if it the sun.</p> <ul style="list-style-type: none"> <li>• Students will be able to observe the crystal formations left behind by the dissolved salt.</li> <li>• Students evaluate the Periodic Table of Elements.</li> </ul>
<ul style="list-style-type: none"> <li>• Students will be able to identify drinks that are diluted and concentrated.</li> <li>• Children will apply an operational definition to determine the relative concentrations of solutions.</li> <li>• Children will use group problem-solving techniques to plan investigations</li> </ul>	<p><b>Testing Solutions for Concentration</b></p> <ul style="list-style-type: none"> <li>• When equal volumes of two solutions made from the same ingredients are compared, the heavier one is the more concentrated solution.</li> <li>• Concentration expresses a relationship between the amount of dissolved material and the volume of solvent.</li> <li>• The more material dissolved in a liquid, the more concentrated the solution.</li> </ul>	<p>5.1, 5.2, 5.6</p>	<ul style="list-style-type: none"> <li>• Students observe and compare soft-drink solutions that differ in the amount of powder (water held constant) and that differ in the amount of water (powder held constant) to develop the concept of concentration.</li> <li>• They make salt solutions of different concentrations and compare them, using a balance. They determine the relative concentrations of three mystery solutions made from the same solid material.</li> </ul>

	<ul style="list-style-type: none"> <li>• A concentrated solution can be made more dilute by adding solvent to the solution.</li> </ul>		
<ul style="list-style-type: none"> <li>• Students will be able to experiment with saturated solutions.</li> <li>• Students will be able to study the gases that are present in our atmosphere.</li> </ul>	<p><b>Mixtures and Solutions, Saturated Solutions</b></p> <ul style="list-style-type: none"> <li>• A solution is saturated when as much solid material as possible has dissolved in the liquid.</li> </ul>	5.1, 5.2, 5.6	<ul style="list-style-type: none"> <li>• Students make a saturated solution by adding salt to water until no more salt will dissolve.</li> <li>• Students also make a saturated Citric Acid solution. Using a balance, they compare the solubility of the two solid materials by comparing the mass of the salt and citric acid dissolved in the saturated solutions.</li> <li>• They use the property of solubility to identify an unknown material.</li> <li>• Students create and taste a diluted cup of ice tea, a concentrated cup and a saturated cup of ice tea.</li> </ul>

<ul style="list-style-type: none"> <li>•Students will be able to identify objects that have undergone chemical reactions.</li> <li>•Students will be able to observe changes when chemicals are mixed.</li> <li>•Students will be able to read about chemical reactions that occurred to created some of our needed medicines and products.</li> </ul>	<p><b>Mixtures and Solutions, Chemical Reactions</b></p> <ul style="list-style-type: none"> <li>• Students systematically mix combinations of solid materials (calcium chloride, baking soda, and citric acid) with water and observe changes that occur.</li> <li>• The changes (formation of a gas and a white precipitate) are identified as chemical reactions.</li> <li>• Students investigate these reactions and the materials that are produced.</li> </ul>	<p>5.1, 5.2, 5.6</p>	<ul style="list-style-type: none"> <li>• Students will mix chemicals(calcium chloride, baking soda, and citric acid) together and see if a chemical reaction occurs.</li> <li>•Students will mix chemicals in a zip lock bag to see if the reactions differ.</li> <li>•Students will create the precipitate chalk. Students will try to identify the mystery precipitate that they have created.</li> </ul>
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