

## Science - Grade 4

Idaho Department of Education Content Standards	Objective	Sub Objectives	Task Analysis	Essential Vocabulary	Resources	Assessments
Cognitive level codes: • B: Memorize • C: Perform procedures • D: Demonstrate understanding • E: Conjecture, generalize, prove • F: Solve non-routine problems, make connections	Bloom's Equivalent • B = Knowledge • C = Comprehension • D = Comprehension • E = Application and Analysis • F = Synthesis					
<b>Standard 1: Nature of Science</b> This Standard may be taught in isolation but should be included in the other content areas.						
Goal 1.1: Understand Systems, Order, and Organization	4.S.1.1.1 Explain that a system consists of an organized group of related objects that form a whole. (588.01.a)		<ul style="list-style-type: none"> <li>Identify various groups/systems by related characteristics (example: circulatory system, school system, solar system, ecosystem, community)</li> <li>Compare and contrast 2 systems previously identified</li> <li>Design a group and define the characteristics to belong in a particular system</li> </ul>	characteristics • elements • group • system • order • organization • component		<ul style="list-style-type: none"> <li>Describe what makes up a system and give an example?</li> </ul>
Goal 1.2: Understand Concepts and Processes of Evidence, Models, and Explanations	4.S.1.2.1 Make and record observations then analyze and communicate the collected data. (588.02.a)		<ul style="list-style-type: none"> <li>Record observations/data using appropriate format(example: science journal, graphs, Excel, Word)</li> <li>Interpret observations and data collected</li> <li>Create a presentation choosing from a variety of formats (example: diagrams, PowerPoint, models, posters, graphs)</li> <li>Predict the result with a change in their experiment</li> </ul>	variable • data • observation		<ul style="list-style-type: none"> <li>Describe how you make an observation and how you could present the findings?</li> </ul>
	4.S.1.2.2 Define observations and inferences. (588.02.b)		<ul style="list-style-type: none"> <li>Recognize what observations are</li> <li>Recognize inferences</li> <li>Compare and Contrast observations and inferences</li> <li>Determine observations and inferences</li> </ul>	specifics • measurements		<ul style="list-style-type: none"> <li>What is observation?</li> <li>What is inference?</li> </ul>
	4.S.1.2.3 Make, describe and/or use models. (588.02.c)		<ul style="list-style-type: none"> <li>Describe what a model is and it's use</li> <li>Make models appropriate for scientific areas (volcano, solar system, human skeleton) (See Standards below for more examples)</li> <li>Present models to large group</li> </ul>	models		<ul style="list-style-type: none"> <li>What is a model?</li> <li>Given an example model, explain what the use of it would be?</li> </ul>
Goal 1.3: Understand Constancy, Change, and Measurement	4.S.1.3.1 Describe how changes occur and can be measured. (588.03.b)		<ul style="list-style-type: none"> <li>Observe and describe changes in scientific experiments/observations (example: physical states of matter)</li> <li>Record changes in observations</li> </ul>	change • observation • physical states of matter		<ul style="list-style-type: none"> <li>Describe something in the world that changes.</li> </ul>
	4.S.1.3.2 Measure in both U.S. Customary and International System of Measurement (metric system) units. (588.03.c)		<ul style="list-style-type: none"> <li>Identify both US and metric system units</li> <li>Identify tools used in measuring that identified unit</li> <li>Measure in both US and Metric system in variety of formats (example: length in inches, centimeters, millimeters volume with quarts, gallons, liters, milliliters)</li> <li>Convert these measurements from US to metric and metric to US</li> </ul>	US Customary • International System of Measurement(metric) • length volume • temperature • weight • distance	For metric conversion chart <a href="http://www.yale.edu/ynhti/curriculum/units/1989/6/89.06.02.x.html">www.yale.edu/ynhti/curriculum/units/1989/6/89.06.02.x.html</a> For both systems conversion chart <a href="http://www.unc.edu/~rowlett/units">www.unc.edu/~rowlett/units</a>	<ul style="list-style-type: none"> <li>Given a ruler, measure the length of your pencil using inches and centimeters.</li> <li>Given a scale, measure the weight of a book in pounds and grams.</li> <li>Given a beaker, fill with water to the capacity to 100ml.</li> <li>Given a thermometer, record the temperature.</li> </ul>
Goal 1.4: Understand the Theory that Evolution is a Process that Relates to the Gradual Changes in the Universe and of Equilibrium as a Physical State	No objectives at this grade level.					
Goal 1.5: Understand Concepts of Form and Function	4.S.1.5.1 Explain the relationship between shape and use. (588.05.a)		<ul style="list-style-type: none"> <li>Explain why objects have a certain shape that is beneficial to it's use (example: ball is round, triangles for bridges)</li> </ul>	use • shape		<ul style="list-style-type: none"> <li>Describe why the shape of a ball is important for bowling</li> </ul>

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Goal 1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills	4.S.1.6.1 Write questions that can be answered by conducting scientific tests. (589.01.a)		<ul style="list-style-type: none"> <li>Discuss possible testable questions (must be measurable and compared and contrasted)</li> <li>Create question of interest that is both measurable and comparable</li> </ul>	question • measurable • compare • contrast • of interest		<ul style="list-style-type: none"> <li>Write questions that can be answered by conducting scientific tests</li> </ul>
	4.S.1.6.2 Conduct scientific tests. (589.01.b)		<ul style="list-style-type: none"> <li>Identify the steps of the scientific method</li> <li>Paraphrase the steps of the scientific method</li> <li>Formulate a question that can be tested and measured</li> <li>Conduct an appropriate scientific test</li> </ul>	scientific method • scientific test • hypothesis • experiment • conclusion • results • data • question	biology.dc.edu/Courses/bio104/sci_meth.htm www.sciencebuddies.org/science-fair-projects?project_scientific_method.shtm	<ul style="list-style-type: none"> <li>Using the scientific method, conduct a scientific experiment.</li> </ul>
	4.S.1.6.3 Use appropriate tools and techniques to gather and display data. (589.01.c)		<ul style="list-style-type: none"> <li>Identify the appropriate tools needed for gathering and displaying data from experiment (thermometers, rulers, magnifiers, balances)</li> <li>Identify multiple ways to represent the data (Excel, Word, graphs, journals, charts, tables)</li> <li>Choose and defend appropriate means to record and display data</li> </ul>	data • means		<ul style="list-style-type: none"> <li>Using your scientific experiment, record and display results.</li> </ul>
	4.S.1.6.4 Use data to construct a reasonable explanation. (589.01.d)		<ul style="list-style-type: none"> <li>Describe the result from the experiment</li> <li>Use data to either defend or reject the hypothesis</li> </ul>	hypothesis • defend • reject		<ul style="list-style-type: none"> <li>Using your hypothesis and data from your experiment, explain the results.</li> </ul>
	4.S.1.6.5 Make predictions based on data. (589.01.e)		<ul style="list-style-type: none"> <li>Compare and contrast differences in data with changing variables</li> <li>Analyze data to determine reasonable outcome</li> </ul>	data • variables • outcomes • predict		<ul style="list-style-type: none"> <li>Given results from completed experiment, predict what would happen given a change in variables.</li> </ul>
	4.S.1.6.6 Analyze alternative explanations. (589.01.f)		<ul style="list-style-type: none"> <li>Construct other explanations to support results</li> <li>Analyze the explanations for validity</li> </ul>	valid • explanations		<ul style="list-style-type: none"> <li>Describe other possible explanations that would lead to the results from completed experiment.</li> </ul>
	4.S.1.6.7 Communicate the results of tests to others in multiple formats. (589.01.g)		<ul style="list-style-type: none"> <li>Report results to class (example: graphs charts, tables, Excel, science journals, pictures, videos)</li> </ul>	results • data		<ul style="list-style-type: none"> <li>Display and verbalize the completed experiment from setup to results.</li> </ul>
Goal 1.7: Understand That Interpersonal Relationships Are Important in Scientific Endeavors	No objectives at this grade level.					
Goal 1.8: Understand Technical Communication	4.S.1.8.1 Analyze and follow multi-step instructions. (598.02.a)		<ul style="list-style-type: none"> <li>Analyze and follow multi-step instructions.</li> </ul>			<ul style="list-style-type: none"> <li>Make a peanut butter sandwich given someone else's multi-step instructions</li> </ul>
<b>Standard 2: Physical Science</b>						
Goal 2.1: Understand the Structure and Function of Matter and Molecules and Their Interactions	4.S.2.1.1 Use instruments to measure properties (590.01.a)		<ul style="list-style-type: none"> <li>Identify various instruments</li> <li>Distinguish between operations of various instruments (example: beaker measures volume)</li> <li>Use instruments correctly to measure solids, liquids and gases</li> </ul>	beakers • rulers • balance • scale • thermometer		<ul style="list-style-type: none"> <li>Given a ruler, measure the length of your pencil using inches and centimeters.</li> <li>Given a scale, measure the weight of a book in pounds and grams.</li> <li>Given a beaker, fill with water to the capacity to 100ml.</li> <li>Given a thermometer, record the temperature.</li> </ul>
	4.S.2.1.2 Describe the physical properties of solids, liquids, and gases. (590.01.b)		<ul style="list-style-type: none"> <li>Summarize the properties of solids, liquids and gases</li> <li>Classify the properties of solids, liquids and gases</li> <li>Create a poster or model showing the correlation between 2 of the 3 properties</li> </ul>	solid • liquid • gas • volume • shape • molecules • density • mass		<ul style="list-style-type: none"> <li>Define a solid</li> <li>Define a liquid</li> <li>Define a gas</li> </ul>
	4.S.2.1.3 Explain the changes caused by heating and cooling materials. (590.01.c)		<ul style="list-style-type: none"> <li>Summarize the changes caused by heating and cooling materials</li> <li>Predict the possible changes in a material when heated or cooled</li> </ul>	temperature • evaporation • condensation • freezing point • boiling point • solution • solubility • dissolve • physical change • chemical change • chemical reaction		<ul style="list-style-type: none"> <li>Explain the changes caused by heating and cooling materials. For example; describe the change that happens if you were to put a ice cube in the microwave</li> </ul>
Goal 2.2: Understand Concepts of Motion and Forces	No objectives at this grade level.					

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Goal 2.3: Understand the Total Energy in the Universe is Constant	No objectives at this grade level.					
Goal 2.4: Understand the Structure of Atoms	No objectives at this grade level.					
Goal 2.5: Understand Chemical Reactions	No objectives at this grade level.					
<b>Standard 3: Biology</b>						
	4.S.3.1.1 Analyze and communicate the adaptations of plants and animals to their environment. (592.01.a)	<ul style="list-style-type: none"> <li>Analyze and communicate the adaptations of plants to their environment</li> <li>Analyze and communicate the adaptations of animals to their environment</li> </ul>	<p>A.</p> <ul style="list-style-type: none"> <li>Identify plants that change for their environment</li> <li>Explain how they adapt</li> <li>Create a new plant and demonstrate how it would adapt to different environments</li> </ul> <p>B.</p> <ul style="list-style-type: none"> <li>Identify animals that change for their environment</li> <li>Explain how they adapt</li> <li>Create a new animal and demonstrate (through writing) how it would adapt in different environments</li> </ul>	<p>A.</p> dormancy • transpiration • taproot • fibrous root <p>B.</p> environments• adaptations• camouflage • mimicry • behavior • instinct • migration • hibernation	Internet Resources <a href="http://evolution.berkeley.edu/evosite/evo101/IIIIE5Adaptation.shtml">http://evolution.berkeley.edu/evosite/evo101/IIIIE5Adaptation.shtml</a> <a href="http://www.ecokids.ca/pub/eco_info/topics/climate/adaptations/index.cfm">http://www.ecokids.ca/pub/eco_info/topics/climate/adaptations/index.cfm</a> <a href="http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=4750">http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=4750</a> <a href="http://www.thewildones.org/sfcEnv.html">http://www.thewildones.org/sfcEnv.html</a> <a href="http://www.desertusa.com/animal.html">http://www.desertusa.com/animal.html</a> Plant Adaptations <a href="http://www.nps.gov/archive/grsa/resources/curriculum/element/lesson28.htm">http://www.nps.gov/archive/grsa/resources/curriculum/element/lesson28.htm</a> <a href="http://www.mbgnet.net/bioplants/adapt.html">http://www.mbgnet.net/bioplants/adapt.html</a> <a href="http://www.desertusa.com/flora.html">http://www.desertusa.com/flora.html</a>	<ul style="list-style-type: none"> <li>Create an animal or plant and explain how that animal adapts to its environment and list the things it does to achieve this.</li> </ul>
	4.S.3.1.2 Describe the difference between vertebrate and invertebrate animals. (592.01.c)		<ul style="list-style-type: none"> <li>List characteristics of a vertebrate and invertebrate</li> <li>Compare and Contrast the characteristics of invertebrates and vertebrate</li> <li>Sort various animals into appropriate categories</li> </ul>	exoskeleton • endoskeleton • backbone		<ul style="list-style-type: none"> <li>Given pictures of various animals, label them as invertebrate or vertebrate and explain what characteristic puts them in that category</li> </ul>
	4.S.3.1.3 Classify the five groups of vertebrates (mammals, reptiles, amphibians, birds, and fish) based on characteristics. (592.01.c)		<ul style="list-style-type: none"> <li>Recognize the characteristics of the 5 groups of vertebrates</li> <li>Create or design (in small groups) a big book about the assigned vertebrate group</li> <li>Present this book to others</li> </ul>	warm blooded • cold blooded • mammals • reptiles • amphibians • birds • fish		<ul style="list-style-type: none"> <li>Given pictures of various animals, sort them into groups of mammals, reptiles, amphibians, birds or fish and write a paragraph explaining the characteristics of each group</li> </ul>
Goal 3.2: Understand the Relationship between Matter and Energy in Living Systems	No objectives at this grade level.					
Goal 3.3: Understand the Cell is the Basis of Form and Function for All Living Things	No objectives at this grade level.					
<b>Standard 4: Earth and Space Systems</b>						
	4.S.4.1.1 Compare and contrast the basic components of our solar system (planets, sun, moon, asteroids, comets, meteors). (594.01.b)		<ul style="list-style-type: none"> <li>Label the components of our solar system</li> <li>Create a model of the solar system using these basic components</li> <li>Compare and contrast the components</li> <li>Evaluate living conditions on other planets</li> </ul>	planets • sun • moons • asteroids • comets • orbit • solar system • meteors • atmosphere • lunar • axis • rotation • inner planets • outer planets • phases of moon (waxes, wanes) • revolution • gas giants	<a href="http://www.ioncmaste.ca/homepage/resources/web_resources/CSA_Astro9/files/html/module3/lessons/lesson4/phasesMoon.html">http://www.ioncmaste.ca/homepage/resources/web_resources/CSA_Astro9/files/html/module3/lessons/lesson4/phasesMoon.html</a> <a href="http://lps.lexingtonma.org/Libdept/elem.lib/grade4.html#sunmoon">http://lps.lexingtonma.org/Libdept/elem.lib/grade4.html#sunmoon</a>	<ul style="list-style-type: none"> <li>Create a model of the solar system and correctly label each component</li> </ul>
	4.S.4.1.2 Explain the effect of gravity on orbits and objects. (594.01.c)		<ul style="list-style-type: none"> <li>Recognize the concept of gravity</li> <li>Summarize why the planets stay in orbit of the sun and why moons stay in orbit with planets</li> <li>Predict what would happen if gravity was not present</li> </ul>	elliptical orbits • gravity • Sir Isaac Newton's Laws of Motion • mass • weight • friction	<a href="http://school.discoveryeducation.com/lessonplans/programs/invisibleforce/">http://school.discoveryeducation.com/lessonplans/programs/invisibleforce/</a> <a href="http://www.exploratorium.edu/ronh/weight/index.html">http://www.exploratorium.edu/ronh/weight/index.html</a> <a href="http://www.thirteen.org/edonline/ntti/resources/lessons/gravity/b.html">http://www.thirteen.org/edonline/ntti/resources/lessons/gravity/b.html</a> Art link: <a href="http://www.crayola.com/lesson-plans/detail/stripes-with-gravity-lesson-plan/">http://www.crayola.com/lesson-plans/detail/stripes-with-gravity-lesson-plan/</a>	<ul style="list-style-type: none"> <li>Summarize the effect of gravity on objects and orbits in the solar system</li> </ul>
	4.S.4.1.3 Explain the effect of moon's gravity on Earth's tides. (594.01.c)		<ul style="list-style-type: none"> <li>Summarize the effect of the moon's gravity on the earth's tide</li> <li>Predict what would happen if the moon's gravity was greater, less or absent</li> </ul>	tides • gravity • phases • tidal bulge • orbit	Internet Resources <a href="http://www.sciencebuddies.org/science-fair-projects/project_ideas/Astro_p009.shtml">http://www.sciencebuddies.org/science-fair-projects/project_ideas/Astro_p009.shtml</a> <a href="http://www.kidsgen.com/school_projects/tides.htm">http://www.kidsgen.com/school_projects/tides.htm</a>	<ul style="list-style-type: none"> <li>Summarize the effect of the moon's gravity on the earth's tide.</li> </ul>

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Goal 4.2: Understand Geo-chemical Cycles and Energy in the Earth System	No objectives at this grade level.					
<b>Standard 5: Personal and Social Perspectives; Technology</b>						
Goal 5.1: Understand Common Environmental Quality Issues, Both Natural and Human Induced	No objectives at this grade level.					
Goal 5.2: Understand the Relationship between Science and Technology	4.S.5.2.1 Identify tools used for space exploration and for scientific investigations. (595.01.b)		<ul style="list-style-type: none"> <li>• Recognize tools used for scientific investigations</li> <li>• Create a model and present on one of the tools used for scientific investigations</li> <li>• Invent a new improvement for a space exploration or scientific tool</li> </ul>	Space Shuttle • space station • satellites • computers • NASA • rockets • rovers • robotics • telescopes • space • probe	<a href="http://school.discoveryeducation.com/lesson-plans/programs/liftoff/www.uen.org/themepar/exploration/space.shtml">school.discoveryeducation.com/lesson-plans/programs/liftoff/www.uen.org/themepar/exploration/space.shtml</a>	<ul style="list-style-type: none"> <li>• On a multiple choice test, correctly identify tools used for space exploration</li> </ul>
Goal 5.3: Understand the Importance of Natural Resources and the Need to Manage and Conserve Them	No objectives at this grade level.					