

## First Grade Science Standards

<b>Science and Engineering Process Standards (SEPS)</b>	
<b>SEPS.1 Posing questions (for science) and defining problems (for engineering)</b>	A practice of science is posing and refining questions that lead to descriptions and explanations of how the natural and designed world(s) work and these questions can be scientifically tested. Engineering questions clarify problems to determine criteria for possible solutions and identify constraints to solve problems about the designed world.
<b>SEPS.2 Developing and using models and tools</b>	<p>A practice of both science and engineering is to use and construct conceptual models that illustrate ideas and explanations. Models are used to develop questions, predictions and explanations; analyze and identify flaws in systems; build and revise scientific explanations and proposed engineered systems; and communicate ideas. Measurements and observations are used to revise and improve models and designs. Models include, but are not limited to: diagrams, drawings, physical replicas, mathematical representations, analogies, and other technological models.</p> <p>Another practice of both science and engineering is to identify and correctly use tools to construct, obtain, and evaluate questions and problems. Utilize appropriate tools while identifying their limitations. Tools include, but are not limited to: pencil and paper, models, ruler, a protractor, a calculator, laboratory equipment, safety gear, a spreadsheet, experiment data collection software, and other technological tools.</p>
<b>SEPS.3 Constructing and performing investigations</b>	Scientists and engineers are constructing and performing investigations in the field or laboratory, working collaboratively as well as individually. Researching analogous problems in order to gain insight into possible solutions allows them to make conjectures about the form and meaning of the solution. A plan to a solution pathway is developed prior to constructing and performing investigations. Constructing investigations systematically encompasses identified variables and parameters generating quality data. While performing, scientists and engineers monitor and record progress. After performing, they evaluate to make changes to modify and repeat the investigation if necessary.
<b>SEPS.4 Analyzing and interpreting data</b>	Investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists and engineers use a range of tools to identify the significant features in the data. They identify sources of error in the investigations and calculate the degree of certainty in the results. Advances in science and engineering makes analysis of proposed solutions more efficient and effective. They analyze their results by continually asking themselves questions; possible questions may be, but are not limited to: "Does this make sense?" "Could my results be duplicated?" and/or "Does the design solve the problem with the given constraints?"

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<p><b>SEPS.5 Using mathematics and computational thinking</b></p>	<p>In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Scientists and engineers understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</p>
<p><b>SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)</b></p>	<p>Scientists and engineers use their results from the investigation in constructing descriptions and explanations, citing the interpretation of data, connecting the investigation to how the natural and designed world(s) work. They construct or design logical coherent explanations or solutions of phenomena that incorporate their understanding of science and/or engineering or a model that represents it, and are consistent with the available evidence.</p>
<p><b>SEPS.7 Engaging in argument from evidence</b></p>	<p>Scientists and engineers use reasoning and argument based on evidence to identify the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation, the process by which evidence-based conclusions and solutions are reached, to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims.</p>
<p><b>SEPS.8 Obtaining, evaluating, and communicating information</b></p>	<p>Scientists and engineers need to be communicating clearly and articulating the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations, as well as, orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.</p>

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<b>Physical Science (PS)</b>
<b>1.PS.1</b> Characterize materials as solid, liquid, or gas and investigate their properties, record observations and explain the choices to others based on evidence (i.e., physical properties).
<b>1.PS.2</b> Predict and experiment with methods (sieving, evaporation) to separate solids and liquids based on their physical properties.
<b>1.PS.3</b> Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
<b>1.PS.4</b> Make observations to collect evidence and explain that objects can be seen only when illuminated.

<b>Earth and Space Science (ESS)</b>
<b>1.ESS.1</b> Use observations of the sun, moon, and stars to describe patterns that can be predicted.
<b>1.ESS.2</b> Observe and compare properties of sand, clay, silt, and organic matter. Look for evidence of sand, clay, silt, and organic matter as components of soil samples.
<b>1.ESS.3</b> Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.
<b>1.ESS.4</b> Develop solutions that could be implemented to reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

<b>Life Science (LS)</b>
<b>1.LS.1</b> Develop representations to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
<b>1.LS.2</b> Develop a model mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. Explore how those external parts could solve a human problem.
<b>1.LS.3</b> Make observations of plants and animals to compare the diversity of life in different habitats.
<b>1.LS.4</b> Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

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<b>Engineering (E)</b>
<b>K-2.E.1</b> Pose questions, make observations, and obtain information about a situation people want to change. Use this data to define a simple problem that can be solved through the construction of a new or improved object or tool.
<b>K-2.E.2</b> Develop a simple sketch, drawing, or physical model to illustrate and investigate how the shape of an object helps it function as needed to solve an identified problem.
<b>K-2.E.3</b> Analyze data from the investigation of two objects constructed to solve the same problem to compare the strengths and weaknesses of how each performs.