

# The Carey School Standards for Science Education 2007-2008

## Pre-Kindergarten

*\*California and National Standards for Pre-K Science do not exist.*

**NAEYC Science Standard**

Opportunities and materials for children to learn key topic content and principles of science such as:

- a. Students will recognize different organisms, the difference between living and nonliving (e.g. plants versus rocks), and life cycles of various organisms (e.g., plants, butterflies, humans).

**NAEYC Science Standard**

Opportunities and materials for children that encourage them to use the five senses to observe, explore, and experiment with scientific phenomena.

**NAEYC Science Standard**

Opportunities for children to use simple tools to observe objects and scientific phenomena.

**NAEYC Science Standard**

Opportunities and materials for children that help them learn and use scientific terminology and vocabulary associated with the content areas.

**Theme: Five Senses**

Students will be able to investigate their environment by using their five senses (sight, touch, smell, and occasional tasting).

**Theme: Animals (Homes and Habitats)**

Students will be able to understand that living things need food, water, air and shelter.

Students will be able to understand the animal characteristics in storybooks are sometimes different from real animal characteristics.

Students will be able to understand that animals and plants can live in extreme environments such as desert and rain forests.

Students will be able to identify animal body parts in relationship to their own.

## Kindergarten

**CA Kindergarten Science Standard**

Scientific progress is made by asking meaningful questions and conducting

**Theme: Patterns and Senses**

Students will be able to identify that a pattern is a sound, shape, or color that

<p>careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.</p> <p>a. Observe common objects by using the five senses</p> <p>b. Describe the properties of common objects</p> <p>c. Compare and sort common objects by one physical attribute (e.g. color, shape, texture, size, weight)</p> <p>d. Communicate observations orally and through drawings</p> <p><b>NAEYC Science Standard</b></p> <p>Opportunities for children to use simple tools to observe objects and scientific phenomena.</p> <p>Opportunities and materials for children to collect data and to represent and document their findings (e.g., through drawing or graphing).</p> <p>Opportunities and materials for children that encourage them to think, question, and reason about observed and inferred phenomena.</p> <p>Opportunities and materials for children that help them learn and use scientific terminology and vocabulary associated with the content areas.</p>	<p>repeats itself.</p> <p>Students will be able to identify what are and are not patterns.</p> <p>Students will be able to create their own patterns.</p> <p>Students will be able to identify the colors of the rainbow.</p>
<p><b>NAEYC Science Standard</b></p> <p>Opportunities and materials for children to learn key topic content and principles of science such as:</p> <p>Earth and sky (e.g., season, weather,</p>	<p><b>Theme: Weather and Seasons</b></p> <p>Students will be able to understand how to read a thermometer.</p> <p>Students will be able to understand that wind comes from the difference in air</p>

<p>geologic features, light and shadow, sun, moon, and stars).</p> <p><b>CA Kindergarten Science Standard</b></p> <p>Earth is composed of land, air and water. As a basis for understanding this concept:</p> <p>a. Students know changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.</p> <p><b>CA First Grade Science Standard</b></p> <p>Weather can be observed, measured, and described. As a basis for understanding this concept:</p> <p>a. Students know how to use simple tools (e.g. thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.</p> <p>b. Students know that the weather changes from day to day but that trends in temperature or of rain (or snow) tend to be predictable during a season.</p> <p>c. Students know the sun warms the land, air and water.</p>	<p>pressure between hot and cold air.</p> <p>Students will be able to understand that hot air rises and cold air sinks.</p> <p>Students will be able to identify cumulus, stratus, and cirrus clouds.</p> <p>Students will be able to identify the characteristics of fall, winter, spring and summer seasons.</p> <p>Students will be able to identify the direction the wind is coming from using a wind vane.</p>
<p><b>NAEYC Science Standard</b></p> <p>Opportunities and materials for children to learn key topic content and principles of science such as:</p> <p>Organisms, the difference between living and nonliving (e.g., plants versus rocks), and life cycles of various organisms (e.g., plants, butterflies, humans).</p> <p><b>CA Kindergarten Science Standard</b></p> <p>Different types of plants and animals inhabit the Earth. As a basis for</p>	<p><b>Theme: Plants, Invertebrates and Vertebrates</b></p> <p>Students will be able to identify the major parts of the plant: seed, seedling, stem, leaves, flower and understand the role of each in the plant's life.</p> <p>Students will be able to identify leaves and the main shapes that they can be found in.</p> <p>Students will be able to recognize the major parts of the flower.</p> <p>Students will be able to understand the</p>

<p>understanding this concept:</p> <p>a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).</p> <p>b. Students know stories sometimes give plants and animals attributes they do not really have.</p> <p>c. Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, and legs).</p> <p><b>CA First Grade Science Standard</b></p> <p>Plants and animals meet their needs in different ways. As a basis for understanding this concept:</p> <p>a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.</p> <p>b. Students know both plants and animals need water, animals need food, and plants need light.</p> <p>c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.</p> <p>d. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.</p>	<p>importance of plants to all life on earth.</p> <p>Students will be able to realize the interdependence of insects in the plant life cycle.</p> <p>Students will be able to know how plants adapt to their environment: e.g. cactus have the ability to store water for long periods, seaweed can absorb nutrients from the water rather than a root system.</p> <p>Students will be able to understand that plants spread their seeds in a variety of ways.</p> <p>Students will be able to identify the three major body parts of an insect and know that insects have six legs.</p> <p>Students will be able to identify the major characteristics between insects, reptiles, birds, fish and mammals.</p> <p>Students will be able to understand that reptiles lay eggs, shed their skin and are cold blooded.</p> <p>Students will be able to understand that birds have feathers and lay eggs.</p> <p>Students will be able to identify birds of prey and what owls eat.</p> <p>Students will be able to understand that mammals have fur and give live birth.</p>
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**First Grade**

<b>CA First Grade Science Standard</b>	<b>Theme: Liquids</b>
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<p>Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:</p> <p>a. Students know solids, liquids, and gases have different properties.</p> <p>b. Students know the properties of substances can change when the substances are mixed, cooled, or heated.</p>	<p>Students will be able to understand that matter comes in three states: solid, liquid and gas.</p> <p>Students will be able to understand the properties of a liquid (it takes the shape of its container, it flows, it is wet, etc.)</p> <p>Students will be able to describe a liquid based on its characteristics.</p> <p>Students will be able to identify viscous liquids.</p> <p>Students will be able to explore how different liquids mix.</p>
<p><b>CA First Grade Science Standard</b></p> <p>Plants and animals meet their needs in different ways. As a basis for understanding this concept:</p> <p>a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.</p> <p><b>CA First Grade Science Standard</b></p> <p>Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.</p> <p>Students will:</p> <p>a. Draw pictures that portray some features of the thing being described.</p>	<p><b>Theme: Animal Defenses</b></p> <p>Students will be able to understand how camouflage helps protect an animal.</p> <p>Students will be able to explore how animals protect themselves through behavior and protective coverings. Students will be able to design an animal with a defense.</p>
<p><b>CA Second Grade Science Standard</b></p>	<p><b>Theme: Force and Motion</b></p>

<p>The motion of objects can be observed and measured. As a basis for understanding this concept:</p> <p>a. Students know the position of an object can be described by locating it in relation to another object or to the background.</p> <p>b. Students know an object's motion can be described by recording the change in position of the object over time.</p> <p>c. Students know the way to change how something is moving is by giving it a push or a pull. The size of the change is related to the strength, or the amount of force, of the push or pull.</p> <p>d. Students know tools and machines are used to apply pushes and pulls (forces) to make things move.</p> <p>e. Students know objects fall to the ground unless something holds them up.</p> <p>f. Students know magnets can be used to make some objects move without being touched.</p>	<p>Students will be able to name Newton's three Laws of Motion and apply them to the world around them.</p> <p>Students will be able to describe potential and kinetic energy and construct a simple marble roller coaster track.</p> <p>Students will be able to identify that a force is a push or pull on an object by doing some simple investigations.</p> <p>Students will be able to describe and identify common forces such as friction and gravity.</p> <p>Students will be able to test the forces in plane flight: lift, drag, thrust and gravity.</p> <p>Students will be able to build a small car that has protective features to protect an egg from breaking through a series of tests.</p>
<p><b>CA Second Grade Science Standard</b></p> <p>Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:</p> <p>a. Students know how to compare the physical properties of different kinds of rocks and know that a rock is composed of different combinations of minerals.</p> <p>b. Students know smaller rocks come from the breakage and weathering of larger rocks.</p> <p>c. Students know that soil is made partly</p>	<p><b>Theme: Rocks, Crystals, and Fossils</b></p> <p>Students will be able to identify rocks and the characteristics that make a rock different from other objects.</p> <p>Students will be able to understand that rocks can be formed from different processes and that each can be identified based on their formation process; volcanic rocks have holes, sedimentary rocks are sandy, etc.</p> <p>Students will be able to understand how to sort rocks based on their major features: color, size, shape, texture.</p>

<p>from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water and ability to support the growth of many kinds of plants.</p> <p>d. Students know that fossils provide evidence about the plants and animals that lived long ago and that scientists learn about the past history of Earth by studying fossils.</p>	<p>Students will be able to draw a rock to show its major features in as much scientific detail as possible.</p> <p>Students will be able to identify crystals and know one way that crystals can be formed from the evaporation of a saturated solution.</p> <p>Students will be able to describe how a fossil is formed in sedimentary rock and that a unique set of events must take place to preserve an animal.</p> <p>Students will be able to understand the difference between a mold and a cast, why many fossils that we see in museums are replicas and how they are created.</p>
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**Second Grade**

<p><b>CA Grade Two Science Standard</b></p> <p>Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</p> <p>a. Make predictions based on observed patterns and not random guessing.</p> <p>b. Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standards metric system units.</p> <p>c. Compare and sort common objects according to two or more physical attributes (e.g., color, shape, texture, size, weight).</p>	<p><b>Theme: Weights and Measures</b></p> <p>Students will be able to use a balance to measure mass using the metric system.</p> <p>Students will be able to use beakers and graduated cylinders to measure liquid volumes using the metric system.</p> <p>Students will be able to describe an object based on its measurements using the metric system.</p> <p>Students will be able to measure their bodies using tape measures in the metric system.</p>
<p><b>CA Grade 2 Science Standard</b></p> <p>The motion of objects can be observed and</p>	<p><b>Theme: Sound</b></p> <p>Students will be able to identify the parts of</p>

<p>measured. As a basis for understanding this concept:</p> <p>a. Students know sound is made by vibrating objects and can be described by its pitch and volume.</p>	<p>the ear and how each part plays a role in the hearing process.</p> <p>Students will be able to understand pitch and frequency.</p> <p>Students will be able to recognize the difference between high and low frequency waves.</p> <p>Students will be able to identify parts of a sound wave: wavelength, trough, and crest.</p> <p>Students will be able to create different instruments with recycled materials.</p> <p>Students will be able to understand the different ways that other animals hear: birds, fish, reptiles, insects and mammals.</p>
<p><b>CA Grade 2 Science Standard</b></p> <p>Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</p> <p>a. Make predictions based on observed patterns and not random guessing.</p> <p>b. Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standard metric system units.</p> <p>c. Write or draw descriptions of a sequence of steps, events, and observations.</p> <p>d. Follow oral instructions for a scientific investigation.</p>	<p><b>Theme: Solution Chemistry (Dissolving)</b></p> <p>Students will be able to measure liquids and solids and mix them together.</p> <p>Students will be able to understand that some solids dissolve in water and that others do not.</p> <p>Students will be able to make a prediction and test their hypothesis.</p> <p>Students will be able to experiment with different liquids and solids.</p> <p>Students will be able to explore basic chemical reactions and understand that a chemical reaction usually involves the release of gas, or a temperature change.</p>
<p><b>CA Grade 2 Science Standard</b></p>	<p><b>Theme: Life Cycles</b></p>

<p>Plants and animals have predictable life cycles. As a basis for understanding this concept:</p> <p>a. Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.</p> <p>b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs and mice.</p> <p>c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.</p> <p>d. Students know there is variation among individuals of one kind within a population.</p> <p>e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.</p> <p>f. Students know flowers and fruits are associated with reproduction in plants.</p>	<p>Students will be able to identify the major parts of the plant and how a plant reproduces.</p> <p>Students will be able to describe the life cycle of an insect and the difference between complete and incomplete metamorphosis.</p> <p>Students will be able to compare and contrast the life cycles of the major groups of animals: amphibians, reptiles, fish, birds, and mammals.</p> <p>Students will be able to understand the main steps to the life cycle: birth, death, growing, changing, and reproduction.</p> <p>Students will be able to understand the life cycle of an invertebrate by raising a mealworm to the adult stage.</p> <p>Students will be able to explore how touch, light, and food affect the behavior of a mealworm.</p> <p>Students will be able to understand the difference between threatened and endangered species and how humans impact the world around us through industry and pollution.</p>
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**Third Grade**

<p>CA Grade 3 Science Standard</p> <p>Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:</p> <p>a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.</p> <p>b. Students know examples of diverse life forms in different environments, such as</p>	<p><b>Theme: Habitats and San Francisco Bay Estuary</b></p> <p>Students will be able to identify producers, consumers, scavengers, decomposers, predator, prey, herbivores, carnivores, and omnivores in an environment.</p> <p>Students will be able to understand the interconnectedness of organisms within an ecosystem.</p> <p>Students will be able to understand how</p>
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<p>oceans, deserts, tundra, forests, grasslands, and wetlands.</p> <p>c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.</p> <p>d. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.</p> <p>e. Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.</p> <p><b>CA Grade 4 Science Standard</b></p> <p>All organisms need energy and matter to live and grow. As a basis for understanding this concept:</p> <p>a. Students know plants are the primary source of matter and energy entering most food chains.</p> <p>b. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.</p> <p>c. Students know decomposers, including many fungi, insects, and microorganisms recycle matter from dead plants and animals.</p> <p>Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:</p> <p>a. Students know ecosystems can be</p>	<p>food chains and food webs operate in an environment.</p> <p>Students will be able to conduct a study of a small area on the school ground and investigate the interaction between different living and non-living things.</p> <p>Students will be able to use scientific equipment such as microscopes and rulers to study soil and other biomaterial.</p> <p>Students will be able to understand a local ecosystem and how animals have special adaptations that allow them to survive in their environment.</p> <p>Students will be able to identify local marsh plants and birds.</p> <p>Students will be able to describe major characteristics of halophytes.</p> <p>Students will be able to identify mudflat invertebrates.</p>
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<p>characterized by their living and nonliving components.</p> <p>b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.</p> <p>c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.</p> <p>d. Students know that most microorganisms do not cause disease and that many are beneficial.</p>	
<p><b>CA Grade 3 Science Standard</b></p> <p>Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept:</p> <p>a. Students know the patterns of the stars stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.</p> <p>b. Students know the way in which the Moon’s appearance changes during the four-week lunar cycle.</p> <p>c. Students know telescopes magnify the appearance of some distant objects in the sky, including the Moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than the number that can be seen by the unaided eye.</p> <p>d. Students know that Earth is one of several planets that orbit the Sun and that the Moon orbits Earth.</p> <p>e. Students know the position of the Sun in the sky changes during the course of the day and from season to season.</p>	<p><b>Theme: Astronomy</b></p> <p>Students will be able to describe the Sun and Moon by comparing their physical features, sizes and locations relative to the Earth.</p> <p>Students will be able to describe the Moon as far away, airless, cratered ball of rock with a diameter about one-fourth that of Earth.</p> <p>Students will be able to understand lunar gravity and its effect on basic activities.</p> <p>Students will be able to use basic math to calculate the difference in gravitational pull between the Moon and the Earth.</p> <p>Students will be able to identify the phases of the Moon.</p> <p>Students will be able to observe how moon craters are formed.</p> <p>Students will be able to describe the Sun as a star that is a ball of gases much larger than the Earth and much farther away than the Moon.</p>

<p><b>CA Grade 5 Science Standard</b></p> <p>The solar system consists of planets and other bodies that orbit the Sun in predictable paths. As a basis for understanding this concept:</p> <p>a. Students know the Sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.</p> <p>b. Students know the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects, such as asteroids and comets.</p> <p>c. Students know the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.</p>	<p>Students will be able to understand the Sun’s three major parts and that it gives off heat and light essential to life on Earth.</p> <p>Students will be able to identify the major constellations in the Northern Hemisphere.</p> <p>Students will be able to use a constellation’s position in the night sky to approximate time and season.</p>
<p><b>CA Grade 3 Science Standard</b></p> <p>Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</p> <p>a. Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.</p> <p>b. Differentiated evidence from opinion and know that scientists do not rely on</p>	<p><b>Theme: Bridge Engineering</b></p> <p>Students will be able to identify the major bridge designs and the advantages and disadvantages of each (beam, suspension, cable-stayed, arch).</p> <p>Students will be able to construct simple bridges out of paper.</p> <p>Students will be able to work cooperatively to construct a truss bridge out of wood.</p> <p>Students will be able to identify important shapes used in the construction of bridges and other structures.</p> <p>Students will be able to understand how ancient people constructed early bridges.</p>

claims or conclusions unless they are backed by observations that can be confirmed.

## Fourth Grade

### CA Grade 3 Science Standard

Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept:

- a. Students know energy comes from the Sun to Earth in the form of light.
- b. Students know sources of stored energy take many forms, such as food, fuel, and batteries.
- c. Students know machines and living things convert stored energy to motion and heat.
- d. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.
- e. Students know matter has three forms: solid, liquid, and gas.
- f. Students know evaporation and melting are changes that occur when the objects are heated.
- g. Students know that when two or more substances are combined, a new substance may be formed with properties that are different from those of the original materials.
- h. Students know all matter is made of small particles called atoms, too small to see with the naked eye.
- i. Students know people once thought that Earth, wind, fire and water were the basic

### Theme: Matter, Solids, and Liquids

Students will be able to identify solids, liquids and gases and the special properties of each.

Students will be able to identify common elements on the periodic table of elements.

Students will be able to understand the basic structure of an atom.

Students will be able to identify a molecule and become familiar with the structure of a basic salt and water molecule.

<p>element that made up all matter. Science experiments show that there are more than 100 different types of atoms, which are presented on the periodic table of the elements.</p>	
<p>CA Grade 4 Science Standard</p> <p>Electricity and magnetism are related effects that have many useful applications in every day life. As a basis for understanding this concept:</p> <p>a. Students know how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.</p> <p>b. Students know how to build a simple compass and use it to detect magnetic effects, including Earth’s magnetic field.</p> <p>c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.</p> <p>d. Students know the role of electromagnets in the construction of electric motors, electric generators, and simple devices, such as doorbells and earphones.</p> <p>e. Students know electrically charged objects attract or repel each other.</p> <p>f. Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.</p> <p>g. Students know electrical energy can be converted to heat, light, and motion.</p>	<p><b>Theme: Electricity and Magnetism</b></p> <p>Students will be able to build a simple circuit.</p> <p>Students will be able to construct series and parallel circuits using batteries, bulbs, switches, and motors.</p> <p>Students will be able to understand how and why a magnet works through free exploration and systematic investigations.</p> <p>Students will be able to discover that magnets display forces of attraction and repulsion.</p> <p>Students will be able to build an electromagnet.</p> <p>Students will be able to organize observations on a graph.</p> <p>Students will be able to understand how motors and other electric devices work in our daily lives.</p> <p>Students will be able to build an electric car using their understanding of electricity and magnetism.</p> <p>Students will be able to identify conductors and insulators.</p> <p>Students will be able to use scientific thinking processes to conduct investigations.</p>
<p>CA Grade 5 Science Standard</p> <p>Water on Earth moves between the oceans and land through the processes of</p>	<p><b>Theme: Water</b></p> <p>Students will be able to understand the molecular structure of water, (2 atoms of</p>

evaporation and condensation. As a basis for understanding this concept:

- a. Students know most of the Earth's water is present as salt water in the oceans, which cover most of the Earth's surface.
- b. Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.
- c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water and ice, and can fall to Earth as rain, hail, sleet, or snow.
- d. Students know that the amount of fresh water located in rivers, lakes, under-ground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.
- e. Students know the origin of the water used by their local communities.

**CA Grade 5 Science Standard**

Energy from the Sun heats Earth unevenly, causing air movement that result in changing weather patterns. As a basis for understanding this concept:

- a. Students know uneven heating of Earth causes air movements (convection currents).
- b. Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.
- c. Students know the causes and effects of different types of severe weather.

hydrogen and 1 atom of oxygen).

Students will be able to understand that water can be found in all three states (solid, liquid, gas) on the Earth and can go back and forth between states.

Students will be able to discover the boiling and freezing point of water and discover surface tension.

Students will be able to understand the processes involved in the Water Cycle and be familiar with the terms, precipitation, condensation, accumulation, transpiration, and watershed.

Students will be able to understand that water is a precious resource.

Students will be able to recognize pollution sources.

Students will be able to recognize common acids and bases and use test strips and indicators to test a substance.

Students will be able to carry out a successful test of home tap water using chemical reagents in a cooperative group setting.

Students will be able to follow a scientific procedure and compare experimental results with standards results.

Students will be able to understand water quality in terms of chlorine level, pH, copper, iron and hardness.

Students will be able to remove basic impurities from water through the process of filtration.

d. Students know how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.

e. Students know that the Earth's atmosphere exerts a pressure that decreases with distance above Earth's surface and that at any point it exerts this pressure equally in all directions.

### **CA Grade 4 Science Standard**

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

a. Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.

b. Measure and estimate the weight, length, or volume of objects.

c. Formulate and justify predictions based on cause-and-effect relationships.

d. Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

e. Construct and interpret graphs from measurements.

f. Follow a set of written instructions for a scientific investigation.

### **CA Grade 4 Science Standard**

**Theme: Geology**

<p>The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:</p> <p>a. Students know how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle)</p> <p>b. Students know how to identify common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.</p> <p><b>CA Grade 4 Science Standard</b></p> <p>a. Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.</p> <p>b. Students know natural processes, including freezing and thawing and the growth of roots, cause rocks to break down into smaller pieces.</p> <p>c. Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).</p>	<p>Students will be able to understand that the earth is made up of three main layers; core, mantle and crust and that these can be further divided into an inner/outer core, mantle, asthenosphere and crust.</p> <p>Students will be able to understand the physical differences between igneous, metamorphic, and sedimentary rocks.</p> <p>Students will be able to understand that igneous rocks are the parent rocks for all other rocks and that rocks change from one type to another by heat, pressure, weathering/erosion, compaction/ sedimentation and time.</p> <p>Students will be able to understand minerals have different properties that can be tested such as streak, hardness, magnetism, and chemical reactions.</p> <p>Students will be able to use Moh's scale of hardness to help identify and unknown mineral.</p> <p>Students will be able to understand the difference between mechanical and chemical weathering.</p> <p>Students will be able to recognize effects of erosion in their environment.</p> <p>Students will be able to identify the major tectonic plates that make up the Earth's crust.</p> <p>Students will be able to understand that plates move and interact causing earthquakes and volcanoes.</p> <p>Students will be able to understand the three types of plate movement: convergent, divergent, and strike-slip and the geomorphic processes that occur at each boundary.</p>
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	<p>Students will be able to identify the three types of volcanoes: shield, composite and cinder and where they form.</p> <p>Students will be able to understand how to read a topographic map and how topographic maps represent true landforms on earth.</p> <p>Students will be able to identify the gold-bearing areas of California and the different types of rock that make up the state.</p>
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## Fifth Grade

<p><b>CA Grade 5 Science Standard</b></p> <p>Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:</p> <p>a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.</p> <p>b. Students know all matter is made of atoms, which may combine to form molecules.</p> <p>c. Students know metals have properties in common, such as high electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), and gold (Au), are pure elements; others, such as steel and brass, are composed of a combination of elemental metals.</p> <p>d. Students know that each element is made of one kind of atom and that the elements are organized in the periodic table by their chemical properties.</p> <p>e. Students know scientists have developed</p>	<p><b>Theme: Periodic Table &amp; Mixtures and Solutions</b></p> <p>Students will be able to identify elements on the Periodic Table.</p> <p>Students will be able to identify the number of protons, neutrons and electrons in an element.</p> <p>Students will be able to recognize chemical formulas.</p> <p>Students will be able to measure liquids and solids using the metric system.</p> <p>Students will be able to understand how to separate mixtures and solutions, and understand the difference between saturation and concentration.</p> <p>Students will be able to identify solutes and solvents.</p> <p>Students will be able to gain experience with chemical reactions.</p> <p>Students will be able to understand how to use evaporation to extract salt from a solution.</p>
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instruments that can create discrete images of atoms and molecules that show that the atoms and molecules often occur in well-ordered arrays.

f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.

g. Students know properties of solid, liquid, and gaseous substances, such as sugar (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>), water (H<sub>2</sub>O), helium (He), oxygen (O<sub>2</sub>), nitrogen (N<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>).

h. Students know living organisms and most materials are composed of just a few elements.

i. Students know the common properties of salts, such as sodium chloride (NaCl).

### **CA Grade 5 Science Standard**

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

a. Classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.

b. Develop a testable question.

c. Plan and conduct a simple investigation based on students-developed questions and write instructions others can follow to carry out the procedure.

d. Identify the dependent and controlled

<p>variables in an investigation.</p> <p>e. Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.</p> <p>f. Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.</p> <p>g. Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.</p> <p>h. Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.</p>	
<p><b>CA Grade 5 Science Standard</b></p> <p>Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</p> <p>a. Develop a testable question.</p> <p>b. Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.</p> <p>c. Identify the dependent and controlled variables in an investigation.</p> <p>d. Identify a single independent variable in a scientific investigation and explain how</p>	<p><b>Theme: Science Fair</b></p> <p>Students will be able to understand the major components of the scientific method.</p> <p>Students will be able to understand the steps in writing a successful experiment.</p> <p>Students will be able to develop good research methods for a scientific investigation.</p> <p>Students will be able to develop a good hypothesis that can be tested.</p> <p>Students will be able to understand quantitative and qualitative analysis techniques.</p> <p>Students will be able to work with dependent and independent variables in an experiment.</p>

<p>this variable can be used to collect information to answer a question about the results of the experiment.</p> <p>e. Select appropriate tools (e.g. thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.</p> <p>f. Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.</p> <p>g. Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.</p> <p>h. Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.</p>	
<p><b>CA Grade 5 Science Standard</b></p> <p>Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:</p> <p>a. Students know many multi-cellular organisms have specialized structures to support the transport of materials.</p> <p>b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO<sub>2</sub>) and oxygen (O<sub>2</sub>) are exchanged in the lungs and tissues.</p> <p>c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the</p>	<p><b>Theme: Archaeology – Egypt</b></p> <p>Students will be able to recognize the effects salt has on a decaying organism.</p> <p>Students will be able to understand how to use scientific instruments to explore internal organs of an organism.</p> <p>Students will be able to understand how to preserve a deceased organism using ancient cultural practices.</p> <p><b>Theme: Human Body</b></p> <p>Students will be able to understand the major systems of the human body and how they work together.</p> <p>Students will be able to understand the major divisions in the human brain and the</p>

<p>function of the digestive system.</p> <p>d. Students know the role of the kidney in removing cellular waster from blood and converting it into urine, which is stored in the bladder.</p> <p>e. Students know how sugar, water, and minerals are transported in a vascular plant.</p> <p>f. Students know plants us carbon dioxide (CO<sub>2</sub>) and energy from sunlight to build molecules of sugar and release oxygen.</p> <p>g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO<sub>2</sub>) and water (respiration)</p>	<p>functions of each.</p> <p>Students will be able to identify the major similarities and differences between animal and plant cells and describe the function of the organelles.</p> <p>Students will be able to identify the major components of DNA and the function.</p> <p>Students will be able to prepare a wet-mount and dry mount slide.</p> <p>Students will be able to use high-powered microscopes to look at cells.</p> <p>Students will be able to use dissection tools to explore the functions of the heart.</p> <p>Students will be able to understand blood types and what blood they can safely mix.</p> <p>Students will be able to understand the parts of the respiratory system and how lungs function.</p> <p>Students will be able to understand the physiology of the female and male reproductive systems.</p>
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## Carey School Science Themes and The National Science Standards K-5

<p><b>Science as Inquiry</b></p> <p><b>CONTENT STANDARD A:</b> As a result of activities in grades K-5, all students should develop</p> <ul style="list-style-type: none"> <li>• Abilities necessary to do scientific inquiry             <ul style="list-style-type: none"> <li>• ASK A QUESTION ABOUT OBJECTS, ORGANISMS, AND EVENTS IN THE ENVIRONMENT.</li> <li>• PLAN AND CONDUCT A SIMPLE INVESTIGATION.</li> <li>• EMPLOY SIMPLE EQUIPMENT AND TOOLS TO GATHER DATA AND EXTEND THE SENSES.</li> <li>• USE DATA TO CONSTRUCT A REASONABLE EXPLANATION.</li> <li>• COMMUNICATE INVESTIGATIONS AND EXPLANATIONS</li> </ul> </li> <li>• Understanding about scientific inquiry</li> </ul>	<p><b>Kindergarten:</b> Weather and Seasons</p> <p><b>First Grade:</b> Liquids, Force and Motion</p> <p><b>Second Grade:</b> Solution Chemistry, Weights and Measures</p> <p><b>Third Grade:</b> Astronomy</p> <p><b>Fourth Grade:</b> Water</p> <p><b>Fifth Grade:</b> Mixtures and Solutions</p>
<p><b>Physical Science</b></p> <p><b>CONTENT STANDARD B:</b> As a result of the activities in grades K-5, all students should develop an understanding of:</p> <ul style="list-style-type: none"> <li>• Properties of objects and materials</li> <li>• Position and motion of objects</li> <li>• Light, heat, electricity, and magnetism</li> </ul>	<p><b>Kindergarten:</b> Patterns and Senses</p> <p><b>First Grade:</b> Force and Motion</p> <p><b>Second Grade:</b> Sound, Weights and Measures</p> <p><b>Fourth Grade:</b> Electricity and Magnetism</p> <p><b>Fifth Grade:</b> Mixtures and Solutions</p>
<p><b>Life Science</b></p> <p><b>CONTENT STANDARD C:</b> As a result of activities in grades K-4, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>• The characteristics of organisms</li> <li>• Life cycles of organisms</li> <li>• Organisms and environments</li> </ul>	<p><b>Kindergarten:</b> Plants, Vertebrates and Invertebrates</p> <p><b>First Grade:</b> Animal Defenses</p> <p><b>Second Grade:</b> Life Cycles, Oceans</p> <p><b>Third Grade:</b> Habitats, San Francisco Bay Estuary</p> <p><b>Fourth Grade:</b> Water</p>

<p><b>Earth and Space Science</b></p> <p><b>CONTENT STANDARD D:</b>  <b>As a result of their activities in grades K-5, all students should develop an understanding of:</b></p> <ul style="list-style-type: none"> <li>• Properties of earth materials</li> <li>• Objects in the sky</li> <li>• Changes in earth and sky</li> </ul>	<p><b>Kindergarten:</b> Weather and Seasons</p> <p><b>First Grade:</b> Rocks, Crystals and Fossils</p> <p><b>Third Grade:</b> Astronomy</p> <p><b>Fourth Grade:</b> Geology</p>
<p><b>Science and Technology</b></p> <p><b>CONTENT STANDARD E:</b>  <b>As a result of activities in grades K-5, all students should develop</b></p> <ul style="list-style-type: none"> <li>• Abilities of technological design <ul style="list-style-type: none"> <li>• IDENTIFY A SIMPLE PROBLEM.</li> <li>• PROPOSE A SOLUTION.</li> <li>• IMPLEMENTING PROPOSED SOLUTIONS</li> <li>• EVALUATE A PRODUCT OR DESIGN</li> <li>• COMMUNICATE A PROBLEM, DESIGN, AND SOLUTION.</li> </ul> </li> <li>• Understanding about science and technology</li> <li>• Abilities to distinguish between natural objects and objects made by humans</li> </ul>	<p><b>Kindergarten</b></p> <p><b>First Grade:</b> Force and motion</p> <p><b>Second Grade:</b> Solution Chemistry</p> <p><b>Third Grade:</b> Bridge Engineering</p> <p><b>Fourth Grade:</b> Electricity and Magnetism, Geology, Water</p> <p><b>Fifth Grade:</b> Mixtures and Solutions, Science Fair Project</p>
<p><b>Science in Personal and Social Perspectives</b></p> <p><b>CONTENT STANDARD F:</b>  <b>As a result of activities in grades K-5, all students should develop understanding of</b></p> <ul style="list-style-type: none"> <li>• Personal health</li> <li>• Characteristics and changes in populations</li> <li>• Types of resources</li> <li>• Changes in environments</li> <li>• Science and technology in local challenges</li> </ul>	<p><b>Kindergarten:</b> Patterns and Senses</p> <p><b>First Grade:</b> Force and Motion</p> <p><b>Second Grade:</b> Life Cycles, Oceans</p> <p><b>Third Grade:</b> Habitats, San Francisco Bay Estuary</p> <p><b>Fourth Grade:</b> Water</p> <p><b>Fifth Grade:</b> Human Body</p>
<p><b>History and Nature of Science</b></p>	<p><b>Kindergarten:</b> Patterns and Senses</p>

<p><b>CONTENT STANDARD G:</b>  <b>As a result of activities in grades K-5, all students should develop understanding of</b></p> <ul style="list-style-type: none"> <li>• Science as a human endeavor</li> </ul>	<p><b>First Grade:</b> Force and Motion  <b>Second Grade:</b> Sound</p> <p><b>Third Grade:</b> Astronomy</p> <p><b>Fourth Grade:</b> Matter, Solids and Liquids  Electricity and Magnetism</p> <p><b>Fifth Grade:</b> Periodic Table,  Archaeology: Egypt</p>
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\*The Carey School Standards for Science Education are aligned with the National Science Education Standards published by National Academy Press, the California State Standards ([www.cde.ca.gov](http://www.cde.ca.gov)), and the National Association for the Education of Young Children ([www.naeyc.org](http://www.naeyc.org)).