

Grade 6: Physical Sciences, Earth Sciences, Life Sciences, Investigation and Experimentation

California State Science Content Standards

Covered in:

**Hands-on science labs, demonstrations, & activities.
Investigation and Experimentation. Lesson Plans.**

Presented by Climate Change Education .org during

Mobile Climate Science Labs

- Professional development for teachers
 - In school presentations
 - Climate science and hands-on education *specialists* presenting alongside teachers and teaching assistants
 - Presentations at CSTA, NSTA, AAAS conferences
- For school field trips, as presented at local science museums

As aligned with existing science content standards, adopted 1997

Referencing: *Science Framework for California Public Schools*

<http://www.cde.ca.gov/ci/sc/cf/documents/scienceframework.pdf>

Adopted by the California State Board of Education

Published by the California Department of Education

Enabling teachers and schools to provide outstanding education called for in the standards under *Investigation and Experimentation* sections. Requirements for a minimum of 20-25% hands-on education in science.

Index of Standards Alignment—other grades, courses and standards:

http://climatechangeeducation.org/labs/k12_standards/index.html

Themes: <http://climatechangeeducation.org/labs/themes/index.html>

In the following, sections of standards noted are part of one or more lab theme.

Sections highlighted in **green** are a *primary focus* of one or more hands-on science lab.

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Standard Set 1 -- Plate Tectonics and Earth's Structure

1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:

1. a. *Students know* evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, **volcanoes**, and midocean ridges; and the distribution of fossils, rock types, and **ancient climatic zones**.
1. d. *Students know* that earthquakes are sudden motions along breaks in the crust called faults and that **volcanoes** and fissures are locations where magma reaches the surface.
1. e. *Students know* major geologic events, such as earthquakes, **volcanic eruptions**, and mountain building, result from plate motions.
1. f. *Students know* how to explain major features of California geology (including mountains, faults, **volcanoes**) in terms of plate tectonics.

Standard Set 2 -- Shaping Earth's Surface

2. c. *Students know* **beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves**.
2. d. *Students know* earthquakes, **volcanic eruptions**, landslides, and floods change human and wildlife habitats.

Standard Set 3 -- Heat (Thermal Energy) Physical Science

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:

3. a. *Students know* energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.
3. b. *Students know* that **when fuel is consumed, most of the energy released becomes heat energy**.
3. c. *Students know* **heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter)**.
3. d. *Students know* **heat energy is also transferred between objects by radiation (radiation can travel through space)**.

Standard Set 4 -- Energy in the Solar System

4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:

4. a. *Students know* the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.

4. b. *Students know* solar energy reaches Earth through radiation, mostly in the form of visible light.

4. c. *Students know* heat from Earth's interior reaches the surface primarily through convection.

4. d. *Students know* convection currents distribute heat in the atmosphere and oceans.

4. e. *Students know* differences in pressure, heat, air movement, and humidity result in changes of weather.

Standard Set 5 -- Ecology (Life Sciences)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

5. a. *Students know* energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.

5. c. *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.

5. e. *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Standard Set 6 -- Resources

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:

6. a. *Students know* the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.

6. b. *Students know* different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.

6. c. *Students know* the natural origin of the materials used to make common objects.

Standard Set 7 -- Investigation and Experimentation

7. 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:

7. a. Develop a hypothesis.

7. b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

7. c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

7. d. Communicate the steps and results from an investigation in written reports and oral presentations.

7. e. Recognize whether evidence is consistent with a proposed explanation.

7. f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.

7. g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).

7. h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).