

Grade 7: Life Sciences, Physical Sciences, Earth 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.

Updated April 27, 2011

Grade 7 -- Focus on Life Sciences

Standard Set 1 -- Cell Biology

1. d. *Students know* that mitochondria liberate energy for the work that cells do and that **chloroplasts capture sunlight energy for photosynthesis.**

Standard Set 2 -- Genetics

Standard Set 3 -- Evolution

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:

3. a. *Students know* **both genetic variation and environmental factors are causes of evolution and diversity of organisms.**

3. e. *Students know* that **extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.**

Standard Set 4 -- Earth and Life History

4. b. *Students know* the **history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.**

4. d. *Students know* that evidence from geologic layers and **radioactive dating** indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.

4. f. *Students know* how movements of Earth's continental and oceanic plates through time, **with associated changes in climate and geographic connections,** have affected the past and present distribution of organisms.

4. g. *Students know* how to explain significant developments and extinctions of plant and animal life on the geologic time scale.

Standard Set 5 -- Structure and Function in Living Systems

5. b. *Students know* organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.

Students learned in grade five how blood circulates through the body and how oxygen, O₂, and carbon dioxide, CO₂, are exchanged in the lungs and tissues.

5. g. *Students know* how to **relate the structures of the eye** and ear to their **functions**.

Standard Set 5 -- Physical Principles in Living Systems

6. Physical principles underlie biological structures and functions. As a basis for understanding this concept:

6. a. *students know* **visible light is a small band within a very broad electromagnetic spectrum**.

6. b. *Students know* that for an **object to be seen, light emitted by or scattered from it must be detected by the eye**.

6. c. *Students know* light travels in straight lines if the medium it travels through does not change.

6. d. *Students know* how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.

6. e. *Students know* that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.

6. f. *Students know* **light can be reflected, refracted, transmitted, and absorbed by matter**.

6. g. *Students know* the angle of reflection of a light beam is equal to the angle of incidence.

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. **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. b. **Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project**.

7. c. **Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence**.

7. d. Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).

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