

Standards

This unit was developed to frame coverage of the following standards.

California Academic Content Standards for Chemistry, Grades 9–12

11. Nuclear processes are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear fusion. As a basis for understanding this concept:

- a. Students know protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons.
- b. Students know the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chemical reactions. The change in mass (calculated by $E=mc^2$) is small but significant in nuclear reactions.
- c. Students know some naturally occurring isotopes of elements are radioactive, as are isotopes formed in nuclear reactions.
- d. Students know the three most common forms of radioactive decay (alpha, beta, and gamma) and know how the nucleus changes in each type of decay.
- e. Students know alpha, beta, and gamma radiation produce different amounts and kinds of damage in matter and have different penetrations.

This unit was developed to meet the following standards.

California Academic Content Standards for Investigation and Experimentation, Grades 9–12

1. 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 four strands, students should develop their own questions and perform investigations. Students will:

- l. Analyze situations and solve problems that require combining and applying concepts from more than one area of science.
- m. Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.

CTE AME Industry Sector Foundation Standards

1.0 Academics

Students understand the academic content required for entry into postsecondary education and employment in the Arts, Media, and Entertainment sector.

1.2 Science

Specific applications of Investigation and Experimentation standards (grades nine through twelve):

- (1.1) Analyze situations and solve problems that require combining and applying concepts from more than one area of science.

2.0 Communications

Students understand the principles of effective oral, written, and multimedia communication in a variety of formats and contexts.

2.1 Reading

Specific applications of Reading Comprehension standards (grades nine and ten):

- (2.2) Prepare a bibliography of reference materials for a report using a variety of consumer, workplace, and public documents.
- (2.3) Generate relevant questions about readings on issues that can be researched.

2.2 Writing

Specific applications of Writing Strategies and Applications standards (grades eleven and twelve):

- (1.1) Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- (2.6) Deliver multimedia presentations:
 - a. Combine text, images, and sound and draw information from many sources (e.g., television broadcasts, videos, films, newspapers, magazines, CD-ROMs, the Internet, electronic media-generated images).
 - b. Select an appropriate medium for each element of the presentation.
 - c. Use the selected media skillfully, editing appropriately and monitoring for quality.