

SAFETY KNOWLEDGE BASE CHANGES

Performance Standard 13A/11A/12C.I

Students will apply the accepted practices of science in the context of safety policies and the changes in scientific knowledge over time accordingly:

- *Knowledge*: Understand how regulatory policies based on scientific research about chemicals have changed over time.
- *Application*: Research examples of the impact of the changes in safety regulations and accepted practices of science.
- *Communication*: Compare research on the evolution of science safety regulatory changes and the impact of the changes on society.

Procedures

1. ***In order to know and apply accepted practices of science (13A), the concepts that describe properties of matter and energy and the interactions between them (12C), the concepts, principles and processes of scientific inquiry (11A)*** students should experience sufficient learning opportunities to develop the following:

- Formulate hypothesis for research to correlate changing safety regulations associated societal situations.
- Propose options for appropriate questions and procedural steps.
- Reference pertinent research associated safety regulations and applications:
 - personal and environmental safety policies for storage, handling and disposal of chemicals,
 - risk/benefit studies for hazardous organic and inorganic chemicals,
 - community disposal procedures for hazardous materials,
 - household waste and hazardous waste pick-up programs organized by the Illinois Environmental Protection Agency, and
 - federal programs for development and enforcement of environmental safety policies.
- Investigate specific settings at which these regulations reflect changes:
 - in scientific knowledge and tolerances for safety,
 - in technological capabilities,
 - in public opinion, and/or
 - in cultural developments.
- Demonstrate how scientific conclusions are open to modification as new data are collected.

Note to teacher: This activity relates to knowledge associated with standard 13A and 12C, while addressing the performance descriptors for stage I within standard 11A. The societal context of implementing safety regulations about hazardous chemicals may be used as an introductory or culminating activity.

2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Set the stage for this activity by explaining some of the regulations that face schools for the handling of chemicals, the removal of asbestos in public buildings, the Superfund for hazardous waste sites around the country and specifically in Illinois, etc. Ask students to offer other examples associated with the regulatory policies for safe storage, handling and disposal of chemicals. They may have heard of Love Canal, Times Beach or others. They may be familiar with current efforts to define tolerances or removal processes for lead batteries, household paints, mercury thermometers, etc. Create a listing of such settings and regulations. Stress that the definitions of safety tolerances may have changed over time. Assign individual research to investigate the historical setting, chemical hazard, economic costs, technological tolerances, industrial utility and societal impact for specific hazards, locales or policy decisions. Students should present their research findings with appropriate mapping, graphic display and timelines for class discussion. Additional topics to be considered include how the changes in tolerance came about, influences which interacted in the change, parallels with other cultural or society developments, public opinion responses, consumer demands or legislative regulations. In addition to individual research, students should reflect on the common denominators about the changing responses from science and the public in the face of new information, as well as political and economic ramifications.

4. Evaluate each student's work using the Science Rubric as follows and add the scores to determine the performance level:
 - *Knowledge*: An overview of the regulatory policies was complete, detailed and accurate,
 - *Application*: The research on the societal impact of changing scientific knowledge was complete and correct, and
 - *Communication*: The comparative factors about the evolution of the changes and impact were insightful and accurate.

Examples of Student Work not available

Time Requirements

- 1-2 days for classroom introductory sessions; 1-2 weeks for individual research; 1 week for research presentations and comparative discussions

Resources

- Science Rubric