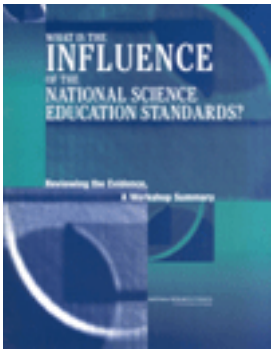


**What Is the Influence of the National Science Education Standards?: Reviewing the Evidence, A Workshop Summary**

Karen S. Hollweg and David Hill, Editors, Steering Committee on Taking Stock of the National Science Education Standards: The Research, Committee on Science Education K-12, National Research Council

ISBN: 0-309-50749-9, 50 pages, 8 1/2 x 11, (2003)

# Appendix D

## OVERVIEW OF THE CONTENT STANDARDS IN THE *NATIONAL SCIENCE EDUCATION STANDARDS*

The following tables list the science content standards from the *National Science Education Standards* (NRC, 1996, Chapter 6). The content standards outline what students should know, understand, and be able to do in natural science.

The science as inquiry standards are described in terms of activities resulting in student development of certain abilities and in terms of student understanding of inquiry.

**TABLE 6.1. SCIENCE AS INQUIRY STANDARDS**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Abilities necessary to do scientific inquiry | Abilities necessary to do scientific inquiry | Abilities necessary to do scientific inquiry |
| Understanding about scientific inquiry | Understanding about scientific inquiry | Understanding about scientific inquiry |

Standards for science subject matter in physical, life, and earth and space science focus on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

**TABLE 6.2. PHYSICAL SCIENCE STANDARDS**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Properties of objects and materials | Properties and changes of properties in matter | Structure of atoms |
| Position and motion of objects | Motions and forces | Structure and properties of matter |
| Light,heat, electricity, and magnetism | Transfer of energy | Chemical reactions |
| | | Motions and forces |
| | | Conservation of energy and increase in disorder |
| | | Interactions of energy and matter |

**TABLE 6.3. LIFE SCIENCE STANDARDS**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Characteristics of organisms | Structure and function in living systems | The cell |
| Life cycles of organisms | Reproduction and heredity | Molecular basis of heredity |
| Organisms and environments | Regulation and behavior | Biological evolution |
| | Populations and ecosystems | Interdependence of organisms |
| | Diversity and adaptations of organisms | Matter, energy, and organization in living systems |
| | | Behavior of organisms |

**TABLE 6.4. EARTH AND SPACE SCIENCE STANDARDS**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Properties of earth materials | Structure of the earth system | Energy in the earth system |
| Objects in the sky | Earth's history | Geochemical cycles |
| Changes in earth and sky | Earth in the solar system | Origin and evolution of the earth system |
| | | Origin and evolution of the universe |

The science and technology standards establish connections between the natural and designed worlds and provide students with opportunities to develop decision-making abilities. They are not standards for technology education; rather, these standards emphasize abilities associated with the process of design and fundamental understandings about the enterprise of science and its various linkages with technology.

**TABLE 6.5. SCIENCE AND TECHNOLOGY STANDARDS**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Abilities to distinguish between natural objects and objects made by humans | Abilities of technological design | Abilities of technological design |
| Abilities of technological design | Understanding about science and technology | Understanding about science and technology |
| Understanding about science and technology | | |

An important purpose of science education is to give students a means to understand and act on personal and social issues. The science in personal and social perspectives standards help students develop decision-making skills.

**TABLE 6.6. SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Personal health | Personal health | Personal and community health |
| Characteristics and changes in populations | Populations, resources, and environments | Population growth |
| Types of resources | Natural hazards | Natural resources |
| Changes in environments | Risks and benefits | Environmental quality |
| Science and technology in local challenges | Science and technology in society | Natural and human-induced hazards |
| | | Science and technology in local, national, and global challenges |

The standards for the history and nature of science recommend the use of history in school science programs to clarify different aspects of scientific inquiry, the human aspects of science, and the role that science has played in the development of various cultures.

**TABLE 6.7. HISTORY AND NATURE OF SCIENCE STANDARDS**

| LEVELS K-4 | LEVELS 5-8 | LEVELS 9-12 |
|---|---|---|
| Science as a human endeavor | Science as a human endeavor | Science as a human endeavor |
| | Nature of science | Nature of scientific knowledge |
| | History of science | Historical perspectives |