

SCIENCE STANDARDS FOR AIR QUALITY CURRICULUM

The National Science Education Standards (National Research Council, 1996) provide the basic framework for many state and local standards in the sciences. These documents set benchmarks for student achievement and address the goals of educational practice in the a number of areas, including:

1. Science Teaching
2. Science Content
3. Assessment in Science Education

The Air Quality Curriculum materials and the use of problem-based learning (PBL) provide educators with the opportunity to address these goals. A sampling of the applicable standards is listed below.

1. Science Teaching – Teachers of science...

Standard A: plan an inquiry-based science program for their students...select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, and experiences of students.

Standard B: guide and facilitate learning... focus and support inquiries while interacting with students; orchestrate discourse among students about scientific ideas; challenge students to accept and share responsibility for their own learning; recognize and respond to student diversity and encourage all students to participate fully in science learning; encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science.

Standard C: engage in ongoing assessment of their teaching and of student learning...use multiple methods and systematically gather data about student understanding and ability; guide students in self-assessment.

Standard D: design and manage learning environments that provide students with the time, space, and resources needed for learning science...identify and use resources outside the school and engage students in designing the learning environment.

Standard E: develop communities of science learners that reflect the intellectual rigor of scientific inquiry and the attitudes and social values conducive to science learning...display and demand respect for the diverse ideas, skills, and experiences of all students; enable students to have a significant voice in decisions about the content and context of their work and require students to take responsibility for the learning of all members of the community; nurture collaboration among students.

2a. Science Content –

As a result of activities in grades K – 12, all students should develop...

Standard A: abilities necessary to do scientific inquiry and understandings about scientific inquiry...including asking questions, planning and conducting investigations, using appropriate technology to gather data, critically review alternative explanations, and communicate results.

Standard E: abilities of technological design, understanding about science and technology, and abilities to distinguish between natural objects and objects made by humans.

Standard F: understanding of personal and community health, natural resources and hazards, changes in environmental quality, risks and benefits, science and technology in local, national and global challenges.

Standard G: understanding of science as a human endeavor, nature of scientific knowledge, and historical perspectives.

2b. Science Content – (Grades K – 4)

As a result of activities in grades K – 4, all students should develop an understanding of...

Standard B: properties of objects and materials.

Standard C: organisms and environments.

Standard D: properties of earth materials, objects in the sky, and changes in the earth and sky.

2c. Science Content – (Grades 5 – 8)

As a result of activities in grades 5 – 8, all students should develop an understanding of...

Standard B: properties and changes of properties in matter.

Standard C: structure and function in living systems, regulation and behavior, populations and ecosystems, adaptations of organisms.

Standard D: structure of the earth system and earth's history.

2d. Science Content – (Grades 9 – 12)

As a result of activities in grades 9 – 12, all students should develop an understanding of...

Standard B: structure and properties of matter, chemical reactions, interactions of energy and matter.

Standard C: matter, energy and organization in living systems.

Standard D: energy in the earth system, geochemical cycles, origin and evolution of the earth system.

3. Assessment of Science Teaching

Standard A: Assessments must be consistent with the decisions they are designed to inform. Assessments are deliberately designed. The relationship between the decisions and the data is clear.

Standard B: Achievement and opportunity to learn science must be assessed and given equal attention.

Standard C: Assessment tasks are authentic. Students have adequate opportunity to demonstrate their achievements.

Standard D: *Assessment practices must be fair, reviewed for the use of stereotypes and assumptions that reflect or offend the perspectives of experiences of a particular group, and accommodates the needs of all students. Assessment tasks must be set in a variety of contexts, be engaging to students with different interests and experiences, and must not assume the perspective or experience of a particular gender, racial, or ethnic group.*