

Active Physics and The National Science Education Standards

Active Physics was designed and developed to provide teachers with instructional strategies that model the following from *The Standards*:

Teaching Standards:

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; encourage all 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.

C. Engage in ongoing assessment of their teaching and student learning

- Use multiple methods and systematically gather data about student understanding and ability.
- Analyze assessment data to guide teaching.
- Guide students in self-assessment.

D. Design and manage learning environments that provide students with time, space, and resources needed for learning science

- Structure the time available so students are able to engage in extended investigations.
- Create a setting for student work that is flexible and supportive of science inquiry.
- Make available tools, materials, media, and technological resources accessible to students.
- Identify and use resources outside of school.

E. Develop communities of science learners that reflect the intellectual rigor of scientific attitudes and social values conducive to science learning

- Display and demand respect for diverse ideas, skills, and experiences of students.
- Enable students to have significant voice in decisions about content and context of work and require students to take responsibility for the learning of all members of the community.
- Nurture collaboration among students.
- Structure and facilitate ongoing formal and informal discussion based on shared understanding of rules.
- Model and emphasize the skills, attitudes and values of scientific inquiry.

Assessment Standards

- Features claimed to be measured are actually measured.
- Students have adequate opportunity to demonstrate their achievement and understanding.
- Assessment tasks are authentic – developmentally appropriate, set in familiar context, and engaging to students with different interests and experiences.
- Assesses student understanding as well as knowledge.
- Improve classroom practice and plan curricula.
- Develop self-directed learners.

Active Physics Units

Content Standards

Physical Science

- Structure of atoms
- Structure and properties of matter
- Chemical reactions
- Motions and forces
- Conservation of energy and increase in disorder
- Interactions of energy and matter

Unifying Concepts and Processes

- System, order and organization
- Evidence, models and explanations
- Constancy, change and measurement
- Evolution and equilibrium
- Form and function

Science as Inquiry

- Identify questions and concepts that guide scientific investigations
- Design and conduct scientific investigations
- Use technology and mathematics to improve investigations
- Formulate and revise scientific explanations and models using logic and evidence
- Communicate and defend a scientific argument
- Understanding scientific inquiry

Science and Technology

- Identify a problem or design an opportunity
- Propose designs and choose between alternate solutions
- Implement a proposed solution
- Evaluate the solution and its consequences
- Communicate the problem, process, and solution
- Understanding science and technology

Science In Personal and Social Perspectives

- Personal and community health
- Population growth
- Natural resources
- Environmental quality
- Natural and human induced hazards
- Science and technology in local, national, and global challenges

History and Nature of Science

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

