



## (1) Intervention of Government/State in Primary/Secondary Education

Control of K-12 education is the responsibility of the individual state governments; there is no national curriculum. Individual states (and, in some cases, even the larger cities) define their own curricula, their own required content, and their own standards of assessment. Local authorities, relying principally on local funding, run the schools. Each school district (and there are more than 15,000) has its own curriculum committee, usually, but not always, adopting its own state's mandated standards of learning. All states now have science content standards for grades K-12. These standards are very loosely based on a set of National Science Education Standards (NSES) developed by the National Research Council. The NSES, despite their name, are NOT federally mandated national standards.

What actually is taught in the classroom depends on two factors: the textbooks and the state mandatory assessments, which also vary significantly in character and depth from state-to-state. Textbook publishers claim that their books are meeting state standards. Some 23 states have rigid adoption procedures to evaluate textbooks and then permit them to be sold in their state. Other states and a number of large cities have looser adoption processes, but most exercise some control.

High school chemistry textbooks are designed for a one-year course, that is most frequently the only introduction to chemistry that most high school students have before they go on to college—even to major in chemistry. The traditional course is heavy on physical and inorganic chemistry, and includes a high percentage of algorithmic manipulations. The ACS textbook, *Chemistry in the Community (ChemCom)* is very different in that it includes some organic, environmental, and industrial chemistry as well as biochemistry. As *ChemCom* is revised, new topics are added, including green chemistry and materials science. However, even with *ChemCom*, there is a limit to the number of topics that can be added, and still meet state content requirements. **ACS would be pleased to explore opportunities to develop new high school education materials collaboratively with C6 countries, especially in nanotechnology.**

## (2) Popularization of Chemistry

The ACS, primarily through its Office of Community Activities and its local sections, is involved in activities throughout the year to popularize science through events held at museums, shopping malls, schools, and various other community venues. The greatest concentration of effort takes place during National Chemistry Week when local sections and undergraduate student affiliates work across the country to popularize chemistry through demonstrations, workshops, talks, and a wide range of highly visible public relations events.

## (3) Training of School Teachers

The biggest problems facing high school chemistry in the United States are the quality and quantity of the teachers. Older, well-qualified teachers are reaching retirement age. Newer teachers, usually with a science education degree, are likely to have an inadequate background in chemistry. New teachers may graduate and be in need of immediate continuing education. Each state has its own standards for teacher certification, many states requiring only a minimum exposure to chemistry in order to be certified. Teacher salaries depend on location. Depending on experience, teachers may be relatively well paid or be inadequately compensated to meet the local cost of living. Attrition

from the profession in the early years is high. While there are excellent teacher preparation and continuing education programs, there are not enough of them. Education research has identified ways to train teachers well. Considerable funding is needed to duplicate the programs that work.

#### **(4) International Chemistry Olympiad**

ACS has participated in the International Chemistry Olympiad since 1984. We run the program in conjunction with our local sections across the country. Local sections screen about 10,000 students annually through a local exam, either purchased from the ACS Examinations Institute or written locally. They may also use other criteria to identify from 8 to 27 students within their jurisdiction who will take the National Chemistry Olympiad in the spring. The National Chemistry Olympiad, taken by less than 1,000 students, consists of both a theoretical examination and a practical, both administered by the local sections. The National Examination is written each year by a subcommittee of our Society Committee on Education. The top 20 students annually attend a 10-day study camp hosted by the U.S. Air Force Academy. The top four students, accompanied by one college and one high school teacher-mentor, represent the United States at the International Chemistry Olympiad.