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Science at Work in the Real World

Prison! We should be preparing our students to do time in prison. So says Michael Leyden¹ in *The Science Teacher*. Leyden points out that only one percent of 10th grade biology students will become scientists, while more than that will end up in penitentiaries.

With most students somewhere between future prisoners and future scientists, the science curriculum must provide for the majority by preparing science literate citizens for the world of tomorrow. Science literate citizens have an understanding of the nature of science and are able to use it in their daily lives. They appreciate basic research, understand the role of science and development of technology, and feel confident they can use new technology.

Just a few years ago, following Sputnik, program developers consciously removed all traces of technology from curricula. Technology, they thought, was something other than science, something too mundane for classrooms. Now the National Science Foundation is emphasizing technology education as an equal partner with science education in order for students to understand new technology and its role in society.

At present, program planners in several countries are developing and implementing new curricula that reflect not only what we know about the learner and the nature of science but also what we know about society. They recognize that science without societal applications means little to students and citizens alike. These programs incorporate the discovery of scientific ideas with career awareness and prep-

aration, as well as participation in decisions about learning and the usefulness of science applications in particular situations. Students use their learning by taking action to solve community concerns and seeking new information about problems.

An example of this trend—the preparation of science literate citizens—is the Science-Technology-Society (STS) approach, which presents the structure of science in relation to society, spotlighting the troublesome elements, particularly the most subjective and value laden. With an STS approach, students identify real-world problems, formulate solutions and courses of action, and make decisions to take action. In the process they may collect data, read from content sources, survey citizens, and write letters. While learning the content of science, students absorb the values, ethics, human engineering, and social perspectives usually overlooked in the classroom.

At Sheehan High School in Wallingford, Connecticut, for example, students are learning about energy and energy use in their community. After passing the State Energy Auditor Certification Test, these students conduct energy audits of public buildings. As fully certified state auditors, they perform a needed service for their community—definitely not child's play. And the service pays off. Citing their first-year audit of buildings in their own school district, they recommended specific changes in buildings and in energy uses. At the end of one year their district saved \$260,000 in energy costs.

At Susan Wagner High School in Staten Island, New York, students also

address science-related social problems in "Contemporary Issues in Science," which may be used as enrichment in either science or social studies or as a complete course. Guest lecturers present a variety of topics, while students conduct library research and surveys to determine the status of ideas and innovations. Groups of students identify and seek solutions for familiar community problems. The students then share their findings in a forum with community leaders in business, schools, and other organizations.

In these exemplary programs students learn about science and society while working on the same problems they will later face as adults. Working on community problems, they encounter basic science and research, begin to understand the role of science and the development of technology, and build confidence in their own abilities to use technology. In other words, with strategies at the application, synthesis, and evaluation levels, science curricula can begin to attain the goal of creating science literate citizens without shortchanging those who become scientists. Perhaps, too, if they see schooling as useful preparation for everyday life, these students, as adults, are likely to support their local schools.

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