

Science in a Technical World

Publisher: W.H. Freeman and Company

Developer: American Chemical Society

Grade levels: 9–12

Scientific domains: Interdisciplinary chemistry, biology, and earth science

Web sites:

<http://www.whfreeman.com/stw/>
www.chemistry.org/education

Year profiled: 2002

Science in a Technical World, developed in 2000, consists of 12 units, each consisting of a separate student book, video, and CD-ROM. Each unit focuses on an industry that applies chemical, biological, or earth science principals in its work. The curriculum integrates science concepts and technological applications. The industrial connections also permit consideration of the nature of technology itself. The program was developed by the American Chemical Society with funding from the National Science Foundation.

SCOPE/CONTENT

Teachers (or districts) can choose the program units they want to teach and the order in which they teach them. In each unit, students try to find a solution to a realistic science- or technology-related problem in the spotlighted industry. The problem is presented in the unit's student book, with student support for solving the problem available on the video and CD-ROM.

Unit titles are listed below, along with their science focus and a brief description of each unit's primary investigation:

- Carbonated Beverages (chemistry): What might cause a can of carbonated soft drink to have an unusual (off-specifications) taste?
- The Plant Tissue Culture Industry (biology): How can a tissue-culture laboratory increase its yield of healthy sugarcane plantlets?
- Polymer Research and Development (chemistry and biology): How can a research and development technician acquire the skills needed to identify different polymers?
- Pulp and Paper Research and Development (chemistry): How is paper made and tested for its properties?
- Upgrading the Wastewater Plant (chemistry and biology): What new skills must wastewater treatment technicians learn when their plant undergoes an upgrade?
- Paint Research and Development (chemistry): How is a new paint developed and tested?
- Food Safety (biology and chemistry): How can technicians assist dairies in keeping the milk supply free of antibiotic contamination?
- Refining Petroleum (chemistry and earth science): How can the tests required on a sample of crude oil be performed in a logical, consistent, safe, and reliable manner?
- Discovering New Medicinal Drugs (chemistry and biology): What information do trainee technicians in the drug discovery process need to understand?
- Medicinal Laboratory Technology (biology): How can clinical laboratory technicians organize their work to best assist physicians in a large hospital?

- Forensic Science (biology and chemistry): How can forensic tests on physical evidence help to solve a crime?
- Making Semiconductors (physics and chemistry): How can training increase skills, knowledge, and teamwork to allow technician teams to build a small robot?

FORMAT

Each unit of the *Science in a Technical World* program includes a student book, a video, and a CD-ROM.

- The student book contains a challenge or problem associated with the unit's industrial theme. It identifies the concepts, information, processes, and skills students need to solve the unit's problem. It also provides information and a sequence of laboratory experiences designed to promote understanding of the issues related to the problem. Students can present their findings and offer solutions to the unit problem using the format included.
- The video (15–20 minutes) shows the processes and perspectives of the workers in the featured industry, as well as applications of science content.
- The CD-ROM comprises five sections of visuals and audio, with information and assessment that students can navigate in any order. For example, the "Polymer Research and Development" CD includes (1) an introduction to the unit, (2) five questions and answers about polymers with word-links to a glossary and encyclopedia, (3) illustrations of the tasks performed by four different technicians in the industry, (4) practice exercises and quizzes, and (5) an assessment.

There are two complete teacher's editions with wraparound Teacher's Notes, each covering the content in 6 of the 12 student books.

ASSESSMENT INSTRUMENTS

Science in a Technical World includes formative and summative assessments. Student books contain several prompts for students to reflect on their work. For summative purposes, students present their solutions to the unit problems for feedback from teacher and peers. The CD-ROM also includes questions that assess students' knowledge.

PROFESSIONAL DEVELOPMENT SUPPORT

The American Chemical Society sponsors workshops throughout the United States for teachers interested in *Science in a Technical World*. These workshops incorporate technology and hands-on activities and vary in length from one hour to three days.

STAND-ALONE VS. SUPPLEMENTAL

The publisher offers the units either as the primary material for a Tech Prep course or as a supplement to a standard basal chemistry, biology, earth science, or physics textbook.

