

## Introduction

### *What is SPICE and What are its Goals?*

SPICE (Student-Presented Interactive Chemistry Experiences) is a science outreach program initiated by the Institute for Chemical Education (ICE) to encourage an interest in the sciences, and chemistry in particular. For many years ICE staff and others delivered science presentations to school groups either at their school or at the University of Wisconsin–Madison Department of Chemistry. During the spring semester of 1990, this outreach program was expanded by recruiting volunteers from among university students, faculty, and staff in the departments of chemistry, chemical engineering, science education, and others. The expanded



SPICE T-shirt worn at all presentations

program, named SPICE, was an immediate success. Without publicly announcing the newly expanded program, 45 presentations to about 7000 students, teachers, and parents were completed during that semester. During the following academic year 1990-1991, SPICE was contacted by about 70 schools and organizations, and gave over 95 chemistry presentations, career days, and teacher workshops reaching about 14,000 students, teachers, parents, and community members. SPICE participates in other functions besides presentations to large and small audiences. Numerous hands-on activities are provided for schools, science clubs, and science fairs. Although these activities are more expensive than a typical presentation because of the large amount of materials consumed, they permit the volunteers a greater opportunity for one-on-one discussions with students.

These programs have proved to be an excellent vehicle to communicate general science awareness and to foster goodwill within the community towards the university. The SPICE program provides a platform for other similar outreach programs, encourages student interest in science, and promotes interactive teaching. Interactive methods involving visual and hands-on activities that relate to students' everyday experiences are powerful motivators. By using interactive methods, student interest in science can be stimulated and maintained in ways that book-dominated discussions often can not. Each SPICE presentation involves a series of chemical demonstrations centered on a common theme, which serves to stimulate enthusiasm and generate thought-provoking ideas. The volunteers portray chemistry and the sciences as an integral part of society, and encourage the idea that science is interesting and exciting by providing an enjoyable program. To encourage further study and discussion, each participant is provided with a take-home booklet that describes 10 experiments (Appendix III) that can be done with kitchen supplies.

## Introduction

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The presenters also serve as role models for young students because the SPICE program has attracted individuals who, as a group, have traditionally been underrepresented in the sciences. For example, for SPICE presentations to girl scouts and their mothers, all of the presenters were women. Each of the SPICE outreach groups includes women scientists. Finding volunteers who are women or from underrepresented minorities has not been a problem for us since these people are often eager to participate. By recruiting university undergraduate and graduate students, faculty, and staff, the seeds are planted for future outreach programs by furnishing experience and expertise needed by these individuals to organize their own outreach programs.

### **About this Manual**

In the following section, we present the structure of the organization, tasks, and financial aspects of the SPICE program. Suggestions for writing your own script for a demonstration show are discussed next. This is followed by the most important reading—safety considerations.

Sample scripts used at SPICE presentations, on several themes—the phases of matter, energy, acids and bases, and polymers, as well as suggestions for hands-on events—constitute the final section. Many other themes are envisioned, for example, on environmental chemistry or on the interaction of light and matter. We encourage your experimentation, and welcome suggestions for our own scripts.

Appendix I contains a list of suppliers' names and addresses for hard-to-find items. Also, suggestions for substitutions of certain pieces of equipment are provided.

In Appendix II, there is a listing of books that provide more complete information on doing the demonstrations mentioned in the sample SPICE scripts and ideas for creating your own scripts. Many other sources of information on demonstrations and hands-on activities may be found in these books. It is important to emphasize that any questions or concerns about a demonstration's safety should be answered *before* attempting it. A few other institutions that have active public outreach programs and that may be of assistance are listed at the end of Appendix II.

Finally, copies of the student handouts used in our program are provided in Appendix III. These handouts were prepared initially by Dr. Rodney Schreiner of the Department of Chemistry at the University of Wisconsin–Madison. **Users of this manual are permitted to reproduce these pages, for noncommercial purposes only.**