

Rochester Chapter Promotes Science with the *Science Demonstrations Handbook*

The University of Rochester Chapter of the Materials Research Society (URCMRS) has nearly completed three years promoting grassroots education. Our primary goal has been to promote for school children an interest in and awareness of science. To this end, we have organized three science days, called "Material World," at the university on an annual basis and participated in several K-12 educational outreach programs.^{1,2} The core of these events consisted of demonstrations and hands-on activities. In an effort to communicate our experience to other university chapters, URCMRS members have compiled a *Science Demonstrations Handbook*.

The first chapter provides important aspects to be considered while organizing a science day, followed by a complete description of URCMRS's latest science day. The bulk of the handbook is a collection of demonstrations and hands-on activities divided into separate chapters for physics, chemistry, and optics activities. Although a large number of these have been drawn from previously published sources, some are unique URCMRS demonstrations. To facilitate the use of the book, each experiment is initially concisely described followed by a point-wise list of materials and equipment, caution, and procedure. In some cases, a discussion section provides lesson tips to be tailored to the audience and participants (see sidebar). Additional book and internet resources relating to science demonstrations has also been included.

Although most of the activities are geared toward school children (K-12), they can be easily modified for any age group. Graduate students have found several of the demonstrations to be exciting. We have incorporated most of these activities in our science days at the university and in demonstrations at local schools and museums. Additionally, most of the activities described rely on a low budget. A significant portion of the materials and equipment are available at chemistry and physics laboratories. This handbook should enable other university chapters and interested individuals to initiate their own grassroots education programs and have an impact on their local communities.

For further information or to obtain a copy of the *Science Demonstrations Handbook*, contact David Sours, Director of Membership Affairs, Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237-6006; 412-367-3004 ext. 401; fax 412-367-4373; e-mail sours@mrs.org.

Acknowledgments

The *Science Demonstrations Handbook* builds on many hours of work put in by

Geometrical Bubbles

An entertaining hands-on activity to form unique cubic and triangular bubbles.

Equipment and Materials

- 10 pipe cleaners
- Deep container of soapy water
- A straw

Procedure

1. Use six pipe cleaners to form a cube.
2. Dip the cube in the soapy solution and pull out.
3. The soap film forms a complex structure with a small square film toward the middle of the cube.
4. Puff a little air into this square to form a cubic bubble as shown in Figure 1.
5. Take three pipe cleaners and bend each one into a "V". Use this to construct a pyramid.
6. Dip the pyramid in the soapy solution and pull out.
7. Blow a little air into the center point of the film structure. A pyramidal bubble is formed as shown in Figure 2.

Discussion

1. The bubbles try to attain the shape of least volume, i.e., a sphere, but have to adhere to the "bubble rules".
2. In the 1800s, Joseph Plateau developed the "bubble rules". Every cluster of bubbles follows these same rules:
 - Six films meet in a point.
 - Four lines meet in a point.
 - Three films meet in a line.

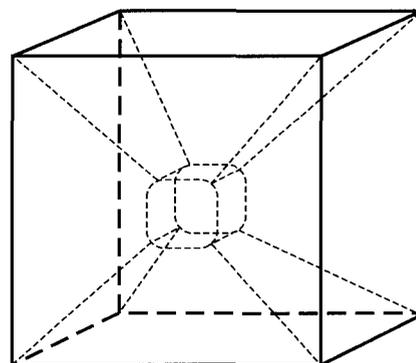


Figure 1. Cubic bubble.

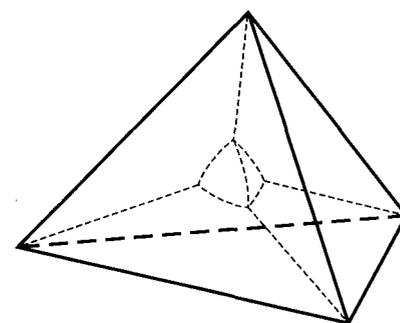


Figure 2. Pyramidal bubble.

enthusiastic past and present URCMRS members eager to further our chapter's endeavors in Grassroots Education. We are especially thankful to Julie Rehm, who initiated our grassroots program with Material World 94, Michal Freedhoff who further enhanced it, Paul Rodney, George Fischer, Karen Moore, Vinita Gupta, Marie Inman, Ai Hoang, Emile Ettegui, Anita Alanko, and Robin Henderson who have been ardent workers and supporters. Sincere gratitude is extended to the MRS Special Projects Subcommittee for funding the *Science Demonstrations Handbook* project.

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1. Julie Rehm, *MRS Bulletin*, December 1994, p. 61
2. Sabrina Diol, *MRS Bulletin*, March 1996, p. 95

1996 MRS FALL MEETING/ICEM-96

December 2-6
Boston, Massachusetts

SYMPOSIUM AIDE POSITIONS

Graduate students who want to assist in the symposium presentations by operating audiovisual equipment are encouraged to apply for a Symposium Aide position. By assisting in a minimum of four half-day sessions, aides will earn a waiver of the student registration fee, a complimentary full-year MRS student membership (January 1 through December 31, 1997) and a small stipend to help defray expenses. Symposium preferences are assigned on a first-come, first-serve basis. To request an application form and/or information, contact MRS Member Services, 412-367-3003; fax 412-367-4373; e-mail info@mrs.org.