Making Science Irresistible

BY JUDITH L. TOOP

You walk into a science classroom. Somehow, you expect to recognize the subject being taught there—just as you would in an English, history, or art room. The bulletin boards and displays catch your eye. The sound of an aquarium pump and ticking of a timer reinforce your impression. This is where science happens.

Bulletin Boards—Not Just Decoration

Making science happen is not solely a function of bulletin boards or displays. But these teaching tools can help students develop interest in the subject. Bulletin boards that reflect the current topic under discussion (cell biology, marine invertebrates, nuclear reactors) can offer a source of more information on the topic.

Encourage students to look closely at the pictures and read the captions to gain background information. This will help them become alert when paging through media. As they spot familiar bits of information in headlines and pictures they will be more likely to add to their knowledge.

Other benefits of bulletin boards: They dress up a room, giving the students an example of order and creativity; they offer an opportunity to feature student contributions; they stimulate questions and invite further investigation.

For maximum impact bulletin boards should be replaced frequently. But where can you get all the things you need to create such an array of attractive bulletin boards? Sources for materials include inexpensive gift wrap for backgrounds, headlines from newspapers, and pictures from magazines. Secondhand bookstores and thrift shops offer bargains on old *National Geographics* and other magazines that can be cut up for interesting pictures. If you want to reuse the illustrations, laminate them or cover with transparent shelf paper and then file them by topics or class units for easy retrieval.

Judith L. Toop teaches chemistry and biology at Auburn Adventist Academy, Auburn, Washington.

Picture removed

Teacher enthusiasm and effective presentations can help make the science classroom an interesting place.

Classroom Displays—Interest Centers

Displays can pique student interest and encourage creative thinking. A

Picture removed

weather-forecasting "duck," some "sensitive plants," a sealed glass tube containing a liquid that boils when handled, or a cartesian diver are some examples. A certain spot in the classroom could be reserved for displays of amazing objects. Let students observe and try experiments to discover what makes them work. Don't explain the principles right away—let the students suggest some hypotheses and test their validity. Ideas for displays can come from textbooks or visits to a science center or museum.

Ask other teachers in your school to help you with the mechanics, artwork, or word processing required. This creates interdisciplinary interest in your topic. Often other people can offer ingenious ideas about the project that will enhance its attractiveness and efficiency. Parents or other members of the community are useful resource persons.

Planning

Because teachers never have enough time, they need to develop labor-saving procedures. For example, in the laboratory, store test tubes, clamps, gas lighters, and other equipment in separate, labeled, stackable tote trays. When an item is needed, it can be located quickly.

Teaching students to clean up and return objects to the right tray helps them learn to be orderly and prevents the chaos of a jumbled storeroom. Properly labeled containers also help reinforce the names of objects in students' minds.

Bulletin boards can be used as teaching tools to help develop student interest in science.

Picture removed

Taking inventory and placing new orders for equipment is more accurate and less time-consuming when tote trays are used. Food storage boxes, dishpans, or other such items can be obtained relatively inexpensively. Investing in a set of uniformly sized boxes and some paper labels will pay great dividends in giving the teacher the feeling of being in control of inventory and saving many minutes of lab preparation time.

Handouts—Works of Art or Just Work?

The photocopy machine has revolutionized teaching in many ways. The quantity of handouts has increased to a blizzard of paper. The student who has a copy of a graph or diagram on which to take notes is better equipped for serious study than the one who must make his or her own quick sketch before the overhead transparency is whisked away.

The quality of handouts depends on several factors. Number one—time. As much as possible, try to rely on prepared materials from the publishers of texts and journals as well as from manufacturers. (Check copyright restrictions first!) Students who receive attractive, well-prepared handouts receive a clear message about expected standards for their own work. Their concepts of order and neatness are modeled by their teacher. They won't miss the example even if they don't listen to directions very well. Some things are caught, not taught!

Take Inventory

David Ausubel and other learning psychologists emphasize the importance of prior knowledge as a foundation for new information. You can't build on a foundation that doesn't exist. When beginning a new unit, ask each student to tell one thing he or she knows about the subject.

For example, the teacher might say, "Today we begin our study of foods and nutrition. I want each of you to share with your classmates something you know about this subject. For example, calcium is found in milk, or Vitamin A is necessary for good vision. Let's share some ideas. Lisa, tell us one fact about foods and nutrition."

A cooperative learning experience has begun. The students are sharing information that they can learn more about in class periods to come. The

Continued on page 45

IRRESISTIBLE SCIENCE

Continued from page 23

teacher gains insight into the students' prior knowledge about the topic and can assess the class's readiness for the new information. As discussion progresses, student leaders develop and group dynamics increases. Students become more interested in the topic as they rummage through their stored knowledge for a fact suitable for public presentation.

Current Events—Ready-made Motivators

Teachable moments can constitute either a threat or an opportunity to a teacher, depending on training and preparedness. The perceptive teacher can tell whether a student is asking a question just to kill time or because he or she really wants to learn more about the topic.

Listening to television and radio news, and reading the daily newspaper can provide ideas for discussion in class. Sometimes it is just coincidental that you are studying viruses when HTLV-III is identified, or just describing nuclear reactions when Chernobyl blows up.

At other times, by being flexible and preparing some materials in advance, you can insert a unit in a different sequence than you had planned. By so doing, you can highlight the connection between science and current events.

Articles in newspapers and popular magazines can also be used to get students interested in the literature of science. The MacNeil/Lehrer NewsHour could be recommended viewing on the evening of an announcement of a scientific breakthrough. *Discover* or wildlife magazines could be required reading on a health or environmental issue. Newspapers can offer starter details for a composition or debate. *Time* or *Newsweek* can be useful in highlighting trends or new discoveries in science through their regular columns on the subject. Students can be encouraged to spend part of their allowance on a magazine to share with the class. A habit of reading or scanning publications, if begun at the high-school level, will continue throughout life.

The student with a lively curiosity about the world around him will never be bored. The teacher sets the tone by example and assignment. If you keep up-to-date through a wide variety of reading materials, your students will see that this is an interesting and productive thing to do.

Try It and See

Science presents many puzzling things to wonder about and to try to figure out. In chemistry class, during a lab or demonstration, students often ask, "What would happen if I mixed these together?" If you know the consequences would be disastrous, describe the problems that would result. But in most cases you could safely say, "Let's try it and see!"

The results could offer a springboard for discussion, for introducing a new topic, or even for demonstrating that, as yet, some things in the field of science haven't been explained. This approach encourages experimentation and fosters a spirit of curiosity. Science often happens in ways you may not have anticipated, ways that were not in your lesson plan for the day.

Student Sees—Student Does

In all your classroom presentations—audio-visuals, handouts, lectures, displays, demonstrations, labs—the quality of the work students are expected to do is modeled by the teacher. Excellence begets excellence.

However, in everyone's work there are bound to be tiny errors or projects that don't turn out so well. Such occurrences show students how to deal with failure, teaching them that mistakes can lead to growth. By seeing their teacher handle problems gracefully, they learn not to be afraid to try. They come to understand that people grow and improve through experience.

"HE JUST GOT A PRICE QUOTE ON LIABILITY INSURANCE FOR THE SCHOOL. HELP ME PRY THE PHONE OUT OF HIS HAND!"

Adventist Science Teaching—The Difference

The theory of evolution permeates text and ancillary publications as well as TV and print media. Teachers must be constantly alert to the need to adapt these materials for classroom use. There are endless subtle references to "millions of years," and "earlier life forms." These must be carefully noted and corrected to avoid leading students astray.

Since repetition promotes learning, the teacher should frequently repeat the fact that the complexity of chemical/physical/biological principles gives clear and convincing evidence of the creativity of God, the Designer of the universe. Nearly every science topic offers ample opportunity to mention that the processes being studied are not the result of random happenings. For example, in physiology, we can celebrate God's creation—the magnificence of the human body and its function.

Conclusion

Teacher enthusiasm and effective presentations can help make the science classroom an interesting place. Truly creative science teaching can happen at every level in our schools. □

SAFE LABS

Continued from page 25

steel drum) to follow more stringent federal regulations for storing and getting rid of such chemicals. Experts say nearly all colleges produce at least that much each month. Chemicals included in these regulations include flammable solvents from the chemistry lab, pesticides from the grounds crew, and oil paints from art classes.

Schools that produce at least 100 kilograms of hazardous materials per month will now have to register with state or federal officials, keep on file records of the amounts and kinds of hazardous waste produced, who transported it for them, and where it was finally disposed.

Institutions that produce larger amounts of toxic materials already had to register with state or federal officials, but this is the first time