TEACHING ELEMENTARY AND SECONDARY STUDENTS

How to Care for the Earth

BY BRYAN NESS

As recently as 50 years ago there seemed to be no reason to be concerned about our environment. The air and water were apparently clean, forests appeared endless, and world population levels seemed manageable.

Our world is radically different today. Smog has become a household word and is no longer confined to large cities. Water pollution is widespread, from the Great Lakes to the Aral Sea, as well as in the groundwater of many communities. Our forests are rapidly shrinking, threatening the extinction of a number of animal and plant species. World population is increasing at an alarming rate and may reach 6.3 billion by the year 2000. Other problems, such as the greenhouse effect and ozone depletion, could have drastic effects on our planet as well as ourselves.

The mere fact that such appalling problems exist makes it imperative that we educate our young people about them. In order to deal with the serious environmental problems of our day, we must become more aware of them. However, we must also teach students how to think about ecology. Environmental problems are poorly understood by the general public, and the media often portray biased views of the problems.

Finally, as Christians, we have a God-given mandate to care for the earth. God told Adam and Eve to "have dominion over the fish of the sea and over the birds of the air and over every living thing that lives upon the face of the earth." God did not give this dominion so humanity could plunder the earth's resources. Rather, He intended that humans be stewards, to keep and protect the earth.

Environmental Education in the Curriculum

Unlike the college level, elementary or secondary education curriculum does not dedicate specific classes solely to environmental studies. This means that the topic must be integrated into other subjects.

Science. This is probably the easiest area in which to incorporate environmental education. This is especially true at the secondary level, where subjects are taught by different teachers.

Many of our environmental problems result from violations of scientific principles. Simple experiments can teach these principles in the classroom.

For example, one cause of water pollution in many of our lakes and streams is overenrichment. This is usually caused by sewage or farm runoff. The process of overenrichment can be easily modelled in the classroom by using two aquaria or large jars filled with water. Put in one aquarium either a very small amount of fertilizer or none at all. Add a large amount of fertilizer to the other aquarium. The fertilized aquarium soon becomes choked with algae and slime, whereas the other aquarium only grows a small amount of algae. This type of visually oriented experiment helps students to understand ecological principles.

Bible. Environmental issues can be integrated into Bible classes as well. As students study the story of Creation, they can learn about their responsibility to care for the earth.

Language Arts. Students can write a letter to the

Writing letters to express concern about ecological concerns can combine language arts and environmental studies.

president/prime minister or a local or state/provincial government official expressing their concern about a particular environmental issue. Students can also write stories about what life would be like if the greenhouse effect occurs or if we run out of oil.

Social studies. Students can investigate the ways that people in various countries deal with garbage or how our ancestors disposed of waste. Another social studies unit could look at the ways other cultures (both past and present) have exploited the earth. Such study could include discussion of how such actions have affected the environment.

Mathematics. Depending on the grade level, environmental topics can be integrated into math in a variety of ways. Computing how much electricity the school or classroom consumes or estimating how much gasoline is burned in delivering all the students to school each day could be projects for older students. Making a bar graph or pie chart of the kinds of litter found in the playground or of the kinds of garbage thrown away by each classroom is a project younger students would enjoy.

Art. Art is also an easy subject with which to integrate environmental concerns. Students can be asked to design posters or bumper stickers with an environmental message. They can also devise art projects using recyclable materials. Making recycled paper and then using it to create a piece of art is also fun for students.

In order to deal with the serious environmental problems of our day, we must become more aware of them.

The key to integrating environmental topics with other school subjects is creativity. Environmental problems affect all parts of our lives; therefore, it seems most appropriate to teach young people about these issues in context.

Individual or Class Projects

Students learn by observation and participation. Projects they design themselves can add an extra dimension to environmental education. Assignments can include individual, small group, or whole class participation. Projects should stress individual impact on the environment, especially at the local level. For this reason, activities like a personal garbage inventory will probably be more relevant for students than projects that deal with tropical rainforest destruction or oil spills in Alaska.

Students should be required to write a final report about their projects. Older pupils can help the younger ones to write the report if necessary. The projects should then be shared with others in the school, possibly by reporting the results in the school newspaper. If a student or class project is especially well done, the results should be shared with the community. Many local newspapers will print such material. This not only provides good public relations for the school, but also encourages the students to pursue environmental activities even after they are no longer required to earn a grade. Through student research and seminars, the school may also encourage the community to practice better stewardship of the earth.

School-wide Projects

In addition to individual and environmental education, class projects can also feature school-wide participation. This is the place to teach students by example and experience that they can be part of the solution to our environmental problems. School-wide projects can be as simple as a regularly scheduled litter patrol day for the school grounds or as ambitious as on ongoing clean-up of a community park or a stretch of highway.

A number of schools have embarked on successful environmental projects.

The Alcott Elementary School in Concord, Massachusetts, began a composting project as a part of an Earth Day celebration. Instead of throwing away all the food scraps from their cafeteria, they now compost them. As a result, they produce high quality compost for the school's flower beds. They also give some to the community and a local organic farm. The school cafeteria's waste output has gone down from about 25 garbage bags a day to only three or four.

As a result of a trash study by four students led by English teacher Judy Collishaw in the Richmond School in New Hampshire, the entire school launched a recycling program. Money received from the recyclables was used to offset project costs. The experiment was so successful that recycling programs were instituted at three other schools in the same district.

Resources

Books and magazines. Because of the heightened interest in environmental problems, books have been produced for every age level. Most focus on practical things people can do to help the environment. An annotated list is found on page 17.

A number of children's magazines also deal with environmental topics. Those are your best source of current information. If you do not already receive the magazines listed in this article, get at least one subscription to circulate to the various classrooms. Assigning outside reading from magazines or even the local newspaper can make students more conscious of current environmental issues.

Videos

Numerous videos are now available on environmental topics, although most are adult-level productions. Some videos are appropriate for fifth or sixth grade and up, but hardly any are available for younger children. Only a few videos are listed here, all of which I have previewed. Your local public library can be a good source of inexpensive videos for schools. Preview them ahead of time to be sure they are not overly biased or inappropriate for the age level of your class. Some videos produced by certain environmental organizations present a very one-sided view.

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Field Trips

Field trips to the local landfill or sewage-treatment plant can help students understand where waste goes. Confronted with the problem in this tangible way, young people may be more willing to help reduce solid waste and waste water production.

A local recycling plant is also a good place for a field trip. Such a visit could supplement class discussions or a school recycling project. Other possible field trip destinations: farms that use environmentally safe methods, a nature center operated by a conservation organization, such as the Audubon Society or Nature Conservancy, or an energy production facility, such as a dam or coal-powered electric plant. Even a trip to the grocery store to study packaging and waste reduction can be rewarding.

Conclusion

Because of the grave environmental problems facing us, we must teach our young people about proper stewardship of the earth. In the elementary and secondary school setting, this is best accomplished by integrating environmental topics with other subjects. One of the best approaches for teaching environmental awareness and responsibility is through participation. Students must see the problems for themselves and learn how to do something personally to remedy them. Christian education must instill in young people a profound respect for the world God has created and the skills to be faithful stewards of this God-given gift.

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PROJECT IDEAS

Individual Student Projects

1. *Home energy audit*: Determine the amount of gas and/or electricity used on a daily basis in your home. Compile and graph the results for a one- or two-week period. Investigate ways to conserve.

2. *Carpool survey*: Conduct a survey near a busy street or highway to determine how many people are riding in each car. Record the results and design a poster to promote carpooling.

3. *Personal garbage inventory*: Keep track of all the things you throw away for a week. Categorize each item as recyclable or non-recyclable. See "Reducing the Garbage Glut: Audubon's Seven-Day Solid Waste Test," *Audubon Activist* 5(2):3 (October 1990). A copy may be obtained by writing to The Audubon Society, 950 Third Ave., New York, NY 10022.

4. *Water audit*: Measure (or estimate, if you don't have a water meter) the amount of water used in your home each day. Graph the results for a one- or two-week period. Design a poster showing ways to conserve water.

5. *Environmental survey*: Design an environmental survey to be filled out by people in your neighborhood. Compile the results and report them to the class.

Group or Class Projects

1. *Garbage inventory*: Keep a record of everything that is thrown away in the classroom. Classify each item as to whether it is recyclable. Design a program to recover the major recyclable items.

2. *Puppet show*: Design a puppet show or skit about one or more environmental problems. Present the show or skit to another class, at a school assembly, or at a home-and-school night.

3. *Adopt-a-highway*: Choose part of a road near the school and pick up all the trash along it on a regular basis. Keep track of how much and what kinds of trash you collect. Report the results to the local newspaper.

4. *Recycling project*: Start a neighborhood recycling project to help raise money for special class outings.

School Projects

1. *Earth Day*: Plan a special Earth Day program, complete with a tree planting, campus cleanup, posters, a letter-writing campaign, and debates. Invite the mayor, congressperson, or some other important person to participate.

2. *Adopt-a-highway*: Involve students, faculty, and parents in your state's adopt-a-highway plan.

3. *Compost food waste*: Build bins to compost all the food wastes from the school cafeteria and students' lunches.

4. *Carpooling*: Analyze how all the students get to school. Try to develop more efficient arrangements, such as carpooling.

RESOURCE MATERIALS • BOOKS FOR STUDENTS

Books for Students

About Stewardship of the Environment. South Deerfield, Mass.: Channing L. Bete Co., Inc. (1-800-628-7733). A 15-page booklet that teaches how Christians should relate to the environment. Includes a number of practical suggestions for helping the environment. Primary focus is grades 3-7.

John Elkington, et al., *Going Green: A Kid's Handbook to Saving the Planet.* New York: Puffin Books. Includes many "Amazing Facts" that will catch students' attention as well as a very thorough list of environmental organizations to contact.

John Javna, *50 Simple Things Kids Can Do to Save the Earth.* Berkeley, Calif.: Earth Works Press. Patterned after *50 Simple Things You Can Do to Save the Earth.* Contains excellent explanations of complex environmental problems, such as acid rain and the greenhouse effect, as well as good project suggestions. Primary focus is grades 4-8.

Betty Miles, *Save the Earth: An Action Handbook for Kids.* New York: Alfred A. Knopf Publishing. Full of pictures and good information.

Michael O'Brien, *I Helped Save the Earth.* New York: Berkeley Books. Includes 55 different things kids can do, with stickers to affix when each is completed. Primary focus is grades 2-6.

Recycling Logic. Sunset Communications, Inc., Pleasantville, N.Y. A computer software package. Uses the topic of recycling to develop critical thinking and enhance reading comprehension. Players decide what trash is recyclable. Good supplement to class discussions on recycling. Primary focus is 6th grade and up.

Books for Teachers

Jerry De Bruin, *Creative, Hands-on Science Experiences: Using Free and Inexpensive Materials.* Carthage, Ill.: Good Apple, Inc. Generally useful for science teachers, but contains a small amount of material relating to energy conservation. Primary focus is 5th grade and up.

John Elkington, Julia Hailes, and Joel Mekower, *Green Consuming.* New York: Penguin Books. An excellent guide that could be used to prepare for a field trip to the grocery store.

Marjorie Frank, *202 Science Investigations: Exciting Adventures in Earth, Life, and Physical Sciences.* Nashville, Tenn.: Incentive Publications. Another book for science teachers containing some activities related to scientific awareness. Primary focus is grades one to six.

50 Simple Things You Can Do to Save the Earth. The Earth Works Group, Earth Works Press, Berkeley, Calif. Good source for interesting facts about the environment and for project ideas.

The Next Step: 50 More Things You Can Do to Save the Earth. The Earth Works Group, Earth Works Press, Berkeley, Calif. A nice continuation of *50 Simple Things You Can Do to Save the Earth.*

Diane MacEachern, *Save Our Planet.* New York: Dell Publishing. Packed full of information and practical ideas. Contains many references and addresses for environmental organizations.

Michael Viner and Pat Hilton, *365 Ways for You and Your Children to Save the Earth One Day at a Time.* New York: Warner Books. Designed especially for parents to help teach their children environmental responsibility. Very practical and adaptable to school use.

Periodicals for Elementary Students

National Geographic World, published monthly by the National Geographic Society, 17th and M St. NW, Washington, DC 20036. Broad coverage of geography, nature, and science. Grades 3-8.

Ranger Rick, published monthly by the National Wildlife Federation, 8925 Leesburg Pike, Vienna, VA 22184-0001. Primarily designed to interest children in nature study, but many articles cover environmental topics. Grades 1-5.

Your Big Backyard, published monthly by the National Wildlife Federation, 1400 16th St. NW, Washington, DC 20036. Similar to National Wildlife, but for the younger reader. Preschool/Kindergarten.

3-2-1 Contact, published by Children's Television Workshop, P. O. Box 53051, Boulder, CO 80322-3051. Primarily designed to interest children in science, but contains some articles on environmental topics. Grades 3-8.

Periodicals for Teachers and Secondary Students

Reports to the Nation on Our Changing Planet. UCAR Office for Interdisciplinary Earth Studies, P. O. Box 3000, Boulder, CO 80307-3000. Will be issued approximately every six months over the next several years and is free upon request. The first issue is on the greenhouse effect. Full of pictures.

National Wildlife, published bimonthly by the National Wildlife Federation, Inc., 1400 16th St. NW, Washington, DC 20036. Discusses issues related primarily to wildlife conservation, but has occasional articles on other environmental topics. Well illustrated.

Audubon Magazine, published bimonthly by the National Audubon Society, 950 Third Ave., New York, N.Y. Excellent magazine devoted to all aspects of the environment. Very well illustrated.

Nature Conservancy, published bimonthly by The Nature Conservancy, 1815 N. Lynn St., Arlington, VA 22209. Articles deal primarily

Continued on page 39