

The Water Resources Education Initiative

Summarized by **Faye Anderson***
Southern Illinois University at Carbondale

Introduction

A water resources education program has been created in response to the President's National Goals for Education. This program is designed to help implement the goal of having United States students first in the world in science and mathematics achievement by the year 2000. Water resources education is a vital component in the attainment of this goal. A cooperative effort was begun in 1990 among the U.S. Geological Survey (USGS), the U.S. Fish and Wildlife Service (FWS), the U.S. Environmental Protection Agency (EPA), the American Water Resources Association (AWRA), and the National Science Teachers Association (NSTA).

The objective of this cooperative effort is to stimulate interest in and provide basic information on water resources for students in grades kindergarten through twelfth grade. In order to accomplish this objective, the water resources education program is designed to provide several different teaching aids. The first teaching aid is a set of water resources education posters which are designed to catch the attention of the students. The second teaching aid is a set of water resources professionals outreach notebooks for in-

structional use in the classroom or at after-school activities, by individuals employed in a water resources related field.

Posters

Posters are useful as supplemental curricula materials as they can attract the students' attention and provide educational information in a graphic form. Posters are easy-to-use materials for instructors who can use them as informative wall/bulletin board decorations.

Nine posters on various topics related to water resources are planned in this Water Resources Education Initiative poster series. Thus far, three have been completed on wetlands, water use, and wastewater treatment. Six more posters are planned on the following topics: the hydrologic cycle, ground water, water quality, ice/glacier or watersheds, acid rain or hazardous materials, and oceans or navigation.

These nine posters are being designed by the same artist and will fit together to create a large wall mural (see figure 1)

POSTER MURAL
9'

ICE/GLACIER OR WATERSHEDS	HYDROLOGIC CYCLE	ACID RAIN OR HAZARDOUS MATERIALS
WETLANDS	WATER USE	WASTEWATER TREATMENT
OCEANS OR NAVIGATION	GROUND WATER	WATER QUALITY

6'

Figure 1

Each poster topic is drawn in a cartoon format and is available in full color and black and white (which can be colored by the students). Each poster is three by two feet in size.

On the reverse side of each color poster are hands-on educational activities for the students. These come in two versions, one for grades K-5 and one for grades 6-8. These educational activities develop the relevant facts and themes related to the poster topic.

For example, the first completed poster was "Water: The Resources That Gets Used and Used and Used for Everything!" This poster relays the importance of water to our society and illustrates the many uses of water. The second poster in the series, "How Do We Treat Our Wastewater?" displays the various types of wastewater treatment methods used throughout the country. The many types of wetlands and the value of wetlands to society is the theme of the third poster, "Wetlands: Water, Wildlife, Plants, and People!"

Thus far, around 400,000 copies of the water-use poster and 200,000 copies of the wastewater and wetlands posters have been distributed. Distribution outlets for the posters have been through the NSTA, AWRA, USGS, EPA, and FWS offices. Two NSTA publications have also been used to distribute the posters. The posters were inserted into two publications for science teachers, "Science and Children" (grades K-5) and "Science Scope" (grades 6-8). These publications reached about 43,000 science teachers across the United States.

In addition, the K-5 version of the water-use poster have been translated into Spanish for those areas of the country with large Spanish-speaking populations. About 140,000 copies of this version have been printed.

The next poster to be developed in the series is the ground water poster. The movement of ground water will be highlighted in this design.

Notebooks

A set of water resources educational training notebooks are also being developed for instructional use in the classroom or in after-school activities. These notebooks will serve to enable individuals employed in a water resources occupation to assist an educator in presenting a topic relating to the science of water resources. The educator could be a science teacher, a 4-H leader, a Girl or Boy Scout leader, etc.

Notebooks will be created around five general topics: Ground Water, Water Quality, Surface Water, Water Use, and Basic Water Properties. Each of these five topics will be discussed for grades 3-5, 6-8, and 9-12 so there will be fifteen notebooks in total.

Each of these notebooks will include:

- 1) Five lesson plans designed to be taught by an educator and water-resources personnel.
- 2) List of responsibilities for educators and water-resources professionals to assist in role identification when working together.
- 3) List of materials needed by the water-resources personnel to complete all the hands-on activities outlined in the five lesson plans.
- 4) Procedures for water resources personnel to complete all the hands-on activities outlined in the five lesson plans.
- 5) Educators' background information concerning the notebook's water-resources topic.
- 6) Pre- and post-visit activities to be accomplished by the educator.
- 7) Listing of water-resource curricula sorted by notebook topic and grade grouping for use by the educator.
- 8) Evaluation materials to determine the effectiveness of the notebook's education materials.

These notebooks are being designed to facilitate cooperation between the educators and the water resources personnel, thus resulting in unique educational materials from each notebook. The educator can select from the five different lesson plans to choose the one that best suits their teaching goals. This educator then conducts a pre-visit activity with the students prior to the visit from the water resources professional. The water resources professional then visits the students to conduct a hands-on activity on these selected water resources topic. Post visit activities are then provided to further develop the topic in the lesson plan.

The educators and water resources personnel are able to stimulate the students' interest and promote learning about water resources through their partnership in the educational process facilitated by the notebook. The educators have a partner in the water resources field they can rely on as a resource person. Students have the opportunity to gain knowledge of the 'real world' from a practicing professional. Water resources personnel have the opportunity to get involved with the educational community and share their expertise, with limited preparation time.

The development of these notebooks began in the summer of 1991. Fifteen K-12 teachers, two curriculum development specialists, and a representative from NSTA were brought together for a workshop in Denver, Colorado. The purpose of this workshop was to obtain input from the

educational community so that the notebooks could best serve their needs. Existing water resources educational materials were reviewed and 125 hands-on activities were selected for incorporation into the notebooks. A notebook development team was established from the workshop participants.

This development team created five lesson plans for water resources personnel. These lesson plans were developed into a notebook on the topic of ground water for grades 6-8. This notebook was field tested by USGS employees at 15 middle school classrooms in Texas during the 1991-92 school year. The field testing was very successful and return visits were requested by every science teacher who participated in the project as well as by other science teachers at the participating schools. Upon completion, the notebook can be obtained from AWRA.

During the summer of 1992, lesson plans on the topic of groundwater for grades 3-5 and 9-12 and on the topic of water quality for grades 6-8 were created. Notebooks for these will be developed next and will similarly field tested.

Conclusion

These notebooks and the poster series are designed to stimulate interest in and provide a basic knowledge of water resources for students in kindergarten through 12th grade. Water resources plays a vital role in our society and their careful management is important for our future. These materials help educators convey an appreciation for our water resources to the next generation. For more information on these water resource educational materials, contact:

Steve Vandas
Chief, Earth Science Education Project
U.S. Geological Survey
Denver Federal Center
P.O. Box 25046, MS-414
Denver, Colorado 80225

**This summary was developed out of materials written and provided by Steve Vandas. His permission to compile this information is greatly appreciated.*