

Water - Ground

**GROUNDWATER EDUCATION ON WHEELS:
Programs for Students Delivered by the "Ecology Van"**

THE ECOLOGY VAN: The Ecology Center is in the process of purchasing a cargo van to transport environmental education displays and programs to schools and youth meetings. Funding avenues for the "Ecology Van" are described under Local Support, below. No financial support for the Ecology Van is being asked of the Kellogg Foundation. Although the Center currently offers school programs, the Ecology Van - replete with logo, signage, and storage space for displays - will confer far greater name recognition and visibility. We are now proposing that the Groundwater Education on Wheels (GE/WHEELS) program be the flagship environmental education initiative transported on the Ecology Van, serving all of southeast Michigan.

IN-CLASS PROGRAMS: GE/WHEELS will offer in-class presentations at schools and youth meetings in southeast Michigan. Presentation topics will cover various environmental issues related to groundwater, including household hazardous waste, landfills, storage tanks, local groundwater resources, pesticides, non-point source pollution, and wetlands. A typical classroom session may include one of the following landfill demonstrations, as part of the full presentation:

"Problems at the Dump:" In a three-dimensional model of a watershed, students will be able to observe the flow of surface and groundwater through agricultural and urban areas. Large slide projections of cross sections will help to visualize water flow patterns and plumes. The educator will have students help concoct a "landfill pollution problem" by filling a miniature perforated trash can with solid waste and food coloring, and then insert it in the community. Students will help track and graph the pollution plume. (*Ecology Center Environmental Education Program, 1988*)

"Pollution From Buried Wastes:" This begins with a brief presentation about landfills and the potential for leachate to endanger groundwater. A coffee can filled with sand, assorted solid waste, and food coloring, with holes poked in the bottom, represents a landfill, situated above an aquarium filled two inches high with water. Students measure essential solid waste data (height and weight of the "landfill," color of the water, etc.) in the classroom, and then graph and chart water discoloration and the rising water table. This activity can be continued in succeeding days. (*Recycling Curriculum: Activities for Grade School through Senior High, Ecology Center, 1987*)

All classes will be hands-on, participatory 30- to 60-minute sessions, with several sessions conducted during a day's visit. School officials will be able to choose program sessions from the GE/WHEELS program menu. Programs sessions will be compiled from existing curricula and the recently-begun See North project of the University of Michigan Biological Station. Other sessions will be developed to highlight portable displays (*see below*). The full program menu will be designed in collaboration with local school officials, and will incorporate the State of Michigan

Science Education Goals and Objectives. The program will be guided by the philosophy adopted at the Tbilisi Conference of the United Nations Environment Programme:

"To succeed in making individuals and communities understand the complex nature and built environments resulting from the interactions of their physical, biological, social, economic, and cultural aspects, and acquire the knowledge, values, attitudes, and practical skills to participate in a responsible and effective way in anticipating and solving environmental problems, and in the management of the quality of the environment."

NEEDS ASSESSMENT AND PROGRAM DEVELOPMENT: Staff will work with curriculum directors of target school districts to determine "curriculum need areas." Program sessions will be both culled from existing curricula and independently developed by Ecology Center staff to address the curriculum need areas. Our experience with the Ecology Center Household Hazardous Substances curricula shows that schools are more likely to use curricula themselves once teachers and other school officials have seen the material presented. GE/WHEELS will provide a planned and researched supplement to school science programs, offering supporting materials unavailable to many districts, and integrating a social studies component to science education. Second-year needs assessments will serve a dual purpose as an evaluation of the succeeding year's program and a blueprint for the year's program menu. Additionally, school officials will be more apt to book presentations after having undergone a needs assessment.

FORMAT: A school visit will generally consist of 3-4 presentations per visit, each with a different class. In some cases, several classes would meet together. The program would be flexible to accommodate the needs of individual schools.

DISPLAYS: Portable displays will be used in many presentations to illustrate concepts more fully. A few high-quality displays are already available, such as graphic models of groundwater flow and electronic simulations of potential contaminants. The Ecology Center will also contract with design artists and educators to create new displays.

FOLLOW-UP: Newsletters will be distributed to teachers at schools while visiting, to former bookings, and to prospective audiences. The newsletter will include the latest additions to GE/WHEELS programs, enrichment curriculum ideas, bibliographies, stories on noteworthy school projects, the Michigan Environmental Youth Awards, etc.

SERVICE AREA: The GE/WHEELS program will service southeast Michigan schools, grades K-12, as well as scout, church, and conservation groups. In the first-year pilot stage, the program will reach students in fifteen schools in Washtenaw and Lenawee Counties, K-6. The service area will expand to the seven-county southeast Michigan area, adding the counties of Livingston, Macomb, Monroe, Oakland, and Wayne, over five years as the program becomes established.

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YOUTH MEETINGS: GE/WHEELS will also be available for presentations to scout, 4-H, and other groups. Scholarships may be provided to groups on limited budgets.

LESLIE SCIENCE CENTER: When not "on the road," GE/WHEELS will make special presentations at the Leslie Science Center in Ann Arbor. The Science Center is property donated to the City of Ann Arbor to be used as a children's learning science center. Dr. Eugene Leslie's philosophy was that "no one can truly own the land, we may only use it, care for it, and pass it on to others." Leslie Science Center currently hosts youth and student workshops, nature walks, seasonal festivals, and other activities. The City's Parks and Recreation Department also makes office space available there to selected non-profit organizations, including the Ecology Center, which support the Science Center's mission. In coming years, the Science Center will serve as a site for teacher and youth leadership trainings.

MARKETING: GE/WHEELS will be publicized through prior Ecology Center contacts, educators' networks, and the media. In the past two years, the Ecology Center has developed statewide school contacts by working with school districts in the development of the household toxics curriculum. We also have a well-established network of contacts in the Ann Arbor Public Schools and the Washtenaw Intermediate School District by virtue of a long track record of classes given on recycling and solid waste, and teacher training in-services given on numerous environmental education topics. Additionally, we have given numerous classes for youth in Wayne County schools on a variety of topics. We would schedule presentations to meetings of the Michigan Alliance for Environmental and Outdoor Education (MAEOE), the Michigan Science Teachers' Association (MSTA), school principals, and science curriculum directors. Media campaigns will be scheduled when necessary. In an effort to attract widespread publicity for the program, we would plan to make presentations at the annual conference of the North American Association for Environmental Education.

The Ecology Center has desktop publishing capability; so we are able to inexpensively produce promotional and educational materials, such as brochures, newsletters, and flyers.

In addition, we are expecting to give presentations in Wayne County schools on energy education in 1989 under the terms of a pending proposal with the Community Foundation for Southeastern Michigan. These presentations will give the Ecology Center wide exposure before GE/WHEELS enters Wayne County in 1991.

FUNDING: Presentation fees will make the outreach program self-supporting after five years. Kindred outreach ventures, such as the Manomet Bird Observatory program in Massachusetts and the Living Science Foundation activities in Michigan, took five years to fully enter the service market and become self-supporting. Based on marketing samples taken this year, we expect GE/WHEELS to be booked quickly. Conversations with school principals and science curriculum directors have found them starved for additional science programs, concerned about students' low test scores, and ready to pay for quality programs. David Pray, principal of Clinton Elementary School, wrote us that "part of the reason that students in Michigan fall far below recommended science testing levels is because they are not afforded

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opportunities to participate in science and actual hands-on activities which make the learning of science more beneficial to the student." This proposal includes letters of endorsement from several educators and administrators, including letters from enrichment program decision-makers in four of the seven counties to be serviced.

The Ecology Center is seeking \$186,500 seed money for operating expenses over three years from the W.K. Kellogg Foundation's Groundwater Education in Michigan (GEM) program. The Ecology Center is also seeking first-year capital funds - for the Ecology Van itself - in the amount of \$17,900 from the Michigan Equity Program of the Department of Commerce. The City of Ann Arbor has recommended the Ecology Van for funding among the top five of all sub-grants in its full request from the Equity Program. Ann Arbor has historically received funding for six or more of its requested projects, at a total cost of \$300,000 - \$360,000. Corporate contributions will smooth the transition in Year 3 through Year 5 toward program self-sufficiency.

Local support will enable the program to meet future capital procurement needs, including classroom supplies, slide projectors, a video cassette recorder, and, eventually, a new vehicle. The procurement fund will be invested in the Ecology Center's Ready Assets fund prior to expenditure. No support for the capital procurement fund is being asked of the W.K. Kellogg Foundation.

LOCAL SUPPORT: First-year local support for the GE/WHEELS project is forthcoming from the School of Natural Resources of the University of Michigan (see enclosed letter) and the federal work-study program. The Advisory Board (below) offers volunteer assistance, and the Ecology Center itself will provide in-kind support of \$1000, including bookkeeping and vehicle maintenance. The Center employs a full-time mechanic, for our fleet of recycling trucks and vehicles, a full-time accountant, and a part-time bookkeeper. In-kind support can be expected to increase after the first year.

In succeeding years, sustaining support will also be solicited from local businesses, corporate giving programs, and WALTEC youth training funds. The Center already has 250 business members, and has received grants for special projects from the corporate giving programs of MichCon, Detroit Edison, Great Lakes Bancorp, Ervin Industries, and others.

INTER-AGENCY COORDINATION: The Ecology Center has held several planning sessions in 1988 with agencies and institutions developing groundwater education projects for the local area. We would allow units on the GE/WHEELS program menu to be designed and offered by Eastern Michigan University and to the several agencies of county government coordinated by the Washtenaw County Hazardous Substances Panel. Units will be offered by other agencies and organizations, such as Michigan Sea Grant and the Washtenaw County Drain Office, as they develop sessions related to groundwater.

LONG-TERM PLANS: After the first year, staff will conduct teacher trainings and youth leadership workshops, in addition to the school visits. The Ecology Center will sponsor roundtable discussions for area teachers to promote the state of Michigan's

environmental awareness projects and awards. We will help develop a network of youth leaders in scouting and churches to teach groundwater and other environmental issues. Also, staff will make presentations at conferences of the North American Association for Environmental Education and at other national and international forums in an effort to encourage program replication and materials distribution.

SPECIAL PROJECTS: In addition to the ordinary programs of GE/WHEELS, the Ecology Center will oversee the development of two major environmental education materials. The Center will produce a videotape for children on groundwater issues, with writing and production services donated by Better Communications, Inc. (BCI), an Ann Arbor firm. In the second year, staff will work with educational software consultants to develop interactive groundwater education computer programs. Preliminary discussions have already been held with one software consultant, LimnoTec, although the Ecology Center would ask for bids on the sub-contract. The videos will be used in Ecology Van presentations, and the software will be made available to school libraries. Both will be distributed nationally.

STAFF: The Ecology Center will hire a full-time project director, with M.S. training in environmental education, natural resources, or a comparable field, and experience in primary school-age education. Desirable qualifications include groundwater expertise, marketing, and experience in grant administration. The Center currently has three staffpersons with comparable training. We will also hire additional part-time staff to oversee development, promotion, and distribution of the video, software, and newsletters. This position will shift to include marketing, fundraising, and clerical support for the full project, with auxiliary teaching responsibilities, as the special projects are completed. It will temporarily become full-time in the third year when the program first enters the full seven-county area.

PROFESSIONAL ADVISORY BOARD: GE/WHEELS staff will be guided in curriculum development, marketing, project administration, and community relations by a professional advisory board, whose members are state, national, and international leaders in environmental education and groundwater protection strategies:

- Sheryl Bush, Jackson Space Center, Jackson;
- Dave Chapman, President, Michigan Alliance of Environmental & Outdoor Education, Lansing;
- Rebecca Head, Ph.D., Washtenaw County Hazardous Substances Panel, Ann Arbor;
- Mark Mitchell, Friends of the Rouge, Dearborn;
- Bruce Monson, Huron River Watershed Council, Ann Arbor;
- Harold Olsen, Ph.D., Math & Science Consultant to Washtenaw Intermediate School District, Ann Arbor;
- Pam Puntenney, Ph.D., Executive Director, Environmental and Human Systems Management, Ann Arbor;
- William Stapp, Ph.D., Professor of Natural Resources, University of Michigan, and Former President, North American Association for Environmental Education, Ann Arbor;

Tammy Voss, Former President, Michigan Environmental Education Association, Okemos;
Martha Walter, Michigan Sea Grant Program, Ann Arbor;
Annie Wolf, Michigan DNR Environmental Youth Awards, Lansing;
Cynthia Yao, Executive Director, Ann Arbor Hands-On Museum; and,
3 citizen representatives.

TRAINING AND GUEST EDUCATORS: Occasional special presentations will be given by outstanding guest educators and entertainers, such as Bill Brennan, the environmental educator based in Washington, D.C. who is popularly known as Billy B. - "Nature's Song and Dance Man." Brennan conducts regular tours in Michigan, and plays to large crowds throughout the state. He now offers training workshops, and has begun to develop a groundwater performance. Other first-rate educators may also be sub-contracted for special presentations.

EVALUATION: Ecology Center staff will submit year-end and mid-year reports to the Professional Advisory Board. Copies of the reports will be sent to the Kellogg Foundation. Reports will be based on both quantitative and qualitative factors measured before and after the period under study. The Advisory Board will assess reports and project status, and make recommendations for future programs. Components of the periodic evaluation follow:

1. Teachers will provide immediate verbal and written feedback of the GE/WHEELS program following a site visit.
2. Follow-up needs assessment will be conducted at selected schools toward the end of a year's program. Staff will work with curriculum directors to determine shifting school needs and the appropriateness of program offerings.
3. Phone interviews will be conducted with teachers two months after a GE/WHEELS presentation. The interview will find if students started follow-up activities as a result of the program.

A work-study intern will be hired solely for the purpose of conducting phone interviews and compiling evaluative information for the reports.