



The Annis Water Resources Institute (AWRI) offers free educational opportunities for K-12 classes in the Annis Educational Foundation classroom at the GVSU Lake Michigan Center in Muskegon. Through the support of the R.B. Annis Educational Foundation, AWRI offers multimedia classroom experiences at the Center where students can learn about their water environment. Experienced instructors lead students through a variety of activities that address Michigan education standards. Programs are generally 1 to 2 hours long and are can be customized for all grades. Classroom experiences can be in addition to cruises onboard our research and education vessels or as stand-alone events. Activities are based on programs such as Project WET (Water Education for Teachers), Michigan Environmental Education Curriculum Support (MEECS), Healthy Water Healthy People, and the Global Learning and Observations to Benefit the Environment (GLOBE) program.

Special programs including educator workshops and tours for adult groups are available upon request. Check with AWRI about GLOBE, Michigan Environmental Education Curriculum Support (MEECS), Healthy Water Healthy People, Project Learning Tree, and Project WET workshops for educators. GVSU Graduate credit courses in Education 601 are offered in the summer at the Lake Michigan Center in Muskegon.

Sample topics for classroom programs include:

Pre-Cruise Orientation/ Post-Cruise Wrap Up

Classes planning a trip aboard the GVSU research and education vessels are introduced to concepts that are part of the cruise. Hypotheses that can be tested on the cruise are explored as well as general concepts about water quality and watersheds. After a cruise, students can graph and analyze water quality data as well as expand upon ideas from the cruise. This module can be one or two hours (either before or after a cruise) and is designed for students using the vessels.

Be an Aquatic Scientist for a Day

This can include a tour of the Lake Michigan Center and hands-on science activities in the R.B. Annis Educational Foundation Classroom. Students explore the alien species that have invaded the Great Lakes and learn about life cycles. Additionally, food chains and food webs are explored. Other topics include what AWRI scientists study such as fish in Muskegon Lake.

The Water Cycle and Watersheds

With attention to both natural and social science, students engage in activities such as the *Incredible Journey* (a water cycle game) from Project WET. Making a model watershed and learning about their own watershed are parts of this module. Students use clues from environmental measurements to guess locations in a watershed from which samples were taken.

Air Quality and Climate Change

How does a burning candle illustrate air pollution? What is ozone? What is the air quality index? What is global climate change? These are a few of the questions explored in this session that is based on the Michigan Environmental Education Curriculum Support (MEECS) Air Quality Unit.

Ecosystems

Discover Michigan's ecosystems through hands-on activities from the Michigan Environmental Education Curriculum Support (MEECS) Ecosystem & Biodiversity Unit.

GLOBE Training

If you are a GLOBE school, come to the LMC to use our GLOBE equipment to learn new protocols or practice protocols. We can come to your school to help you with GLOBE protocols.

Contact Janet Vail at (616) 331-3048 or vailj@gvsu.edu or www.gvsu.edu/wri/education for more information about the AWRI outreach and education programs.

Water Resources Outreach Education Program

Explore Lake Michigan aboard a working scientific vessel!



Since 1986, thousands of students and others have experienced hands-on science on Lake Michigan and adjoining waters through the Water Resources Outreach Education Program of Grand Valley State University's Robert B. Annis Water Resources Institute.

Offered aboard GVSU's research and education vessels **D.J. Angus** and **W.G. Jackson**, the program serves school groups as well as other organizations. Trips can be customized for all ages from fourth grade through adults.

The optimal size group for a cruise is twenty students plus two or three teachers/parents. The MAXIMUM group size permitted is a TOTAL of 26 students and adults in any combination on the **D. J. Angus** docked at Harbor Island in Grand Haven and 28 participants on the **W. G. Jackson** docked at the Lake Michigan Center in Muskegon, Michigan.

Operating season for the vessels is mid-April through mid-October. There are two reservation times: Fall trip reservations are taken in May, and spring trip reservations for the next year are taken in fall of the current season. There are a limited number of endowment supported cruises available.

This two and a half hour hands-on, investigative science experience is truly a unique learning experience. In this floating classroom, aquatic science instructors guide participants in the use of sampling equipment and instruments to compile water quality data from Lake Michigan and shoreline water bodies.

Sampling equipment used on a standard cruise includes a plankton net, Van Dorn water bottles, and a PONAR dredge. Equipment for determining water color, transparency (Secchi disk), and temperature is also found on the vessels.

The main cabins on the vessels have specially designed laboratories for students, which have various water analysis stations. These include dissolved oxygen, pH, turbidity, and conductivity. Other types of analyses can include nitrates, phosphates, and alkalinity. Microscopes with video cameras are used for examining biological samples. Other instruments on the vessels are a Global Positioning System (GPS) for position and depth finders. For more information on cruises, please see our Instructor's Manual.

Data from sampling stations are compared and contrasted to develop an understanding of Lake Michigan and inland lake or river ecology. For school groups, attention is paid to aligning the cruise experience with Michigan science standards.

SCHEDULING A TRIP

To schedule a trip, please contact Roxana Taylor at taylorr@gvsu.edu or 616-331-3749. She can let you know about the availability of the **D. J. Angus** and the **W.G. Jackson**.

Questions on the cost of trips can be directed to Roxana Taylor at taylorr@gvsu.edu.

Note: For schools wishing to bring two groups at a time for the whole day, we offer free supplemental classroom programs in the Annis Educational Foundation Classroom at the Lake Michigan Center in Muskegon. The contact for this is Janet Vail at vailj@gvsu.edu or 616-331-3048.