

## **Challenges and Opportunities in Broadening Participation in Geosciences**

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Manchester Community College is located just to the east of Connecticut's capitol city, Hartford. Our college's service area includes both urban and rural communities. We serve students who are from many different cultural backgrounds and who speak over fifty different languages. To promote student participation in geosciences and environmental sciences, we use several different tools at the college. These include:

1. science literacy via general education courses and campus activities;
2. a growing Environmental Science A.S. Degree program;
3. informal community internships and service learning;
4. engaging grade 6-12 students and teachers in geoscience activities.

1) Many students at the college enroll in our geoscience courses to fill a general education requirement. And some of them have a bit of science anxiety that stems from a lack of first-hand experiences interacting with nature. So we ease them into things and let them play with all of the rocks, map and equipment such as the stream table that we leave out in the classroom/lab. Every day on the way to class, they walk the Geologic Time Line that is engraved in the floor of our science wing. We keep class sizes small to allow for enhanced hands-on experiences. We have to be sure to find ways to demonstrate how the skill sets they are learning are transferable to other professions, such as with students in our large Business, Accounting and Criminal Justice programs. We show them how paying attention to detail, using the processes of the Scientific Method and experimentation will help them in these fields. Students have even told me that they find themselves driving around town questioning the world around them, wondering "How?" or "When?" or "Why?" in a way that they had not experienced before. They think it's pretty funny when they catch themselves wondering about rocks on the side of the road and talking to their families about them.

We schedule the lab time to immediately follow the class so that we have a 4.5 hour block for extended activities. With budget support from our department, we can provide bus transportation for field trips. This allows (and requires) all of our students to participate in the field experiences. Students are excited when they are able to put classroom knowledge to work in the field. Although Connecticut is a coastal state, many of our students have not had the opportunity to go to the beach. It has been amazing as a teacher to watch some "A-ha!" moments as students pick up crabs and feel the sand moving in the waves at their feet. It makes our discussions about climate change and shoreline erosion/migration a lot more applicable to their lives. And on another trip, students think it is great to be able to kneel right on a dinosaur trackway, measure Eubrontes tracks and calculate the hip height of a Dilophosaurus!

Sometimes students enroll in Introduction to Environmental Science as a non-lab general education class. Many find, after a rewarding experience in the course, that pairing Introduction to Physical Geology with lab is a natural fit. Then they have two courses that complement each other, and they have also satisfied their lab requirement.

2) As our college enrollment has increased in the past several years, so too has interest in our Environmental Science A.S. Degree program. This program has several goals: to prepare students with a strong science foundation for transfer to a 4 year degree program; and to provide students with technical skills, laboratory and field experiences necessary for full time employment. Two new courses on Sustainable Energy are also part of this program. No matter what interest originally got

them started in the program, all participants must take a required group of courses, including Introduction to Physical Geology. Sometimes we get individuals who want to continue a geosciences track when they transfer. Much of the time we are just excited to get students to continue their exploration of environmental sciences.

3) Our Environmental Science A.S. Degree Program Advisory Committee members represent local, state and federal government agencies, non-profit organizations, environmental consulting firms, and state colleges and universities. Committee members help us to shape course content, and they provide us with community resources. They are frequently guest lecturers, and some of them serve as adjunct faculty members. Our full-time faculty members are regularly invited to join these professionals on job-shadowing visits and field trips. This helps us to stay current and connected to local businesses. These connections have also provided students with internships at the USGS, the state DEP, municipal planning and wetlands agencies, and the Soil and Water Conservation Districts. Students have even participated in the Connecticut Business and Industry Association's sustainability workshops. These internships have been the key to converting some of these students to dedicated geology majors!

One way to foster interest in our local resources is through civic engagement. Several sections of our Introduction to Environmental Science course require students to participate in service learning activities for "learning in action" with community organizations and local municipal agencies. Our college programs have become well known throughout the Greater Hartford/Manchester area because our students are working with the community on these special class projects. Many organizations look forward to working with our students annually. Students participate in River Watch sampling and monitoring, soil sampling and nutrient management on local farms, and vernal pool surveys and mapping. Some students provide assistance for campus activities such as electronics recycling, Earth Day events, and the Global Issues Conference on Global Climate Change. Members of the MCC Science and Engineering Club, the MCC Sustainability Team and students in my environmental science classes assisted in an Energy Audit of the college campus.

4) Some who enroll in our geoscience courses have participated in activities that the college has provided for them as students in grades 6-12. For many years, we have delivered presentations and lab activities for local middle school students as part of the Connecticut Pre-Engineering Program. This year we added a new STEM program that brought together middle school girls from 12 local communities. In 1991, I joined resource professionals from around the state to found the Connecticut Envirothon program. Envirothon is a natural resources conservation education program and competition for high schools students statewide. Students work as teams to solve field-based problems in the areas of soils, wildlife, forestry, aquatics and current resource issues. The Steering Committee develops and provides Connecticut-specific resource materials and curricula for participating high school students and teachers/advisors. The Committee also conducts a series of workshops and assembles professional mentors to assist students in preparation for the field competition. The winning team goes on to represent Connecticut at the Cannon National Envirothon competition. We estimate that over 1500 students and teachers benefit from program resources each year.