ACS Chemistry for Life®

Putting the Fun in Science

The American Chemical Society (ACS) Midland Section creates a customizable, water quality lesson plan for Michigan middle school teachers with the help of Hanna Instruments.

About the American Chemical Society (ACS) Midland Section

The American Chemical Society (ACS) Midland Section in Michigan geographically covers Midland Bay, Saginaw, Gratiot, and Isabella Counties and received its charter as a local section of the American Chemical Society. The ACS Midland Section's main objective is to promote chemistry and improve public perception of science through innovation in research, education and career development, for the benefit of its members and partners in the surrounding local communities of the Great Lakes Bay Region.

The H_2O Q Project: A Complete Water Quality Lesson Plan in a Portable Backpack

H_2O Q
Water Chemistry in the Great Lakes Region

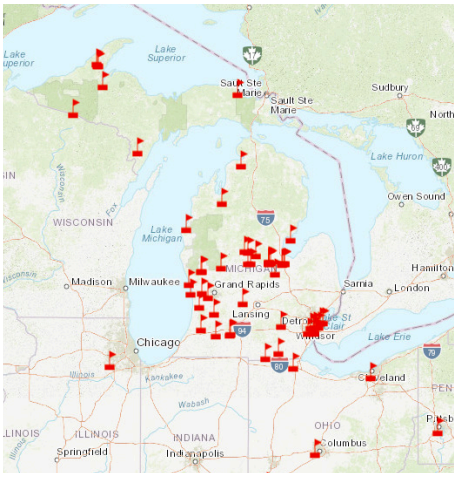
The H_2O Q project started in the late fall of 2017 and is a product of the ACS Midland Section. The ACS Midland Section customized and designed a water quality chemistry activity kit for middle school students that incorporates STEM principles and aligns with Next Generation Science Standards (NGSS). This water quality chemistry kit arrives complete in a backpack, providing teachers with a ready to go, hands-on lesson plan that can be utilized in either a classroom setting or out in the field at a local watershed.

This particular lesson plan enables teachers to educate students about the importance of water quality testing, with a focus on 6 key water quality parameters.

HANNA® instruments

Dale LeCaptain, Professor for the Department of Chemistry and Biochemistry at Central Michigan University, explains that, "part of our design is there are 6 water quality parameters, so if a teacher has a class of 30 students, they can have groups of 3 or 4 students who are running different tests. Once the group of students completes the first water quality test, teachers can then have the students rotate so that by the end of the lesson each student will have measured the 6 water quality parameters." Additionally, these 6 parameters are the basis for almost any local or regional water quality questions the students may have.

The place based learning strategy of H_2O Q, enables teachers to take the students out to their local stream, lake, pond, etc. and get them engaged with their environment. Incorporating chemistry and environmental concepts about their watershed engages the students on levels beyond what happens in a traditional classroom.



The map above shows schools who are currently participating in the H_2O Q project throughout the Great Lakes Region.

Funding for the H_2O Q project was initially provided by Dow-Corning Corporation Foundation and Central Michigan University. Hanna Instruments USA, Inc. Backpacks and water quality testing instruments were used.

Before the ACS Midland Section Volunteers could fully implement the H_2O Q project, they first had to find the scientific analytical instruments that would be incorporated into the water quality lesson plan. The scientific instruments needed to be real, just like scientists use, and easy to use so that both teachers and students could feel comfortable using them to test common water quality parameters.

After doing some research and testing other instruments on the market, the ACS Midland Section Volunteers discovered Hanna Instruments. They were initially drawn to Hanna's Backpack Labs which were built around a similar concept; a portable, water quality chemistry test kit for educators and students. The ACS Midland Section Volunteers also were interested in some of Hanna's water quality testing instruments such as the High Range Phosphate Colorimeter Checker® (HI717) and the Waterproof Pocket pH Tester with 0.1 Resolution - pHep® (HI98107).

In addition, a small group of students actually tested out some of Hanna Instruments' products beforehand and found Hanna's testers incredibly easy to use. This feedback helped further aid the ACS Midland Section with their decision-making process. As a result, they selected Hanna Instruments to be part of their water quality test kit lesson plan.

The ACS Midland Section utilized the backpacks from Hanna Instruments' Backpack Lab for their customized lesson plan. In addition, the ACS Midland Section did select various scientific instruments from Hanna to be incorporated into the backpacks. Below is a list of some of the Hanna products that were included as part of the ACS Midland Section's initiative.

- **High Range Phosphate Colorimeter Checker® (HI717)**
- **Waterproof Pocket pH Tester with 0.1 Resolution - pHep® (HI91807)**
- **Primo TDS Tester**
- **Dissolved Oxygen Chemical Test Kit (HI3810)**
- **Any necessary reagents, cleaning and storage solutions**

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Hanna looks forward to continuing to assist the ACS Midland Section with their mission for years to come.

With the help of Hanna Instruments, the ACS Midland Section Volunteers were able to complete their customizable backpack design for their H_2O Q project. A total of 100 backpacks were distributed to teachers at schools throughout the Great Lakes Region. As a result, teachers across the region were able to implement this water quality lesson plan into their curriculum. Middle school students received a hands-on learning experience, testing water quality parameters in water samples. Students performed water quality tests in both a classroom setting as well as in surrounding lakes and rivers. The success in Midland is now spreading to Ohio, The Columbus Section of the American Chemical Society is making plans to become a H_2O Q hub.

Dale LeCaptain, Professor for the Department of Chemistry and Biochemistry at Central Michigan University, goes on to say that, "From a chemical industry standpoint, I believe that this is a really cool thing. You're engaging the community - you are getting chemistry out there. You are also getting teachers and students excited about Chemistry."

Overall, the ACS Midland Section's H_2O Q project was a success! Teachers were able to implement this water quality lesson plan into their middle school classrooms, and as a result, students were able to learn the importance of water quality testing in an engaging way. The ACS Midland Section needed backpacks as well as scientific analytical instruments for water quality testing. With Hanna Instruments' backpacks and scientific instruments, the ACS Midland Section created a customizable water quality testing lesson plan. The H_2O Q project set the standard for this out of the box lesson plan, successfully connecting teachers and students to the importance of water quality testing within their local communities. Hanna Instruments' looks forward to working with the ACS Midland Section in the future, as they continue to develop unique lesson plans for science teachers for years to come.

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