



Chemistry class studies plastic pollution

Alpena High students test their chemistry skills in researching plastic pollution in the Great Lakes, while gathering data, raising awareness, and exploring possible solutions toward this issue of pollution.

Marine debris (or floating litter) is a growing issue and concern in our world's oceans, but also here at home in our freshwater seas - the Great Lakes. Plastic pollution is the focus of class project led by Alpena High School ninth grade chemistry students who set out to explore this very issue in northern Lake Huron.

Discovering the Local Issue

This opportunity to investigate plastic pollution in the Great Lakes was developed by teacher Melissa Smith during her participation in the 2013 Lake Huron Place-Based Education Summer Institute. Engaging her class in this emerging issue reflects a place-based education opportunity where students are learning about marine debris and microplastics, as well as why they are of concern in the Great Lakes.

Classroom on the Lake

During a research cruise onto Lake Huron, students collected water samples aboard the glass-bottom boat Lady Michigan by deploying a surface trawl - a research



net designed to sample plastic pollution. Collecting data specific to local Thunder Bay waters, these samples were taken back to the school chemistry lab where they were analyzed for plastics and other chemicals.

While on the water, students conducted some field-based water chemistry analysis and learned about biological pollution – aquatic invasive species – also affecting the health of Lake Huron ecosystems.

Connection to Higher Education

This project is also a chance to learn about careers in chemistry. Students are coordinating and sharing their data with Dr. Sherri Mason, a chemistry professor at Fredonia State University in New York, and researcher who studies plastic pollution in the Great Lakes.

Students are applying their chemistry learning about plastics and other polymers, as well as solubility and the process of biological magnification in food chains. Their research is also community connected through the NOAA B-WET water education

initiative and the Northeast Michigan Great Lakes Stewardship Initiative network, where Smith's class is conducting their studies in partnership with Michigan Sea Grant, Michigan State University Extension, and NOAA Thunder Bay National Marine Sanctuary.

From Books to Boat to Lab

Prior to these field studies, students researched this issue in class, learning first about marine debris, such as the widely publicized *Pacific Ocean garbage patch*. The class next localized the issue by exploring current scientific research about plastic pollution in the Great Lakes, including studies about microplastic beads that end up in the environment as a by-product of some personal care products.

In the lab, students conducted a



A penny provides scale for the size of micro plastics being found in the Great Lakes. Credit: 5Gyres.



"I learned that marine debris could destroy our Earth, it's affecting our economy as well as wildlife. Marine debris can enter a body of water either directly or indirectly. We can resolve this problem with simple ways that can make a difference. "

*-Kaitlyn Shultz
AHS Student*

Project Partners



preliminary assessment of their own local Lake Huron samples, which will be shared and verified with Dr. Mason's research team. Students sorted their samples under microscopes discovering relatively low amounts but a variety of plastic pollution.

The class even found a few perfectly round green and blue plastic particles thought to be microplastic beads from personal care products.

Contribution through Learning

Working with Great Lakes scientists, these students are contributing scientific information about plastic pollution in Lake Huron, while raising awareness about marine debris in their local watershed. As the class continues its studies, they hope to be more involved in addressing the issue of plastics

"This place-based education project enabled my students to become active participants in collecting scientific data on plastic pollution and contribute to ongoing research projects about the issue. Students learned a valuable lesson on being stewards in their community while learning about chemistry topics in the process."

-Melissa Smith, Teacher
Alpena High School

entering the Great Lakes, and developing a plan to prevent marine debris. They hope to educate and involve their community as partners in exploring ways to reduce and prevent plastic debris from entering the waterways.

Place Based Education in Action

You can learn more about the issue of marine debris at the NOAA Marine Debris Program website - <http://marinedebris.noaa.gov/>

Visit the NE MI GLSI website to learn more about the Northeast



Michigan Great Lakes Stewardship Initiative, NOAA B-WET water education efforts, and this place-based education partnership with Alpena High School.

What is Place-Based Education?

Place-Based Education (PBE) or Community Based Education (CBE) utilizes the local, natural and built environments as a context for learning and in doing so brings students into closer contact with their communities. This method is proven to develop knowledgeable and active stewards of the environment. When schools and communities work together, everybody wins!

Why:

This education strategy protects Great Lakes ecosystems, strengthens Northeast Michigan communities and provides critical support to schools as they strive to serve the academic and developmental needs of their students.

How:

Teachers and students are supported through project mini grants, connection to resource partnerships, and high-quality Professional Development that provides essential tools and techniques for fostering a collaborative culture of place-based learning within and among schools and their communities.

Supporting Community Development and Resource Stewardship Priorities through education:

Since 2006, numerous local and regional partners have engaged in Great Lakes education, networking and planning efforts across Michigan's "sunrise side." These efforts mobilized a network of school and community partners committed to identifying needs and developing strategies for enhancing coastal access, education, and sustainable resource management. Empowered through funding support from the Great Lakes Fishery Trust (GLFT), this collaboration now comprises the Northeast Michigan Great Lakes Stewardship Initiative, one of nine regional hubs through which GLFT furthers the principals and practices of place and community-based education as the Great Lakes Stewardship Initiative.

You are invited:

If you care about Northeast Michigan and want to make a difference for the future of our region, please contact NEMI GLSI to find out how you can get involved.

Phone: 989.356.8805 x41 or daniel.moffatt@noaa.gov

Northeast Michigan GLSI network programs and materials are open to all without regard to race, color, national or ethnic origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status, or veteran status.

How can I participate in the NE Michigan GLSI Network?



Many partners are currently exploring community- or place-based education development opportunities within the NE Michigan region. For more information, visit us on the web: www.nemiglsi.org

Who Can I Contact?

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