Storm Drains to Streams: Youth-Led Microplastics Investigations

Introduction

James Barnes is a third-grade teacher with Dexter Community Schools who integrates place-based environmental education, watershed science, and Indigenous ways of knowing into elementary learning. For more than 25 years, he has collaborated with organizations including the Huron River Watershed Council, Michigan EGLE, Trout Unlimited, SEMIS, and Indigenous community partners to engage students in authentic investigations connected to local waterways and stewardship. His students have participated in storm drain mapping, water quality and microplastics investigations, salmon and sturgeon restoration projects, and community-based civic action throughout the Mill Creek and Huron River watershed.

Annabelle Barnes graduated from Dexter Community Schools in 2026. Annabelle is passionate about marine science , watershed stewardship, and community-based research. She has participated in several immersive environmental learning experiences, including a four-week program at Dauphin Island Sea Lab and the 12-week off-the-grid Alaska Tides to Tongass Science and Arts Academy in Port Alexander, Alaska, last fall. Through these experiences, she explored marine ecology, watershed systems, environmental field research, and science communication. Annabelle has also worked with elementary students on microplastics sampling and analysis as part of watershed and stormwater investigations connected to the Mill Creek and Huron River watershed.

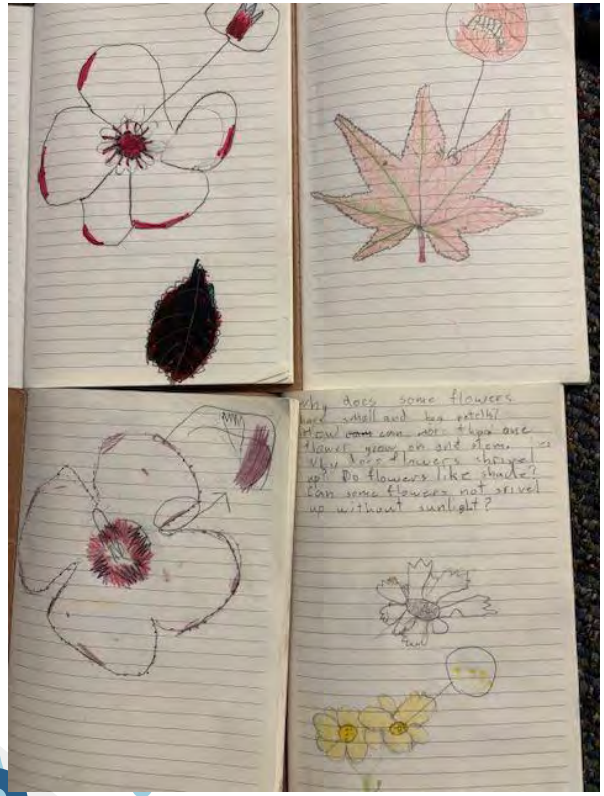
Wondering Walks

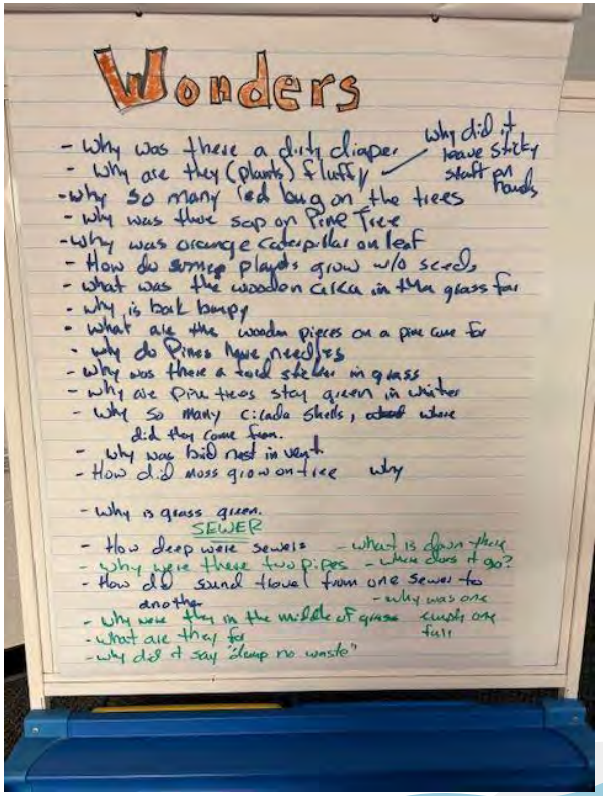






Wondering Walls





Focused Wondering Walks







Focused Wondering Walks





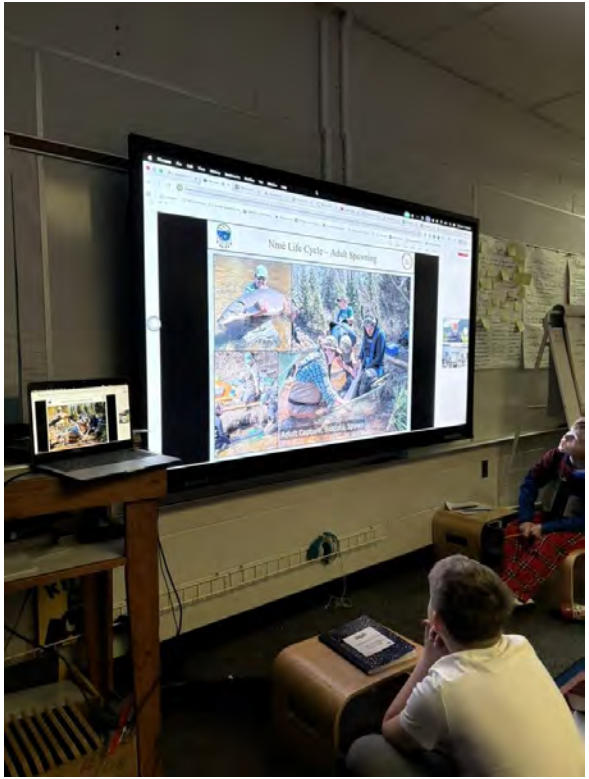


Classroom Experiment

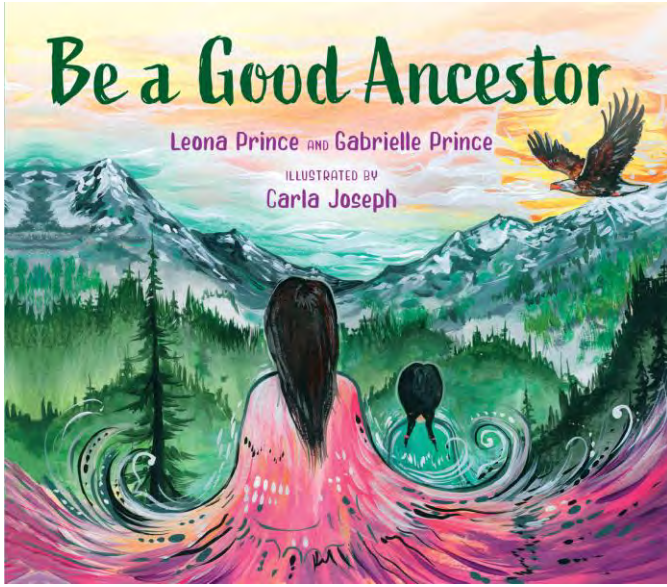




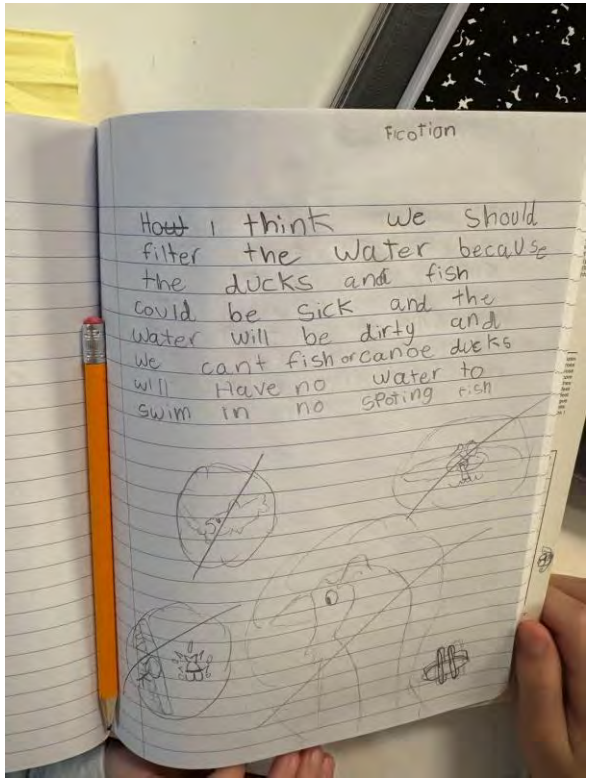
Indigenous Ways of Knowing

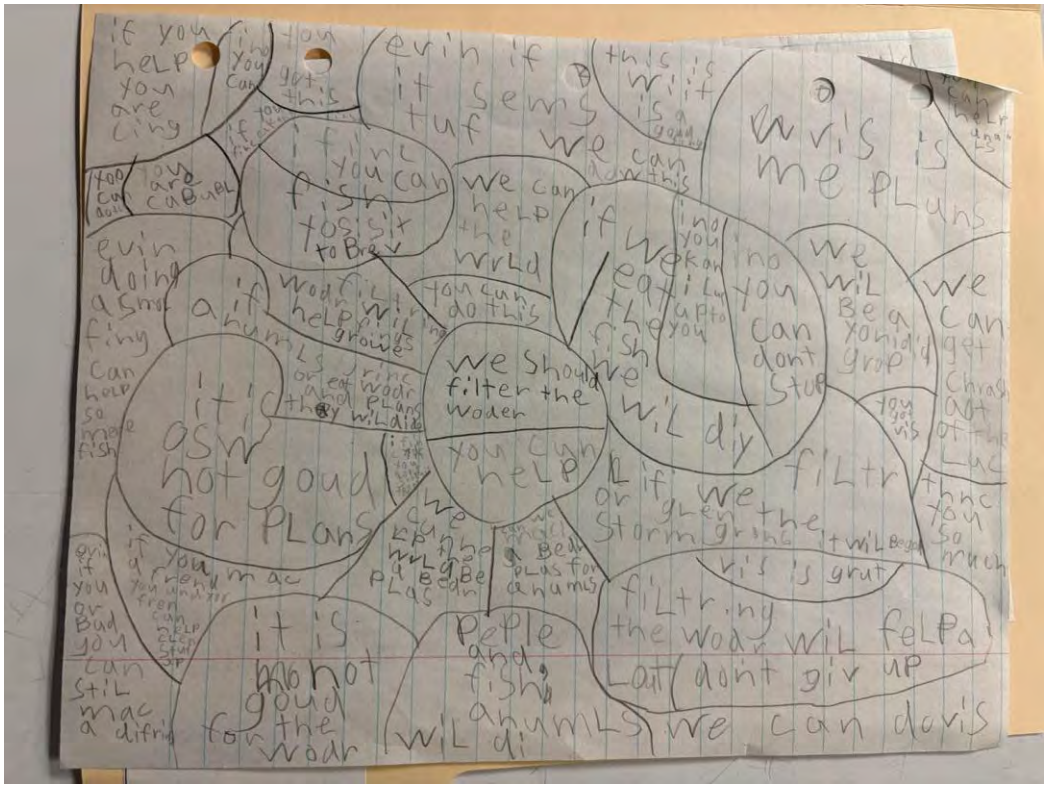




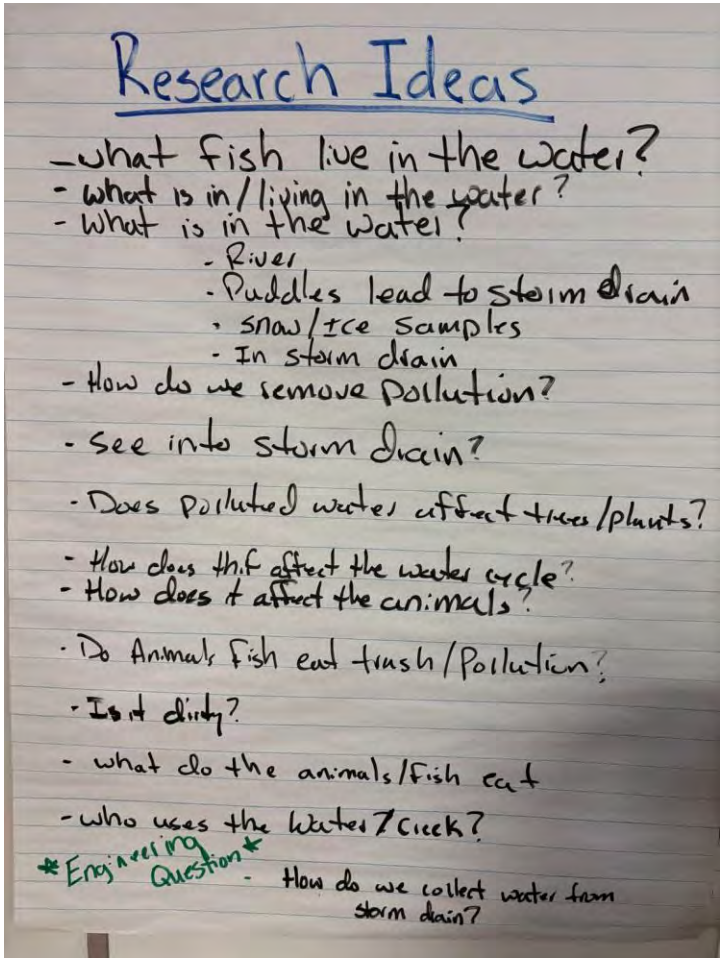


Should We Filter the storm drain water before it enters the creek?





Research Ideas



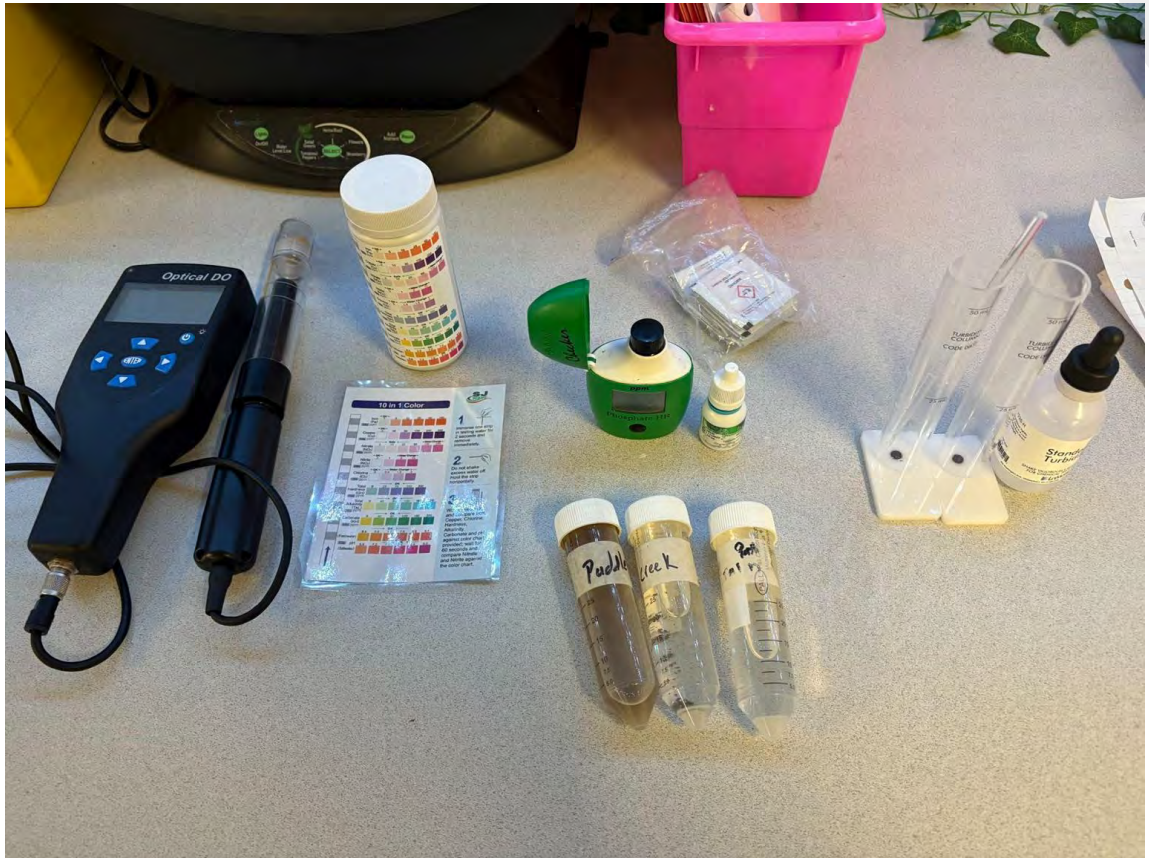
Gathering Samples



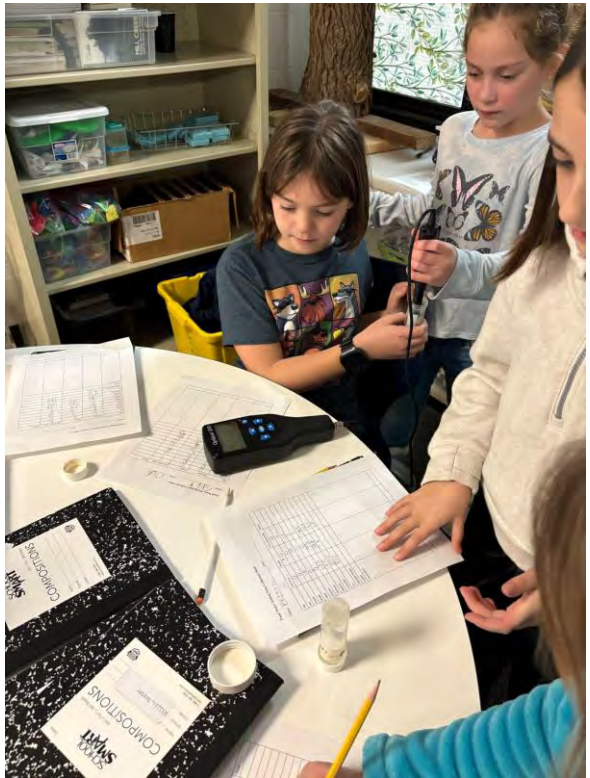


Testing

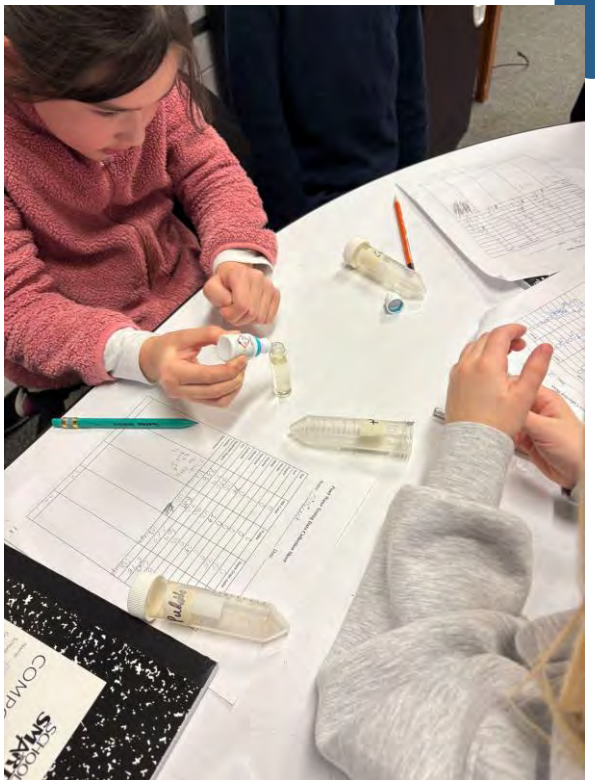




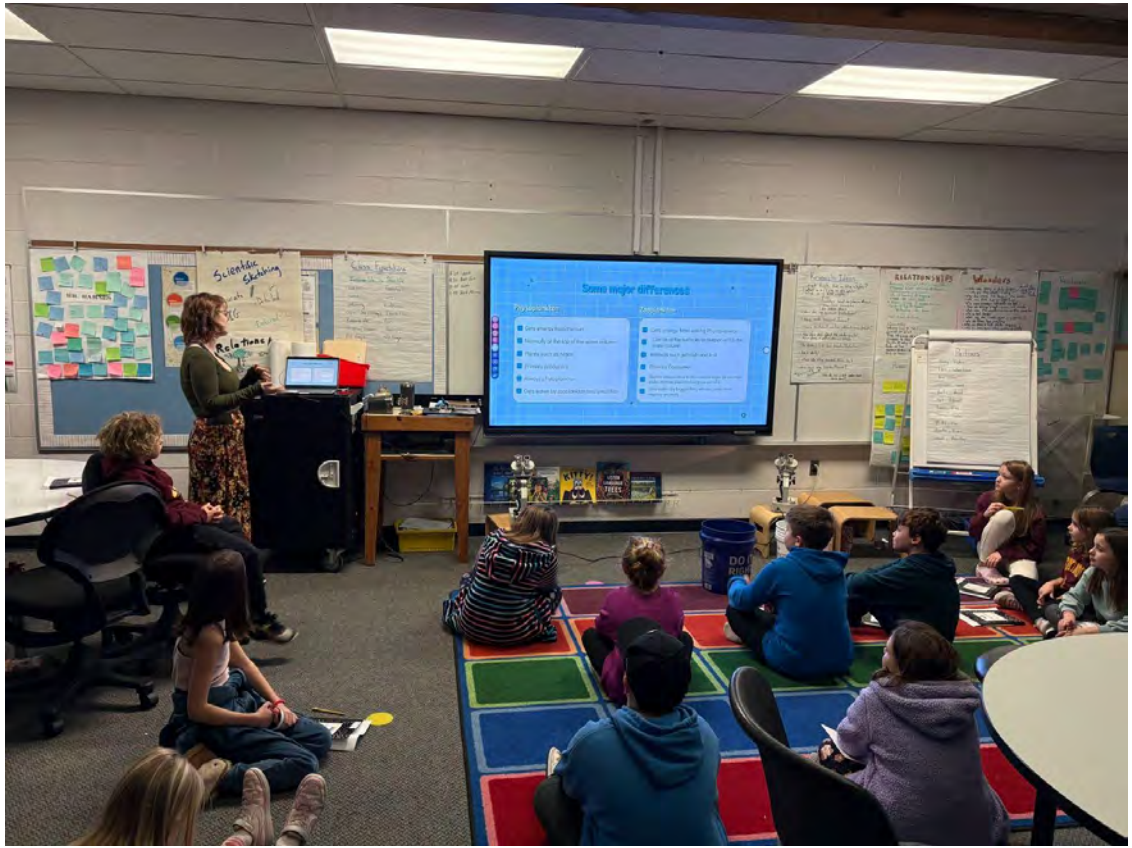
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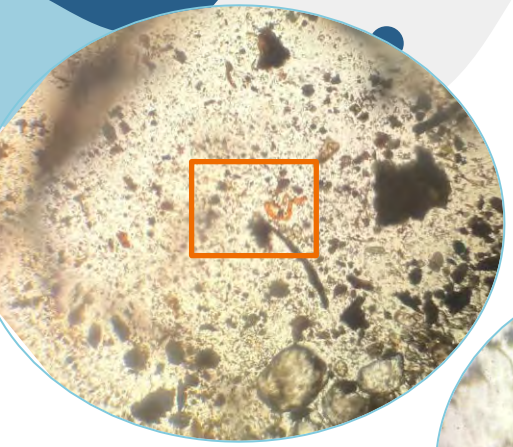
Plankton Counting



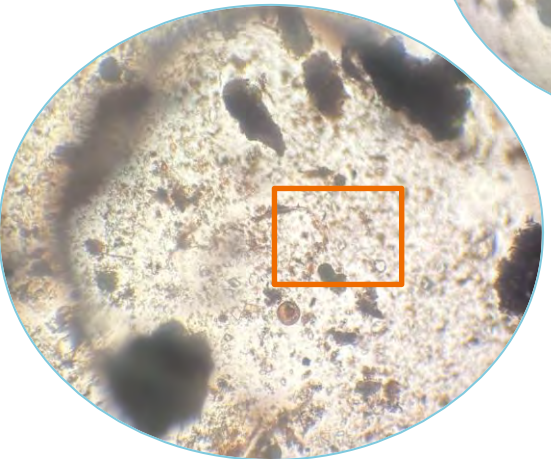
Collecting samples



Finding plankton

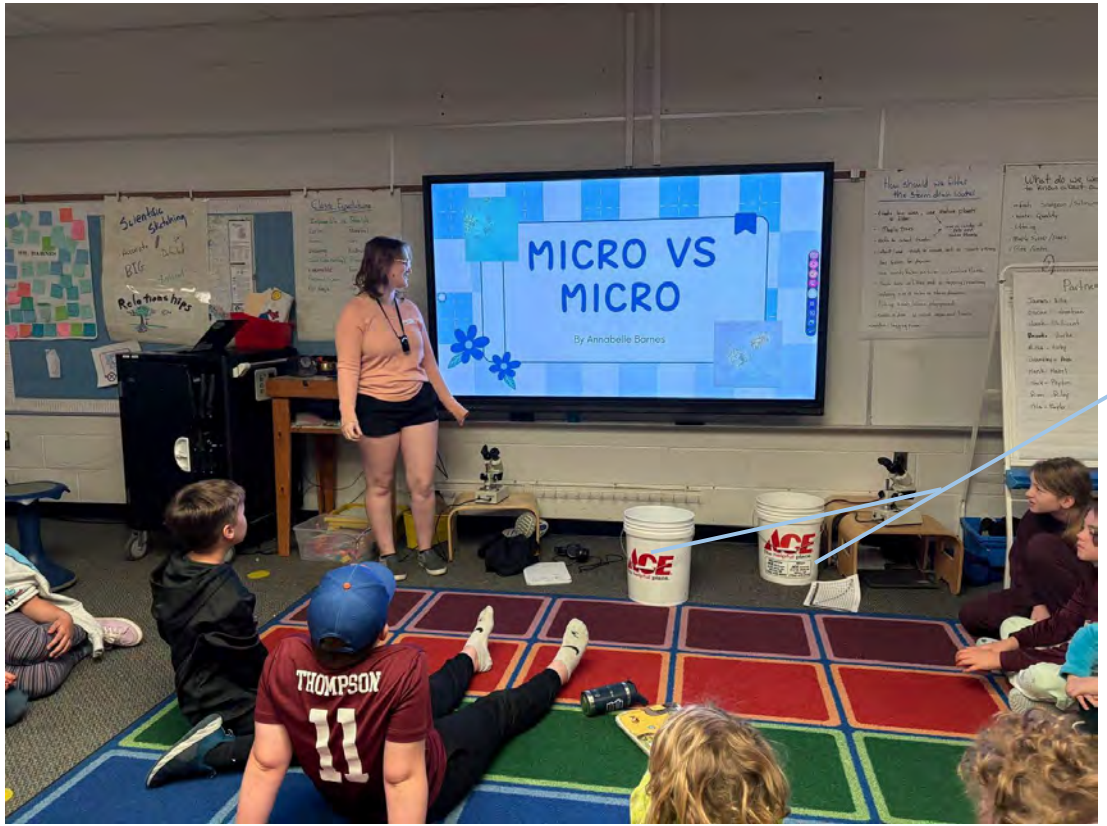






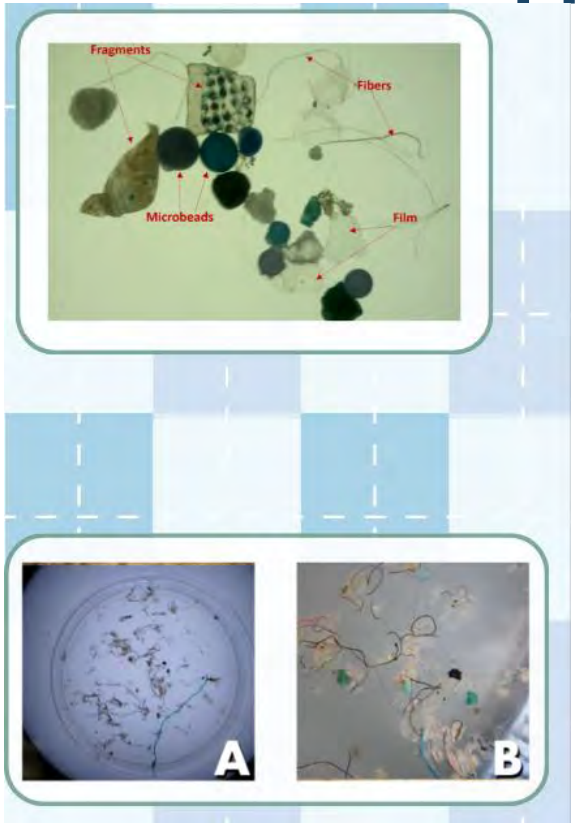


Introduction to microplastics



Buckets containing the water samples

Finding microplastics

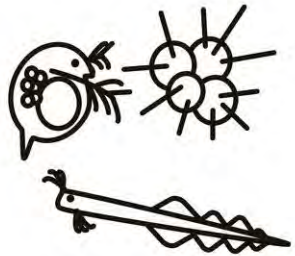


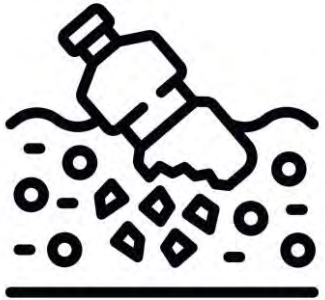


Connecting them together

Phytoplankton
Zooplankton

Microplastics disrupt the food web by reducing phytoplankton photosynthesis and hindering zooplankton feeding, which leads to decreased growth, reproduction, and fertility in these organisms. This has a ripple effect: because zooplankton are a primary food source, the impacts on them reduce the energy available for higher trophic levels, including fish and larger predators. The microplastics, along with any attached toxins, are transferred up the food chain through biomagnification, potentially affecting the health of the entire ecosystem.

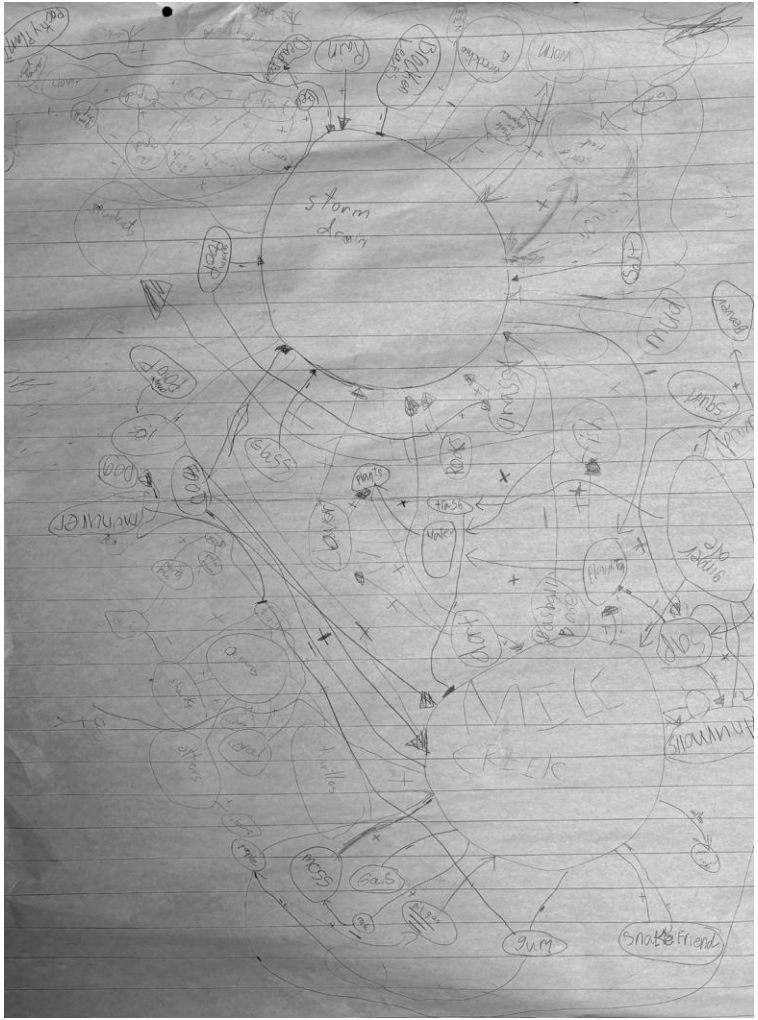




Understanding further

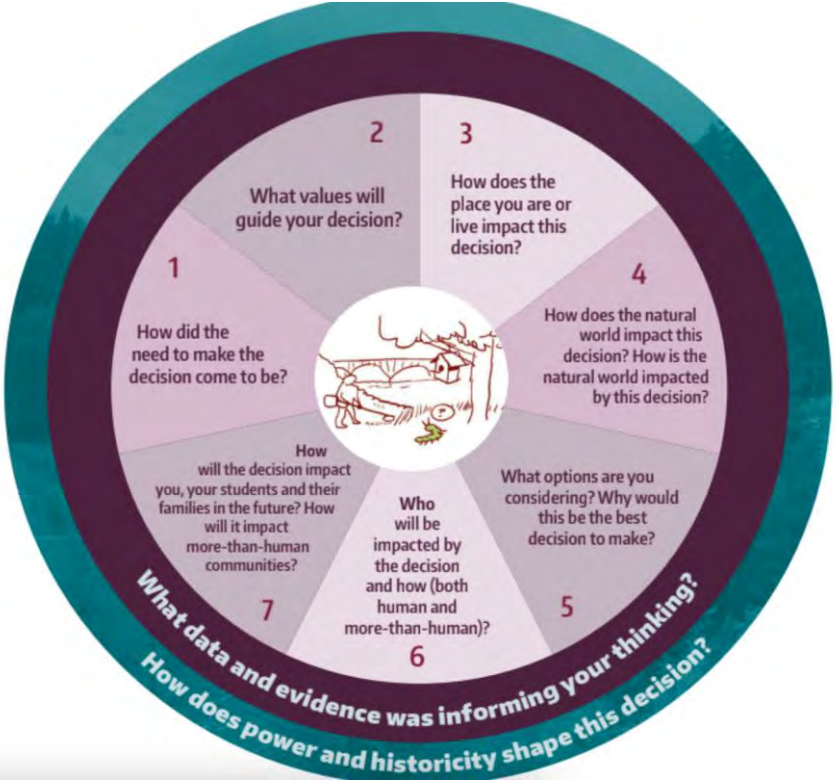






Modeling

Ethical Decision Making







Thanks

Any questions?