Microplastic Pollution in the Puget Sound
BC Earth and Space Science CHS Professional Development Exercise for 2026-27

Microplastics (plastic particles ranging from 1 micron to 5 millimeter) and nanoplastics (<1 micron in size) are emerging as a major source of pollution everywhere on Earth. These human-made "forever" particles did not exist on Earth 100 years ago, but are now so ubiquitous that they can be found from the highest mountains to the deepest oceans. And over the past two decades we have learned that these pollutants can bioaccumulate and have adverse effects on living things (including humans). Although we are still at the early stages of research into microplastics, we know that they are becoming increasingly concerning in Puget Sound.

Plastics Overview (Optional Reading)
Plastics are carbon-based polymers that are primarily made from fossil fuels (though there is an increasing market for bioplastics), and these polymers come in many different forms. If you are not familiar with the different types of plastics, or just need a quick review, please take a look at this resource.

- **The 7 Different Types of Plastics** (*Plastics for Change*)

Microplastics in Puget Sound
Review the following resources. There are 2 required videos (about 20 minutes each) and 1 required reading to help us all be on the same page. However, I have included a number of additional resources you can explore in more detail as time permits.

Microplastic Readings (1 Required Reading)
Read the first article from the UN Environmental Program to get an overview of microplastics. The page contains a lot of great links embedded withing the FAQs. The other links contain optional resources for exploring more.

- **Everything you should know about microplastics** - UN Environmental Program (June, 2025)
- **Ocean Conservancy Plastics Policy Resources**
- **Breaking the Plastic Wave 2025** – PEW Foundation, 2025
- **What are microplastics?** - NOAA
- **The Plastic Detox** (Netflix documentary from March 2026) - Trailer
- **Four Things To Know About Microplastics in the Deep** - Smithsonian, May 2025
- **Microplastics and our health: What the science says** - Stanford News, January 2025

Washington Department of Ecology : Puget Sound Microplastic Strategy Workshops (Watch 2 video lectures)

The Washington Department of Ecology has been running a Puget Sound Microplastic Strategy Workshops this year (from December 2025 to present). As of Oct 23, they have held 4 workshops and have posted the lectures and materials from those events. I have found the talks and discussions on this site to be an excellent overview of issues (from their source to potential solutions) of plastics in Puget Sound, and highly recommend reviewing the talks if you want to take a deeper dive into this topic (though be warned, each workshop is 4 hours or so).

The first workshop (December 2025) included a lot of introductory material on microplastics and plastic waste in Washington. The second workshop has some great talks as well about reducing plastic waste (vias source, consumers and the waste stream) and the third workshop covers human impacts and risk reduction. Some of the talks are focused on plastic waste in general, and I highly recommend them for those of you teaching Environmental Science. (The fourth workshop occurred on Oct 23, and should be posted soon, and a fifth is yet to come.)

For this PD assignment, I'll just ask that you watch two of the talks to get you up to speed and inspire some ideas:

- Elsie Granek, Portland State University – **Microplastics – The What, Where and Why** (Workshop 1, watch 0.14-0:43 min)
- Britta Baechler and Anja Brandin, Ocean Conservancy, **Microplastic fibers in the Pacific Northwest (and effective solutions!)** (Workshop 2, 2:20-2:48 min including Q&A)
- A few other optional sections that may be of interest:
    - Suzanne Brander, Oregon State University- The Problem with Microplastics: Occurrence, Toxicity & Solutions Workshop 1, (0.43-1.09 min)
    - Shelia Sathyanarayana, University of Washington & Seattle Children's – Microplastics and Human Health (Workshop 1, 1:10-1:36 min)
    - Julie Masuru, UW Tacoma - Microplastics in Salish Sea (Workshop 1, 2:30-2:59 min)

Some ideas for Exercises (optional resources)

Nothing in this section is required reading but there are some resources you may find helpful in designing labs or exercises. I'm sure there are a lot more out there, so consider this a starting place. (The first few resources describe protocol for measuring beach microplastics.)

- **EPA's Microplastic Beach Protocol ,** 2021
- **Microplastics & Microfibers Research in the Classroom** - NOAA
- **Laboratory methods for the analysis of microplastics in the marine environment : recommendations for quantifying synthetic particles in waters and sediments** (2015) -By: Masura, Julie ; Baker, Joel E., 1959- ; Foster, Gregory D. (Gregory Duane)

- **Ocean Diagnostics** (located in Victoria, BC) – Includes the book *Microplastic Science Education Guide* for $28 *(I have not reviewed this book, so I am not endorsing it, but the preview looks decent.)*
- **Microplastic Extraction of Exfoliating Beads from Cleansers** - TeachEngineering, 9-12 activity
  Microplastic beads that were commonly used in cosmetics and scrubs were one of the first major microplastics to be addressed in the United States. Per the Microbead-Free Waters Act of 2015, the use of microbeads in wash-off cosmetics (including toothpaste) was banned in the US effect 2018. (This does not cover non-wash-off cosmetics and glitter add ins.) While not as easy to do now, here is an old exercise from "TeachEngineering" on how to extract and measure the microbeads in cosmetics.
- **Microplastic Law:** Another area of interest for developing class assignments may be around the law. Washington does not require filtration for microfibers on washing machines, thought there is a proposal (House Bill 2212) to require filters for commercial and industrial machines (not residential). An opportunity for students who want to enact change. (For comparison, Washington State really led the way in greatly reducing phosphates in laundry detergents over the last 25 years.)

Questions for Discussion (Please post your discussion by December 6)

Once you completed readings/videos, please take time to share your response to the following questions on the Canvas discussion board. Try to focus on how you can make this information useful or practical in your own classroom. (Make sure you have your NetID, and if you are not already in the Canvas site, let me know and I can make sure Susan adds you to the site.)

(1) Consider how you would engage students in each of the following topics and determine what the key takeaway you would like students to know about each of these microplastic topics:
   a. What are microplastics?
   b. What are the sources of microplastics and how abundant are microplastics in Puget Sound?
   c. What the methods used to measure microplastics in the ocean or ocean sediments?
   d. What the impacts of microplastics on the environment and on people?
   e. What are some of the solutions to addressing microplastics in Puget Sound (think source reduction, clean up, laws, individuals, etc.)?

(2) Pick one of the topics above and either share an exercise you could use with students to help them better understand the issue, or describe an exercise you would like to develop. *(Again – no need to fully develop something – you can just start with a concept.)*

(3) Share a couple additional resources you discovered on microplastics in Puget Sound.

(4) What additional questions do you have about microplastics in Puget Sound?

Let me know if you would be interested in discussing this in a synchronous session. Otherwise, be sure to take a look at what others have posted, and/or ask questions.