

Microplastics

Activity Overview:

In this activity, students will learn about microplastics. What are microplastics? Where do they come from? What is their impact on humans and ecosystems including aquatic, and what can we do?

Objectives:

The key messages students should learn:

- ❖ What are microplastics and where do they come from
- ❖ The impacts on humans, aquatic ecosystems and living creatures
- ❖ How to reduce microplastics in the environment

Activities:

- 1) Sediment Sample
- 2) Source Guessing Game

Activity Inventory:

Please check the activity inventory sheet to ensure that all materials are present prior to the start of the activity.

Sediment Sample

- 5.6mm sieve
- 1.0mm sieve
- Metal canning funnel
- Paper table cover
- Sieve brush
- Metal catch tray
- Paper with microplastics dividers
- Sediment Sample

- Microplastic restock
- 10 pairs of tweezers (blunt)
- 6 metal pie plates

Source Guessing Game

- Images of types of Microplastics
- Shadow Box
- Biomagnification infographic
- Dinner or Danger image

Setup:

Place the activities on either ends of the table.



Vocabulary:

Microplastics: plastic beads, fibres, pellets, or other fragments generally < 5mm in size

Biodegradable: Capable of being decomposed (broken down) by natural biological processes

Biomagnification - The concentration of toxins in an organism from ingesting other plants or animals in which the toxins are more widely dispersed.

What will I be doing? (Procedure)

Before you start your presentation check with the teacher or chaperone that the entire group is present and ready to start.

Remember that kids have more fun when they are **doing** an experiment and **discovering** the answer, rather than watching and listening.

Activity 1: Source Guessing Game

1. Students to look at the image of the microplastic and guess where it comes from
2. After students have looked at images of microplastics, point out some examples on the shadow box/display board.

Activity 2: Sediment Sample

1. Volunteers will pour sample jar into 5mm sieve stacked on top of the 1mm sieve, with a metal pie plate on the bottom to catch the sand.
2. Pour the samples in the 5 mm sieve and 1 mm sieve into the metal pie plates.
3. Students will look for microplastics in the metal pie plates and sort through it with tweezers
4. Students can remove the items from the plate and organize them into: Fibre, Nurdle, and Plastic Fragment onto the divider paper. Please don't promote use of tweezers directly on the sieve – they can cause damage.
5. Explain while students are doing the activity that this sample taken from a beach along Lake Ontario.
6. Once activity is complete pour all pieces of the sample back into the sample jar using the canning funnel. Use metal brush to clean out sieve.

Call to Action:

- ❖ Set a goal for yourself each year to reduce the use of plastics in your life
- ❖ Use Reusable items whenever you can!
- ❖ Say no to plastic cutlery and straws when provided to you. Carry reusable versions with you
- ❖ When going out to dinner bring a reusable container for leftovers rather than accepting a plastic container or Styrofoam
- ❖ Try alternatives (choose metal, glass, or wood products over plastic)
- ❖ Buy in bulk (For example: a single extra-large container of yogurt is better than several small single-use containers)
- ❖ Wash synthetic clothing less often so that fewer fibres find their way into our waterways
- ❖ Remember it is Reduce...then Reuse...then Recycle.
- ❖ Support compostable single-use products
- ❖ Join or organize a litter clean-up with TRCA

Background Information (for high school volunteers):

In the 1950s plastic disposable household items were marketed as a low cost means of reducing time and energy doing chores, but this 'disposable' behaviour has created significant consequences on our environment. Plastics have their benefits: they are easy and cheap to produce; able to shape into many things; and are durable. Unfortunately, these plastic items are derived from fossil fuels that are non-renewable and often require destruction of ecosystems to obtain; and while they may be durable, plastics never biodegrade. While plastics can break down into smaller and smaller fragments through sunlight (UV Radiation), they never fully disappear from our environment.

Microplastics are plastics that are smaller than 5mm. They come in all shapes and forms but the most common include:

- ❖ Microbeads: Come from cosmetic products such as face washes, body scrubs, toothpastes and hand soaps.
- ❖ Synthetic Fibres: Fibres come from synthetic clothing. Synthetic fabric includes fleece, polyester and nylon. Found in our clothing, carpets, blankets, towels, and furniture.
- ❖ Fragments: Are the result of larger plastics being broken down into small fragments over time.
- ❖ Industrial pellets or "nurdles": Lentil sized plastic pellets used in factories to melt and mould into plastic products.

What is the lifecycle of plastics?

Plastics are first created as lentil sized pellets or 'nurdles' that are shipped around the world and used to manufacture most plastic products. Nurdles are melted and moulded into plastic products. Nurdles can be spilled while be transported or washed away during truck spray downs after transportation, during filling and off-loading a vessel, and packaging and easily make their way into our streams, lakes, and oceans.

Plastics products are then used and eventually thrown out. When we recycle plastics, the plastics are melted down again to be recycled – although not all plastic products can be recycled. Plastics items cannot be recycled forever. Recycled plastic usually downgraded to a lesser quality plastics items and eventually becomes a type of plastic that cannot be recycled.

Only 14% of plastics worldwide are collected for recycling.

What are the effects of microplastics?

Research into microplastics is still a fairly new and therefore we do not know all the impacts of microplastics on ecosystems and human health.

Microplastics are small enough to confuse fish and even plankton as they are looking for food, and the fish or plankton will eat the plastic. There isn't much nutrition in plastic so sometimes these animals starve.

Contaminants will often attach to the outside of plastic. This includes the following: pesticides like DDT, PCBs, flame-retardants, and hormone disrupting compounds.

As fish consume these contaminated plastics, the amount of toxins stored in their bodies increases. In small amounts, this may not cause an issue, but as larger fish eat many contaminated smaller fish, the larger fish becomes more contaminated. Who eats the big fish with all of these toxins? Humans do.