TeachEngineering

Preventing Microplastics from Getting into Humans

Think:

How might plastics affect human health?

Write your response on your handout.

1

INTRODUCTION: MICROPLASTICS

What are they? Are they harmful?

Watch & Keep This Question in Mind:

What surprised you most about what you just watched?

ABOUT MICROPLASTICS

What are microplastics?

Plastic particles <5 mm formed from breakdown of larger plastics or manufactured for products.

How do they enter the environment?

Through industrial waste, sewage, plastic litter, synthetic fabrics, tire wear, and air.

How do they affect human health?

Can enter bloodstream, accumulate in organs, disrupt hormones, and transport harmful chemicals.

2

CHALLENGE

What can we do about microplastics?

CURRENT SITUATION & PROBLEMS

Current Situation

Plastic waste breaks down in the environment.

Problems

Microplastics

Get released into the environment

Harmful Chemicals

Get released into the environment

Get into Humans

No way to remove from humans once absorbed.

A FEW CURRENT FILTERS

Mechanical

Physical barriers

Carbon or Activated Charcoal

Adsorbs contaminants

Reverse Osmosis

Forces water through semipermeable membrane

YOUR CHALLENGE

Design a filter that can remove the microplastics from the provided plastic solution.

PLASTIC SOLUTION

What is it?

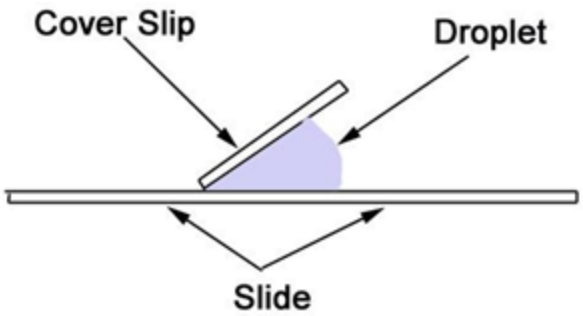
- Simulates microplastics in water
- Mixture of water and plastic glitter particles made out of polyethylene terephthalate (PET)

About PET plastic

- PET is non-biodegradable and can harm the environment if not disposed of properly.
- PET can release chemicals into food or beverages stored in it.

How to observe it?

- Make observations by looking at it in the provided cup.
- Create a wet mount and look at it under a microscope.
    - *I will help you with this!*



FILTER DESIGN STEPS

01 **Review**
Materials provided

02 **Design**
Filter with your group

03 **Draw & Label**
Filter on handout

04 **Explain**
Chosen materials and placement on handout

05 **Get Filter Approval**
Call me over to get your filter approved

IMPORTANT

BUILD & TEST YOUR FILTER

01 **Gather**

Send up one group member to gather needed materials - clean up any messes you make!

02 **Build**

Make your filter according to how you designed it.

03 **Test**

Complete the “Test Your Filter” section of handout.

04 **Improve**

Complete the “Improve Your Filter” section of handout.

IMPROVE YOUR FILTER

Complete the “Improve Your Filter” section of your handout:

If we had significantly more time and if you could acquire any material you feel your filter could benefit from, then what improvements could you make if you could redesign and remake your filter?

CLEAN UP

Throw away filters, cups, and trash

Return unused materials

Tidy up area

3

EVALUATE & PRESENT

PRESENT YOUR FILTER

Share the following:

1. Brief description of your filter components and the layers
2. How effective your filter was (or was not)
3. What improvements you would propose for your filter

FINAL THOUGHTS

Answer the two final questions on your handout:

1. What are microplastics?

2. Why might particle size be important in filtration?