

Clean It Up

Summary

In this activity, students will learn about Environmental Engineering. They will investigate their impact on the environment, while discovering how engineers work to clean up the world around us. They will learn the concepts of environmental engineering as it relates to drinking water and wastewater treatment plants. Students will participate in a hands-on activity to simulate water filtration.

After completing this activity, students should be able to:

- Explain how engineers design and build devices to help make our environment a better place
- Explain water treatment and how it works
- Understand the importance of filtration and the sizes that are commonly used
- Evaluate their carbon footprint and how they can use Earth's resources more wisely

Setting the Stage

Before the students start working, initiate an introduction/discussion about the topic using some of the following open-ended questions.

1. Where does your drinking water come from?
2. When it rains, where does that water collect?
3. Do we use water from the lakes and streams in our everyday lives?
4. How do we know our water is safe to drink?

Materials

- Hot cocoa pouch (any type of hot cocoa mix should work)
- 2 syringes
 - (suggested purchase: <https://www.cvs.com/shop/luer-lok-tip-syringe-prodid-179150>)
- 2 syringe filters
 - (suggested purchase: https://www.amazon.com/gp/product/B06XWL3LV2/ref=ox_sc_act_title_1?smid=A2WJ50ILVLFYKK&psc=1 or)
- 2 small glass vials
 - (suggested purchase: https://www.amazon.com/dp/B002JV89OC/ref=cm_sw_em_r_mt_dp_SCCHRG608SKKQG9M8K9N)
- Spoon
- Tall glass/cup (for mixing)
- Tap water

Test Procedure

1. Pass out materials to each group/student.
2. Students should mix a small amount of hot cocoa into the bowl of water. Make sure that the hot cocoa is dissolved.
3. Using the syringe, deliver some of the “dirty” water into the first glass vial.
4. Fill up the syringe again with “dirty” water.
5. Now take the filter and screw it onto the end of the syringe.
6. Carefully deliver the water, through the filter, into the other glass vial.
7. Observe the difference in the vials.

Vocabulary

- **Environmental engineering:** the application of science and engineering concepts to care for and restore our natural environment
- **Air pollutant:** a substance in the air that can cause harm to the environment and/or humans
- **Greenhouse effect:** heat from the sun gets trapped inside the glass of a greenhouse and heats up its air
- **Renewable resource:** a natural resource that can be replaced by a natural process
- **Non-renewable resource:** a natural resource that cannot be replaced or re-grown or reused
- **Carbon footprint:** total amount of greenhouse gases that are generated by our actions

Reference

Teach Engineering

https://www.teachengineering.org/lessons/view/cub_footprint_lesson1

https://www.teachengineering.org/lessons/view/wst_environmental_lesson01