

PUZZLERS

#48 | MAKE SOMETHING USEFUL



Puzzle

Repurpose a plastic bottle to develop a useful new product.

Standards & Connections

NGSS.HS-ETS1-1-4, NGSS.MS-ETS1-1-4, NGSS.3-5-ETS1-1-3 3

Background:

Mismanaged waste and domestic litter is a major contributor to the increase in the presence of plastic in the world's oceans. The United States is the second highest generator of plastic waste in the world with an estimated 38 million tonnes of plastic waste.ⁱ Even with well-established recycling programs and plastic trade among developed nations, plastic still contributes to a high percentage of landfill waste and pollution. Governmental agencies around the world are looking at unique ways to combat this problem. "Re-use, recycling, and recovery are becoming the key words around which a new paradigm needs to be built to promote sustainability innovation and competitiveness, so that waste will cease to be a problem and become a resource."ⁱⁱ

Suggested Materials:

Access to the internet



IDENTIFY

Share the background information with the students, then share the puzzle to be solved. Determine constraints (e.g., time allotted, space, materials provided, etc.) and divide students into small groups.



IMAGINE

Ask a series of questions to help students brainstorm solutions to the puzzle. Encourage students to list all ideas – don't hold back! Before moving on, make sure each group selects a solution that fits within the constraints.

Ask: How can you solve this puzzle? Which of your ideas can you build a prototype for given the constraints?



DESIGN

Students diagram the prototype, identify the materials needed to build the prototype, and write out the steps to take. Students describe the expected outcomes.

Ask: What steps will you take to create your solution? What do you expect your solution to look like and be able to do?



CREATE

Students follow their design plan and build their prototypes. Monitor their progress and remind them about how much time they have.



TEST & IMPROVE

Students evaluate their creation and compare it with the expected outcomes. Students seek areas of improvement and make changes where needed.



SHARE

Students share their solution to the puzzle and communicate lessons learned.

Ask: What was your biggest takeaway? What would you do differently?

Additional Resources:

For more background information on this topic, please visit www.purpleplow.org.



Investigate the different ways in which plastics are recycled around the world.

¹ <https://ourworldindata.org/plastic-pollution>

² <https://www.europarl.europa.eu/news/en/press-room/20170308IPR65671/waste-boost-recycling-cut-landfilling-and-curb-food-waste-parliament-says>

<https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data>

<https://www.nationalgeographic.com/science/article/plastic-produced-recycling-waste-ocean-trash-debris-environment>

<https://plasticsrecycling.org/resources/the-national-postconsumer-plastic-bottle-recycling-report-is-out-here-s-what-it-means/>