

PUZZLERS

#44 | NATURAL FILTRATION



Puzzle

Create a natural filtration system and investigate how things found in nature (sand, rocks, soil, and plants) act to improve our water quality.

Standards & Connections

NGSS.MS-LS2-5, NGSS.MS-ETS1, NGSS. HS-ETS1-2

Background:

How can dirt clean water? "Nature works to filter and release water over time – for free! In this way, nature reduces the amount of artificial treatment needed to filter water and also contributes to prevention of flooding. In nature, water is filtered through layers of soil, sand, rock, and other natural materials like leaves." In this puzzler, students explore how natural materials filter runoff and improve water quality.

Suggested Materials:

2 two-liter bottles, coffee filters, soil, rocks, sand, dirty water, pH strips



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 how to create more natural filtration systems and what your local community has already done.

¹ https://www.natureworkseverywhere.org/asset/resources/HowNaturalAreasFilterWater_v4_8_31_2015.pdf

https://www.canr.msu.edu/news/want_clean_water_filter_with_soil

<https://www.jpl.nasa.gov/edu/teach/activity/water-filtration-challenge/>