STEM in

LESSON PLAN

Water purification experiment

In this activity, students will create simple water filters while understanding the basics of water filtration and the importance of clean water for health and ecosystems.

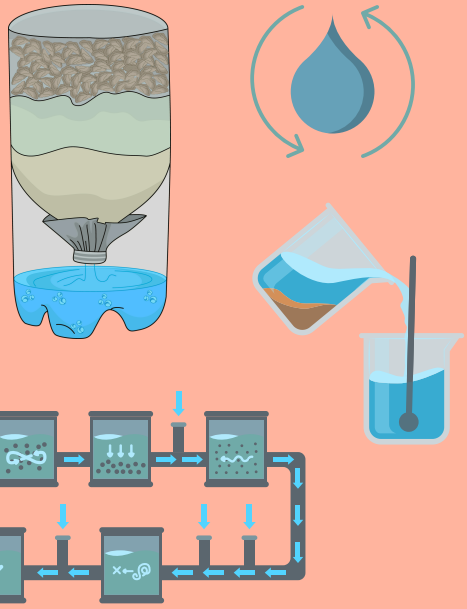
45-60 min

Duration

Recommended age for this game

10-12 years

Learning Objectives



- Understand the concept of water filtration and its importance in providing clean drinking water.
- Learn about pollutants and how they affect water quality.
- Develop problem-solving and critical thinking skills through hands-on experimentation.

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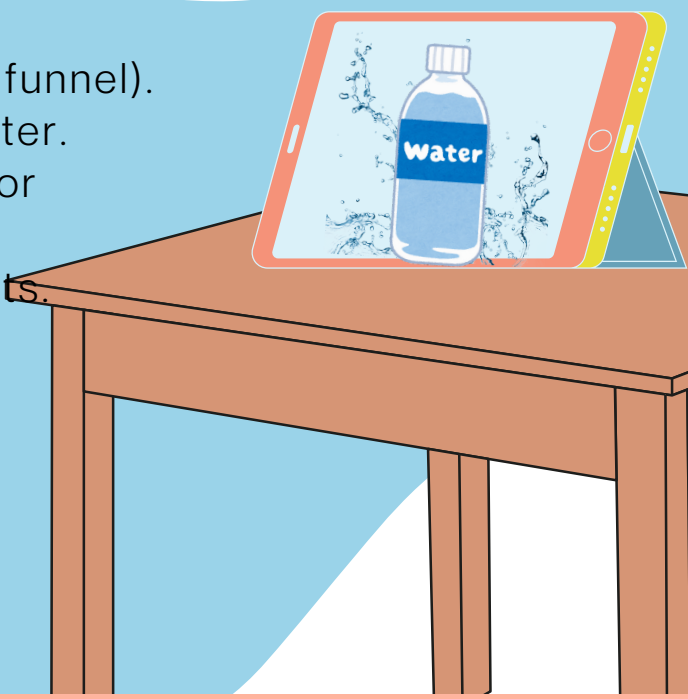
Materials and tools needed

- Dirty water (mix soil, small pebbles,
- and leaves into water).
- Filter materials (cotton, coffee filters, sand, activated charcoal, gravel).
- Plastic bottles (cut in half to use as a funnel).
- Beakers or cups to collect filtered water.
- Dropper and food coloring (optional for testing).
- Worksheet for observations and results. (See Annex 1)



Guidance for Teachers

Activity description

Students will simulate a basic water purification process by designing and building their own water filters.

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Preparation

- Prepare sample dirty water for students.
- Set up stations with materials for filter construction.
- Provide instructions on how to layer filter materials.

Implementation steps

- INTRO: Discuss the importance of clean water and introduce terms like filtration, pollutants, and contaminants. Show also a simple demonstration of water filtration.
- DESIGN PHASE: Guide students to plan how they will layer materials in their filter.
- BUILD AND TEST: Allow students to construct their water filters and test them with dirty water. Observe and compare the filtered water to the original sample.

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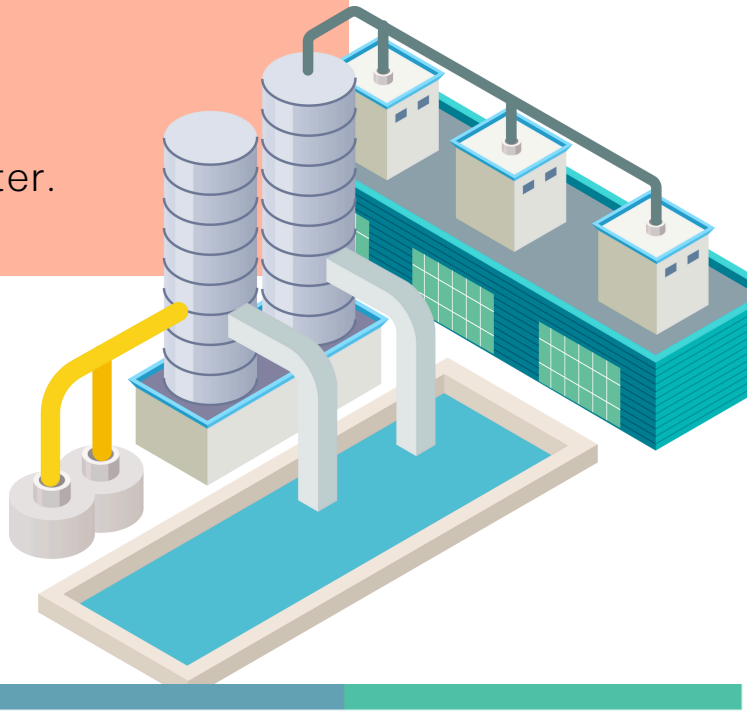
- OBSERVATION: Have students record their observations and discuss which materials worked best.
- REFLECTION: Discuss how this experiment relates to real-world water purification systems.

Follow-up and reflection

- Assign a research project on advanced water purification technologies, such as reverse osmosis.
- Discuss global water scarcity and solutions to provide clean water.



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Student Activities

Activity description	Expected outcome	Technology integration
Create a Water Filter	Students will design and build a basic water filter using the provided materials.	Watch a video tutorial on filtration methods
Test Water Quality	Students will test how effectively their filter cleans the water.	Use a digital microscope to observe particles in water.
Record Observations	Students will document their results and evaluate filter performance.	Input data into a digital spreadsheet or form.
Compare Filter Designs	Students will compare different designs to find the most effective combination.	Present findings using tools like Google Slides.

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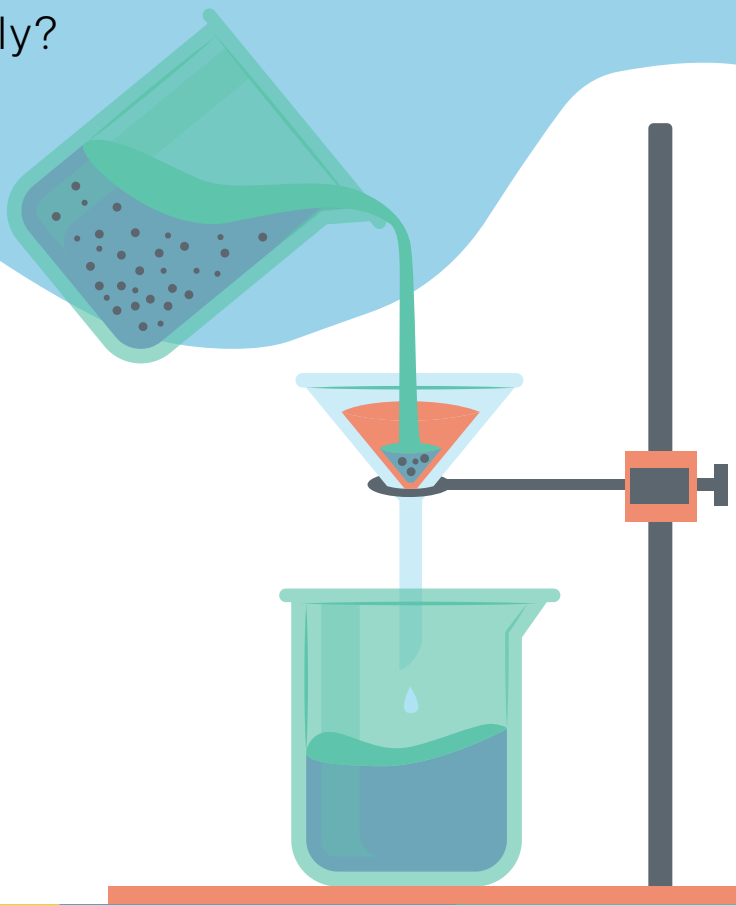
Reflective questions for students

- What materials worked best in cleaning the water and why?
- How do you think this process compares to real-life water purification methods?
- What would you change in your filter design to improve its efficiency?
- Why is access to clean water important, and what can we do to ensure it globally?



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Differentiation ideas

Advanced Students

- Ask them to research and replicate more complex filtration techniques, such as adding chemical purification steps.
- Challenge them to measure pH levels of the water before and after filtration.
- Have them create a presentation comparing filtration techniques used globally.

Students with special needs

- Provide pre-layered filters to simplify the construction process.
- Pair them with peers for collaborative support.
- Use visuals and videos to explain each step clearly.

Tips

- Emphasize the importance of observing and recording results carefully.
- Provide extra materials in case students want to try multiple designs.
- Use clear, age-appropriate explanations of filtration concepts.
- Encourage collaboration and creativity in filter designs.

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Additional materials and references

- Video: Water Filter

- Water Filtration Challenge

- Interactive website on water contamination (e.g., Explore Learning).

- Guide Make a water filter

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ANNEX 1

Worksheet for observation

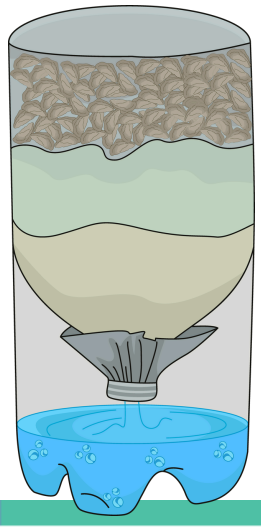
1. Describe the appearance of the water before filtration: (Color, clarity, any visible particles, smell, etc.)

_____
_____.

2. Describe the appearance of the water after each filtration step:

- First Filtration (e.g., Gravel):
  -
  -
- Second Filtration (e.g., Sand):
  -
  -
- Third Filtration (e.g., Cotton or Cloth):
  -
  -

3. Draw what you observed at each stage (before and after filtration):



Extra Challenge:
Can you think of any other ways to purify water besides filtration?

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