

CLEANING WATER

BENCHMARK AND TASKS

SC.D.2.1.1 The student understands that people influence the quality of life of those around them.

- The student recognizes and explains why some resources are limited.
- The student creates a plan for being more personally responsible about caring for the earth.

KEY QUESTION

Can we clean dirty water?



BACKGROUND INFORMATION

Because water is used and reused, waste materials, bacteria, and viruses must first be eliminated before the water returns to the environment. The increased amount of waste and the greater demand for water have reduced the capacity of rivers, streams, and lakes to purify themselves. The creation of new products leads to the need for more advanced water treatment and pollution control technology.

Before our population and industry grew to their present sizes, the sheer volume of clean water in streams was able to dilute the small volume of waste. Today, bacteria would quickly rob our water of dissolved oxygen, which would result in the loss of drinking water and the death of fish and other animals.

The function of a waste water treatment system is to speed up the natural process by which water purifies itself. The process of water purification usually takes three stages. The first phase removes solids. The second phase employs biological methods to remove biodegradable materials. The final stage disinfects water and makes the water ready for drinking.

MATERIALS

Teacher

coffee grounds
pebbles or marbles
raisins
broken toothpicks
water
Save Our Planet by Diane MacEachern

Per group

Available tools for cleaning wastewater:
clear, plastic cups
hand held flour sieves
4" by 4" square screens
spoons
sorting sieves (if available)
coffee filters
magnifiers (1 per student)
student science journals
newspaper
microscope

TEACHING TIPS

1. To make wastewater:
Fill plastic cups until they are $\frac{1}{2}$ full of water and then add the coffee grounds, marbles, raisins, and small broken toothpicks. Create one cup of “wastewater” for every group.
2. An optional chart is available at the end of this activity for each group to use for organizing and planning. Students will need guidance to complete the chart.

ENGAGE

Using a globe or map, show how water covers approximately $\frac{3}{4}$ of our planet. Explain that because of the salt content in our oceans and the pollution of clean water around the globe, much of our available water is undrinkable. Because we cannot live without drinking water, it is important that we understand the importance of keeping our water clean.

Say, *Each group will be given a cup of ‘dirty’ water. Another way of describing this water would be to call it **wastewater**. Each group is challenged to use the materials available to clean the water.*

This wastewater will not harm you, but should be treated like real wastewater and considered unsafe for drinking.

EXPLORE

1. Organize the students in groups of three or four.
2. Have students cover their work area with newspaper.
3. Give each group a cup of wastewater.
4. Allow the groups time to use the magnifiers to observe the wastewater. Students will record their observations in their science journals.
5. Show the students the tools each group may select from to help clean the water.
6. Groups will need to create a plan for cleaning the water. Discuss some possible methods, using the tools. The plan should include:
 - assigned tasks for every member of the group,
 - the tools to be used,
 - a plan for using the tools (sequence of events).
7. Have one helper from each group collect the needed tools.
8. The groups should follow their plans to clean the water.

EXPLAIN

Each group will explain their plan and share their results.

Ask:

Was the wastewater completely changed back to clean water?

If not, what remains to be cleaned?

What tools worked the best?

What materials were easiest to remove from the wastewater?

What are some ways that people pollute water?

Could we clean our wastewater at home?

Why is it important to think about how we use water?

If you removed most of the waste from the water, but could still not drink it, how could you still use the water?

EXTEND/APPLY

1. Collect a sample of water from a local pond and some tap water. Observe the differences between the two samples, using a hand lens and a microscope.
2. *Save Our Planet* has many, excellent tips for saving our water and keeping it clean.

EXTENSIONS

1. Organize a field trip to visit our local wastewater treatment plant.
2. Invite a representative from a local bottled water company to explain the difference between bottled and tap water.

WasteWater to Clean Water

Write the steps of your plan in order from beginning to end and number the steps.

Steps of our plan:

Student Scientist	Task	Tools Needed