

Troubled Waters

Summary

Students will be given a sample of dirty water. Their job will be to develop a process to purify the water.

Time Frame

4 class periods of 60 minutes each

Group Size

Small Groups

Materials

The students will need to provide materials that they have described in their procedure. It makes it much easier if the students have access to lab stations and equipment, however there are many options such as solar stills, hot plates and electric teapots.

Background for Teachers

A good sample of polluted water can be made by beginning with 4 liters of water. Then add 250 ml of salt, (which will be the most difficult pollution to separate), a pinch of instant coffee to make good color, and 5 ml of citric acid to show up on a pH test. Salt cannot be filtered out of water. The most effective way to clean the water would be some type of distillation process. There are some commercial filters which use membranes for osmosis. These might work but are generally too expensive. The purity of water is often tested with an electroconductivity meter. This meter measures the amount of electricity the water can conduct. The dirtier the water, the more electricity it will conduct.

Student Prior Knowledge

Students have been introduced to the intricacies of the hydrologic cycle. They understand that nature purifies millions of gallons of water each day through evaporation and percolation. They should be able to use these principles to purify their own water.

Instructional Procedures

Day 1:

Show the students a bottle of dirty water. Instruct them that although it seems dirty, nature cleans millions of gallons of this stuff each day in the hydrologic cycle. Surely with all the technology they have access to they can clean 15 ml in 2 days. Allow student groups the bulk of the time remaining to plan a way to clean the water. On day 4 they will share with the class how they cleaned the water and describe its cleanliness.

Day 2: Allow students to conduct their experiment.

Day 3: Allow students to conduct their experiment.

Day 4: Each student group will use some type of visual to report to the class how they cleaned their water. This is also an ideal time to test the conductivity of the water to determine how well they solved the problem.

Assessment Plan

If an electroconductivity meter is used, grading can be based on the results of this test. Simply put the probe in the water and read the scale. If teachers don't have a meter, grading becomes more

subjective. However, if a good process is followed, the written and oral procedure is a good indicator of whether the students understand how the hydrological cycle works to clean water.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)