
LESSON: WATER FILTRATION



Grade level: 4th through 5th grade

- 4-ESS2-1.** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- 5-ESS2-1.** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

INTRODUCTION

Comprehension of the critical role played by water in support of all life on Earth is an essential foundational element of the Inland Empire Resource Conservation District's (IERCD's) Water Conservation classroom presentation. This activity is being provided to increase student awareness of water uses and benefits prior to program facilitation, and encourages development of this knowledge in a free-form, group exercise. The suite of concepts and vocabulary covered will depend on length of activity facilitated by the participating teacher, but at any length should increase student preparation for IERCD program participation. It would also be suitable for post-program facilitation, to reinforce concepts and vocabulary covered during the program for maximum content retention.

OBJECTIVE

By completing the activities, the students will:

- Demonstrate how groundwater flows into the ground.
- Demonstrate how groundwater gets filtered through the soil and is purified through filtration.

BACKGROUND

Water needs to be purified before it can be consumed by people. There are several ways of doing this, each of which removes a different contaminant, such as, chemicals, solid wastes, and bacteria. Some city water treatment plants use all of these methods, whereas other treatment plants use only one or a combination of several. Water is naturally filtered through soil and stored in underground aquifers. The degree of filtration can depend on the different soil types that exist in the area.

SUMMARY

This activity demonstrates the process of water filtration by giving three different examples on filtering water through different types of soil.

MATERIALS

- 6 coffee filters
- 3 empty 2 liter "clear" plastic soda bottles
- 3 large jars
- 3 cups of sand
- 1 cup Gravel
- 1 cup of soil
- 3 cups Water

SKILLS DEVELOPED

- Listening
- Observation
- Collaboration
- Analyzing
- Critical Thinking

DIRECTIONS

1. *Filtration:* First, cut empty water bottles in half, closer to the top. Use top piece as a funnel. Put coffee filters in the three "funnels" and set in three bottom pieces and fill each filter half full with sand, gravel *or* soil. Make some muddy water and pour a cup of it in each funnel.
2. After the water has seeped through each medium and funnel, about 5-8 minutes, compare the water samples. The gravel will be the worst filtering process, the soil will be moderately effective, and the sand will be the most effective in filtering the muddy water.
3. Hold a piece of white paper in back of the filtered water and examine for particulate matter and color. The winning team has the clearest water bottle.
4. Students can measure the effectiveness of their filtration device using pH test strips.

Note: Water filtered in this experiment SHOULD NOT be consumed by humans.

EXTENSION

Have students research and answer the questions listed below with a partner.

Inquiry:

1. What kind of water purification system does your town operate?
2. What is the process of removing salt from water?
3. Why would the distillation of water be an expensive process for cities to use?
4. How does aerating water improve its taste and the unpleasant odors?

Show the students the picture below and discuss the importance of plants (not only for oxygen and erosion prevention) to help filter water as it infiltrates into underground aquifers.

