

Ages:

10 & up

Won't You Be My Neighbor?

(Adapted from *Water Wise: Lessons in Water Resources* by Elizabeth C. Moran and Marianne E. Krasny. See “More Great Resources for Grab and Go with Science Activities” at the end of this publication for more information.)

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Main idea: Youth will be charged with cleaning up a water supply contaminated with a variety of nonpoint source pollutants. They will experience the many steps, challenges, and expenses involved in the purification of water, followed by discussion of pollution prevention and alternatives to nuisance pollutants.

Objective: Youth will manipulate different materials and explore alternative methods for removing water contaminants. They will be able to describe different types of nonpoint source pollution and give examples of how waters can be protected from such contamination. Youth will understand how we all need to act as neighbors that care about our water resources.

Materials:

Each group of 4 to 5 needs:

A 5-gallon bucket

Pollutants:

- q ½ cup vegetable oil
- q 1 drop food coloring
- q 2 teaspoons sand/gravel
- q 5 drops dish detergent
- q 1 tablespoon leaf litter
- q 1 teaspoon salt
- q trash (bottle caps, styrofoam, etc.)

Clean-up Apparatus:

- q 1 piece of screen (15cm square)
- q cotton facial pads
- q funnel
- q eye dropper/turkey baster
- q paper towels
- q empty plastic or metal pan
- q pint jar filled with clean water

Motivator: Drink a glass of clean water and talk about how refreshing it is. (Aaaahhhh!) Then introduce yourself as Iggy, their new next-door neighbor.

Questions:

Ask and discuss these questions before starting the activity. See Background and Activity for help with answers.

- q What is the difference between point and nonpoint source pollution? Give examples.
- q What substances can pollute our surface and ground waters?
- q How is the water that we drink purified?
- q What does a water treatment device do?
- q How many of you know that you have water treatment devices at your home?

Activity:

1. Divide youth into groups of 4 or 5.
2. Provide each group with a 5 gallon bucket about half full of water and explain that the bucket contains their drinking water supply.
3. Introduce yourself as a new neighbor who is just moving into town and act out the following scenarios.
4. “My house is still under construction. I notice that there seems to be a lot of soil in the street around it.” (Walk around and dump a load of sand or gravel into each bucket.)
5. “Now that my house is finished, I am putting in my lawn. I am using extra fertilizer so that my grass grows very fast and is very green.” (Walk around and squirt green food coloring into each bucket.)

6. “When I do my yard work I simply blow my grass and leaves into the street.” (Walk around and dump leaves and organic debris into each bucket.)

7. “My lawn mower is in need of an oil change. I am not sure what to do with the used oil. I usually just pour it in the gutter.” (Walk around and squirt some oil into each bucket.)

8. “My car needs to be washed. This soap produces so many bubbles. I am glad that they just run down the driveway.” (Walk around and squirt dish detergent into each bucket.)

9. “In the wintertime, I like to salt my sidewalks and the driveway so that I don’t slip and fall.” (Walk around and dump some salt into each bucket.)

10. “I lost the lid for my garbage can. On windy days garbage tends to blow away.” (Walk around and drop small pieces of trash in the buckets.)

11. “It looks like rain today. I am glad because my yard sure could use the water.” (Walk around and stir each bucket with a spoon.)

12. Ask each individual how they feel about their new neighbor and what they think about their water.

13. Ask each group to begin the clean-up process. Here are some hints:

q Use the screen as a filter for the large objects.

- q Put the facial pads or paper towel in the funnel and pour the water through to filter out the smaller particles and some of the non-soluble liquid contaminants.
- q Just dab the surface of the water with the cotton or paper towels to absorb some contaminants.
- q Dump the contaminants into the empty jar or pan.
- q Suck out oil particles and small bits with eye dropper.
- q The pint of water is to illustrate dilution.

14. Bring all of the groups back together and ask how clean they think their water is. Discuss how there are still pollutants in it that you cannot see. Ask them if they would want to drink, swim in, or fill their fish aquariums with this water.

Learning checks: Have each group should share their final product of their water purification.

- q How clean is the water?
- q Which pollutants were the easiest to remove? (solids)
- q The most difficult to remove? (Everyone should realize that the substances that dissolved in the water-food coloring, salt, soap-pose the greatest problems for clean-up).
- q How long did it take to pollute the water?
- q How long did it take to clean it up?
- q How could some of this pollution been prevented?

Background:

Water can easily become polluted by human activities. Unfortunately, the same cannot be said for the purification of water. Care must be taken to protect water quality.

Some pollutants enter water from a localized, identifiable source, or **point source**, such as discharge from a factory. **Nonpoint sources** of pollution are those that come from large, dispersed land areas such as parking lots or lawns.

The science of water treatment to remove pollutants is continually evolving with the invention of new methods and technologies. Today's processes are costly, complicated, and imperfect, yet necessary as humans continue to rely on pollution clean-up instead of pollution prevention.

Vocabulary:

dissolve: Mixing of particles in liquids to the point that no individual particles are left. **nonpoint source:** Large or widespread areas such as parking lots and croplands that discharge pollutants into the environment.

purification: The process of removing impurities.

Extensions:

1. Keep track of the materials that go into cleaning the water. Use play money to charge groups for materials. Judge the cleanliness of the water and factor in how costly the clean-up was for each group.

2. Try the activity “Soil as a Filter” on page 49 of *Water Wise: Lessons in Water Resources*. (See “More Great Resources for Grab and Go with Science Activities” at the end of this publication.)

3. Instructor can demonstrate the use of charcoal as a filter: Place 2 coffee filters in a funnel and fill it with well-rinsed charcoal (available where aquarium supplies are sold). Take one of the group's "purified" water supplies and slowly pour the water through the charcoal filter. The charcoal will absorb some of the dissolved pollutants.