
4. IS THAT ALL WATER? Pond Water Filtration

Overview: Students collect and filter pond water samples to check for contents other than water.

Objective: To learn how filtering methods help take excess residue out of water.

Time needed: Approximately 1 ½ hours

Group Size: large group or class

Age appropriateness: 4th grade and up

Site: Pond location or classroom. (If pond location is unavailable, you may simulate pond water by placing a handful of hay in a jar. Next you add water to cover it. Place a lid on it and let it stand in the dark for a couple of days.)

Background: Pond water is a habitat in itself and when students hear the word water, they often think of tap water. This activity will allow students to get outside and conduct their own experiments as well as find out more about pond water and the contents within.

Filtration Systems: There are several different methods of water filtration and students will get to see a very simple means of filtration and a more complex method.

Materials:

 Provided at the Garden

 Pond water

 Provided by the classroom teacher

 Collecting jars

 Filter paper (coffee filters will work)

 Cotton balls, stirring sticks

 Crushed charcoal

 2 liter bottle (cut in half, top is the funnel and the bottom is the jar)

 Ring stand and ring

 Fine to medium sand

 4 test tubes and rack

Preparation: Cut 2 liter bottles to create funnels and jars.

Pre Activity: View videos, observe posters and conduct class discussions about pond life. Do water filtration activities.

Procedure:

1. Collect and label water samples in jars or other containers from a variety of places around the pond .
 2. Hold sample containers up to the light and make some visual observations. Also students may observe the sample with a microscope.
 3. Hypothesize what might be in the water.
 4. Observe and discuss the pond habitat while on location.
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The following activities may be done at the Garden or back in the classroom.

5. Weigh the dry filter paper.
6. In groups, students will place a piece of filter paper in a funnel set in a jar (can use 2 liter bottle).
7. Pour the water sample through the filter paper.
8. After the filter paper has dried, it can be compared by weight to the clean filter paper.

After the pond sample has "ripened" for several days:

9. Shake the mixture and pour a sample into a test tube and label it "Before Treatment."
10. Use an aerator from an aquarium to bubble air through the water in the jar for several hours or overnight. If you don't have an aerator, use a mixer or a stick to stir for several hours.
11. When aeration is complete, pour another sample into a second test tube and label "Aerated Sample."
12. Fold a piece of filter paper in half and in half once again so that you have a quarter pie shape.
13. Hold three sides together and pull out the remaining side to form a cone.
14. Wet the paper with tap water and then insert the cone in a funnel.
15. Mount the funnel on the ring on your ringstand.
16. Place a layer of medium gravel, then fine gravel, and finally fine sand in the funnel as shown in figure 1. A filtration plant does not use filter paper, but the sand trap is several meters deep. The paper replaces several layers of sand.
17. Pour the remaining aerated liquid through the filter. Do not allow the liquid to spill over the filter paper. You may have to filter the same liquid several times before you obtain good results.
18. Pour a sample of the filtered water in the third test tube and label "Filtered."
19. Pour another sample of filtered water into the fourth test tube and label "Chlorinated." Add a small amount of chlorine in this test tube and shake until the water is clear.
20. Observe all four test tubes and write a detailed description of each liquid. Include odor of each sample. *CAUTION: Do not taste the water!*
21. Compare the weight of the unused and used filter papers and explain what caused the change in weight.

Modifications: This activity could be done very simply or with more detail depending on time and equipment available.

Extensions: Take microscopes along to the pond and have students check for signs of life in the pond water or sediments. Students can compare and contrast different methods of filtering pond water. Students can take samples from different areas around the pond and can compare and contrast them. Take a field trip to the city's water treatment plant and compare processes. The Yuma Conservation Garden pond is fed by canal water. Compare it to river water.

Reference List:

- Environmental Science Activities Kit by Michael Roa.
- Our Environment Battles Water Pollution by Dr. Charles E. Renn.
- Water Pollution Detention Outfit by Lamotte.
- Pond Guide: OBIS.

Time of Year: anytime

****This activity was created by Paul Myers and Debbie Weber.**