



Theme: Water (Grades 3-5)

Post-visit Activity #1 Water Filtration

Overview:

In this inquiry-based lesson, students will learn how to clean “dirty water.” Water in lakes, rivers, and swamps often contains impurities that make it look and smell bad. The city of Las Vegas receives its drinking water from Lake Mead. However, we do not drink the water directly from Lake Mead; it must go through a treatment process. Students should come to realize that more than one filtration process is needed to effectively clean the water.

Objectives:

- Students will understand where water goes after it is used.
- Students will gain an understanding of the water treatment process.

Materials:

- One half liter bottle of dirty water with cap per group
- One clear water bottle that is cut in half for filtration per group
- One strainer per group
- Paper towels
- Coffee filters
- Sand
- Charcoal
- Rubber bands
- Cotton balls
- Small rocks
- Gauze
- Tape
- Sponges or towels for clean up

Activity:

1. Place a half liter bottle half-filled with dirty water on each of the tables and ask the students to shake it up.
2. Have students examine their bottle. What does the water look like? Ask students to draw and record their observations in their notebooks.
3. Give them 2-3 minutes to discuss, within their groups, how they could get the water clean.

4. On their table they will also have a clear plastic bottle that is cut in half. They will flip the top upside down and place it in the bottom half. This will act like a funnel.
5. Have the students work in their groups using the products provided (paper towels, coffee filters, sand, rocks, charcoal, cotton balls, etc.) to create a filtration system.
6. Once they have created their filtration system using the materials provided, the groups need to vigorously shake up the dirty water again and pour the dirty water into the clean 2-liter filtration system they just created.
7. Have the students make and record their observations.
8. Have the students walk around making observations of the other groups' systems.

Discussion:

1. Ask the students how they could have made a better filtration system based on these observations.
2. Would they drink their filtered water? Why or why not?
3. Discuss how drinking water is actually cleaned. Water treatment plants typically clean water by taking it through the following processes of aeration, coagulation, sedimentation, filtration, and disinfection:
 - a. Aeration – This is the addition of air to water. The air lets gasses trapped in the water escape and adds oxygen to the water.
 - b. Coagulation – Dirt and other solid particles are stuck together with chemicals so that they can be removed from water.
 - c. Sedimentation – This is the process that occurs when gravity pulls clumps sediment to the bottom.
 - d. Filtration – This process that removes most of the solid impurities remaining in water after coagulation and sedimentation have taken place.
 - e. Disinfection – This is the final step at a water treatment plant; disinfection kills any organisms that may be harmful if consumed.

Suggested Reading:

1. *Brother Eagle, Sister Sky: A Message from Chief Seattle* illustrated by Susan Jeffers. A story about Native American beliefs and how each generation deserves to breathe fresh air, drink pure water and to enjoy all the beauty that the earth offers.
2. *The Drop in My Drink* by Meredith Hooper and Chris Coady. Water takes on fascinating new significance as readers discover the amazing complexity of a substance we take for granted. Includes a detailed depiction of water cycles, amazing facts and important environmental information.

3. ***A Drop of Water: A Book of Science and Wonder*** by Walter Wick. Shows the different forms of water in amazingly detailed photographs; explains water's properties.
4. ***The Earth and I*** by Frank Asch. Explains the friendship between the earth and a young child and what each can do for the other. .
5. ***Gullywasher*** by Joyce Rossi. In English and Spanish. A grandfather tells tall tales of his life as a cowboy (vaquero) and of the harsh life in the desert, flash floods, and wildlife.
6. ***I Am Water*** by Jean Marzollo. A first book about water in its different forms and uses.
7. ***One Small Square: Cactus Desert*** by Donald M. Silver. Teaches about all the plants and wildlife that exist in one small square of desert - an excellent introduction to ecosystems and biodiversity.
8. ***Snail Girl Brings Water*** by Geri Reams. A retelling of a traditional Navaho creation myth which explains how water came to earth.
9. ***This Place is Dry*** by Vicki Cobb, illustrated by Barbara Lavallee. Surveys the living conditions in Arizona's Sonoran Desert for the people and the unusual animals that live there. Also describes the engineering accomplishment of the Hoover Dam.
10. ***Water Science, Water Fun: Great Things to Do with H₂O*** by Noel Fiarotta and Phyllis Fiarotta. Lessons and experiments teach about floating, refraction, leaching temperature gravity, buoyancy, flow and other water properties.
11. ***Where Does Water Come From?*** by C. Vance Cast. Clever Clavin shows how much water there is on earth, how wells are dug to bring it out of the ground, and how water treatment plants work.
12. ***The Woman Who Outshone the Sun/La Mujer Que Brillaba Aún Más Que el Sol*** by Alejandro Cruz Martinez, illustrated by Fernando Olivera. A bilingual tale from ancient Mexico that tells of a beautiful woman who arrives in a mountain village and is driven out because she is different, taking the river with her.