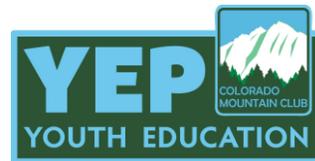


# Watersheds: Nature's Water Filter



*An exciting activity that illustrates the impacts on our water system, and how nature acts as water filter.*

**Grades:** 1st and up

**Time:** 1-1.5 hours

## Pt 1: Water Pollution (15-20 mins)

### **Materials:**

- Liquid soap
- Sunscreen
- Bits of food
- Bits of trash (ripped up paper)
- Dried raisins/fruits or chocolate chips (poop)
- Vegetable oil (motor oil)
- Clear cup or jar
- Water bottle full of drinkable water

**Directions:** Take a clean glass or large clear container of water, show it to students and tell them what the glass contains. Then ask, “Would you drink this water?” Discuss their answer, which 100% of the time will be “yes.” As what kind of pollutants end up in our water? Now, take out the liquid soap—we use this to wash and clean dishes. Then add a small amount of soap to the water and stir it. Ask the group once again, “Would you drink the water?” Continue with other things that can pollute our waters: sunscreen, food, trash, human and animal feces/poop, motor oil, etc. At the end, review, do you think this is safe to drink?

**IMPORTANT NOTE:** Participants should NEVER actually consume the wastewater water, despite the gleeful acceptance from the one participant in your group who would drink motor oil if put up to the challenge.

## Pt 2: Nature as a Water Filter (40 mins- 1 hour)

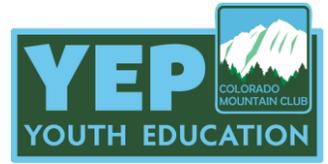
### **Materials:**

- Wastewater from part 1
- Funnel and collection unit (2 liter soda bottle or juice container with bottom cut off)
- Gravel or small stones
- Clean sand
- Gardening soil
- Coffee filter/cloth
- Get creative: sponge, cotton balls, cloth, etc.
- Water clarity card (optional)
- Nature's Water Filter worksheet (optional)



In nature, water is naturally filtered through layers of dirt, gravel, and sand. When the water travels through the layers it is cleaned. When rainfall lands on natural areas like forests, deserts, and wetlands, the water soaks into the ground. When it soaks into the ground it is cleaned through the layers of the

# Watersheds: Nature's Water Filter



soil (soil horizons). Soil works as a filter in three ways: physical, chemical, and biological. In this experiment, we will mainly focus on physically filtering or cleaning our polluted water.

## **Directions:**

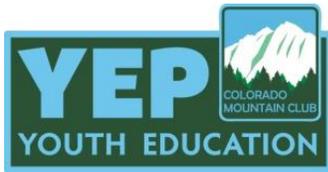
1. Follow along with the attached worksheet or create your design(s) on a blank sheet of paper
2. Draw 2-3 different soil filtration designs- you can use some or all of the materials in any order or thickness of layers (coffee filter recommended for best results in keeping the substrates in your funnel and as an extra filtration layer).
3. Build your 2-3 designs using your funnel and collection units (build 2-3 at the same time with multiple collection units, or one at a time, reusing the funnel and collection unit with new materials)
4. Compare your results: which filter took the fastest for all your water to filter? Which filter made the cleanest water?
  - a. Optional: use water clarity cards to quantify water clarity- seeing the thinnest line means the water is the most clean.

**Conclusion:** Students should discover that the combination with the longest infiltration rate filtered water the best.

- Now think about pavement, where there is zero infiltration. How does that impact water quality? What happens when the soil is not packed down in layers like in our filter? How does this happen in nature? What holds soil in place? How can this be prevented?
- What do you think this activity has to do with the water you drink? The water you drink comes from a watershed - this is why it is important that we try not to pollute either the water or the land. Anything that pollutes the land will eventually wind up in the water! ***Healthy soils are important for good drinking water.***

Discuss how easy it is for people to impact water quality with common items they use while camping or spending time outside. What are some possible solutions or alternatives to using these items for our comfort and safety without contaminating water sources? How can we help conserve water, prevent pollution, and help protect our watersheds?

- ✓ Conserve water by turning off the tap when running water is not necessary. This helps prevent water shortages and reduces the amount of contaminated water that needs treatment.
- ✓ Be careful about what you throw down your sink or toilet. Don't throw paints, oils or other forms of litter down the drain. Use environmentally household products, such as washing powder, household cleaning agents and toiletries.
- ✓ Take great care not to overuse pesticides and fertilizers. This will prevent runoffs of the material into nearby water sources.
- ✓ Plant more plants. Plants help hold in the soil, and slow down water runoff. By having more plants in your garden or by waterways, you are preventing fertilizer, pesticides and contaminated water from running off into nearby water sources.
- ✓ Throw away your trash in designated trash bins. Even trash on the ground can make its way into waterways and oceans. Help clean up any trash you see, but make sure it is safe to collect.
- ✓ Follow leave no trace principles- camp, cook, clean, and dispose of human waste at least 200 feet away from water sources.



### Nature's Filter: Water Infiltration Investigation

**Question:** What is the role of soil in a watershed? Can nature's substrates help clean water?

**Initial Observation: Water Clarity (circle one)-**

1      2      3      4      5

1= very clean-----5 = very dirty

**Challenge:** Create 2-3 wastewater filtration systems using these materials: gravel, sand, soil, coffee, filter, etc. *(You can use as many or as little materials as and layer them in any order and thickness)*

**Design:** Draw, label, and describe your designs below:

**Funnel 1:**

**Funnel 2:**

**Hypothesis:** Which design do you think will filter water the fastest? Which design do you think will clean the water best? Why?



## Water Clarity Card:

\*Print this out, or create your own by drawing lines of increasing thickness.

