



# COMPONENTS OF A COMMUNITY WATER SYSTEM INSTRUCTIONS (Recommended for grades 4 and up)

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## OBJECTIVE

To teach students how water gets from its source, then to their homes, and back into the environment.

## RECOMMENDED AUDIENCE AND SETTING

This activity is easily adapted for grades four and up. An optimal group size is 12 to 20 students. Since some spilled water is expected for this activity, it should be performed outdoors in a grassy field or inside a barn.

## MATERIALS NEEDED

- ▶ *Components of a Community Water System* 24 × 36 inch poster (PDF file)
- ▶ 24 × 36 inch poster frame
- ▶ Easel
- ▶ Empty 1 gallon water jugs (2)
- ▶ Plastic cups: 16-ounce or 20-ounce (6)
- ▶ Permanent markers
- ▶ Pushpin

## PREPARATION

- Step 1** Download the Components of a Community Water System poster (Fig. 1) at [https://texas4-h.tamu.edu/wp-content/uploads/water\\_components\\_community\\_water\\_system\\_poster.pdf](https://texas4-h.tamu.edu/wp-content/uploads/water_components_community_water_system_poster.pdf). Take the PDF file to the nearest copy/print shop.
- Step 2** Mount the poster inside a poster frame.
- Step 3** Fill one of the 1 gallon jugs with tap water.
- Step 4** Use the permanent markers to label each plastic cup: Cup 1) Water Source; Cup 2) Water Treatment Facility; Cup 3) Water Tower; Cup 4) Neighborhood; Cup 5) Wastewater Treatment Facility; Cup 6) Environment.
- Step 5** For cups 2 through 5, use the pushpin to poke 15 to 20 small holes around the top half of the cup.

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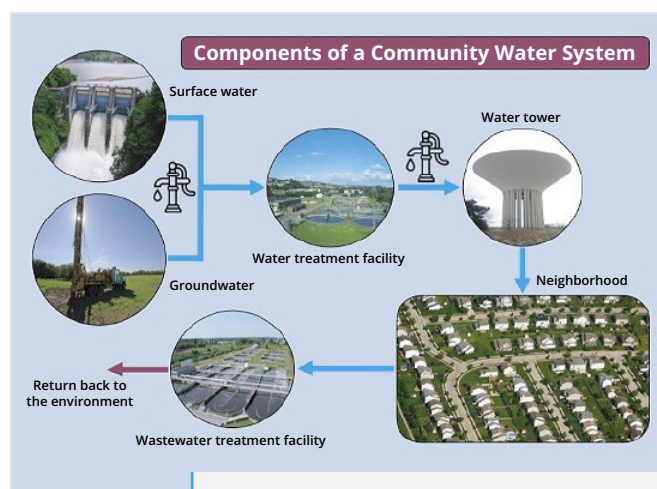


Figure 1. Components of a Community Water System poster.

## ACTIVITY

*The goal of this activity is to teach students how water gets from its source, then to their homes, and back into the environment—as well as how water is treated and conveyed through the system.*

**Time Required:** Optimal time to complete this activity is 15 minutes.

**First 7 to 8 minutes:** Set the poster on the easel, gather all of the youth and **Ask, “where does water we use in our home come from?”** Discuss the source(s) of water in the area. This may be surface water (e.g., from a reservoir) or groundwater (e.g., from an underground aquifer). **Ask, “do you know how water gets from the reservoir or aquifer to our homes?”** Point to the picture of the dam and water well on the poster. If the source is groundwater, explain that a water well is used to pump water from the underground aquifer. Then, point to the image of the water pump and explain that water often must be forced through pipes to a higher elevation using a pump. Pumps require energy to “push” water.

Explain that water is transported in underground pipes to a treatment facility to filter out sediment and kill harmful organisms. Point to the picture of the water treatment facility. For the older youth, explain that there are five basic steps to water treatment:

- 1. coagulation/flocculation** – alum or polymers are added to cause small particles to stick to one another, forming larger particles;
- 2. sedimentation** – large particles become heavy enough to settle to the bottom where sediment is removed;
- 3. filtration** – water flows through sand and/or sand and coal to remove small particles to make the water more clear;
- 4. disinfection** – chlorine is added to water to “disinfect,” or kill harmful bacteria and viruses to prevent the spread of waterborne diseases; and
- 5. corrosion control** – alkaline substances are added to maintain pH, which reduces corrosion in pipes and plumbing.

Point to the pump and water tower. Explain that water is pumped through an underground pipe into water towers for storage. **Ask, “why do you think water towers are so tall?”** They are elevated to create water pressure. For the older youth, explain that a 100-foot water tower will produce 43 psi (pounds per square inch) of pressure. When water is released, this pressure “pushes” water through underground pipes to homes and businesses.

Next, explain that water is conveyed in an underground pipe to homes and businesses. Point to the neighborhood and **Ask, “what are some of the ways we use water in and around our homes?”** Examples may include: bathing, washing clothes, flushing toilets, washing dishes, watering the yard, and more. **Ask, “what are some of the ways we tend to waste water?”**

**Ask, “what happens to all of the water after we use it in our homes?”** Discuss that some water is consumed by drinking it, some water is used by plants, or wasted through evaporation or runoff when watering the yard, and some water moves on to the wastewater treatment facility. This water was used for bathing, washing dishes, washing clothes, and flushing toilets. Point to the wastewater treatment facility. Explain that sewer pipes carry water from their homes to the treatment facility, where it is treated again to remove odor, screen out solids and organic matter, and disinfected to remove harmful bacteria and viruses. Finally, explain that when properly treated, water is released back into the environment, such as rivers and streams, where it can be used again by those downstream.

**Last 7 to 8 minutes:** The purpose of this activity is to reinforce how water moves from its source, then to homes, and back into the environment. The activity also demonstrates how some of the water is lost along the way. Ask for seven volunteers. One volunteer will be responsible for pouring water from the 1 gallon jug into the first plastic cup that is labeled “Water Source.” Hand out the remaining cups and have the volunteers line up facing front-to-back in the order water flows through the system. **Say, “our goal is to see how much of our water source is returned to the environment.”** Direct the volunteer to start pouring water into the cup 1 labeled “Water Treatment Facility.” Without turning around, the cup 1 volunteer will raise the cup of water over their head and pour water into cup 2, which is labeled “Water Tower.” Continue the process until the water is moved to cup 6 that is labeled “Environment.” At this time, the cup 6 volunteer will pour the water into an empty 1 gallon jug. Repeat this process until all of the water is poured from the source (from the full 1 gallon jug). Compare how much water the students have at the end of the process to the amount they had at the beginning.

During the activity, water will leak out from the holes in the cups and will be spilled out by mistake—as it is poured from one cup to the next. Explain that no water system is 100 percent efficient, and that some water is always lost during the process. **Ask, “what can we do to use water more efficiently?”** Possible answers may include: repairing leaks in pipe and plumbing fixtures, taking shorter showers, use more water-efficient devices, eliminating sprinkler runoff, only applying the amount of water plants need, and more.