

Watershed Experience Trailer: Conservation

Note:

Use remote buttons to activate lights in exhibit. Two remotes are used, one for each house.

Usage is the house on the left, **Recycle** is on the right.

Usage: Button #1 activates second floor bath.

Button #2 second floor laundry.

Button #3 first floor kitchen.

Button #4 first floor bathroom.

Recycle: Button #1 activates third floor.

Button #2 second floor.

Button #3 first floor.

Materials:

- Usage Remote and Recycle Remote (can leave all lights on during an event)
- Microfiber towel to clean glass before and after the event.
 - *a special cleaner can be used for the glass, found in the lower left hand cabinet.

Objectives The Student Will:

- Know where your water comes from
- Know what fixtures in your home use water
- Discover how water use affects the water cycle and supply
- Explore how much water your household uses each day
- Understand how best management practices and education can reduce water use



Part 1 – Introduction

ASK: Where does your water come from?

ASK: How many people live in your house? How much water do you think you use every day?

ASK: How many gallons of milk can you carry at one time? How much water could you carry in a day?

ASK: What do you think of when you hear “water conservation” or “water reclamation”?

Intro to water conservation, water usage, and reclamation. What are Best Management Practices for water conservation? AKA, how can you save water?

Part 2 – Running the Experiment. Water Usage Home

Toilet:

Older toilets can use up to 3 gallons per flush. The average person flushes 6 times per day

$$\frac{3\text{gal}}{\text{flush}} * \frac{6 \text{ flushes}}{\text{person.day}} = \frac{18\text{gal}}{\text{person.day}}$$

Per family:

$$\frac{18\text{gal}}{\text{person.day}} * \frac{4 \text{ persons}}{\text{family}} = \frac{72\text{gal}}{\text{family.day}} = \frac{504 \text{ gal}}{\text{family.week}} = \frac{26,280\text{gal}}{\text{family.year}}$$

Just to flush the toilet.

New toilets can use 1.2 gallons per flush and @ 6 flushes per day:

$$\begin{aligned} \frac{1.2\text{gal}}{\text{flush}} * \frac{6 \text{ flushes}}{\text{person.day}} &= \frac{7.2\text{gal}}{\text{person.day}} \\ \frac{7.2\text{gal}}{\text{person.day}} * \frac{4 \text{ persons}}{\text{family}} &= \frac{28.8\text{gal}}{\text{family.day}} = \frac{201.6 \text{ gal}}{\text{family.week}} = \frac{10,512\text{gal}}{\text{family.year}} \end{aligned}$$

Savings of 16,000 gallons per year just by changing out the toilet! No behavior change needed. Also, may save money on sewer billing costs as well. Look for the WaterSense label when shopping for a new toilet.

*Move the arrow to the student’s water usage.

Shower:

1 person taking an average 8-minute shower with a showerhead flow of 2.5 gallons per minute:

= 20 gallons/day

$$\frac{8\text{min}}{\text{shower}} * \frac{2.5\text{gal}}{\text{min}} = \frac{20\text{gal}}{\text{shower}}$$

Family of 4 each taking an 8-minute shower:

$$\frac{20\text{gal}}{\text{shower}} * \frac{4 \text{ persons}}{\text{family}} * \frac{7 \text{ days}}{\text{week}} = \frac{560\text{gal}}{\text{week.family}} = \frac{29,200\text{gal}}{\text{year.family}}$$

Shower also uses energy (electricity or natural gas) for hot water. Taking a shorter shower saves on the energy and water bill for the family. 5 minutes is all you need to get in, get clean and get out.

Savings: from changing to a 5-minute shower:

$$\frac{5 \text{ min}}{\text{shower}} * \frac{2.5 \text{ gal}}{\text{min}} = \frac{12.5 \text{ gal}}{\text{shower}}$$

$$\frac{12.5 \text{ gal}}{\text{shower}} * \frac{7 \text{ days}}{\text{week}} = \frac{87.5 \text{ gal}}{\text{week.person}} = \frac{4,563 \text{ gal}}{\text{year.person}}$$

For a family of 4:

$$\frac{4,563 \text{ gal}}{\text{year.person}} * \frac{4 \text{ persons}}{\text{family}} = \frac{18,250 \text{ gal}}{\text{year.family}}$$

For even more savings: upgrade your showerhead fixture to a WaterSense labeled product that uses no more than 2 gallons per minute. WaterSense labeled products perform just as well as standard fixtures and save water with no changes in routines.

*Move the arrow to the student's water usage.

Bathroom sink faucet:

A bathroom faucet uses 2 gallons per minute. Leaving the water on when you brush your teeth:

$$\frac{2 \text{ gal}}{\text{person.min}} * \frac{2 \text{ min}}{\text{brush}} * \frac{2 \text{ brush}}{\text{day}} = \frac{8 \text{ gal}}{\text{person.day}}$$

Family of 4: 8 gallons of wasted water per person per day * 7 days = 225 gallons per week or 12,000 gallons per year

Savings: Turn water on, wet toothbrush, turn water off, put pea-sized amount of toothpaste on toothbrush, brush for 2 minutes/twice a day, turn water on and rinse = less than 1 gallon used per person per day vs 8 gal/person/day

*Move the arrow to the student's water usage.

Washing Machine:

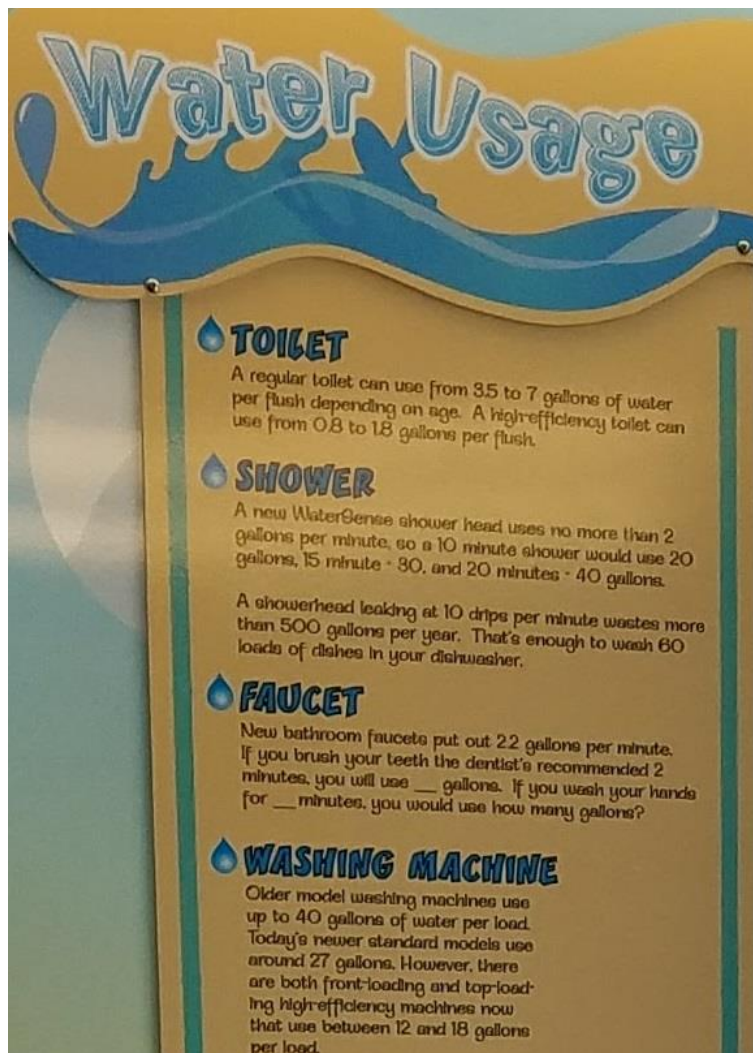
Older washing machines can use 25 gallons/load and a family of 4 does about 6 loads per week. This uses about 150 gallons/week or about 7,800 gallons/year.

$$\frac{25 \text{ gal}}{\text{load}} * \frac{6 \text{ loads}}{\text{family.week}} = \frac{150 \text{ gal}}{\text{family.week}} = \frac{7,821 \text{ gal}}{\text{family.year}}$$

Savings: Changing to water-efficient washing machine will use only 15 gallons per load and is equal to 90 gallons of water used per week or 4,700 gallons per year. This is a 40% savings in water use just by purchasing a new washing machine!

$$\frac{15 \text{ gal}}{\text{load}} * \frac{6 \text{ loads}}{\text{family.week}} = \frac{90 \text{ gal}}{\text{family.week}} = \frac{4,693 \text{ gal}}{\text{family.year}}$$

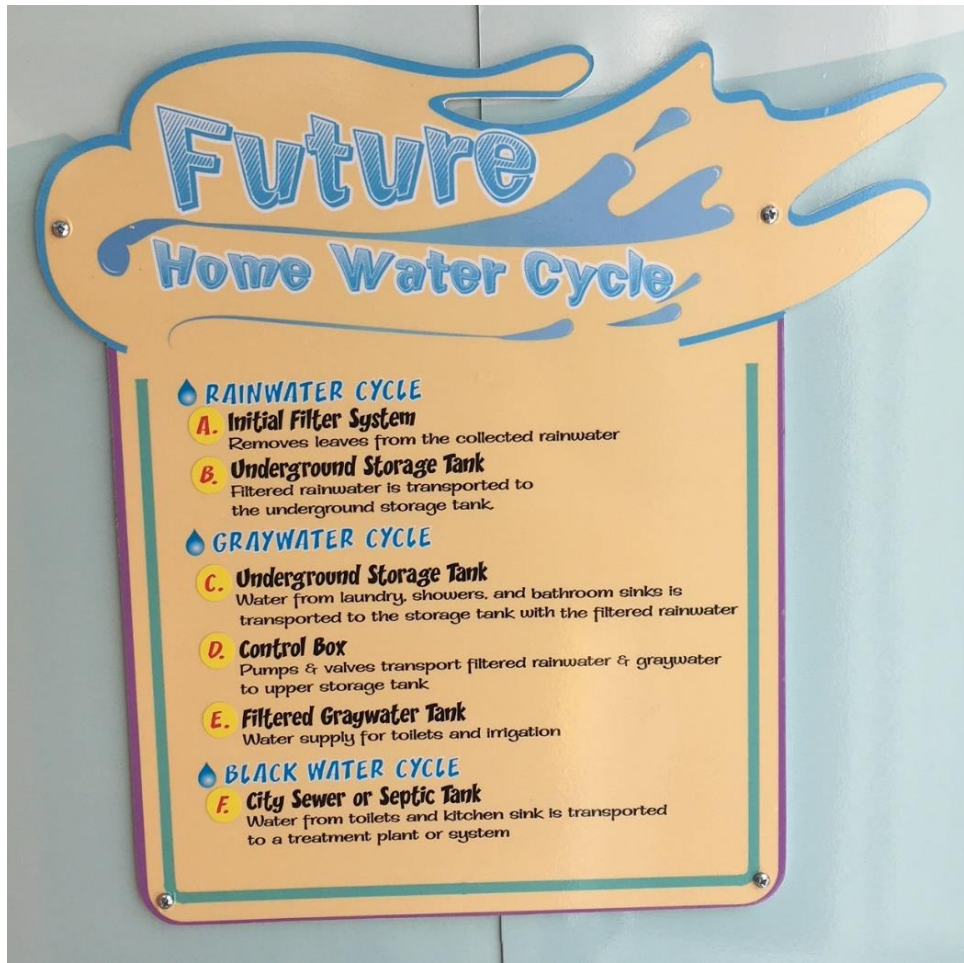
*Move the arrow to the student's water usage.



Part 3 – Running the Experiment. Water Reclamation (Reuse) Home

Follow each colored pipe through the house to see where you can RECLAIM water, or reuse it again for another purpose.

Start with the roof, and follow the Rainwater Harvesting path into the storage tank. Go through every room and pathway until you complete the cycle with the lawn irrigation and the septic tank.



Part 4– Best Management Practices

ASK: What are some other ways that we can reduce water use in our homes or yards? How can you save water in your home?

ASK: Could you carry that much water for your family every day or week?

Technology vs human behavior.

Outdoor water use!

Resources:

www.trwd.com

waterisawesome.com

TEKS