Water Use Inventory

*You will need a copy of a recent water bill. The bill will give both the amount of water used and the cost.

Most bills show billing in HCF (hundreds of cubic feet) or units, both of which are equivalent to 746 gallons. Most bills are bi-monthly

1. What month and year is the bill for?_____

2.Which agency supplies your water ? _____

3. On your water bill, find the amount of water used for the month(s): _____(include units)

4. Calculate your **<u>average</u>** cost of water **per gallon** and **per 1000 gallons**. **Show calculations**:

Average cost of water (gallons) = _____ Average cost of water (1000gallons) = _____

Note: Water prices vary widely around the country, but usually fall in a range of 1-3 $/1000 gallons

5. Is your water rate tiered (different for different quantities used)? List the rate structure from your bill, whether tiered or not.

Estimated Water Use

These figures are estimates. There is a tremendous amount of variation. For example, if you have a water-efficient showerhead the water flow will be about half the estimate below. If you have a water-efficient toilet the water used per flush will be as low as 1.5-2 gallons per flush. The amount of water used for tooth brushing, shaving, hand and face washing, and dishwashing will vary significantly based on the time spent and the faucet setting. The amount of water used yard will vary depending on the area in need of water.

Use	Conditions	Estimated gallons
Shower	per minute	4-10
Fill bathtub	per use	30-50
Toilet Flushing	per use (flush)	5
Tooth brushing	per minute (letting water run)	3
Washing hands and face	per minute (letting water run)	3
Shaving	per minute (letting water run)	3
Cooking	per meal	3
Washing Machine	depends on setting	20-50
Dish Washing	by hand (per minute)	3
Dish Washing	w/machine (depends on setting)	15-30
Water Lawn	per minute (depends on area)	10-20
Lawn Sprinklers	per minute (depends on area)	5-20
Washing Car	per minute	10
Wash down driveway w/hose	per minute	10
Fill swimming pool	per use	20,000-30,000

Personal Water Use Inventory

For shared activities like washing clothes, calculate your share of the water. For example, if there are 4 people in your house and the washing machine is estimated to use 40 gallons per load, your share is 40/4 = 10 gallons.

Use the data in the first table to fill in the "**Estimated gallons per use or unit of time**," but change the figures in that column if you have more accurate data about your personal water use.

Use	Number of uses or time used per day	Estimated gallons per use or unit of time	Estimated gallons used per day	Estimated gallons used per week	Cost per gallon	Estimated cost per week	Estimated cost per year
Shower							
Fill bathtub							
Toilet Flushing							
Tooth brushing							
Washing hands and face							
Shaving							
Cooking							
Washing Machine							
Dish Washing							
Water Lawn							
Lawn Sprinklers							
Wash Car							
Wash down driveway							
Fill swimming pool							
Other:							
TOTALS	N/A	N/A	____gallons	____gallons	N/A	$_____	$_____

WATER CONSERVATION AND CALCULATIONS

Purpose and background: To become familiar with various municipal water measurements, analyze personal and local water use trends, calculate associated costs for water consumption, and think about ways to conserve water resources.

Procedure: Think back to earlier this morning when you were brushing your teeth. Did you let the water run while you were brushing? Brushing one's teeth with the water running continuously uses about **3 gallons/min on average**. Most people spend about **1-3** minutes brushing their teeth each time they brush their teeth. In the table below, you will estimate your own water use assuming you try to use as little water as possible (i.e. conserving water as opposed to letting the water flow). We want an estimate in gallons per minute…an easy way to do this is just think of how much water you could save as a percentage, and multiply that by the **3gallons/minute** flow rate, to get an estimate of your average rate of water use while conserving. Record estimates (in gpm) for yourself and four of your classmates, and find the average of the rate of water use while conserving. Also, estimate your total time spent brushing your teeth, four other peoples' estimates, as well as, the average time spent brushing based upon your data.

Estimated water use (**gallons/min**) while conserving water {table 1}

Your estimate	Person #2's estimate	Person #3's estimate	Person #4's estimate	Person #5's estimate	**Average estimate**

Total estimated brushing time per day (**in minutes**) {table 2}

Your estimate	Person #2's estimate	Person #3's estimate	Person #4's estimate	Person #5's estimate	**Average estimate**

Analysis questions/calculations:

1. Calculate the amount of water used per day (in gallons) for just YOUR estimate when conserving and when no conservation measures are used.
2. Calculate the amount of water used per day (in gallons) for the AVERAGE estimate data that includes your data, and 4 of your classmates' data. Again, calculate the number of gallons used when conserving and not conserving water.
3. Convert your answers for question # 2 into total mL used per day (**1 gal=3785 mL**)
4. Calculate the **% difference** between conserving and non-conserving water use from question #3.

$$\left| \frac{\text{First Value - Second Value}}{\text{(First Value + Second Value)/2}} \right| \times 100\%$$

5. If the combined populations of Del Mar, Carlsbad and Encinitas total close to **250,000**, how much water (in liters) would be used each day if these people allow the water to run continuously while brushing their teeth (use the average brushing time estimate from the table for your calculation).
6. *How much water would be saved* (in liters) if the people in question #5 conserved water (use the average gpm estimate from the first table to do this)?
7. Assume the state of California has a population of **3 x10^7** people. How much water (in liters) could be saved if the average Californian conserved at the rate of the average conservation estimate from the first table?
8. If the current U.S. population is about **307 million** people, how much water (in liters) could our nation save each day by implementing water conservation using the average estimate from the first table?
9. The data for question #8 represents the amount of water that could be saved nationally in one day if people simply conserved water. How much water (in liters)would be saved annually?
10. Assuming the average cost of water is about **$0.05 per gallon** for tap water, how much money would be saved annually in the U.S. if everyone conserved water while brushing their teeth (to convert from liters to gallons, multiply liters by **0.26417**)?
11. The current cost for an Ipad 2 is about **$500**. Based upon the amount of money saved in question ten, how many people could get free Ipad 2's if everyone conserved water while brushing their teeth for one year?

12. The current volume of Lake Powell in Arizona is project to be about **17 million acre-feet**. If one acre foot (one acre one foot deep in water) is equivalent to **12,200 gallons**, about how long would it take the people Del Mar, Encinitas, and Carlsbad to drain Lake Powell if nobody conserved water while brushing their teeth?
13. Bottled water is extremely popular in the United States, but how does that compare to the price of tap water you might get from your local water authority. Using your calculated price per gallon from your water bill, how does that compare to a the price of bottled water? Calculate the price of bottled water in per gallon assuming you purchase liter of bottled water for **$1.00** (remember **1 gallon = 3.785 L**).
14. Based up your and your families water consumption, in which areas of water use (*laundry, showers, etc.*) do you think your family could easily conserve water? Why?
15. Individually, which activity do you do that consumes the most water? Why do you think this activity consumes so much water?
16. Based upon the cost of tap water that you calculated from you bill, do you think tap water is priced appropriately or not? Why?
17. California and San Diego county are prone to drought, which can strain limited supply. As a citizen, do you think we should be focusing efforts on conservation or increasing supply?
18. Assume you are a presidential candidate, and a reporter asked for your top three ideas related to water conservation. What would you tell the reporter? Explain your three best water conservation ideas in detail.