

**WATER**

**EXPERIMENTS**



**Galway  
Atlantaquaria**

**See  
Water  
Differently**

**#WaterWise**

## EXPERIMENT 1.

### Soap Suds Test

#### Materials:

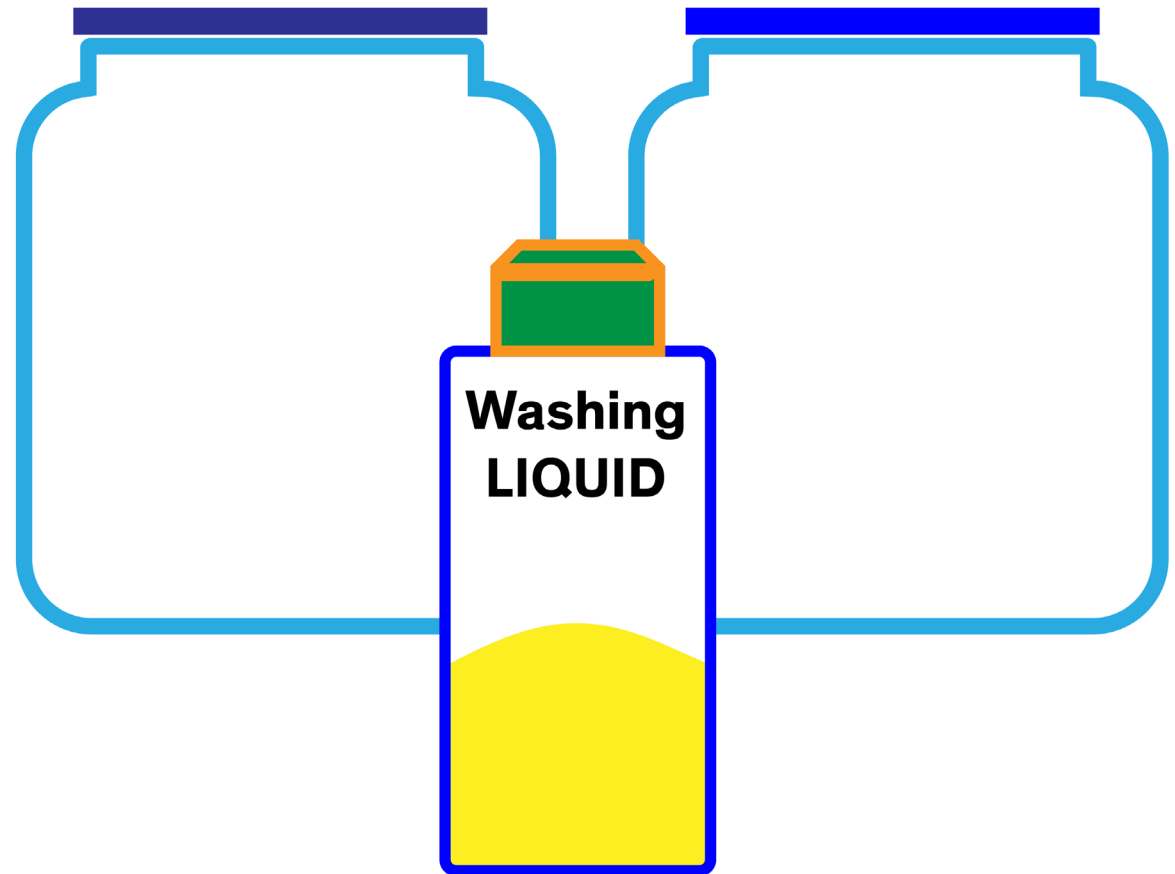
Two clear glass jars or bottles  
Tap water (potentially hard, depending on your location)  
Softened water (you can use distilled water as a substitute)  
Liquid soap or dishwashing liquid.

#### Procedure:

Fill one jar with tap water and the other with softened (distilled) water.  
Add a few drops of liquid soap to each jar.  
Cap the jars and shake them vigorously for the same amount of time.  
Observe the amount of suds produced in each jar.

#### Observation:

Softened water should produce more soap suds compared to hard water.



## Hard & Soft Water

Hard and soft water can have various impacts on both our daily lives and overall health. Here's a detailed look at how each type of water can affect us.

**Note:** All experiments should be supervised by an Adult

## EXPERIMENT 2.

### Precipitate Formation

#### Materials:

Two clear glasses

Tap water

Softened water (distilled water)

Soap flakes or bar soap

A grater (if using bar soap)

#### Procedure:

Grate some bar soap to get fine soap flakes (if using bar soap).

Fill one glass with tap water and the other with softened (distilled) water.

Add an equal amount of soap flakes to each glass.

Stir the mixtures and observe the formation of precipitate (scum).

#### Observation:

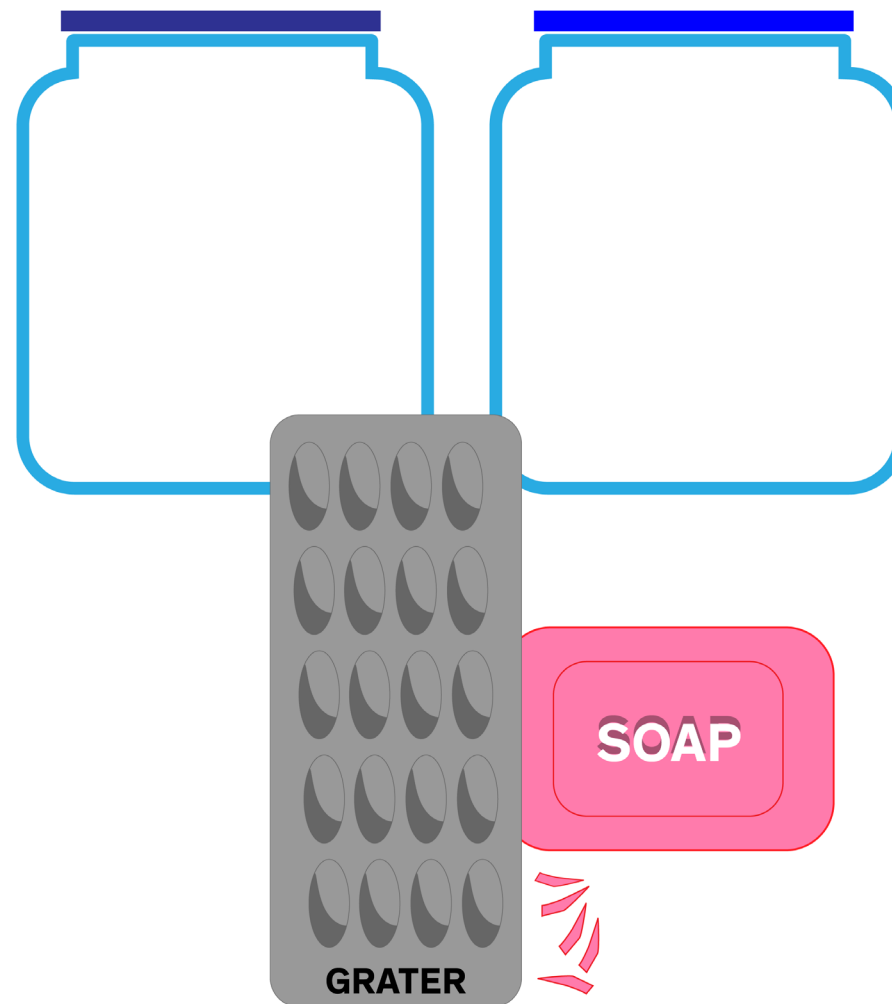
Hard water will likely form a cloudy precipitate due to the reaction of soap with the minerals, while softened water will remain clearer.

#### Impact of Hard Water

##### 1. Household Appliances and Plumbing:

**Scale Buildup:** Hard water contains high levels of calcium and magnesium, which can precipitate out and form scale deposits. These deposits can build up in pipes, water heaters, and appliances like dishwashers and washing machines, reducing their efficiency and lifespan.

**Increased Energy Costs:** Scale buildup in water heaters can insulate the heating elements, making them work harder and use more energy to heat water.



## EXPERIMENT 3.

### Scale Formation Test

#### Materials:

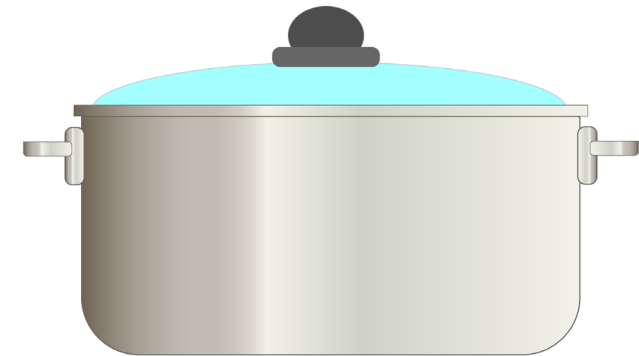
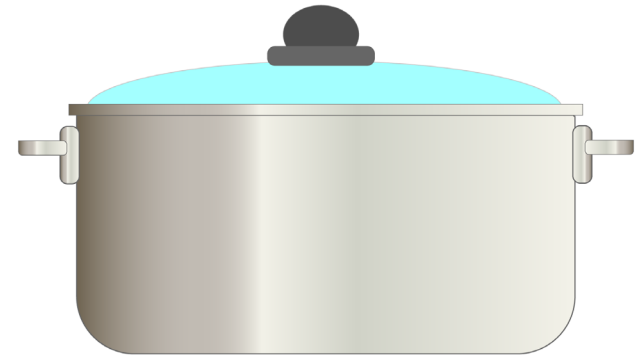
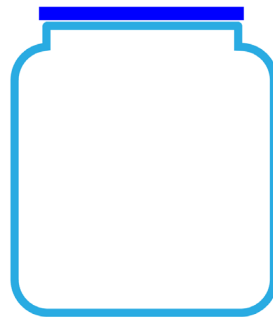
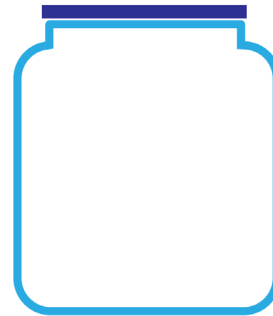
Two small pots or pans  
Tap water  
Softened water (distilled water)  
Heat source (stove)

#### Procedure:

Fill one pot with tap water and the other with softened (distilled) water.  
Boil both pots of water until most of the water has evaporated.  
Observe the residue left behind in each pot.

#### Observation:

Hard water will leave behind a noticeable scale (mineral deposits), whereas softened water will leave little to no residue.



## 2. Cleaning:

**Soap Efficiency:** Hard water reacts with soap to form soap scum, which reduces the effectiveness of soaps and detergents. This means you need to use more soap to achieve the same level of cleanliness.

**Laundry:** Clothes washed in hard water can feel rough and may wear out faster due to the mineral deposits left behind.

## EXPERIMENT 4.

### pH Test

#### Materials:

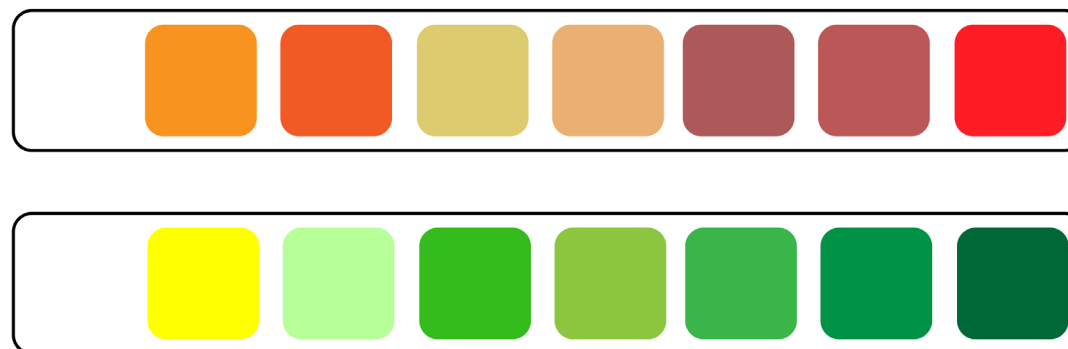
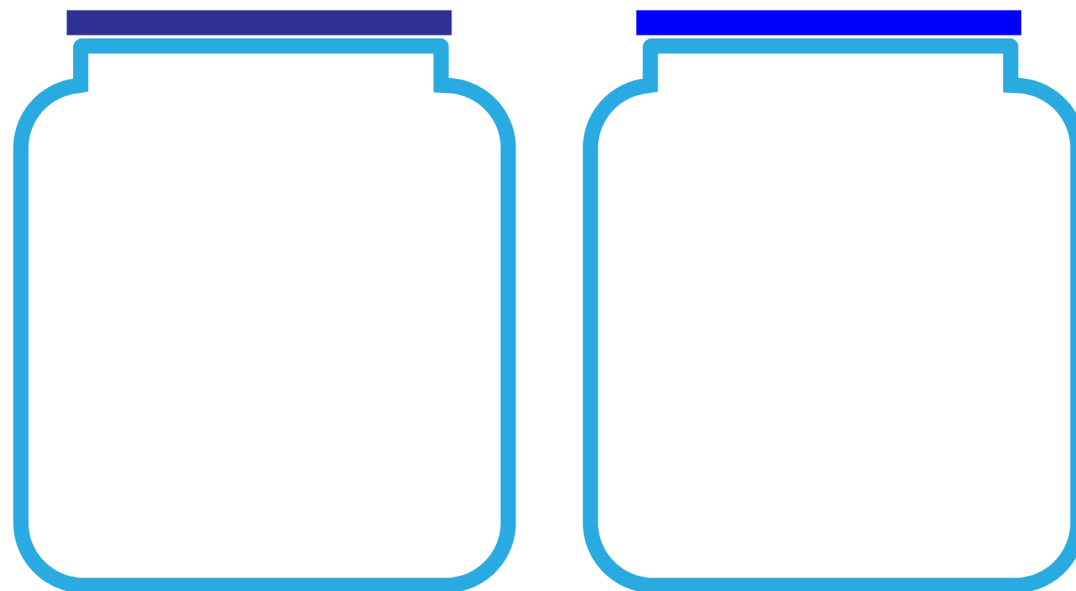
Two clear glasses  
Tap water  
Softened water (distilled water)  
pH test strips or a pH meter

#### Procedure:

Fill one glass with tap water and the other with softened (distilled) water.  
Dip a pH test strip or use a pH meter to measure the pH level of each type of water.

#### Observation:

Hard water typically has a higher pH (more alkaline) due to the dissolved minerals, whereas softened (distilled) water will have a more neutral pH.



#### Conclusion:

By conducting these experiments, you can observe the differences between hard and soft water in terms of soap interaction, scale formation, and pH levels. This helps illustrate the practical effects of water hardness in everyday activities such as cleaning and appliance maintenance.

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