



## Testing For Water Hardness

### Materials:

- 3 jars or bottles with lids per student pair
- Distilled water (soft water or water without minerals)
- Road salt (1 teaspoon per liter of water)
- Local stream or lake water
- Dish soap
- Snow from school yard (in winter)

### Activity:

Chloride is difficult to measure without specialized equipment, but we can use other methods to indicate the prevalence of road salt. For instance, we can measure water hardness or the amount of ions in water. Follow the steps below to determine if water is hard or soft, therefore, showing if there are a lot of minerals (like road salt) in the water or not.

### Instructions:

1. Collect three jars or bottles with lids.  
Fill:
  - A. One with distilled water (soft water or water without minerals),
  - B. One with distilled water and dissolved road salt -or table salt- (1 teaspoon per liter of water, to mimic the concentration of road salt in an urban pond), and
  - C. One with water from a local stream/lake.
2. After the salts are completely dissolved, add a small amount (several drops) of dish soap to each jar.
3. Close the jars and shake vigorously.
4. Make observations and based on results, estimate the hardness of the local water sample.

### Extension(s):

- A.
  1. In the wintertime try melting snow from different areas around the school yard (near the road vs. not) and test the hardness of water from these different locations.
  2. After the soap test, the water can be left in an open jar for several days, or heated, to allow the water to completely evaporate.



3. After all the water is gone, observe what minerals are left behind.
    - Does this match with the results you found with the soap test?
    - Do the amount of minerals in the water affect the ability of soap to make suds?
    - Consider how this impacts on drinking water, cleaning tasks, and the entirety of an ecosystem water enters?
  4. Reflect on what this experiment indicates regarding the hardness or softness of water sources in our local ecosystem and the amount of road salt that ends up in our water sources.
- B.
1. In small groups explore alternatives (ie: sand) that are being used in other provinces in the place of road salt.

<sup>1</sup> Information from “Environmental impacts of road salt and other de-icing chemicals”: <https://rb.gy/elmw9>