

Telling pure substances from mixtures

Grade 7 science (Year 8 · Class 7) · Lab

Name: _____ Date: _____ Class: _____

How can you show that some clear liquids contain dissolved solids? In this lab you evaporate 20 mL of four different waters and measure the residue left on a watch glass. You then compare your results with a label and decide which sample is closest to a pure substance.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS1-2

Aim

To compare how much solid is left behind when four different waters are evaporated, and to decide which are closer to pure substances.

Equipment

- 4 clean watch glasses (or shallow dishes)
- Beaker and hot plate or kettle
- Balance reading to 0.001 g
- 20 mL measuring cylinder
- Distilled water, tap water, bottled mineral water, salt solution (35 g of salt per litre)
- Heat-proof gloves

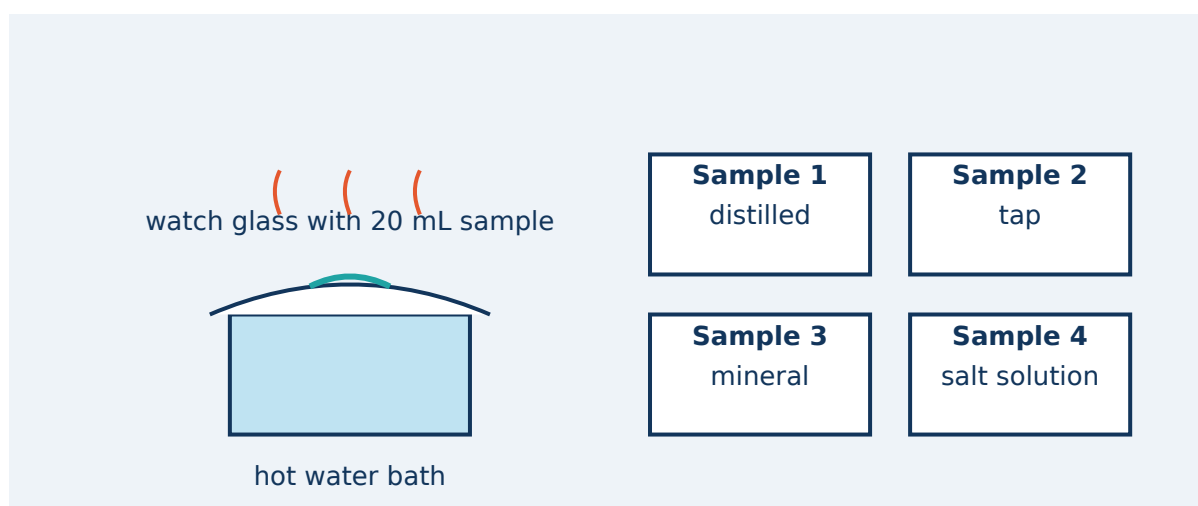
Safety

Safety

Hot water and steam can scald. Wear heat-proof gloves and eye protection, keep the beaker away from the table edge and let the glasses cool before you handle or weigh them.

Method

1. Weigh each watch glass when it is clean and dry and record its mass.
2. Measure 20 mL of one sample into each watch glass.
3. Place each watch glass on top of a beaker of gently boiling water, one at a time or in separate beakers, until the liquid has gone.
4. Let each glass cool and weigh it again.
5. Calculate the mass of residue = final mass - starting mass.



Evaporation set-up and the four samples.

Results

A class in Mombasa obtained these results:

Sample	Volume (mL)	Residue (g)
1 Distilled water	20	0.000
2 Tap water	20	0.012
3 Mineral water	20	0.007
4 Salt solution	20	0.700

Analysis questions

Question 1 Rank the samples

Rank the four samples from least residue to most residue.

Question 2 Residue per litre

Calculate the mass of residue per litre (g/L) for tap water and for mineral water.

Question 3 Check the salt solution

The salt solution was made with 35 g of salt per litre. Calculate the mass of salt in 20 mL and compare it with the measured residue.

Question 4 Compare with the label

The mineral water label says 340 mg/L. Convert your result for mineral water to mg/L and compare.

Question 5 Which is purest?

State which sample is closest to a pure substance and explain how the data show this.

Question 6 Improve the method

Suggest two ways to make the results more reliable.

Question 7 Explain with particles

Explain, using the particle model, why the residue stays behind when the water evaporates.