GCSE Chemistry required practical activity: Water purification

Student sheet

Analysis and Distillation of water from different sources

In this investigation you will test three water samples from different sources for pH and the presence of dissolved solids. After distillation of the sea water, you will test the water again to check that dissolved solids have been removed, making the water fit to drink.

Method

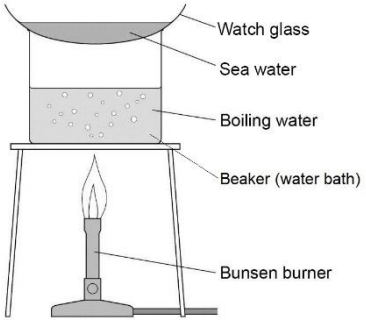
You are provided with the following:

- water samples
- universal indicator
- test tubes and rack
- Bunsen burner
- 10 cm^3 measuring cylinder
- tripod
- gauze
- heatproof mat
- 250 cm^3 beaker
- watch glass
- tongs
- clamp stand
- 250 cm^3 conical flask
- delivery tube with bung
- ice

You should read these instructions carefully before you start work.

1. Pour around 1 cm depth of the sea water into a test tube in the rack. Add a few drops of universal indicator solution. Using a pH colour chart, match the colour and record the pH of the water in the results table. Repeat this test for spring water and rain water and record the results.

2. Weigh a dry watch glass. Record its mass in the table. Pour 4 cm^3 sea water (less if your watch glass is small) into it and place it above a beaker acting as a water bath as shown in the diagram.

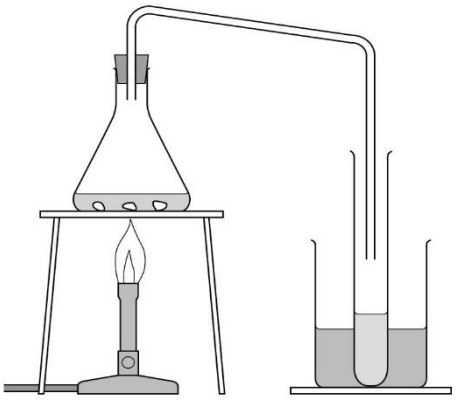


3. Allow all the water to evaporate from the watch glass. Do not let the water bath boil dry.

4. You should see dissolved solids on the glass. Remove the watch glass with tongs and allow to cool. Dry the bottom of the watch glass with a cloth and reweigh it. Record the new mass in the table. Subtract the mass of the watch glass alone and record the mass of the dissolved solids. Wash the watch glass and dry it.

5. Repeat steps 2 – 4 for the other water samples. You do not need to weigh the empty watch glass again as long as you use the same one each time.

Place the remaining sea water (around 40 cm^3) in the conical flask and set up the apparatus for distillation as shown in the diagram.



.Make sure the conical flask is held on the tripod and gauze using the clamp stand. Place a mixture of ice and water in the beaker surrounding the test tube.

6. Heat the sea water with the Bunsen burner until it starts to boil. Then reduce the heat so that the water boils gently. Distilled water will collect in the cooled test tube. Collect about 5 cm depth of water in this way, then stop heating.
7. Repeat the tests in steps 1 to 4 again using the distilled sea water, again recording your results in the table. How does the distilled water compare with the undistilled sea water?

Water	pH	Mass in grams		
		Watch glass	Watch glass and dissolved solids	Dissolved solids
Sea	8.10	14.75	14.92	
Spring	5.8	14.75	14.82	
Rain	5.6	14.75	14.78	
Distilled sea	6.9	14.75	14.76	