Analysing and purifying water

Chemistry required practical | AQA Combined Science 8464 and AQA GCSE Chemistry 8462 | 14 questions, 35 marks

GCSE science required practicals

This practical online

Name: _____ **Date:** _____ **Score:** _____ **/ 35**

Aim: To measure the pH and the mass of dissolved solids in water samples from different sources, and to purify salty water by distillation.

Equipment: water samples (for example tap water, sea water, pond water, rainwater); universal indicator paper and colour chart, or a pH meter; evaporating basins; balance reading to 0.001 g; 50 cm^3 measuring cylinder; Bunsen burner, tripod, gauze and heatproof mat; conical flask with bung and delivery tube; test tube in a beaker of ice-cold water to collect the distillate; thermometer; safety goggles.

Results

Jamal and Sofia evaporated 50.0 cm^3 of five water samples and weighed the basins before and after. They also tested each sample with a pH meter.

Sample	pH	Mass of empty basin in g	Mass of basin and solid after evaporating in g	Mass of dissolved solids in g
Tap water	7.4	48.312	48.329	0.017
Sea water	8.1	47.905	49.660	?
Pond water	6.8	49.120	49.141	0.021
Rainwater	5.6	48.556	48.558	0.002
Distilled water	7.0	48.774	48.774	0.000

Questions

1 State the independent variable and one dependent variable in Jamal and Sofia's investigation.

(2 marks)

2 Explain why the same volume of each water sample must be evaporated.

(2 marks)

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3 Describe how to measure the pH of a water sample with universal indicator paper. (2 marks)

4 During distillation the delivery tube becomes blocked. Explain the hazard and how to prevent it. (2 marks)

5 Calculate the mass of dissolved solids in the sea water sample. (1 mark)

6 Calculate the concentration of dissolved solids in the sea water in g/dm^3. Use your answer to question 5. Give your answer to 3 significant figures. Show your working. (3 marks)

7 Calculate the concentration of dissolved solids in the tap water in g/dm^3. (2 marks)

8 Which sample is pure water? Give two pieces of evidence from the table. (2 marks)

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9 Tap water is potable but is not pure. Use the results to explain what this means. (2 marks)

10 Explain how distillation separates pure water from sea water, and why the collecting test tube stands in ice-cold water. (3 marks)

11 A desalination plant takes in sea water with the same concentration as Jamal and Sofia's sample. Use your answer to question 6 to calculate the mass of dissolved solids removed from 2.5 dm^3 of this sea water. Give your answer to 2 significant figures. (2 marks)

12 **Higher tier**

The balance reads to 0.001 g. Sofia says the result for rainwater (0.002 g) has a much larger uncertainty than the result for sea water (1.755 g). Explain why she is right, and suggest one improvement. (3 marks)

13 Jamal did not let the basin cool before weighing it after evaporation. Suggest how this could affect his result, explain why weighing until the mass stays the same is a better method, and say whether any remaining water causes a random or a systematic error. (3 marks)

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14 A pupil has collected a sample of distilled water from her distillation of sea water. Plan how she could test whether the distilled water is pure, and say what results she would expect if it is.

(6 marks)

End of questions | Total 35 marks | The answers sheet has the full method as revision notes.

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