



Evaporation

Topic Summary

- Evaporation explained – Some particles in a liquid have enough energy to escape into the gas state, even below boiling point. Chemists use this to separate a dissolved solid from a solution.
- Evaporation vs. boiling – Evaporation is gradual, only a few particles have enough energy to transition to the gas state, it happens at the surface, it happens at all temperatures where a substance is in the liquid state; boiling is rapid, with all particles gaining enough energy to enter the gas state, bubbles (of the gas state) form throughout the liquid.
- Evaporation is used to obtain the dissolved solid from a solution
- Lab method for GCSE – Place the solution in an evaporating basin, heat it gently in a water bath (85–95 °C for water), stop when crystals start forming, and let the rest evaporate at room temperature.
- Why it matters – Controlled evaporation prevents splashing (loss), thermal decomposition or other reactions (such as oxidation) of the solid. Slower final stages of evaporation allows slow crystal growth for larger (and purer) crystals.
- Beyond GCSE – Modern labs often use hot plates, fume cupboards, or rotary evaporators to work with different solvents safely and efficiently.



Quick Checks to Build Recall

1. Which mixture would evaporation help you to separate?

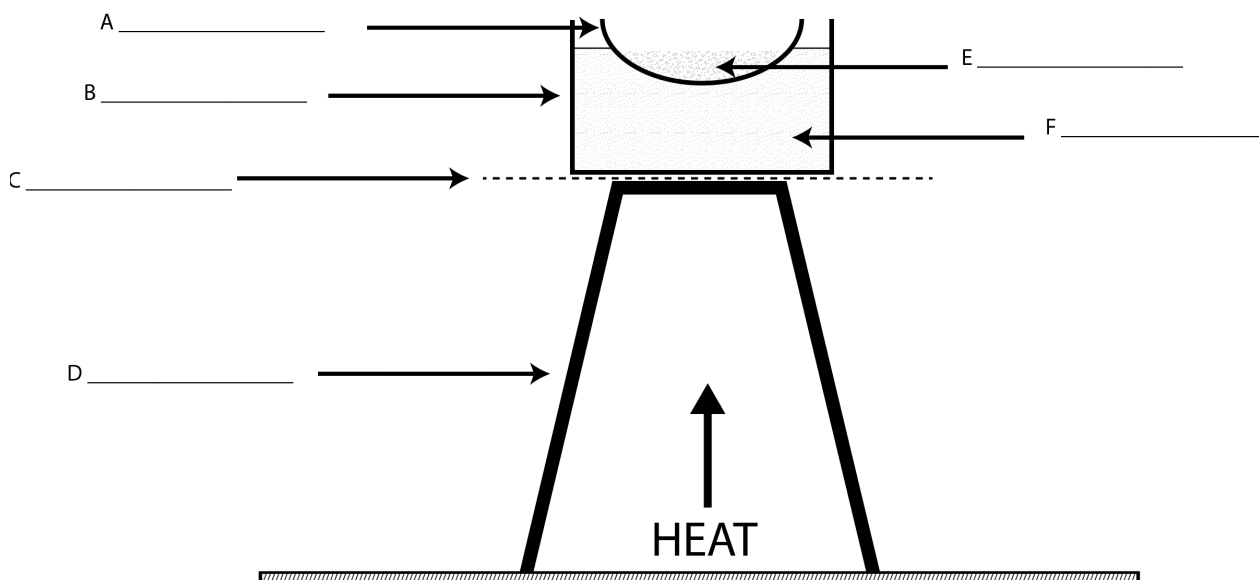
Oil from oil and water

Salt from salty water

Water from salty water

(1 mark)

2. Label this diagram of the equipment needed for evaporation in the laboratory. (3 marks)



3. Which of these terms apply to evaporation but NOT boiling (2 marks)

Happens at any temperature where the substance is a liquid, happens throughout the liquid, is gradual, causes large bubbles of gas to form throughout the liquid.



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Exam Style Questions

1. Describe how a student could obtain large crystals of copper sulphate from a solution of copper sulphate and water. (4 marks)

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2. A student is asked to evaporate some acetone from a mixture. Acetone is highly flammable and its vapours can be harmful to humans. Give two improvements to the method used to evaporate water to keep the student safe while carrying out this experiment.

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.....(2 marks)



Do this later...

Give your brain a break and come back to these questions later. Cover the rest of the sheet while you have a go. By doing this 24-48 hours after watching the video you will boost your chances of remembering the key points in an exam. If you struggle with these questions, re-watch the video and then try again.

1. Draw a fully labelled diagram of the equipment required to carry out evaporation in the lab.
2. What are the advantages of slowly evaporating the final bit of solvent from the sample?
3. Why would a hotplate be better than a Bunsen burner if the solvent was ethanol instead of water?
4. Why might a student chose to evaporate a solvent other than water in a fume cupboard rather than at the bench?