

Graphs in chemistry: Cooling curves

Education in Chemistry

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Complete the practical, sketch a graph of your results and answer the questions.

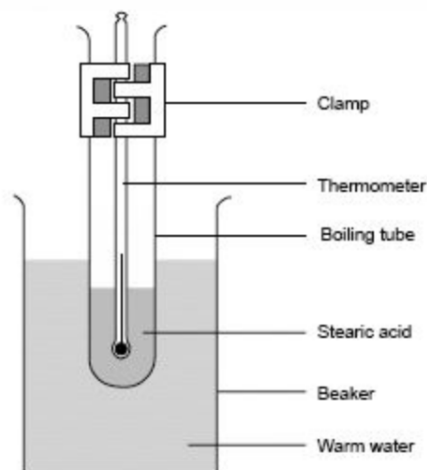
Part 1: Practical

Kit:

- Beaker
- Water
- Stearic acid
- Bunsen burner
- Thermometer
- Clamp
- Boiling tube
- Timer

Instructions:

1. Set up the apparatus as shown, filling the beaker with approximately 150 cm³ of water.
2. Heat the water using a Bunsen burner until the thermometer reads approximately 80°C.
3. Raise the level of the clamp so the boiling tube lifts out of the boiling water.
4. Record the temperature and start the timer.
5. Record the temperature every 30 seconds until the thermometer reads approximately 40°C, noting down the temperature when the stearic acid starts to freeze.

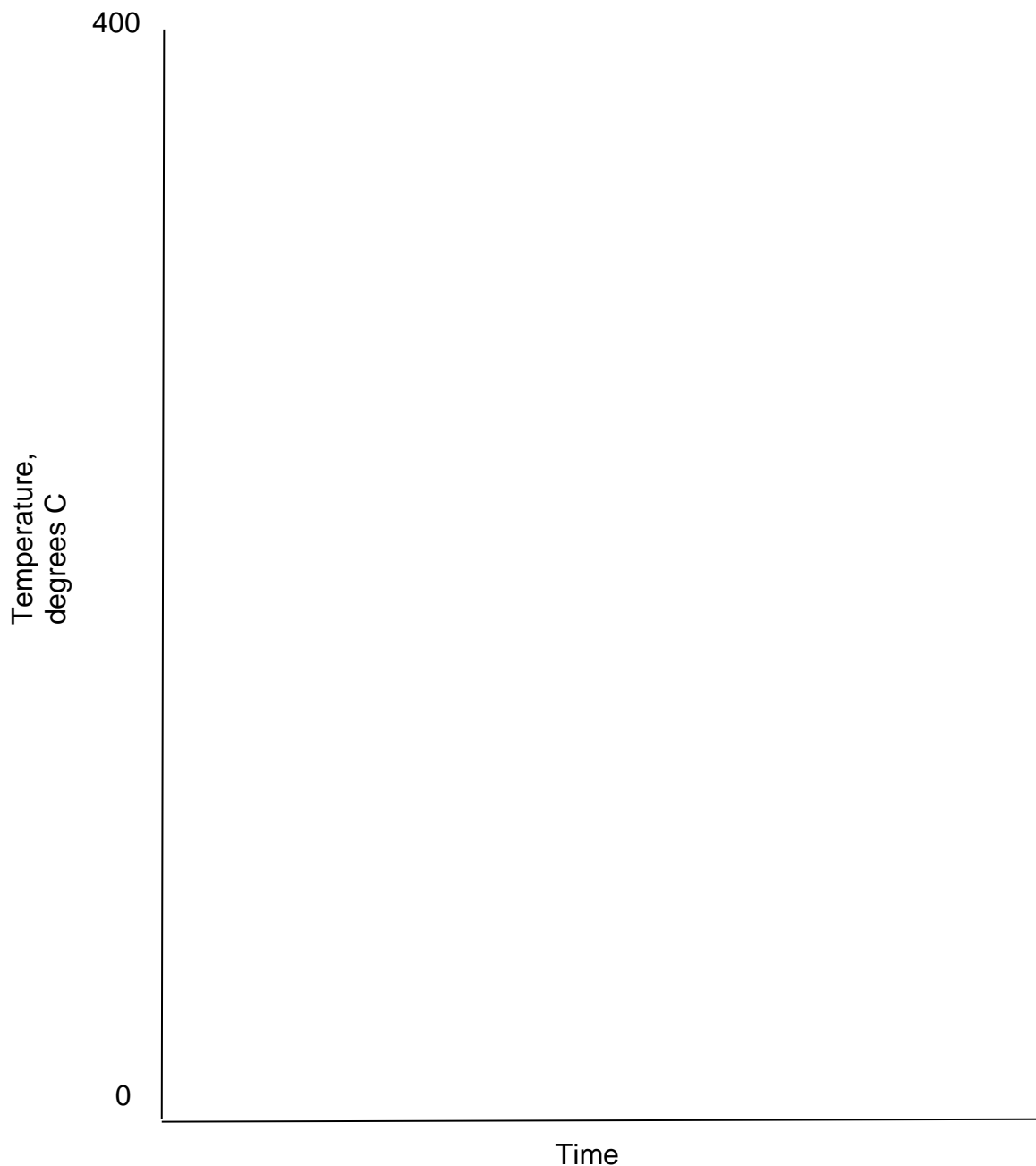


Part 2: Your results

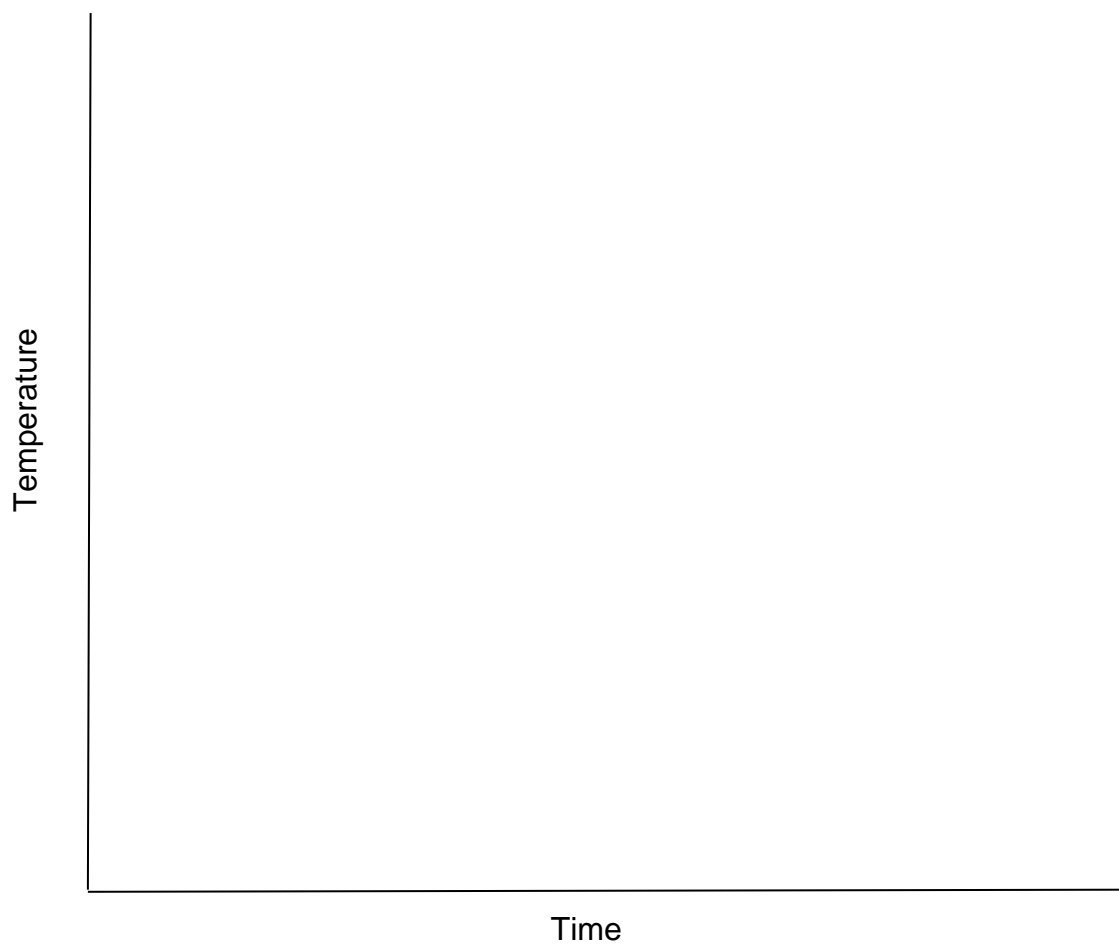
1. Plot a graph of your results, choosing appropriate scales for the axes.
2. Label the temperature when the stearic acid was freezing. What do you notice about the shape of the graph at this point?
3. Draw a smooth curve of best fit.
4. The temperature should stay constant at 69.3°C while the stearic acid is melting, but often the temperature continues to go down slowly. Why might your experimental results not show a perfect horizontal line at 69.3°C?

Part 3: Other graphs

1. On the axes below, draw a sketch of what you think the graph would have looked like if you had cooled the stearic acid gas down from 400°C to 30°C. The boiling point of stearic acid is 361°C.



2. How does your sketch differ from the graph of your experimental results? What have you assumed? Have you changed or ignored anything?
3. When would the graph above be more useful than your graph from Part 2? When would it be less useful?
4. Draw a sketch to represent the cooling curve for *any* substance.



5. Why might a graph showing the general trend for cooling curves be useful for chemists?