WJEC England Physics GCSE

SP2B: Volume and Temperature

Practical Flashcards

Outline the basic steps of the practical.

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1. Set syringe volume to 20 cm^3 and ensure the syringe and tube only contain air.
2. Insert the loose end of the tube into a measuring cylinder to collect gas.
3. Place syringe into room temperature water for a 2 minutes and then transfer to 30 °C water.
4. Record initial volume of gas and wait until no more bubbles appear.
5. Record the final volume.
6. Repeat 3 times.
7. Repeat at 50 °C.

What do you calculate from the initial and final volume readings?

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You subtract the initial volume from the final volume to give a value for the volume of gas produced as a result of the temperature increase.

Explain why the volume of gas increases when the temperature increases.

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As the temperature increases, the gas molecules gain more kinetic energy and so move around more. This causes the gas to expand and take up more volume.

Why do you submerge the syringe in room temperature water first?

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So that you can control the starting temperature of the gas and produce a starting volume of gas in the cylinder.

Why should you take repeat readings at the same temperature?

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To identify any anomalous results and to allow you to calculate an average value. This improves the accuracy of the final results.

Why is it likely that the data collected is very variable?

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The volumes involved are very small so the uncertainty in the results is magnified. Resolution and human error will produce large percentage errors.

What safety precautions should be taken during this experiment?

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1. Take care when working with hot water to avoid splashing and scalding.
2. Avoid excessively tightening the clamp on the measuring cylinder as it could shatter and be a cutting hazard.

What is a better alternative to boiling water and waiting for it to cool down to the required temperature?

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Using an electronically controlled water bath.

If the syringe floats in the water, what can be done to keep it submerged?

If the syringe floats in the water, what can be done to keep it submerged?

Attach a slotted mass to it using a rubber band so that it is weighed down.

How should the volume increase be different for the 30 °C and the 50 °C experiments?

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The volume increase should be greater for the hotter temperature (50 °C) since the molecules will have more kinetic energy and so will spread out more.