CIE Chemistry IGCSE

AO3 Practical Skills 2: Plan Experiments and Investigations

Flashcards

What is a hypothesis?

What is a hypothesis?

A prediction made before conducting an experiment based on limited evidence and used as a starting point for further investigation.

True or False?

‘A hypothesis can be proven to be true if enough data supports the statement.’

True or False? ‘A hypothesis can be proven to be true if enough data supports the statement.’

FALSE

A hypothesis can be supported by data but it can never be completely proven.

Fill in the gap: ‘A hypothesis states a relationship between two _____’

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Variables

What are independent and dependent variables?

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Independent variable - the factor that is changed in an experiment

Dependent variable - the factor that changes with (or depends on) the independent variable

What are control variables?

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Factors that are kept constant throughout an experiment to ensure the test is fair.

The rate of reaction between an acid and a metal is being measured at various temperatures. What are the independent and dependent variables?

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Independent variable - temperature

Dependent variable - volume of gas produced

The rate of reaction between an acid and a metal is being measured at various temperatures. What variables should be controlled?

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- Concentration of the acid
- Volume of the acid
- Mass of metal
- Surface area of the metal

Why might an experiment be repeated?

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- To enable anomalous data to be spotted and replaced
- To enable a mean to be calculated, increasing the accuracy and reliability of the data

What is a control experiment?

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All factors are the same as the experiment but the value of the independent variable is zero

Why are control experiments done?

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To verify that it is the independent variable (rather than another factor) affecting the dependent variable

What needs to be considered when devising an experimental method?

What needs to be considered when devising an experimental method?

- The independent and dependent variables
- The control variables
- The apparatus set up
- Techniques required
- Range and intervals of values you will test
- Whether the experiment needs repeating
- Whether a control experiment can be carried out
- Whether the method will test the prediction

When should a risk assessment be carried out?

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Before starting the experiment

What should be considered in a risk assessment?

What should be considered in a risk assessment?

- Conditions
- Chemicals
- Apparatus

What are some common risks which should be considered for a risk assessment?

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- Glassware: Glassware is fragile so must be handled with care. Clear up any broken glass immediately.
- Bunsen burners: Bunsen burners may ignite flammable chemicals so keep flammable substances away from the flame.
- Hazardous chemicals: Corrosive chemicals can burn the skin so wear safety glasses and handle with care. Clear up any spillages immediately. Toxic chemicals have toxic vapours so handle them in a fume cupboard and keep the laboratory well ventilated.

What should be considered when choosing experimental apparatus?

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- The required precision of the apparatus.
- The practicality of the apparatus.

What different apparatus can be used to measure the volume of liquids? What are the benefits of each piece of apparatus?

What different apparatus can be used to measure the volume of liquids? What are the benefits of each piece of apparatus?

- Dropping pipette: suitable for very small quantities of solutions, used to add drops to a mixture
- Measuring cylinder: simpler to use than a burette
- Beaker: low accuracy so used to measure approximate volumes.
- Volumetric pipette: measures extremely accurate volumes, often only measure one volume accurately (e.g. 25cm^3 volumetric pipette)
- Burette: measures a range of volumes extremely accurately