

Drivers of Reactions

CH11-11

3 inquiry questions • 13 dot points

1 What energy changes occur in chemical reactions?

- conduct practical investigations to measure temperature changes in examples of endothermic and exothermic reactions, including:...
- investigate enthalpy changes in reactions using calorimetry and $q = mc\Delta T$ (heat capacity formula) to calculate, analyse and compare experimental results with reliable secondary-sourced data, and to explain any differences
- construct energy profile diagrams to represent and analyse the enthalpy changes and activation energy associated with a chemical reaction
- model and analyse the role of catalysts in reactions

2 How much energy does it take to break bonds, and how much is released when bonds are formed?

- explain the enthalpy changes in a reaction in terms of breaking and reforming bonds, and relate this to:...
- investigate Hess's Law in quantifying the enthalpy change for a stepped reaction using standard enthalpy change data and bond energy data, for example:...
- apply Hess's Law to simple energy cycles and solve problems to quantify enthalpy changes within reactions, including but not limited to:...

3 How can enthalpy and entropy be used to explain reaction spontaneity?

- analyse the differences between entropy and enthalpy
- use modelling to illustrate entropy changes in reactions
- predict entropy changes from balanced chemical reactions to classify as increasing or decreasing entropy
- explain reaction spontaneity using terminology, including:...
- solve problems using standard references and $\Delta G^{\circ} = \Delta H^{\circ} - T\Delta S^{\circ}$ (Gibbs free energy formula) to classify reactions as spontaneous or nonspontaneous
- predict the effect of temperature changes on spontaneity