AQA Chemistry GCSE Student Progress

Unit 4.5 - Energy Changes

4.5.1. Exothermic and Endothermic Reactions

4.5.1.1. Energy Transfer During Exothermic and Endothermic Reactions

a	I know that energy is conserved in chemical reactions.			
b	I know that an exothermic reaction is one that transfers energy to the surroundings so the temperature of the surroundings increases. Exothermic reactions include combustion, many oxidation reactions and neutralisation.			
c	I can describe some everyday uses of exothermic reactions, including self-heating cans and hand warmers.			
d	I know that an endothermic reaction is one that takes in energy from the surroundings so the temperature of the surroundings decreases. Endothermic reactions include thermal decompositions and the reaction of citric acid and sodium hydrogen carbonate.			
e	I can describe some everyday uses of endothermic reactions, including sports injury packs.			
f	I can evaluate uses and applications of exothermic and endothermic reactions given appropriate information.			

4.5.1.2. Reaction Profiles

a	I know that chemical reactions can occur only when reacting particles collide with each other and with sufficient energy. The minimum amount of energy that particles must have to react is called the activation energy.			
b	I know that reaction profiles can be used to show the relative energies of reactants and products, the activation energy and the overall energy change of a reaction.			
c	I can draw simple reaction profiles (energy level diagrams) for exothermic and endothermic reactions showing the relative energies of reactants and products, the activation energy and the overall energy change, with a curved line to show the energy as the reaction proceeds.			
d	I can use reaction profiles to identify reactions as exothermic or endothermic.			
e	I know that the activation energy is the energy needed for a reaction to occur.			

4.5.1.3. The Energy Change of Reactions (HT only)

a	I know that, during a chemical reaction, energy must be supplied to break bonds in the reactants and energy is released when bonds in the products are formed.			
b	I know that the energy needed to break bonds and the energy released when bonds are formed can be calculated from bond energies.			
c	I know that the difference between the sum of the energy needed to break bonds in the reactants and the sum of the energy released when bonds in the products are formed is the overall energy change of the reaction.			
d	I know that in an exothermic reaction, the energy released from forming new bonds is greater than the energy needed to break existing bonds.			
e	I know that, in an endothermic reaction, the energy needed to break existing bonds is greater than the energy released from forming new bonds.			
f	I can calculate the energy transferred in chemical reactions using bond energies supplied.			

4.5.2. Chemical Cells and Fuel Cells (Chemistry Only)

4.5.2.1. Cells and Batteries (Chemistry Only)

a	I know that cells contain chemicals which react to produce electricity.			
b	I know that a simple cell can be made by connecting two different metals in contact with an electrolyte.			
c	I know that the voltage produced by a cell is dependent upon a number of factors including the type of electrode and electrolyte.			
d	I know that batteries consist of two or more cells connected together in series to provide a greater voltage.			
e	I know that in non-rechargeable cells and batteries the chemical reactions stop when one of the reactants has been used up and that alkaline batteries are non-rechargeable.			
f	I know that rechargeable cells and batteries can be recharged because the chemical reactions are reversed when an external electrical current is supplied.			
g	I can interpret data for relative reactivity of different metals and evaluate the use of cells.			
h	I can describe the safe and careful use of liquids.			

4.5.2.2. Fuel Cells (Chemistry Only)

a	I know that fuel cells are supplied by an external source of fuel (e.g. hydrogen) and oxygen or air and that the fuel is oxidised electrochemically within the fuel cell to produce a potential difference.			
b	I know that the overall reaction in a hydrogen fuel cell involves the oxidation of hydrogen to produce water.			
c	I can evaluate the use of hydrogen fuel cells in comparison with rechargeable cells and batteries.			
d	I can write the half equations for the electrode reactions in the hydrogen fuel cell (HT Only).			