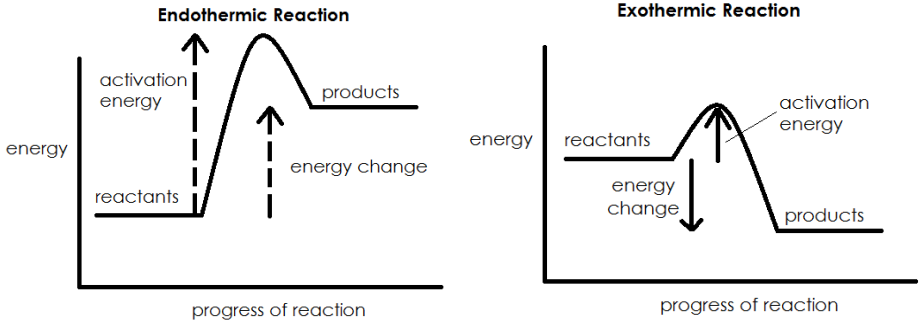
Chapter 4 Energetics - GCSE Assumed Knowledge

Learning Objectives	Keypoints
Identify exothermic and endothermic reactions	In an exothermic reaction, the temperature of the reaction mixture will increase. In an endothermic reaction, the temperature of the reaction mixture will decrease.
Compare exothermic and endothermic reactions	In an exothermic reaction, energy is transferred to the surroundings. In an endothermic reaction, energy is transferred from the surroundings.
Draw and label reaction profiles for exothermic and endothermic reactions	For an exothermic reaction, the reactants will have more energy than the products. For an endothermic reaction, the reactants will have less energy than the products. In an exothermic reaction, the bonds which form are stronger than the bonds which are broken. In an endothermic reaction, the bonds which form are weaker than the bonds which are broken. 
Explain the meaning of activation energy	The activation energy is the minimum amount of energy needed to start a reaction. The activation energy is needed to break bonds in the reagents. On a reaction profile diagram the activation energy is the difference between the energy of the reactants and the top of the peak.
Define bond energy	The bond energy is the amount of energy that must be transferred to break one mole of a particular covalent bond. Bond energy is measured in $KJmol^{-1}$ Bond energies are usually averages over a range of compounds. This means that the experimental values are sometimes different to the theoretical value. A larger bond energy means a stronger bond.
Calculate energy changes in chemical reactions using bond energy values	Energy change = (sum of the bond energies of the reactants) – (sum of the bond energies of the products) A positive energy change means the reaction is endothermic. A negative energy change means the reaction is exothermic.