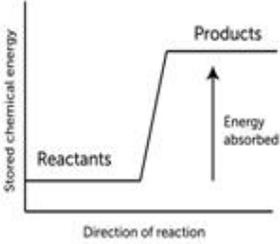
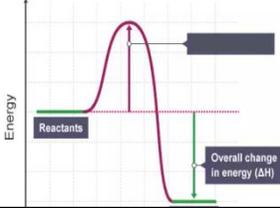
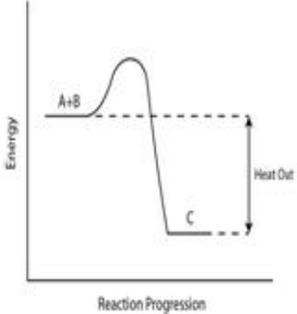
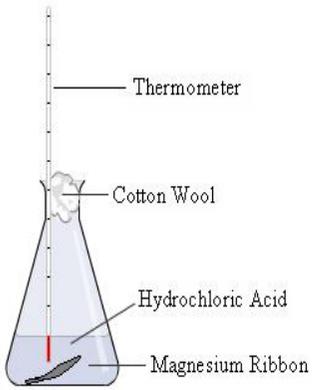
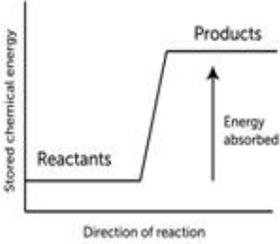
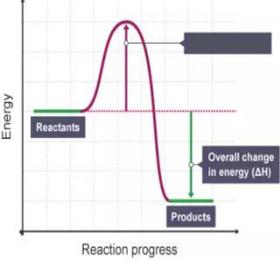
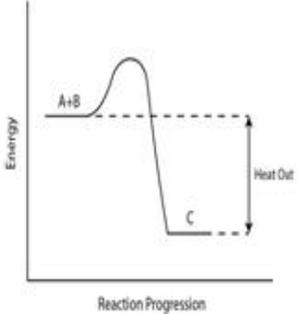
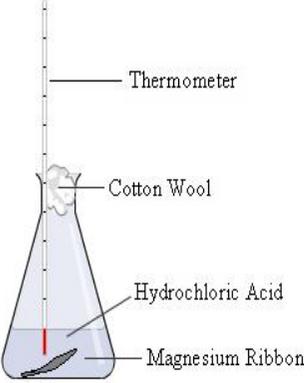
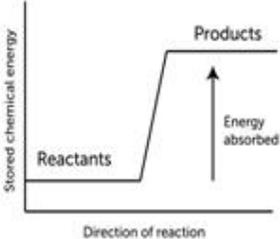
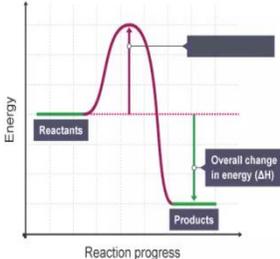
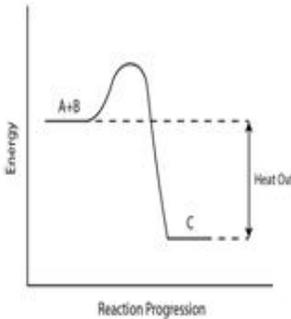
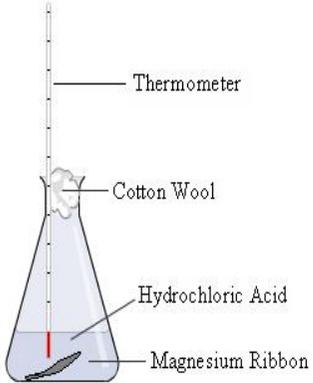
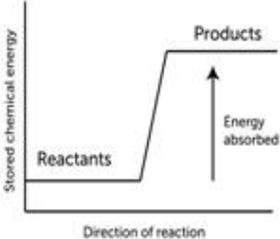
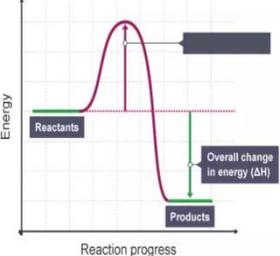
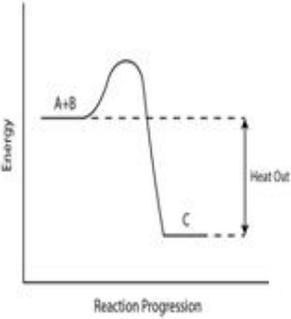
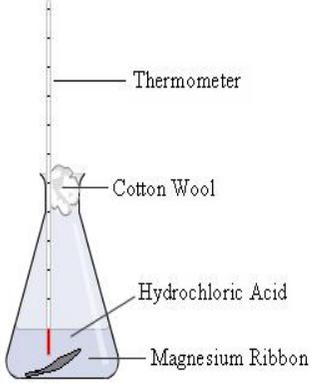


F	1	2	3	4	5	6
1	<i>conservation of energy</i>	energy transferred to surroundings		<i>Cell voltage depends on...</i>		<i>endothermic reaction</i>
2	the minimum amount of energy required to react	<i>Connected in series</i>		<i>successful collision of particles</i>		<i>thermal decomposition</i>
3	<i>Sports injury pack</i>	<i>energy level diagram</i>	calcium carbonate → calcium oxide + carbon dioxide	<b>Fuel cells</b>	<i>Produces a rise in temperature</i>	<i>battery</i>
4	<i>self-heating cans</i>		<b>Hydrogen fuel cell</b>	temperature of surroundings decreases	overall energy in the universe is equal before and after reaction	
5	<b>exothermic reaction</b>		<i>Rechargeable cells</i>	<i>activation energy</i>	<b>product molecules contain less energy than reactant molecules</b>	
6	<i>surroundings increase in temperature</i>		<i>Simple cell</i>	<i>collisions require sufficient energy for reaction to occur</i>	<i>Only product is water</i>	combustion, neutralisation & oxidation

F	1	2	3	4	5	6
1	<i>conservation of energy</i>	energy transferred to surroundings		?		<i>endothermic reaction</i>
2	<i>the minimum amount of energy required to react</i>	?		<i>successful collision of particles</i>		<i>thermal decomposition</i>
3	?	<i>energy level diagram</i>	<i>calcium carbonate → calcium oxide + carbon dioxide</i>			?
4	<i>self-heating cans</i>		<b>Hydrogen fuel cell</b>	<i>temperature of surroundings decreases</i>	<i>overall energy in the universe is equal</i>	
5	<b>exothermic reaction</b>		<i>Rechargeable cells</i>	<b>activation energy</b>	product molecules contain less energy than reactant molecules	
6	<i>surroundings increase in temperature</i>		?	<i>collisions require sufficient energy for reaction to occur</i>	?	<i>combustion, neutralisation &amp; oxidation</i>

H	1	2	3	4	5	6
1	<i>conservation of energy</i>	energy transferred to surroundings		<i>energy released by new bonds &gt; energy needed to break existing bonds</i>		<b>endothermic reaction</b>
2	$H_2 \rightarrow 2H^+ + 2e^-$ $O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$	<i>reactant bonds broken by energy input</i>		<b>successful collision of particles</b>		<i>thermal decomposition</i>
3	<i>bond energies</i>	<b>energy level diagram</b>	<b>calcium carbonate → calcium oxide + carbon dioxide</b>			
4	<i>self-heating cans</i>	energy needed to break existing bonds is greater than the energy released from		HOW TO MEASURE THE ENERGY CHANGE IN A METAL DISPLACEMENT REACTION?	<b>overall energy in the universe is equal before and after reaction</b>	
5	<i>overall energy change for a reaction</i>		<b>exothermic reaction</b>	<b>activation energy</b>	product molecules contain less energy than reactant molecules	
6	<b>surroundings increase in temperature</b>		<b>temperature of surroundings decreases</b>	<i>collisions require sufficient energy for reaction to occur</i>	<i>energy given out by formation of product bonds</i>	combustion, neutralisation & oxidation

H	1	2	3	4	5	6
1	<i>conservation of energy</i>	<b>energy transferred to surroundings</b>		<i>energy released by new bonds &gt; energy needed to break existing bonds</i>	?	<b>endothermic reaction</b>
2	$H_2 \rightarrow 2H^+ + 2e^-$ $4e^- + O_2 + 4H^+ \rightarrow 2H_2O$	<b>reactant bonds broken by energy input</b>		?		<i>thermal decomposition</i>
3	<i>bond energies</i>	?	<i>calcium carbonate → calcium oxide + carbon dioxide</i>			
4	<i>self-heating cans</i>	<b>energy needed to break existing bonds is greater than the energy released from</b>		<b>how to measure the energy change in a metal displacement reaction?</b>	<i>overall energy in the universe is equal</i>	
5	<i>overall energy change for a reaction</i>		<b>temperature of surroundings decreases</b>	<b>activation energy</b>	product molecules contain less energy than reactant molecules	
6	?		?	<i>collisions require sufficient energy for reaction to occur</i>	<i>energy given out by formation of product bonds</i>	?

### 5.5 Energy changes (AQA Trilogy) revision checklist

Can you...			
a) define 'conservation of energy' in the context of chemical reactions			
b) describe the terms 'exothermic' and 'endothermic', giving examples of both type			
c) distinguish between exothermic and endothermic reactions on the basis of the temperature change of the surroundings			
d) draw reaction profiles (energy level diagrams) for exothermic/endothermic reactions showing relative energies of reactants and products, the activation energy and the overall energy change			
e) use reaction profiles to identify reactions as exothermic or endothermic			
f) explain that the activation energy is the energy needed for a reaction to occur			
g) explain chemical reactions in terms of energy transfers			
h) explain why a reaction is either exothermic or endothermic			
i) <b>[HT only]</b> describe bond making and bond making in terms of energy transfers			
j) <b>[HT only]</b> calculate the energy transferred in chemical reactions using bond energies supplied			
k) describe the operation of a simple cell, battery and rechargeable cell			
l) interpret data for relative reactivity of different metals and evaluate the use of cells			
m) evaluate the use of hydrogen fuel cells in comparison with rechargeable cells and batteries			
n) <b>[HT only]</b> write the half equations for the electrode reactions in the hydrogen fuel cell			