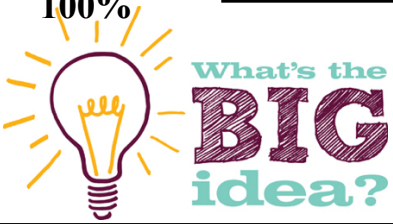
You need to know the content of this sheet. 100%

100% Sheet
Energy of Reactions



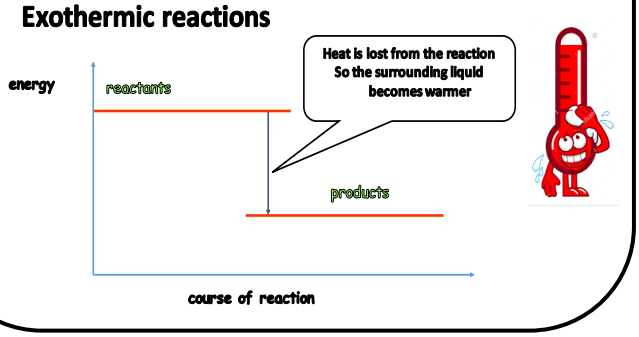
Chemical Reactions involve rearrangement of atoms in substances to form new substances.

Exothermic Reactions

An exothermic reaction is one in which heat is given out and the surroundings get hotter
Combustion reactions – burning.
Explosions

Energy Level Diagrams

Exothermic reactions

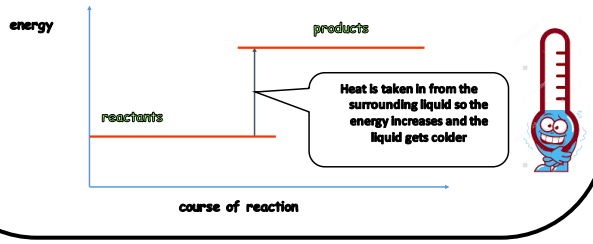


Endothermic Reactions

An endothermic reaction is one in which heat energy is taken in and the surrounding get colder
Photosynthesis
Dissolving ammonium nitrate in water

Energy Level Diagrams

Endothermic reactions



Using energy transfers from reactions

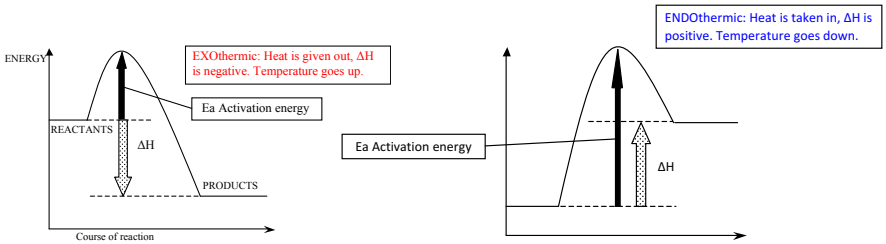
cold packs Most cold packs use the reaction between ammonium nitrate and water. These reactants need to mix to bring about a lowering of temperature.

Pressing a metal button causes sodium ethanoate to recrystalise, releasing heat. , Most versions are reusable ,as all you need to do is heat them up in hot water.

Heat packs

Disposable heat packs are one off packs but have the advantage of releasing their heat for longer.

Self heating cans **Pressing a button in the base of the can breaks a seal allowing the water and calcium oxide to mix. The resulting reaction releases heat and produces calcium hydroxide.**



Higher Only

Breaking a bond requires energy to be put in
So breaking bonds is Endothermic

Making bonds releases energy
So making bonds is Exothermic

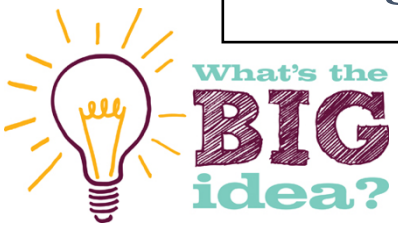
All reactions involve making and breaking bonds

The overall heat of a reaction depends on the balance between making and breaking bonds

Energy (enthalpy) of reactions can be calculated by;
Total energy to break bonds minus total energy to make bonds

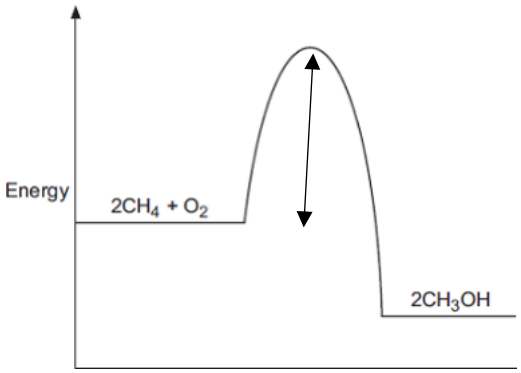
You need to apply your knowledge

100% Sheet
Energy of Reactions

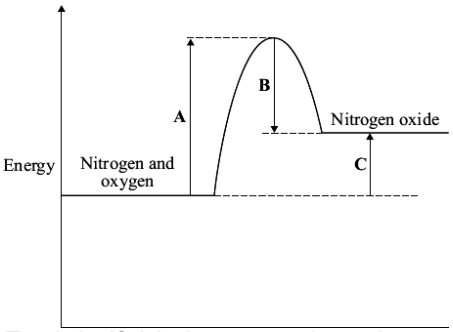


Chemical Reactions involve rearrangement of atoms in substances to form new substances.

Explain if this is an exothermic or endothermic reaction



Explain what the double headed arrow represents



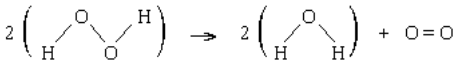
Explain if this is an exothermic or endothermic reaction

What is meant by the term *activation energy*?

Which letter represents;

a) activation energy
b) energy of reaction

HIGHER The following equation represents the decomposition of hydrogen peroxide. The structural formulae of the chemicals involved are shown.



Use the following information about bond energies to answer this part of the question.

BOND	BOND ENERGY (kJ)
O = O	498
O – O	146
H – O	464

(i) Calculate the energy needed to break all the bonds in the reactants.

(ii) Calculate the energy released when new bonds are formed in the products.

(iii) Calculate the energy change for this reaction.

(iv) Is the reaction exothermic or endothermic? Explain why