## KNOWLEDGE ORGANISER BIG IDEA: REACTIONS TOPIC: CHEMICAL ENERGY

Key Word	Definition	
reactant(s)	Substances that react together.	
product(s)	Substances formed in a reaction.	
catalyst	A substance that increases the rate of a chemical reaction but is unchanged at the end	
chemical reaction	Where the atoms in the reactant(s) rearrange to form new chemical(s).	
exothermic reaction	A chemical reaction that gives out energy, usually as heat or light	
endothermic reaction	A chemical reaction that takes in energy, usually as heat or light	
chemical bond	A force that holds atoms together in molecules	
activation energy	The minimum (lowest) amount of energy needed for a reaction to take place	

**Investigating energy changes:** We use this apparatus to determine whether a reaction is endothermic or exothermic. The polystyrene cup is used because it is a thermal insulator (doesn't let heat pass through easily).



**Endothermic and exothermic reactions:** All chemical reactions involve a change in the energy of the chemicals. This is because, when a chemical reaction takes place, energy can either be taken in from, or transferred to the surroundings (the air, water, beaker etc.). Energy profile diagrams are used to show this change in the energy of the chemicals. Here are some features of endothermic and exothermic reactions:

type of reaction	endothermic	exothermic
energy of chemicals	increases	decreases
energy of surroundings	decreases	increases
observations	temperature decreases	temperature increases and/or light given off
examples	photosynthesis, ice packs	respiration, neutralisation, combustion (burning)
energy profile diagram	energy energy reactants progress of reaction	reactants energy released products progress of reaction

<u>Catalysts:</u> These increase the rate of a chemical reaction but are unchanged at the end. Examples include:

- Platinum and palladium used in car exhausts to make gases less harmful
- Nickel used to make margarine
- Enzymes biological catalysts made of proteins that ensure the chemical reactions in our body can take place (keeping us alive!)