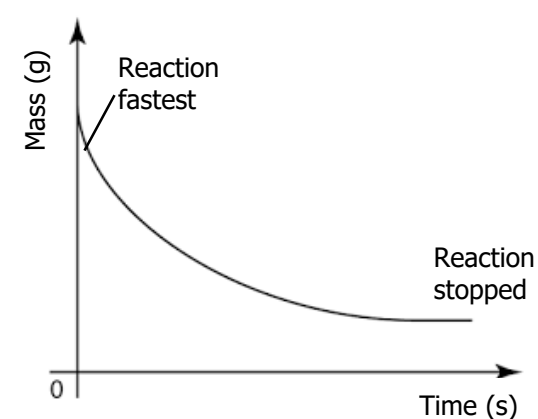


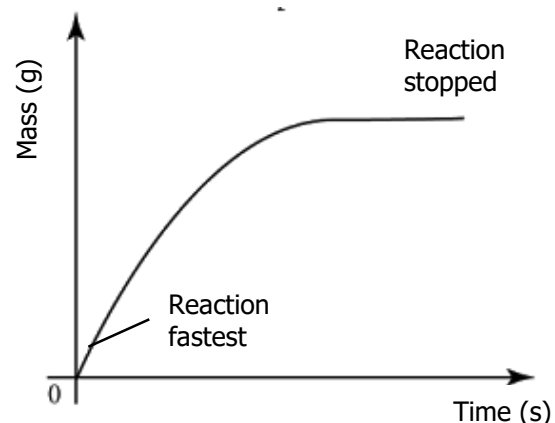
Chemistry 6: Rate and Extent of Chemical Change

1 Calculating rate of reaction:

Mean rate = $\frac{\text{amount of reactant used}}{\text{time taken}}$ or Mean rate = $\frac{\text{amount of product formed}}{\text{time taken}}$



2 Typical graph when measuring reactants used



3 Typical graph when measuring products formed

Section 1: Key terms

4 Collision theory	Reactions occur only when particles collide with enough energy .
5 Activation energy	The amount of energy particles need in order to react .
6 Catalyst	A chemical (or enzyme) that increases the rate of reaction without being used itself (therefore they are not included in an equation). They provide an alternative pathway for the reaction with a lower activation energy .
7 Concentration	The number of particles in a certain volume .

Section 2: Factors Affecting Rate

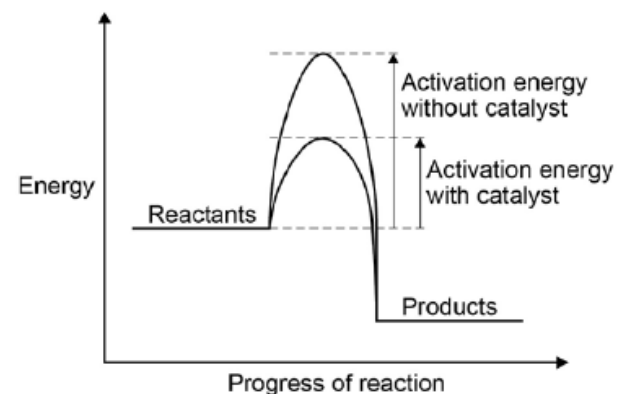
Factor	Effect on Rate	Explanation
9 Concentration of reactants	Increasing the concentration increases the rate of reaction.	Increases the chance of a collision as there are more particles.
10 Pressure of gases	Increasing the pressure increases the rate of reaction.	Increases the chance of a collision as there are more particles.
11 Surface area of solid reactants	Increasing the surface area increases the rate of reaction.	Exposes more of the solid so that there is a greater chance of collisions occurring.
12 Temperature	Increasing the temperature increases the rate of reaction.	Increases speed at which particles move and makes collisions more energetic .
13 Catalyst	Catalysts increase the rate of reaction.	Lowers the activation energy .

Section 3: Reversible Reactions

14 Reversible reaction	A reaction in which the products can also form the reactants . Shown as: $A + B \rightleftharpoons C + D$
15 Exothermic	A reaction that releases heat to the environment .
16 Endothermic	A reaction that takes in heat from the environment .
17 Equilibrium (HT)	Equilibrium is reached when the forward and reverse reactions occur at exactly the same rate . Needs a sealed container .
18 Le Chatelier's Principle (HT)	If a system is at equilibrium and a change is made to any of the conditions, then the system responds to counteract the change .

Section 4: Changing conditions at equilibrium

19 Changing temperature (HT)	<p>If the temperature of a system at equilibrium is increased:</p> <ul style="list-style-type: none"> the amount of products at equilibrium increases for an endothermic reaction the amount of products at equilibrium decreases for an exothermic reaction. <p>If the temperature of a system at equilibrium is decreased:</p> <ul style="list-style-type: none"> the amount of products at equilibrium decreases for an endothermic reaction the amount of products at equilibrium increases for an exothermic reaction.
20 Changing concentration (HT)	<ul style="list-style-type: none"> If the concentration of a reactant is increased, more products will be formed. If the concentration of a product is decreased, more products will be formed.
21 Changing pressure (HT)	<p>For reactions of gases:</p> <ul style="list-style-type: none"> an increase in pressure causes the reaction to favour the side with the smaller number of molecules (as shown by the symbol equation for that reaction). A decrease in pressure causes the reaction to favour the side with the larger number of molecules (as shown by the symbol equation for that reaction).



8 Energy profile diagram for a reaction with/ without a catalyst.