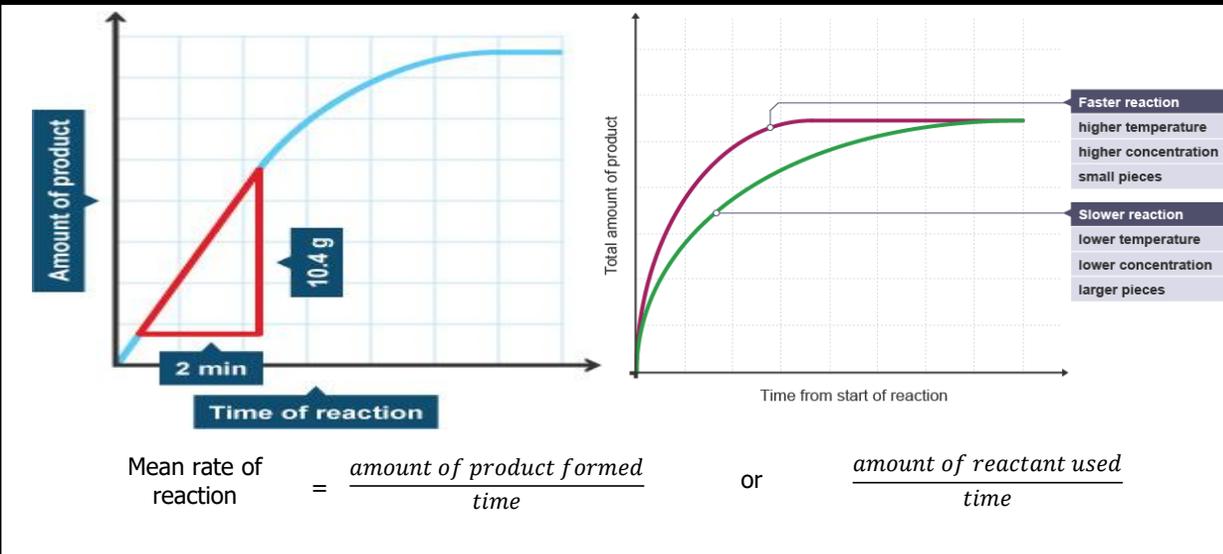


Chemistry 6: Rates of reaction

Section 1: Organisation

1 Reactant	The starting materials in a reaction that undergo a chemical change.
2 Product	What you end up with in a reaction.
3 Collision Theory	Particles must collide with enough energy and the correct orientation to react.

Section 2



Section 3: Factors affecting the rate of reaction

5 Concentration	Increasing the concentration increases the number of particles in the same volume . This increases the collision frequency between reactant particles.
6 Surface area	A powder has a greater surface area than a solid. Increasing the SA will make the particles more exposed which increases the collision frequency between reactant particles.
7 Temperature	Increasing the temperature of the reaction increases the energy of the reactant particles meaning more collisions will have the required energy to be successful.
8 Pressure	This is the same as concentration but for gases. Reactant particles occupy a smaller volume.
9 Catalyst	Reduces the activation energy by providing an alternative reaction pathway

Section 4: Measuring rates of reaction

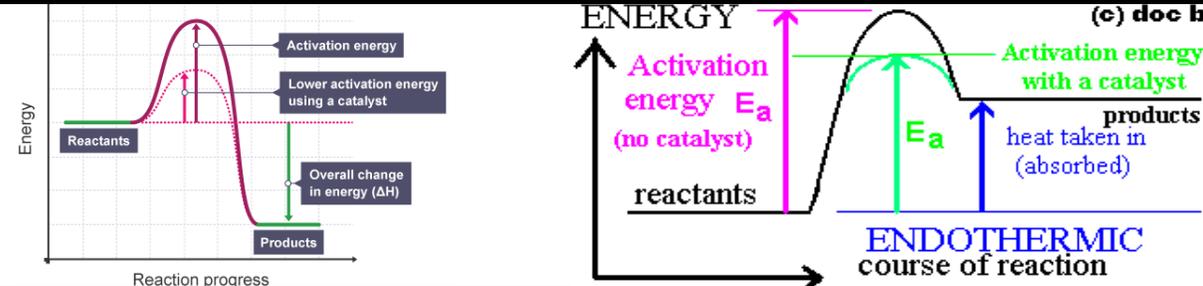
Method	How	Negatives
10 Precipitation and colour change	Measure the time taken for the solution to go cloudy	Colour change is subjective
11 Change in mass (usually gas)	Reaction takes place on a balance	Most accurate but gas escapes into the room
12 Measuring the volume of gas given off	Use a gas syringe to collect the gas	If the reaction is too vigorous the plunger may blow off.

Section: Required practicals

1. Add 40cm³ hydrochloric acid.
2. Add a metal
3. Place cotton wool in the top.
4. Record the mass at set time intervals.
5. Vary the concentration, repeat

1. Add sodium thiosulfate to conical flask on the cross
2. Add sodium hydroxide.
3. Time how long it takes for the cross to disappear.
4. Vary the concentration of thiosulfate, repeat.

Section 6



Section 7 Reversible reactions

\rightleftharpoons	The reaction is reversible
Closed system	None of the products or reactants can escape and nothing can get in.
Dynamic equilibrium	In a closed system, the rate of the forward and backward reaction are the same.

Section 8: Le Chatelier's principle

Change	Effect
Temperature	Heating the reaction moves the equilibrium to the endothermic side. Reducing the temperature moves equilibrium to the exothermic side.
Pressure	Increasing the pressure shifts the equilibrium to the side with fewer molecules. Decreasing the pressure shifts equilibrium to the side with more molecules.
Concentration	Increasing the concentration of reactants shifts equilibrium to the side of products. Decreasing product concentration shifts the equilibrium to the side of reactants.