

Calculating rates of reactions		
1	Mean rate of reaction =	quantity of reactants used / time taken or quantity of reactant formed / time taken
2	Factors that affect rate of reaction	concentration pressure surface area temperature catalysts
3	Collision theory	chemical reactions can occur only when reacting particles collide and with sufficient energy
4	Activation energy	minimum amount of energy that particles must have to react
5	Catalysts	increases the rate of a chemical reaction but is not used up, by providing a different pathway that has a lower activation energy

Reversible reactions and dynamic equilibrium		
6	Reversible reaction	the products of the reaction can react to produce the original reactants
7	Reversible symbol	$\rightleftharpoons$
8	Energy changes in a reversible reaction	if a reversible reaction is exothermic in one direction, it is endothermic in the opposite direction
9	Equilibrium	when the forward and reverse reactions occur at exactly the same rate in a closed system
10	Le Chatelier's Principle	if a system at equilibrium is subjected to any change, the system will adjust itself to counteract the applied change

RP: Rate of reaction		
11	Independent variable	concentration
12	Independent variable	volume of gas formed in a given time  <u>or</u> time taken to change colour
13	Control	all variables below must be kept the same (unless it is being tested as the independent variable) <ul style="list-style-type: none"> <li>• pressure</li> <li>• surface area</li> <li>• temperature</li> <li>• catalysts</li> </ul>
14	Method example (for changing temperature)	measure 50 cm <sup>3</sup> of dilute sodium thiosulfate solution to a conical flask.  place on piece of paper with a black cross drawn on it.  add 10 cm <sup>3</sup> of dilute hydrochloric acid to the conical flask.  swirl and start a stop clock.  when the cross can no longer be seen, record the time.  repeat with different starting temperatures