

... independent.	Start: Mean rate of reaction (using reactants) =	quantity of reactant used ÷ time taken	Mean rate of reaction (using products) =
quantity of product formed ÷ time taken	Units of rate of reaction (mass change)	g/s (grams/second)	Units of rate of reaction (mole change)
mol/s (moles/second)	Units of rate of reaction (gaseous reactions)	cm <sup>3</sup> /s (centimetre cubed/second)	Collision theory states that ...
... reactant particles must bump into one another with sufficient energy in order for reaction to take place.	Activation energy is ...	... the minimum amount of energy that particles must have before they can react.	The effect of increasing concentration of reactants in solution ...
... increases the frequency of collisions, so increases the reaction rate.	The effect of increasing pressure of reacting gases ...	... pushes gas particles closer together, so more chance of collision, increasing reaction rate.	The effect of increasing the surface area of a solid reactant ...
... increases the chance of particles colliding, so increasing the reaction rate.	The effect of increasing temperature ...	... gives more energy to colliding reactant particles, so increasing the reaction rate.	A catalyst ...

... increases the rate of a chemical reaction.	Enzymes are ..	... catalysts in a biological system.	A reversible reaction is ...
... a chemical reaction where the products react and form the original reactants.	Reversible sign for chemical reactions	$\rightleftharpoons$	An exothermic chemical reaction transfers ...
... energy from reacting chemicals to surroundings.	An endothermic chemical reaction transfers ...	... energy from the surroundings to the reacting chemicals.	If a reversible reaction is endothermic in one direction ...
... it must be exothermic in the other direction.	A closed system is ...	... an arrangement where no reactant or product can get in or out.	Equilibrium occurs when there is ...
... no change in amount of reactants and products, as the rate of the forward reaction is equal to the rate of the reverse reaction.	The effect of changing equilibrium conditions can be predicted by	... le Chatelier's principle	Le Chatelier's principle states that ...
... a change in temperature, concentration or pressure on a system in equilibrium results in an equilibrium change to counteract these effects.	The effect of increasing reactant concentration on equilibrium ...	... more products will be formed until equilibrium is reached again.	The effect of decreasing product concentration on equilibrium ...

## Rate of chemical change - dominoes

... more reactants will react until equilibrium is reached again.	The effect of increasing temperature on an exothermic reaction at equilibrium	.. decreases the amount of products formed.	A catalyst speeds up a reaction by ...
... lowering the activation energy of the reaction.	In gaseous reactions at equilibrium an increase in pressure causes ...	... the equilibrium position to shift towards the side with the smaller number of molecules.	Factors which affect the rate of reaction are ...
... concentration of reactants, temperature, catalysts.	The rate of reaction between magnesium and HCl acid can be found by ...	... measuring the volume of gas produced in a certain amount of time.	The variables In a practical to find the effect of concentration on the rate of reaction are ...
... independent - concentration dependent - time taken	The rate of reaction between sodium thiosulfate and HCl acid can be found by ...	... measuring the time it takes for a precipitate to develop in the 'disappearing cross' practical.	The variable in an experiment you have control over is ...



### Teaching notes

There are 32 cards, allowing it to be used with a whole class. the activity could also be done individually, in pairs or in small groups to produce a complete ordered set of cards.