



Chemistry

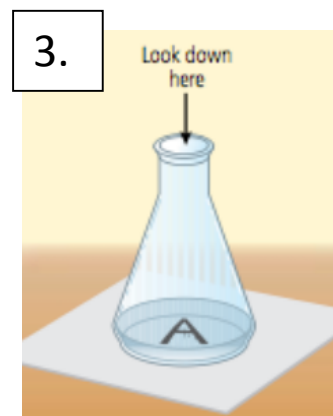
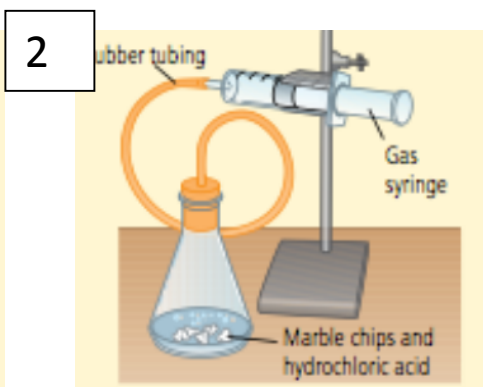
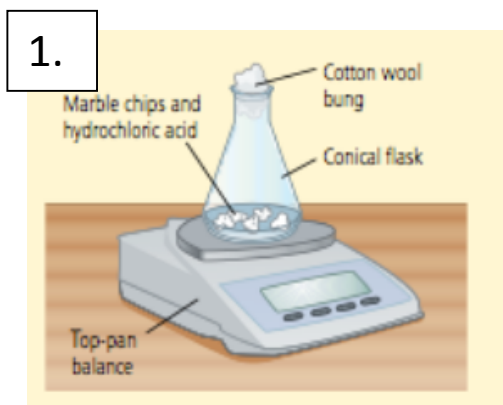
6. Rate and Extent of Chemical Change

Revisiting Booklet

Name:

Measuring the Rate of Reaction

Give three ways you can work out the rate of a chemical reaction shown in the diagrams below



1. _____

2. _____

3. _____

Looking at experiment 1: Why is the cotton wool placed in the neck of the conical flask?

Looking at experiment 2: What are the sources of error when measuring the volume of gas?

Looking at experiment 3: What are the advantages of using a light sensor rather than the 'disappearing cross' method to monitor precipitation?

Sketch these graphs

The mass of products formed in a reaction over time	The mass of reactants remaining in a reaction over time.
---	--

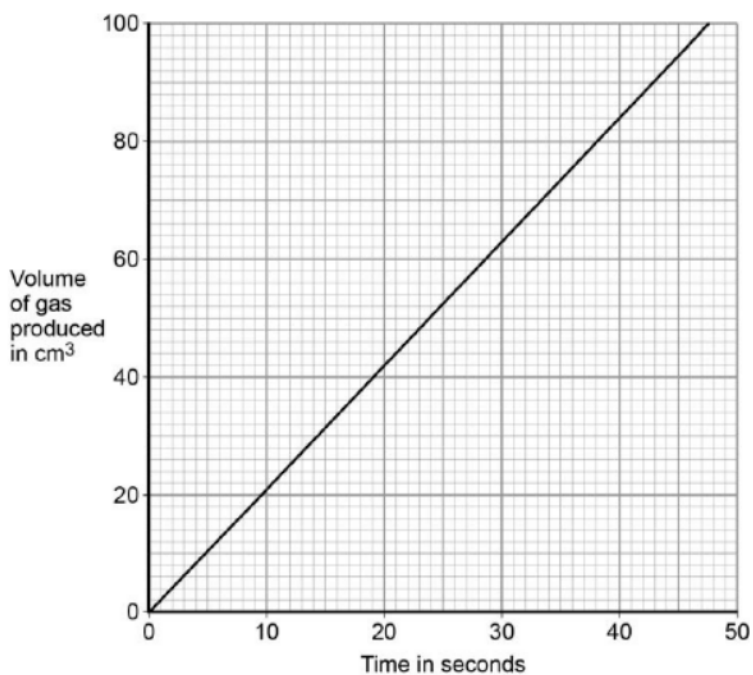
Calculating the rate of a reaction

Give two possible equations for calculating the rate

Mean rate of reaction =

OR

The graph below shows the amount of gas produced in the reaction between Hydrochloric acid and Magnesium



Calculate the rate of reaction

Collision theory and the Factors that Affect the Rate of a Reaction

What is the activation energy?

What is the collision theory?

List all the factors that can affect the rate of a chemical reaction

1. _____
2. _____
3. _____
4. _____

Which substance has the greatest surface area?

- € Boulder
- € Large Rock
- € Small Pebble
- € Powder

Why does increasing the surface area increase the rate of reaction?

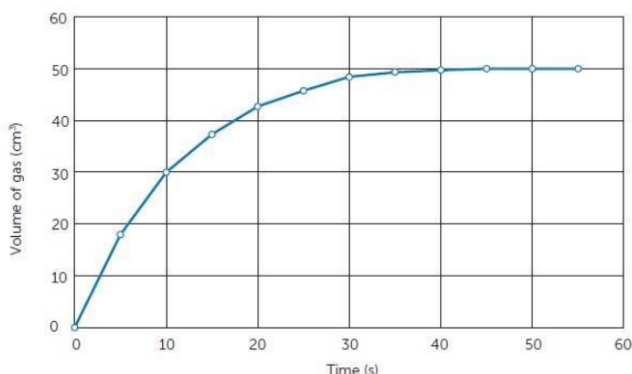
Explain why digestion by enzymes in your stomach happens quicker if you chew your food well before you swallow

Will a reaction go faster or slower at a higher temperature _____

Why does temperature affect rate in this way? Explain your answer using the collision theory.

Draw a diagram to show reactions happening at **low** and at **high** temperatures.

Cold	Hot
------	-----



This graph shows the amount of gas produced in a reaction in a given time.

Sketch another line to show how the graph would change at a higher temperature.

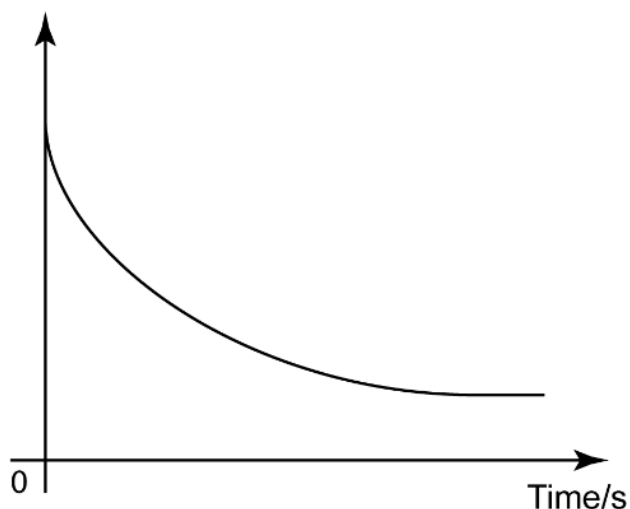
Will a reaction go faster or slower with a higher concentration of reactants? _____

Why does concentration affect rate in this way? Explain your answer using the collision theory.

Draw a diagram to show reactions happening at **low** and at **high** concentrations.

Low concentration	High Concentration
-------------------	--------------------

Mass of CaCO_3 / g



This graph shows how the mass of the reaction mixture changes over time with 1.00 mol/dm^3 acid.

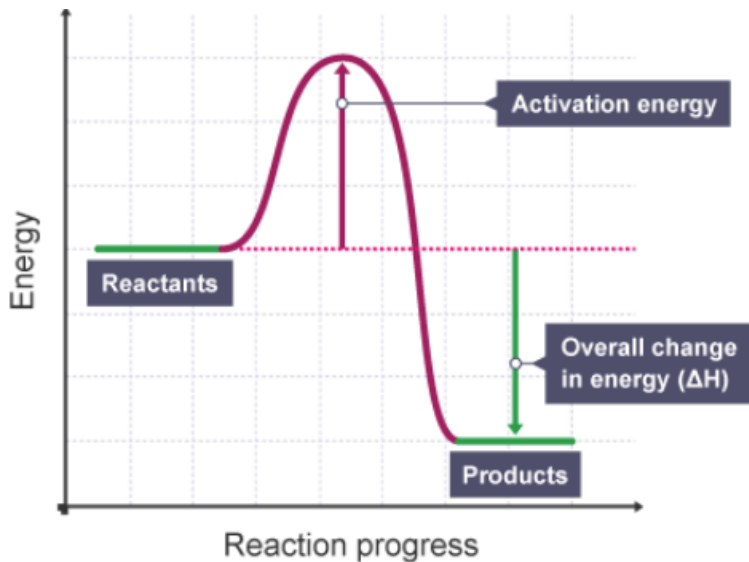
Sketch another line to show how the graph would change if 2.00 mol/dm^3 acid was used.

If you were asked to carry out an investigation into how concentration affects the rate of a reaction what would you keep the same to make it a fair test?

If you are measuring the mass change in a reaction the electric balance used needs a high resolution. What does this mean?

What is a catalyst?

How do Catalysts work?



This graph shows the energy profile of a reaction.

Sketch how this profile would change if a catalyst was added.

Catalysts are often used in industrial reactions. Why?

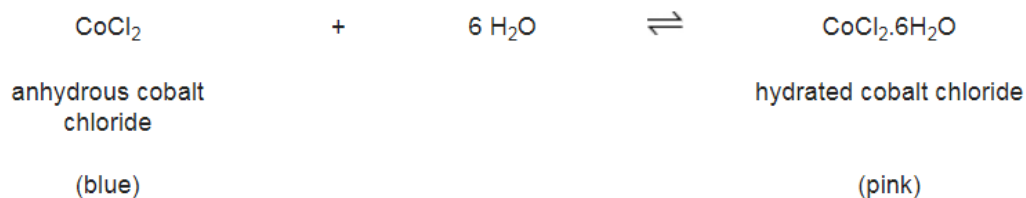
Solid Catalysts used are often shaped as tiny beads. Why are they made in these shapes?

Reversible Reactions

What is a reversible reaction?

What sign do we use to represent a reversible reaction?

The equation below shows the reversible reaction between anhydrous cobalt chloride and water.



What colour will be seen if water is added? _____

What colour will be seen if the substance is heated for a time? _____

What is an exothermic reaction?

What is an endothermic reaction?

How does the enthalpy (energy) change for a reversible reaction in one direction compare with the energy change for the reaction in the opposite direction?

What is a closed system?

What do chemists mean by equilibrium?

Higher Only

What is Le Chatlier's Principle?

Look back at the equation showing anhydrous cobalt chloride and water.

Explain why adding water turns the reaction mixture pink with Le Chatlier's principle

Pressure and Equilibrium

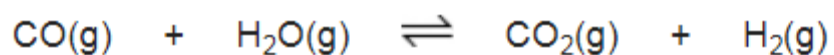
If the forward reaction produces more molecules of a gas....	If the forward reaction produces fewer molecules of a gas...
...an increase in pressure will...	...an increase in pressure will...
...a decrease in pressure will...	...a decrease in pressure will...



Look at the equation above..

How will an increase in pressure affect the yield of the reactants and products? Why?

How will a decrease in pressure affect the yield of the reactants and products? Why?



Look at the equation above..

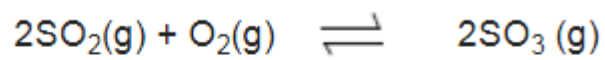
Explain why changing the pressure does **not** affect the yield of hydrogen at equilibrium

Concentration and equilibrium

If the concentration of the reactants is increased, how will this affect the yield of the products? Explain why using Le Chatelier's principle.

Temperature and Equilibrium

If the forward reaction is exothermic....	If the forward reaction is endothermic...
...an increase in temperature will...	...an increase in temperature will...
...a decrease in temperature will...	...a decrease in temperature will...



The reaction is exothermic in the forward direction.

Look at the equation above...

How will increasing the temperature the yield of sulphur trioxide (SO₃)? Why?
