

# Scheme of Learning: Rates of Reaction

## Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Cell Biology	Particle Model of Matter	Infection & Response	Atomic Structure & the Periodic Table	Atomic Structure (Physics)	Bonding & Structure	Energy	Bioenergetics	Rates of Reaction	Chemistry of the Atmosphere

## Topic Overview:

Chemical reactions can occur at vastly different rates. Whilst the reactivity of chemicals is a significant factor in how fast chemical reactions proceed, there are many variables that can be manipulated in order to speed them up or slow them down. Chemical reactions may also be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of desired product. Understanding energy changes that accompany chemical reactions is important for this process. In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product. Whilst there may be compromises to be made, they carry out optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way.

## Lesson Sequence:

We begin this topic by defining rate of reaction and how it can be quantified. We then carry out a series of practical investigations to demonstrate how surface area, temperature, concentration and catalysts effect the rate of chemical reactions. We spend a lesson on the maths skill of drawing tangents on a curved line graph to determine rate and then finish the topic focussing on reversible reactions and how changing conditions affects their equilibrium. The focus skill for this topic is graph skills.

## Sequence of Lessons:

1	Rate of Reaction
2	Collision Theory & Surface Area
3	Temperature & Rate of Reaction
4	Concentration & Rate – <i>Required Practical &amp; mid topic assessment</i>
5	Required Practical Write Up
6	The Effect of Catalysts
7	Using Tangents
8	Reversible Reactions
9	Altering Conditions
10	Revision
11	Test

## Resources:

1	1.0mol/dm <sup>3</sup> hydrochloric acid, Calcium carbonate, Balances, Cotton wool
2	Gas syringes, 1M Hydrochloric acid, Balances, Marble chips, Powdered CaCO <sub>3</sub> Conical flasks (correct size for gas syringe bungs)
3	Indigestion tablets, Pestle & mortars, Delivery tubes, Ice cream tubs, Kettles
4	Sodium thiosulphate, X's on card, 0.25M, 0.5M, 1M, 2M hydrochloric acid
5	Uncertainty worksheet
6	Hydrogen peroxide, Cooked liver, Raw liver Manganese oxide, Copper oxide, Iron oxide
7	Measuring rates worksheet
8	Class set: Anhydrous copper sulphate Demo: Traffic light reversible reaction bottle
9	n/a
10	Worksheets in shared folder
11	Test in shared folder

## Supportive Reading:

TBC
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## Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions based on the skill of 'graph skills'.