

Year 12

Chemistry - A Level

Atomic Structure & The Periodic Timetable

Group → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

↓ Period

The Periodic Table of the Elements

Lanthanides: 57 La, 58 Ce, 59 Pr, 60 Nd, 61 Pm, 62 Sm, 63 Eu, 64 Gd, 65 Tb, 66 Dy, 67 Er, 68 Tm, 69 Yb, 70 Lu

Actinides: 89 Ac, 90 Th, 91 Pa, 92 U, 93 Np, 94 Pu, 95 Am, 96 Cm, 97 Bk, 98 Cf, 99 Es, 100 Fm, 101 Md, 102 No, 103 Lr



Wider reading on ideas about the Atomic Model. Student's should also read up on: John Dalton, JJ Thomson, Ernest Rutherford, Hans Geiger and other Scientists.

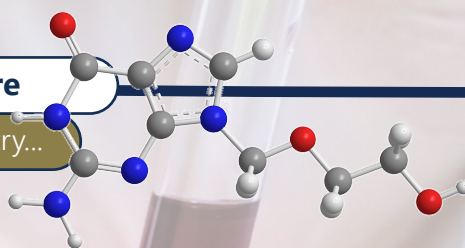
Linking



Use interconnected prior knowledge about atomic structure, bonding and the periodic table to add and secure previous knowledge.

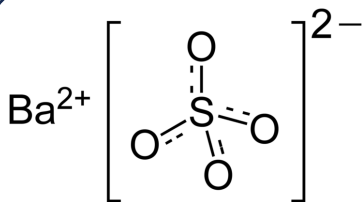
Chemical Bonding and Structure

Discrete molecules and electro chemistry...



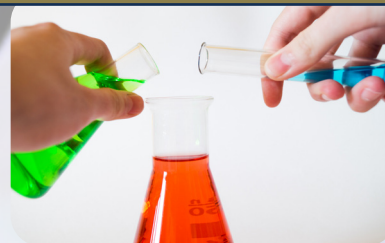
Redox Reactions

Studying oxidation and reduction...



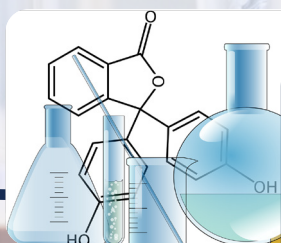
Inorganic Chemistry

Studying the use of Barium Sulfate in medical imaging and the periodic table Group 2 and Group 7



Formulae, equations and amounts of substance

- Empirical and molecular formulae
- Amount of substance
- Equations and calculations
- Errors and uncertainties
- Yield and atom economy
- Types of reactions



Organic Chemistry

Looking at Hydrocarbons, Halogenoalkanes and alcohols

Understanding the ethics of palm oil and biodiesel.



HARD WORKING

Using deliberate practice to understand and remember the stages of different mechanisms in organic chemistry

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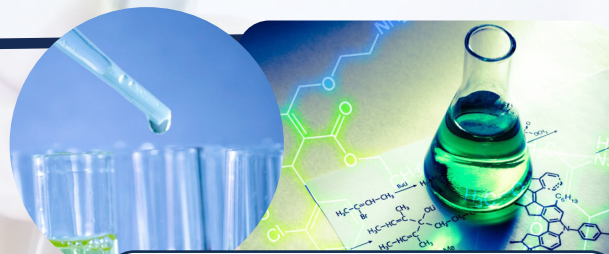
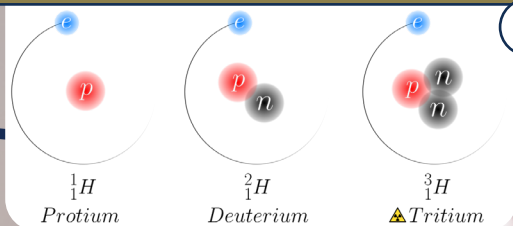
Chemistry - A Level

Modern analytical techniques

Mass and infrared spectroscopy, studying Francis Aston's work on the Isotope...



Nobel prize



Chemical Energetics

Heat energy and bond enthalpy...

Further reading

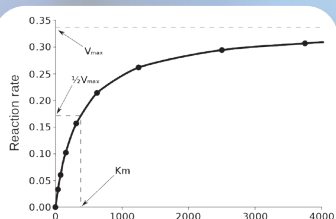
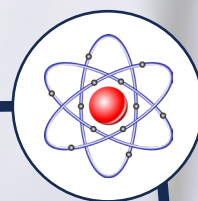
Thermodynamic systems, Brønsted-Lowry acids and bases.



ANALYSING



Students will need to study and analyse data to identify unknown substances.



Visit from The Royal Society of Chemistry - Spectroscopy in a Suitcase

Reaction Kinetics

Studying reaction rate and the world's fastest chemical reaction...

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Chemical Equilibrium

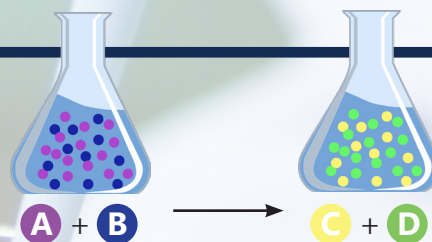
Looking at reversible reactions and equilibrium position...

Studying Henry-Louis Le Chatelier's chemical research



Year
13

Chemistry - A Level



Further Equilibrium

Diving deeper into chemical equilibrium...



Acid-base equilibria

Studying strong and weak acids and acid-base titrations...

Applying Occam's razor to the principle of pH.



CREATING

Flexible thinking

The ability to abandon one idea for a superior one or generate multiple solutions

$$\Delta G = \Delta H - T \Delta S$$

$T \Delta S_{total}$

$T \Delta S_{surr}$

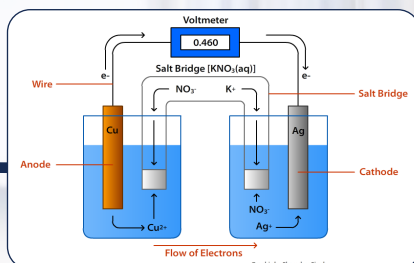
$T \Delta S_{system}$

Further Energetics

Researching lattice energy, entropy and Gibbs energy.

Wider reading

The History of Entropy and Gibbs Energy



Further Redox

Studying work on Faraday and Nerst. Further research into electrode potentials and redox in action

Transition Metals

Studying the principles of transition metals and its reactions, as well as their use as a catalyst.

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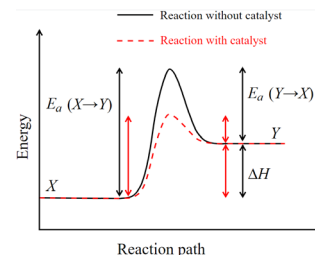


Chemistry - A Level

META-THINKING

Meta-cognition

The ability to knowingly use a wide range of thinking approaches and to transfer knowledge from one circumstance to another.



Further Kinetics

Researching historical naming of enantiomers using D/L and (+)/(-) notations...

Further Organic Chemistry

Studying the history of paracetamol and the medical properties of Aspirin. As well as organic structures and analysis.

Wider research

Students are encouraged to also research the use of Grignard reagents and the use of esters.

REALISING

Automaticity

The ability to use some skills with such ease as they no longer require active thinking

Time to revise!

A Level Assessment:

Students are assessed by 3 written exams at the end of Year 13:

1. Advanced Inorganic and Physical Chemistry
1h30m - 30% of A-Level grade
2. Advanced Organic and Physical Chemistry
1h30m - 30% of A-Level grade
3. General and Practical Principles of Chemistry
2h30m - 40% of A-Level grade

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