Chemistry Year 10 Triple

Curriculum Intent

Chemistry is the science of the composition, structure, properties and reactions of matter, understood in terms of atoms, atomic particles and the way they are arranged and link together. It is concerned with the synthesis, formulation, analysis and characteristic properties of substances and materials of all kinds. The GCSE Chemistry course provides interesting and challenging experiences to link key chemical ideas and understand how they relate to each other.

The course aims for all students to:

develop essential knowledge, understanding and application of different areas of Chemistry and how they relate to each other

understand how society makes decisions about scientific issues and how Chemistry contributes to the success of the economy and society

develop competence and confidence in a variety of practical, mathematical and problem solving skills

develop and demonstrate a deep appreciation of the skills, knowledge and understanding of scientific methods

promote students' interest in and enthusiasm for the subject, including an interest in further study and careers associated with the subject.

Autumn Term | Bonding, structure and properties & Quantitative chemistry

Students will learn:-

Bonding, structure and the properties of matter

Quantitative chemistry

What does excellence look like?

Carrying out practical processes logically, precisely and accurately.
Linking ideas together to answer questions logically and sequenced.
Linking big ideas to answer real life Chemistry problems.
For example:
- Draw dot-cross diagrams for unfamiliar compounds
- Justify the type of bonding of a substance in terms of properties
- Evaluate representations of covalent bonding
- Write formulae of ionic compounds incorporating polyatomic ions
- Explain the effect of a limiting reactant on the amount of product made.
- Calculate the unknown concentration in a neutralisation reaction, extracting data to perform multistep calculations independently.

How will we assess impact?

- Peer and self-assessment
- Previous lesson recap quiz
- Land mark tasks
- End of topic test

Knowledge, understanding & Skills

Chemical bonds: ionic, covalent and metallic; representing bonds; formulae of ionic compounds.
Relating bonding and structure to the properties of substances.
Structure, bonding and properties of carbon allotropes.
Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations.
Use of amount of substance (in moles) in relation to masses of pure substances, volumes of gases and concentration of solutions.
Reacting masses and gas volumes calculations; titration calculations.
Yield and atom economy.

How is homework used to enhance learning?

BBC Bitesize https://www.bbc.co.uk/bitesize/examspecs/z8xtmnb
Doc Brown's Chemistry http://www.docbrown.info/
Physicsandmathstutor https://www.physicsandmathstutor.com/chemistry-revision/gcse-aqa/

Suggested homework tasks

- Learn definitions of key terms
- Group and independent research projects
- Past examination questions practice
- Practical activity preparation, simulations and follow-up

Spring Term | Chemical changes, Electrolysis & Energy changes

Students will learn:-

Chemical changes

Electrolysis

Energy changes

How will we assess impact?

- Peer and self-assessment
- Previous lesson recap quiz
- Checkpoint tasks
- End of topic tests

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Knowledge, understanding & skills

Reactivity of metals: metal oxides, reactivity series, extraction of metals, reduction and oxidation.
Reactions of acids: with metals, neutralisation, formation of a soluble salt.
pH scale, strong and weak acids.
Electrolysis of molten ionic compounds, extraction of reactive metals, electrolysis of aqueous solutions, representation of redox reactions at electrodes as half equations.
Exothermic and endothermic reactions: energy transfer, reaction profiles, calculation of energy change using bond energies.
Chemical cells and fuel cells: cells and batteries, fuel cells.

Example homework tasks

- Learn definitions of key terms
- Group and independent research projects
- Past examination questions practice
- Practical activity preparation, simulations and follow-up

What does excellence look like?

Carrying out practical processes logically, precisely and accurately.
Linking ideas together to answer questions logically and sequenced.
Linking big ideas to answer real life Chemistry problems.
For example:
- Plan, carry out and evaluate the errors in a calorimetry investigation.
- Evaluate the use of hydrogen fuel cells instead of rechargeable cells and batteries.
- Represent displacement reactions using ionic equations.
- Explain quantitatively how the pH of a solution changes as acid or alkali is added, in terms of hydrogen ion concentration.
- Explain the electrolysis of brine using half equations, classifying reactions at the electrode as oxidation or reduction.
- Explain quantitatively how the pH of a solution changes as acid or alkali is added, in terms of hydrogen ion concentration.

Summer Term | Rate and extent of chemical change & Hydrocarbons

Students will learn:-
Rate and extent of chemical change
Organic Chemistry: Crude oil and alkanes

Knowledge, understanding & Skills

Rate of reaction: measuring rate of reactions, calculating rate of reactions, factors affecting rate, collision theory and activation energy, catalysts.
Reversible reactions and dynamic equilibrium: reversible reactions, energy changes, equilibrium.
The effect of changing conditions on equilibrium: temperature, equilibrium, pressure.
Carbon compounds as fuels and feedstock: crude oil, hydrocarbons, alkanes; fractional distillation; properties of hydrocarbons; cracking.

What does excellence look like?

Carrying out practical processes logically, precisely and accurately.
Linking ideas together to answer questions logically and sequenced.
Linking big ideas to answer Chemistry problems.
For example:
- Justify quantitative predictions and evaluate in detail their investigation into the effect of concentration on rate of reaction.
- Justify the use of catalysts in industry and in household products.
- Predict the effect on the rate of forward and reverse reactions by applying the Le Chatelier's Principle when conditions of a dynamic equilibrium are changed then equilibrium is re-established.
- Explain in detail how fractional distillation and cracking are used to meet demand for hydrocarbon products.

How is homework used to enhance learning?

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Suggested homework tasks

- Learn definitions of key terms
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International Opportunities

Visits Programmes

- Cruise guided visit on the River Rance
- Fontaine les Vaucluse – water mills
- La Camargue – marshes vegetation.
- Roussillon – ochre ridge.
- Senckenberg Museum – National History Museum.
- Physics lesson in school.
- Science Museum"
- Lake Como – Villa Carlotta and botanical gardens in Tremezza + Villa Monastero in Varenna
- Science and tech museum
- Arese - historical museum Alfa Romeo"
- Science museum - foucault's pendulum
- Biology - botanical gardens"
- Alcázar – guided tour and Camera Obscura
- Tarifa harbour - Whale watching
- Arcos - visit to El Rancho Cortesano (Bee/Honey Museum) - workshop"

Within the curriculum

The GCSE Chemistry curriculum is designed to deepen understanding and appreciation of how the International scientific society collaborates and makes decisions about world scientific issues.

Students are encouraged to research each theme beyond lessons, exploring topical international scientific examples.

Classwork and homework is designed to ensure that they can draw upon a worldwide knowledge of skills, techniques and theoretical understanding required for their examinations and the potential further study of Chemistry at an International level at global universities.