UNIT 1 - MATTER

CHEMISTRY 1

Content

- Solid, liquid and gaseous states
- Diffusion and Brownian motion
- Experimental techniques
- Separation techniques
- Balancing equations
- Atomic structure
- Periodic table
- Periodicity
- Ionic bonding
- Covalent bonding
- Metallic bonding
- Bonding and structure

Resources & ICT

- Textbook
- Study guide
- Keynote
- Online resources available from BM website
- Internet research

Types of assessment

- Quality of practical work
- Exercises from textbook and study guide
- Multiple choice questions from past papers
- Structured questions from past papers
- Peer assessment
- Judgements on effort and attitude towards learning

Students to Know

- Matter can be under solid, liquid or gaseous states
- Atoms are bonded together through ionic, covalent or metallic bonding in order to form molecules and compounds
- Elements are found in the Periodic Table which helps chemists to determine the structure of the atom and hence its reactivity, type of bonding or charge of its ion(s)

Students to Understand

- The kinetic theory explains the conversion from one state to another
- Different separation techniques used depending on the mixture
- The numbers indicated in the periodic table relate to the number of protons, neutrons and electrons in the atom
- The type of bonding depends on the number of electrons on the outer shell

Students to be able to Do

- Factual questions and show good exam technique

Cross curricular links

- Biology; chromatography
- Geography; salt evaporation ponds
- Economy; economical importance of selected chemicals: salt, platinum
- Physics; the kinetic theory of matter

Differentiation incl. EAL

- Extension tasks for students who previously studied material or have a good grasp of it
- Group work considerations; mixed ability

Learning styles activities

- Lectures
- Individual and group exercises
- Quizzes
- Test
- Presentation production
- Poster production

Guérande salt evaporation ponds, France

Global citizenship, internationalism, local environment

- Connections with commo used elements: chlorine, neon, tungsten...
- Desalination facilities in the United Arab Emirates
- Images in the presentation connect to international or to local culture (salt evaporation ponds in France, Swiss coins)
- Acceptance of new scientific theories, as exemplified by Mendeleev's proposal of a Periodic Table

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September-December - 13 weeks

UNIT 2 - INORGANIC CHEMISTRY

CHEMISTRY I

Content

- pH scale and indicators
- Properties of acids & bases
- Weak species
- Acidity in soil
- Preparation of soluble salts
- Preparation of insoluble salts
- Anions, cations, gas detection
- Reactivity series
- Competition reactions
- Metal extraction: iron and zinc
- Steel production
- Use of metals: Al, Zn, Fe, Cu
- Rusting

Resources & ICT

- Textbook
- Study guide
- Keynote
- Online resources available from BM website
- Internet research

Types of assessment

- Quality of practical work
- Exercises from textbook and study guide
- Multiple choice questions from past papers
- Structured questions from past papers
- Peer assessment
- Judgements on effort and attitude towards learning

Students to Know

- The main uses and the main compounds of iron, zinc, aluminium, copper, calcium
- How salts are prepared depending on their solubility
- How to name salts according to the acid and the metallic compound involved
- The tables of anion and cation detection
- The main parts of a blast furnace and the reactions taking place

Students to Understand

- How pH is determined, what is its significance
- The concept of a weak species
- How steel is produced from pig iron
- The conditions required for iron to rust

Students to be able to Do

- Place a metal in the reactivity series given some experimental data
- Perform anion and cation detection in the laboratory
- Connect the properties of a metal with possible applications

Cross curricular links

- Economy; economical importance of some elements and their compounds, i.e. iron and zinc
- Geography; natural resources
- Biology; pH control in soils

Differentiation incl. EAL

- Extension tasks for students who previously studied material or have a good grasp of it
- Group work considerations; mixed ability

Learning styles activities

- Lectures
- Individual and group exercises
- Quizzes
- Test
- Presentation production
- Poster production

Spreading lime on a Devon field, UK

Mark Robinson / CC BY 2.0

Global citizenship, internationalism, local environment

- Blast furnace in Northern Germany
- Discussion of the evolution of steel production by country
- pH control in local agriculture; pH control in lake Geneva

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January-March - 9 weeks

UNIT 3 - ORGANIC CHEMISTRY

CHEMISTRY I

Content

- Natural fuels
- Distillation of crude oil
- Alkanes: combustion, substitution, structure
- Alkenes: preparation, addition reactions, test
- Alcohols: preparation, structure
- Addition polymerisation
- Condensation polymerisation
- Polyesters, polyamides
- Uses of polymers
- Plastics and pollution

Resources & ICT

- Textbook
- Study guide
- Keynote
- Online resources available from BM website
- Internet research

Types of assessment

- Quality of practical work
- Exercises from textbook and study guide
- Multiple choice questions from past papers
- Structured questions from past papers
- Peer assessment
- Judgements on effort and attitude towards learning

Students to Know

- Definitions of these terms: distillation, homologous series, functional group, general formula, isomerism, monomer, polymer, addition and condensation polymerisation
- The structures of these homologous series: alkanes, alkenes, alcohols
- The reactions and uses of the previous homologous series
- The test for alkenes

Students to Understand

- Why certain functional groups give rise to certain reactivity

Students to be able to Do

- Classify a compound in its homologous series and recall its characteristics based on its functional group
- Determine which repeating unit will result from the polymerisation of specific monomers

Cross curricular links

- Biology; food constituents, digestion, amino acids
- Economy; consequences of crude oil facilities operation
- PSHE; health consequences of pollution

Differentiation incl. EAL

- Extension tasks for students who previously studied material or have a good grasp of it
- Group work considerations; mixed ability

Learning styles activities

- Lectures
- Individual and group exercises
- Quizzes
- Test
- Presentation production
- Poster production

Anacortes oil refinery, USA

Walter Siegmund / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- Plastics and pollution, ways to reduce plastic consumption and to reduce the impact of residues on the environment using biodegradable plastics
- Oil spills: ecological implications and possible solutions
- Field trip to the TRIDEL plant in Lausanne

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April-June - 10 weeks