Crewe Engineering & Design UTC

# Curriculum Summary – Chemistry (Year 10)

## Autumn

### C1: Atomic structure

In this chapter students will:

- Develop their understanding of atoms as fundamental chemical building blocks.
- Interpret chemical formulae and understand the law of the conservation of mass and balance chemical equations.
- Understand the differences between compounds and mixtures, and how mixtures can be separated using different techniques.
- Learn about the development of the atomic model, the development and use of models within science and compare different models of the atom.
- Draw electronic structures of the first 20 elements in the periodic table.

### C2: The periodic table

In this chapter students will:

- Learn about the development of the periodic table, including the work of Dalton, Newlands, and Mendeleev.
- Students will develop their understanding of electronic structures and apply this to the arrangement of the periodic table and the chemical properties of Group 0, Group 1, and Group 7 elements.
- Identify and explain trends in properties and reactivity in terms of the electronic structure of the elements.

### C3: Structure and bonding

In this chapter students will:

- Develop their understanding of the states of matter and build on their understanding of the particle model, using this to explain the energy transfers involved when substances change state.
- Learn about the different types of bonding in substances and explain these in terms of ions and electrons.
- Learn how the bonding of a substance affects its bulk properties and describe the difference in bonding and properties of giant ionic structures, simple covalent molecules, and giant covalent structures (including different arrangements of carbon).
- Understand that covalent, metallic, and ionic bonding is strong, but that it is how the particles interact (intermolecular forces) that determines properties.

## Spring

### C5: Chemical changes

In this chapter students will:

- Develop their understanding of the reactivity series, study the reactions of the metals with water and acids and describe these reactions.
- Apply their understanding of the reactivity series to displacement reactions and the extraction of metals
- Learn about oxidation and reduction as the loss and gain of electrons respectively.
- Learn about salts and how they are prepared, including from metals and acids, acids and bases, and acids and carbonates.
- Prepare a pure, dry sample of a salt from an insoluble metal oxide or carbonate as part of the required practical.
- Learn about the pH scale and explain how pH relates to H+(aq) ion concentration and the difference between strong and weak acids.

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**C6: Electrolysis**

In this chapter students will:

- Explain why ionic compounds can undergo electrolysis when molten or in solution.
- Explain the movement of particles during electrolysis, and the reactions that occur at the electrodes.
- Apply their understanding of electrolysis to the extraction of aluminium, and learn how to investigate the electrolysis of a solution.
- Predict the products of electrolysis and write balanced half equations.

**Summer**

**C7: Energy changes**

In this chapter students will:

- Learn about the energy transfers that occur during chemical reactions and the difference between exothermic and endothermic reactions.
- Interpret experimental data to identify if a reaction is exothermic or endothermic and describe some uses of exothermic and endothermic reactions.
- Sketch and interpret reaction profile diagrams
- Use bond energies to calculate overall energy changes for a reaction, identifying if it is exothermic or endothermic.

**C4: Chemical calculations**

In this chapter students will:

- Learn about relative atomic mass and relative formula mass and use relative atomic masses to calculate relative formula masses of compounds.
- Understand the mole and Avogadro's constant, calculate the number of moles and use moles to balance symbol equations and calculate reacting masses.
- Apply their understanding of relative atomic mass, relative formula mass, and moles to concentrations and calculate concentrations in $g/dm^3$.