

## AUTUMN 1

## AUTUMN 2

## SPRING 1

## SPRING 2

## SUMMER 1

## SUMMER 2

### YEAR 12

#### Atoms, ions and compounds

- Atomic structure and isotopes
- Relative formula mass and formulae equations

#### Amount of substance

- Amount of substance and the mole
- Moles and volume (PAG 1.1 Determining the formula of a compound)
- Reacting quantities

#### Electrons and bonding

- Electron structure
- Ionic and covalent bonding

#### Acid and redox

- Acid, base and neutralisation (PAG 2.3 Identifying an unknown carbonate)
- Acid-base titrations
- REDOX

#### Shapes of molecules and intermolecular forces

- Shapes of molecules and ions
- Electronegativity and polarity
- Intermolecular forces and hydrogen bonding

#### Periodicity

- Periodic table
- Ionisation energies
- Periodic trends in bonding and structure

#### Reactivity trends

- Group 2 and halogens
- Qualitative analysis (PAG 4.3 Identifying unknowns)

#### Enthalpy

- Measuring enthalpy changes (PAG 3.1 Determination of the enthalpy change of neutralisation)
- Bond enthalpies
- Hess' law and enthalpy cycles

#### Reaction rates and equilibrium

- Reaction rates (PAG 9.3 Rate of reaction of magnesium and hydrochloric acid)
- Catalysts
- Boltzmann distribution
- Le Chatelier's principle
- The equilibrium constant Kc

#### Basic concepts of organic chemistry

- Organic chemistry
- Nomenclature
- Isomerism
- Reaction mechanisms introduction

#### Alkanes and Alkenes

- Properties of alkanes and their reactions
- Properties of alkenes and their reactions

#### Alcohols

- Properties of alcohols and their reactions

#### Haloalkanes

- Chemistry of haloalkanes (PAG 5.1 Synthesis of haloalkane)
- Organohalogen compounds in the environment

#### Organic synthesis

- Practical techniques in organic chemistry
- Synthetic routes

#### Spectroscopy

- Mass spectroscopy
- IR spectroscopy

### YEAR 13

#### Rates of reactions

- Orders, rate equations and constants
- Concentration - time graphs
- Rate - concentration graphs (PAG 10.1 Iodine clock)
- Reaction determining step

#### Equilibrium

- Equilibrium constant Kc part 2
- Equilibrium constant Kp
- Controlling the position of equilibrium

#### Acids, bases and pH

- Bronsted-Lowry acids and bases
- pH scale and strong acids (PAG 11.2 pH titration curves)
- Acid dissociation Ka, pH of weak and strong acids

#### Aromatic Chemistry

- Benzene and substitution reactions
- Chemistry of phenol
- Distributing and directing groups

#### Carbonyls and carboxylic acids

- Identifying carbonyl compounds
- Carboxylic acid derivative (PAG 6.1 synthesising aspirin)

#### Amines, amino acids and proteins

- Amino acids, amides and chirality
- Condensation polymers

#### Buffers and neutralisation

- Buffer solutions in the body
- Neutralisation

#### Enthalpy and entropy

- Lattice enthalpy
- Enthalpy changes in solution
- Factors effecting lattice enthalpy and hydration
- Entropy and free energy

#### Redox and electrode potentials

- Redox reactions

#### Redox titrations (PAG 12.1 Investigating iron tablets)

- Electrode potentials (PAG 8.1 Electrochemical cells)

#### Transition elements

- D-block
- Formation and shapes of ions
- Stereoisomerism
- Ligand substitution
- REDOX and qualitative analysis

#### Organic synthesis

- Carbon-carbon bond formation
- Further practical techniques
- Further synthetic routes (PAG 7.2 Identifying organic unknowns)

#### Chromatography and spectroscopy

- Chromatography and functional group analysis
- NMR
- Carbon-13 NMR Spectroscopy
- Proton NMR
- Combined techniques

Revision of  
identified topics