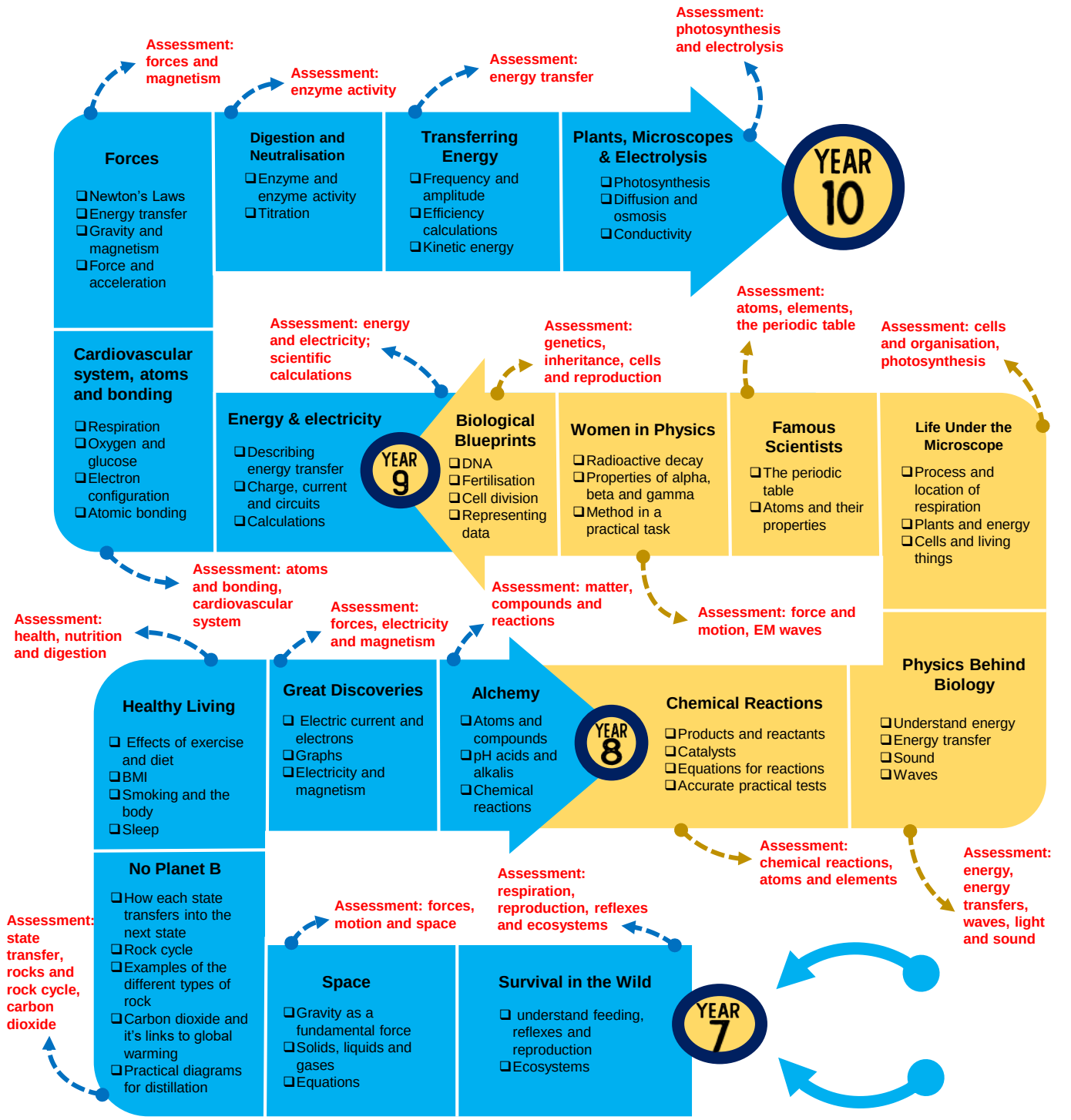
KS3 SCIENCE CURRICULUM MAP



SCIENCE SKILL Scientific knowledge and conceptual understanding

SCIENCE SKILL The nature, processes and methods of science

SCIENCE SKILL Analysis, evaluation and measurement

SCIENCE SKILL Experimental skills and investigations

KS4 SCIENCE (COMBINED) CURRICULUM MAP

FURTHER STUDY

A level Physics, Chemistry and Biology; Level 3 BTEC Science

CAREER PATHS

University, Researcher, Forensic Scientist, Biochemist, Chemical Engineer, Education and Training

SKILLS

Critical analysis, scientific investigation, evaluation

Assessment: multiple shorter assessments and two exam questions on growth and reactions, groups of the periodic table, forces, matter and ionising radiation, exchange, electricity and electrolysis.

REVISION & EXAMS

REVISION

Exchange, Electrolysis and Electricity

- ❑ Energy transfer in electric circuits
- ❑Diffusion and osmosis
- ❑Scientific observation and electrolysis
- ❑Ions and the process
- ❑Products of electrolysis
- ❑Current, charge, resistance and electric circuits
- ❑The National Grid

Growth and Reactions, Groups of the Periodic Table, Forces, Matter and Ionising Radiation

- ❑ Different groups of elements
- ❑Plant function and cell division
- ❑Radio-activity and the periodic table
- ❑Radiation and its effect on matter
- ❑How forces can deform materials

Assessment: mock exams covering all content to-date

Assessment: synoptic 20 marks on evolution, separating mixtures and radioactive decay

Assessment: 20 mark synoptic on pathogens, metal extraction, the EM spectrum and waves

Evolution, Separating Mixtures and Radioactive Decay

- ❑ Theory of evolution
- ❑Evolution and bacteria
- ❑Distillation and fractional distillation
- ❑Nucleus and radioactivity
- ❑Background radiation
- ❑Separation techniques
- ❑Half-life
- ❑Analysing data

Metal extraction, Pathogens, EM Spectrum

- ❑ Communicable and non-communicable disease
- ❑Metals and ores
- ❑Waves and energy transfer
- ❑Reflection and refraction

Risk Factors, Dynamic Equilibrium

- ❑ Risk factors and cardiovascular disease
- ❑Reversible and irreversible reactions
- ❑Equilibrium
- ❑Pressure, temperature and concentration

YEAR 11

Cycles, Rates of Reaction, Forces and Matter

- ❑ Cell division
- ❑The water, nitrogen and carbon cycles
- ❑Endo and exothermic reactions
- ❑Rates of reaction
- ❑DT and VT graphs to analyse journey
- ❑History of the structure of the atom

Assessment: End of year exams - GCSE past paper. 60 marks on the topics from GCSE paper 1 including risks and dynamic equilibrium

Assessment: three exam questions on the content from cycles, measuring rates of reaction, acceleration as a vector and matter.

Inheritance and Neutralisation

- ❑ Genes and alleles (including ratio and probability)
- ❑Inheritance and variation
- ❑Reactions involving acids
- ❑Strong and weak acids
- ❑Draw conclusions from experimental data
- ❑Scientific method

Response, Fuels and Energy

- ❑ Nerve impulses and hormones
- ❑Thermoregulation and gluco-regulation
- ❑ Structure and formation of hydrocarbons
- ❑Fractional distillation
- ❑Power and heat capacity

Survival, Bonding and Forces

- ❑ understanding food chains and webs
- ❑Ecosystems – change and the environment
- ❑Atomic structures – ions and bonding
- ❑Momentum – kinetic energy

YEAR 10

Assessment: synoptic 20 marks on the content from inheritance and neutralisation

Assessment: synoptic 40 marks. 20 marks on the content from response, fuels, energy, electrical power and heating; and 20 marks on survival, bonding and forces.

A series of short answer questions on cardiovascular system and digestion, energy stores and transfers, atoms the periodic table and neutralisation. Longer response questions on survival, bonding and forces.

SCIENCE SKILL
Scientific knowledge and conceptual understanding

SCIENCE SKILL
The nature, processes and methods of science

SCIENCE SKILL
Analysis, evaluation and measurement

SCIENCE SKILL
Experimental skills and investigations

SCIENCE (BIOLOGY) CURRICULUM MAP

FURTHER STUDY

A level Biology; Level 3 BTEC Science

CAREER PATHS

University, Researcher, Forensic Scientist, Biochemist, Chemical Engineer, Education and Training

SKILLS

Critical analysis, scientific investigation, evaluation

Assessment: multiple shorter assessments and two exam questions on growth and reactions, survival, inheritance, evolution, exchange and pathogens.

REVISION & EXAMS

REVISION

Exchange

- ❑Parts of the circulatory system
- ❑Energy transfer in electric circuits
- ❑Diffusion and osmosis
- ❑Adaptions of root hair cells
- ❑Calculating heat rate
- ❑Role of stomata
- ❑Adaptions of leaf for gas exchange
- ❑Fick's law
- ❑Stroke volume

Growth and Reactions

- ❑ Different groups of elements
- ❑Plant function and cell division
- ❑Enzymes
- ❑Stem cells
- ❑Photosynthesis and respiration
- ❑Equations for plant functions
- ❑How plants and animals grow
- ❑Creating new cells
- ❑Plant tropism

Assessment: mock exams covering all content to-date

Assessment: 20 mark synoptic longer response on pathogens

Assessment: longer response synoptic 20 marks on evolution

Cycles

- ❑ Cell division
- ❑The water, nitrogen and carbon cycles
- ❑Hormones and the menstrual cycle
- ❑Treatments for infertility
- ❑Cycles and real-world problems (drought and global warming)
- ❑Bacteria and the nitrogen cycle

Evolution

- ❑ Theory of evolution
- ❑Organisms adapting to their environment
- ❑Evolution and bacteria
- ❑Classification
- ❑Antibiotics
- ❑Darwin and Wallace
- ❑The 5 kingdoms and the domain method
- ❑Evolution and the pentadactyl limb

Pathogens

- ❑ Communicable and non-communicable disease
- ❑Defences against disease
- ❑Herd immunity
- ❑Vaccines
- ❑How pathogens are spread
- ❑Aseptic technique

Risk Factors

- ❑ Risk factors and cardiovascular disease
- ❑Understanding health
- ❑Drug testing and placebos
- ❑BMI and the weight to hip ratio
- ❑Diet and exercise
- ❑Human genome project

YEAR 11

Assessment: End of year exams - GCSE past paper. 60 marks on the topics from GCSE paper 1 pathogens, risk factors and evolution.

Assessment: one longer response exam question on the content from survival.

Inheritance

- ❑The structure of DNA
- ❑Genes and alleles (including ratio and probability) and how this affects appearance
- ❑Inheritance and variation
- ❑Genes and the sex chromosomes
- ❑Selective breeding and genetic engineering
- ❑Codominance in blood groups

Response

- ❑ Nerve impulses, the body and hormones
- ❑Thermoregulation and gluco-regulation
- ❑ Understanding how stimuli are detected
- ❑Blood glucose variation

Survival

- ❑ understanding food chains and webs
- ❑Living and non-living factors influence ecosystems
- ❑Ecosystems – change and the environment
- ❑Energy transfers

YEAR 10

Assessment: longer response synoptic 20 marks on the content from inheritance and 20 marks on survival and response

Assessment: longer response synoptic 20 marks on the content from response and 20 marks on survival

A series of short answer questions on the cardiovascular system and digestion; one 30 mark longer response question on survival

SCIENCE SKILL — Scientific knowledge and conceptual understanding

SCIENCE SKILL — The nature, processes and methods of science

SCIENCE SKILL — Analysis, evaluation and measurement

SCIENCE SKILL — Experimental skills and investigations

SCIENCE (CHEMISTRY) CURRICULUM MAP

FURTHER STUDY

A level Chemistry; Level 3 BTEC Science

CAREER PATHS

University, Researcher, Forensic Scientist, Biochemist, Chemical Engineer, Education and Training

SKILLS

Critical analysis, scientific investigation, evaluation

Assessment: created using past paper questions, including content on groups of the periodic table and electrolysis.

REVISION & EXAMS

REVISION

Electrolysis

- How and why electrolysis is used
- How the process of ions work
- The products of electrolysis
- Running an electrolysis experiment on the electrolyte and the electrodes
- Construct half equations to show the reactions at the electrodes

Groups of the Periodic Table

- Trends of reactivity on the periodic table
- Different groups of elements
- Products from reactions
- Displacement of halogens and reactions of alkali metals with water
- Reactivity and electron configuration
- Balancing symbol equations for complex reactions

Assessment: mock exams covering all content to-date

Assessment: synoptic, 20 marks on the content from separating mixtures, and 20 marks on the content from neutralisation, bonding and fuels

Assessment: synoptic, 20 marks on the content from metal extraction, and 20 marks on the content separating mixtures

Separating Mixtures

- Filtrations
- Distillation and fractional distillation
- Chromatography
- Designing separation techniques
- Changes in particles during separation
- Comparing different substances using Rf values and boiling points

Metal extraction

- Origins of metals and extraction
- Reactivity and extraction methods
- Metals, alloys and their properties
- Corrosion
- Oxidation and reduction
- Transition metals

Dynamic Equilibrium

- Chemical reactions as a symbol equation
- Reversible and irreversible reactions.
- Understanding equilibrium
- Effects of pressure, temperature and concentration on a chemical reaction.
- Titration to make fertilisers

YEAR 11

Measuring Rates of Reaction

- Indicator that chemical reactions are taking place
- Endo and exothermic reactions
- Factors that affect rates of reaction
- Rates of reactions including collisions of particles
- Calculating energy release

Assessment: End of year exams - GCSE past paper. 60 marks on the topics from GCSE paper 1

Assessment: three exam questions - one on a core concept, one on the content from measuring rates or reaction, and one from dynamic equilibrium or metal extraction.

Neutralisation

- Uses of acids and alkalis
- Reactions involving acids
- Strong and weak acids
- Solubility rules for common compounds
- Write a scientific method
- Concentration calculations

Fuels

- Fuels and the difference between compounds and mixtures
- Hydrocarbons
- Alkanes and alkenes
- Fractional distillation
- Crude oil into fractions
- Fuel cells
- Balanced equations

Bonding

- Atomic structure and electron configuration
- Atoms and Ions
- Dot-cross diagrams to demonstrate bonding
- Atoms and bonding
- Delocalised electrons and electricity
- Large lattice structures

YEAR 10

Assessment: synoptic, 20 marks on the content from neutralisation, and 20 marks on the content from bonding and fuels

Assessment: 30 mark short answer test on the content from fuels

Assessment: 15 marks - a series of short answer questions on atoms the periodic table and neutralisation; 30 mark short answer test on the content from bonding

SCIENCE SKILL Scientific knowledge and conceptual understanding

SCIENCE SKILL The nature, processes and methods of science

SCIENCE SKILL Analysis, evaluation and measurement

SCIENCE SKILL Experimental skills and investigations

SCIENCE (PHYSICS) CURRICULUM MAP

FURTHER STUDY

A level Physics; Level 3 BTEC Science

CAREER PATHS

University, Researcher, Forensic Scientist, Education and Training

SKILLS

Critical analysis, scientific investigation, evaluation

Assessment: multiple shorter assessments and two exam questions on electricity, forces, matter and ionising radiation, and space

REVISION & EXAMS

REVISION

Electricity

- ❑Energy transfers in electric circuits
- ❑Substitute into and rearrange equations to calculate electrical quantities
- ❑Use of current, charge, potential difference and resistance in electric circuits
- ❑Transformers in the national grid
- ❑Electricity and magnetism
- ❑Transformers, dynamos and motors

Forces, Matter and Ionising Radiation

- ❑Understanding of resultant force and free-body diagrams
- ❑How the different types of radiation affect matter
- ❑Analyse how forces can deform materials
- ❑Resolving vector diagrams
- ❑How multiple forces affect the motion of an object
- ❑Knowledge of materials and real life scenarios

Assessment: mock exams covering all content to-date

Assessment: synoptic 40 marks, with 20 marks on the content from radio-active decay, and 20 marks on the content from forces and energy, electrical power and heating

Assessment: synoptic 20 marks on the EM spectrum and waves

Space

- ❑Objects in the solar system.
- ❑The force of gravity.
- ❑Frequency and wavelength
- ❑Structure of the universe
- ❑Star processes
- ❑Mass vs Weight
- ❑Life cycle of a star
- ❑The doppler effect
- ❑Gas pressure
- ❑Electromagnetic waves and the atmosphere

Radioactive Decay

- ❑Structure of the atom
- ❑Alpha, beta and gamma radiation
- ❑Explain why a nucleus may or may not be radioactive
- ❑Measuring radiation
- ❑Background radiation
- ❑Analyse data to determine the type of radioactivity present
- ❑Half-life calculations and nuclear decay equations
- ❑Analysing half-life and radio-active materials

The EM Spectrum and Waves

- ❑Waves and energy transfer
- ❑Reflection and refraction
- ❑Electromagnetic waves
- ❑Wave frequency and energy transfer
- ❑Waves at a boundary
- ❑Uses of EM waves

Acceleration as a Vector and Matter

- ❑Calculating speed and acceleration
- ❑Using DT and VT graphs to analyse a journey
- ❑History of the structure of the atom
- ❑Rutherford's alpha scattering experiment
- ❑Calculating gradients

YEAR 11

Assessment: End of year exams - GCSE past paper. 60 marks on the topics from GCSE paper 1

Assessment: assessment one is a test made up of three exam questions. One on a core concept, one on the content from space and one from the content from the EM spectrum and waves, or acceleration as a vector and matter

Energy, Electrical Power and Heating

- ❑Power, heat capacity and latent heat
- ❑Resistance and thermal energy transfer
- ❑Heat and change in particles
- ❑Internal substance energy
- ❑Analyse series and parallel circuits

Forces

- ❑Force and acceleration
- ❑Momentum – kinetic energy
- ❑Use of F=ma
- ❑Drawing free body diagrams
- ❑Centripetal force and circular motion
- ❑Conservation of momentum to collisions and explosions

YEAR 10

Assessment: synoptic 40 marks, with 20 marks on the content from radio-active decay, and 20 marks on the content from forces and energy, electrical power and heating

Assessment: synoptic 40 marks, with 20 marks on the content from energy, electrical power and heating; and 20 marks on content from forces

Assessment: 15 marks - a series of short answer questions on energy stores and transfers; 30 mark short answer test on the content from forces

SCIENCE SKILL
Scientific knowledge and conceptual understanding

SCIENCE SKILL
The nature, processes and methods of science

SCIENCE SKILL
Analysis, evaluation and measurement

SCIENCE SKILL
Experimental skills and investigations

BIOLOGY CURRICULUM MAP

FURTHER STUDY
Biology university study
Post-graduate study

CAREER PATHS
Researcher, Forensic Scientist, Biochemist, Education and Training

SKILLS
Critical analysis, interpretation, evaluation

Assessment: Two 45 mark assessment, mixture of multiple short and long answer questions on neuronal communication, respiration, cellular control and patterns of inheritance, hormonal communication, photosynthesis, manipulating genomes, cloning and biotechnology, excretion, ecosystems, plant and animal responses.

Mock assessments

Assessment: two 45 mark assessment; a mixture of multiple short and long answer questions on neuronal communication, respiration, cellular control and patterns of inheritance, hormonal communication, photosynthesis, manipulating genomes, cloning and biotechnology.

Revision and Examination Preparation

Excretion, Ecosystems Plant and Animal Responses
- ❑Role of the liver
- ❑Kidney structure
- ❑Divisions of the nervous system
- ❑Types of muscle
- ❑Energy transfers
- ❑Succession
- ❑Recycling in ecosystems
- ❑Types of dialysis
- ❑The nephron
- ❑Knee jerk reflex
- ❑Muscle structure
- ❑Affecting succession

Assessment: Two 45 mark assessment, mixture of multiple short and long answer questions, and a synoptic element on cell structure, biological molecules, nucleotides, nucleic acids, enzymes, cell division, biological membranes, and communicable disease, exchange surfaces and biodiversity.

Assessment: Two 45 mark assessment, mixture of multiple short and long answer questions, synoptic elements on cell structure, biological molecules, nucleotides, nucleic acids, enzymes, cell division, biological membranes, and communicable disease, exchange surfaces, biodiversity, transport in animals and plants, and classification

Hormonal Communication Photosynthesis Manipulating Genomes, Cloning and Biotechnology
- ❑Hormone action
- ❑Glucoregulation keywords
- ❑Structure of the chloroplasts
- ❑Thin layer chromatography
- ❑Restriction enzymes
- ❑The Calvin cycle
- ❑Limiting factors in respiration
- ❑Gene therapy

Exchange Surfaces; Biodiversity
- ❑The need for exchange surfaces
- ❑Inhalation and exhalation
- ❑Types of sampling
- ❑Factors affecting biodiversity
- ❑Gas exchange in fish
- ❑Insect gas exchange
- ❑Accurate dissection
- ❑Importance of international cooperation for conservation

Transport in Animals and Plants; Classification
- ❑Comparing single and double circulatory structures
- ❑Heart structure
- ❑water and transport in plants
- ❑Types of conservation

Homeostasis Populations and sustainability
- ❑ Why homeostasis is required
- ❑Cell signalling
- ❑Negative feedback
- ❑Interspecific and intraspecific competition

YEAR 13

Neuronal Communication Respiration Cellular Control and Patterns of Inheritance
- ❑ neurone structure
- ❑where the reactants of respiration are used
- ❑where each stage of respiration occurs
- ❑mutations

End of year exam- full papers, breadth and depth

Assessment: two 45 mark assessment, mixture of multiple short and long answer questions on neuronal communication, respiration, cellular control and patterns of inheritance

Hall based exams - assessment on cell structure, biological molecules, nucleotides and nucleic acids, enzymes and cell division, biological membranes, communicable disease, exchange surfaces, biodiversity, transport in animals and plants, classification, homeostasis, populations and sustainability (40 marks per paper)

Biological membranes; Communicable disease
- ❑Physical defences against disease
- ❑Roles of antibodies
- ❑Physical defences against disease
- ❑Roles of antibodies
- ❑How the structure of membranes links to its functions
- ❑Permeability of membranes
- ❑Chemical defences

Nucleotides, Nucleic Acids; Enzymes, Cell Division
- ❑DNA replication
- ❑Transcription and translation
- ❑How nucleic acids are formed
- ❑Factors affecting enzyme activity

Cell Structure; Biological Molecules
- ❑Functions of organelles
- ❑Yeast cell structure
- ❑Advantages of each microscopes
- ❑Reactions of the biological molecule

YEAR 12

Assessment: Two 45 mark assessment, mixture of multiple short and long answer questions, a synoptic element on cell structure, biological molecules, nucleotides, nucleic acids, enzymes, cell division, biological membranes, and communicable disease.

Assessment: Two 45 mark assessment, mixture of multiple short and long answer questions, synoptic element on cell structure, biological molecules, nucleotides, nucleic acids, enzymes and cell division

Transition test - 30 marks of short answer questions based on the transition work.
Two 45 mark assessment, mixture of multiple short and long answer questions on cell structure and biological molecules.

SCIENCE SKILL
Scientific knowledge and conceptual understanding

SCIENCE SKILL
The nature, processes and methods of science

SCIENCE SKILL
Analysis, evaluation and measurement

SCIENCE SKILL
Experimental skills and investigations

CHEMISTRY CURRICULUM MAP

FURTHER STUDY

Chemistry university study
Post-graduate study

CAREER PATHS

Researcher, Forensic Scientist, Biochemist, Education and Training

SKILLS

Critical analysis, interpretation, evaluation

Assessment: full range of examination papers covering all the content on the course

Two 40 mark synoptic assessments on the content from redox and synthesis

Two 40 mark synoptic assessments on rates and enthalpy, benzene, carbonyls, acids and bases nitrogen compounds.

Revision and Examination Practice

Redox and Synthesis

- Single half equations
- Reducing and oxidising agents
- Measuring voltage in electrochemical cells
- Electrochemical series and reactivity
- Ligands
- Reflux and Distillation
- GC-MS
- Merging two or more half equations
- Redox titration calculations for familiar redox titrations
- Complex ions
- Transition element precipitations
- Types of chemical reactions
- Carbon and Hydrogen NMR environments

Acids and Bases Nitrogen Compounds

- Condensation polymers
- Basic structure of amino acids
- Chiral isomers
- Conjugate acid-base pairs
- How zwitterions are formed
- naming of polyesters and polyamides
- Amino acids formation to proteins
- Converting between pH and concentration for strong acids
- The concentration of strong bases using Kw
- Multistep synthetic routes - including conditions and products

Assessment: Two further short answer assessments each 30 or 40 marks. Made up of a range of short answer questions from bonding, organic chemistry, the periodic table, alkenes, acids, synthetic routes and analysis, moles, alcohols and haloalkanes; a synoptic assessment drawing from the same content.

End of Year exams consisting of one breadth and one depth paper. The assessment content covers: enthalpy and rates of reaction, bonding, organic chemistry, the periodic table, alkenes, acids, synthetic routes, moles, alcohol, haloalkanes and analysis.

YEAR 13

Acids, Synthetic Routes and Analysis

- pH is a logarithmic scale
- Strong and weak acids
- Interpreting IR spectra
- Mass Spectrometry
- Ionic equation for neutralisation
- Standard solutions
- Titrations
- Predicting IR spectra
- Predicting fragment patterns

Enthalpy and Rates of Reaction

- Energy profile diagrams for endothermic and exothermic
- Bond enthalpy
- Specific heat capacity
- Drawing a boltzmann distribution curve
- Factors that speed up a reaction
- Drawing Hess's law cycles
- Interpreting a Boltzmann curve
- Le Chatelier's principle

Rates and Enthalpy Benzene and Carbonyls

- Reactivity of Phenol compared to benzene
- Disproving Kekule's model of benzene
- Monitoring of a rates practical and collecting data
- Use of IT software to analyse data

Assessment: Two 40 mark synoptic assessments on topics from Year 12 and this first half term on rates and enthalpy, benzene and carbonyls.

Moles, Alcohols and Haloalkanes

- Empirical formula calculations
- Combustion reactions
- Substitution reactions
- Elimination reactions
- Concentration calculations
- Yield and atom economy calculations
- Oxidising an alcohol
- Reflux and distillation practical techniques

The Periodic table and Alkenes

- Trends in physical properties in groups
- Pi and sigma bonds
- Ionisation energy
- Trends in periodicity
- Electrophiles and nucleophiles
- Addition and condensation polymers

Bonding and Organic Chemistry

- Different types of formula
- Electron orbitals
- Shapes of molecules
- Different types of formula
- Electron orbitals
- Shapes of molecules
- Stages of free radical substitution
- Dative bonds
- Exemptions to the Octet rule

YEAR 12

Assessment: Two short answer assessments each 30 or 40 marks. Made up of a range of short answer questions from bonding, organic chemistry, the periodic table, alkenes, acids, synthetic routes and analysis, moles, alcohols and haloalkanes; a synoptic assessment drawing from the same content.

Assessment: Two short answer assessments each 40 marks. Synoptic assessments made up of a range of exam style questions on the content and skills from bonding, organic chemistry, the periodic table and alkene

Assessment: Transition test - 30 marks of short answer questions based on the transition work.
Two further short answer assessments each 30 marks. Made up of a range of short answer questions from bonding and organic chemistry.

SCIENCE SKILL

Scientific knowledge and conceptual understanding

SCIENCE SKILL

The nature, processes and methods of science

SCIENCE SKILL

Analysis, evaluation and measurement

SCIENCE SKILL

Experimental skills and investigations

PHYSICS CURRICULUM MAP

FURTHER STUDY

Physics university study
Post-graduate study

CAREER PATHS

Researcher, Forensic Scientist, Education and Training

SKILLS

Critical analysis, interpretation, evaluation

Assessment: Synoptic assessment 40 marks. Made up of a range of exam style questions on the content and skills from the paper 2 content: electric fields, radioactivity, capacitors, quantum physics.

Assessment: Synoptic assessment on last year's content from terms 1-5: vectors and motion, thermal physics, forces, space, materials, circular motion, gravitational fields, oscillations, electricity and waves.

Assessment: Mock exams (full set of three papers)

Revision and Examination Practice

Medical Physics; Magnetic fields

- ❑CAT scans, gamma cameras and PET scans
- ❑Use of ultrasound and acoustic impedance
- ❑Determine the magnitude and direction of a force on a current carrying conductor
- ❑Calculations involving magnetic flux and magnetic flux density
- ❑Faraday and Lenz's laws

Electric Fields; Radioactivity

- ❑ How to calculate electric field strength, force, electrical potential
- ❑Uniform and radial electric fields
- ❑The strong force within the nucleus
- ❑Hadrons, baryons, mesons and quarks
- ❑The stability curve and atoms position on the graph
- ❑Fission and fusion reactions

Assessment: Two short answer assessments each 40 marks.
Synoptic assessments made up of a range of exam style questions on the content and skills from vectors and motion, and thermal physics, forces and space, material and circular motion.

End of year exam. 20 multiple choice questions followed by a series of short answer questions based on vectors and motion, and thermal physics, forces and space, material, circular motion, gravitational fields, oscillations, electricity and waves.

Capacitors Quantum Physics

- ❑Photoelectric effect
- ❑Threshold frequency and work function
- ❑De Broglie equation
- ❑Use of capacitors to store electrical charge
- ❑Capacitance
- ❑Combining capacitors in series and parallel
- ❑Energy stored in charged capacitors

Materials and Circular Motion

- ❑Stress, strain and Young's modulus
- ❑Analysing graphs of materials under tension.
- ❑Centripetal force
- ❑Velocity and radius of circle
- ❑The radian as a unit of angle
- ❑Angular velocity
- ❑Experimental techniques to prove the validity of an equation

Gravitational fields Oscillations

- ❑Use equations to calculate gravitational field strength and force
- ❑Conditions for harmonic motion
- ❑Variations of energy within an oscillation
- ❑Displacement, velocity and acceleration

Electricity and Waves

- ❑Resistivity, potential dividers and internal resistance
- ❑Combining resistors in series and parallel
- ❑Properties of LDRs and Thermistors and applications as variable resistors
- ❑Energy transferred by electricity.
- ❑Reflection, refraction, polarisation, diffraction.
- ❑Superposition when waves meet.

YEAR 13

Assessment: One full exam paper: 20 multiple choice questions followed by a series of short answer questions based on vectors and motion, and thermal physics, forces and space, material, circular motion, gravitational fields and oscillations. There will be one extended answer question and at least one practical based question.

Assessment: Synoptic assessment 40 marks. Made up of a range of exam style questions on the content and skills from the paper 2 content: capacitors, quantum physics. Synoptic assessment on last year's content from terms 1-5: vectors and motion, thermal physics, forces, space, materials, circular motion, gravitational fields, oscillations, electricity and waves.

Forces and Space

- ❑Resolving forces at different angles and understanding the effects.
- ❑Equilibrium
- ❑Energy levels in atoms
- ❑What we can learn from the temperature and emissions of stars
- ❑Archimedes principle and its applications
- ❑How neutron stars are formed
- ❑Dark energy and dark matter

Forces and Space

- ❑Newton's laws of motion
- ❑Moments as turning forces
- ❑Terminal velocity
- ❑Explaining the stages of a star's life
- ❑Doppler shift used as evidence for the expanding universe leading to Hubble's law.

Vectors and Motion Thermal Physics

- ❑Base units
- ❑Analysing motion graphs
- ❑Describe situations involving transfers of thermal energy.
- ❑Specific heat capacity and latent heat.
- ❑Moles as an amount of substance

YEAR 12

Assessment: Three short answer assessments each 40 marks.
Synoptic assessments made up from a range of exam style questions on the content and skills from vectors and motion, and thermal physics, forces and space.

Assessment: Transition test - 30 marks of short answer questions based on the transition work.
Two further short answer assessments each 40 marks. Made up of a range of short answer questions from vectors and motion, and thermal physics.

SCIENCE SKILL
Scientific knowledge and conceptual understanding

SCIENCE SKILL
The nature, processes and methods of science

SCIENCE SKILL
Analysis, evaluation and measurement

SCIENCE SKILL
Experimental skills and investigations