Key Stage 4 Physics - Lesson Sequencing

Bold denotes: Additional Separate Science Lessons

Year 9

P1 Conservation and dissipation of energy
Energy stores and transfers
Energy and work
G.P.E Stores
K.E Stores
Elastic energy stores
Efficiency
Energy and power

P2 Energy transfer by heating
Conduction
Convection (enrichment)
Infrared radiation
Infrared radiation (Required P)
Specific heat capacity (maths)
Specific heat capacity (Required P)
Reducing unwanted energy transfer
Thermal insulation (Required P)

P3 Energy resources
Energy demands

P4 Electric circuits
Static electricity
Electric fields
Circuit symbols and simple circuits
Charge and current
Voltage
Resistance and Ohm's law
Resistance in a wire (Required P)
Resistance profiles (Required P)
Properties of series and parallel
Resistance in series and parallel (Required P)

P5 Electricity in the home
AC/DC
Plugs and safety
Electrical power

P6 Molecules and matter
Density
Density (Required P)
States of matter
Changes of state
Internal energy
Specific latent heat
Gas pressure and temperature
Gas pressure and volume

Year 10

P7 Radioactivity
Atoms and radiation
The discovery of the nucleus
Alpha, beta, gamma
Decay equations
Activity and half life
Nuclear radiation in medicine
Nuclear fission
Nuclear fusion
Nuclear issues

P8 Forces in action
Vectors and scalars
Resultant forces
The parallelogram of forces
Resolution of forces
Newtons third law
Centre of mass
Moments and equilbrium
Levers and gears

P9 Motion
Speed and velocity
Acceleration
D-T graphs
V-T graphs
Weight
Terminal velocity
Forces and acceleration
Acceleration (Required P)

P10 Forces and motion
Stopping distance
Momentum
Conservation of momentum
Impact forces
Hooke's law
Hooke's law

P11 Force and surfaces
Pressure and surfaces
Pressure in a liquid
Atmospheric pressure
Upthrust and flotation

P12 Wave properties
Transverse and longitudinal waves
Wave properties
Waves Ripple tank (Required P)
Waves on a string (Required P)
Sound waves
Speed of sound
Ultrasound
Seismic waves

Year 11

P13 Electromagnetic waves
Types of EM wave
Properties of EM waves
Communications

P14 Light
Reflection of light
Refraction of light
Refraction of light (Required P)
Light and colour
Lenses
Ray diagrams
Magnification

P15 Electromagnetism
Magnets and magnetic fields
Electromagnets
Uses of electromagnets
The motor effect
AC generator effect
Transformers
Transformers in action

P16 Space
Formation of solar system
Life cycle of a star
Orbits
Expanding universe
Big bang and future of universe

Key Stage 4 Biology - Lesson Sequencing

Bold denotes: Additional Separate Science Lessons

Year 9

B1 Cell Biology
Plant and Animal Cells
Microscopes
Magnification Calculations
Microscope (Required Practical)
Specialised Cells
Eukaryotic Prokaryotic Cells
Diffusion theory
Osmosis theory
Osmosis (Required Practical) - (Planning)
Osmosis (Required Practical) - (Practical and Conclusion)
Osmosis in Plants and Animal Cells
Active Transport
Mitosis
Stem Cells

B2 Organisation
Tissues and Organs
Structure and Function of Digestive system
Chemistry in Food (Polymers and monomers)
Food Tests 1 (Starch and Sugar)
Food Tests 2 (Protein and Lipids)
Enzyme (Lock and Key Theory)
Enzymes in Digestion
Effect of temperature on enzyme (Planning)
Effect of temperature on enzyme (Pract & conc)
Blood
Circulatory System and Blood Vessels
Structure of Heart (Possible Dissection)
Coronary heart Disease
Respiratory System (Breathing)
Structure of Alveoli (Gas Exchange)
Plant Leaf Structure
Xylem, Phloem and Transpiration
Rates of Transpiration (Demo Potomoter)
Stomal Density (Practical)

B3 Disease
Pathogens and how they Spread
Treating pathogens
Bacteria, Virus and Fungus
Protozoa
Primary Defences
Immune System
Vaccines
Antibiotics and Pain Killers
Culturing Bacteria
Culturing Bacteria (Required Practical)
Development of Drugs
Monoclonal Antibodies
Plant Disease and Defences
Noncommunicable Diseases
Smoking
Diet

Year 10

B4 Bioenergentics
Photosynthesis
Uses of glucose
Testing a leaf for starch
Limiting Factors of Photosynthesis
Photosynthesis (Required Practical) – (Planning)
Photosynthesis (Required Practical) – (Practical)
Photosynthesis (Required Practical) – (Conclusion)
Aerobic Respiration
Aerobic Respiration and Exercise
Anaerobic Respiration and Exercise
Anaerobic Respiration in other organisms
Metabolism

B5 Homeostasis
What is Homeostasis (Intro)
Nervous System
Reflex Arc
Reaction Times (Required Practical)
The Brain
The eye and its problems
Endocrine System
Glucose Control and Diabetes
(HIGHER ONLY) Negative Feedback
Menstrual Cycle
Contraception
(HIGHER ONLY) Infertility Treatment
Controlling body temperature
Removal Of Waste
Kidneys
Kidneys and Water Control (ADH)
Kidney Transplants and Dialysis
Plant Hormone Practical (Germination)

B6 Inheritance, Variation and Evoluation
Sexual and Asexual Reproduction
Meiosis and determining gender
Reproduction of Fungi, Plants and Parasites
DNA and the Human Genome
Protein Synthesis
Gene expression and Mutation
Punnett Squares
Pedigree Diagrams
Genetic Disorders
Variation
Selective Breeding
Genetic Engineering
Cloning
Evolution and Natural Selection
Evidence for Evolution and extinction
Evidence for Antibiotic Resistance
Classification

Year 11

B7 Ecology
Communities, Biotic and Abiotic Factors
Food Chains and Predator Prey Diagrams
Adaptations
Distributions of Organisms - Quadrat and Transects
Quadrat and Transects (Required Practical)
Quadrat and Transects – Conclusions and questions
Carbon and Water Cycle
Rates of Decay
Biodiversity
Waste Management – Pollution and acid rain
Global Warming - Deforestation and peat bogs
Trophic Levels and biomass
Food production and Security
Sustainable Food Production

Key Stage 4 Chemistry - Lesson Sequencing

Bold denotes: Additional Separate Science Lessons

Year 9

C1 Atomic Structure
Atoms
Chemical Equations
Separating Techniques
Distillation
Chromatography
History of the Atom
Electronic Structures
Ion Formation
Isotopes

C2 The Periodic Table
Development of the Periodic Table
Periodic Table and Noble Gases
Group 1 Metals
Group 1 - Trends
Group 7
Group 7 - Trends
Transition Metals

C3 Structure and Bonding
States of matter
Atoms into ions
Ionic bonding
Giant ionic structures
Covalent bonding
Structure of simple molecules
Giant Covalent structures
Fullerenes and graphene
Bonding in metals
Giant metallic structures
Polymers
Nanoparticles

C4 Chemical Calculations
Relative masses and moles
Equations and calculations
Chemical calculations
Limiting Reactants
Percentage Yield and Atom economy
Concentration
Titrations (Required P)
Gas Volumes

Year 10

C5 Chemical Changes
The reactivity series
Displacement reactions
Extracting metals
Salts from metals
Salts from insoluble bases **(Required P)**
Making more salts
Neutralisation and the pH scale
Strong and weak acids

C6 Electrolysis
Introduction to electrolysis
Electrolysis of Molten Compounds
The extraction of aluminium
Electrolysis of aqueous solutions
Electrolysis **(Required P)**
Half Equations

C7 Energy Changes
Exothermic reactions
Endothermic reactions
Energy Changes
Energy Level Diagrams
Bond energy calculations
Chemical cells and batteries
Fuel cells

C8 Rates and Equilibrium
Rate of reaction
Collision theory
Effect of temperature
Effect of concentration **(Required P)**
Effect of surface area
Catalysts
Reversible reactions
Equilibrium and Altering Conditions

C9 Crude oil and fuels
Hydrocarbons
Fractional distillation of oil
Burning hydrocarbon fuels
Cracking Hydrocarbons

C10 Organic Reactions
Reactions of alkenes
Structures and uses of alcohols
Structures and uses of carboxylic Acids
Structures and uses of Esters

C11 Polymers
Addition polymerisation
Condensation polymerisation
Natural Polymers and DNA

Year 11

C12 Chemical Analysis
Pure substances and mixtures
Analysing chromatograms **(Required P)**
Testing for gases
Tests for positive ions
Tests for negative ions (Required P)
Tests for ions (Required P)
Instrumental analysis

C13 The Earth's Atmosphere
History of our atmosphere
Our evolving atmosphere
Greenhouse gases
Global climate change
Atmospheric pollution

C14 The Earth's Resources
Finite and Renewable Resources
Water safe to drink **(Required P)**
Treating Waste Water
Extracting metals from ores
Life cycle assessments
Reduce, reuse and recycle

C15 Using Resources
Rusting
Useful alloys
Ceramics, Polymers and Composites
Making ammonia - the Haber process
Fertilizers