

Science KS3 Year 7-9 Curriculum Overview

Students follow the AQA KS3 Science Curriculum. Topics are taught on a Biology, Chemistry, Physics rotation. Each topic has two subtopics per year. Year 9 students have a two term preparation for GCSE topics before beginning GCSE science during term 3.

*Assessments are synoptic and will include knowledge and skills from previous units

Biology

| Topic | Subtopic | Key Knowledge | Key Skills | Key Vocabulary | Common Misconceptions | Assessment* |
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| Organisms | Yr7 Movement | Musculoskeletal system, types of joints and movement; structure of bones and muscles. | Label parts of the skeletal and muscular systems; explain movement mechanisms. | Ligament, tendon, joint, cartilage, muscle. | Muscles push to move bones; bones are not alive. | DC 1 assessment Formative in class questions |
| | Yr 7 Cells | Cell structure and function, specialised cells, basic cell biology. | Use microscopes; label cell diagrams; compare plant and animal cells. | Nucleus, cytoplasm, cell membrane, chloroplast, mitochondria. | Plant cells do not have a cell membrane; all cells are the same size. | DC 1 assessment Formative in class questions |
| | Yr 8 Breathing | Gas exchange in the lungs, breathing mechanics, effects of exercise on breathing. | Explain respiratory system function; measure lung capacity. | Alveoli, diaphragm, trachea, respiration, oxygen. | Breathing is the same as respiration; lungs store oxygen. | DC 1 assessment Formative in class questions |
| | Yr 8 Digestion | Digestive system structure, enzyme function, absorption of nutrients. | Describe digestion stages; explain enzyme action; | Enzyme, bile, stomach, small intestine, absorption. | Digestion only occurs in the stomach; all enzymes work the same way. | DC 1 assessment Formative in class questions |

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| | | | label digestive organs. | | | |
| Ecosystems | Yr 7 Interdependence | Food chains and webs, predator-prey relationships, impact of human activities on ecosystems. | Construct food webs; explain energy flow in ecosystems. | Producer, consumer, decomposer, habitat, biodiversity. | Food webs have a set number of levels; only animals are part of food chains. | DC 2 assessment Formative in class questions |
| | Yr 7 Plant Reproduction | Flower structure, pollination, fertilisation, seed dispersal. | Label parts of a flower; describe pollination and fertilisation processes. | Pollination, stigma, stamen, ovary, seed dispersal. | Flowers only reproduce by seeds; all flowers are pollinated by bees. | DC 2 assessment Formative in class questions |
| | Yr 8 Respiration | Cellular respiration, aerobic vs. anaerobic processes, energy release from glucose. | Explain respiration equations; compare aerobic and anaerobic respiration. | Glucose, ATP, aerobic, anaerobic, mitochondria. | Respiration is only breathing; plants do not respire. | DC 2 assessment Formative in class questions |
| | Yr 8 Photosynthesis | Process of photosynthesis, factors affecting the rate, importance in ecosystems. | Write the photosynthesis equation; explain how light, carbon dioxide, and temperature affect the rate. | Chlorophyll, stomata, glucose, carbon dioxide, light intensity. | Plants get energy directly from the sun; photosynthesis only occurs with sunlight rather than any light source. | DC 2 assessment Formative in class questions |
| Genes | Yr 7 Variation | Variation is caused by genetic and environmental factors; continuous variation | Describe how variation occurs; analyse data to classify variation as | Variation, genetics, continuous, discontinuous, allele, trait. | Traits are only inherited from one parent; all variation is genetic. | DC 3 assessment Formative in class questions |

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| | | (e.g., height) vs. discontinuous variation (e.g., blood group). | continuous or discontinuous. | | | |
| | Yr 7 Human Reproduction | Structure and function of reproductive systems, fertilisation, stages of development from zygote to foetus, puberty changes. | Label diagrams of male and female reproductive systems; explain the process of fertilisation; describe changes during puberty. | Sperm, egg, fertilisation, zygote, embryo, foetus, puberty, ovary, testis. | Fertilisation occurs instantly after intercourse; puberty happens at the same age for everyone. | DC 3 assessment Formative in class questions |
| | Yr 8 Evolution | Evolution as a gradual change in species over time; natural selection and survival of the fittest; evidence for evolution, such as fossils. | Explain the process of natural selection; use evidence to support the theory of evolution. | Evolution, natural selection, adaptation, survival, fossil, species. | Individual organisms evolve during their lifetime; evolution is a choice or goal-directed process. | DC 3 assessment Formative in class questions |
| | Yr 8 Inheritance | Inheritance of traits from parents; dominant and recessive alleles; genetic diagrams like Punnett squares for predicting offspring traits. | Use Punnett squares to predict inheritance patterns; explain dominant and recessive inheritance. | Inheritance, allele, dominant, recessive, genotype, phenotype, chromosome. | Recessive traits are less common; one parent's traits are always | DC 3 assessment Formative in class questions |
| Preparing for GCSE | Yr 9 Preparing for GCSE | Photosynthesis, respiration, enzymes, | Describe trends in data - limiting | Photosynthesis, respiration, enzymes, | Plants do not respire, inherited traits are from one | DC 1 and 2 assessment |

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| | | pathogens, DNA and genetic testing | factors of photosynthesis. Temperature and pH on enzymes. Evaluating science ethics | limiting factors, pathogens, DNA, genotype, phenotype, genetic testing, ethics | parent, scientists can grow test tube babies. | Formative in class questions |
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Chemistry

| Topic | Subtopic | Key Knowledge | Key Skills | Key Vocabulary | Common Misconceptions | Assessment* |
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| Matter | Yr 7 Particle Model | Properties of solids, liquids, gases; changes in state explained by particle movement. | Draw particle diagrams for different states; explain temperature and state changes. | Particle, diffusion, density, evaporation, sublimation. | Particles in solids are completely still; substances "disappear" when dissolved. | DC 1 assessment Formative in class questions |
| | Yr 7 Separating Mixtures | Techniques based on physical properties; examples include filtration, distillation, and chromatography. | Choose appropriate separation methods; explain solubility using curves. | Solvent, solute, solution, chromatography, distillation. | All substances dissolve in water; dissolved substances are "gone" from the mixture. | DC 1 assessment Formative in class questions |
| | Yr 8 Periodic Table | Patterns in element properties across groups and periods; chemical behaviour | Use data to identify trends; predict reactions of elements based on their group. | Group, period, alkali metals, halogens, noble gases. | The periodic table only shows metals; elements in the same group are identical. | DC 1 assessment Formative in class questions |

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| | | predictions based on position. | | | | |
| | Yr 8 Elements | Properties of elements vs. compounds; atomic structure basics. | Classify substances using particle diagrams; name compounds based on their formulae. | Atom, molecule, compound, polymer, chemical formula. | Atoms are indivisible; molecules are always made of different elements. | DC 1 assessment Formative in class questions |
| Reactions | Yr 7 Metals and Non-Metals | Reactivity series, reactions with oxygen and acids, displacement reactions. | Describe reactions with word equations; represent reactions with particle diagrams. | Oxidation, displacement, reactivity, base, acid. | All metals react the same way; non-metals do not react. | DC 2 assessment Formative in class questions |
| | Yr 7 Acids and Alkalis | pH scale, neutralisation reactions, strength of acids and alkalis. | Choose indicators to identify pH; explain neutralisation applications. | pH, indicator, base, alkali, concentration. | Acids are always dangerous; alkalis are not dangerous; neutral solutions are always safe to touch. | DC 2 assessment Formative in class questions |
| | Yr 8 Chemical Energy | Exothermic and endothermic reactions; energy changes during chemical reactions. | Measure temperature changes; identify reactions based on energy profiles. | Exothermic, endothermic, activation energy, energy profile. | Chemical bonds release energy when formed; heat is always a reactant in reactions. | DC 2 assessment Formative in class questions |
| | Yr 8 Types of Reaction | Different types of chemical reactions, including combustion, oxidation, and neutralisation. | Identify reaction types from descriptions; balance chemical equations. | Combustion, oxidation, neutralisation, catalyst, precipitate. | Combustion is always with oxygen; all reactions are either exothermic or endothermic. | DC 2 assessment Formative in class questions |

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| Earth | Yr 7 Earth Structure | Layers of the Earth, rock cycle, processes like erosion and sedimentation. | Label diagrams of the Earth's structure; explain rock formation processes. | Sedimentary, igneous, metamorphic, erosion, crust. | Rocks are not constantly changing; only volcanoes create rocks. | DC 3 assessment Formative in class questions |
| | Yr 7 Universe | Structure of the solar system, stars, and galaxies; concepts like light-years and gravity in space. | Explain planet orbits; use models to describe the solar system. | Solar system, galaxy, orbit, gravity, light-year. | Space has air; gravity does not exist outside of Earth's atmosphere. | DC 3 assessment Formative in class questions |
| | Yr 8 Climate | Factors affecting climate, evidence for climate change, human impact. | Analyse climate data; explain processes contributing to climate change. | Greenhouse gases, carbon footprint, global warming, climate. | Climate change is the same as weather change; only carbon dioxide affects climate. | DC 3 assessment Formative in class questions |
| | Yr 8 Earth Resources | Natural resource types, sustainable use, and environmental impact of resource extraction. | Compare renewable and non-renewable resources; suggest ways to reduce resource depletion. | Sustainability, conservation, natural resources, fossil fuels. | Renewable resources are infinite; fossil fuels are not harmful when burned. | DC 3 assessment Formative in class questions |
| Preparing for GCSE | Yr 9 Preparing for GCSE | Structure of the atom, trends in the periodic table, properties and structure of matter, energy changes and rate of reaction, neutralisation | Using data, word and symbol equations, forming conclusions from data. | Atom, element, proton, neutron, trend, endothermic, exothermic, rate, neutralisation. | Heat is also released during a reaction; atoms are solid and circular. | DC 1 and 2 assessment. Formative in class questions |

Physics

| Topic | Subtopic | Key Knowledge | Key Skills | Key Vocabulary | Common Misconceptions | Assessment* |
|--------|---------------------|--|---|--|--|---|
| Forces | Yr 7 Speed | Resultant force affects motion, speed calculation using distance/time, constant speed, acceleration. | Calculate speed; interpret distance-time graphs; describe changes in speed. | Speed, acceleration, distance-time graph, relative motion. | Speed and acceleration are the same; a stationary object has no forces acting on it. | DC 1 assessment Formative in class questions |
| | Yr 7 Gravity | Differences between mass and weight, gravitational forces, weight variation with gravitational field strength. | Use the formula $\text{weight} = \text{mass} \times \text{gravitational field strength}$; draw force diagrams. | Mass, weight, gravity, gravitational field strength. | Mass changes with gravity; weight is not a force. | DC 1 assessment Formative in class questions |
| | Yr 8 Contact Forces | Equilibrium, deformation, factors affecting friction and drag. | Sketch forces; explain factors affecting friction and drag; describe material behaviour under stress. | Friction, tension, compression, equilibrium, deformation. | Friction always opposes motion; friction is not needed for walking. | DC 1 assessment Formative in class questions |
| | Yr 8 Pressure | Pressure in fluids, effects of forces on surfaces, pressure calculation using force/area. | Use pressure formula; explain sinking, floating, and upthrust in terms of forces. | Pressure, fluid, upthrust, stress, atmospheric pressure. | Pressure is the same at all depths in a fluid; larger objects always sink. | DC 1 assessment Formative in class questions |

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| Electromagnets | Yr 7 Voltage and Resistance | Voltage as energy transfer per unit charge, resistance reducing current flow. | Calculate resistance; draw circuit diagrams showing voltage measurements. | Voltage, resistance, ohm, electrical conductor, insulator. | Voltage gets "used up" in a circuit; thicker wires increase resistance. | DC 2 assessment Formative in class questions |
| | Yr 7 Current | Current in series and parallel circuits, effects of charged objects. | Describe current flow in different circuit types; build and interpret circuits. | Current, electron, series, parallel, electrostatic force. | Current is "used up" in components; current is the same in parallel circuits. | DC 2 assessment Formative in class questions |
| | Yr 8 Electromagnets | Magnetic field generation by electric current, factors affecting electromagnet strength. | Construct and modify electromagnets; explain their uses. | Electromagnet, solenoid, core, magnetic field. | Permanent magnets and electromagnets are the same; electric current is not needed for electromagnets. | DC 2 assessment Formative in class questions |
| | Yr 8 Magnetism | Magnetic field patterns, Earth's magnetism, magnetic force. | Use field lines to describe magnetic fields; explain navigation with magnetic fields. | Magnet, magnetic poles, permanent magnet, field lines. | Only metals attract magnets; all metals are magnetic. | DC 2 assessment Formative in class questions |
| Energy | Yr7 Energy Costs | Domestic energy costs, different energy resources, and their advantages/disadvantages. | Calculate energy usage costs; compare energy resource benefits. | Energy, power, renewable, non-renewable, fossil fuels. | Energy is "lost" or "destroyed" in a system; renewable energy is always free of environmental impact. | DC 3 assessment Formative in class questions |
| | Yr7 Energy Transfer | Conservation of energy, dissipation, different energy stores. | Describe energy transfers in real-life examples; calculate useful and dissipated energy. | Thermal energy, chemical energy, kinetic energy, dissipation. | Heat is a substance that flows; energy is only present in moving objects. | DC 3 assessment Formative in class questions |

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| | Yr 8 Work | Relationship between force, distance, and work done; use of machines like levers and pulleys. | Use the formula work = force \times distance; draw diagrams to illustrate work. | Work, lever, displacement, input force, output force. | Work is only done if an object moves; lifting an object slowly requires less work. | DC 3 assessment Formative in class questions |
| | Yr 8 Heating and Cooling | Thermal energy transfer by conduction, convection, and radiation; effect of mass and temperature. | Explain insulation methods; sketch diagrams of convection currents. | Conduction, convection, radiation, thermal conductor, insulator. | Cold travels; metal feels cold because it contains "coldness." | DC 3 assessment Formative in class questions |
| Waves | Yr 7 Sound | Sound as vibrations, properties of sound waves, factors affecting speed of sound. | Relate waveform shape to pitch and volume; describe wave behaviours like reflection and absorption. | Vibration, longitudinal wave, amplitude, frequency, pitch. | Sound travels through a vacuum; louder sounds travel faster. | DC 3 assessment Formative in class questions |
| | Yr 7 Light | Reflection, refraction, absorption of light; colour perception. | Construct ray diagrams; explain how lenses affect light. | Incident ray, refraction, absorption, transparent, opaque. | Light bends because it "slows down" suddenly; black objects reflect no light at all. | DC 3 assessment Formative in class questions |
| | Yr 8 Wave Effects | Energy transfer by waves, wave interactions with living cells, use of ultrasound and UV. | Describe effects of waves on cells; explain audio equipment functioning. | Ultrasound, ultraviolet, pressure wave, absorption, reflection. | All waves travel the same speed; higher frequency means more intensity. | DC 3 assessment Formative in class questions |
| | Yr 8 Wave Properties | Differences between transverse and longitudinal waves, | Use the wave model to explain reflection, absorption, and transmission. | Transverse wave, wavelength, speed, transmission, reflection. | Waves move matter from one place to another; transverse | DC 3 assessment Formative in class questions |

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| | | properties of waves such as speed and wavelength. | | | waves are the only wave type. | |
| Preparing for GCSE | Yr 9 | Calculate resultant force, speed calculations, energy changes and efficiency, renewable and non renewable energy, potential difference, current and resistance in a circuit. | Using data, rearranging equations, using graphs, evaluating. | Inertia, scalar, vector, conservation of energy, efficiency, renewable and non renewable energy, potential difference, current, resistance. | There is no force acting on an object if it is stationary. Stationary objects have no energy. Current is 'used up' in a circuit. | DC 1 and 2 assessment. Formative in class questions. |