3-year Scheme of Work

**This 3-Year Scheme of Work offers a suggested topic order for KS3 using Collins AQA KS3 Science Student Books 1 and 2, assuming that one teacher teaching all three sciences rotates through the sciences to give variety. Other routes through the books are possible if you wish to teach different topics first or to suit timetabling or equipment needs. Note, however, that the suggested route ensures that each term’s content builds upon the previous term’s content and knowledge.**

**The suggested timings are based on covering an average of two Student Book spreads per week, but can be tailored to suit the needs of a particular class or group of students.**

Year 1 of 3-year scheme of work

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| **Year** | **Term** | **Week** | **Student Book spread number and lesson plan reference** | **Big Idea/**  **subtopic and AQA syllabus reference** | **Title** | **Programme of study references** | **Learning objectives** | **CD-ROM resources** |

Book 1, Chapter 1: Forces – Speed *and* Gravity

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| Year 7 | Term 1 | 1 | 1.1.1 | Forces, Speed  3.1.1 | Understanding speed | Change depending on direction of force and its size  Speed and the quantitative relationship between average speed, distance and time  (speed = distance ÷ time) | | List the factors involved in defining speed.  Explain a simple method to measure speed.  Use the speed formula. | Worksheet 1.1.1; Practical sheet 1.1.1; Technician’s notes 1.1.1 |
| Year 7 | Term 1 | 1 | 1.1.2 | Forces, Speed  3.1.1 | Describing journeys with distance–time graphs | The representation of a journey on a distance–time graph | | Gather relevant data to describe a journey.  Use the conventions of a distance–time graph.  Display the data on a distance–time graph. | Worksheet 1.1.2; Practical sheet 1.1.2; Technician’s notes 1.1.2 |
| Year 7 | Term 1 | 2 | 1.1.3 | Forces, Speed  3.1.1 | Exploring journeys on distance–time graphs | The representation of a journey on a distance–time graph  Speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) | | Interpret distance–time graphs to learn about the journeys represented.  Relate distance–time graphs to different situations and describe what they show. | Worksheet 1.1.3; Practical sheet 1.1.3; Technician’s notes 1.1.3 |
| Year 7 | Term 1 | 2 | 1.1.4 | Forces, Speed  3.1.1 | Investigating the motion of a car on a ramp | Relating ideas about changing speed and factors affecting it to the identification and management of variables to gather evidence and form conclusions. | | To describe the motion of an object whose speed is changing.  To devise questions that can be explored scientifically.  To present data so that it can be analysed to answer questions. | Worksheet 1.1.4; Practical sheet 1.1.4; Technician’s notes 1.1.4 |
| Year 7 | Term 1 | 3 | 1.1.5 | Forces, Speed  3.1.1 | Understanding relative motion | Relative motion: trains and cars passing one another | | Describe the motion of objects in relation to each other.  Explain the concept of relative motion.  Apply the concept of relative motion to various situations. | Worksheet 1.1.5; Practical sheet 1.1.5; Technician’s notes 1.1.5 |
| Year 7 | Term 1 | 3 | 1.1.6 | Forces, Gravity  3.1.2 | Understanding forces | Forces as pushes or pulls arising from the interaction between two objects  Using force arrows in diagrams | | Recognise different examples of forces.  List the main types of force.  Represent forces using arrows. | Worksheet 1.1.6 |
| Year 7 | Term 1 | 4 | 1.1.7 | Forces, Gravity  3.1.2 | Understanding gravitational fields | Gravity force, weight = mass × gravitational field strength (*g*), on Earth *g* =10 N/kg, different on other planets and stars | | Describe gravity as a non-contact force.  Explore the concept of gravitational field and weight.  Relate this concept to life on Earth. | Worksheet 1.1.7; Practical sheet 1.1.7; Technician’s notes 1.1.7 |
| Year 7 | Term 1 | 4 | 1.1.8 | Forces, Gravity  3.1.2 | Understanding mass and weight | Explain the difference between mass and weight. | | To answer questions that draw on the distinction between mass and weight. | Technician’s notes 1.1.8 |
| Year 7 | Term 1 | 5 | 1.1.9 | Forces, Gravity  3.1.2 | Understanding gravity | Understanding that weight is an effect caused by an object being in a gravitational field and that moving from one such field to another (such as various places in the solar system) causes a change in weight. | | Explain what gravity is.  Understand how gravity varies according to where you are in the solar system.  Apply ideas about gravity to various situations. | Technician’s notes 1.1.9 |
| Year 7 | Term 1 | 5/6 | End of chapter assessment | | | |

Book 1, Chapter 5: Matter – Particle model *and* Separating mixtures

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| Year 7 | Term 1 | 6 | 1.5.1 | Matter, particle model  3.5.1 | Using particles to explain matter | The properties of different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure | | Recognise differences between solids, liquids and gases.  Describe solids, liquids and gases in terms of the particle model. | Worksheet 1.5.1; Practical sheet 1.5.1; Technician’s notes 1.5.1 |
| Year 7 | Term 1 | 6 | 1.5.2 | Matter, particle model  3.5.1 | Understanding solids | The properties of different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure | | Describe the properties of solids.  Relate the properties and behaviour of solids to the particle model. | Worksheet 1.5.2; Practical sheet 1.5.2; Technician’s notes 1.5.2 |
| Year 7 | Term 1 | 7 | 1.5.3 | Matter, particle model  3.5.1 | Understanding liquids and gases | Describe the properties of liquids and gases.  Relate the properties and behaviour of liquids and gases to the particle model. | Worksheet 1.5.3; Practical sheet 1.5.3; Technician’s notes 1.5.3a; Technician’s notes 1.5.3b |
| Year 7 | Term 1 | 7 | 1.5.4 | Matter, particle model  3.5.1 | Exploring diffusion | Diffusion in liquids and gases driven by differences in concentration  Diffusion in terms of the particle model | | Use the particle model to explain observations involving diffusion. | Worksheet 1.5.4; Practical sheet 1.5.4; Technician’s notes 1.5.4 |
| Year 7 | Term 1 | 8 | 1.5.5 | Matter, particle model  3.5.1 | Explaining changes of state | Changes of state in terms of the particle model | | Recognise changes of state as being reversible changes.  Use scientific terminology to describe changes of state.  Explain changes of state using the particle model and ideas about energy transfer. | Worksheet 1.5.5; Practical sheet 1.5.5; Technician’s notes 1.5.5 |
| Year 7 | Term 1 | 8 | 1.5.6 | Matter, separating mixtures  3.5.2 | Separating mixtures | Mixtures, including dissolving  Simple techniques for separating mixtures: filtration | | Recognise the differences between substances and use these to separate them. | Worksheet 1.5.6; Technician’s notes 1.5.6 |
| Year 7 | Term 1 | 9 | 1.5.7 | Matter, separating mixtures  3.5.2 | Exploring solutions | Mixtures, including dissolving | | Explain the terms solvent, solution, solute and soluble.  • Describe the effect of temperature on solubility.  • Analyse patterns and present data to explain solubility. | Worksheet 1.5.7; Practical sheet 1.5.7; Technician’s notes 1.5.7 |
| Year 7 | Term 1 | 9 | 1.5.8 | Matter, separating mixtures  3.5.2 | Understanding distillation | Simple techniques for separating mixtures: distillation | | Use distillation to separate substances.  Explain why distillation can purify substances.  Devise ways to separate mixtures, based on their properties. | Worksheet 1.5.8a; Worksheet 1.5.8b; Practical sheet 1.5.8; Technician’s notes 1.5.8 |
| Year 7 | Term 1 | 10 | 1.5.9 | Matter, separating mixtures  3.5.2 | Exploring chromatography | Simple techniques for separating mixtures: chromatography  The identification of pure substances | | Use chromatography to separate dyes.  Use evidence from chromatography to identify unknown substances in a mixture. | Worksheet 1.5.9; Technician’s notes 1.5.9 |
| Year 7 | Term 1 | 10/11 | End of chapter assessment | | | |

Book 1, Chapter 8: Organisms – Movement *and* Cells

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| Year 7 | Term 1 | 11 | 1.8.1 | Organisms, Movement  3.8.1 | Exploring the human skeleton | The structure and functions of the human skeleton, to include support, protection, movement and making blood cells | | Identify bones of the human skeleton.  Describe the roles of the skeleton.  Explain why we have different shapes and sizes of bones. | Worksheet 1.8.1; Technician’s notes 1.8.1 |
| Year 7 | Term 1 | 11 | 1.8.2 | Organisms, Movement  3.8.1 | Understanding the role of joints and muscles | Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles | | Describe the roles of tendons, ligaments, joints and muscles.  Identify muscles used in different movements.  Compare different joints in the human skeleton. | Worksheet 1.8.2 |
| Year 7 | Term 1 | 12 | 1.8.3 | Organisms, Movement  3.8.1 | Examining interacting muscles | The function of muscles and examples of antagonistic muscles | | Describe antagonistic muscles and give examples.  Explain how antagonistic muscles bring about movement using scientific vocabulary  Plan an investigation to compare muscle strengths | Worksheet 1.8.3; Practical sheet 1.8.3a; Technician’s notes 1.8.3b; Practical sheet 1.8.3a; Technician’s notes 1.8.3b |
| Year 7 | Term 1 | 12 | 1.8.4 | Organisms, Movement  3.8.1 | Exploring problems with the skeletal system | The structure and functions of the human skeleton, to include support, protection, movement and making blood cells  Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles | | Recall some medical problems with the skeletal system.  Explain how some conditions affect the skeleton.  Consider the benefits and risks of a technology for improving human movement. | Worksheet 1.8.4 |
| Year 7 | Term 2 | 1 | 1.8.5 | Organisms, Cells  3.8.2 | Understanding organisation in multicellular organisms | Hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms | | Define the terms tissues, organs and organ systems.  Describe how some recreational drug affect body systems.  Suggest the effect of organ damage on other body systems. | Worksheet 1.8.5 |
| Year 7 | Term 2 | 1 | 1.8.6 | Organisms, Cells  3.8.2 | Describing plant and animal cells | Cells as the fundamental unit of living organisms, including how to observe and record cell structure using a light microscope  The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts  The similarities and differences between animal and plant cells | | Describe the structures found in animal and plant cells.  Explain the function of some of the structures within animal and plant cells.  Communicate ideas about cells effectively using scientific terminology. | Worksheet 1.8.6a; Worksheet 1.8.6b; Technician’s notes 1.8.6 |
| Year 7 | Term 2 | 2 | 1.8.7 | Organisms, Cells  3.8.2 | Understanding adaptations of cells | The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts  The similarities and differences between animal and plant cells | | Recall the purpose of specialised cells.  Identify examples of specialised plant and animal cells.  Explain the structure and function of specialised cells. | Worksheet 1.8.7; Technician’s notes 1.8.7 |
| Year 7 | Term 2 | 2 | 1.8.8 | Organisms, Cells  3.8.2 | Exploring cells | Cells as the fundamental unit of living organisms, including how to observe and record cell structure using a light microscope  The similarities and differences between animal and plant cells | | Observe cells using a microscope and record findings.  Explain how to use a microscope to identify and compare cells.  Explain how developments in science can change ideas. | Worksheet 1.8.8; Practical sheet 1.8.8a; Practical sheet 1.8.8b; Technician’s notes 1.8.8 |
| Year 7 | Term 2 | 3 | 1.8.9 | Organisms, Cells  3.8.2 | Understanding unicellular organisms | The structural adaptations of some unicellular organisms | | Recognise different types of unicellular organisms.  Explain how unicellular organisms are adapted to carry out functions.  Compare and contrast features of unicellular organisms. | Worksheet 1.8.9 |
| Year 7 | Term 2 | 3/4 | End of chapter assessment | | | |

Book 1, Chapter 2: Electromagnets – Voltage and resistance *and* Current

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| Year 7 | Term 2 | 4 | 1.2.1 | Electromagnets, Voltage and resistance  3.2.1 | Describing electric circuits | Other processes that involve energy transfer: completing an electrical circuit  Electric current, measured in amperes, in circuits | | Describe and draw circuit diagrams.  Explain what is meant by current.  Explain how materials allow current to flow. | Worksheet 1.2.1; Practical sheet 1.2.1; Technician’s notes 1.2.1 |
| Year 7 | Term 2 | 4 | 1.2.2 | Electromagnets, Voltage and resistance  3.2.1 | Understanding energy in circuits | Other processes that involve energy transfer: completing an electrical circuit  Electric current, measured in amperes, in circuits  Potential difference, measured in volts, battery and bulb ratings | | Describe what the voltage does in a circuit. | Worksheet 1.2.2; Technician’s notes 1.2.2 |
| Year 7 | Term 2 | 5 | 1.2.3 | Electromagnets, Voltage and resistance; Current  3.2.1, 3.2.2 | Explaining resistance | Potential difference, measured in volts, battery and bulb ratings  Resistance, measured in ohms, as the ratio of potential difference (p.d.) to current | | Explain what resistance is and how it affects the circuit.  Investigate and identify the relationship between voltage and current. | Worksheet 1.2.3; Practical sheet 1.2.3; Technician’s notes 1.2.3 |
| Year 7 | Term 2 | 5 | 1.2.4 | Electromagnets, Voltage and resistance; Current  3.2.1, 3.2.2 | Describing series and parallel circuits | Series and parallel circuits, currents add where branches meet and current as flow of charge | | Describe how the voltage, current and resistance are related in different circuits.  Understand the differences between a series and a parallel circuit. | Worksheet 1.2.4; Technician’s notes 1.2.4 |
| Year 7 | Term 2 | 6 | 1.2.5 | Electromagnets, Voltage and resistance; Current  3.2.1, 3.2.2 | Comparing series and parallel circuits | Electric current, measured in amperes, in circuits  Series and parallel circuits, currents add where branches meet and current as flow of charge  Potential difference, measured in volts, battery and bulb ratings | | Investigate and explain current and voltage in series and parallel circuits.  Explain the circuits in our homes. | Worksheet 1.2.5; Practical sheet 1.2.5; Technician’s notes 1.2.5 |
| Year 7 | Term 2 | 6 | 1.2.6 | Electromagnets, Current  3.2.2 | Investigating static charge | Non-contact forces: forces due to static electricity  Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects | | Recognise the effects of static charge.  Explain how static charge can be generated.  Use evidence to develop ideas about static charge. | Worksheet 1.2.6; Practical sheet 1.2.6; Technician’s notes 1.2.6 |
| Year 7 | Term 2 | 7 | 1.2.7 | Electromagnets, Current  3.2.2 | Explaining static charge | Explain static charge in terms of electron transfer.  Apply this explanation to various examples. | Worksheet 1.2.7; Technician’s notes 1.2.7 |
| Year 7 | Term 2 | 7 | 1.2.8 | Electromagnets, Current  3.2.2 | Understanding electrostatic fields | Non-contact forces: forces due to static electricity  Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects  The idea of electric field, forces acting across the space between objects not in contact | | Explain static electricity in terms of fields.  Explain how charged objects affect each other. | Worksheet 1.2.8; Technician’s notes 1.2.8 |
| Year 7 | Term 2 | 8 | End of chapter assessment | | | |

Book 1, Chapter 6: Reactions – Metals and non-metals *and* Acids and alkalis

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| Year 7 | Term 2 | 9 | 1.6.1 | Reactions, metals and non-metals  3.6.1 | Using metals and non-metals | The varying physical and chemical properties of different elements  The properties of metals and non-metals | | Recognise the properties and uses of metals and non-metals.  Explain the uses of metals and non-metals based on their properties. | Worksheet 1.6.1; Practical sheet 1.6.1; Technician’s notes 1.6.1 |
| Year 7 | Term 2 | 9 | 1.6.2 | Reactions, metals and non-metals  3.6.1 | Exploring the reactions of acids with metals | Reactions of acids with metals to produce a salt plus hydrogen | | Describe the reaction between acids and metals using word equations and particle diagrams.  Explain the reaction between acids and metals.  Compare the reactivities of different metals. | Worksheet 1.6.2; Practical sheet 1.6.2; Technician’s notes 1.6.2 |
| Year 7 | Term 2 | 10 | 1.6.3 | Reactions, metals and non-metals  3.6.1 | Understanding displacement reactions | The order of metals and carbon in the reactivity series; representing chemical reactions using formulas and using equations; displacement reactions; changes of state and chemical reactions. | | Represent and explain displacement reactions using equations and particle diagrams.  Make inferences about reactivity from displacement reactions. | Worksheet 1.6.3; Practical sheet 1.6.3; Technician’s notes 1.6.3 |
| Year 7 | Term 2 | 10 | 1.6.4 | Reactions, metals and non-metals  3.6.1 | Understanding oxidation reactions | Combustion, thermal decomposition, oxidation and displacement reactions | | Recall examples of oxidation reactions.  Describe oxidation using word equations and particle diagrams.  Investigate changes caused by oxidation. | Worksheet 1.6.4; Practical sheet 1.6.4a; Practical sheet 1.6.4b; Technician’s notes 1.6.4 |
| Year 7 | Term 2 | 11 | 1.6.5 | Reactions, Acids and alkalis  3.6.2 | Exploring acids | Defining acids and alkalis | | Describe what an acid is and give examples.  Evaluate the hazards that acids pose. | Worksheet 1.6.5; Technician’s notes 1.6.5 |
| Year 7 | Term 2 | 11 | 1.6.6 | Reactions, Acids and alkalis  3.6.2 | Exploring alkalis | Describe what an alkali is and give examples.  Identify the hazards that alkalis pose. | Worksheet 1.6.6; Technician’s notes 1.6.6 |
| Year 7 | Term 2 | 12 | 1.6.7 | Reactions, Acids and alkalis  3.6.2 | Using indicators | The pH scale for measuring acidity/alkalinity; and indicators | | Use indicators to identify acids and alkalis.  Analyse data from different indicators.  Compare the effectiveness of different indicators.  Describe what a pH scale measures. | Worksheet 1.6.7; Practical sheet 1.6.7; Technician’s notes 1.6.7 |
| Year 7 | Term 3 | 1 | 1.6.8 | Reactions, Acids and alkalis  3.6.2 | Exploring neutralisation | Defining acids and alkalis in terms of neutralisation reactions  The pH scale for measuring acidity/alkalinity; and indicators | | Recall and use the neutralization equation.  Use indicators to identify chemical reactions.  Explain colour changes in terms of pH and neutralisation. | Worksheet 1.6.8; Practical sheet 1.6.8; Technician’s notes 1.6.8 |
| Year 7 | Term 3 | 1 | 1.6.9 | Reactions, Acids and alkalis  3.6.2 | Investigating neutralisation | Reactions of acids with alkalis to produce a salt plus water | | Design an investigation to compare the effectiveness of indigestion remedies.  Analyse data to identify a suitable indigestion remedy and suggest improvements. | Worksheet 1.6.9; Practical sheet 1.6.9; Technician’s notes 1.6.9 |
| Year 7 | Term 3 | 2 | End of chapter assessment | | | |

Book 1, Chapter 9: Ecosystems – Interdependence *and* Plant reproduction

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| Year 7 | Term 3 | 2/3 | 1.9.1 | Ecosystems, Interdependence  3.9.1 | Understanding food webs | The interdependence of organisms in an ecosystem, including food webs | | Describe how food webs are made up of a number of food chains.  Make predictions about factors affecting plant and animal populations.  Analyse and evaluate changes in a food web. | Worksheet 1.9.1a; Worksheet 1.9.1b; Technician’s notes 1.9.1 |
| Year 7 | Term 3 | 3 | 1.9.2 | Ecosystems, Interdependence  3.9.1 | Understanding the effects of toxins in the environment | How organisms affect, and are affected by, their environment, including the accumulation of toxic materials | | Describe how toxins pass along the food chain.  Explain how toxins enter and accumulate in food chains.  Evaluate the advantages and disadvantages of using pesticides. | Worksheet 1.9.2; Technician’s notes 1.9.2 |
| Year 7 | Term 3 | 4 | 1.9.3 | Ecosystems, Interdependence  3.9.1 | Exploring the importance of insects | The interdependence of organisms in an ecosystem, including insect-pollinated crops  The importance of plant reproduction through insect pollination in human food security | | Describe the impact of low pollination on fruit production.  Explain why artificial pollination is used for some crops.  Evaluate the risks of monoculture on world food security. | Worksheet 1.9.3; Practical sheet 1.9.3 |
| Year 7 | Term 3 | 4 | 1.9.4 | Ecosystems, Interdependence  3.9.1 | Exploring ecological balance | The interdependence of organisms in an ecosystem, including insect-pollinated crops  How organisms affect, and are affected by, their environment, including the accumulation of toxic materials | | Describe ways in which organisms affect their environment.  Explain why prey populations affect predator populations.  Evaluate a model of predator–prey populations and explain the importance of predators. | Worksheet 1.9.4a; Worksheet 1.9.4b; Technician’s notes 1.9.4 |
| Year 7 | Term 3 | 5 | 1.9.5 | Ecosystems, Plant reproduction  3.9.2 | Exploring flowering plants | Reproduction in plants, including flower structure, wind and insect pollination | | Identify parts of flowering plants.  Describe the function of the parts of  flowering plants and link structure  and function.  Evaluate the differences between wind-pollinated and insect-pollinated plants. | Worksheet 1.9.5; Practical sheet 1.9.5; Technician’s notes 1.9.5 |
| Year 7 | Term 3 | 5 | 1.9.6 | Ecosystems, Plant reproduction  3.9.2 | Exploring fertilisation | Reproduction in plants, including flower structure, wind and insect pollination, fertilisation | | Describe the processes of pollination and fertilisation.  Describe the role of pollen tubes.  Explain how seeds are formed. | Worksheet 1.9.6; Practical sheet 1.9.6a; Practical sheet 1.9.6b; Technician’s notes 1.9.6 |
| Year 7 | Term 3 | 6 | 1.9.7 | Ecosystems, Plant reproduction  3.9.2 | Understanding how seeds are dispersed | Reproduction in plants, including seed and fruit formation and dispersal | | Recognise the variety of different structures shown by different seeds.  Describe the need for plants to disperse their seed.  Plan an investigation into seed dispersal by wind. | Worksheet 1.9.7a; Worksheet 1.9.7b; Technician’s notes 1.9.7 |
| Year 7 | Term 3 | 6 | 1.9.8 | Ecosystems, Plant reproduction  3.9.2 | Understanding how fruits disperse seeds | Reproduction in plants, including seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms | | Describe how fruits are used in seed dispersal.  Compare evidence about seed dispersal by wind and by fruit formation.  Use data to evaluate different seed dispersal mechanisms. | Worksheet 1.9.8 |
| Year 7 | Term 3 | 7 | End of chapter assessment | | | |

Book 1, Chapter 3: Energy – Energy costs *and* Energy transfer

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| Year 7 | Term 3 | 8 | 1.3.1 | Energy, Energy transfer  3.3.2 | Understanding energy transfers by fuels and food | Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change  Comparing energy values of different foods (from labels) (kJ)  Other processes that involve energy transfer: metabolism of food, burning fuels | | Describe the use of fuels in the home.  Explain that foods are energy stores and that the amount stored can be measured.  Explain that energy is not a material and can be neither created nor destroyed. | Worksheet 1.3.1; Technician’s notes 1.3.1 |
| Year 7 | Term 3 | 8 | 1.3.2 | Energy, Energy transfer  3.3.2 | Comparing rates of energy transfer | Comparing power ratings of appliances in watts (W, kW)  Comparing amounts of energy transferred (J, kJ, kW hour) | | Describe what is meant by ‘rate of energy transfer’.  Recall and use the correct units for rate of energy transfer.  Calculate quantities of energy transferred when change happens. | Worksheet 1.3.2; Technician’s notes 1.3.2 |
| Year 7 | Term 3 | 9 | 1.3.3 | Energy, Energy costs  3.3.1 | Looking at the cost of energy use in the home | Comparing power ratings of appliances in watts (W, kW)  Comparing amounts of energy transferred (J, kJ, kW hour)  Domestic fuel bills: fuel use and costs | | Describe the information a typical fuel bill provides.  Explain and use the units used on a fuel bill.  Explain how the cost of energy used can be calculated. | Worksheet 1.3.3 |
| Year 7 | Term 3 | 9 | 1.3.4 | Energy, Energy transfer  3.3.2 | Getting the electricity we need | Calculation of fuel uses and costs in the domestic context: fuels and energy resources. | | Describe ways of generating electricity.  Explain advantages and disadvantages of different methods.  Evaluate the consequences of using various generating method. | Worksheet 1.3.4; Technician’s notes 1.3.4 |
| Year 7 | Term 3 | 10 | 1.3.5 | Energy, Energy costs  3.3.1 | Using electricity responsibly | Calculation of fuel uses and costs in the domestic context: comparing power ratings of appliances in watts (W, kW), comparing amounts of energy transferred (J, kJ, kW hour), domestic fuel bills, fuel use and costs and fuels and energy resources. | | Apply the concept of energy transfers to a device such as a hand crank torch.  Critique claims made for the running costs of fluorescent light bulbs.  Evaluate actions that could be taken in response to rising energy demand. | Worksheet 1.3.5; Technician’s notes 1.3.5 |
| Year 7 | Term 3 | 10 | 1.3.6 | Energy, Energy transfer  3.3.2 | Stores and transfers | Processes that involve energy transfer and changes in systems, including: energy as a quantity that can be quantified and calculated; comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy. | | Investigate a model of energy.  Describe energy stores and transfers.  Apply the energy model to different situations. | Worksheet 1.3.6; Technician’s notes 1.3.6 |
| Year 7 | Term 3 | 11 | 1.3.7 | Energy, Energy transfer  3.3.2 | Exploring energy transfers | Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, burning fuels  Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change. | | Recognise what energy is and its unit.  Describe a range of energy transfers using simple diagrams.  Use a Sankey diagram as a model to represent simple energy changes. | Worksheet 1.3.7; Technician’s notes 1.3.7 |
| Year 7 | Term 3 | 11 | 1.3.8 | Energy, Energy transfer  3.3.2 | Understanding potential energy and kinetic energy | Other processes that involve energy transfer: changing motion, dropping an object | | Recognise energy transfers due to falling objects.  Describe factors affecting energy transfers related to falling objects.  Explain how energy is conserved when objects fall. | Worksheet 1.3.8; Technician’s notes 1.3.8 |
| Year 7 | Term 3 | 12 | 1.3.9 | Energy, Energy transfer  3.3.2 | Understanding elastic potential energy | Other processes that involve energy transfer: stretching a spring.  Work done and energy changes on deformation.  Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy in elastic distortions | | Describe different situations that use the energy stored in compressing and stretching elastic materials.  Describe how elastic potential energy in different materials can be compared.  Explain how elastic potential energy is transferred. | Worksheet 1.3.9; Practical sheet 1.3.9; Technician’s notes 1.3.9 |
| Year 7 | Term 3 | 12 | End of chapter assessment | | | |

Year 2 of 3-year scheme of work

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| **Year** | **Term** | **Week** | **Student Book spread number and lesson plan reference** | **Big Idea/**  **subtopic and AQA syllabus reference** | **Title** | **Programme of study references** | **Learning objectives** | **CD-ROM resources** |

Book 1, Chapter 7: Earth – Earth structure *and* Universe

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| Year 8 | Term 1 | 1 | 1.7.1 | Earth, Earth structure  3.7.1 | Understanding the structure of the Earth | The composition of the Earth  The structure of the Earth | | Describe the layers of the Earth.  Describe the characteristics of the different layers.  Explain how volcanoes change the Earth. | Worksheet 1.7.1a; Worksheet 1.7.1b; Technician’s notes 1.7.1 |
| Year 8 | Term 1 | 1 | 1.7.2 | Earth, Earth structure  3.7.1 | Exploring igneous rocks | The rock cycle and the formation of igneous, sedimentary and metamorphic rocks | | Describe how igneous rocks are formed.  Explain how the pH of the magma affects the formation of rocks.  Investigate the effect of cooling rate on the formation of crystals. | Worksheet 1.7.2; Practical sheet 1.7.2a; Practical sheet 1.7.2b; Technician’s notes 1.7.2 |
| Year 8 | Term 1 | 2 | 1.7.3 | Earth, Earth structure  3.7.1 | Exploring sedimentary rocks | Describe how sedimentary rocks are formed.  Explain how fossils give clues about the past.  Explain the properties of sedimentary rocks. | Worksheet 1.7.3; Practical sheet 1.7.3a; Practical sheet 1.7.3b; Technician’s notes 1.7.3 |
| Year 8 | Term 1 | 2 | 1.7.4 | Earth, Earth structure  3.7.1 | Exploring metamorphic rocks |  | | Describe how metamorphic rocks are formed.  Explain the properties of metamorphic rocks. | Worksheet 1.7.4; Practical sheet 1.7.4; Technician’s notes 1.7.4 |
| Year 8 | Term 1 | 3 | 1.7.5 | Earth, Earth structure  3.7.1 | Understanding the rock cycle | Describe the rock cycle.  Explain how rocks can change from one type to another. | Worksheet 1.7.5a; Worksheet 1.7.5b; Practical sheet 1.7.5; Technician’s notes 1.7.5 |
| Year 8 | Term 1 | 3 | 1.7.6 | Earth, Universe  3.7.2 | Describing stars and galaxies | Our Sun as a star, other stars in our galaxy, other galaxies | | Describe the characteristics of a star.  Relate our Sun to other stars.  Explain the concept of galaxies and the position of our galaxy compared to others. | Worksheet 1.7.6 |
| Year 8 | Term 1 | 4 | 1.7.7 | Earth, Universe  3.7.2 | Explaining the effects of the Earth's motion | The seasons and the Earth’s tilt, day length at different times of year, in different hemispheres | | Describe variation in length of day, apparent position of the Sun and seasonal variations.  Compare these with changes in the opposite hemisphere.  Explain these changes with reference to the motion of the Earth. | Worksheet 1.7.7; Practical sheet 1.7.7; Technician’s notes 1.7.7 |
| Year 8 | Term 1 | 4 | 1.7.8 | Earth, Universe  3.7.2 | Exploring our neighbours in the Universe | The light year as a unit of astronomical distance | | Recall that the light year is used to measure astronomical distances.  Explain the limitation of units such as kilometres in describing astronomical distances.  Explain what causes the appearance of the Moon to change. | Worksheet 1.7.8; Practical sheet 1.7.8; Technician’s notes 1.7.8 |
| Year 8 | Term 1 | 5 | 1.7.9 | Earth, Universe  3.7.2 | Using models in science | understanding that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas | | Explore how we can use models to explain ideas in science.  Construct an explanation using ideas and evidence.  Decide if a model is good enough to be useful. | Worksheet 1.7.9; Technician’s notes 1.7.9 |
| Year 8 | Term 1 | 5/6 | End of chapter assessment | | | |

Book 1, Chapter 10: Genes – Variation *and* Human reproduction

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| Year 8 | Term 1 | 6 | 1.10.1 | Genes, Variation  3.10.1 | Looking at variation | The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation | | Describe what is meant by variation in a species.  Explain the difference between continuous and discontinuous variation.  Plot graphs to show variation. | Worksheet 1.10.1; Technician’s notes 1.10.1 |
| Year 8 | Term 1 | 7 | 1.10.2 | Genes, Variation  3.10.1 | Exploring the causes of variation | Heredity as the process by which genetic information is transmitted from one generation to the next | | Identify whether a feature is inherited or determined by the environment.  Understand that offspring from the same parents may show variation. | Worksheet 1.10.2; Practical sheet 1.10.2; Technician’s notes 1.10.2 |
| Year 8 | Term 1 | 7 | 1.10.3 | Genes, Variation  3.10.1 | Considering the importance of variation | The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. | | Describe the importance of variation.  Explain how variation may help a species to survive.  Apply ideas about variation and survival to specific examples. | Worksheet 1.10.3; Technician’s notes 1.10.3 |
| Year 8 | Term 1 | 8 | 1.10.4 | Genes, Human reproduction  3.10.2 | Understanding the female reproductive system and fertility | Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth | | Describe the structures and functions of different parts of the female reproductive system.  Describe the process of menstruation.  Describe causes of low fertility. | Worksheet 1.10.4; Technician’s notes 1.10.4 |
| Year 8 | Term 1 | 8 | 1.10.5 | Genes, Human reproduction  3.10.2 | Understanding the male reproductive system and fertilisation | Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems | | Describe the structure and function of different parts of the male reproductive system.  Describe fertilisation in humans. | Worksheet 1.10.5; Technician’s notes 1.10.5 |
| Year 8 | Term 1 | 9 | 1.10.6 | Genes, Human reproduction  3.10.2 | Learning how a foetus develops | Reproduction in humans (as an example of a mammal), fertilisation, gestation and birth | | Describe the role of the mother in supporting and protecting the developing foetus.  Recognise the development of a foetus. | Worksheet 1.10.6; Technician’s notes 1.10.6 |
| Year 8 | Term 1 | 9 | 1.10.7 | Genes, Human reproduction  3.10.2 | Understanding factors affecting a developing foetus | Reproduction in humans (as an example of a mammal), to include the effect of maternal lifestyle on the foetus through the placenta | | Describe the effects of different factors on a developing foetus.  Evaluate the strength of data.  Analyse advice given to pregnant women. | Worksheet 1.10.7 |
| Year 8 | Term 1 | 10 | 1.10.8 | Genes, Human reproduction  3.10.2 | Communicating ideas about smoking in pregnancy | Reproduction in humans (as an example of a mammal), to include the effect of maternal lifestyle on the foetus through the placenta | | Critique claims linked with the effects of smoking in pregnancy.  Identify potential bias in sources of information.  Give a reasoned opinion. | Worksheet 1.10.8; Technician’s notes 1.10.8 |
| Year 8 | Term 1 | 10/11 | End of chapter assessment | | | |

Book 1, Chapter 4: Waves – Sound *and* Light

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| Year 8 | Term 1 | 11 | 1.4.1 | Waves, sound  3.4.1 | Exploring sound | Sound produced by vibrations of objects; sound waves are longitudinal | | Identify how sounds are made.  Describe how sound waves transfer energy.  Explain how loud and quiet sounds are made. | Worksheet 1.4.1; Practical sheet 1.4.1; Technician’s notes 1.4.1 |
| Year 8 | Term 1 | 11 | 1.4.2 | Waves, sound  3.4.1 | Describing sound | Sound produced by vibrations of objects, in loudspeakers; detected by their effect on microphone diaphragm and the ear drum  Frequencies of sound waves, measured in hertz (Hz) | | Explain what is meant by pitch.  Understand frequency, wavelength and amplitude.  Relate sounds to displayed waveforms. | Worksheet 1.4.2; Technician’s notes 1.4.2 |
| Year 8 | Term 1 | 12 | 1.4.3 | Waves, sound  3.4.1 | Hearing sounds | Sound produced by vibrations of objects, detected by their effects on microphone diaphragm and the ear drum  Waves transferring information for conversion to electrical signals by microphone | | Explain what is meant by audible range.  Understand how the ear detects sounds.  Apply ideas about sound to explaining defects in hearing. | Worksheet 1.4.3; Practical sheet 1.4.3; Technician’s notes 1.4.3 |
| Year 8 | Term 1 | 12 | 1.4.4 | Waves, sound  3.4.1 | Understanding how  sound travels through  materials | Echoes, reflection and absorption of sound | | Recognise how the speed of sound changes in different substances.  Explain why the speed of sound varies between solids, liquids and gases. | Worksheet 1.4.4; Practical sheet 1.4.4; Technician’s notes 1.4.4 |
| Year 8 | Term 2 | 1 | 1.4.5 | Waves, light  3.4.2 | Learning about  the reflection and  absorption of sound | The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface | | Recognise which materials reflect the quality of sound.  Analyse the effect of different materials on sound waves.  Use ideas about energy transfer to explain how soundproofing works. | Worksheet 1.4.5; Practical sheet 1.4.5; Technician’s notes 1.4.5 |
| Year 8 | Term 2 | 1 | 1.4.6 | Waves, light  3.4.2 | Exploring properties of light | Use of the ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye | | Describe how light passes through different materials.  Explain the difference between scattering and specular reflection.  Explain how shadows are formed in eclipses. | Worksheet 1.4.6; Practical sheet 1.4.6; Technician’s notes 1.4.6 |
| Year 8 | Term 2 | 2 | 1.4.7 | Waves, light  3.4.2 | Exploring reflection | Use of the ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye | | Describe how a mirror reflects light.  Explain the difference between specular and diffuse reflection.  Apply the law of reflection. | Worksheet 1.4.7; Practical sheet 1.4.7; Technician’s notes 1.4.7 |
| Year 8 | Term 2 | 2 | 1.4.8 | Waves, light  3.4.2 | Exploring refraction | Use of the ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye | | Describe how light is refracted when it enters a different medium.  Explain how this can cause it to change direction.  Apply ideas about refraction to understanding lenses. | Worksheet 1.4.8; Practical sheet 1.4.8; Technician’s notes 1.4.8 |
| Year 8 | Term 2 | 3 | 1.4.9 | Waves, light  3.4.2 | Seeing clearly | Use of the ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye | | Describing how the human eye works.  Explaining how the eye focuses on objects different distances away.  Applying ideas about lenses to the correction of vision. | Worksheet 1.4.9; Practical sheet 1.4.9; Technician’s notes 1.4.9 |
| Year 8 | Term 2 | 3 | 1.4.10 | Waves, light  3.4.2 | Exploring coloured light | Colour and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection | | Describe how a spectrum can be produced from white light.  Compare the properties of light atdifferent frequencies.  Explain how light of different wavelengths can be split and recombined. | Worksheet 1.4.10; Practical sheet 1.4.10; Technician’s notes 1.4.10 |
| Year 8 | Term 2 | 4 | End of chapter assessment and end of year assessment | | | |

Book 2, Chapter 1: Forces – Contact forces *and* Pressure

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| Year 8 | Term 2 | 4/5 | 2.1.1 | Forces, Contact forces | Analysing equilibrium | Opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface  Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces | | Analyse situations to identify the various forces that are acting.  Explore static situations in which objects are held in equilibrium and the nature of the forces involved. | Worksheet 2.1.1; Practical sheet 2.1.1; Technician’s notes 2.1.1 |
| Year 8 | Term 2 | 6 | 2.1.2 | Forces, Contact forces | What a drag! | Forces associated with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water | | Describe the effects of drag and other forces on objects as they move.  Describe factors which affect the size of frictional and drag forces.  Evaluate how well sports or vehicle technology reduces frictional or drag forces. | Worksheet 2.1.2; Technician’s notes 2.1.2 |
| Year 8 | Term 2 | 6 | 2.1.3 | Forces, Contact forces | Understanding stretch and compression | Forces associated with deforming objects  Measurements of stretch or compression as force is changed | | Explain the relationship between an applied force and the change of shape of an object.  Investigate forces involved in compressing and stretching materials.  Identify applications for compressible and stretchable materials. | Worksheet 2.1.3; Practical sheet 2.1.3; Technician’s notes 2.1.3 |
| Year 8 | Term 2 | 7 | 2.1.4 | Forces, Contact forces | Investigating Hooke’s Law | Forces associated with deforming objects; stretching and squashing – springs  Measurements of stretch or compression as force is changed  Force–extension linear relation; Hooke’s Law as a special case | | Investigate the effects of applied forces on springs.  Generate data to produce a graph and analyse outcomes. | Worksheet 2.1.4; Practical sheet 2.1.4; Technician’s notes 2.1.4 |
| Year 8 | Term 2 | 7 | 2.1.5 | Forces, Pressure | Exploring pressure on a solid surface | Pressure measured by ratio of force over area – acting normal to any surface | | Explain how pressure can be applied on a solid surface.  Describe some effects of varying pressure. | Worksheet 2.1.5a; Worksheet 2.1.5b; Practical sheet 2.1.5; Technician’s notes 2.1.5 |
| Year 8 | Term 2 | 8 | 2.1.6 | Forces, Pressure | Exploring pressure in a fluid | Pressure in liquids, increasing with depth  Atmospheric pressure; decreases with increase of height as weight of air above decreases with height | | Describe how pressure in a liquid alters with depth.  Describe how pressure in a gas varies with height above the Earth.  Explain pressure changes in relation to particles and gravity. | Worksheet 2.1.6; Technician’s notes 2.1.6 |
| Year 8 | Term 2 | 8 | 2.1.7 | Forces, Pressure | Calculating pressure | Pressure measured by ratio of force over area – acting normal to any surface | | Identify the factors that determine the size of pressure on a solid.  Calculate the size of pressure exerted. | Worksheet 2.1.7; Practical sheet 2.1.7; Technician’s notes 2.1.7 |
| Year 8 | Term 2 | 9 | 2.1.8 | Forces, Pressure | Explaining floating and sinking | Upthrust effects, floating and sinking | | Explain why some objects float and others sink.  Relate floating and sinking to density, displacement and upthrust.  Explain the implications of these ideas. | Worksheet 2.1.8; Practical sheet 2.1.8; Technician’s notes 2.1.8 |
| Year 8 | Term 2 | 9/10 | End of chapter assessment | | | |

Book 2, Chapter 5: Matter – Periodic table *and* Elements

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| Year 8 | Term 2 | 10 | 2.5.1 | Matter, periodic table | Looking at the periodic table of elements | The principles underpinning the Mendeleev periodic table  The periodic table: periods and groups; metals and non-metals | | Navigate the periodic table and identify some of the elements.  Identify features of the periodic table and describe how it is organised.  Explain why the periodic table is useful. | Worksheet 2.5.1; Technician’s notes 2.5.1 |
| Year 8 | Term 2 | 11 | 2.5.2 | Matter, periodic table | Exploring metals in the periodic table | The varying physical and chemical properties of different elements  How patterns in reactions can be predicted with reference to the Periodic Table  The properties of metals and non-metals | | Describe the physical properties of Group 1 metals.  Describe the pattern in reactions of Group 1 metals.  Use data to predict the reactivity and position of metals within the periodic table. | Worksheet 2.5.2; Practical sheet 2.5.2; Technician’s notes 2.5.2 |
| Year 8 | Term 2 | 11 | 2.5.3 | Matter, periodic table | Exploring non-metals in the periodic table | The varying physical and chemical properties of different elements  How patterns in reactions can be predicted with reference to the Periodic Table  The properties of metals and non-metals | | Describe the physical properties of the halogens.  Describe the pattern in reactions of the halogens.  Use data to predict the reactivity and position of non-metals within the periodic table. | Worksheet 2.5.3; Practical sheet 2.5.3; Technician’s notes 2.5.3 |
| Year 8 | Term 2 | 12 | 2.5.4 | Matter, periodic table | Analysing wider patterns within the periodic table | The varying physical and chemical properties of different elements  How patterns in reactions can be predicted with reference to the Periodic Table | | Sort elements using chemical data and relate this to their position in the periodic table. | Worksheet 2.5.4 |
| Year 8 | Term 2 | 12 | 2.5.5 | Matter, Elements | Combining elements | Differences between atoms, elements and compounds  Chemical symbols and formulas for elements and compounds | | Explain what is meant by a compound.  Recognise how compounds are formed and named.  Interpret the ratio of atoms and formula of compounds. | Worksheet 2.5.5; Practical sheet 2.5.5; Technician’s notes 2.5.5 |
| Year 8 | Term 3 | 1 | 2.5.6 | Matter, Elements | Comparing elements and compounds | Differences between atoms, elements and compounds  The chemical properties of metal and non-metal oxides | | Describe the properties of elements and the compound that they form.  Compare the properties of elements with the properties of the compounds that they form. | Worksheet 2.5.6; Practical sheet 2.5.6; Technician’s notes 2.5.6 |
| Year 8 | Term 3 | 1 | 2.5.7 | Matter, Elements | Exploring polymers | Properties of ceramics, polymers and composites (qualitative) | | Describe what a polymer is, using examples.  Explain how the properties of polymers relate to their function. | Worksheet 2.5.7; Technician’s notes 2.5.7 |
| Year 8 | Term 3 | 2 | 2.5.8 | Matter, Elements | Exploring ceramics and composites | Properties of ceramics, polymers and composites (qualitative) | | Describe what is meant by ceramic and composite, using examples.  Explain how the properties of ceramics and composites relate to their function. | Worksheet 2.5.8; Practical sheet 2.5.8; Technician’s notes 2.5.8 |
| Year 8 | Term 3 | 2/3 | End of chapter assessment | | | |

Book 2, Chapter 8: Organisms – Breathing *and* Digestion

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| Year 8 | Term 3 | 3 | 2.8.1 | Organisms, Breathing | Understanding how we breathe | The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases | | Describe the mechanism of breathing in and out.  Explain how changes in pressure help us to breathe.  Evaluate a model of breathing. | Worksheet 2.8.1; Technician’s notes 2.8.1 |
| Year 8 | Term 3 | 4 | 2.8.2 | Organisms, Breathing | Measuring breathing | The mechanism of breathing to move air in and out of the lungs, including simple measurements of lung volume | | Describe what is meant by lung volume and identify some simple methods to measure it.  Identify independent, dependent and control variables in a lung volume investigation.  Interpret and evaluate data linked to lung volume. | Worksheet 2.8.2; Practical sheet 2.8.2; Technician’s notes 2.8.2 |
| Year 8 | Term 3 | 4 | 2.8.3 | Organisms, Breathing | Explaining gas exchange in humans | The structure and functions of the gas exchange system in humans, including adaptations to function | | Describe the features of the human gas exchange system.  Explain how the features enable gases to be exchanged.  Distinguish between breathing and respiration. | Worksheet 2.8.3; Technician’s notes 2.8.3 |
| Year 8 | Term 3 | 5 | 2.8.4 | Organisms, Digestion | Exploring the effects of disease and lifestyle | The impact of exercise, asthma and smoking on the human gas exchange system | | Describe the physical effects of disease and lifestyle on the breathing system.  Explain the physical effects of disease and lifestyle on the breathing system.  Describe how our understanding about the effects of smoking has changed over time. | Worksheet 2.8.4; Technician’s notes 2.8.4 |
| Year 8 | Term 3 | 5 | 2.8.5 | Organisms, Digestion | Exploring a healthy diet | Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed | | Describe the components of a healthy diet.  Examine the importance of each component of a healthy diet.  Compare the energy requirements of different healthy diets. | Worksheet 2.8.5 |
| Year 8 | Term 3 | 6 | 2.8.6 | Organisms, Digestion | Understanding the effects of an unbalanced diet | The consequences of imbalances in the diet including obesity, starvation and deficiency diseases | | Describe the physical effects of eating too much and eating too little.  Identify the causes and effects of some deficiencies in the diet. | Worksheet 2.8.6 |
| Year 8 | Term 3 | 6 | 2.8.7 | Organisms, Digestion | Understanding the human digestive system | The tissues and organs of the digestive system, including adaptations to function | | Identify the organs of the human digestive system.  Describe the process of digestion.  Evaluate a model of the digestive system. | Worksheet 2.8.7; Practical sheet 2.8.7; Technician’s notes 2.8.7 |
| Year 8 | Term 3 | 7 | 2.8.8 | Organisms, Digestion | Understanding the roles of the digestive organs | The tissues and organs of the digestive system, including adaptations to function | | Describe the roles of the organs of the digestive system.  Describe the importance of enzymes and gut bacteria in digestion.  Explain how the structure of each of the organs is adapted to its function. | Worksheet 2.8.8; Technician’s notes 2.8.8 |
| Year 8 | Term 3 | 7/8 | End of chapter assessment | | | |

Book 2, Chapter 2: Electromagnets – Magnetism *and* Electromagnetism

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| Year 8 | Term 3 | 8 | 2.2.1 | Electromagnets, Magnetism | Forces and fields | Magnetic poles, attraction and repulsion.  Magnetic fields by plotting with compass, representation by field lines  Earth’s magnetism, compass and navigation | | Know the laws of magnetic attraction.  Explain how a magnetic field can be represented by field lines.  Apply ideas about attraction to magnetic materials placed in a field. | Worksheet 2.2.1; Technician’s notes 2.2.1 |
| Year 8 | Term 3 | 9 | 2.2.2 | Electromagnets, Magnetism | Using ideas about fields | Magnetic poles, attraction and repulsion.  Magnetic fields by plotting with compass, representation by field lines  Earth’s magnetism, compass and navigation | | Describe key features of the Earth’s magnetic field.  Explain why fields vary in strength.  Explore the fields around combinations of magnets. | Worksheet 2.2.2; Technician’s notes 2.2.2 |
| Year 8 | Term 3 | 9 | 2.2.3 | Electromagnets, Electromagnets | Investigating electromagnetism | The magnetic effect of a current, electromagnets | | Describe what an electromagnet is.  Investigate the factors affecting the strength of electromagnets. | Worksheet 2.2.3; Practical sheet 2.2.3; Technician’s notes 2.2.3 |
| Year 8 | Term 3 | 10 | 2.2.4 | Electromagnets, Electromagnets | Using electromagnets | Electromagnets | | Describe different applications of electromagnets. | Worksheet 2.2.4 |
| Year 8 | Term 3 | 10 | 2.2.5 | Electromagnets, Electromagnets | Investigating strength of electromagnets | The magnetic effect of a current, electromagnets, D.C. motors | | Identify and manage variables  Investigate the effect of changing variables.  Draw conclusions about how the strength of an electromagnet can be controlled. | Worksheet 2.2.5; Technician’s notes 2.2.5 |
| Year 8 | Term 3 | 11 | End of chapter assessment | | | |

Year 3 of 3-year scheme of work

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| **Year** | **Term** | **Week** | **Student Book spread number and lesson plan reference** | **Big Idea/**  **subtopic and AQA syllabus reference** | **Title** | **Programme of study references** | **Learning objectives** | **CD-ROM resources** |

Book 2, Chapter 6: Reactions – Chemical energy *and* Types of reaction

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| Year 9 | Term 1 | 1 | 2.6.1 | Reactions, chemical energy | Understanding exothermic reactions | Internal energy stored in materials; exothermic chemical reactions (qualitative); comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with chemical compositions | | Describe examples of exothermic reactions.  Explain the energy changes taking place during an exothermic reaction. | Worksheet 2.6.1; Practical sheet 2.6.1; Technician’s notes 2.6.1 |
| Year 9 | Term 1 | 1 | 2.6.2 | Reactions, chemical energy | Comparing endothermic and exothermic changes | Exothermic and endothermic chemical reactions (qualitative); comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with chemical compositions | | Describe examples of endothermic reactions. | Worksheet 2.6.2; Practical sheet 2.6.2; Technician’s notes 2.6.2 |
| Year 9 | Term 1 | 2 | 2.6.3 | Reactions, chemical energy | Investigating endothermic reactions | Exothermic and endothermic chemical reactions (qualitative); | | Choose a suitable range and interval of values in an investigation.  Consider how to present data to make conclusions. | Worksheet 2.6.3; Practical sheet 2.6.3; Technician’s notes 2.6.3 |
| Year 9 | Term 1 | 2 | 2.6.4 | Reactions, chemical energy | Explaining the use of catalysts | What catalysts do | | Describe what a catalyst is.  Explain how catalysts work. | Worksheet 2.6.4; Practical sheet 2.6.4; Technician’s notes 2.6.4 |
| Year 9 | Term 1 | 3 | 2.6.5 | Reactions, types of reaction | Exploring combustion | Chemical reactions as the rearrangement of atoms  Representing chemical reactions using formulas and using equations  Combustion  Fuels and energy resources  Exothermic and endothermic chemical reactions (qualitative); | | Summarise combustion using an equation.  Make observations during chemical reactions.  Write word equations to represent chemical changes.  Explain chemical changes using a model. | Worksheet 2.6.5; Technician’s notes 2.6.5 |
| Year 9 | Term 1 | 3 | 2.6.6 | Reactions, types of reaction | Exploring the use of fuels |  | | Identify applications of combustion reactions.  Identify fuels used in different applications.  Compare the energy content of different fuels. | Worksheet 2.6.6; Practical sheet 2.6.6; Technician’s notes 2.6.6 |
| Year 9 | Term 1 | 4 | 2.6.7 | Reactions, types of reaction | Understanding thermal decomposition | Chemical reactions, thermal decomposition | | Recognise and explain thermal decomposition reactions.  Describe some uses of thermal decomposition. | Worksheet 2.6.7; Practical sheet 2.6.7a; Practical sheet 2.6.7b; Technician’s notes 2.6.7 |
| Year 9 | Term 1 | 4 | 2.6.8 | Reactions, types of reaction | Explaining changes | Differences between atoms, elements and compounds  Chemical symbols and formulae for elements and compounds  Conservation of mass changes of state and chemical reactions  Chemical reactions as the rearrangement of atoms  Thermal decomposition, oxidation | | Observe and explain mass changes for chemical and physical processes.  Use particle diagrams to explain chemical processes. | Worksheet 2.6.8; Practical sheet 2.6.8; Technician’s notes 2.6.8 |
| Year 9 | Term 1 | 5 | Assessments | | | |

Book 2, Chapter 9: Ecosystems – Respiration *and* Photosynthesis

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| Year 9 | Term 1 | 5/6 | 2.9.1 | Ecosystems, Respiration | Understanding aerobic respiration | Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life  The word equation for aerobic respiration | | Recall the equation for respiration and describe what it shows.  Explain the importance of respiration.  Apply what we know about respiration. | Worksheet 2.9.1; Practical sheet 2.9.1; Technician’s notes 2.9.1 |
| Year 9 | Term 1 | 6 | 2.9.2 | Ecosystems, Respiration | Exploring respiration in sport | Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life | | Describe what is meant by anaerobic respiration.  Explain why some sports involve more aerobic or more anaerobic respiration.  Explain what is meant 5by oxygen debt. | Worksheet 2.9.2 |
| Year 9 | Term 1 | 7 | 2.9.3 | Ecosystems, Respiration | Understanding anaerobic respiration | The process of anaerobic respiration in humans and micro-organisms, including fermentation, and the word equation for anaerobic respiration | | Recall that plants and microbes carry out anaerobic respiration.  Recall the word equation for fermentation in plants and microbes.  Describe some evidence to show that anaerobic respiration can produce carbon dioxide. | Worksheet 2.9.3; Practical sheet 2.9.3; Technician’s notes 2.9.3 |
| Year 9 | Term 1 | 7 | 2.9.4 | Ecosystems, Respiration | Investigating fermentation | The process of anaerobic respiration in humans and micro-organisms, including fermentation, and the word equation for anaerobic respiration | | Describe some applications of fermentation.  Identify dependent, independent and control variables in an investigation.  Analyse data and identify next steps. | Worksheet 2.9.4; Practical sheet 2.9.4; Technician’s notes 2.9.4 |
| Year 9 | Term 1 | 8 | 2.9.5 | Ecosystems, Respiration | Comparing aerobic and anaerobic respiration | The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism | | Describe some similarities and differences between aerobic and anaerobic respiration. | Worksheet 2.9.5 |
| Year 9 | Term 1 | 8 | 2.9.6 | Ecosystems, Photosynthesis | Exploring how plants make food | The reactants in, and products of, photosynthesis, and a word summary for photosynthesis  Plants making carbohydrates in their leaves by photosynthesis | | Describe a method to show that chlorophyll is essential for photosynthesis.  Identify risks and control measures. | Worksheet 2.9.6; Practical sheet 2.9.6; Technician’s notes 2.9.6 |
| Year 9 | Term 1 | 9 | 2.9.7 | Ecosystems, Photosynthesis | Looking at leaves | The adaptations of leaves for photosynthesis | | Relate the size of a leaf to the availability of light.  Relate the function of the leaf to its structure and the types of cell.  Evaluate the structure of a cell related to its function. | Worksheet 2.9.7; Practical sheet 2.9.7; Technician’s notes 2.9.7 |
| Year 9 | Term 1 | 9 | 2.9.8 | Ecosystems, Photosynthesis | Exploring the movement of water and minerals in plants | Plants gain mineral nutrients and water from the soil via their roots | | Identify how water and minerals move through a plant.  Explain how water and minerals move through a plant.  Evaluate the cell structures that allow the movement of water and minerals through a plant. | Worksheet 2.9.8a; Worksheet 2.9.8b; Practical sheet 2.9.8; Technician’s notes 2.9.8 |
| Year 9 | Term 1 | 10 | 2.9.9 | Ecosystems, Photosynthesis | Investigating the importance of minerals to plants |  | | Identify the minerals essential to healthy plant growth.  Explain the effects of a deficiency in essential minerals.  Evaluate the limitations of evidence. | Worksheet 2.9.9a; Worksheet 2.9.9b; Practical sheet 2.9.9; Technician’s notes 2.9.9 |
| Year 9 | Term 1 | 10 | 2.9.10 | Ecosystems, Photosynthesis | Investigating photosynthesis | The reactants in, and products of, photosynthesis, and a word summary for photosynthesis | | Identify the factors that can affect photosynthesis.  Predict results of investigations.  Interpret secondary data about photosynthesis. | Worksheet 2.9.10a; Worksheet 2.9.10b; Practical sheet 2.9.10a; Practical sheet 2.9.10b; Technician’s notes 2.9.10 |
| Year 9 | Term 1 | 11 | End of chapter assessment | | | |

Book 2, Chapter 3: Energy – Work *and* Heating and cooling

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| Year 9 | Term 1 | 11/12 | 2.3.1 | Energy, Work | Doing work | Work done; simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged | | Recognise situations where work is done.  Describe the relationship work done = force × distance.  Apply the equation for work done to different situations. | Worksheet 2.3.1; Technician’s notes 2.3.1 |
| Year 9 | Term 1 | 12 | 2.3.2 | Energy, Work | Making work easier | Work done; simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged | | Understand what simple machines are.  Explain why they are useful.  Compare and contrast different machines | Worksheet 2.3.2; Technician’s notes 2.3.2 |
| Year 9 | Term 2 | 1 | 2.3.3 | Energy, heating and cooling | Explaining thermal energy | Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one  Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with temperatures | | Describe how temperature differences lead to energy transfer. | Worksheet 2.3.3; Practical sheet 2.3.3; Technician’s notes 2.3.3 |
| Year 9 | Term 2 | 1 | 2.3.4 | Energy, heating and cooling | How heat travels | Explain how heat can travel by conduction, convection and radiation.  Give examples of each of these happening. | Worksheet 2.3.4; Technician’s notes 2.3.4 |
| Year 9 | Term 2 | 2 | 2.3.5 | Energy, heating and cooling | How to stop heat from travelling | Explain the difference between conductors and insulators.  Explain how insulation works.  Apply ideas about insulation to practical applications. | Worksheet 2.3.5; Practical sheet 2.3.5; Technician’s notes 2.3.5 |
| Year 9 | Term 2 | 2 | 2.3.6 | Energy, heating and cooling | Energy and temperature | Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators | | Describe the warming and cooling of objects.  Explain the relationship between energy transfer and temperature change. | Worksheet 2.3.6; Practical sheet 2.3.6; Technician’s notes 2.3.6 |
| Year 9 | Term 2 | 3 | End of chapter assessment | | | |

Book 2, Chapter 7: Earth – Climate *and* Earth resources

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| Year 9 | Term 2 | 3/4 | 2.7.1 | Earth, Climate | Understanding our atmosphere | The composition of the atmosphere | | Describe the composition of our atmosphere.  Describe how the atmosphere has changed over time.  Explain why the atmosphere has changed. | Worksheet 2.7.1; Practical sheet 2.7.1; Technician’s notes 2.7.1 |
| Year 9 | Term 2 | 4 | 2.7.2 | Earth, Climate | Understanding how carbon is recycled | The carbon cycle | | Describe the carbon cycle. | Worksheet 2.7.2; Practical sheet 2.7.2; Technician’s notes 2.7.2 |
| Year 9 | Term 2 | 5 | 2.7.3 | Earth, Climate | Exploring how humans affect the carbon cycle | the carbon cycle, the composition of the atmosphere and the production of carbon dioxide by human activity and the impact on climate. | | Understand that human activities affect the carbon cycle.  Appreciate the scale of this impact.  Explain how the impact relates to carbon stores as well as carbon dioxide producers. | Worksheet 2.7.3; Technician’s notes 2.7.3 |
| Year 9 | Term 2 | 5 | 2.7.4 | Earth, Climate | Understanding global warming | The production of carbon dioxide by human activity and the impact on climate | | Describe the effects of global warming.  Explain the consequences of global warming for living things.  Evaluate the arguments for human activity impacting on global warming. | Worksheet 2.7.4 |
| Year 9 | Term 2 | 6 | 2.7.5 | Earth, Earth resources | Exploring damage to the Earth’s resources | Describe resources that the Earth provides.  Explain how human activity limits these resources.  Justify decisions about making changes to the environment. | Worksheet 2.7.5 |
| Year 9 | Term 2 | 6 | 2.7.6 | Earth, Earth resources | Considering the importance of recycling | Earth as a source of limited resources and the efficacy of recycling | | Describe examples of recycling.  Explain the benefits and limitations of recycling schemes.  Compare the efficiency of recycling methods. | Worksheet 2.7.6; Practical sheet 2.7.6; Technician’s notes 2.7.6 |
| Year 9 | Term 2 | 7 | 2.7.7 | Earth, Earth resources | How to extract metals | The order of metals and carbon in the reactivity series and the use of carbon in obtaining metals from metal oxides | | Understand that most metals are found as ores.  Understand how less reactive metals can be extracted.  Understand how more reactive metals can be extracted. | Worksheet 2.7.7; Technician’s notes 2.7.7 |
| Year 9 | Term 2 | 7/8 | End of chapter assessment | | | |

Book 2, Chapter 10: Genes – Evolution *and* Inheritance

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| Year 9 | Term 2 | 8 | 2.10.1 | Genes, Evolution | Explaining natural selection | The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection | | Describe how variation causes competition for resources, and drives natural selection. | Worksheet 2.10.1; Practical sheet 2.10.1; Technician’s notes 2.10.1 |
| Year 9 | Term 2 | 9 | 2.10.2 | Genes, Evolution | Understanding the importance of biodiversity | Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction  The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material | | Describe what is meant by biodiversity.  Explain the importance of biodiversity. | Worksheet 2.10.2 |
| Year 9 | Term 2 | 9 | 2.10.3 | Genes, Evolution | Explaining extinction | Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction  The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material | | Identify changes that can cause a species to become extinct.  Explain the use of gene banks to preserve hereditary material before a species becomes extinct.  Analyse and evaluate theories of what caused the extinction of the dinosaurs. | Worksheet 2.10.3 |
| Year 9 | Term 2 | 10 | 2.10.4 | Genes, Inheritance | Understanding the nature of genetic material | A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model | | Identify that the nucleus contains chromosomes, which carry inherited genetic information.  Describe the link between chromosomes, genes and DNA.  Describe the structure of DNA.  Assess the work of Watson, Crick, Wilkins and Franklin on DNA structure. | Worksheet 2.10.4a; Worksheet 2.10.4b; Practical sheet 2.10.4; Technician’s notes 2.10.4 |
| Year 9 | Term 2 | 10 | 2.10.5 | Genes, Inheritance | Exploring the role of chromosomes | A simple model of chromosomes, genes and DNA in heredity | | Identify that a fertilised egg contains a full set of chromosomes, half from each parent.  Explain the number of chromosomes in gametes.  Explain how some genetic disorders arise. | Worksheet 2.10.5a; Worksheet 2.10.5b; Practical sheet 2.10.5; Technician’s notes 2.10.5 |
| Year 9 | Term 2 | 11 | 2.10.6 | Genes, Inheritance | Understanding variation | Heredity as the process by which genetic information is transmitted from one generation to the next | | Identify inherited characteristics in plants and animals that vary between offspring.  Explain how inherited differences arise by genetic material from both parents combining.  Describe how identical twins occur and analyse data about their features. | Worksheet 2.10.6; Technician’s notes 2.10.6 |
| Year 9 | Term 2 | 11 | 2.10.7 | Genes, Inheritance | Modelling inheritance | Heredity as the process by which genetic information is transmitted from one generation to the next | | Use a model to represent inheritance of a trait.  Predict likelihood of offspring inheriting specific traits. | Worksheet 2.10.7 |
| Year 9 | Term 2 | 12 | End of chapter assessment | | | |

Book 2, Chapter 4: Waves – Wave effects *and* Wave properties

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| Year 9 | Term 3 | 1 | 2.4.1 | Waves, Wave effects | Exploring sound | frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound  sound needs a medium to travel, the speed of sound in air, in water, in solids  auditory range of humans and animals.  use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone.  sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal | | Understand how sound waves vary in frequency.  Apply ideas about frequency to understand ultrasound.  Understand practical applications of ultrasound. | Worksheet 2.4.1; Technician’s notes 2.4.1 |
| Year 9 | Term 3 | 1 | 2.4.2 | Waves, Wave effects | Sound systems | Understand the function of microphones and loudspeakers.  Understand how audio equipment responds to different frequencies. | Worksheet 2.4.2; Technician’s notes 2.4.2 |
| Year 9 | Term 3 | 2 | 2.4.3 | Waves, wave properties | Exploring light | the similarities and differences between light waves and waves in matter  light waves travelling through a vacuum; speed of light  the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface  use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye  light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras  colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.  Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition | | Understanding light can vary in frequency.  Describe UV light and its risks.  Explain the uses of UV light. | Worksheet 2.4.3; Technician’s notes 2.4.3 |
| Year 9 | Term 3 | 2 | 2.4.4 | Waves, wave properties | Exploring waves | Use water waves to model wave behaviour.  Understand and apply the processes of reflection and absorption. | Worksheet 2.4.4; Technician’s notes 2.4.4 |
| Year 9 | Term 3 | 3 | 2.4.5 | Waves, wave properties | Comparing transverse and longitudinal waves | Understanding longitudinal waves.  Understanding transverse waves.  Comparing types of wave | Worksheet 2.4.5; Practical sheet 2.4.5; Technician’s notes 2.4.5 |
| Year 9 | Term 3 | 3/4 | End of chapter assessment | | | |
| Year 9 | Term 3 | 5 to 12 | Revision and end of Key Stage assessment / Introduction to GCSE | | | |