Scheme of Work: SCIENCE KS3

Teaching Key Stage 3 in two years

If you are using the Collins KS3 Science scheme to deliver the Programme of Study in **two** years there are **three** ways you can do it:

1. **Focus** on the lessons **shaded** in the table. By so doing you will have visited all the key ideas.
2. Use the shaded lessons as a **starting point** but **draw on ideas, activities and questions as necessary,** i.e., 'swapping out' the occasional activity on an indicated lesson. **For the two year scheme important parts that occur in the sections not highlighted have been included in bold in the Learning Objectives of highlighted lessons. It also indicates where the teaching can be reduced in scope.**
3. Use the **introductory lesson and/or the 'Applying key ideas'** lesson to see what students are more confident with and what time would be better spent on.

Year 8

The Teacher pack has all of the resources used in this SOW: It is split into 3 sections. As we have less teaching time available you may need to focus on the shaded lessons only. Book 2 is for teaching Year 8.

The numbers in the first column Lesson refers to where to find the resources in the Teachers Pack: e.g.

1.1.3 - **1** Folder 1

1.**1**.3 - **1 Cells – the building Blocks of Life**

1.1.3 - **Comparing plant and animal cells**

Term 1

Chapter 1: Exploring The Human Skeleton TERM 1						
Lesson	**Lesson title**	**Overarching objectives**	**Learning objectives**	**CD-ROM differentiated resources for SEN/EAL/G&T**	**Assessment and Skills (including ICT)**	**Keywords**
2.1.2	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 Explain why we have different shapes and sizes of bones Communicate effectively to investigate the structure and function of bones	Worksheet 2.1.2	Thinking scientifically Model building – skeleton Investigation – bones of a cooked chicken	Bone, skeleton, calcium, marrow
2.1.3	Analysing the skeleton	The structure and functions of the human skeleton, to include support, protection, movement and making blood cells	Describe the roles of the skeleton Explain the evidence for each of the roles of the skeleton Estimate height using bone measurement calculations and suggest reasons for differences between people	Worksheet 2.1.3; Practical sheet 2.1.3; Technician's notes 2.1.3	Research skills	Support, protect, blood cells, joint, cartilage
2.1.4	Understanding the role of skeletal joints	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 Compare different joints within the human skeleton Collaborate effectively to interpret how we use joints	Worksheet 2.1.4; Practical sheet 2.1.4; Technician's notes 2.1.4	Practical skills	Ligament, muscle, tendon

2.1.5	Investigating muscle strength	Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles	Identify muscles used in different activities Plan an investigation to compare strength of different muscles Make a prediction about which muscles are stronger than others	Worksheet 2.1.5; Practical sheet 2.1.5; Technician's notes 2.1.5	Practical skills	Contracted, relaxed, force, newton
2.1.6	Analysing muscle strength	Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles	Display data in a suitable graph Analyse data to compare the force of different muscles Explore the use of scientific ideas in identifying and treating muscle disorders	Worksheet 2.1.6a (copied onto card) and Worksheet 2.1.6b	Data analysis skills Analysis skills	Electromyography (EMG), anabolic steroid
2.1.7	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 Evaluate a model of antagonistic muscles	Worksheet 2.1.7; Practical sheet 2.1.7 (second page copied onto card); Technician's notes 2.1.7	Evaluation skills	Antagonistic muscle, bicep, tricep, quadricep
2.1.8	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 Describe treatments for some skeletal system problems Communicate effectively to learn how treatments have changed over time	Worksheet 2.1.8	Recollection Research & Communication	Skeletal system, fracture, osteoporosis, arthritis

2.1.9	Applying key ideas	The bare bones of space travel.	Extract ideas about skeleton and muscles from the text, including earlier sections of the chapter Apply ideas about maintaining muscle and bone mass in relation to the effects of space travel Suggest how understanding the effects of space on the skeleton can be applied on Earth	Worksheet 2.1.9	Application of key ideas Discursive & presentation skills	
Revise: Human sleleton – muscles and bones		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				

Chapter 1: Respiration TERM 1

Lesson	Lesson title	Overarching objectives	Learning objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
2.1.10	Understanding how our muscles get energy	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 2.1.10; Practical sheet 2.1.10; Technician's notes 2.1.10	Observational skills from practical demo	Energy, respiration, glucose, aerobic respiration
2.1.11	Investigating 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 that respiration takes place in plants and animals Describe some experimental evidence for respiration Consider the quality of evidence for respiration	Cards from Worksheet 2.1.10 (as used in the previous lesson); Worksheet 2.1.11; Practical sheets 2.1.11a–d; Technician's notes 2.1.11	Practical skills	Reactant, photosynthesis, product, germinating

2.1.12	Analysing adaptations for respiration	Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life	Describe where in the cell respiration takes place Explain how mitochondria are adapted for respiration Compare and explain numbers of mitochondria in different cells	Worksheet 2.1.12	Quick starter; Interactive activity: Match the mitochondria-rich cells with their energy-consuming function Analysis	Mitochondria, membrane, enzymes
2.1.13	Examining links between respiration and body systems	Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life	Describe some systems in animals and plants that are linked with respiration Explain how some systems and respiration are dependent Suggest the consequences of a failure in linked body systems	Worksheet 2.1.13	Developing scientific questioning	Digestive system, breathing system, circulatory system, phloem, stomata
2.1.14	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 by oxygen debt **Ensure important points about the role of respiration are covered, from lesson 2.1.13**	Worksheet 2.1.14	Understanding how theories develop Collaboration	Anaerobic respiration, lactic acid, oxygen debt, glycogen
2.1.15	Understanding anaerobic respiration	The process of anaerobic respiration in humans and micro-organisms, including fermentation, and the word equation for anaerobic respiration	Recall that microbes carry out anaerobic respiration Describe some evidence to show that anaerobic respiration produces carbon dioxide Construct a method to show what is produced in anaerobic respiration	Worksheet 2.1.15; Practical sheet 2.1.15; Technician's notes 2.1.15	Designing investigations Practical skills	Fermentation, microbe, yeast

2.1.16	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 2.1.16; Practical sheet 2.1.16; Technician's notes 2.1.16	Working scientifically	Brewing, fossil fuel, independent variable, dependent variable
2.1.17	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 Work responsibly within a team to summarise respiration	Worksheet 2.1.17	Compare and contrast	catalyst
Revision of Respiration		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				

Chapter 3: Explaining Physical Changes TERM 1						
Lesson	**Lesson title**	**Overarching objectives**	**Learning objectives**	**CD-ROM differentiated resources for SEN/EAL/G&T**	**Assessment and Skills (including ICT)**	**Keywords**
2.3.2	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 2.3.2; Practical sheet 2.3.2 (the last page copied onto card); Technician's notes 2.3.2	Practical and organisational skills	Particles, energy, intermolecular forces
2.3.3	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 **The principles of the particle model from lesson 2.3.2 should underpin this and the next two lessons**	Worksheet 2.3.3; Practical sheet 2.3.3 (last page copied onto card); Technician's notes 2.3.3	Thinking and working scientifically	Malleable, strength, hardness, soluble, conduct, alloy
2.3.4	Exploring Brownian motion	Brownian motion in gases	• Describe how theories develop • Describe and explain Brownian motion in terms of particles	Worksheet 2.3.4; Practical sheet 2.3.4; Technician's notes 2.3.4	Observational skills	Hypothesis, Brownian motion, kinetic theory, evidence
2.3.5	Understanding liquids and gases	The properties of different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure	• Compare different properties of liquids and gases • Relate the properties and behaviour of liquids and gases to the particle model	Worksheet 2.3.5; Practical sheet 2.3.5; Technician's notes 2.3.5	Practical and observational skills	Viscosity, compressed, solubility

2.3.6	Changing 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 of energy transfer	Worksheet 2.3.6; Practical sheet 2.3.6; Technician's notes 2.3.6	Practical and analysis of data	Sublimation, melting point, boiling point, latent heat
2.3.7	Understanding evaporation	Changes of state in terms of the particle model Energy changes on changes of state (qualitative)	• Investigate factors affecting evaporation • Explain the differences between boiling and evaporation using the particle model	Worksheet 2.3.7; Practical sheet 2.3.7; Technician's notes 2.3.7	Investigative skills	Evaporation, boiling, surface area
2.3.8	Exploring thermal expansion	Changes with temperature in motion and spacing of particles	• Identify how heat affects the arrangement and movement of particles • Use the particle model to explain the effects of heat on expansion	Worksheet 2.3.8; Practical sheet 2.3.8; Technician's notes 2.3.8	Practical explorations	Thermal expansion
2.3.9	Making sense of models	A simple Dalton atomic model	• Describe the concept of a 'good enough' model • Link the particle model to elements and compounds • Evaluate the strengths and weaknesses of the particle model	Worksheet 2.3.9; Technician's notes 2.3.9	Analyse and describe models	Atom, element, compound, particle model

2.3.10	Applying key ideas	Explaining Heat Packs.	• Extract ideas about changes of state, expansion and energy changes from the text, including earlier sections of the topic • Apply ideas about the particle model to explain some physical processes • Use ideas and information about particles to explain the properties of different states of matter and how changes of state can be applied	Worksheet 2.3.10; Technician's notes 2.3.10	Application of key ideas Reading, comprehension and analysis	
2.3.11	Explaining density of solids and liquids	The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice–water transition Similarities and differences, including density differences, between solids, liquids and gases	• Use the particle model to explain density differences between solids and liquids • Use the particle model to explain anomalies between ice and water **May be combined with lesson 2.3.12**	Worksheet 2.3.11; Technician's notes 2.3.11	Mathematical skills Graphical skills Recording	Density, mass, volume, float
2.3.12	Explaining the density of gases	The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice–water transition Similarities and differences, including density differences, between solids, liquids and gases	• Use the particle model to explain differences in the density of gases • Evaluate a method of measuring density	Worksheet 2.3.12a; Worksheet 2.3.12b; Practical sheet 2.3.12; Technician's notes 2.3.12	Mathematical skills	Density, mass, volume
2.3.13	Explaining concentration and pressure	The properties of different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure	• Describe what is meant by concentration and pressure. • Use the particle model to explain differences in concentration and pressure	Worksheet 2.3.13; Practical sheet 2.3.13; Technician's notes 2.3.13	Mathematical	Concentration, concentrated, dilute, pressure, kilopascal

2.3.14	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 2.3.14; Practical sheet 2.3.14; Technician's notes 2.3.14	Observational skills	Diffusion, equilibrium, concentration gradient
2.3.15	Conserving mass	Conservation of mass Changes of state Conservation of material and mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving	• Use the particle model to explain the Law of Conservation of Mass	Worksheet 2.3.15; Practical sheet 2.3.15a; Practical sheet 2.3.15b; Technician's notes 2.3.15	Analysis & Practical skills	Law of Conservation of Mass, chemical reaction, physical change, efficiency
2.3.16	Deciding between physical and chemical changes	Mixtures, including dissolving The difference between chemical and physical changes	• Use the particle model to explain the differences between physical and chemical changes • Recognise that mass is conserved in all changes **May be combined with lesson 2.3.17**	Worksheet 2.3.16; Practical sheet 2.3.16; Technician's notes 2.3.16	Developing questions & collaboration	Physical change, reversible, chemical change, exothermic, endothermic
2.3.17	Explaining the properties of mixtures	Mixtures, including dissolving The properties of different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure	• Use the particle model to explain the properties of mixtures	Worksheet 2.3.17; Practical sheet 2.3.17; Technician's notes 2.3.17	Designing investigations	Emulsion, colloid, foam, gel
2.3.18	Using particle models	The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice–water transition	• Use 'good enough' particles models to explain different observations	Worksheet 2.3.18; Practical sheet 2.3.18a; Practical sheet 2.3.18b; Technician's notes 2.3.18	Using models	Particle model
Revision: Explaining physical changes		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				

Term 2

Chapter 6: Magnetism and Electricity TERM 2						
Lesson	**Lesson title**	**Overarching objectives**	**Learning objectives**	**CD-ROM differentiated resources for SEN/EAL/G&T**	**Assessment and Skills (including ICT)**	**Keywords**
2.6.2	Looking at the history of magnets	Earth's magnetism, compass and navigation	Summarise historical ideas about magnetism Describe how historical ideas about magnetism have changed over time	Practical sheet 2.6.2; Technician's notes 2.6.2	Summarising information Practical skills	
2.6.3	Exploring magnetic materials	Magnetic poles, attraction and repulsion	Investigate magnetism in materials Explain magnetism using the domain theory	Worksheet 2.6.3; Practical sheet 2.6.3; Technician's notes 2.6.3	Practical investigative skills	Permanent magnet, temporary magnet, electromagnet, domain
2.6.4	Testing the strength of magnets	Magnetic poles, attraction and repulsion	Compare different methods of testing magnets Collect data to investigate the strength of magnetism	Practical sheet 2.6.3 (from previous lesson); Practical sheet 2.6.4; Technician's notes 2.6.4	Comparisons, investigative	Subjective, reliability, repeatability, reproducibility, accuracy, precision
2.6.5	Describing the Earth's magnetic field	Earth's magnetism, compass and navigation	Explain evidence for the Earth's magnetic field Explain the impact the Earth's magnetic field has on our planet	Worksheet 2.6.5	Developing explanations Communication	Geodynamo theory, magnetosphere, solar wind
2.6.6	Investigating electromagnetism	The magnetic effect of a current, electromagnets	Describe what an electromagnet is Investigate the factors affecting the strength of electromagnets	Worksheet 2.6.6; Practical sheet 2.6.6; Technician's notes 2.6.6	Investigative skills	Current, magnetic field, electromagnet, iron core
2.6.7	Using electromagnets	Electromagnets	Describe different applications of electromagnets	Worksheet 2.6.7; Technician's notes 2.6.7	Thinking scientifically	Armature, contact, circuit breaker
2.6.8	Exploring D.C. motors	Other processes that involve energy transfer: completing an electrical circuit The magnetic effect of a current, D.C. motors (principles only)	Describe the magnetic effect of a current and how this is applied to D.C. motors	Worksheet 2.6.8; Practical sheet 2.6.8; Technician's notes 2.6.8	Developing explanations	Electric motor, motor effect, direct current (D.C.)

2.6.9	Applying key ideas	How can magnets be used to operate trains?	Extract ideas about magnets from the Student Book text, including earlier sections of the chapter. Apply ideas about the properties of magnets to explain some of their applications.	Worksheet 2.6.9	Application of ideas Presentation of key ideas	
2.6.10	Investigating batteries	Other processes that involve energy transfer: completing an electrical circuit	Describe the link between chemical energy and electricity. Investigate how fruit batteries work	Worksheet 2.6.10; Technician's notes 2.6.10	Designing investigations & analysing data	Battery, electron, electric circuit, voltage
2.6.11	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 2.6.11 (the second page printed onto card); Practical sheet 2.6.11; Technician's notes 2.6.11	Drawing circuits	Component, conductor, insulator, ammeter, ampere
2.6.12	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 Explain voltage using different analogies	Worksheet 2.6.12; Technician's notes 2.6.12	Describing and explaining	Voltage, volt, voltmeter, potential difference
2.6.13	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 **Refer to factors affecting resistance, from lesson 2.6.14**	Worksheet 2.6.13; Practical sheet 2.6.13; Technician's notes 2.6.13	Investigating and explaining	Resistance, free electron, ohm

2.6.14	Investigating factors affecting resistance	Resistance, measured in ohms, as the ratio of potential difference (p.d.) to current Differences in resistance between conducting and insulating components (quantitative)	Describe some uses of resistance Investigate and explain factors affecting resistance	Worksheet 2.6.14; Practical sheet 2.6.14; Technician's notes 2.6.14	Practical investigative	Resistor, variable resistor, filament
2.6.15	Explaining circuits using models	Potential difference, measured in volts, battery and bulb ratings Resistance, measured in ohms, as the ratio of potential difference (p.d.) to current	Describe how the voltage, current and resistance are related in different circuits Use a model to explain the relationship between voltage, current and resistance	Worksheet 2.6.15; Practical sheet 2.6.15; Technician's notes 2.6.15	Explaining scientific principles	Model, analogy
2.6.16	Describing series and parallel circuits	Series and parallel circuits, currents add where branches meet and current as flow of charge	Understand how voltage and current vary in a series circuit Understand how voltage and current vary in a parallel circuit	Worksheet 2.6.16; Technician's notes 2.6.16	Making predictions	Series circuit, branch, parallel circuit
2.6.17	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 2.6.17; Practical sheet 2.6.17; Technician's notes 2.6.17	Collaboration & interpretation	Ring main, appliance, mains supply
2.6.18	Applying circuits	Series and parallel circuits, currents add where branches meet and current as flow of charge	Describe how circuits are arranged in common appliances	Worksheet 2.6.18, the second page copied onto card	Formulation of questions, thinking scientifically	Circuit breaker, thermostat, series-parallel circuit
Revision of Magnetism and Electricity		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				

Chapter 7: Explaining Chemical Changes TERM 2						
Lesson	**Lesson title**	**Overarching objectives**	**Learning objectives**	**CD-ROM differentiated resources for SEN/EAL/G&T**	**Assessment and Skills (including ICT)**	**Keywords**
2.4.2	Exploring acids	Defining acids and alkalis	• Recognise acids used in everyday life • Describe what all acids have in common • Evaluate the hazards that acids pose	Worksheet 2.4.2	Evaluating risks	Acid, corrosive, irritant, hydrogen
2.4.3	Exploring alkalis	Defining acids and alkalis	• Recognise alkalis used in everyday life • Describe what all alkalis have in common • Evaluate the hazards that alkalis pose	Worksheet 2.4.3	Risk assessment	Alkali, soapy, hydroxide
2.4.4	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 **May be combined with lesson 2.4.5**	Worksheet 2.4.4; Practical sheet 2.4.4; Technician's notes 2.4.4	Practical skills, working safely	Indicator, litmus, neutral
2.4.5	Using universal indicator	The pH scale for measuring acidity/alkalinity; and indicators	• Describe what the pH scale measures • Measure and record pH values • Identify the advantages of universal indicator	Worksheet 2.4.5; Practical sheet 2.4.5; Technician's notes 2.4.5	Units and nomenclature	Strong/weak acid and alkali, universal indicator, pH number

2.4.6	Exploring neutralisation	Defining acids and alkalis in terms of neutralisation reactions The pH scale for measuring acidity/alkalinity; and indicators	• Describe examples of neutralisation • Use indicators to identify chemical reactions • Explain colour changes in terms of pH and neutralisation	Worksheet 2.4.6; Practical sheet 2.4.6; Technician's notes 2.4.6	Considering the quality of evidence Collaboration	Neutralisation, titration
2.4.7	Explaining neutralisation	Defining acids and alkalis in terms of neutralisation reactions Chemical reactions as the rearrangement of atoms Representing chemical reactions using formulas and using equations Reactions of acids with alkalis to produce a salt plus water	• Recall the equation for a neutralisation reaction • Explain how water is made during a neutralisation reaction • Apply a model to explain neutralisation	Worksheet 2.4.7	Thinking scientifically and using equations	Water, neutral, salt, equation
2.4.8	Understanding salts	Chemical reactions as the rearrangement of atoms Representing chemical reactions using formulas and using equations Reactions of acids with alkalis to produce a salt plus water	• Name examples of salts • Describe the uses of common salts • Predict the reactants used in and the salts made by different neutralisation reactions	Worksheet 2.4.8	Application of ideas Match the salts to their uses	Salt, base
2.4.9	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 • Explain the reaction between acids and metals • Compare the reactivity of different metals	Worksheet 2.4.9; Practical sheet 2.4.9; Technician's notes 2.4.9	Balancing equations	Chemical reaction, salt, hydrogen, reactivity

2.4.10	Exploring the reactions of acids with carbonates	Chemical reactions as the rearrangement of atoms Representing chemical reactions using formulas and using equations	• Describe the reaction between acids and carbonates • Explain the reaction between acids and carbonates • Write word equations for the reactions between acids and carbonates	Worksheet 2.4.10; Practical sheet 2.4.10; Technician's notes 2.4.10	Using scientific units and nomenclature	Carbonate, carbon dioxide, limewater
2.4.11	Applying key ideas	Ever-changing urine. P192-193	• Identify some factors that affect the pH of urine • Explain how the pH of urine can be used by medical practitioners • Apply knowledge about acids and alkalis to reactions in the body	Worksheet 2.4.11; Technician's notes 2.4.11	Application of ideas about acids and alkalis to medicine and the body	
2.4.12	Investigating the effectiveness of antacids	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	Worksheet 2.4.12; Practical sheet 2.4.12; Technician's notes 2.4.12	Investigative practical skills	Indigestion, heartburn, antacid, base, neutralisation
2.4.13	Understanding the importance of acids and alkalis	Defining acids and alkalis in terms of neutralisation reactions Reactions of acids with alkalis to produce a salt plus water	• Classify common useful chemicals as acids or alkalis • Explain the importance of acids and alkalis in everyday life • Explore common misconceptions about acids and alkalis	Worksheet 2.4.13	Development of questioning techniques	Fertiliser, misconception

2.4.14	Exploring combustion	Combustion Fuels and energy resources	• Explain the terms fuel and combustion • Recall what is needed for combustion • Analyse the fire triangle and apply it to putting out fires **Refer to reasons for selecting different fuels, from lesson 2.4.15**	Worksheet 2.4.14; Technician's sheet 2.4.14	Making predictions and communication	**Chemical reaction, fuel, combustion, fire triangle**
2.4.15	Understanding combustion and the use of fuels	Combustion Fuels and energy resources	• Identify applications of combustion reactions • Identify fuels used in different applications • Compare the energy of different fuels	Worksheet 2.4.15; Practical sheet 2.4.15; Technician's notes 2.4.15	Analysis of data and comparisons	Exothermic, energy, alcohol
2.4.16	Exploring the effects of burning	Combustion Chemical reactions as the rearrangement of atoms Representing chemical reactions using formulas and using equations The production of carbon dioxide by human activity	• Summarise combustion using an equation • Compare complete and incomplete combustion • Explain what is meant by the conservation of mass	Worksheet 2.4.16 (with the second page copied onto card); Practical sheet 2.4.16; Technician's notes 2.4.16	Comparison of data and equations to recognise trends	Hydrocarbon, complete combustion, oxidation, incomplete combustion
2.4.17	Understanding acid rain	Combustion The composition of the atmosphere	• Describe how combustion can cause acid rain • Describe the effects of acid rain • Explain the effects of acid rain	Worksheet 2.4.17	Application of knowledge to environmental issues	Sulfur dioxide, acid rain
Revision: Explaining chemical changes		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				

Term 3

Chapter 2: Looking at Plants and Ecosystems TERM 3						
Lesson	**Lesson title**	**Overarching objectives**	**Learning objectives**	**CD-ROM differentiated resources for SEN/EAL/G&T**	**Assessment and Skills (including ICT)**	**Keywords**
2.2.2	Understanding the importance of plants	The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store, and to maintain levels of oxygen and carbon dioxide in the atmosphere	• Identify the importance of plants to life on Earth • Use evidence to explain that plants do not use soil to grow • Evaluate secondary data to start to explain how plants make food	Worksheet 2.2.2; Practical sheet 2.2.2; Technician's notes 2.2.2	Working scientifically and designing investigations	Carbon dioxide, water
2.2.3	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	• Identify the reactants and products of photosynthesis • Plan and predict the results of investigations • Evaluate the risks of a procedure	Worksheet 2.2.3; Practical sheet 2.2.2; Practical sheet 2.2.3; Technician's notes 2.2.3	Evaluation of risks Working safely in the lab Making predictions	Glucose, chlorophyll, photosynthesis, starch, iodine
2.2.4	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 2.2.4; Practical sheet 2.2.4; Technician's notes 2.2.4	Practical skills in chromatography Recording and analysing evidence	Cuticle, epidermis, palisade cell, spongy, guard cells

2.2.5	Exploring the role of stomata	The adaptations of leaves for photosynthesis The role of leaf stomata in gas exchange in plants	• Describe how stomata control gas exchange • Explain how gas exchange occurs in leaves • Analyse how stomata density is affected by different conditions **Recap on the adaptations of leaves, using key points from lesson 2.2.4**	Worksheet 2.2.5a; Worksheet 2.2.5b (second page copied onto card); Practical sheet 2.2.5a; Practical sheet 2.2.5b; Technician's notes 2.2.5	Producing drawn models to explain scientific ideas	Pore, stomata, stoma, guard cell
2.2.6	Investigating photosynthesis	The reactants in, and products of, photosynthesis, and a word summary for photosynthesis	• Identify the factors that can affect photosynthesis • Predict the results of the investigations • Interpret secondary data about photosynthesis	Worksheet 2.2.6a; Worksheet 2.2.6b; Practical sheet 2.2.6a; Practical sheet 2.2.6b; Technician's notes 2.2.6	Practical investigation Making predictions Collecting data	Rate, photosynthesis
2.2.7	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 **Refer to the role of minerals, from lesson 2.2.**8	Worksheet 2.2.7a, Worksheet 2.2.7b; Technician's notes 2.2.7	Mind map to demonstrate knowledge across the topic	Transpiration, xylem cells, root hair cell
2.2.8	Investigating the importance of minerals to plants	Plants gain mineral nutrients and water from the soil via their roots	• Identify the minerals essential to healthy plant growth • Explain the effects of a deficiency in essential minerals • Evaluate the limitations of evidence	Worksheet 2.2.8a copied onto card; Worksheet 2.2.8b; Practical sheet 2.2.8; Technician's notes 2.2.8	Investigative skills	Deficiency, fertiliser, manure

2.2.9	Investigating chemosynthesis	The interdependence of organisms in an ecosystem, including food webs	• Describe how ocean vent communities survive • Describe the adaptations of tubeworms • Compare and contrast chemosynthesis and photosynthesis • Evaluate models of chemosynthesis and photosynthesis	Worksheet 2.2.9	Building questions and collaboration	Chemosynthesis, hydrothermal vent
2.2.10	Applying key ideas	Down at the allotment. P76-77	• Extract ideas about plant adaptations and nutrition from the text, including earlier sections of the chapter • Apply ideas about plant nutrition to explain evidence • Apply ideas and information about plant nutrition to propose the outcome of a situation	Worksheet 2.2.10a; Worksheet 2.2.10b	Application of key concepts, bringing it all together. Application to agriculture.	
2.2.11	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 2.2.11a; Worksheet 2.2.11b copied on to card and cut up; Worksheet (teacher) 2.2.11c; Worksheet (teacher) 2.2.11d	Sorting and ordering cards for food webs	Food chain, food web, primary consumer, secondary consumer, tertiary consumer, trophic level

2.2.12	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 2.2.12; Practical sheet 2.2.12; Technician's notes 2.2.12	Thinking scientifically to solve problems in the real world	Food security, yield, pesticide, monoculture
2.2.13	Looking at other examples of interdependence	How organisms affect, and are affected by, their environment, including the accumulation of toxic materials	• Describe examples of the interdependence of organisms • Explain how organisms help other organisms to survive • Explain ideas about habitat destruction	Worksheet 2.2.13a; Worksheet 2.2.13b copied on to card and cut up	Evaluating risks Developing explanations	Niche, symbiosis, commensalism, mutualism, parasitism, competition
2.2.14	Understanding interactions in the environment	How organisms affect, and are affected by, their environment, including the accumulation of toxic materials	• Describe some effects of human activity on the environment • Explain why a range of species is endangered • Analyse and evaluate secondary data and recommend solutions for species survival	Worksheet 2.2.14	Analysis and interpretation of data	Endangered, biodiversity, extinct, vulnerable, captive breeding

2.2.15	Learning about ecological balance	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 **Include the impact of human activity from lesson 2.2.14**	Worksheet 2.2.15a; Worksheet 2.2.15b	Evaluation of models	Ecology, predator, prey, equilibrium
2.2.16	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 2.2.16	Evaluation of advantages and disadvantages	Fertiliser, insecticide, toxin, bioaccumulation
2.2.17	Exploring how organisms co-exist	How organisms affect, and are affected by, their environment, including the accumulation of toxic materials	• Describe the role of niches • Explain the concept of resource partitioning • Analyse and evaluate the role of variation in enabling organisms to co-exist	Worksheet 2.2.17; Practical sheet 2.2.17; Technician's notes 2.2.17	Analysis and evaluation	Specialist, generalist, resource partitioning, co-exist, variation
Revision: Plants and ecosystems		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				

Chapter 5: Exploring Contact and Non-Contact forces TERM 3						
Lesson	**Lesson title**	**Overarching objectives**	**Learning objectives**	**CD-ROM differentiated resources for SEN/EAL/G&T**	**Assessment and Skills (including ICT)**	**Keywords**
2.5.2	Exploring magnets	Non-contact forces: forces between magnets Magnetic poles, attraction and repulsion	• Explain magnetic attraction and repulsion • Apply the concept of poles and laws of attraction and repulsion • Predict the effects of arrangements of magnetic poles **May be combined with lesson 2.5.3**	Worksheet 2.5.2; Practical sheet 2.5.2; Technician's notes 2.5.2	Development of questioning and making predictions	Non-contact force, attract, pole, repel
2.5.3	Understanding magnetic fields	Magnetic poles, attraction and repulsion Magnetic fields by plotting with compass, representation by field lines Earth's magnetism	• Describe magnetic fields • Explore the field around a magnet • Explain the shape, size and direction of magnetic fields	Worksheet 2.5.3; Practical sheet 2.5.3; Technician's notes 2.5.3	Developing theories	Magnetic field, strength, field lines, core
2.5.4	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 **May be combined with lesson 2.5.5**	Worksheet 2.5.4; Practical sheet 2.5.4; Technician's notes 2.5.4	Recording evidence	Charge, static electricity, field, attract, repel

2.5.5	Explaining 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	• Explain static charge in terms of electron transfer • Apply this explanation to various examples	Worksheet 2.5.5; Practical sheet 2.5.5;Technician's notes 2.5.5	Interpretation of evidence	Electron, positive charge, proton, negative charge, neutral
2.5.6	Understanding electric 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 other objects	Worksheet 2.5.6; Technician's notes 2.5.6	Communicate explanations	Electrostatic field, induced
2.5.7	Applying what we know about electrostatics	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	• Apply an understanding of static electricity to various situations • Explain how static electricity can be useful and can be dangerous	Worksheet 2.5.7	Evaluate risks Present evidence	Electrostatic attraction, lightning
2.5.8	Exploring gravity on Earth	Non-contact forces: gravity forces acting at a distance on Earth and in space	• Explain the effects of gravity • Compare gravity to other non-contact forces • Use the concept of a gravitational field **Refer to applications from lesson 2.5.9**	Worksheet 2.5.8; Practical sheet 2.5.8	Practical skills	Gravity, weight, gravitational field, accelerate

2.5.9	Applying our understanding of gravity to space travel	Non-contact forces: gravity forces acting at a distance on Earth and in space	• Apply ideas about gravity on Earth to other places • Explore how gravitational fields vary • Consider the effects of these changes	Worksheet 2.5.9	Application of ideas	Air resistance
2.5.10	Applying key ideas	Exploring Earth's atmosphere and beyond.	• To extract ideas about magnetism, electrostatic charge and gravity from the text, including earlier sections of the topic. • To apply ideas about magnetism, electrostatics and gravity. • To evaluate ideas in relation to magnetism, electrostatics and gravity.	Worksheet 2.5.10; Technician's notes 2.5.10	Application of ideas through collaborative work	
2.5.11	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 2.5.11a (copied onto card); Worksheet 2.5.11b	Evaluate quality of evidnece	Pressure, area
2.5.12	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 2.5.12; Practical sheet 2.5.12; Technician's notes 2.5.12	Mathematical skills	Formula. Pascal (Pa)
2.5.13	Exploring pressure in a liquid	Pressure in liquids, increasing with depth; upthrust effects, floating and sinking	• Describe how pressure in a liquid alters with depth • Explain pressure increases in relation to particles and gravity	Worksheet 2.5.13; Technician's notes 2.5.13	Using equations Present evidence	Pressure, depth, decompression

2.5.14	Explaining floating and sinking	Pressure in liquids, increasing with depth; 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 2.5.14; Practical sheet 2.5.14; Technician's notes 2.5.14	Practical skills Analyse data	density, buoyancy, upthrust, displaced
2.5.15	Exploring gas pressure	Atmospheric pressure; decreases with increase of height as weight of air above decreases with height	• Explore how the pressure in a gas varies with height • Explain the implications of this changing pressure **May be combined with lesson 2.5.16**	Worksheet 2.5.15; Technician's notes 2.5.15	Using scientific nomenclature Develop explanations	Atmospheric pressure, weather front, altitude
2.5.16	Working with pressure	Atmospheric pressure; decreases with increase of height as weight of air above decreases with height	• Give examples of how pressure affects our lives • Explain how pressure is used and managed	Worksheet 2.5.16; Practical sheet 2.5.16; Technician's notes 2.5.16	Development of theories Evaluation of data	Pressurised, barometer, altimeter, valve
Revision: Contact and non-contact forces		**ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS**				