

Scheme of Work: SCIENCE KS3

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 7

The Teacher pack has all of the resources used in this SOW: It is split into 3 sections to be taught as a three year programme. We will be delivering this programme over two years and two terms. Book 1 is for Year 7. It shows which topics are covered each term. As we have less teaching time available you may need to focus on the shaded lessons only.

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 3: Working Safely in the Laboratory Term 1

Lesson	Lesson title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.3.2	Working safely in a laboratory		Recognise and reduce risks when working in a laboratory; name and select appropriate equipment.	Worksheet 1.3.2		Risk, laboratory, hazard, apparatus, Bunsen Burner
1.3.3	Recording experiments		Represent scientific experiments clearly; make and record accurate measurements.	Worksheet 1.3.3		Experiment, line diagram, measuring, meniscus, data

Chapter 1: Cells – the Building Blocks of Life Term 1

Lesson	Lesson title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.1.2	Historical ideas about living things	Cells as the fundamental unit of living organisms, including how to observe and record cell structure using a light microscope	Summarise some historical ideas about living things; explain how evidence can change ideas; select evidence to support or disprove ideas.	Worksheet 1.1.2		
1.1.3	Comparing 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	Develop models to explain the differences between animal and plant cells; record evidence using a microscope; communicate ideas about cells effectively using scientific terminology.	Worksheet 1.1.3a Worksheet 1.1.3b Practical sheet 1.1.3a Practical sheet 1.1.3b Technician's notes 1.1.3		Nucleus, cytoplasm, cell membrane, mitochondria, cell wall, vacuole, chloroplast
1.1.4	Describing cells	The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts The similarities and differences between animal and plant cells	Classify specialised cells as animal or plant cells; describe different specialised animal and plant cells; explain the structure and function of specialised cells using models.	Worksheet 1.1.4		Nerve cell, muscle cell, root hair cell

1.1.5	Understanding unicellular organisms	The structural adaptations of some unicellular organisms	Recognise different types of unicellular organisms; describe differences in unicellular organisms; compare and contrast the features of unicellular organisms. May be reduced in scope	Worksheet 1.1.5		Yeast, bacterium, protozoa, prokaryote, eukaryote
1.1.6	Understanding diffusion	The role of diffusion in the movement of materials in and between cells Diffusion in liquids and gases driven by differences in concentration	Describe the process of diffusion and its relation to the cell; plan a fair test investigation to explore the factors affecting diffusion; explain how the different factors speed up or slow down diffusion.	Worksheet 1.1.6 Practical sheet 1.1.6a Practical sheet 1.1.6b Practical sheet 1.1.6c Technician's notes 1.1.6		Diffusion, surface area, volume, glucose
1.1.7	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; explain the organisational structure in multicellular organisms; compare the strengths and weaknesses of multicellular organisms and single-celled organisms.	Worksheet 1.1.7		Tissue, organ, organ system

1.1.8	Applying key ideas	The skin is an organ. P18-19	Extract ideas about the structure of plant and animal cells from earlier topics using the context of skin; apply ideas about the adaptations of specialised animal cells using examples from cells in the skin; use ideas about information to explain the structure and differences between multicellular and unicellular organisms.	Worksheet 1.1.8a Worksheet 1.1.8b		
Revise: Cells		ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS				

Chapter 5: Forces and their Effects Term 1

Lesson	Lesson title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.5.2	Discovering forces	Forces as pushes or pulls arising from the interaction between two objects Using force arrows in diagrams	Recognise different examples of forces; list main types of force; represent forces using arrows.	Worksheet 1.5.2		Pushing force, pulling force, turning force
1.5.3	Measuring forces	Forces measured in newtons	Measure forces using newtonmeters; use correct unit for force; explain difference between mass and weight. May be combined with 1.5.2	Worksheet 1.5.3 Practical sheet 1.5.3		Newton, newtonmeter, precision, weight, gravity, mass
1.5.4	Understanding weight on other planets	Gravity forces acting at a distance on Earth and in space	Explain the meaning of 'weightless'; investigate weight on the Moon and on different planets; identify the link between weight and gravitational attraction.	Worksheet 1.5.4		Gravity, weightless

1.5.5	Exploring the effects of forces	Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion	Identify and describe the effects of forces of different sizes and directions; predict and explain the changes caused by forces; explain the concept of force pairs (action and reaction).	Worksheet 1.5.5 Practical sheet 1.5.5 Technician's notes 1.5.5		Prediction, action force, reaction
1.5.6	Understanding stretch and compression	Forces associated with deforming objects Measurements of stretch or compression as force is changed	Explain the relationship between 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 1.5.6 Practical sheet 1.5.6 Technician's notes 1.5.6		Compress, stretch, elastic behaviour, elastic limit, brittle
1.5.7	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 1.5.7 Practical sheet 1.5.7 Technician's notes 1.5.7		elastic limit, extension, Hooke's Law

1.5.8	Understanding friction	Rubbing and friction forces between surfaces	Identify the force of friction between two objects; describe the effects of friction; understand that friction acts in the opposite direction to the direction of movement.	Worksheet 1.5.8		Friction, contact force, lubricant
1.5.9	Exploring the benefits of friction		Describe applications that make use of friction; design procedures for investigating the force of friction.	Worksheet 1.5.9		Independent variable, dependent variable, control variables, reliable, safety
1.5.10	Understanding air and water resistance	Forces: pushing things out of the way; resistance to motion of air and water	Link frictional forces between surfaces to 'drag' between objects in a fluid; discuss examples of frictional drag in air and in water; consider the effects of friction on sky divers.	Worksheet 1.5.10		Air resistance, water resistance, terminal velocity, particle, collide
1.5.11	Discovering streamlining		Recognising natural and man-made examples of streamlining; link streamlining to fuel efficiency in vehicles; evaluate the use of data collected from investigations of drag.	Worksheet 1.5.11 Practical sheet 1.5.11 Technician's notes 1.5.11		Streamlined, turbulence, evaluate

1.5.12	Applying key ideas	Adventure sport. P232-233	Identify and represent forces in a range of situations, including less familiar ones; apply ideas about elastic behaviour; use ideas about forces and air resistance in an unfamiliar context to analyse problems.			
1.5.13	Exploring forces and motion	Forces being needed to cause objects to stop or start moving, or to change their speed or direction Balanced and unbalanced forces	Recognise that for an object to start moving there must be a force applied; describe the effects of balanced and unbalanced forces; explain the significance of balanced and unbalanced forces on a moving object.	Worksheet 1.5.13 Practical sheet 1.5.13		Balanced (forces), unbalanced (forces), reaction force
1.5.14	Exploring how forces affect speed and direction	Change depending on direction of force and its size	Recognise that the size of a force determines the effect; recognise that the direction of a force determines the effect; provide examples to illustrate where a force of precise strength and direction is needed.	Worksheet 1.5.14		Horizontally, vertically
1.5.15	Understanding speed calculations	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 1.5.15 Practical sheet 1.5.15		Distance, speed, unit, formula, average

1.5.16	Understanding turning forces	Moment as the turning effect of a force	Describe the forces acting on a see-saw; understand that the forces turn about the fulcrum; explain how to balance different weights on a see-saw.	Worksheet 1.5.16 Practical sheet 1.5.16 Technician's notes 1.5.16		Turning force, pivot, fulcrum
1.5.17	Discovering moments		State and use the law of moments; describe how turning forces can be increased; list some examples of levers used as force multipliers.	Worksheet 1.5.17 Practical sheet 1.5.17 Technician's notes 1.5.17		Moment, lever, load, effort, force multiplier
1.5.18	Understanding the application of moments		Link the law of moments to the design of cranes; explain why counterweights are needed by cranes; investigate the lifting capacity of a crane. Include the definition of 'moment' and the law of moments from lesson 1.5.17	Worksheet 1.5.18 Practical sheet 1.5.18 Technician's notes 1.5.18		counterweight
Revise: Forces and their effects		ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS				

Term 2

Chapter 3: Mixing, Dissolving and Separating Term 2

Lesson	Lesson title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.3.4	Recognising materials, substances and elements	Differences between atoms, elements and compounds Chemical symbols and formulae for elements and compounds The concept of a pure substance	Recognise the difference between materials, substances and elements; identify elements by their names and symbols; explain what is meant by a chemically pure substance.	Worksheet 1.3.4		Material, compound, element, symbol, molecule, pure
1.3.5	Understanding water	The concept of a pure substance	Recognise the importance and different sources of water; explain the differences between types of water.	Worksheet 1.3.5 Practical sheet 1.3.5 Technician's notes 1.3.5		Mixture, water, limescale, purifying
1.3.6	Dissolving	Mixtures, including dissolving	Explain the terms solvent, solution, solute and soluble; identify factors that affect dissolving; explain the difference between a dilute solution and a concentrated solution.	Worksheet 1.3.6 Practical sheet 1.3.6 Technician's notes 1.3.6		Solvent, solution, soluble, solute, concentration
1.3.7	Separating mixtures	Mixtures, including dissolving Simple techniques for separating mixtures: filtration	Recognise the differences between substances and use these to separate them.	Worksheet 1.3.7		Filter, mixture, filtration, insoluble, immiscible

1.3.8	Dissolving and evaporating	Mixtures, including dissolving Simple techniques for separating mixtures: evaporation	Separate a soluble substance from water; form crystals from solutions; explain solubility.	Worksheet 1.3.8		Soluble, solubility, crystalline, crystal, saturated
1.3.9	Extracting salt		Identify sources of salt and describe how it is extracted; recognise the uses and importance of salt; obtain pure salt from a mixture.	Worksheet 1.3.9 Practical sheet 1.3.9a Practical sheet 1.3.9b Practical sheet 1.3.9c Technician's notes 1.3.9		Salt, evaporate, sodium chloride, rock salt, brine
1.3.10	Understanding distillation	Simple techniques for separating mixtures: distillation	Use distillation to separate substances; explain why distillation can purify substances.	Worksheet 1.3.10a Worksheet 1.3.10b Practical sheet 1.3.10 Technician's notes 1.3.10		Vapour, condense, distillation, Liebig condenser, purify
1.3.11	Applying key ideas	How hard is your water? P116-117	Extract ideas about water being hard from the text; extract ideas about solubility to explain some of the implications of the concept; use ideas and information about elements, compounds and formulae to explain the properties of chemicals.			

1.3.12	Finding out what air is made of	Simple techniques for separating mixtures: distillation The composition of the atmosphere	Describe the composition of air; separate gases from air.	Worksheet 1.3.12		Gas, air pollution, boiling point, compressed
1.3.13	Exploring chromatography	Simple techniques for separating mixtures: chromatography The identification of pure substances	Use chromatography to separate dyes.	Worksheet 1.3.13		Mixture, separate, paper chromatography, chromatogram, dye
1.3.14	Using chromatography	Simple techniques for separating mixtures: chromatography	Use chromatography to identify unknown substances; draw conclusions from evidence. May be combined with 1.3.13	Worksheet 1.3.14 Practical sheet 1.3.14 Technician's notes 1.3.14		Forensic, reliable, chromatography, accurate, evidence
1.3.15	Finding the best solvent	Mixtures, including dissolving Simple techniques for separating mixtures: chromatography	Choose the best solvent; recognise hazards when using solvents.	Worksheet 1.3.15 Technician's notes 1.3.15		Insoluble, solvent, dissolve, hazard, volatile
1.3.16	Modelling mixtures and separation	Mixtures, including dissolving Conservation of mass, changes of state and chemical reactions	Explain what happens to mass during dissolving; use a circle model to explain dissolving and separation.	Worksheet 1.3.16		Model, atom, molecule, pure, Law of Conservation of Mass
Revise: Mixing, dissolving, separating		ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS				

Chapter 2: Eating, Drinking and Breathing Term 2

Lesson	Lesson Title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.2.2	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; evaluate the quality of evidence contained in advertising about a healthy diet.	Worksheet 1.2.2		Food group, nutrient, balanced diet
1.2.3	Testing foods		Test foods for starch, sugars, protein and fat; predict the results of food tests for a range of foods; evaluate the risks involved in carrying out food tests.	Worksheet 1.2.3 Practical sheet 1.2.3 Technician's notes 1.2.3		Starch, sugar, protein, fat, risk
1.2.4	Comparing energy needs	Calculations of energy requirements in a healthy daily diet Comparing energy values of different foods (from labels) (kJ)	Describe how we use energy from food; compare the energy requirements of people of different ages and lifestyles; analyse numerical data about energy contents of foods.	Worksheet 1.2.4		Energy, respiration, kilojoule (Kj)

1.2.5	Exploring obesity and starvation	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; explain the physical effects of obesity and starvation; compare how deaths from obesity and starvation have changed over time.	Worksheet 1.2.5		Obesity, starvation, malnutrition
1.2.6	Understanding deficiency diseases		Identify the causes and effects of some deficiencies in the diet; suggest which foods could prevent well-known deficiencies; plan ways of communicating ideas about preventing deficiency diseases.	Worksheet 1.2.6		Deficiency disease, vitamin, scurvy, rickets, anaemia
1.2.7	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; explain the role of digestion; analyse links between digestion and the circulatory system.	Worksheet 1.2.7		Digestion, digestive system, chemical energy, respiration, circulatory system

1.2.8	Investigating the start of digestion	The tissues and organs of the digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)	Describe what is meant by chemical and physical digestion; explain how teeth and saliva are adapted to digestion; suggest how results can demonstrate that digestion begins in the mouth.	Worksheet 1.2.8		Physical digestion, saliva, enzyme, chemical digestion
1.2.9	Understanding the roles of the digestive system	The tissues and organs of the digestive system, including adaptations to function	Describe the roles of the oesophagus, stomach, intestine and pancreas in digestion; explain how the structure of each of the organs is adapted to its function.	Worksheet 1.2.9 Technician's notes 1.2.9		Faeces, adaptation, oesophagus, stomach, pancreas, small intestine
1.2.10	Applying key ideas	Differentiated task to test application of ideas. P24-25 Can you stomach it?	Extract ideas from the text about diet and digestion in other animals; use information about the structure of other digestive systems to show how they are adapted to their function; apply ideas about digestive systems to the efficiency of digestion in different animals.	Worksheet 1.2.10		

1.2.11	Introducing enzymes	How the digestive system digests food (enzymes simply as biological catalysts)	Describe role of different enzymes in digestion; analyse a model of the digestive system; explain observations of a practical activity to explore the role of enzymes.	Worksheet 1.2.11 Practical sheet 1.2.11 Technician's notes 1.2.11		Amylase, starch, sugar, catalyst
1.2.12	Recognising the role of bacteria	The importance of bacteria in the human digestive system	Describe the role of bacteria in our digestive system; explain how the natural flora of bacteria can be disturbed; analyse data about the effects of antibiotics on gut bacteria.	Worksheet 1.2.12		Gut, flora, probiotic, antibiotic
1.2.13	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; evaluate a model of breathing; calculate changes in pressure and explain how these help us breathe. Include the practical activity exploring lung volume from lesson 1.2.14	Worksheet 1.2.13 Technician's notes 1.2.13		Lung, diaphragm, pressure

1.2.14	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 1.2.14 Technician's notes 1.2.14 Practical sheet 1.2.14		Vital capacity, independent variable, dependent variable, control variable
1.2.15	Evaluating 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; evaluate how well adapted the human gas exchange system is to its function.	Worksheet 1.2.15		Alveoli, respiration, capillary
1.2.16	Investigating diffusion	The structure and functions of the gas exchange system in humans, including adaptations to function Diffusion in liquids and gases driven by differences in concentration Diffusion in terms of the particle model	Explain how diffusion makes breathing possible; observe the effects of diffusion; apply diffusion to our breathing system and ask questions to develop understanding.	Worksheet 1.2.16 Technician's notes 1.2.16		Particle, concentration, semi-permeable membrane

1.2.17	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 of the effects of smoking has changed over time.	Worksheet 1.2.17 Technician's notes 1.2.17		Asthma, nicotine, tar, cilia
Revision of Eating, drinking and breathing		ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS				

Term 3

Chapter 4: Elements, Compounds and Reactions Term 3

Lesson	Lesson title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.4.2	Finding elements and building the Periodic Table	Chemical symbols and formulas for elements and compounds	Identify where and how different elements were found; recognise differences between elements; recognise that the Periodic Table has changed over time.	Worksheet 1.4.2		Element, native element, compound, atom, Periodic Table
1.4.3	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 1.4.3a Worksheet 1.4.3b Practical sheet 1.4.3 Technician's notes 1.4.3		Periodic Table, period, group. Atomic number
1.4.4	Understanding elements and atoms	Differences between atoms, elements and compounds Chemical symbols and formulae for elements and compounds	Interpret chemical symbols; explain what is meant by 'element' and 'atom'; work out the composition of different substances based on their names.	Worksheet 1.4.4 Practical sheet 1.4.4 Technician's notes 1.4.4		Atom, atomic number, atomic mass, compound

1.4.5	Understanding metals	The varying physical and chemical properties of different elements The properties of metals and non-metals	Recognise the properties and uses of metals; identify differences between metals.	Worksheet 1.4.5 Practical sheet 1.4.5 Technician's notes 1.4.5		Ductile, malleable, sonorous, conductor
1.4.6	Understanding non-metals	The varying physical and chemical properties of different elements The properties of metals and non-metals	Identify uses of common non-metals; describe the properties of non-metals.	Worksheet 1.4.6 Practical sheet 1.4.6 Technician's notes 1.4.6		Halogen, salt, noble gas, inert
1.4.7	Identifying metalloids	The varying physical and chemical properties of different elements	Describe semi-metals and their properties; identify some common uses of semi-metals.	Worksheet 1.4.7		Metalloid, semi-metal, semiconductor, crystalline, radioactive
1.4.8	Discovering the origin of metals	The varying physical and chemical properties of different elements The properties of metals and non-metals Chemical symbols and formulae for elements and compounds	Recognise that metals have to be extracted from ores; evaluate the impact of extracting metals from the Earth.	Worksheet 1.4.8a Worksheet 1.4.8b Practical sheet 1.4.8 Technician's notes 1.4.8		Extraction, ore, electrolysis, reduction
1.4.9	Choosing elements for a purpose	The varying physical and chemical properties of different elements	Recognise the elements and their differences from physical data; use data and the properties of elements to choose suitable materials.	Worksheet 1.4.9		Melting point, toxic, density

1.4.10	Applying key ideas	How tinny is a computer? P114-115	Extract ideas about tin or other elements from the text, including earlier sections of the chapter; apply ideas about the properties of tin to explain some of its applications; use ideas and information about elements, compounds and formulas to explain the properties of chemicals.	Worksheet 1.4.10		
1.4.11	Combining elements	Differences between atoms, elements and compounds Chemical symbols and formulae 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 1.4.11 Practical sheet 1.4.11 Technician's notes 1.4.11		Model, ratio, formula
1.4.12	Using models to understand chemistry		Use a simple model to show the differences between atoms and molecules; use models to represent compounds.	Worksheet 1.4.12 Practical sheet 1.4.12		Atom, element, molecule, compound, ratio
1.4.13	Understanding what happens when an element burns	Chemical reactions as the rearrangement of atoms Representing chemical reactions using formulae and using equations Combustion	Make observations during chemical reactions; write word equations to demonstrate chemical changes; explain chemical changes using a model.	Worksheet 1.4.13 Practical sheet 1.4.13 Technician's notes 1.4.13		Reaction, equation, reactant, product, atom

1.4.14	Observing how elements react in different ways	<p>The varying physical and chemical properties of different elements</p> <p>Representing chemical reactions using formulae and using equations</p> <p>The chemical properties of metal and non-metal oxides with respect to acidity</p>	Draw conclusions to explain observations; use symbols and models to describe a chemical reaction.	<p>Worksheet 1.4.14a</p> <p>Worksheet 1.4.14b</p> <p>Practical sheet 1.4.14</p> <p>Technician's notes 1.4.14</p>		Fuel, burning, acid, product, base
1.4.15	Identifying the special features of carbon	The varying physical and chemical properties of different elements	Explain the importance of carbon in our lives; identify and explain the differences between an element and its compounds.	<p>Worksheet 1.4.15</p> <p>Practical sheet 1.4.15a</p> <p>Practical sheet 1.4.15b</p> <p>Technician's notes 1.4.15</p>		Carbonate, carbohydrate, organic compound, polymer
1.4.16	Understanding oxidation	<p>Representing chemical reactions using formulae and using equations</p> <p>Oxidation</p>	Describe oxidation; recognise the effects of oxidation; use data to support conclusions.	<p>Worksheet 1.4.16</p> <p>Practical sheet 1.4.16a</p> <p>Practical sheet 1.4.16b</p> <p>Technician's notes 1.4.16</p>		Oxidation

1.4.17	Investigating carbonates	<p>Conservation of mass changes of state and chemical reactions</p> <p>Combustion, thermal decomposition, oxidation</p> <p>Chemical symbols and formulae for elements and compounds</p> <p>Thermal decomposition</p>	Describe the composition and uses of carbonate compounds; recognise and explain thermal decomposition reactions; identify carbon dioxide.	<p>Worksheet 1.4.17</p> <p>Practical sheet 1.4.17a</p> <p>Practical sheet 1.4.17b</p> <p>Technician's notes 1.4.17</p>		Carbonate, stable, thermal decomposition, limewater
1.4.18	Explaining changes	<p>Differences between atoms, elements and compounds</p> <p>Chemical symbols and formulae for elements and compounds</p> <p>Conservation of mass changes of state and chemical reactions</p> <p>Chemical reactions as the rearrangement of atoms</p> <p>Thermal decomposition, oxidation</p>	Observe and explain mass changes; use scientific terms and simple models to explain chemical processes.	Worksheet 1.4.18		Oxidation, thermal decomposition, reactants, products
Revision of Elements, Compounds and Reactions		ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS				

Chapter 6: Energy Transfers and Sound Term 3

Lesson	Lesson title	Overarching objectives	Learning Objectives	CD-ROM differentiated resources for SEN/EAL/G&T	Assessment and Skills (including ICT)	Keywords
1.6.2	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 1.6.2		Joule, energy transfer diagram, Sankey diagram
1.6.3	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 1.6.3		Gravity, gravitational potential energy, kinetic energy
1.6.4	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 $\text{work done} = \text{force} \times \text{distance}$; apply the equation for work done to different situations.	Worksheet 1.6.4		Work done

1.6.5	Looking at dynamos	Other processes that involve energy transfer: changing motion, completing an electrical circuit	Describe the energy changes in a dynamo; explain how a dynamo works.	Worksheet 1.6.5 Technician's notes 1.6.5		Dynamo, kinetic energy, magnetism, electrical energy
1.6.6	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 1.6.6 Practical sheet 1.6.6 Technician's notes 1.6.6		Elastic potential energy, work done
1.6.7	Knowing the difference between heat and temperature	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	Recognise what we mean by temperature; describe how temperature differences lead to energy transfer; explain the difference between heat and temperature.	Worksheet 1.6.7 Practical sheet 1.6.7 Technician's notes 1.6.7		Temperature, degrees Celsius, heat

1.6.8	Thinking about fuels	Fuels and energy resources; other processes that involve energy transfer: burning fuels, metabolism of food	Identify examples of fuels and their uses; describe combustion of fuels and recognise that different fuels transfer different amounts of energy; describe the advantages and disadvantages of using different fuels. May be combined with 1.6.9	Worksheet 1.6.8 Technician's notes 1.6.8		Chemical potential energy, oxygen, combustion, hydrocarbon, fossil fuel
1.6.9	Investigating fuels	Fuels and energy resources; other processes that involve energy transfer: burning fuels Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy in chemical compositions	Describe how to measure the energy of fuels; collect evidence to investigate the energy of different fuels; present data using appropriate graphs and evaluate the quality of evidence collected.	Worksheet 1.6.9 Practical sheet 1.6.9 Technician's notes 1.6.9		Combustion
1.6.10	Applying key ideas	Energy Changes – making electricity	Extract ideas about energy transfers and fuels from earlier sections of the chapter; apply ideas about how energy is transferred to explain its application in making electricity; use ideas and information about electricity generation to compare different energy transfers.	Worksheet 1.6.10		

1.6.11	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 1.6.11 Practical sheet 1.6.11 Technician's notes 1.6.11		Vibrate, longitudinal wave, decibel (dB), amplitude
1.6.12	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)	Describe how the pitch of a sound wave can be changed; apply the terms frequency, wavelength and amplitude to different waveforms. Include the nature of sound as a longitudinal wave, as introduced in lesson 1.6.11	Worksheet 1.6.12 Technician's notes 1.6.12		Frequency, waveform, wavelength, amplitude, microphone
1.6.13	Measuring the speed of sound	Echoes; the speed of sound in air	Describe what an echo is; describe how the speed of sound can be measured using echoes; calculate distances using ideas about echoes. May be combined with 1.6.14	Worksheet 1.6.13 Practical sheet 1.6.13		Reflection, echo, speed of sound, sonar
1.6.14	Understanding how sounds travels through materials	Sound needs a medium to travel; the speed of sound in air, in water, in solids	Recognise how the speed of sound changes in different substances; use the particle model to explain why there are differences when sound travels through solids, liquids and gases.	Worksheet 1.6.14 Practical sheet 1.6.14 Technician's notes 1.6.14		Particle, vacuum, hypothesis

1.6.15	Learning about the reflection and absorption of sound	Echoes, reflection and absorption of sound May be reduced in scope	Recognise which materials affect the quality of sound; analyse the effects of different materials on sound waves; use ideas about energy transfer to explain how soundproofing works. May be reduced in scope	Worksheet 1.6.15 Practical sheet 1.6.15 Technician's notes 1.6.15		Reflect, absorb, soundproofing
1.6.16	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	Describe the structure and function of different parts of the ear; explain how the ear is able to hear and detect sounds.	Worksheet 1.6.16 Practical sheet 1.6.16 Technician's notes 1.6.16		Ear canal, ear drum, ossicles, cochlea, auditory nerve
1.6.17	Understanding factors affecting hearing	Auditory range of humans and animals	Describe factors which affect hearing; explain how to prevent damage to ears; understand the term hearing range.	Worksheet 1.6.17		Loudness, ear defenders, frequency, hearing range

1.6.18	Finding out about sounds we cannot hear	Auditory range of humans and animals Pressure waves transferring energy; use for cleaning and physiotherapy by ultrasound	Recognise what is meant by ultrasound and infrasound; describe some applications for ultrasound and infrasound; explain how some applications work. Include the meaning of hearing range as presented in 1.6.17	Worksheet 1.6.18		Infrasound, ultrasound, scan
Revision of Energy Transfers and Sound		ASSESSMENT OF LEARNING: END OF UNIT TEST + CHECK YOUR PROGRESS + END OF CHAPTER QUESTIONS				