Curriculum Long Term Planning Overview	Key Stage 3	Subject Area: Science	Academic Year: 2022-23

Year	Study Modules	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 7	**Study Modules**	**7E Mixtures & Separation** • Identify mixtures and how they can be separated using simple techniques; sieving, filtering, decanting, magnetism, evaporation • Describe dissolving of substances using key terminology; solvent, solute, soluble, solution • Explain how distillation can be used to separate mixtures	**7B Reproduction** • Gametes in fertilisation (internal and external) • Reproductive organs (label and functions) • Becoming pregnant • Gestation, nutrient exchange and pregnancy • Giving birth • Puberty and menstruation • Contraception • Use of reproduction in zoos	**7F Acids & Alkalis** • Hazard symbols • Properties of acids and alkalis • Indicators • pH scale • Neutralisation • Word equations • Preparing a soluble salt • Neutralisation in daily life	**7I Energy** • Humans receive their energy from food • Compare the energy released per gram of food • To know that different food contain different amounts of energy per gram • Different people require different amounts of energy from food • Law of Conservation of Energy • Energy transfers and stores • Fuels, including formation of fossil fuels and their classification as non-renewable and renewable.	**7D Ecosystems** • the concept of a habitat • Variation between organisms and within populations • continuous and discontinuous variation. • adaptations of organisms to their environments. • how changes in the environment affect the organisms living in a habitat • the resources needed by organisms from their habitats and how organisms affect their habitats • the flow of energy through food chains, food webs	**7C Muscles & Bones** • Antagonistic Pairs of Muscles • Ligaments/Tendons/Muscles • Function of Bones Support/Movement/ Manufacture of RBCs • Describe different Joints (x3) • Name and describe blood vessels • Name and describe constituents of Blood • Effect of drugs (stimulant Vs Depressant)

					• How to compare amounts of energy released by different fuels. • What renewable energy resources are and that the energy obtained from most originates in the Sun. • Advantages and disadvantages of different energy resources. • Explain energy efficiency and calculate the efficiency of devices • That climate change is being caused by adding carbon dioxide to the atmosphere and ways we could reduce our use of fossil fuels.	and pyramids of numbers. • how some persistent pesticides accumulate in food chains.	
		7A Cells, Tissues & Organ Systems • MRSGREN • Names and function of the main human organs	**7G The Particle Model** • Identify and describe the behaviour of solids, liquids and gases • Use the particle model to explain	**7K Forces** • Define contact and non-contact forces • Define weight and mass with calculations and units	**7H Atoms, Elements & Molecules** • Matter is made of different types of particles made of atoms • How our understanding of	**8A Food & Digestion** • contents of a healthy human diet: carbohydrates, lipids, proteins, vitamins,	**7L Sound** • State how sound is produced • Define what a wave is • State that sound is a longitudinal wave and can be

	• Names and functions of plant organs • Photosynthesis word equation • Define tissue with examples (animal and plant) • Describe the function of tissues and why they are important • Animal vs plant organelles • Specialised cells • The circulatory system in detail • Transport systems in plants • Know the main organs that can be transplanted in humans	they physical behaviours of solids liquids and gases • Brownian motion is random and unpredictable • Describe net movement of particles using diffusion • Describe the impact of pressure on particle arrangement	• Spring characteristics and measuring extension • Hooke's Law(experiment + elastic limit) • Friction and how to reduce it • Pressure definition and use of equation + unit • Balanced and unbalanced forces, diagrams, calculations and effects (Free body diagrams and Force diagrams) • Balanced forces and Force meters (Newton meters)	elements has changed over time • How metals and non-metals differ in their properties • Elements forming compounds with specific names • Word equations (reactants, products, symbols)	minerals, fibre and water, and why each is needed • calculations of energy requirements in a healthy daily diet • the tissues and organs of the human digestive system, including adaptations to function • enzymes as biological catalysts and their action • the role of diffusion in the movement of materials in and between cells	reflected or absorbed • Link pitch to frequency of a sound wave • Link volume to amplitude of a sound wave • Compare speed of sound in different materials • Describe how sound travels through the human ear • State human range of hearing (Hz) • Define infrasound and ultrasound and state uses of ultrasound • Describe constructive and destructive interference

Assessment	**7E Mixtures & Separation** Design a water filter that can purify dirty water, and create a poster explaining its function and justifying your choice of materials. **Also assessed in Autumn term assessment papers.**	**7B Reproduction** Assessed as part of Autumn term assessment papers.	**7F Acids & Alkalis** Badger assessment task: How do antacid tablets work? **Also assessed in Summer term assessment papers.**	**7I Energy** Practical skills assessment – Planning an investigation to measure the efficiency of burning food to find its energy content. **Also assessed in Summer term assessment papers.**	**7D Ecosystems** Practical skills assessment: Collecting and presenting transect and quadrat data while investigating species populations. **Also assessed in Summer term assessment papers.**	**7C Muscles & Bones** Assessed as part of End of Year 7 assessment papers.
	7A Cells, Tissues & Organ Systems Scale drawing & Microscope skills assessment: Estimate FOV of microscope, sketch a scale labelled diagram of a cell and calculate the actual size. **Also assessed in Autumn term assessment papers.**	**7G The Particle Model** Assessed as part of Autumn term assessment papers.	**7K Forces** Graph skills assessment: Investigate the relationship between force and extension on a spring and plot this relationship on a suitable graph. **Also assessed in Summer term assessment papers.**	**7H Atoms, Elements & Molecules** Mini assessment on definitions, naming conventions, word equations and chemical equations. **Also assessed in Summer term assessment papers.**	**8A Food & Digestion** Badger assessment task: The journey of a cheese sandwich. **Also assessed in Summer term assessment papers.**	**7L Sound** Assessed as part of End of Year 7 assessment papers.
Builds Upon	**7E Mixtures & Separation** KS2: • state changes • Measuring temperature in ^{0}C	**7B Reproduction** KS2: • describe the life process of reproduction in	**7F Acids & Alkalis** KS2: • Describe the properties of	**7I Energy** KS2: • recall that temperature is a measure of how	**7D Ecosystems** KS2: • describe how different habitats provide for the basic needs of	**7C Muscles & Bones** KS2: • identify that humans and some other animals

		• the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • understand how some materials dissolve in liquid to form a solution • describe how to recover a substance from a solution • Separation of mixtures through filtering, sieving and evaporating • demonstrate that dissolving, mixing and changes of state are reversible changes **No prerequisites from KS3 topics.**	some plants and animals • describe the changes as humans develop to old age **KS3: 7A Cells, Tissues & Organ Systems**	different materials **No prerequisites from KS3 topics.**	hot or cold something is and be able to use thermometers • describe some materials as thermal conductors and some as thermal insulators • understand that burning is an irreversible change • recall that plants need sunlight to grow and that animals, including humans, need food. **No prerequisites from KS3 topics.**	animals and plants, and how they depend on each other • construct Food chains, identifying producers, predators and prey • describe how living things are classified into broad groups according to characteristics **No prerequisites from KS3 topics.**	have skeletons and muscles for support, protection and movement. **No prerequisites from KS3 topics.**
		7A Cells, Tissues & Organ Systems KS2: • Function of parts of flowering plants • requirements of plants for life and growth • Water transport in plants	**7G The Particle Model** KS2: • compare and group materials together as solids, liquids or gases • understand that some materials will dissolve in	**7K Forces** KS2: • describe different kinds of forces, including magnetism, gravity, upthrust and friction, and	**7H Atoms, Elements & Molecules** KS2: • compare and group materials together as solids, liquids or gases • observe that materials change	**8A Food & Digestion** KS2: • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	**7L Sound** KS2: • State that sounds are made by vibrations • State that pitch is how high or low a sound is, and that

		• pollination, seed formation and seed dispersal • basic parts of the digestive system in humans • main parts of the human circulatory system **No prerequisites from KS3 topics.**	liquid to form a solution, and describe how to recover a substance from a solution • decide how mixtures might be separated, including through filtering, sieving and evaporating **No prerequisites from KS3 topics.**	be able to classify these as contact or non-contact forces • identify the effect of drag forces that act between moving surfaces • describe why moving objects that are not driven tend to slow down. **No prerequisites from KS3 topics.**	state when heated or cooled, and measure the temperature at which this happens in °C • demonstrate that dissolving, mixing and changes of state are reversible changes • compare and group substances by their properties. • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible. **KS3:** • **7E Mixtures & Separation topics** • **7F Acids & Alkalis** • **7G The Particle Model**	**KS3:** • **7A Cells, Tissues & Organ Systems** • **7C Muscles & Bones** • **7D Ecosystems** • **7G The Particle Model** • **7I Energy**	volume is how loud or quiet a sound is

Year	Study Modules	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 8	**Study Modules**	**8I Fluids** • Using the particle model of matter, describe how the volumes and densities of substances change at different temperatures. • Compare chemical and physical changes with examples. • Describe the effect of physical weathering. • Explain what happens to particles and temperature during changes of state, in terms of energy and forces. • Compare densities of materials and link them to the mass of the particles and how closely they pack together.	**8D Unicellular Organisms** • How to observe cells using a light microscope • Understand that the cell is the fundamental unit of all living things • Explain the difference between plant, animal, and bacterial cells • Understand that nearly all life on Earth depends on the ability of photosynthetic organisms to build organic molecules • Understand the role of diffusion in the movement of materials • The difference between aerobic and anaerobic respiration, including word equations of each • How energy is transferred through	**8E Combustion** • Structure of word equations • Define combustion and incomplete combustion with a word equation • Describe the health implications of incomplete combustion • Describe combustion as an exothermic reaction • Define oxidation with word equations • Development of the Law of conservation of mass (phlogiston) • Law of conservation of mass • Fire safety • Environmental consequences of combustion • Catalytic converters	**8L Earth & Space** • non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets • magnetic poles, attraction and repulsion • magnetic fields by plotting with compass, representation by field lines • Earth's magnetism, compass and navigation • gravity force, weight = mass × gravitational field strength (g), on Earth g = 10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)	**8J Light** • State that light is a transfer wave • Compare the speeds of light and sound • State the speed of light in a vacuum • Describe what can happen to light at a boundary (absorption, transmission, reflection, refraction) • Draw ray diagrams/use ray models • Describe uses of lenses in cameras • Describe how light travels through the human eye • State that white light is made up of many colours • Explain why we see different objects as different colours	**8H Rocks** • Identify the uses of different rocks based on grain size • Describe how rocks are formed (igneous, metamorphic and sedimentary) • Explain weathering and erosion and the impacts of this • Identify that rocks are a source of metals and minerals

	• Explain why ice is less dense than water. • Use the idea of latent heats when discussing changes of state. • Use the particle model of matter to explain why gas pressure changes with temperature, number of particles and volume. • Use the equation relating pressure to the depth and density of a liquid. • Explain that the upthrust depends on the weight of fluid displaced. • Use ideas about displacement to explain phenomena connected with floating and sinking. • Describe the causes of air and water resistance. • Describe the ways in which the	ecosystems using food chains and pyramids of numbers • Explain how carbon is cycled through an ecosystem	• Global Warming (graphical evidence over time)	• our Sun as a star, other stars in our galaxy, other galaxies • the seasons and the Earth's tilt, day length at different times of year, in different hemispheres • the light year as a unit of astronomical distance. • apply mathematical concepts and calculate results		

	size of drag forces can be changed. • Explain why a vehicle needs a force from the engine to keep moving at a constant speed.					
	8C Breathing & Respiration • Define diffusion and explain how O2 and CO2 diffuse between the alveoli and capillaries. • Label and state the function of the structures in the respiratory system. • Understand the function of mucus and cilia. • Understand that alveoli increase the surface area for gas exchange. • Write the word equations for aerobic and anaerobic respiration. • Use a model to explain how changes in	**8K Energy Transfers** • Define internal(thermal) energy and temperature. • Describe the factors that affect the amount of energy stored in a heated substance • Explain the process of evaporative cooling. • Describe the processes of conduction and convection using the particle model • Explain radiative heating/cooling as an energy transfer • Evaluate ways of increasing or decreasing energy transfer by	**8F The Periodic Table** • Development of the atomic model • Atoms are the smallest chemical unit • Representing elements as symbols • Development of the periodic table • Reading the periodic table (groups, periods and symbols) • Particles are made of subatomic particles with a specific arrangement • Physical and chemical properties of matter • Particles have different physical	**8B Plants & their Reproduction** • Describe the characteristics of organisms in the five kingdoms. • Identify the genus and species names from a scientific name. • Explain why biodiversity is important. • State the difference between asexual and sexual reproduction. • Recall ways in which plants reproduce asexually. • Describe what happens during fertilisation.	**8G Metals & their Uses** • Properties of metals • Uses of metals • Metals as catalysts • Differences between corrosion and rusting • Chemical reactions; symbol and word equations • Reactions of metals with water • Reactions of metals with acids • Pure metals and alloys • Uses and properties of alloys • Melting and boiling points of substances	**7J Electrical Circuits** • Definitions of the key variables Current, Potential difference/Voltage, Resistance. • Definitions and properties of series and parallel circuits. • Describe what happens when the number of bulbs in a series circuit changes. • Describe what current is and how it is measured. • Use models to understand the flow of electricity in circuits, and discuss the strengths and weaknesses of individual models.

	pressure cause air to move in and out of the lungs. • The impact of exercise, asthma, and smoking on gas exchange • The components of blood and the different types of blood vessels. • The use of limewater and hydrogen carbonate indicator as tests for carbon dioxide. • The function of gills and stomata in gas exchange. • The difference between aerobic and anaerobic respiration, including the reactants, products, and why your body needs to use both types. • Explain why EPOC (excess post-exercise oxygen consumption) is necessary after anaerobic respiration.	conduction, convection, radiation and evaporation. • Explain the concept of thermal mass in homes. • Describe what power and efficiency mean • Calculate power and efficiency • Interpret Sankey diagrams • Explain how the kWh is a unit of energy and use it to determine the cost of electricity. Explain what payback time is and calculate it.	and chemical properties • Reactions of elements • Conservation of mass • Equations are balanced • Writing chemical formulae • Trends on the periodic table (physical and chemical)	• Identify and give examples of inherited variation. • Identify the main parts of a flower and describe their functions. • Identify how a flower is pollinated based on its shape/pollen type. • Describe how the parts of a flower are adapted to their functions. • Explain how and why plants avoid self-pollination. • Identify different kinds of fruits and describe how they disperse seeds. • Explain the importance of seed dispersal. • Recall the resources needed for germination and how this occurs. • Describe what happens in photosynthesis and respiration. • Describe examples of interdependence		• Explain how switches and location control different kinds of circuits. • Describe how changing the number or type of components in a circuit affects the current. • Describe the differences in how current behaves in series and parallel • Describe how voltage is measured, and how a voltmeter is used. • Explain why the current increases when the voltage increases • Describe the relationship between resistance and current. • Explain the safety precautions that should be followed when using electricity. • Explain how fuses and circuit

				and how changes in a population or community affect other populations.		breakers protect the user. • Recall how plugs are wired.
Assessment	**8I Fluids** Practical skills assessment (Technique and data manipulation): Find the density of objects and determine whether they will float in a strange fluid. **Also assessed in Autumn term assessment papers.**	**8D Unicellular Organisms** Assessed as part of Autumn term assessment papers.	**8E Combustion** Practical skills assessment (Planning): Investigating the effect of candle height on burn time for a candle in a jar. **Also assessed in Summer term assessment papers.**	**8L Earth & Space** Maths skills assessment: Calculations involving Weight and mass on different planets and moons. **Also assessed in Summer term assessment papers.**	**8J Light** Practical skills assessment (Measurement techniques): Investigate how the angle of incidence of a ray on a Perspex block affects the angle of refraction. **Also assessed in Summer term assessment papers.**	**8H Rocks** Assessed as part of End of Year 8 assessment papers.
	8C Breathing & Respiration Practical skills assessment (Graph skills): Investigating the effects of exercise on the time needed for pulse rate and breathing rate to recover. **Also assessed in Autumn term assessment papers.**	**8K Energy Transfers** Assessed as part of Autumn term assessment papers.	**8F Periodic Table** Students research and create poster on an element of their choice describing properties, abundance, discovery, and some examples of compounds containing it. **Also assessed in Summer term assessment papers.**	**8B Plants & their Reproduction** Practical skills assessment (Scientific drawing): Dissection of flower. **Also assessed in Summer term assessment papers.**	**8G Metals & their Uses** Practical Skills assessment, recording and analysing results: Investigating the reactivity of metals with Acids. **Also assessed in Summer term assessment papers.**	**7J Electrical Circuits** Assessed as part of End of Year 8 assessment papers.

	Builds Upon	**8I Fluids** KS2: • classify substances as solids, liquids or gases • observe and name changes of state • identify the effects of air resistance and water resistance. **KS3:** • **7G The Particle Model** • **7H Atoms, Elements & Compounds** • **7K Forces**	**8D Unicellular Organisms** KS2: • Define a microorganism • Recall the seven life processes • Explain that different cells are specialised for different functions • Describe how organisms are interdependent in an ecosystem **KS3:** • **7A Cells, Tissues, Organs & Systems** • **7D Ecosystems** • **8B Plants & Reproduction** • **8C Breathing and Respiration**	**8E Combustion** **KS3:** • **7F Acids & Alkalis** • **7G The Particle Model** • **7H Atoms, Elements & Compounds** • **7I Energy**	**8L Earth & Space** KS2: • describe the movement of the Earth and other planets relative to the Sun • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night **KS3: 7K Forces**	**8J Light** KS2: • State that light travels in straight lines • Describe how we can see objects **KS3: 7L Sound**	**8H Rocks** KS2: • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock. **KS3:** **7H Atoms, Elements & Compounds**
		8C Breathing & Respiration KS2: • Understand that we have many different types of cell that have different functions. • State the names and functions of the main organs in the respiratory system.	**8K Energy Transfers** **KS3:** • **7G The Particle Model** • **7I Energy**	**8F Periodic Table** KS2: • compare and group materials on the basis of their properties • explain that some changes result in the formation of new materials, and that this kind	**8B Plants & their Reproduction** KS2: • identify and describe the functions of different parts of flowering plants • explore the requirements of plants for life and growth and how	**8G Metals & their Uses** KS2: • compare and group together everyday materials on the basis of their properties • explain that some changes result in the formation of new materials, and that this kind of	**7J Electrical Circuits** KS2: (Knowledge below is likely to be patchy, assume none) • construct simple circuits and use them to determine whether materials are conductors or insulators

		• Understand that we need oxygen and glucose to release energy. • Understand that the circulatory system carries oxygen and nutrients around the body. • Be familiar with the concept of air pressure. **KS3: 7C Muscles & Bones**		of change is not usually reversible **KS3:** • **7G The Particle Model** • **7H Atoms, Elements & Compounds**	they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants. • recognise that living things can be grouped in a variety of ways • describe the life process of reproduction in some plants • give reasons for classifying plants based on specific characteristics. **KS3:** • **7B Sexual Reproduction in Animals** • **7D Ecosystems**	change is not usually reversible **KS3:** **7G The Particle Model** **7H Atoms, Elements & Compounds**	• know how switches work • draw circuit diagrams and construct circuits from diagrams using conventional symbols • be able to investigate the effect of changing components in a circuit on the brightness of bulbs • describe the effects of changing the voltage of a battery • describe the effects of short circuits and the use of fuses. **No prerequisites from KS3 topics.**