Science	Working towards expected outcomes Your child is not yet making the expected progress within this course.	Working at expected outcomes Your child is achieving the expected progress for this point within the course.	Working beyond expected outcomes Your child is working beyond the expected progress for this point within the course.
Year 7 Autumn 1 – Autumn 2 Chemistry: Particles and Structure	Students working **towards** expected outcomes in Year 7 can: • Describe that all matter is made up of very tiny particles. • State that particles are too small to see, even with a microscope. • Describe the basic properties of solids, liquids and gases. • Recognise and name changes of state (melt, freeze, boil, condense, sublime). • State that a substance is a solid below its melting point, a liquid above it, and a gas above its boiling point. • Recall that evaporation is when a liquid changes to a gas at the surface. • State that an element contains only one type of atom. • State that a compound is made of two or more atoms joined together. • Recognise that energy can be stored in different forms (e.g., thermal, kinetic, gravitational, chemical).	Students working **at** expected in Year 7 can: • Describe the arrangement and movement of particles in solids, liquids and gases using the particle model. • Use the particle model to explain differences in the properties of solids, liquids and gases. • Use particle ideas to explain changes of state. • Describe changes in temperature and state in terms of particles gaining or losing energy. • Explain observations about diffusion, gas pressure and density using particle ideas. • Identify elements, compounds and mixtures using particle diagrams. • Explain that all matter is made of atoms and that molecules can consist of two to thousands of atoms joined by chemical bonds. • Describe that a chemical bond is a force holding atoms together. • Describe and compare the different energy stores and identify which stores increase or decrease.	Students working **beyond** expected in Year 7 can: • Explain how new experimental evidence can lead to scientific models being changed or replaced. • Describe how ideas about the atom have changed over time (e.g., from indivisible spheres to models with subatomic particles). • State the relative electrical charges of protons, neutrons and electrons. • Explain that atoms are neutral because the number of protons equals the number of electrons. • Apply particle diagrams and atomic ideas to more complex classification problems (e.g., distinguishing molecules of elements vs molecules of compounds, mixtures vs pure substances). • Apply the principle of energy conservation to justify outcomes in unfamiliar systems. • Evaluate energy transfers in devices, commenting on efficiency and limitations of data. • Compare and critique renewable and non-renewable energy resources, considering reliability, environmental cost and scalability.

Physics: Energy	• Identify simple energy stores in familiar scenarios (e.g., a stretched elastic band, food, a moving object). • State that energy can be transferred from one place to another. • Recall that energy can be transferred by heating, by forces (mechanically), electrically or by waves. • Identify a useful energy store in a device (e.g., motor, battery, hot water). • Recognise that fuels and food contain energy that can be released. • Describe, in simple terms, the difference between renewable and non-renewable resources. • Recall that energy is measured in joules (J). • Follow basic instructions for practical work and identify simple risks and precautions when heating materials.	• Construct energy transfer chains, naming stores and transfers correctly. • Explain how energy is conserved during changes, including identifying useful and wasted energy stores. • Use numerical values to represent energy changes and apply the idea that total energy stays the same. • Convert between J and kJ and compare energy values of foods using nutritional data. • Define and correctly identify independent, dependent and control variables in an investigation and explain why control variables are needed. • Carry out the food-energy investigation safely, collecting data and drawing conclusions from results. • Compare renewable and non-renewable energy resources and outline advantages and disadvantages. • Calculate power from data on energy transferred and time taken, using Watts (W) appropriately. • Compare power ratings of common household appliances and relate these to energy use on domestic bills (kWh).	• Use multi-step calculations (J, kJ, kWh & £) to reach and defend a conclusion. • Propose improvements to an investigation to increase validity or accuracy.

Biology: Cells	• Use a light microscope to observe cells. • Record observations of microscope slides. • Label the parts of an animal and plant cell. • Understand that there are many types of cell, each with different structures or features. • Understand that multicellular organisms are composed of cells organised into tissues, organs and systems to carry out life processes.	• Use a light microscope to observe and draw cells. • Explain how to use a microscope to identify and compare different types of cells. • Explain the roles of the parts of an animal and plant cell. • Understand the similarities and differences between animal and plant cells. • Gather sufficient data for investigations and repeat if appropriate. • Suggest what kind of tissue a cell is part of, based on its features. • Explain why multicellular organisms need organ systems to keep their cells alive. • Understand how recreational drugs might affect different body systems.	• Deduce general patterns about how the structure of different cells is related to their function. • Explain how unicellular organisms are adapted to carry out functions that, in multicellular organisms, are done by different types of cell. • Suggest how damage to, or failure of, an organ would affect other body systems. • Explain how organ donation or replacement can treat damaged organs and systems. • Explain how stem cells could be used to potentially treat damaged organs and systems.

Autumn 2 – Spring 2 Chemistry: Substance and Properties	• Recognise that all materials are made of either a single substance (pure) or a mixture of substances (impure). • Describe the characteristics of a substance as its properties. • Understand that melting point can be used to distinguish pure from impure substances. • Understand that an impure substance melts over a range of temperatures. • Identify that a solution is a mixture of solute and solvent, and that the solute is still present even when it cannot be seen. • Know that some substances dissolve in a solvent (soluble) and some do not (insoluble). • Understand that mass is conserved in a physical change.	• Use the properties of substances to select appropriate separation techniques (filtration, distillation, evaporation, chromatography, evaporation and crystallisation). • Describe a mixture as two or more elements or compounds not chemically combined. • Understand that substances in a mixture retain their chemical properties. • Explain that mixtures can be separated by physical processes and that these do not create new substances. • Understand that a pure substance has a sharp melting point and boiling point and that its state at room temperature depends on these points. • Describe chromatography as a method for separating mixtures and giving information that helps identify substances. • Define a saturated solution as one in which no more solute will dissolve. • Explain that solubility changes with temperature and must be defined at a specific temperature. • Interpret graphical data on solubility to predict whether a solute will fully dissolve.	• Calculate and interpret Rf values using the ratio of the distance moved by a compound to the distance moved by the solvent. • Use Rf values and the behaviour of spots in different solvents to help identify pure compounds and differentiate mixtures. • Predict how different compounds in a mixture will separate in chromatography depending on the solvent used. • Apply particle-level explanations to relate solubility data in unfamiliar scenarios.

Physics: Forces	• State that a force is a push or a pull and that forces are measured in Newtons. • Identify some common forces in context (e.g., weight, friction, air resistance, magnetic). • Recognise that some forces require contact and others do not. • Draw basic force arrows to show direction. • State that balanced forces mean no change in movement. • Recall that stretching and squashing objects involves forces. • Carry out simple instructions in practical work safely.	• Describe the effects forces can have on objects (speeding up, slowing down, changing shape). • Distinguish accurately between contact and non-contact forces and give examples of each. • Draw force diagrams using arrows to show size and direction. • Calculate resultant force in one dimension and predict motion from it. • Describe the relationship between force and extension and apply Hooke's Law to data. • Explain how friction, air resistance and water resistance oppose motion. • Calculate speed from distance and time using measured data. • Explain how pressure depends on force and area and calculate pressure in common contexts. • Describe how pressure in liquids increases with depth and explain why objects float or sink using upthrust and weight.	• Deduce the forces acting in unfamiliar scenarios and justify the resultant motion. • Interpret force–extension graphs to identify proportionality and limits. • Evaluate how variables (e.g., surface area, weight, depth) affect resistive forces or pressure. • Explain floating and sinking using quantitative reasoning and links to density. • Propose improvements to investigations to increase validity and accuracy.

Biology: Reproduction	• Identify the different parts of the male and female reproductive system. • Know that the menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised. • Identify key events on a diagram of the menstrual cycle. • State what happens during sexual intercourse. • State the main parts of a flower. • Know that plants reproduce sexually to produce seeds following fertilisation in the ovary. • Identify differences between wind- and insect-pollinated flowers. • State different ways in which plants can disperse seeds. • Know that plants have adaptations for dispersal using wind, water, or animals. • Identify variables in an investigation, explain why some need to be controlled, and draw conclusions from collected data.	• Describe the role of the different parts of the reproductive systems. • Describe the changes that occur during puberty. • Describe the sperm's journey to the egg. • Describe how the developing foetus changes during pregnancy. • Describe causes of low fertility in male and female reproductive systems. • Describe how IVF works. • Describe some differences between wind- and insect-pollinated plants. • Describe the main steps that take place when a plant reproduces successfully. • Explain why pregnancy is more or less likely at different stages of the menstrual cycle. • Explain how the mother can try to ensure the developing baby is healthy. • Identify things that women should and should not do during pregnancy. • Explain the role of the parts of a flower in reproduction. • Explain why some plants place their seeds inside a fruit. • Explain why seed dispersal is important for the survival of the parent plant and its offspring.	• Evaluate the ethical issues associated with fertility treatment. • Explain how the steps in IVF lead to a developing foetus • Explain why pregnancy is more or less likely at different stages of the menstrual cycle with references to changes in the uterus. • Explain how diet and lifestyle choices can affect the development of a healthy baby. • Evaluate how each component of the flower contributes to fertilisation. • Suggest how a plant carries out seed dispersal based on features of its fruit or seed. • Evaluate the effectiveness of techniques used by plants for seed dispersal

Summer 1 – Summer 2 Chemistry: Chemical Reactions	• During a chemical reaction a new substance or substances are formed. • A physical change changes the physical properties of a substance, but no new substance is formed. • Reactants are substances that react together and appear before the arrow in an equation. • Products are substances formed in a reaction and appear after the arrow in an equation. • Chemical reactions are represented by chemical equations; a word equation summarises reactants and products. • Some metals react with acids. • For any chemical reaction, the total mass of reactants equals the total mass of products (mass is conserved).	• Observations of chemical reactions may include formation of a precipitate, heat evolved or taken in, colour changes, gas production, or changes in smell. • During a chemical reaction, atoms are rearranged, forming new substances with different properties from the reactants. • Thermal decomposition is a reaction where a single reactant breaks down into simpler products when heated. • Combustion is a reaction with oxygen that transfers energy to the surroundings as heat and light. • Metals react with oxygen to produce metal oxides. • The name of a salt can be deduced from the acid and metal used. • Recall and describe the reactions of common metals with water or dilute acids. • In an exothermic reaction, the temperature of the surroundings increases. • In an endothermic reaction, the temperature of the surroundings decreases. • Describe how the Earth's rotation causes day and night and explain why day length varies.	• Recognise common formula from the chemical reactions covered. • Begin to write symbol equations for the chemical reactions covered. • Link exothermic and endothermic reactions to energy changes.

Physics: Space	• Recognise that the Earth spins on its axis and orbits the Sun. • State that the Moon orbits the Earth. • Identify day and night as linked to the Earth's rotation. • State that the Sun is a star. • Recognise that planets orbit the Sun. • Know that gravity pulls objects downwards. • Recall that the Moon appears to change shape over time.	• Explain how the Earth's tilt and orbit cause the seasons and differences between hemispheres. • Describe how the Moon's phases occur due to reflection of sunlight. • Explain how eclipses occur using diagrams and key scientific vocabulary. • Identify the order of the planets and describe differences between them. • Describe gravity as a non-contact force acting between masses in space. • Use models to represent distances and scales in the Solar System. • Explain that a light year is a unit of distance and why it's needed.	• Analyse how axial tilt, latitude and Earth's orbit influence climate and daylight hours. • Explain eclipses and lunar phases using precise geometrical reasoning and shadow models. • Interpret scale models and secondary data to compare planetary motion and orbital periods. • Evaluate limitations of models used to represent astronomical distances. • Apply the concept of light-years to estimate and compare distances in the Universe.
Biology: Organisms	• Discuss how to classify organisms using the Linnaeus system. • Look at examples of classification keys and produce their own. • Determine the criteria for the five different vertebrate classes. • Classify land plants into the four main taxonomic groups. • Identify groups affected by scientific development such as the exploitation of plants for new drugs. • Draw and label food chains.	• Describe how classification can be used to identify an unknown species. • Explain how to use classification to identify the species of a vertebrate. • Apply understanding of vertebrate classification to predict characteristics of an animal based on its vertebrate group and lifestyle. • Explain the importance of using scientific understanding to preserve plant species.	• Recognise that data about animal characteristics can be interpreted in different ways for organisms that are difficult to classify. • Evaluate different techniques of preserving species. • Evaluate possible consequences to food webs if populations and the environment changes within a habitat. • Recognise that scientific data may be interpreted differently when classifying organisms that do not fit neatly into established groups.

	• Combine food chains to form a food web. • Explain how organisms in a food chain depend on each other for nutrients. • Define the term biomass. • Define the term sampling. • Display plant population data in an appropriate format.	• Describe possible consequences to food webs if populations change within a habitat. • Draw and describe a pyramid of number. • Explain how to draw a pyramid of number to scale. • Describe the disadvantages of a pyramid of number. • Draw and describe a pyramid of biomass. • Describe the advantages of using a pyramid of biomass compared to a pyramid of number. • Describe how to generate coordinates and use a quadrat to sample plants.	• Explain how to draw a pyramid of biomass to scale. • Evaluate how pyramids of number and biomass can look different for the same food chain. • Use random sampling to gain accurate population data on organisms in an environment.