



SUNNYDOWN SCHOOL

SCIENCE CURRICULUM PLAN

Subject	Science	Year group	7
Subject Intent	<p><i>In Y7, students start to develop their scientific knowledge, understanding and skills through the specific disciplines of biology, chemistry, and physics. They benefit from a broad curriculum that promotes the development of inclusive learning opportunities, differentiated to meet the needs of all students. The integrated working scientifically component and the focus on literacy aim at building their competence and confidence in articulating scientific ideas. Essential enquiry and life skills are taught through a series of practicals in a relevant, appropriate and engaging way.</i></p> <p>The studied Science content in Y7 builds on the KS2 National Curriculum and is presented into the following macro-sections: 'Organisms', 'Ecosystems', 'Genes', 'Matter', 'Earth structure', 'Reactions', 'Forces', and 'Waves'. Each of these broader topics is divided into subtopics.</p> <p>In Y7 Biology the broader ideas of 'Organisms', 'Genes' and 'Ecosystems' are introduced through study of 'Movement', 'Cells', and 'Interdependence and variation'. In Chemistry, 'Matter', 'Earth' and 'Reactions' are introduced through 'The particle model', 'Separating mixtures', 'Earth structure', and 'Metals and nonmetals'. In Physics the topics 'Forces' and 'Waves', are introduced through study of 'Gravity', 'Speed', and 'Sound'.</p> <p>Autumn 1 starts with an Introduction to Science covering Lab Safety Rules, Hazard Symbols, Basic Lab Equipment, and Bunsen Burner Safety</p>		

Term	Topic	Core learning	Key concepts	Sequencing
Autumn 1	Introduction to Science Lab Safety	Understand and follow key safety rules, use personal protective equipment (PPE), and know emergency procedures; identify common hazard symbols and understand associated risks and safety precautions.	Lab Safety PPE Hazard Symbols Corrosive Flammable Toxic	Building on... Basic safety learned in KS2 to include specific lab safety rules and use of PPE, more advanced lab equipment; Develops from basic hazards to understanding hazard symbols;

	Basic Lab Equipment	Recognise, name, and safely use essential lab equipment	Explosive Test tubes Beakers Measuring cylinders Parts of the Bunsen Burner Safety / Blue / Roaring Flame	Builds on the scientific method focusing on safe experimentation. Building towards... More advanced practical skills; Strong safety practices for conducting experiments safely and effectively; Developing a solid understanding of the scientific method to support more independent scientific inquiry.
	Bunsen Burner Safety	Safely set up, light, and use a Bunsen burner, understanding different flame types and safety measures.		
	Particle model and separating mixtures	Know the properties of solids, liquids and gases in terms of arrangement and movement of particles Explain changes of state in terms of changes to the energy of particles. Make predictions about what will happen during unfamiliar physical processes, in terms of particles and their energy.	Particle Particle model Solid Liquid Gas Melting Freezing Condensation Evaporation Sublimation Diffusion Gas pressure	Building on... KS2 Curriculum Year 4 States of Matter, Year 5 Properties and Changes of Materials. Materials can exist in solid, liquid, and gas states, depending on their temperature. Melting, freezing, evaporating, and condensing are changes of state. Building towards... This topic studies the properties of matter in terms of particle arrangement and movement. In Y8 Chemistry pupils will learn about acids and alkalis. In Y8 Biology, Breathing they will learn about the movement of substances in biological systems. In Y8 Physics, Energy: Heating and cooling they will learn about energy transfers.
	Particle model			
	Separating mixtures	Know the difference between pure substances and mixtures; Define diffusion in terms of the particle model; Describe simple techniques for separating mixtures: filtration,	Solute Solvent Solution Soluble	Building on... Some substances dissolve in water and others do not. Evaporation can be used to separate a dissolved substance from its solution. Sieving or filtration can be used to separate an undissolved solid from a liquid.

		<p>evaporation, distillation and chromatography.</p> <p>Explain the process of dissolving using the particle model; Be able to choose the most suitable technique to separate out a mixture of substances.</p> <p>Interpret solubility curves. Suggest methods to separate a complex mixture and justify your choice; Identify an unknown substance through using separation techniques.</p>	<p>Insoluble Solubility Pure substance Mixture Filtration Evaporation Distillation Chromatography</p>	<p>Building towards... In Reactions: Acids and alkalis students will learn how to make a salt solution and separate the salt from the solution.</p>
Autumn 2	Movement	<p>Know the parts and the functions of the skeleton, the function of muscles and examples of antagonistic muscles.</p> <p>Explain how antagonistic muscles produce movement around a joint.</p> <p>Predict the consequences of damage to a joint, bone or muscle. Consider the benefits and risks of a technology for improving movement.</p>	<p>Skeletal system Muscles Bones Bone marrow Joints Cartilage Ligament Antagonistic muscle pairs Tendons</p>	<p>Building on... Plants contain different parts such as roots, stem, leaves and flowers. The life cycles of plants and animals include growth, development and reproduction. Animals and humans have a skeleton for support and protection. Muscles work together with the skeleton to allow movement.</p> <p>Building towards... Human reproduction in Y8 – pupils will learn about the male and female human reproductive systems; Digestive system in Y9 – students will learn about the organs in the digestive system and revisit both topics in more depth at GCSE.</p>
Spring 1	Speed and gravity	<p>Define speed; Understand factors that affect the speed of an object Calculate speed, rearrange the speed equation to find distance travelled and time taken.</p>	<p>Speed Distance-time graph</p>	<p>Building on... Most forces require direct contact between two objects. Friction, air resistance, and water resistance act between moving surfaces to slow things down.</p>

	Speed	<p>Interpret and Illustrate a journey on a distance-time graph Describe how the speed of an object varies depending on the position of the observer relative to the object.</p> <p>Suggest how the motion of two objects moving at different speeds in the same/different directions would appear to the other.</p>	<p>Average speed Relative motion Acceleration</p>	<p>Students will learn that if the resultant force on an object is not zero, it speeds up, slows down or changes direction.</p> <p>Building towards... In Forces: Contact forces pupils will learn more about contact forces (drag and friction). In Forces: Pressure they will learn about the link between force, area, and pressure.</p>
	Gravity	<p>Know that gravity is a force that attracts objects towards each other pulling in the direction towards the centre of any object; The difference between mass and weight. Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).</p> <p>Explain how gravity varies for different masses and distances. Compare your weight on Earth with your weight on other planets using the formula.</p> <p>Suggest how gravity varies for a space mission; Compare and contrast gravity with other forces.</p>	<p>Gravity Mass Weight Gravitational field strength</p>	<p>Building on... In Y5 Forces pupils have learnt that there is a force of gravity acting between the Earth and any object pulling towards the centre of the Earth.</p> <p>Building towards... In Y8 pupils will study the solar system and learn more about the orbit of the Earth and other planets and about magnetic fields.</p>
Spring 2	Earth's structure	<p>Know the composition and the structure of the Earth, the rock cycle and the formation of igneous, sedimentary and metamorphic rocks</p>	<p>Rock cycle Weathering Erosion</p> <p>Minerals</p>	<p>Building on... From KS2 Science, Y3 Rocks, pupils know that rocks can be classified according to their properties, depending on how they were</p>

	Cells	<p>Relate properties of rocks to their formation; Identify the causes of weathering and erosion and describe how they occur.</p> <p>Predict the type of weathering that would be observed in different places; Identify conditions that indicate faster/slower processes of change on Earth.</p> <p>Know that multicellular organisms are built up of cells that are organised into tissues, organs and systems; Specialised cells are responsible for a specific job. Learn the key organelles of both plant and animal cells and recognise their similarities and differences. Use a light microscope to observe and draw cells.</p> <p>Explain why multicellular organisms need organ systems to keep their cells alive. Explain how unicellular organisms are adapted to perform their functions.</p> <p>Suggest how damage to, or failure of, an organ would affect other body systems.</p>	<p>Sedimentary rocks</p> <p>Igneous rocks</p> <p>Metamorphic rocks</p> <p>Microscope</p> <p>Nucleus Cytoplasm</p> <p>Cell membrane</p> <p>Cell wall</p> <p>Chloroplasts</p> <p>Permanent vacuole</p> <p>Specialised cells</p> <p>Red blood cell</p> <p>Nerve cells</p> <p>Sperm cells</p> <p>Egg cell</p> <p>Root hair cell</p> <p>Adaptations</p> <p>Diffusion</p> <p>Concentration</p> <p>Multicellular</p> <p>Unicellular</p> <p>Amoeba</p> <p>Euglena</p> <p>Flagellum</p>	<p>formed.</p> <p>Building towards...</p> <p>This topic links to Geology and provides opportunities to apply concepts from Biology, Chemistry and Physics to understanding the structure of the Earth and processes of rock formation.</p> <p>Building on.....</p> <p>Their knowledge of organisation of an organism towards the detail of cells from a micro level.</p> <p>Building towards...</p> <p><i>At GCSE in Y10, students will revisit a topic of cells and learn about plant, animal and specialised cells in more depth, including cell division (mitosis), specialisation and differentiation.</i></p>
Summer 1	Metals and non-metals	<p>Know that both metals and non-metals react with oxygen to form oxides;</p> <p>The order of metals and carbon in the reactivity series, showing how readily they react with other substances.</p> <p>The main reactions of metals: oxidation, displacement, and reactions with acids.</p>	<p>Metals Non-metals</p> <p>Displacement</p> <p>Oxidation</p> <p>Reactivity</p>	<p>Building on...</p> <p>Y5 knowledge on Properties and changes of materials.</p> <p>From their study of Matter: Particle model, students recognise changes of state, and dissolving as physical changes, as opposed to</p>

	Sound	<p>Present the reactions of metals with word equations. Place an unfamiliar metal into the reactivity series based on information about its reactions.</p> <p>From the appearance of a metal, deduce the physical or chemical changes it has undergone. Determine whether reactions will occur, based on the reactivity series.</p> <p>Know that sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. Define amplitude, frequency and wavelength of a wave.</p> <p>Explain observations where sound is reflected, transmitted or absorbed by different media. Use wave diagrams of how sound waves change with volume or pitch.</p> <p>Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture.</p>	<p>Volume Pitch Amplitude Wavelength Frequency Vacuum Oscilloscope Absorption Auditory range Echo</p>	<p>chemical changes that result in the formation of new materials.</p> <p>Building towards... In Y8 in Reactions: Types of reactions pupils will learn how particles are rearranged in chemical reactions, and in Chemical energy they will learn about energy changes during chemical reactions.</p> <p>Building on... Y4 Sound. Sounds are made by vibrating objects. Vibrations travel through a medium to the ear. You can change the pitch and loudness of a sound by making an object vibrate in different ways.</p> <p>Building towards... In Y8 students will learn about light waves. At GCSE Y11, they will revisit the topic of waves and learn how waves transfer energy and while studying wave properties they will learn how to model waves and use the models to explain reflection and refraction.</p>
Summer 2	Inter-dependence and variation	<p>Know what food chains and food webs are. Organisms in a food web depend on each other for nutrients.</p>	<p>Food chain, producer, consumer, prey,</p>	<p>Building on... Y3 Animals, Y4 Living Things & Their Habitats. This topic builds and extends on the topic of Plant reproduction. Pupils will learn that the</p>

	Inter-dependence	<p>Describe how a species' population changes as its predator or prey population changes.</p> <p>Explain effects of environmental changes and accumulation of toxic materials on a species' population. Explain issues with human food supplies in terms of insect pollinators.</p> <p>Suggest what might happen when an unfamiliar species is introduced into a food web. Make a conclusion on the basis of data about what caused a change in the population of a particular species.</p>	<p>predator, food web, decomposer, interdependence, population, bioaccumulation, ecosystem, community, habitat, environment, niche, competition,</p> <p>predator-prey relationships</p>	<p>population of a species is affected by the number of its predators and prey, disease, pollution and competition for limited resources.</p> <p>Building towards... Variation as the next Y7 topic and subsequently at GCSE – students will learn how organisms are adapted to survive in a habitat.</p>
	Variation	<p>Know that there is variation between individuals of the same species either inherited or environmental or both. Variation is important for the survival of a species.</p> <p>Explain how characteristics of a species are adapted to particular environmental conditions.</p> <p>Plot bar charts or line graphs to show discontinuous or continuous variation data.</p> <p>Predict how a certain change in the environment would affect a population.</p>	<p>Variation, species, inherited variation, environmental variation, discontinuous variation, continuous variation, adaptations</p>	<p>Building on... This topic builds and extends on the topic of human reproduction. Students will be able to decide on whether characteristics are inherited, environmental or both.</p> <p>Building towards... In Y9 students will study Evolution – how organisms have evolved to survive changes in the environment. The topic will be revisited in more depth at GCSE in Y11.</p>