SUNNYDOWN SCHOOL
SCIENCE CURRICULUM PLAN

Subject	Science	Year group	Y9
Subject Intent	In year 9 the students will build on their knowledge from earlier KS3 by expanding on the following topics :- Cells, Movement, Acids and Alkalis, Forces, Interdependence and Evolution, Metals and Nonmetals, Earth Structure, Circuits and circuit symbols, human reproduction, and Energy transfers. They will study through working scientifically, including a series of practicals, and a focus on literacy and communication in order to cultivate confidence in expressing their understanding of the three disciplines biology, chemistry and physics **enabling all students to meet their full academic potential.** This year is designed to prepare students for KS4 by further developing critical thinking, culminating in a KS4 bridging unit on Biomimicry.		

Term	Topic	Core learning	Key concepts	Sequencing
Autumn 1	Safety Breathing (Biology) Chemical Energy (Chemistry)	Breathing: ● Structure of the lungs ● Factors that affect breathing ● Role of stomata in plants Chemical Energy ● Exothermic reaction ● Endothermic reactions ● Chemical bonds	Breathing. Trachea (windpipe) Bronchi Bronchioles Alveoli Ribs Diaphragm Lung volume Catalysts Exothermic reaction Endothermic reaction. Chemical bond	**Building on…..** The topic on breathing builds on the topics of: Cells (Year 7) where the students were taught about cell organelles and Movement (Year 7) where the students were taught about how muscles move and where they get their energy from. The topic on chemical energy builds on the topics of: Acid and alkalis (Year 8) where the students were taught about neutralisation reactions which show a temperature increase. **Building towards…** The topic of breathing builds towards the GCSE units: B1 Cell Biology where students learn about cell organelles such as mitochondria. B2 Organisation where students learn about different organ systems and their functions and adaptations. B4 Bioenergetics where students are taught about respiration and photosynthesis and the adaptations required for both of these

				processes to take place. The topic of Chemical energy builds towards the GCSE units: C4 Chemical changes where students are taught about the reactivity series, extracting metals and electrolysis. C5 Energy Changes where students are taught about endothermic and exothermic reactions and measuring energy changes. C6 Rate and extent of chemical changes where the students are taught about factors that affect rate and reversible reactions.
Autumn 2	Electromagnets and Magnetism (Physics) Evolution (Biology) Climate and Earth Resources (Chemistry)	Electromagnets and Magnetism ● Magnetic poles ● Plotting field line ● Constructing an Electromagnets Evolution ● Darwin's finches ● Darwin's theory on evolution ● Lamarck's theory on evolution ● Differences between species Climate and Earth Resources ● Global warming ● Extraction of materials (Phytomining & Bioleaching) ● Recycling	Electromagnet: A non-permanent magnet turned on and off by controlling the current through it. Solenoid Core Magnetic force. Permanent magnet Magnetic poles Population Natural selection Extinct Biodiversity Competition Evolution Global warming Fossil fuels Carbon sink Greenhouse effect Natural resources Mineral Ore Extraction Recycling Electrolysis	**Building on…..** The topic of Electromagnets and magnetism builds on the topic of: KS2 Forces & Magnets and Forces (Year 8) where students are taught about different forces including magnetic forces. The topic of Evolution builds on the topic of Interdependence and variation (Year 7) where the students are taught about how organisms are linked in food chains. The topic of Climate and Earth resources builds on the topic Metals & nonmetals where the students are taught about the uses and properties of metals and Earth structure where the students are taught about the makeup of the earth's layers. **Building towards…** The topic of Electromagnets and magnetism build towards the GCSE unit of: P7 Magnets where the students learn about permanent and induced magnets The topic of Evolution builds toward the GCSE unit of: B6 Inheritance, Variation and Evolution where the students are taught about DNA, inherited disorders and genetic diagrams. The topic of Climate and Earth resources builds towards the GCSE units of: C7 Organic chemistry where the students are taught about the problems with polymers. C10 Using resources where the students are taught about Life cycle assessments, water treatments and finite resources.

Spring 1	Digestion (Biology) Voltage & Resistance (Physics) Inheritance (Biology)	Digestion: ● Dietary needs and requirements for different groups of people. ● Balanced diets ● Role of enzymes ● Food absorption Voltage and Resistance: ● Modelling voltage ● How voltage is shared in series circuits and the same in parallel circuits. ● Calculate resistance using the formula: resistance (Ω) = potential difference (V) ÷ current (A). Inheritance: ● Where do we get our genetic data from ● How genetic data is transferred ● Role of DNA, Genes and chromosomes ● Inherited variation and Characteristics	Enzymes Dietary fibre Carbohydrates Lipids Protein Stomach Small intestine Gut bacteria Potential Difference (voltage) Resistance Electrical conductor Electrical insulator Inherited characteristics DNA Chromosomes Gene Dominant Recessive	**Building on…..** KS2 Animals and Cells in Year 7, which means they are familiar with the role of mitochondria and ribosomes in the cells where the topic on digestion expands their knowledge on where the cells get their resources from to make energy and other proteins. The students also study KS2 Electricity and Current in Year 8, which means they are familiar with how electricity flows and the circuit symbols.The topic on voltage and resistance expand on this knowledge and help them to link voltage, current and resistance using the equation triangle. Also in year 8 the students learn about human reproduction where they talk about the process of fertilisation, the topic on inheritance builds on this further by talking about what happens in terms of DNA and how different characteristics can be passed from one generation to the next. **Building towards…** These topics build towards KS4 Science by ensuring the students have understood the key concepts of how organ systems function ready the AQA trilogy Biology unit 2: organisation. An understanding of voltage will ensure the students understand the key concept of voltage and resistance links to the AQA trilogy Physics unit 2: Electricity.
Spring 2	Inheritance (Biology) Types of reaction (Chemistry)	Inheritance ● Simple model of DNA, genes and chromosomes. ● Variation between species	Inherited characteristics DNA Chromosomes Gene Dominant Recessive	**Building on…..** Students study cells in Year 7 and human reproduction in Year 8 which looks at how and where genetic information is transferred. Types of reactions build on the chemical energy studied earlier in year 9 where the students expand on how energy is transferred in a reaction. The topic of work builds on the student's previous knowledge from

	Work (Physics)	• Biodiversity Types of Reactions • Different types of reactions • Combustion • Thermal decomposition • Displacement reaction Work • Calculating work and energy changes • Hooke's law	Fuel Chemical reaction Physical change Reactants Products Conserved Work Lever Input force Output force Displacement Deformation	studying speed and gravity in Year 7 and energy transfers from Year 8. **Building towards…** Topics build towards KS4 GCSE science: The Biology unit on Inheritance builds towards GCSE unit 6 in Year 11 in spring term. The Chemistry unit on Types of Reactions builds towards GCSE unit 4 on Chemical Changes in Spring of Year 10. The Physics unit on Work builds towards GCSE unit 1 Energy in Autumn of Year 10.
Summer 1	Respiration (Biology) Heating and Cooling (Physics)	Respiration (Biology) • Aerobic Respiration • Anaerobic Respiration • Fermentation Heating and Cooling (Physics) • How heat is transferred • Thermal conductors • Thermal insulators	Aerobic respiration Anaerobic respiration (fermentation) Thermal conductor Thermal insulator Temperature Thermal energy Conduction Convection. Radiation	**Building on…..** The topic of respiration builds on the topic of: KS2 Animals and Cells (Year 7) where students were taught about cell organelles including mitochondria. The topic of Heating and Cooling builds on the topic of Energy transfers where students are taught about different types of energy and how they are transferred from one to another. **Building towards…** Topics build towards KS4 GCSE Science: The topic of respiration builds towards the GCSE unit of B4 Bioenergetics where the students are taught about aerobic and anaerobic respiration and metabolism. The topic of Heating and Cooling builds towards the GCSE unit of P1 Energy where students are taught about energy transfers by heating, specific heat capacity and efficiency.
Summer 2	Biomimicry (AQA Bridging Unity)	• Nanotechnology • Developments in microscopy • Bioluminescence • Termite mounds • Neural networks		**Building on…..** Biomimicry builds on Energy Transfers (Year 7), Photosynthesis (Year 8) and Chemical Reactions (Year 9) **Building towards…** Biomimicry builds towards various GCSE topics as it covers aspects of

		• Tardigrade & Vaccines • Wind turbines • Artificial Photosynthesis		how Science is communicated using standard form, converting units & using ideas from nature to guide Science theories.