



SUNNYDOWN SCHOOL

SCIENCE CURRICULUM PLAN

Subject	Science	Year group	Y8
Subject Intent	<p><i>In Y8, students 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 practical's in a relevant, appropriate and engaging way.</i></p> <p>The studied Science content in year 8 builds on the respective topics pupils have learnt in Y7, as well as on the KS2 National Curriculum for Science and is presented into the following macro-sections: 'Genes', 'Ecosystems', 'Reactions', 'Earth', 'Matter', 'Energy', 'Waves', 'Electromagnets' and 'Forces'. Each of these broader topics is divided into subtopics.</p> <p>In Y8 Biology the broader ideas of 'Genes' and 'Ecosystems' are introduced through study of 'Human reproduction' and 'Plant reproduction'. In Chemistry 'Reactions', 'Earth' and 'Matter' are introduced through 'Acids and alkalis', 'Universe' and 'The Periodic table and elements'. In Physics the topics 'Energy', 'Waves', 'Electromagnets' and 'Forces', are introduced through study of 'Energy costs and Energy transfers', 'Light', 'Current' and 'Contact Forces and Pressure'. The Y8 content builds towards the KS4 more in depth studies of the above topics.</p>		

Term	Topic	Core learning	Key concepts	Sequencing
Autumn 1	Acids and Alkalis	Know to name some common acids and alkalis; Know the pH for a neutral, acidic and alkaline solutions; define neutralisation as a chemical reaction between an acid and an alkali; know that acids and alkalis can be corrosive or irritant and how to work with them safely.	pH Indicators Acid Base Alkali Concentration Neutralisation Salt Acid rain	Building on... From the Particle model and Separating mixtures studied in Y7 pupils know that everything is made up of tiny particles and have learned to distinguish between reversible and irreversible changes. Reactions that result in the formation of new materials are not reversible,

	<p>Energy costs and Energy transfers</p>	<p>Know the colours of the pH scale and how indicators work; Know the pH of a solution depends on the strength of the acid and that hydrochloric, sulphuric and nitric acid are strong acids; Know the word equation for neutralisation and how these reactions are used in a range of situations.</p> <p>Identify the best indicator to use based on particular data; Suggest the pH of acids from information from reactions; Work out the name of the salt produced upon the neutralisation of a known acid and alkali; Evaluate the damages of acid rain.</p> <p>Know that energy cannot be created or destroyed but only be transferred from one form to another; Recall the different types of energy; Define useful and wasted energy; Compare the amount of energy stored in different foods or transferred in activities; Differentiate between renewable and non-renewable energy; Recognise electricity as a form of energy</p> <p>Give examples of energy transfer from real life; Calculate the useful energy and the wasted energy, given the amounts of input and output energy; describe the process of generating electricity; Calculate the cost of electricity, using the formula: $\text{cost} = \text{power (kW)} \times \text{time (hours)} \times \text{price (per kWh)}$.</p>	<p>Energy resource Renewable Non-renewable Fossil fuels Energy stores Thermal Chemical Kinetic Gravitational potential Elastic Energy transfer Dissipation Input energy Output energy Useful energy Wasted energy Power Cost of electricity</p>	<p>and these include the reactions of acids and alkalis.</p> <p>Building towards... In Y9 in Types of Reactions, students will learn how particles are rearranged during chemical reactions, and subsequently in Chemical changes at GCSE level, they will upgrade their knowledge on Acids and Alkalis and their reactions. In Energy Changes in Y10, students will learn about energy changes during chemical reactions.</p> <p>Building on... From Y7 in Waves, Sound pupils have learnt how sound transfers energy. Earlier in Y8, Light they have studied some properties of light as a form of energy.</p> <p>Building towards... In Y9 pupils will learn about electromagnets and how energy can be transferred using an electric current. Later, in Energy, subtopic Work they will learn about work, energy, and machines and how energy is transferred using a force. In Energy, Heating and cooling, they will learn about transferring energy by particles and radiation.</p>
--	--	---	--	---

		Compare the energy usage of different home devices and the cost of their running; Evaluate the environmental impact of the usage of renewable and non-renewable resources; Suggest ways to reduce cost of electricity by looking at data on a home energy bill.		Students will revisit the topic of Energy and power at GCSE level.
Autumn 2	Energy costs and Energy transfers (continued) Light	<p>Know that light travels in straight lines at 300 million m/s; Describe the reflection of light off a mirror; Construct ray diagrams and label correctly rays and angles; Explain that refraction happens when light enters a medium with different density.</p> <p>Use ray diagrams to show how light passes through transparent materials of different density; Explain the use of lenses for vision correction; Explain observations of mixing coloured lights and when objects are viewed in different coloured light.</p> <p>Predict whether light will reflect, refract or scatter upon hitting the surface of a particular material; Explain what happens with light when it passes through a prism; Use confidently ray diagrams to show how images are formed in different circumstances.</p>	<p>Incident ray Reflected ray Normal line Angle of incidence Angle of reflection Reflection Refraction Absorption Specular Reflection Diffuse Scattering Transparent Translucent Opaque Convex lens Concave lens Retina</p>	<p>Building on... Y3 & Y6 Light. Light from the Sun can be dangerous and they need to protect eyes and skin, that they cannot see in darkness, about day and night, and that objects have shadows. These pique their curiosity to find the answers.</p> <p>Building towards... In Universe pupils will learn about the speed of light and light years, the seasons, lunar and Solar eclipses; In Y11 in Wave properties they will revisit the topic to explain reflection and refraction, and in EM Waves they will learn about EM spectrum and visible light.</p>
Spring 1	Universe	<p>Know that the earth orbits the sun and is one of the planets of the solar system; Describe what happens at sunset and sunrise; Know the planets in the solar system</p> <p>Explain day and year length, seasons, the phases of the moon; Explain why places on the Earth experience different daylight hours and amount of sunlight during the year</p>	<p>Galaxy Light year Stars Orbit Exoplanet Satellite Hemisphere Constellation Meteor</p>	<p>Building on... Y5 Earth & Space, a topic, which catches pupils' imagination and curiosity.</p> <p>Building towards... Understanding of how observation has led to knowledge of phenomena that cannot be seen or handled directly; Ability to make deductions from</p>

	Current	<p>Compare models of the solar system; Describe how space exploration and observations of stars are affected by the scale of the universe, Predict patterns in day length, the Sun's intensity or an object's shadow at different latitudes</p> <p>Know what a complete circuit is, the main components of an electrical circuit; Describe what current is and how it is measured; Define electrical charge and static electricity</p> <p>Explain what happens to current in a parallel and a series circuit; Draw circuit diagrams and turn them into real circuits; Describe the uses of series and parallel circuits</p> <p>Describe how current changes in series and parallel circuits upon changing the components; How to model current; How series and parallel circuits are suitable for particular uses; Evaluate risks to avoid electric shock</p>	<p>Meteorite Comet Asteroid</p> <p>Electrons Positively charged Negatively charged Electrostatic force Current Series circuit Parallel circuit Switch Battery Bulb Wire</p>	<p>observation data of planets, stars and galaxies.</p> <p>Building on... Y6 Electricity. In Energy costs and transfers pupils have learnt about how electric current transfers energy and how electricity is generated; have calculated the cost of running home electrical devices</p> <p>Building towards... In Y9 students will learn about magnetism and electromagnetism and how to make an electromagnet. They will return to the topic of electricity at GCSE level to study voltage, resistance and electricity in the home</p>
Spring 2	Current (continued) Plant reproduction	<p>Know that flowers contain the plant's male and female reproductive organs. Describe how the pollen is carried by insects and animals.</p> <p>Know that plants make their own food and store it as starch. Iodine is used to test for the presence of starch.</p>	<p>Petal Anther Stigma Style Pollination Pollen Sepal Stamen Filament</p>	<p>Building on... Y3 Plants, Y5 Living Things & Their Habitats. Pupils have been introduced to the different types of plant reproduction and explored the requirements of plants for life and growth (air, light, water, nutrients).</p>

		<p>Identify the parts of the flower and link their structure to their function. Describe the steps during plant reproduction. Describe the different types of seed dispersal considering plant's fruit and seed adaptations. Describe the process of photosynthesis and give the word equation.</p> <p>Explain adaptations of leaves, roots and stems. Compare the features of wind pollinated and insect pollinated plants. Show how the rate of photosynthesis is affected by changing conditions by plotting a line graph. Explain the process of selective breeding.</p>	<p>Carpel Ovary Ovule Fertilisation Fertilizers Seed Fruit Germination Seed dispersal Photosynthesis Chlorophyll Stomata</p>	<p>In Y7 pupils have learnt the structures of plant cells and the topic of Interdependence and variation; also on pupils' appreciation of inanimate nature; their basic knowledge on plants' main parts, some factors that plants need to grow and how they are pollinated by bees</p> <p>Building towards... In Y9 pupils will study Evolution; Earth's resources, and will learn how organisms have adapted to the changes of their environment, about the protection of endangered species.</p>
--	--	--	--	---

Summer 1	<p>Periodic table and elements</p> <p>Periodic Table and Elements Atoms and the Periodic Table Knowledge Organiser.pdf</p>	<p>Know the symbols of key elements as hydrogen, oxygen, nitrogen, carbon, iron, zinc, copper, sulphur, aluminium, iodine, bromine, chlorine, sodium, potassium, magnesium; Define the terms atom, molecule, element, mixture or compound; State the position of metals and non-metals in the Periodic Table (PT); Group1, Group7 and Group0 elements and their properties</p> <p>Predict reactions of an unfamiliar Group 1 or 7 element; Recognise atoms, molecules, elements, mixtures or compounds from their particle diagrams; Name the elements in a chemical formula and give their number; Knowing the position of an element in the PT describe a trend in its properties</p> <p>Predict the behaviour of a particular element in a group; Compare and contrast the properties of elements and compounds; Use particle diagrams to represent elements and compounds and predict their physical properties; Suggest different uses of elements from their position in the PT.</p>	<p>Atom Molecule Element Compound Mixture Particle diagram Chemical formula Periodic table Group Period Physical properties Chemical properties Pattern in reactivity Observation Trend Halogen Metal Non-metal Alkali metal Noble gases Polymer</p>	<p>Building on... In Y7 Reactions, Metals and non-metals pupils learnt how to classify elements as metals and non-metals and what is their position in the Periodic table; To differentiate between physical and chemical properties of a substance; Some basic properties of metals and non-metals</p> <p>Building towards... In Y9 Reactions, Types of reaction pupils will learn about different types of chemical reactions. At CGSE students will expand their knowledge with the topics rate of chemical reactions and chemical analysis.</p>
	<p>Human Reproduction</p> <p>Human Reproduction</p>	<p>Know the stages of puberty in boys and girls; The menstrual cycle lasts approximately 28 days; How the egg is fertilised by the sperm, moves down the fallopian tube and settles in the lining of the uterus; The foetus receives oxygen and nutrients from the mother.</p>	<p>Adolescence Puberty Sex hormones Gamete Fertilisation Ovaries Sexual intercourse</p>	<p>Building on... Y5 Living Things & Their Habitats. Pupils are familiar with the term reproduction from their studies on plants. Living things produce offspring of the same kind however not identical to their parents.</p>

		<p>Explain the stages of the menstrual cycle on a diagram; the stages in development of a foetus fertilisation to birth; How the placenta and umbilical cord provide the baby with substances from the mother's organism.</p> <p>Explain at which stages of the menstrual cycle pregnancy is most likely to take place; Suggests causes of low fertility in male and female reproductive systems; Explain the principles behind contraception and fertility treatments; Reason on the effect of cigarettes, alcohol or drugs consumption during the gestation period on the developing foetus.</p>	<p>Testicles/testes Penis Scrotum Semen Ejaculation Sperm cell Sperm duct Urethra Oviduct/fallopian tube Uterus/womb Cervix Ovulation Menstruation Reproductive system Vagina Foetus, embryo Implantation Gestation Placenta Amniotic fluid Umbilical cord Contraception Contraceptive pill Fertility Condom</p>	<p>Building towards... In Y9 pupils will study Inheritance and how different characteristics are inherited from their parents. At GCSE in Y11, they will revisit these topics in more depth in section Inheritance, variation and evolution.</p>
--	--	--	--	---

<p>Summer 2</p>	<p>Human Reproduction (continued)</p> <p>Contact Forces and Pressure</p> <p>Contact Forces and Pressure</p>	<p>State the effects of applying forces; Label the forces acting on an object on a diagram showing their size and direction; Define resultant force and equilibrium; Describe friction and its effects and identify situations where friction is helpful or unhelpful; Define pressure and describe the effects of low and high pressure in simple situations; Suggest whether an object will float or sink in a fluid</p> <p>Describe factors affecting the size of frictional and drag forces; Describe the effect on the object when it is stretched or squashed; Explain the cause of gas pressure using the particle theory and explain some of its effects; Explain the state of objects which are at equilibrium when the resultant force is zero; Explain sinking and floating of objects depending on the weight and upthrust acting on them</p> <p>Explain observations of fluids in terms of unequal pressure using diagrams; Explain how pressure changes with depth and its effect on submerged objects; Explain the effect of solid surfaces on each other using ideas about stress; Use the formula to calculate fluid pressure or stress on a surface for different situations.</p>	<p>Contact force Resultant force Equilibrium Deformation Newton Friction Pressure Atmospheric pressure Tension Stress Compression Fluid Upthrust</p>	<p>Building on... Y5 Forces. In Y7 pupils have learned about gravity and weight, how to differentiate between contact and non-contact forces and some examples of such; They know from observation that forces can change the shapes of solid objects by squashing, stretching, bending, and twisting.</p> <p>Building towards... At GCSE pupils will revisit the topic of forces in more depth and learn about friction, weight, elastic and non-elastic behaviour, how to calculate work done against friction and extending a spring; Resultant forces and equilibrium, Forces in motion and how to interpret stopping and braking distance considering friction. At GCSE students will learn how gas pressure changes with temperature, density of a fluid and the height of the atmosphere; how to calculate pressure in a column of liquid</p>
------------------------	---	---	--	--