

Year 7 Curriculum Overview Plan: Subject Science

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key Theme: Organisms 1	Key Theme: Reactions 1	Key Theme: Force 1 Genes 1	Key Theme: Electromagnets 1	Key Theme: Matter 1	Key Theme: Ecosystem 1
Key Concepts, Knowledge & Skills to be Embedded: <ul style="list-style-type: none"> • the structure and functions of the human skeleton, to include support, protection, movement and making blood cells • biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles • the function of muscles and examples of antagonistic muscles • cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope • the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts • the similarities and differences between plant and animal cells • the role of diffusion in the movement of 	Key Concepts, Knowledge & Skills to be Embedded: <ul style="list-style-type: none"> • the properties of metals and non-metals • the chemical properties of metal and non-metal oxides with respect to acidity • defining acids and alkalis in terms of neutralisation reactions • the pH scale for measuring acidity/alkalinity; and indicators • reactions of acids with metals to produce a salt plus hydrogen • reactions of acids with alkalis to produce a salt plus water • evaluate risks 	Key Concepts, Knowledge & Skills to be Embedded: <ul style="list-style-type: none"> • speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • the representation of a journey on a distance-time graph • relative motion: trains and cars passing one another • forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size • use and derive simple equations and carry out appropriate calculations • forces as pushes or pulls, arising from the interaction between 2 objects • non-contact forces: gravity forces acting at a distance on Earth and in space, forces between 	Key Concepts, Knowledge & Skills to be Embedded: <ul style="list-style-type: none"> • differences in resistance between conducting and insulating components (quantitative) • electric current, measured in amperes, in circuits, series and parallel circuits, currents and where branches meet and current as flow of charge • interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces 	Key Concepts, Knowledge & Skills to be Embedded: <ul style="list-style-type: none"> • the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density; the anomaly of ice-water transition • atoms and molecules as particles • the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure • changes of state in terms of the particle model • the concept of a pure substance • the identification of pure substances • mixtures, including dissolving • diffusion in terms of the particle model • simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography 	Key Concepts, Knowledge & Skills to be Embedded: <ul style="list-style-type: none"> • the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere • the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops • the importance of plant reproduction through insect pollination in human food security • how organisms affect, and are affected by, their environment, including the accumulation of toxic materials • apply sampling techniques • use appropriate techniques, apparatus,

<p>materials in and between cells</p> <ul style="list-style-type: none"> • diffusion in liquids and gases driven by differences in concentration • the structural adaptations of some unicellular organisms • the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms • make predictions using scientific knowledge and understanding 		<p>magnets, and forces due to static electricity</p> <ul style="list-style-type: none"> • gravity force, weight = mass x gravitational field strength (g), on Earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and sun (qualitative only) • apply mathematical concepts and calculate results • differences between species • the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation • the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material • reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation 	<p>between charged objects</p> <ul style="list-style-type: none"> • the idea of electric field, forces acting across the space between objects not in contact • evaluate data, showing awareness of potential sources of random and systematic error 	<ul style="list-style-type: none"> • use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety 	<p>and materials during fieldwork and laboratory work, paying attention to health and safety</p> <ul style="list-style-type: none"> • reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms • present reasoned explanations, including explaining data in relation to predictions and hypotheses
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		<p>and birth, to include the effect of maternal lifestyle on the foetus through the placenta</p> <ul style="list-style-type: none"> present observations and data using appropriate methods, including tables and graphs 			
<p>Links to Prior Learning:</p> <ul style="list-style-type: none"> identify that humans and some other animals have skeletons and muscles for support, protection and movement identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense describe the changes as humans develop to old age 	<p>Links to Prior Learning:</p> <ul style="list-style-type: none"> compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic 	<p>Links to Prior Learning:</p> <ul style="list-style-type: none"> compare how things move on different surfaces identify the effects of air resistance, water resistance and friction, that act between moving surfaces explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) explore and compare the differences between things that are living, dead, and things 	<p>Links to Prior Learning:</p> <ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram 	<p>Links to Prior Learning:</p> <ul style="list-style-type: none"> describe the difference between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) 	<p>Links to Prior Learning:</p> <ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and name a variety of common animals that are carnivores, herbivores and omnivores find out about and describe the basic needs of animals, including humans, for survival (water, food and air) construct and interpret a variety of food chains, identifying producers, predators and prey identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and

		<p>that have never been alive</p> <ul style="list-style-type: none"> • recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics • notice that animals, including humans, have offspring which grow into adults • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene • describe the changes as humans develop to old age 		<ul style="list-style-type: none"> • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • demonstrate that dissolving, mixing and changes of state are reversible changes 	<p>animals in their habitats, including microhabitats</p> <ul style="list-style-type: none"> • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • identify and describe the basic structure of a variety of common flowering plants, including trees • observe and describe how seeds and bulbs grow into mature plants • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal • describe the life process of reproduction in some plants and animals
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		<ul style="list-style-type: none"> describe the life process of reproduction in some plants and animals 			
<p>Key Assessment Pieces: Response Time: Mixed response exam questions</p> <p>Organisms 1 Quiz</p>	<p>Key Assessment Pieces: Response Time: Mixed response exam questions</p> <p>Reactions 1 Quiz</p>	<p>Key Assessment Pieces: Response Time: Planning an investigation, calculating speed using speed equation.</p> <p>Forces 1 Quiz</p> <p>Response Time: Calculating means and graph drawing</p> <p>Genes 1 Quiz</p>	<p>Key Assessment Pieces: Response Time: Graph drawing and conclusion</p> <p>Electromagnets 1 Quiz</p>	<p>Key Assessment Pieces: Response Time: Extended Response, Paul the particle</p> <p>Matter 1 Quiz</p>	<p>Key Assessment Pieces: Response Time: Sampling Practical – Carrying out investigation, observation and recording of results.</p> <p>Ecosystems 1 Quiz</p>
<p>Tier 3 Vocabulary Vault: Movement</p> <ul style="list-style-type: none"> Joints: Places where bones meet. Bone marrow: Tissue found inside some bones where new blood cells are made. Ligaments: Connect bones in joints. Tendons: Connect muscles to bones. Cartilage: Smooth tissue found at the end of bones, which reduces friction between them. Antagonistic muscle pair: Muscles working in unison to create movement. <p>Cells</p> <ul style="list-style-type: none"> Cell: The unit of a living organism, contains parts to carry out life processes. 	<p>Tier 3 Vocabulary Vault: Metals/non-metals</p> <ul style="list-style-type: none"> Metals: Shiny, good conductors of electricity and heat, malleable and ductile, and usually solid at room temperature. Non-metals: Dull, poor conductors of electricity and heat, brittle and usually solid or gaseous at room temperature. Displacement: Reaction where a more reactive metal takes the place of a less reactive metal in a compound. Oxidation: Reaction in which a substance combines with oxygen. Reactivity: The tendency of a substance to undergo a chemical reaction. 	<p>Tier 3 Vocabulary Vault: Speed</p> <ul style="list-style-type: none"> Speed: How much distance is covered in how much time. Average speed: The overall distance travelled divided by overall time for a journey. Relative motion: Different observers judge speeds differently if they are in motion too, so an object's speed is relative to the observer's speed. Acceleration: How quickly speed increases or decreases. <p>Gravity</p> <ul style="list-style-type: none"> Weight: The force of gravity on an object (N). Non-contact force: One that acts without direct contact. 	<p>Tier 3 Vocabulary Vault: Voltage and Resistance</p> <ul style="list-style-type: none"> Potential difference (voltage): The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V). Resistance: A property of a component, making it difficult for charge to pass through, in ohms (Ω). Electrical conductor: A material that allows current to flow through it easily, and has a low resistance. Electrical insulator: A material that does not allow current to flow easily, and has a high resistance. 	<p>Tier 3 Vocabulary Vault: Particle model</p> <ul style="list-style-type: none"> Particle: A very tiny object such as an atom or molecule, too small to be seen with a microscope. Particle Model: A way to think about how substances behave in terms of small, moving particles. Diffusion: the process by which particles in liquids or gases spread out through random movement from a region where there are many particles to one where there are fewer. Gas pressure: Caused by collisions of particles with the walls of a container. Density: How much matter there is in a particular volume, or 	<p>Tier 3 Vocabulary Vault: Interdependence</p> <ul style="list-style-type: none"> Food web: Shows how food chains in an ecosystem are linked. Food chain: Part of a food web, starting with a producer, ending with a top predator. Ecosystem: The living things in a given area, and their non-living environment. Environment: The surrounding air, water, and soil where an organism lives. Population: Group of the same species living in an area. Producer: Green plant or algae that makes its own food using sunlight. Consumer: Animal that eats other animals or plants.

<ul style="list-style-type: none"> • Uni-cellular: Living things made up of one cell. • Multi-cellular: Living things made up of many types of cell. • Tissue: Group of cells of one type. • Organ: Group of different tissues working together to carry out a job. • Diffusion: One way for substances to move into and out of cells. • Structural adaptations: Special features to help a cell carry out its functions. • Cell membrane: Surrounds the cell and controls movement of substances in and out. • Nucleus: Contains genetic material (DNA) which controls the cell's activities. • Vacuole: Area in a cell that contains liquid, and can be used by plants to keep the cell rigid and store substances. • Mitochondria: Part of the cell where energy is released from food molecules. • Cell wall: Strengthens the cell. In plant cells it is made of cellulose. • Chloroplast: Absorbs light energy so the plant can make food. 	<p>Acids and alkalis</p> <ul style="list-style-type: none"> • pH: Scale of acidity and alkalinity from 0 to 14. • Indicators: Substances used to identify whether unknown solutions are acidic or alkaline. • Base: A substance that neutralises an acid - those that dissolve in water are called alkalis. • Concentration: A measure of the number of particles in a given volume. • Hazard: anything that may cause injury 	<ul style="list-style-type: none"> • Mass: The amount of stuff in an object (kg). • Gravitational field strength, g: The force from gravity on 1 kg (N/kg). • Derive: calculate using measured data <p>Variation</p> <ul style="list-style-type: none"> • Species: A group of living things that have more in common with each other than with other groups. • Variation: The differences within and between species. • Continuous variation: Where differences between living things can have any numerical value. • Discontinuous variation: Where differences between living things can only be grouped into categories. <p>Human reproduction</p> <ul style="list-style-type: none"> • Gamete: The male gamete (sex cell) in animals is a sperm, the female an egg. • Fertilisation: Joining of a nucleus from a male and female sex cell. • Ovary: Organ which contains eggs. • Testicle: Organ where sperm are produced. 	<p>Current</p> <ul style="list-style-type: none"> • Negatively charged: An object that has gained electrons as a result of the charging process. • Positively charged: An object that has lost electrons as a result of the charging process. • Electrons: Tiny particles which are part of atoms and carry a negative charge. • Charged up: When materials are rubbed together, electrons move from one surface to the other. • Electrostatic force: Non-contact force between two charged objects. • Current: Flow of electric charge, in amperes (A). • In series: If components in a circuit are on the same loop. • In parallel: If some components are on separate loops. • Field: The area where other objects feel an electrostatic force. 	<p>how close the particles are.</p> <ul style="list-style-type: none"> • Evaporate: Change from liquid to gas at the surface of a liquid, at any temperature. • Boil: Change from liquid to a gas of all the liquid when the temperature reaches boiling point. • Condense: Change of state from gas to liquid when the temperature drops to the boiling point. • Melt: Change from solid to liquid when the temperature rises to the melting point. • Freeze: Change from liquid to a solid when the temperature drops to the melting point. • Sublime: Change from a solid directly into a gas. <p>Separating mixtures</p> <ul style="list-style-type: none"> • Solvent: A substance, normally a liquid, that dissolves another substance. • Solute: A substance that can dissolve in a liquid. • Dissolve: When a solute mixes completely with a solvent. • Solution: Mixture formed when a solvent dissolves a solute. • Soluble: (insoluble) Property of a substance 	<ul style="list-style-type: none"> • Decomposer: Organism that breaks down dead plant and animal material so nutrients can be recycled back to the soil or water. <p>Plant reproduction</p> <ul style="list-style-type: none"> • Pollen: Contains the plant male sex cells found on the stamens. • Ovules: Female sex cells in plants found in the ovary. • Pollination: Transfer of pollen from the male part of the flower to the female part of the flower on the same or another plant. • Fertilisation: Joining of a nucleus from a male and female sex cell. • Seed: Structure that contains the embryo of a new plant. • Fruit: Structure that the ovary becomes after fertilisation, which contains seeds. • Carpel: The female part of the flower, made up of the stigma where the Pollen lands, style and ovary.
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<ul style="list-style-type: none"> • Cytoplasm: Jelly-like substance where most chemical processes happen. • Immune system: Protects the body against infections. • Reproductive system: Produces sperm and eggs, and is where the foetus develops. • Digestive system: Breaks down and then absorbs food molecules. • Circulatory system: Transports substances around the body. • Respiratory system: Replaces oxygen and removes carbon dioxide from blood. • Muscular skeletal system: Muscles and bones working together to cause movement and support the body. • Prediction: statement that forecasts what would happen under particular conditions, based on scientific experiment and knowledge 		<ul style="list-style-type: none"> • Oviduct, or fallopian tube: Carries an egg from the ovary to the uterus and is where fertilisation occurs. • Uterus, or womb: Where a baby develops in a pregnant woman. • Ovulation: Release of an egg cell during the menstrual cycle, which may be met by a sperm. • Menstruation: Loss of the lining of the uterus during the menstrual cycle • Reproductive system: All the male and female organs involved in reproduction. • Penis: Organ which carries sperm out of the male's body. • Vagina: Where the penis enters the female's body and sperm is received. • Foetus: The developing baby during pregnancy. • Gestation: Process where the baby develops during pregnancy. • Placenta: Organ that provides the foetus with oxygen and nutrients and removes waste substances. • Amniotic fluid: Liquid that surrounds and protects the foetus. 		<p>that will (will not) dissolve in a liquid.</p> <ul style="list-style-type: none"> • Solubility: Maximum mass of solute that dissolves in a certain volume of solvent. • Pure substance: Single type of material with nothing mixed in. • Mixture: Two or more pure substances mixed together, whose properties are different to the individual substances. • Filtration: Separating substances using a filter to produce a filtrate (solution) and residue. • Distillation: Separating substances by boiling and condensing liquids. • Evaporation: A way to separate a solid dissolved in a liquid by the liquid turning into a gas. • Chromatography: Used to separate different coloured substances. 	
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<p>Reading Exposure: DEAR: Sabre Tooth Tiger Skeleton DARTs: Joints</p>	<p>Reading Exposure: DEAR: The Changing Colour of the Statue of Liberty</p>	<p>Reading Exposure: DEAR: Worms going to the ISS DARTs: Being an astronaut reading task</p> <p>DARTs: Biodiversity Reading Activity DARTs: Contraceptives DEAR: Breastfeeding During Lockdown DEAR: Contraception for Poorer Countries</p>	<p>Reading Exposure: DARTs: Circuit symbols DEAR: Grenfell Tower</p>	<p>Reading Exposure: DARTs: States of Matter DEAR: Desalinating Water</p>	<p>Reading Exposure: DEAR: How Humans Brought Change to a Tropical Paradise Red squirrel article</p>
<p>Strategies to enable new concepts, knowledge & skills to embed in long-term memory:</p> <ul style="list-style-type: none"> • Do it Now starter activities • Educake retrieval homework • Low-stakes quizzing • Practicals 	<p>Strategies to enable new concepts, knowledge & skills to embed in long-term memory:</p> <ul style="list-style-type: none"> • Do it Now starter activities • Educake retrieval homework • Low-stakes quizzing • Practicals 	<p>Strategies to enable new concepts, knowledge & skills to embed in long-term memory:</p> <ul style="list-style-type: none"> • Do it Now starter activities • Educake retrieval homework • Low-stakes quizzing • Calculations 	<p>Strategies to enable new concepts, knowledge & skills to embed in long-term memory:</p> <ul style="list-style-type: none"> • Do it Now starter activities • Educake retrieval homework • Low-stakes quizzing • Practicals 	<p>Strategies to enable new concepts, knowledge & skills to embed in long-term memory:</p> <ul style="list-style-type: none"> • Do it Now starter activities • Educake retrieval homework • Low-stakes quizzing • Modelling 	<p>Strategies to enable new concepts, knowledge & skills to embed in long-term memory:</p> <ul style="list-style-type: none"> • Do it Now starter activities • Educake retrieval homework • Low-stakes quizzing • Storyboarding

<ul style="list-style-type: none">• Interleaving Working Scientifically• Retrieval questions	<ul style="list-style-type: none">• True/false quizzes• Interleaving Working Scientifically• Retrieval questions	<ul style="list-style-type: none">• Matching activities• Practicals• Interleaving Working Scientifically• Retrieval questions	<ul style="list-style-type: none">• Interleaving Working Scientifically• Modelling• Retrieval questions	<ul style="list-style-type: none">• Videos• Practicals• Interleaving Working Scientifically• Retrieval questions	<ul style="list-style-type: none">• Practicals• Interleaving Working Scientifically• Retrieval questions
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