Science Curriculum Map

Science

Year Group		Autumn 1	Autumn 2	Autumn 2	Spring 1	Spring 1	Spring 2	Spring 2	Summer 1	Summer 1	Summer 2	Summer 2
Y7	KS3 spiral thematic topic	Science readiness	Space	Cells and genetics	Substances and particles	Cells and genetics	Substances, particles and chemical reactions	Forces and motion	Ecosystems and evolution	Substances and particles	Energy	Cells, genetics and health
	Topic	**Introduction to Science at LWS**	**Space**	**Cells and organisation**	**States of matter**	**Photosynthesis and plant structure**	**Atoms, elements, compounds, mixtures and the periodic table**	**Forces (contact and non-contact)**	**Food chains and ecosystems**	**Separating mixtures**	**Energy stores and transfers**	**Body systems: Part 1 (Skeletal and muscular)**
	Learning pathway	*How can we stay safe in a science lab? *How do you safely use a Bunsen burner *What is the scientific method? *What is a hypothesis? * Why do we make a hypothesis? *What is a method? * Why do we make a method? *What is a table for? *What is a graph for? *How do you draw a graph? * How do you write a	*Where are we in our solar system? *What else is in our solar system? *How big is the universe? *How do we get days, nights and seasons? *Do they have these on other planets? *What are the differences	*a cell is the smallest unit of life, but what happens when cells join together? *What is the order of hierarchy? * How are plant and animal cells structured? What are the functions of each part of a cell? * How are cells specialised depending on where you find them? *How do you use a microscope to see cells?	*What are particles? How are they arranged in solids, liquids and gases? *What happens to the particles if you apply heat (energy) or take away heat (energy)? *How do you make a solution? * Where do the particles go when you dissolve something? *What can speed up the rate of dissolving?	*How are plant cells structured? *What are the parts of a plant? *What is photosynthesis? *How can you represent it in an equation? *How do plants reproduce? *What do plants need to survive? *Investigation - What are the best conditions for plant growth?	*What are atoms? *Atoms make up elements *Who was Mendeleev? *How did he put the periodic table together? *What are the properties of metals and non-metals? *Compounds are elements chemically combined *Mixtures are elements and compounds mixed together *How can we separate compounds?	*What are forces? *What happens when they are unbalanced?* How can you calculate the resultant force? *What are contact forces? *What are non-contact forces? *What is friction? *What surfaces cause more friction? *What is air and water resistance? *Why are weight and mass different? *Is weight a force?	*Who eats who in a food chain? *Is there anything else a food chain represents? *Is there anything that animals need to compete for? *Is there anything plants need to compete for? *How do plants get their seeds away from them? *How can we investigate seed dispersal?	*Recap on what are compounds and mixtures. *How can mixtures be separated? *How can you separate mixtures with a sieve or a magnet? *How can you separate mixtures by filtering? *What do we mean by a residue? *What is evaporation? *How can evaporation help explain distillation? *What is chromatogr	*We are learning about the energy in food * What other stores of energy are there? *How can energy be transferred from one store to another? *How efficient are energy transfers? *What are the advantages and disadvantages of renewable energy?	*Recap on cells. *How do we go from cells to organ systems? *What body systems are there in an organism? *What is the purpose of the skeleton? *Why do we need muscles? *Can we control all of our muscles? *Why is the heart classed as a muscle? *How does the heart work in the circulatory system?

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		PEE sentence for a conclusion? *Use your previous knowledge on the scientific method and apply to a practical on parachutes	between natural and manmade satellites? *What does our moon do? *Why does it look different in the sky? *What is gravity like on other planets? *Are gravity and mass different?	*How can you make a slide to use under a microscope? *How can you calculate the size of a cell based on the size of the image?						aphy?		
	Topic vocabulary	Independent variable, dependent variable, control variables, reliable, valid, fair test, reproducible, repeatable, hypothesis, conclusion, explanation	Moon, solar system, universe, tile, gravity, mass, weight, seasons elliptical	Animal cell, plant cell, specialised cell, nucleus, cell membrane, cell wall, vacuole, mitochondria, ribosomes, function, cytoplasm, chloroplasts	Particles, solids, liquid, gas, vibrate, freeze, melt, evaporate, condensation, physical, temperature, bonding	Photosynthesis, structure, carbon dioxide, oxygen, cells, germination, reproduction, seeds	Atom, periodic table, element, compound, mixture, particles, combined	Force, balanced forces, unbalanced forces, resultant force, gravity, air resistance, water resistance, upthrust, friction	Producer, consumer, food chain, food web, population, model, ecosystem, predator, prey, competition, dispersal	Mixture, compound, filtering, distillation, chromatography, evaporation, separation	Chemical, thermal, light, kinetic, gravitational potential, renewable, turbines, geothermal, efficiency, solar, biomass, calories	Skeleton, muscle, antagonistic, heart, circulatory system, organ, cells
	Disciplinary literacy link											

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	SMSC/International dimension link to build cultural capital	SMSC: Spiritual - How to keep yourself safe whilst being in a laboratory.	SMSC: Spiritual - With the Universe being so big, where do we fit in? Moral - Feeling significant with the enormity of space around us.	SMSC: Moral -	SMSC: Moral - Atoms make up the entire universe.			SMSC Cultural - How do different cultures work together to create the model of the force of gravity Social - Why do we need speed limits for methods of transportation?	SMSC: Social - How can knowledge of how seeds spread be used to maximise how many plants we can get for food?	SMSC: Moral - Atoms make up the entire universe. Social - How can we use separating techniques to help make water clean for all to drink?	SMSC: Moral - What responsibility do we have to make all energy resources renewable? Social - How can we take renewable resources and ensure they are affordable to all to use?	SMSC: Cultural - Religious beliefs on how the body works and should be treated. Beliefs on how to treat animals before eating them. Social - How do we look after our own bodies?
	Horizon Skills (Link to careers)											Grow throughout life
	Knowledge and skills	Pupils should be taught to: * Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility *Understand that scientific methods and theories develop as earlier explanations are	Pupils should be taught to: * Order of the planets in our solar system * Varying size order from satellite to known Universe * The light	Pupils should be taught to: * Cells are the basic fundamental unit of a living organism * Use a light microscope to observe cells * The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondri	Pupils should be taught: * The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure * Similarities and differences, including density	Pupils should be taught: * Recap on a basic plant cell and specialised plant cells (root hair cell) * Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots *How plants require sunlight,	Pupils should be taught: *A simple (Dalton) atomic model *The differences between atoms, elements and compounds *Chemical symbols and formulae for elements and compounds *The varying physical and chemical properties of different elements (specifically	Pupils should be taught: *Forces as pushes or pulls, arising from the interaction between two objects. *Forces can change the speed, shape or direction of an object *Using force arrows in diagrams, adding forces in one dimension, to show the direction of the force.	Pupils should be taught: *Producers are organisms that can make their own food, including plants and some microorganisms. *Consumers (e.g. humans and other animals) cannot make their own food; they get their food by eating other organisms. *A food chain diagram	Pupils should be taught: *Recap on the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure. *Recap on the changes of state in terms of the particle	Pupils should be taught: *The different types of energy stores *About the conservation of energy *Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a	Pupils should be taught: *The structural adaptations of some unicellular organisms (recap) *The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms (recap) *The skeletal and muscular

		modified to take account of new evidence and ideas, together with the importance of publishing results and peer review * Evaluate risks ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience * Make predictions using scientific knowledge and understanding *Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent	year as a unit of astronomical distance * Our Sun as a star, other stars in our galaxy, as well as presence of other galaxies * A day being how long it takes for one rotation of a planet (on Earth - 24 hours) * The seasons and the Earth's tilt, day length at different times of year, in different hemispheres * Gravity force, weight = mass x	a and chloroplasts * The similarities and differences between plant and animal cells * The role of diffusion in the movement of materials in and between cells * The structural adaptations of some unicellular organisms * The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms	differences, between solids, liquids and gasses *Changes of state in terms of the particle model * Conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving * 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 * Changes with temperatur	water and carbon dioxide for photosynthesis to take place *The products of photosynthesis, and a word summary for photosynthesis *Plants are an essential energy store and are needed to maintain levels of oxygen and carbon dioxide in the atmosphere *Respiration occurs in both plants and animals *How water and nutrients are transported around plants via the xylem and phloem *The dependence of almost all life on Earth on the ability of photosynthetic organisms, *The role of leaf stomata in gas exchange in plants	group 1, group 7 and group 0 *The principles underpinning the Mendeleev Periodic Table *The development of the modern periodic table *The Periodic Table: periods and groups; metals and non-metals *How patterns in reactions can be predicted with reference to the Periodic Table *The properties of metals and non-metals	*Balanced forces (either stationary or moving at a steady speed) *Unbalanced forces (accelerating or decelerating) *Friction between surfaces *Resistance to motion of both air and water. *Non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity *Newton's third law: For every action there is an opposite or equal reaction *Forces measured in newtons, measurements of stretch or compression as force is changed force-extension linear relation; Hooke's Law as a special case	shows the feeding relationships between populations of organisms. *The arrows in a food chain diagram represent transfers of biomass. *A change in the size of a population will affect other populations in the food chain.	model *Recap on atoms and molecules as particles *Recap of diffusion in terms of the particle model *Recap of diffusion in liquids and gases driven by differences in concentrationRecap on the concept and identification of a pure substance *The simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography	change *That energy is transferred from one store to another *Processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels *Comparing energy values of different foods (from labels) (kJ) *Not all energy in an energy transfer is useful. *How a Sankey diagram represents the transfer of energy *How to calculate the efficiency of an energy transfer *How can	systems are organ systems. *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 *The introduction of the heart as a muscle, and how it works alongside the circulatory system

		, dependent and control variables, where appropriate *Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety * Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements *Apply sampling techniques apply mathematical concepts and calculate results * Present observation	gravitational field strength (g), on Earth g = 10N/kg, different on other planets and stars. * Gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)		e in motion and spacing of particles * Internal energy stored in materials *Energy changes on changes of state * The concept of a pure substance * The identification of pure substances * Brownian motion in gases *Diffusion in terms of the particle model *Diffusion in liquids and gases driven by differences in concentration *Mixtures, including dissolving	*Reproduction in plants, including methods such as wind and insect pollination. * Fertilisation and the development of fruit and seeds		*Weight as force and how it is calculated			homes lose thermal energy, and what can be done to make them more efficient	

		s and data using appropriate methods, including tables and graphs * Interpret observation s and data, including identifying patterns and using observation s, measureme nts and data to draw conclusions * Present reasoned explanation s, including explaining data in relation to predictions and hypotheses *Evaluate data, showing awareness of potential sources of random and systematic error * Identify further questions arising from their results *Understan d and use SI units and IUPAC (Internation										

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		al Union of Pure and Applied Chemistry) chemical nomenclature * Use and derive simple equations and carry out appropriate calculations * Undertake basic data analysis including simple statistical techniques										
	Assessment	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic Summative assessment of all learning up to this point	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic Summative assessment of all learning up to this point	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic Summative assessment of all learning up to this point

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Y8	KS3 spiral thematic topic	Cells, genetics and health	Earth chemistry and substances	Electricity	Health	Particles and chemical reactions	Energy	Cells, genetics and health	Earth chemistry and substances	Matter and energy	Cells and evolution	Earth Chemistry	Waves
	Topic	Body systems: Part 2 (Ventilation and digestion)	Properties of metals and non metals	Electricity (series and parallel circuits)	Health and disease	Chemical vs physical changes and rates of reactions	Energy resources (renewable and non-renewable)	Human reproduction	Acids and alkalis	Particle model of matter (including heat transfer)	Cells and DNA	Earth and the atmosphere	Waves (light and sound)
	Learning pathway												
	Topic vocabulary												
	Disciplinary literacy link												
	SMSC/International dimension link to build cultural capital												
	Horizon Skills (Link to careers)												
	Knowledge and skills												
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Y9	KS3 spiral thematic topic	Cells and health	Chemical reactions	Electricity	Cells, genetics and evolution	Ecosystems	Forces and motion	Cells, genetics and evolution	Particles and chemical reactions	Electricity and magnetism	Chemical reactions and energy	Earth chemistry	Waves and matter
	Topic	Respiration and gas exchange	The reactivity series	Electricity calculations	Inheritance and variation	Ecosystems and interdependence	Motion and pressure	Evolution, natural selection and adaptations	Atomic structure	Magnets and electromagnets	Fuels, combustion and burning	Materials: Extracting metals and recycling	Radiation
	Learning pathway												
	Topic vocabulary												
	Disciplinary literacy link												
	SMSC/International dimension												

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	link to build cultural capital												
	Horizon Skills (Link to careers)												
	Knowledge and skills												
	Assessment	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic Summative assessment of all learning up to this point	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic Summative assessment of all learning up to this point	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic	Exam style questions given informally (answers/scores recorded for monitoring and QLA). Exit ticket at the end of the topic Summative assessment of all learning up to this point