Year 9 Curriculum Implementation: Science

	Autumn	Spring	Summer
Knowledge & Skills	**Chemical Reactions 2** • The law of conservation of mass • Writing symbol equations • Alkali Metals • Halogens • Investigating reactivity of metals • Metals & Acids • Neutralisation • Displacement • Using carbon to extract metals • Comparing the properties and uses of ceramics, polymers and composites **Photosynthesis** • Photosynthesis as a chemical reaction – the products and reactants • Testing a leaf for starch practical • Structure of a leaf • The role of stomata • Plant minerals and what they are needed for • Chemosynthesis – what is it and how does it compare to photosynthesis **Forces & Motion** • Balanced & unbalanced forces • Calculating work done • Force multipliers – what they are, what they do and examples • Calculating moments • Newton's Law • Forces when stopping • Interpreting distance/time graphs • Relative motion • Using significant figures	**Genetics & Evolution** • Variation – types and what causes it • Variety & biodiversity • Charles Darwin & natural selection • DNA – what is it, where is it found, what does it do • DNA extraction practical • Family Traits • Hereditary material • Selective breeding – what is it, how does it occur, examples of • Genetic engineering - what is it, how does it occur, examples of • Evolution and extinction **Earth & Atmosphere** • Rock types – structure and comparisons • Rock cycle • Igneous rock crystal practical • Earth's structure • Earth's atmosphere • Carbon cycle • Fossil fuels – how they are made and their uses • Greenhouse effect • Global warming – causes and effects • Acid rain – causes and effects • Energy Resources **Ecosystems** • Creating and interpreting food chains • Food webs & accumulation of toxins • Organisms & their environment • Sampling techniques – fieldwork practical • Limited resources research and presentation	**Astronomy & Space** • The Big Bang • History of the solar system • Animal astronauts & the space race • Telescopes & satellites • Stars & constellations • Black Holes • The future of the universe **GCSE Bridging Units** **Cell Biology** • Animal & plant cells • Microscopy • Eukaryotic & prokaryotic • Cell specialism **Atoms** • Structure of the atom • Elements & compounds • Electron configuration • History of the atom **Physics** • Greek symbols • SI units • Energy stores & transfers • Conservation of energy • Non renewables & power stations • Renewable energy resources **Working Scientifically** • Errors • Reproducible, Repeatable and Reliable • Accuracy & precision • Unit prefixes & converting units
Links to prior learning	Year 3 Plants • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants. • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Year 5 Forces • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • Recognise that some mechanisms, including levers, pulleys, and gears, allow a smaller force to have a greater effect. Year 7 Forces • forces as pushes or pulls, arising from the interaction between two objects • using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces • moment as the turning effect of a force • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water • forces measured in newtons, measurements of stretch or compression as force is changed • force-extension linear relation; Hooke's Law as a special case • work done and energy changes on deformation • non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity.	Year 6 Evolution & Inheritance • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Year 3 Rocks • Compare and group together different kinds of rocks based on their appearance and simple physical properties. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Recognise that soils are make from rocks and organic matter. Year 4 Living things & Their Habitats • Recognise that living things can be grouped in a variety of ways. • Recognise that environments can change and that this can sometimes pose dangers to living things. Year 4 Animals including humans • Construct and interpret a variety of food chains, identifying producers, predators, and prey.	Year 5 Earth & Space • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth, and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Year 7 Space • gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) • our Sun as a star, other stars in our galaxy, other galaxies • the seasons and the Earth's tilt, day length at different times of year, in different hemispheres • the light year as a unit of astronomical distance

Assessment	• Chemical Reactions 2 prior knowledge quiz • Chemical Reactions formative assessment • Photosynthesis prior knowledge quiz • Photosynthesis formative assessment • Chemical Reactions & Photosynthesis assessment (when both units completed) • Forces & Motion prior knowledge quiz • Forces & Motion formative assessment	• Genetics & evolution prior knowledge quiz • Genetics & evolution formative assessment • Forces & Motion and Genetics & Evolution assessment (when both units completed) • Earth & Atmosphere prior knowledge quiz • Earth & Atmosphere formative assessment • Earth & Atmosphere and Ecosystems assessment (when both units completed) • School Assessment Week Summative Assessment	• Space formative assessment • Cell Biology Formative Assessment • Atomic Structure Formative Assessment • Energy Formative Assessment
Home learning	• Key word spellings and definitions • Educake quiz • Retrieval Practice sheets • Plants are producers article • Xylem & Phloem article	• Key word spellings and definitions • Educake quiz • Retrieval Practice sheets • Endangered species article • Atmospheric layers article • Water Cycle article • Water, water everywhere article	• Key word spellings and definitions • Educake quiz • Retrieval Practice sheets
Cultural Capital and extra-curricular opportunities	• KS3 STEM club	• KS3 STEM club • British Science Week Activities • Science House Cup Challenge • Year 9/10 trip to Iceland or Geneva	• KS3 STEM club • KS3 trip to Manchester Museum of Science & Industry
Literacy	• Key word spellings and definitions • Science story – Sheffield Steel • Science story – Discovery of photosynthesis • Science story – The laws of motion	• Key word spellings and definitions • Science story – Jumping Genes • Science story – Greta Thunberg • Science story – Convincing the world about bioaccumulation	• Key word spellings and definitions • Science story – Getting into Space • Science story – Reaching the moon
Numeracy	• Calculating work done • Using equations • Calculating stopping distances • Calculating speed • Interpreting distance time graphs	• Analysing data • Interpreting graphs	• Converting units • Calculating magnification • Electron configuration
Careers Information, Education, Advice and Guidance (CEIAG)	• Metallurgist reading comprehension • Botanist reading comprehension • Air traffic controller reading comprehension	• Forensic scientist lesson • Genetic counsellor reading comprehension • Mining Geologist reading comprehension • Environmental health officer lesson • Conservation scientist reading comprehension	• Astronauts • Aeronautical Engineer
Spirituality	• Respect for the environment – the plant Kingdom • Stewardship of the Earth	• Empathy and compassion for others when discussing genetics	• Reflection on our place in the world, solar system and universe
How can parents support the curriculum?	• Test the key words and definitions • Encourage students to use the knowledge organiser	• Test the key words and definitions • Encourage students to use the knowledge organiser	• Test the key words and definitions • Encourage students to use the knowledge organiser • Watch ‘Hidden Figures’ movie together