# Curriculum map: Science

| TERM | YEAR 7 | YEAR 8 | YEAR 9 |
|---|---|---|---|
| AUTUMN 1 | **WORKING SCIENTIFICALLY SKILLS**<br>▪ Safety in the lab and hazard symbols<br>▪ Science apparatus<br>▪ The Bunsen Burner<br>▪ Variables, units and conversions<br>▪ Tables<br>▪ Graphs<br>▪ Planning investigations<br>▪ Practical investigations<br>▪ **BASELINE ASSESSMENT**<br><br>**ECOSYSTEMS: INTERDEPENDENCE & PLANT REPRODUCTION**<br>▪ Adaptations of plants and animals<br>▪ Adaptations to feeding<br>▪ Food chains and food webs<br>▪ Effects of toxins in the environment<br>▪ Importance of insects<br>▪ Ecological balance<br>▪ Structure of flowering plants<br>▪ Insect and wind pollination – seed and fruit formation<br>▪ Fertilisation in plants<br>▪ Seed dispersal and its effectiveness | **WORKING SCIENTIFICALLY SKILLS**<br>▪ Planning investigations<br>▪ Practical investigations<br>▪ Tables and graphs<br>▪ Analysis of results and interpreting data<br>▪ Evaluation of practical investigations<br><br>**MATTER: PERIODIC TABLE & ELEMENTS**<br>▪ Atomic theory<br>▪ Periodic table of elements<br>▪ Metals in the periodic table<br>▪ Non-metals in the periodic table<br>▪ Analysing wider patterns within the periodic table<br>▪ Compounds and chemical formulae<br>▪ Word and symbol equations<br>▪ Polymers<br>▪ Ceramics and composites | **FORCES: CONTACT FORCES & PRESSURE**<br>▪ Forces: contact and non-contact<br>▪ Balanced and unbalanced forces<br>▪ Stretching materials and applications of elastic materials<br>▪ Hooke's law<br>▪ Deformation and compression<br>▪ Pressure and calculating pressure<br>▪ Pressure in liquids and gases<br>▪ Sinking, floating and upthrust<br><br>**GENES: EVOLUTION & VARIATION**<br>▪ Natural selection<br>▪ Biodiversity and the importance of biodiversity<br>▪ Extinction and causes of extinction<br>▪ Nature of genetic material – chromosomes, genes, DNA structure<br>▪ Genetic mutations<br>▪ Variation between organisms<br>▪ Gregor Mendel and monohybrid crosses |

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| TERM | YEAR 7 | YEAR 8 | YEAR 9 |
|---|---|---|---|
| AUTUMN 2 | **MATTER: PARTICLE MODEL & SEPARATING MIXTURES**<br>▪ Particles to explain matter<br>▪ Properties of solids, liquids and gases<br>▪ Particle model of solids, liquids and gases<br>▪ Solids and alloys<br>▪ Changes of states<br>▪ Diffusion<br>▪ Dissolving and factors effecting dissolving<br>▪ Separating mixtures<br>▪ Distillation<br>▪ Chromatography<br><br>**ORGANISMS: MOVEMENT & CELLS**<br>▪ 'MRS GREN'<br>▪ Identification of different parts of animal and plant cells and their functions<br>▪ Specialised cells - adaptations and functions<br>▪ Microscopes and magnification (image size / object size)<br>▪ Unicellular organisms<br>▪ Tissues, organs and organ systems<br>▪ Drugs and how they affect body systems<br>▪ Human skeleton<br>▪ Role of joints and muscles<br>▪ Examining interacting muscles<br>▪ Problems with the skeletal system | **ORGANISMS: BREATHING & DIGESTION**<br>▪ Structure and function of the lungs<br>▪ Measuring breathing<br>▪ Gas exchange in humans<br>▪ Effects of disease and lifestyle<br>▪ Identifying food groups<br>▪ Describing food tests and making observations<br>▪ Balanced diet and analysing nutritional content in a meal<br>▪ Effects of an unbalanced diet and health risks including obesity, starvation and deficiency diseases<br>▪ Parts of the digestive system and how food is digested<br>▪ How food is absorbed in the small intestine and the structure of the villi<br>▪ Function of enzymes<br>▪ Effect of temperature and pH on enzymes<br><br>**ENERGY: WORK, HEATING & COOLING**<br>▪ Work done – energy transferred<br>▪ Levers and simple machines<br>▪ Difference between temperature and thermal energy<br>▪ Conduction<br>▪ Convection<br>▪ Radiation<br>▪ Application to real life designs<br>▪ Difference between conductors and insulators and practical applications – how insulators reduce conduction, convection and radiation<br>▪ Interpreting cooling curves | **REACTIONS: CHEMICAL ENERGY & TYPES OF REACTIONS**<br>▪ Conservation of mass<br>▪ Word and symbol equations<br>▪ Exothermic and endothermic reactions<br>▪ Comparing endothermic and exothermic changes – energy changes during a reaction<br>▪ Catalysts<br>▪ Combustion<br>▪ Use of fuels – applications of combustion reactions<br>▪ Thermal decomposition<br>▪ Observing and explaining mass changes for chemical and physical reactions |

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| TERM | YEAR 7 | YEAR 8 | YEAR 9 |
|---|---|---|---|
| SPRING 1 | **ENERGY: ENERGY TRANSFER & ENERGY COSTS**<br>▪ Energy stores and the 4 transfer mechanisms<br>▪ Conservation of energy<br>▪ Drawing and interpreting energy transfer diagrams<br>▪ Energy change (unit conversions and comparison of energy at the start and end of a system)<br>▪ Drawing and interpreting Sankey diagrams and calculating efficiency (useful energy output / total energy input)<br>▪ Fossil fuels and renewable energy resources, including advantages and disadvantages<br>▪ Application of equations to calculate the cost of electricity<br>▪ Using electricity responsibly<br><br>**GENES: VARIATION & HUMAN REPRODUCTION**<br>▪ Variation: continuous / discontinuous<br>▪ Causes of variation: genetic and/or environmental<br>▪ Importance of variation<br>▪ Human reproductive systems<br>▪ Fertilisation<br>▪ Menstruation cycle<br>▪ Pregnancy and the role of the placenta<br>▪ Fertility and contraception<br>▪ Smoking in pregnancy | **ECOSYSTEMS: RESPIRATION & PHOTOSYNTHESIS**<br>▪ Aerobic respiration<br>▪ Anaerobic respiration<br>▪ Fermentation<br>▪ Comparing aerobic and anaerobic respiration<br>▪ Photosynthesis<br>▪ Internal structure of a leaf and adaptations<br>▪ Movement of water and minerals in plants<br>▪ Importance of minerals to plants<br><br>**WAVES: SOUND & LIGHT**<br>▪ Definition of sound and how it is created<br>▪ Sound as a longitudinal wave<br>▪ Pitch, frequency, amplitude and wavelength<br>▪ Parts of the ear and how we hear<br>▪ Effect of loudness on hearing<br>▪ Calculating the speed of sound<br>▪ Reflection and absorption of sound | **ELECTROMAGNETS: MAGNETISM & ELECTROMAGNETISM**<br>▪ Properties of magnets<br>▪ Magnetic fields<br>▪ Electromagnets and factors that affect the strength of an electromagnet<br>▪ Applications of electromagnets<br><br>**WAVES: WAVE EFFECTS & WAVE PROPERTIES**<br>▪ Sound waves<br>▪ Ultrasound and practical applications of ultrasound<br>▪ Sound systems – microphone loudspeaker<br>▪ Light and UV light<br>▪ Uses of UV light<br>▪ Comparing transverse and longitudinal waves<br>▪ Water waves to model behaviour – reflection and absorption |

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|---|---|---|---|
| SPRING 2 | **ELECTROMAGNETS: CURRENT, VOLTAGE & RESISTANCE**<br>▪ Circuit symbols and electric circuits<br>▪ Measuring current<br>▪ Measuring potential difference (voltage)<br>▪ Series and parallel circuits<br>▪ Measuring resistance<br>▪ Calculating resistance<br>▪ Static electricity and dangers of electricity<br>▪ Electric fields<br><br>**REACTIONS: METAL AND NON-METALS & ACIDS AND ALKALIS**<br>▪ Metals and non-metals<br>▪ Reactions of metals and acids<br>▪ Displacement reactions<br>▪ Oxidation reactions<br>▪ Acids and sources of acids in food and drink<br>▪ Alkalis<br>▪ Testing for acids and alkalis, including strength<br>▪ Neutralisation<br>▪ Investigating neutralisation<br>▪ Reactions of metal carbonates and acids | **WAVES: SOUND & LIGHT (CONTINUED)**<br>▪ Luminous and non-luminous objects<br>▪ Opaque, transparent and translucent objects<br>▪ Difference between scattering and specular reflection<br>▪ How shadows are formed<br>▪ Use of a ray diagram to explain the path of light<br>▪ Reflection and mirrors<br>▪ Law of reflection<br>▪ Lateral inversion and virtual images<br>▪ Refraction and application of refraction to lenses<br>▪ Parts of the eye and their functions<br>▪ Focussing of light through a convex lens<br>▪ Dispersion<br>▪ Primary and secondary colours<br>▪ Explaining how light of different wavelengths can be split and recombined<br>▪ Use of light in communication<br><br>**EARTH: EARTH STRUCTURE**<br>▪ Structure of the Earth and describing composition of each part of the Earth<br>▪ How volcanoes change the Earth<br>▪ Naming the three different types of rocks and how they are formed<br>▪ Describing physical and chemical weathering<br>▪ Rock cycle<br>**EARTH: UNIVERSE**<br>▪ Describing stars and galaxies<br>▪ Day and night<br>▪ Seasons<br>▪ State that the light year is used to measure astronomical distances<br>▪ Moon and causes of change to the appearance<br>▪ Science models | **ORGANISATION**<br>▪ Cell organisation<br>▪ Digestive system<br>▪ Food tests<br>▪ Enzymes and their properties<br>▪ Conditions for enzyme activity<br>▪ Enzymes and digestion<br>▪ The heart and the circulatory system, including pacemakers<br>▪ Blood vessels<br>▪ Blood<br>▪ Cardiovascular diseases<br>▪ Stents and statins<br>▪ Artificial hearts<br>▪ The structure of the lungs and the breathing system<br>▪ Health and disease<br>▪ Communicable and non-communicable diseases<br>▪ Cancer<br>▪ Plant cell organisation<br>▪ Transpiration and translocation<br>▪ Transpiration and stomata<br>▪ Active transport |

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|---|---|---|---|
| SUMMER 1 | **FORCES: SPEED & GRAVITY**<br>▪ Speed and calculating speed<br>▪ Motion graphs: distance-time graphs and velocity-time graphs<br>▪ Investigating motion<br>▪ Relative motion<br>▪ Introduction to forces<br>▪ Mass and weight<br>▪ Gravity<br>▪ Calculating weight (W = mg) | **EARTH: CLIMATE CHANGE & EARTH RESOURCES**<br>▪ Composition of the atmosphere<br>▪ How carbon can be recycled<br>▪ How humans affect the carbon cycle<br>▪ Global warming<br>▪ Exploring damage to the Earth's resources<br>▪ Importance of recycling<br>▪ Metal extraction | **ATOMS**<br>▪ Atomic structure<br>▪ Atomic theory changes<br>▪ Periodic table<br>▪ Elements and compounds<br>▪ Word and symbol equations<br>▪ Mixtures and separation techniques<br>▪ Metals and non-metals<br>▪ Group 1<br>▪ Group 0<br>▪ Group 7<br>▪ Transition metals |
| SUMMER 2 | **BRONZE CREST AWARD (STEM) / WORKING SCIENTIFICALLY PROJECTS**<br>▪ Planning investigations independently<br>▪ Practical investigation<br>▪ Interpretation of data collected and analysis<br>▪ Evaluation<br>▪ Communication of ideas, methodology, conclusions and evaluation of projects | **SILVER CREST AWARD (STEM) / WORKING SCIENTIFICALLY PROJECTS**<br>▪ Planning investigations independently<br>▪ Practical investigation<br>▪ Interpretation of data collected and analysis<br>▪ Evaluation<br>▪ Communication of ideas, methodology, conclusions and evaluation of projects | **MATHS IN SCIENCE SKILLS**<br>▪ Units and conversions<br>▪ Standard form<br>▪ Equations and rearranging equations<br>▪ Interpreting data: tables and graphs |