Science

CURRICULUM OVERVIEW – YEAR 7 (KS3)

Maximise our potential, to be the best we can be, every day.

Curriculum Overview

Subject: KS3 Science

Year group	Topic and length	Key Words	Key Skills	Key Knowledge	Assessments	Cultural Capital	Links to NC and Spec
7	How to be a Scientist 10 hours	Variables Method Results Reliability Conclusion Evaluation Equipment Health Safety	**WS-** Recognising practical equipment, diagrams, health and safety in a laboratory **Maths-** measuring, graphs, calculating average **Literacy & communication**- subsections for writing up practical investigations and scientific terminology	Students should recognise, draw and use some common practical equipment. They should be able to record quantitative and qualitative results and discuss the meaning of them.	Baseline assessment meeting new Trust KS3 criteria	Recognising hazards and how to keep safe.	Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety. This unit also focuses on the aim to 'equip students with the scientific knowledge required to understand the uses and implications of science, today and for the future'.

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7	8. Organisms (Part 1) 12 hours	Antagonistic muscle pair Bone Bone marrow Cartilage Cell Concentration Diffusion Joints Ligaments Microscope Muscular skeletal system Nucleus Organ Organism Organ system Skeleton Specialised cell Tendons Tissue	• Model muscular and skeletal interaction using real examples. • Interpret structures and models of key scientific concepts. • Communicate ideas.	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	What are we made of? What happens inside of us? Why should we look after our bodies and what happens if we don't? Why do scientists use microscopes and how do they work?	• 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 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

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7	1. Forces (Part 1) 12 hours	Acceleration Air resistance Balanced Contact force Deceleration Distance-time graph Field Force	• Identify the variables in a given method • Select appropriate apparatus for making measurements	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to	How do objects move? What is a force? How can we change how quickly objects move?	• 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

		Friction Gravity Gravitational force Interaction pair Kilograms Mass Newton Non-contact Pull Push Relative motion Resultant force Speed Unbalanced Weight	• Collect and process results, and choose to present the data as a suitable graph • Write conclusions based on results obtained or secondary data provided, and relate results to predictions/ hypothesis • Use and rearrange equations to perform calculations, using SI units where appropriate. • Formulate a hypothesis and make a prediction.	measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	Why is it harder for some objects to move than others? Why do objects fall? What is speed? What will happen if multiple forces are applied to an object?	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 Science – key stage 3 11 • non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity

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7	5. Matter (Part 1) 12 hours	Boiling point Chromatography Condensation Diffusion Dissolve Distillation Evaporation Filtration Freezing Impure substance Melting point Mixture Property Pure substance Saturated solution Substance Soluble Solubility Solute Solution Solvent	• Analyse patterns • Discuss limitations • Draw conclusions • Present data • Estimate risks • Collect data • Graph skills	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	How do we separate salt from sand? Why do some substances change state quicker than others? How do we separate solids from liquids? How do we separate liquids from other liquids? How can we investigate crime scenes or identify food colouring ingredients?	• 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 • mixtures, including dissolving • diffusion in terms of the particle model • simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography • the identification of pure substances

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7	10. Genes (Part 1) 12 hours	Adaptation Adolescence Cervix Egg cell Embryo Fertilisation Fetus Gametes Gestation Implantation Menstrual cycle Ovary Oviduct Ovulation Penis Period Placenta Puberty Reproductive system Scrotum Sex hormones Species Sperm cell Sperm duct Testicles Umbilical cord Urethra Uterus Vagina Variation	• Communicate ideas • Construct explanations • Analyse diagrams/models • Justify opinions • Review theories • Examine consequences	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	How are babies made? How are seeds made? Why do living things have a reproductive system? What happens during gestation? Appreciation for the influence of genetics in ecosystems – variation and adaptations.	• 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 and birth, to include the effect of maternal lifestyle on the foetus through the placenta • reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

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7	2. Electromagnets (Part 1) 12 hours	Ammeter Atom Attract Battery Cell Conductor Current Electrons Electric charge Insulator Neutral Neutron Parallel Potential difference Protons Repel resistance Series Voltmeter	• Calculations and rearranging equations • Use diagrams to visualise scientific equipment • Evaluate the effectiveness of specific models	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	Looking at the concept of electricity in our everyday lives. Where does electricity in our home come from? Links to environmental impact of energy sources and the concept of wasteful energy.	• electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • differences in resistance between conducting and insulating components (quantitative)

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7	7. Earth (Part 1) 12 hours	Asteroid belt Artificial satellite Axis Crust Deposition Durable Dwarf planet Galaxy Gas giant Igneous rock Lava Inner core Magma Mantle Metamorphic rock Milky way Natural satellite Outer core Orbit Phases of the moon Planet Porous Rock cycle Season Sediment Sedimentary rock Solar system Star	• Use diagrams to visualise scientific concepts. • Analyse models of scientific concepts. • Review scientific theories. • Analyse patterns • Draw conclusions.	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	Gravity in space. Our Sun as a star, other stars in our galaxy, other galaxies. Looking at how technological developments have increased our knowledge of the Solar system. What is the Earth made up of? How are rocks made? How can rocks change into other types of rock?	• the composition of the Earth • the structure of the Earth • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks • Earth as a source of limited resources and the efficacy of recycling • 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

		Sun Universe Year				

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7	3. Energy (Part 1) 12 hours	Chemical Dissipated Efficiency Elastic potential Energy Energy resources Fossil fuels Gravitational potential Joules Kinetic Kilojoules Law of conservation of energy Non-renewable Power Renewable Thermal Watts	• Examine consequence • Analyse patterns • Draw conclusions • Discuss limitations • Collect data/practical skills relating to conduction and convection.	~45 mark end of topic test with review action points for pupils to act on upon reflection Think pink/go green task to measure the understanding of topic key skills. Weekly Seneca homework to review concepts from this topic.	Where does electricity in our home come from? References to energy in our food and energy needed to power our homes and modes of transport. Links to environmental impact of energy sources and the concept of wasteful energy.	• comparing energy values of different foods (from labels) (kJ) • comparing power ratings of appliances in watts (W, kW) comparing amounts of energy transferred (J, kJ, kW hour) • domestic fuel bills, fuel use and costs • other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. Changes in systems • energy as a quantity that can be quantified and calculated; the total

						energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes