

Science at Compass School Southwark
2022 - 2023

| Year 7 | | | | | | |
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| | HT1 Topic/Unit: Particles (Chemistry) | HT2 Topic/Unit: Forces (Physics) | HT3 Topic/Unit: Interdependence and cells (Biology) | HT4 Topic/Unit: Types of reaction and the periodic table (Chemistry) | HT5 Topic/Unit: Energy (Physics) | HT6 Topic/Unit: Reproduction and Variation (Biology) |
| Key Content: | <ol style="list-style-type: none"> Routines and Expectations (optional) Variables Accuracy Equipment Following a method Drawing graphs Maths in Science States of matter (inc. density) Changes of state Melting and boiling points (Practical) Expansion and contractions (Demonstration) Brownian Motion and the particle model (Demonstration) Types of transport Atoms and elements Compounds and mixtures Symbols and formulae Atomic Structure | <ol style="list-style-type: none"> Identifying forces – contact vs non-contact Balanced and unbalanced forces Resultant force Friction- advantages and disadvantage Streamlining- everyday examples and linked to particles (EXT) (Practical) Speed calculations Distance- time graphs Velocity-time graphs Hooke's Law- (Practical) Moments Gravity, weight, and mass Solar system Day and night Seasons Galaxies and universe Light year | <ol style="list-style-type: none"> Living things: MRS NERG 5 Kingdoms and classes Classification and keys Food chains Food webs Pyramids of numbers Environment and habitats Competition (Practical) Microscopes Animal cells (Practical) Plant cells (Practical) Prokaryotic vs eukaryotic Specialised cells Stem cells Cells, tissues, organs, systems | <ol style="list-style-type: none"> Physical and Chemical reactions Pure substances and solubility Rates of dissolving (Practical) Filtration (Practical) Crystallisation (linking to evaporation) (Practical) Simple Distillation (Demonstration) Chromatography (Practical) Acids and Alkalis Indicators (Practical) Neutralisation (Practical) The periodic table – structure History of the periodic table Metals and non-metals Ceramics, Polymers, Composite | <ol style="list-style-type: none"> Energy Stores Energy transfers Useful and wasted energy Efficiency calculations Energy in food Heating and thermal equilibrium Conduction, convection, and radiation (Practical) Preventing heat loss- practical skills The National Grid Renewable and non-renewable Generating electricity from renewable and non-renewable sources Renewables- advantages and disadvantages Nuclear energy Calculations: power and energy costs | <ol style="list-style-type: none"> Male and female reproductive organs in humans and plants Gametes – humans and plants Fertilisation in humans Pregnancy and gestation Effect of maternal lifestyle Menstrual cycle Pollination and seed dispersal Quantitative investigations of dispersal mechanisms Genetic and environmental variation Variation Adaptation Natural Selection Selective Breeding Endangered species and extinction Biodiversity |

| Year 8 | | | | | | |
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| | HT1 Topic/Unit: Chemical Reactions (chemistry) | HT2 Topic/Unit: Waves and Pressure (physics) | HT3 Topic/Unit: Energy from Food (Biology) | HT4 Topic/Unit: Reactions and the Environment (chemistry) | HT5 Topic/Unit: Electricity and Magnetism (physics) | HT6 Topic/Unit: Keeping Healthy (biology) |
| Key Content: | <ol style="list-style-type: none"> Transverse and longitudinal (EXT) Producing sounds (Demonstration) How sound travels Hearing sounds – structure of the ear Properties of sound waves (Demonstration) Using sound: ultrasound and echo waves Waves – EM waves (inc water waves) Introduction to light Comparing sound & light waves Wave calculations The eye (Optional Practical/demonstration) Reflection (diffuse and specular) (Practical) Refraction (inc. prisms) (Practical) Pressure (over area) (Demonstration) Pressure (in liquids) (Demonstration) Pressure (in gases) (Demonstration) | <ol style="list-style-type: none"> Atomic Structure Electronic Configuration Alkali metals (group 1) Halogens (Group 7) Noble Gases (Group 0) Reactivity of Group 1 and 7 (EXT) Naming compounds (EXT) Writing formulae (EXT) Exothermic and endothermic reactions Testing for gases Metals and oxygen (Practical) Metals and acid reactions (Practical) Acids and hydroxides Acids and carbonates (Practical) Combustion (Demonstration) Word and symbol equations Balancing equations Conservation of mass | <ol style="list-style-type: none"> Food groups Balanced and unbalanced diets Energy in food (Practical) Tissues and organs of the digestive system (Demonstration) Digestion Absorption – diffusion, active transport, osmosis (EXT) Enzymes in the digestive system Photosynthesis Investigating Photosynthesis (Practical) Leaf adaptations – Gas exchange Root adaptation - Absorption of water Testing for starch (Practical) | <ol style="list-style-type: none"> Conductors and Insulators (Practical) Electrical circuits (Practical) Current (Practical) Potential difference Measuring potential difference Series and Parallel circuits (Practical) Resistance in a circuit Power in a circuit Static electricity (Demonstration) Magnets Making Magnets Drawing magnetic fields (Practical) Earth's magnetic field Electromagnets (Practical) Using Electromagnets (inc. introduction to D.C. motors) | <ol style="list-style-type: none"> The Reactivity series (Practical) Displacement reactions Extracting metals Rates of reaction (EXT) Thermal decomposition and catalysts (Practical) Composition of the Earth Structure of the Earth The Rock Cycle Igneous rocks Sedimentary rocks Metamorphic rocks (Practical) Fossil fuel formation The Earth's Atmosphere The carbon cycle Climate change and the greenhouse effect Finite resources and recycling | <ol style="list-style-type: none"> Sub cellular structures (recap) Cells, tissues, organs, and systems The lungs (Demonstration) Breathing Gas exchange The heart and blood (Demonstration) The circulatory system The skeletal & muscular system Aerobic respiration Anaerobic respiration Exercise and respiration (Practical) Communicable vs non communicable diseases Microorganisms Pathogens Antibiotics Human defences Vaccination Drugs & lifestyle choices |

| Year 9 | | | | | | |
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| | HT1 Topic/Unit: Chemistry Fundamentals (Chemistry) | HT2 Topic/Unit: Energy and Waves (Physics) | HT3 Topic/Unit: Cell Biology (Biology) | HT4 Topic/Unit: Investigative Chemistry (Chemistry) | HT5 Topic/Unit: Forces (Physics) | HT6 Topic/Unit: Communicable Diseases (Biology) |
| Key Content: | <ol style="list-style-type: none"> 1. Changing states of matter 2. Atoms and elements 3. Compounds and formulae 4. Pure substances and solutions 5. Separation techniques (Demonstration) 6. Chromatography (R.Practical) 7. Changing Atomic Theories 8. Protons, Neutrons and Electrons 9. Electron configuration 10. Isotopes and relative atomic mass 11. The periodic table 12. Metals and non-metals 13. Uses of metals 14. Alloys 15. Properties and uses of alloys 16. Alkali metals (Demonstration) 17. Halogens 18. Noble Gases 19. Gas tests (Demonstration/Practical) | <ol style="list-style-type: none"> 1. Energy stores and energy transfers 2. Open and closed systems 3. Work done 4. Power 5. Efficiency calculations 6. Insulation 7. Gravitational potential energy 8. Kinetic energy 9. Elastic potential energy 10. Multi-step calculations (GPE/KE/EPE/Efficiency) 11. Energy Resources 12. Introduction to waves 13. Waves equation 14. Measuring period of a wave 15. RP: Measuring speed of a wave using a ripple tank 16. Measuring the speed of sound 17. EM Spectrum <p>Astronomy</p> <ol style="list-style-type: none"> 1. <i>Solar System</i> 2. <i>The Planets</i> 3. <i>Moons</i> 4. <i>Life Cycle of a star</i> 5. <i>Orbits</i> 6. <i>Galaxies</i> 7. <i>Red Shift and Expanding Universe</i> <p><i>The Big Bang Theory</i></p> | <ol style="list-style-type: none"> 8. Types of cells 9. Specialised cells 10. Tissues, organs, and systems 11. Microscopes 12. The Human Genome 13. Mitosis and the cell cycle 14. Incredible stem cells 15. Therapeutic cloning 16. Asexual reproduction 17. Sexual and Asexual reproduction and Meiosis 18. Inheritance (genetic cross diagrams) 19. Family trees 20. Genetic diseases and sex determination <p>Human Anatomy</p> <ol style="list-style-type: none"> 1. The brain 2. The heart 3. The Lungs 4. The Kidneys 5. The Eye 6. The Ear 7. The Skeleton | <ol style="list-style-type: none"> 1. Ionic bonding 2. Properties of ionic bonding 3. Covalent bonding 4. Properties of covalent structures 5. Giant covalent structures 6. Metallic Bonding 7. Comparing and contrasting types of bonding 8. Word and symbol equations 9. Balancing equations 10. Conservation of mass 11. Reactions with Metals 12. Redox reactions (Higher only) 13. Acids and bases 14. Neutralisation 15. RP: Soluble Salts 19. Reactivity series and displacement reactions (Practical) 20. Ionic half equations for displacement (Higher only) 21. Reactivity series and extraction methods 22. Electrolysis of molten compounds (ionic half equations - higher only) 23. Electrolysis of aqueous compounds (ionic half equations - higher only) 24. Electrolysis part 1 (R.Practical) 25. Electrolysis part 2 (R.Practical) | <ol style="list-style-type: none"> 1. Types of forces 2. Weight 3. Resultant forces 4. Vector diagrams 5. Speed and velocity 6. Distance time graphs 7. Acceleration and deceleration 8. Velocity time graphs 9. Terminal Velocity 10. Newton's first law 11. Newton's second law 12. Inertia and inertial mass ((higher only) 13. Investigate Newton's Second Law of motion (R. Practical) 14. Newton's third law 15. Stopping distances 16. Momentum (higher only) 17. Hooke's Law 18. Relationship between force and extension 19. Circular Motion 20. Magnets 21. Electromagnets | <ol style="list-style-type: none"> 1. Pathogens 2. Our barriers to diseases 3. The immune system 4. Vaccinations 5. Medicines 6. Multiplying bacteria 7. Culturing microorganisms 8. Investigating Antiseptics (part 1) 9. Investigating antiseptics (part 2) 10. Analysing Antibiotics 11. Antibiotic resistance 12. Developing new drugs (part 1) 13. Developing new drugs (part 2) |

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| Year 10 | | | | | | |
|---------------------|---|---|---|---|--|---|
| | HT1 Topic/Unit: Reacting Substances (Chemistry) | HT2 Topic/Unit: Electricity and Astrophysics (Physics) | HT3 Topic/Unit: Human Biology (Biology) | HT4 Topic/Unit: humans and the Earth (Chemistry) | HT5 Topic/Unit: Nuclear and Thermal Physics (Physics) | HT6 Topic/Unit: Plant Biology (Biology) |
| Key Content: | <ol style="list-style-type: none"> Exothermic and endothermic reactions Temperature Changes (R.Practical) Reaction profiles Bond energies (higher) Measuring the rate of reaction Factors affecting rates of reaction Drawing rates of reaction graphs Factors affecting rates of reaction (R.Practical) Catalysts Reversible reactions (Demonstration) Chatelier Principle (higher only) Factors affecting equilibrium (higher only) Word equations and conservation of mass Relative Formula Mass Reacting Masses (higher only) Calculating mass of a solute Calculating moles in a solution (higher only) Explaining concentration (higher only) | <ol style="list-style-type: none"> Electrical Circuits Introduction Calculating current Current in circuits (practical) Potential Difference in circuits (practical) Resistance in circuits Factors affecting resistance (R.Practical) Ohm's Law Light Dependent Resistors (Demonstration) Thermistors (Demonstration) Investigating non-Ohmic conductors (R.Practical) Mains electricity and AC & DC Plugs (Practical) Power calculations Work done calculations Equations practice National Grid and Transformers | <ol style="list-style-type: none"> Aerobic respiration Anaerobic respiration The lungs (Demonstration) The heart (Practical/Demonstration) Blood vessels and blood flow Composition of blood Cardiovascular diseases Digestion Enzymes Testing for food groups (R.Practical) pH and Enzymes (R.Practical) Reaction rates in the body Diffusion | <ol style="list-style-type: none"> The Early Earth's Atmosphere Theories of the atmosphere The Greenhouse Effect Effects of global warming Reducing our carbon footprint The Harmful Effects of Combustion Resources used by humans Sustainable development Potable Water Desalination Evaluating potable water methods Analysing water samples (R.Practical) Wastewater Sewage Treatment Phytomining and bioleaching Life Cycle Assessment Reduce, Reuse, Recycle | <ol style="list-style-type: none"> EM Spectrum Atomic physics Radioactive decay Nuclear equations Half life Contamination and Irradiation Particle model - density and states Changes of state Heating and temperature Calculating density (R.Practical) Pressure in gases Specific heat capacity Investigating specific heat capacity (R.Practical) Latent heat Heating and cooling graphs | <ol style="list-style-type: none"> Food webs Predator and prey graphs Ecological Sampling techniques Quadrats (R.Practical) Distribution patterns Pyramids of biomass and tropic levels Plant cells, tissues and organs Osmosis Osmosis (R. Practical) Active transport Transpiration & Translocation Photosynthesis Photosynthesis (R. Practical) Using glucose and nitrogen in plants Limiting factors (higher only) Inverse square law (higher only) Carbon Cycle Water cycle Biodiversity and human impact Maintaining biodiversity |

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| Year 11 | | | | | |
|--------------|--|--|---|---|---|
| | HT1 Topic/Unit: Using Biology to our Advantage (Biology) | HT2 Topic/Unit: Organic Chemistry and Polymers (Chemistry) | HT3 Topic/Unit: Application of Forces and Waves (Physics) | HT4: Revision | HT5: Revision |
| Key Content: | <ol style="list-style-type: none"> 1. Classification 2. Natural selection and evolution 3. Evidence for evolution 4. Genetic cross diagrams 5. Selective breeding 6. Genetic engineering and modification 7. The nervous system & synapses 8. Conscious and unconscious responses 9. Investigating human reaction time (R. Practical) 10. Homeostasis 11. The Endocrine system 12. Negative feedback loops (higher only) 13. Controlling glucose 14. Diabetes 15. Hormones and the Menstrual cycle 16. Contraception 17. IVF (higher only) 18. Embryo screening 19. Comparing nervous and hormonal responses <p>Organic Chemistry and Polymers</p> <ol style="list-style-type: none"> 1. Crude Oil 2. Alkanes and Alkanes 3. Bromine Test (Practical) 4. Fractional Distillation 5. Cracking 6. Polymers 7. Reducing our human impact | <ol style="list-style-type: none"> 1. Magnets 2. Electromagnets (Demonstration) 3. The Motor Effect (Flemings' left-hand rule) (Demonstration) 4. Magnetic Flux Density (higher only) 5. Generating electricity (Demonstration) 6. National Grid and Transformers <p>*lots of these topics covered earlier in the curriculum but revisited here because they are difficult concepts for students.</p> <ol style="list-style-type: none"> 8. | <p>Interleaved practice and application to different contexts</p> <p>Address gaps in knowledge and build on links between different topics when applied to a range of scenarios</p> | <p>Interleaved practice and application to different contexts</p> <p>Address gaps in knowledge and build on links between different topics when applied to a range of scenarios</p> | <p>Interleaved practice and application to different contexts</p> <p>Address gaps in knowledge and build on links between different topics when applied to a range of scenarios</p> |