

Oasis Science Curriculum Long Term Plan



Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	<p>Topic: Particles</p> <ol style="list-style-type: none"> Routines and Expectations (optional) Variables Using Scientific Equipment Following a Method Drawing Graphs Analysing Graphs Maths in Science <ol style="list-style-type: none"> Particle model – states of matter (inc. density) Brownian motion Particle model- advantages and disadvantages (EXT) Changes of state Melting and Boiling points Expansion and contraction (with ice as an exception) Diffusion, osmosis, active transport <ol style="list-style-type: none"> Atoms and elements Compounds and mixtures Symbols and formulae Structure of an atom <p>Skills/working scientifically: Introduce accuracy, precision, repeatability, reproducibility Evaluation of risks Introduction of variables Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions Understand use of chemical nomenclature</p>	<p>Topic: Types of reaction and the periodic table</p> <ol style="list-style-type: none"> Physical and Chemical reactions Pure substances and solubility Rates of dissolving Filtration Crystallisation (linking to evaporation) Simple Distillation Chromatography <ol style="list-style-type: none"> Acids and Alkalis Indicators Neutralisation <ol style="list-style-type: none"> The periodic table – structure History of the periodic table Metals and non-metals Alloys (EXT) Ceramics, Polymers, Composite <p>Skills/working scientifically: Present data using appropriate methods Interpret observations and data and draw conclusions</p>	<p>Topic: Forces</p> <ol style="list-style-type: none"> Identifying forces – contact vs non-contact Balanced and unbalanced forces Resultant force Newton's Laws (EXT) Hooke's Law- practical and graph skills <ol style="list-style-type: none"> Friction- advantages and disadvantage Streamlining- everyday examples and linked to particles (EXT) Moments Speed calculations Distance- time graph Velocity-time graph <ol style="list-style-type: none"> Gravity, weight and mass Solar system Day and night Seasons Galaxies and universe Light year <p>Skills/working scientifically: Changing scientific theories Identifying types of variables Use a range of methods to carry out investigations Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions Evaluate data showing awareness of sources of error Understand use of SI units</p>	<p>Topic: Energy</p> <ol style="list-style-type: none"> Different types of energy stores Energy in food Energy transfers Sankey diagrams (EXT) Efficiency calculations <ol style="list-style-type: none"> Heating and thermal equilibrium Conduction, convection and radiation Preventing heat loss- practical skills <ol style="list-style-type: none"> Renewable and non-renewable Renewables- advantages and disadvantages Nuclear energy Calculations: power and energy costs <p>Skills: Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions Understand use of SI units Use basic data analysis</p>	<p>Topic: Interdependence and cells</p> <ol style="list-style-type: none"> Living things: MRS NERG 5 Kingdoms and classes Classification and keys Food chains Food webs Pyramids of numbers Pyramids of biomass (EXT) Environment and habitats Competition Sampling techniques (EXT) <ol style="list-style-type: none"> Animal cells Plant cells Prokaryotic vs eukaryotic Microscopes Microscope calculations (EXT) Specialised cells Stem cells Cells, tissues, organs, systems <p>Skills/working scientifically: Apply sampling techniques Apply mathematical concepts Understand use of SI units</p>	<p>Topic: Reproduction and Variation</p> <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 <ol style="list-style-type: none"> Genetic and environmental variation Genetic cross diagrams (EXT) Genetic diseases and sexual determination (EXT) <ol style="list-style-type: none"> Variation Adaptation Natural Selection Selective Breeding Endangered species and extinction Biodiversity Extremophiles (EXT) <p>Skills/working scientifically: Apply sampling techniques Changing scientific theories</p>
	<p>Milestones/outcomes: HPA: To know what is meant by Brownian motion and explain its significance MPA: To know what is meant by diffusion, active transport and osmosis Transition: To know what is meant by the particle model and what it can demonstrate</p> <p>Oracy: Spelling bee of key terms</p> <p>Careers: Poster competition 'carrying out experiments in real life situations'</p>	<p>Milestones/outcomes: HPA: To know what we mean by alloys and their useful properties MPA: To know what we mean by ceramics, polymers and composites and their properties Transition: To know the structure of the periodic table and how we can take information from it</p> <p>Oracy: Intergroup quiz</p> <p>Careers: Either: Include a 'forensic chromatography' lesson or Poster showing jobs that involve 'chemistry'</p>	<p>Milestones/outcomes: HPA: To know what we mean by 'moments' and how to interpret diagrams and calculate the turning force MPA: To know how to use speed formula and perform calculations Transition: To know what is meant by 'resultant force' and how to calculate</p> <p>Oracy: Presentation on 'our solar system'</p> <p>Careers: Be a designer- make/design model of a future vehicle!</p>	<p>Milestones/outcomes: HPA: To know how to calculate power and energy costs MPA: To know how to calculate energy efficiency Transition: To know the advantages and disadvantages of renewable energy</p> <p>Oracy: Inter-house science quiz</p> <p>Careers: Presentation on -why our future energy use must be 'green'.</p>	<p>Milestones/outcomes: HPA: To know what we mean by 'competition' and be able to interpret information MPA: To be able to identify prokaryotic and eukaryotic cells and be able to interpret said diagrams/photos Transition: To know where the organs, systems, tissues and cells of the human body are and what they do.</p> <p>Oracy: Essay competition/presentation on 'how life is interconnected'</p> <p>Careers: Poster/presentation on 'careers working with animals e.g. vet, vet nurse, zoos, SSI, farming'</p>	<p>Milestones/outcomes: HPA: To know which hormones are involved in the menstrual cycle and how to interpret diagrams. MPA: To know how to draw and interpret genetic cross diagrams. Transition: To know what we mean by adaptation and explain how this 'works'</p> <p>Oracy: Summer quiz or spelling bee</p> <p>Careers: Science fayre – pupil exhibit work from previous terms and focus on careers where science is related to job/profession.</p>

8	<p>Topic: Chemical reactions</p> <ol style="list-style-type: none"> Atomic Structure Electronic Configuration Ar and Mr (EXT) 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 <ol style="list-style-type: none"> Metals and oxygen Metals and acid reactions Acids and hydroxides Acids and carbonates Combustion Word and symbol equations Balancing equations Conservation of mass <p>Skills/working scientifically: Changing scientific theories Understand use of chemical non-nomenclature Present data using appropriate methods Interpret observations and data and draw conclusions</p>	<p>Topic: Reactions and the environment</p> <ol style="list-style-type: none"> The Reactivity series Displacement reactions Extracting metals Rates of reaction (EXT) Thermal decomposition and catalysts <ol style="list-style-type: none"> Composition of the Earth Structure of the Earth The Rock Cycle Igneous rocks Sedimentary rocks Metamorphic rocks Fossil fuel formation <ol style="list-style-type: none"> The Earth's Atmosphere The carbon cycle Climate change and the greenhouse effect Finite resources and recycling <p>Skills/working scientifically: Accuracy, prevision, repeatability, reliability Evaluation of risks Making scientific predictions Carry out scientific enquires to test predictions Types of variables Use basic data analysis</p>	<p>Topic: Waves and Pressure</p> <ol style="list-style-type: none"> Producing sounds How sound travels Hearing sounds – structure of the ear Properties of sound waves Wave calculations Using sound: ultrasound and echo waves <ol style="list-style-type: none"> Waves – EM waves (inc water waves) Transverse and longitudinal (EXT) The eye and light Reflection (diffuse and specular) Refraction (inc. prisms) Seeing colour (EXT) <ol style="list-style-type: none"> Pressure (over area) Pressure (in liquids) Pressure (in gases) <p>Skills/working scientifically: Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions Understand use of SI units</p>	<p>Topic: Electricity and Magnetism</p> <ol style="list-style-type: none"> Static electricity Conductors and Insulators Electrical circuits Current Potential difference Measuring potential difference Series and Parallel circuits Resistance in a circuit Power in a circuit <ol style="list-style-type: none"> Magnets Making Magnets Drawing magnetic fields Earth's magnetic field Electromagnets Using Electromagnets (inc. introduction to D.C. motors) <p>Skills/working scientifically: Apply mathematical concepts Changing scientific theories Understand use of SI units</p>	<p>Topic: Energy from food</p> <ol style="list-style-type: none"> Food groups Balanced and unbalanced diets Energy in food Tissues and organs of the digestive system Digestion Absorption – diffusion, active transport, osmosis (EXT) Enzymes in the digestive system <ol style="list-style-type: none"> Photosynthesis Leaf adaptations – Gas exchange Rood adaptation - Absorption of water Transpiration/translocation (EXT) Testing for starch <p>Skills/working scientifically: Present data using appropriate methods Interpret observations and data and draw conclusions</p>	<p>Topic: Keeping Healthy</p> <ol style="list-style-type: none"> Sub cellular structures (recap) Cells, tissues, organs and systems The lungs Breathing Gas exchange The heart and blood The circulatory system The skeletal & muscular system Aerobic respiration Anaerobic respiration Exercise and respiration <ol style="list-style-type: none"> Communicable vs non communicable diseases Microorganisms Pathogens Antibiotics Human defences Vaccination (EXT) Drugs & lifestyle choices <p>Skills/working scientifically: Changing scientific theories Present data using appropriate methods Interpret observations and data and draw conclusions Evaluate data showing awareness of sources of error</p>
	<p>Milestones/outcomes:</p> <p>HPA: To know the trends in the reactivity of group 1 and 7 and to be able to explain the reasons for them.</p> <p>MPA: To know how to write the electron configuration of different atoms and be able to explain how the differences affect the reactions.</p> <p>Transition: To know the general structure of an atom and be able to describe the characteristics of the particles.</p> <p>Oracy: Spelling bee between classes – top 20 terms</p> <p>Careers: Where risk assessments are used in different careers – poster/project</p>	<p>Milestones/outcomes:</p> <p>HPA: To know what we mean by climate change and the greenhouse effect and the damage it causes</p> <p>MPA: To know the processes in the carbon cycle and the interdependence of it.</p> <p>Transition: To know what we mean by displacement reactions and why they happen.</p> <p>Oracy: Make a model- competition. rock cycle, carbon cycle or climate change.</p> <p>Careers: Poster/project on 'who are geologist- what do they do?'</p>	<p>Milestones/outcomes:</p> <p>HPA: To know definitions for pressure in gases, liquids and over area.</p> <p>MPA: To know what is meant by refraction and explain why this happens.</p> <p>Transition: To know what is meant by the law of reflection and draw accurately</p> <p>Oracy: Interhouse term quiz</p> <p>Careers: Poster on work of e.g. radiographers, opticians, ophthalmologist.</p>	<p>Milestones/outcomes:</p> <p>HPA: To know what we mean by power and how to calculate</p> <p>MPA: To know how series and parallel circuits are drawn and be able to calculate current and voltage from them.</p> <p>Transition: To know how to draw electrical circuit diagrams and how current and voltage changes.</p> <p>Oracy: Interhouse spelling bee</p> <p>Careers: Poster on 'what is involved in becoming an electrical engineer/electrician</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how particles are absorbed in the gut and can explain the terms diffusion, active transport and osmosis.</p> <p>MPA: To know the photosynthesis symbol equation and explain factors affecting it</p> <p>Transition: To know the tissues and organs of the digestive system and what they do.</p> <p>Oracy: Competition – annotated diagram of the human digestive system</p> <p>Careers: 'Food industry' poster</p>	<p>Milestones/outcomes:</p> <p>HPA: To know what is meant by antibiotics and how they work</p> <p>MPA: To know both the aerobic and anaerobic equations and where they occur</p> <p>Transition: To know the main organs, tissues and systems of the body and their main functions.</p> <p>Oracy: Summer quiz/spelling bee on whole of year key words</p> <p>Careers: Investigate and then produce a poster on 'how science is involved in most industries'</p>

*Please note: Skills and working scientifically is interleaved throughout our course. We have indicated here where they are delivered most explicitly.

New content

Content moved within a half term

Content moved from one half term to another

Content moved from year 8 to year 7



Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
9	<p>Topic: Chemistry Fundamentals</p> <p>Knowledge:</p> <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 6. RP: Chromatography <ol style="list-style-type: none"> 7. Changing Atomic Theories 8. Protons, Neutrons and Electrons 9. Electron configuration 10. Isotopes and relative atomic mass 11. The periodic table 12. The modern periodic table 13. Mini Quiz <ol style="list-style-type: none"> 14. Metals and non-metals 15. Uses of metals 16. Corrosion (Separate only) 17. Corrosion prevention (Separate only) 18. Transition metals (Separate only) 19. Typical properties (Separate only) 20. Alloys 21. Properties and uses of alloys (Separate only) <ol style="list-style-type: none"> 22. Alkali metals 23. Halogens 24. Noble Gases 25. Gas tests <p>Skills:</p> <p>Calculate the number of protons, neutrons and electrons for different elements</p> <p>Naming apparatus</p> <p>Selecting appropriate apparatus</p> <p>Explaining why certain apparatus is used</p> <p>Accuracy (comparison to true value)</p> <p>Select the best hypothesis based on results</p>	<p>Topic: Investigative Chemistry</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Ionic bonding part 1 2. Ionic bonding part 2 3. Properties of ionic bonding 4. Covalent bonding 5. Properties of covalent structures 6. Giant covalent structures 7. Nanoparticles (Separate only) 8. Metallic Bonding 9. Comparing and contrasting types of bonding <ol style="list-style-type: none"> 10. Word and symbol equations 11. Balancing equations 12. Conservation of mass 13. Metals and oxygen 14. Metals and acid 15. Metals and water 16. Redox reactions (Higher) 17. Acids and bases 18. Acids - weak and strong (Higher) 19. Neutralisation 20. RP: Soluble Salts 21. RP: Titrations part 1 (Separate only) 22. RP Titrations part 2 (Separate only) 23. Testing for ions (Separate only) 24. RP: Testing for ions part 1 (Separate only) 25. RP: Testing for ions part 2 (Separate only) <ol style="list-style-type: none"> 26. Atom economy (Separate only) 27. Percentage yield (Separate only) 28. Reacting masses (Higher) 29. Reactivity series and displacement reactions 30. Ionic half equations for displacement (Higher) 31. Reactivity series and extraction methods 32. Electrolysis of molten compounds 33. Electrolysis of aqueous compounds 34. RP: Electrolysis part 1 35. RP: Electrolysis part 2 <p>Skills:</p> <p>Writing a method</p> <p>Reproducibility and repeatability</p> <p>Following a given method</p> <p>Following a given risk assessment</p> <p>Writing a risk assessment (hazards, risks, precautions)</p> <p>Explaining properties of types of bonding</p> <p>Reproducibility and repeatability</p>	<p>Topic: Physics - Energy and Waves</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Types of energy and energy transfers 2. Open and closed systems 3. Insulation 4. RP: Investigating thermal insulators (Separate only) 5. Non-renewable resources 6. Renewable resources 7. Comparison of energy resources <ol style="list-style-type: none"> 8. Work done 9. Power 10. Efficiency calculations 11. Gravitational potential energy 12. Kinetic energy 13. Elastic potential energy 14. RP: Relationship between force and extension 15. Mini Quiz <ol style="list-style-type: none"> 16. Introduction to waves 17. Waves equation 18. Measuring speed of sound 19. Measuring period of a wave 20. RP: Measuring speed of a wave using a ripple tank 21. EM Spectrum 22. Radios (Separate only) 23. RP: Investigating IR radiation (Separate only) 24. Sound waves (Separate only) 25. Uses of sound waves (Separate only) 26. Reflection of light (Separate only) 27. Refraction of light (Separate only) 28. RP: Investigating reflection and refraction of light 29. Lenses (Separate only) 30. Magnification (Separate only) 31. Colour (Separate only) <p>Skills:</p> <p>Independent, dependent and control variables</p> <p>Explaining differences between waves</p> <p>Stating the resolution</p> <p>Using a manual or digital scale</p> <p>Explaining why certain apparatus is used</p> <p>Bar chart</p>	<p>Topic: Forces</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Scalar and vector quantities 2. Types of forces 3. Weight 4. Resultant forces 5. Vector diagrams 6. Speed and velocity 7. Circular motion 8. Distance time graphs 9. Acceleration and deceleration 10. Velocity time graphs 11. Terminal Velocity 12. Newton's first law 13. Newton's second law 14. Inertia and inertial mass (Separate only) 15. RP: Investigate Newton's Second Law of motion 16. Newton's third law 17. Stopping distances 18. Energy transfers in stopping 19. Momentum (Separate only) 20. Momentum calculations (Separate only) <ol style="list-style-type: none"> 21. Moments (Separate only) 22. Levers and gears (Separate only) 23. Static electricity (Separate only) 24. Electric field patterns (Separate only) 25. Sound waves (Separate only) 26. Uses of sound waves for detection and exploration (Separate only) <ol style="list-style-type: none"> 27. Magnets 28. Magnetic fields 29. Electromagnets <p>Skills:</p> <p>Using a manual or digital scale</p> <p>Rearranging and using equations</p> <p>Stating the resolution</p> <p>Explaining why certain apparatus is used</p> <p>Sketch graph</p> <p>Using a manual or digital scale</p> <p>Making predictions from data</p> <p>Range electrolyte</p> <p>Gradient</p> <p>Area under a graph</p>	<p>Topic: Cell Biology</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Types of cells 2. Specialised cells 3. Tissues, organs and systems <ol style="list-style-type: none"> 4. Introducing microscopes 5. RP: Using Microscopes 6. Types of microscope <ol style="list-style-type: none"> 7. Multiplying bacteria (Separate only) 8. Culturing microorganisms 9. RP: Investigating Antiseptics (part 1) 10. RP: Investigating antiseptics (part 2) 11. Analysing Antibiotics 12. Mini Quiz <ol style="list-style-type: none"> 13. DNA 14. The Human Genome (Separate only) 15. Mitosis and the cell cycle 16. Incredible stem cells 17. Therapeutic cloning 18. Cloning plants 19. Cloning animals (Separate only) 20. Asexual reproduction 21. Sexual Reproduction and Meiosis 22. Sexual vs asexual reproduction 23. Examples of unusual reproduction <ol style="list-style-type: none"> 24. Inheritance (genetic cross diagrams) 25. Family trees 26. Genetic diseases and sex determination 27. Protein Synthesis (Separate only) <p>Skills:</p> <p>Writing instructions</p> <p>Calculate uncertainty</p> <p>Creating own hypothesis</p> <p>Making scientific drawings</p> <p>Evaluating stem cells</p> <p>Explaining why certain apparatus is used</p>	<p>Topic: Communicable Diseases</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Viral diseases 2. Bacterial diseases 3. Fungal and protists 4. Our barriers to diseases 5. The immune system 6. Vaccinations 7. Medicines 8. Antibiotic resistance 9. Developing new drugs (part 1) 10. Developing new drugs (part 2) 11. Monoclonal antibodies (Separate only) <ol style="list-style-type: none"> 12. Scatter Graphs and Health 13. Frequency tables and histograms 14. Analysis data 15. Mini Quiz <ol style="list-style-type: none"> 16. Plant diseases (Separate only) 17. Parts of the brain (Separate only) 18. Brain Surgery (Separate only) 19. The Eye (Separate only) 20. Myopia and hyperopia (Separate only) <p>Skills:</p> <p>Plot and interpret scatter graphs showing data about health and diseases</p> <p>Analyse data health from frequency tables and histograms</p> <p>Using a given result table</p>

	<p>Milestones/outcomes:</p> <p>HPA: To know how an isotope is different to an atom and to be able to calculate relative atomic and relative formula mass</p> <p>MPA: To know the difference between atom, element, molecule, compound and to be able to describe a particle as either an atom, element, compound or molecule</p> <p>Transition: To know the structure of an atom and to be able to work out how many protons, neutrons and electrons in an atom</p> <p>Oracy: Verbally describe the arrangement of elements on the periodic table</p> <p>Careers: scientist, chemist, pharmacologist,</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how ions move in molten and aqueous electrolysis and to be able to predict the product of reactions between metals and oxygen, water, acids</p> <p>MPA: To know how bonds form and to be able to draw electron dot-cross diagrams to represent them</p> <p>Transition: To know ionic bonds form between metal and non-metal ions, covalent bonds form between non-metals and metallic bonds form between metals and to be able to bonds in terms of electrostatic attraction</p> <p>Oracy: Use the term electrostatic attraction</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how to use a ripple tank to measure the speed of a wave and to be able to use EVERY to calculate velocity from kinetic energy</p> <p>MPA: To know the equations for work done, power, efficiency, GPE, KE EPE, and velocity of a wave and to be able to use EVERY to answer maths questions requiring conversion of units and rearranging</p> <p>Transition: To know the different stores of energy and to be able to describe simple energy transfers</p> <p>Oracy: Use the term energy transfer</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how to calculate distance, velocity and acceleration from distance and velocity time graphs and to be able to calculate velocity after a collision in conservation of momentum questions</p> <p>MPA: To know newtons 3 laws of motion and to be able to understand the motion of an object from a distance time of velocity time graph</p> <p>Transition: To know the different forces acting on a moving object and to be able to describe forces as contact or non-contact</p> <p>Oracy: Use the terms balanced and unbalanced forces to explain changes in momentum</p> <p>Careers: F1 car engineer, mechanic, astronaut, sports scientist, biomechanical evolutionary biologist</p>	<p>Milestones/outcomes:</p> <p>HPA: To know the process of therapeutic cloning and to be able to compare the advantages and disadvantages of sexual and asexual reproduction in different organismal contexts</p> <p>MPA: To know all cell arise from other cells due to mitosis and to be able to complete genetic cross diagrams</p> <p>Transition: To know the organelles of an animal, plant and prokaryotic cell and to be able to identify an animal, plant or prokaryotic cell from a diagram due to the presence/absence of organelles</p> <p>Oracy: Use the terms differentiated and specialised</p> <p>Careers: Doctor</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how to analyse a histogram and to be able to explain how bacteria become resistant to antibiotics</p> <p>MPA: To know how a vaccination works and to be able to describe how a new drug is produced</p> <p>Transition: To know the four types of pathogens and to be able to describe the symptoms of HIV, measles, TMV, rose black spot, malaria, gonorrhoea and salmonella</p> <p>Oracy: Use the term immunity</p> <p>Careers: Doctor, cleaner, hygeinist,</p>
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Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
10	<p>Topic: Human Biology</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Aerobic respiration 2. Anaerobic respiration 3. Fermentation 4. The lungs 5. The heart 6. Blood vessels and blood flow 7. Composition of blood 8. Cardiovascular diseases 9. Mini Quiz 10. Disease data 1 11. Disease data 2 12. Digestion 13. Enzymes 14. RP: Testing for food groups 15. RP: pH and Enzymes 16. Reaction rates in the body 17. Diffusion 18. Kidneys and the function (Separate only) 19. Kidneys and ADH (Separate only) 20. Dissections and Data (Separate only) 21. Diffusion and Surface area 22. Diffusion in action <p>Skills:</p> <p>Spotting errors (random, systematic, zero errors)</p> <p>Identifying trends in data from graphs.</p> <p>Independent, dependent and control</p>	<p>Topic: Plant Biology</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Food webs 2. Predator and prey graphs 3. Ecological Sampling techniques 4. RP: Quadrats 5. Distribution patterns 6. Pyramids of biomass and tropic levels 7. Decomposers (Separate only) 8. Plant cells, tissues and organs 9. Osmosis 10. RP: Osmosis 1 11. RP: Osmosis 2 12. Active transport 13. Transpiration & Translocation 14. Transpiration investigation 15. Photosynthesis 16. RP: Photosynthesis 17. Using glucose and nitrogen in plants 18. Limiting factors (Separate only) 19. Inverse square law (Separate only) 20. Mini Quiz 21. Tropisms (Separate only) 22. Plant hormones (Separate only) 23. RP: Germination 1 (Separate only) 24. RP: Germination 2 (Separate only) 25. Carbon Cycle 26. Water cycle 27. Decay (Separate only) 28. Biogas generators (Separate only) 29. RP: Decay part 1 (Separate only) 30. RP: Decay part 2 (Separate only) 31. Biodiversity and human impact 32. Maintaining biodiversity 33. Food security (Separate only) <p>Skills:</p> <p>Creating own hypothesis</p> <p>Writing a method for ecological techniques</p> <p>Calibrating apparatus</p> <p>Categoric or continuous</p> <p>x-intercepts</p> <p>Median/Mode</p> <p>Scattergraph</p> <p>Using a scale</p> <p>Use and explain sampling techniques</p>	<p>Topic: Nuclear Physics, Radiation and Magnetism</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Atomic physics 2. Radioactive decay 3. The three types of decay 4. Nuclear equations 5. Half life 6. Half life calculations 7. Contamination and Irradiation 8. Uses of radiation 9. Background radiation 10. Evaluating hazards 11. Radiation Exam Questions 12. Mini Quiz 13. Nuclear Fission and Fusion (Separate only) 14. Particle model - density and states 15. RP: Calculating density 16. Changes of state 17. Heating and temperature 18. Pressure in gases 19. Work done and pressure (Separate only) 20. Calculating Pressure (Separate only) 21. Pressure at different depths (Separate only) 22. Floating and sinking (Separate only) 23. The Atmosphere (Separate only) 24. Mini Quiz 25. Specific heat capacity 26. RP: Investigating specific heat capacity 27. Latent heat 28. Heating and cooling graphs <p>Skills:</p> <p>Drawing magnetic fields.</p> <p>Calculating half-life</p> <p>Using a manual or digital scale</p>	<p>Topic: Electricity and Astrophysics</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Electrical Circuits Introduction 2. Calculating current 3. Current in circuits 4. Potential Difference in circuits 5. Resistance in circuits 6. RP: Factors affecting resistance 7. Ohm's Law 8. Light Dependent Resistors 9. Thermistors 10. RP: investigating non-ohmic conductors 11. Mini Quiz 12. Mains electricity and AC & DC 13. Plugs 14. Power calculations 15. Work done calculations 16. Equations practice 17. National Grid and Transformers 18. Transformers structure and equation (Separate only) 19. Transformers power equation (Separate only) 20. Solar System (Separate only) 21. Life Cycle of a star (Separate only) 22. Orbits (Separate only) 23. Orbits 2 (Separate only) 24. Red Shift and Expanding Universe (Separate only) 25. The Big Bang Theory (Separate only) 26. Dark Mass and Dark Energy (Separate only) 27. Black bodies (Separate only) 28. Radiation and the Earth (Separate only) <p>Skills:</p> <p>Draw electrical circuits and circuit symbols.</p> <p>Using and rearranging equations</p> <p>Naming apparatus</p> <p>Using a manual or digital scale</p> <p>Sketch graph</p> <p>Suggest explanations for the conclusion</p>	<p>Topic: Reacting Substances</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Exothermic and endothermic reactions 2. RP Temperature Changes 3. Reaction profiles 4. Bond energies 5. Chemical cells and voltage 6. Rechargeable and non-rechargeable batteries 7. Fuel Cells (Separate only) 8. Half equations for fuel cells (Separate only) 9. Measuring the rate of reaction 10. Factors affecting rates of reaction 11. Drawing rates of reaction graphs 12. RP: Factors affecting rates of reaction 13. Catalysts 14. Mini Quiz 15. Reversible reactions 16. Chatelier Principle (Higher) 17. Factors affecting equilibrium (Higher) 18. Word equations and conservation of mass (Combined only) 19. Relative Formula Mass (Combined only) 20. Atom economy (Separate only) 21. Percentage Yield (Separate only) 22. Reacting Masses (Combined only) 23. Calculating mass of a solute 24. Calculating moles in a solution (Separate only) 25. Using titration to calculate concentration (Separate only) 26. RP: Titrations Part 1 27. RP: Titrations Part 2 28. Explaining concentration (Separate only) 29. Calculating gas volume from relative formula mass (Separate only) 30. Calculating gas volumes from balanced equations (Separate only) <p>Skills:</p> <p>Drawing graphs</p> <p>Drawing lines of best fit</p> <p>Calculating rates of reaction</p> <p>Calculations involving moles, mass and Mr</p> <p>Stating the resolution</p> <p>Spotting anomalies and reasons for these</p> <p>Tangents</p>	<p>Topic: Humans and the Earth</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. The Early Earth's Atmosphere 2. Theories of the atmosphere 3. The Greenhouse Effect 4. Effects of global warming 5. Reducing our carbon footprint 6. The Harmful Effects of Combustion 7. Resources used by humans 8. Sustainable development 9. Potable Water 10. Desalination 11. Evaluating potable water methods 12. RP Analysing water samples 13. Waste Water 14. Sewage Treatment 15. Mini Quiz 16. Phytomining and bioleaching 17. Life Cycle Assessment 18. Reduce, Reuse, Recycle 19. Ceramics (Separate only) 20. Polymers (Separate only) 21. Thermosetting and thermosetting polymers (Separate only) 22. Glass (Separate only) 23. Reducing our human impact (Separate only) 24. The Haber process 1 (Separate only) 25. Conditions graphs (Separate only) 26. The Haber process 2 (Separate only) 27. NPK Fertilisers <p>Skills:</p> <p>Writing instructions</p> <p>Evaluating theories of how the atmosphere has changed</p> <p>Describing the effect of different factors on chemical processes e.g. Haber process</p> <p>Suggest explanations for the conclusion</p>

<p>Milestones/outcomes:</p> <p>HPA: To know the relationship between surface area and volume and to be able to describe how the reactants for aerobic respiration are brought to a cell via the digestive system, cardiovascular system and the respiratory system</p> <p>MPA: To know the difference between arteries, veins and capillaries and to be able to describe how oxygen and carbon dioxide diffuse across the alveoli and capillaries</p> <p>Transition: To know respiration is the process that RELEASES energy from glucose and to be able to write the word and symbol equations for aerobic and anaerobic respiration</p> <p>Oracy: Use the terms respiration (not in reference to breathing) Use the term concentration gradient</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know the uses of glucose in a plant and to be able to describe how the reactants for photosynthesis arrive in the chloroplasts of palisade cells and how the products are distributed through the plant via the phloem</p> <p>MPA: To know how osmosis is the movement of water from a dilute to a more concentrated area through a partially permeable membrane and to be able to describe the carbon and water cycle</p> <p>Transition: To know photosynthesis uses the energy from sunlight to synthesise glucose from carbon dioxide and water and to be able to describe a food chain using the words producer, consumer, predator, prey, herbivore, omnivore, carnivore</p> <p>Oracy: Use the terms energy and biomass Use the term concentration gradient</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how increasing temperature affects internal energy (and its constituent parts, kinetic and potential energy) and to be able to explain how this results in specific heat capacity and specific latent heat</p> <p>MPA: To know the three types of nuclear decay and to be able to complete decay equations for alpha and beta decay, explaining beta decay as a neutron decaying to a proton and electron</p> <p>Transition: To know the 4 main changes of state and to be able to describe how temperature increase leads to melting and vaporisation and how cooling leads to condensation and freezing</p> <p>Oracy: Use the term vaporisation to mean evaporation or boiling Use the term decay</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how transformers increase the efficiency of energy transfer and to be able to explain how light and temperature cause the resistance of an LDR and thermistor to change</p> <p>MPA: To know the equations for current, charge, resistance, power and work done and to be able to use EVERRY to answer maths questions requiring conversion of units and rearranging</p> <p>Transition: To know the difference between a parallel and series circuit and to be able to use EVERRY to calculate simple equations that do not require conversion or rearranging</p> <p>Oracy: Correctly use the words current and potential difference</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how pressure, temperature and concentration effect the position of an equilibrium in term of Le Chateliers principle and to be able to calculate total energy changes in a reaction from bond energies</p> <p>MPA: To know collisions theory and to be able to explain how the rate of reaction will be affected by the change in conditions (catalyst, concentration, pressure, temperature, surface area)</p> <p>Transition: To know what exothermic and endothermic reactions are and to be able to identify whether a reaction is endothermic or exothermic from a temperature change (including when the change is between negative and positive numbers)</p> <p>Oracy: Use the term collision theory and the term activation energy Use the tier 2 word: sufficient</p> <p>Careers:</p>	<p>Milestones/outcomes:</p> <p>HPA: To know how phytomining and bioleaching can be used as sustainable alternatives and to be able to describe the greenhouse effect in terms of short and long wavelength radiation</p> <p>MPA: To know how the oceans formed and how atmospheric carbon dioxide decreased and to be able to complete a life cycle assessment</p> <p>Transition: To know the difference between the early atmosphere and modern atmosphere and to be able to describe how to make potable water from freshwater</p> <p>Oracy: Use the terms sustainable Be able to discuss the causes and effects of climate change</p> <p>Careers: Being a human on earth now</p>
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Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
11	<p>Topic: Evolution and Systems Knowledge:</p> <ol style="list-style-type: none"> Natural selection and evolution Evolutionary trees Selective breeding Genetic engineering and modification The nervous system Reflex arcs RP: Investigating human reaction time Homeostasis Thermoregulation (Separate only) Mini Quiz The Endocrine system Negative feedback loops (Separate only) Controlling glucose Controlling water (Separate only) Diabetes Hormones and the Menstrual cycle (Higher) Contraception Embryo screening IVF (Higher) Comparing nervous and hormonal responses 	<p>Topic: Organic Chemistry & polymers Knowledge:</p> <ol style="list-style-type: none"> Crude Oil Alkanes Alkenes Bromine Test Fractional Distillation The Fractions Cracking 1 Cracking 2 Ceramics (Combined only) Polymers (Combined only) Thermosetting and thermosoftening (Combined only) Glass (Combined only) Reducing our human impact (Combined only) Organic Compound diagrams (Separate only) Alkene reactions 1 (Separate only) Alkene reactions 2 (Separate only) The Alcohols (Separate only) Alcohol reactions (Separate only) Fermentation (Separate only) Carboxylic acid reactions (Separate only) 	<p>Topic: Application of forces Knowledge:</p> <ol style="list-style-type: none"> Magnets Magnetic fields Electromagnets The Motor Effect (Flemings' left hand rule) Magnetic Flux Density (Higher) Generating electricity Radio waves (Separate only) Sound waves (Separate only) Uses of sound waves (Separate only) Applications of the motor effect and generator effect (Separate only) National Grid and Transformers (Separate only) Transformer structure (Separate only) Transformer power equation (Separate only) <p>Skills: Analysing graphs Using a manual or digital scale Significant figures and rounding Calculate gradients Selecting appropriate apparatus</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>Biology Paper 2 Chemistry Paper 2 Physics Paper 2</p> <p>Physics Paper 1 Chemistry Paper 1 Biology Paper 1</p>	<p>Topic: Exams</p>	



	<p>Skills: Comparing two different processes Spotting anomalies and reasons for them Spotting errors (random, systematic, zero errors) Reasons for random, systematic and zero errors) Issues and improvements of method Histogram Frequency Table</p>	<p>21. Carboxylic acid and water (Separate only) 22. Esters (Separate only) 23. Addition Polymerisation (Separate only) 24. Condensation Polymerisation (Separate only) 25. Amino Acids and Polymerisation (Separate only) 26. Polymers in food (Separate only)</p> <p>Skills: Testing for different chemicals. Writing balanced symbol equations Describing different steps in a process</p>	Significant figures and rounding			
	<p>Milestones/outcomes: HPA: To know how IVF is used and to be able to describe how the four different hormones effect each other in the menstrual cycle MPA: To know how an adaptation evolves due to natural selection and to be able to describe the series of events that decreases blood insulin levels when it is too high and increases blood insulin levels when it is too low Transition: To know the components of the reflex arc and to be able to describe how electrical impulse moves from receptor to effector</p> <p>Oracy: Use the terms adaptation, selective pressure, and evolution Use the term electrical impulse</p> <p>Careers:</p>	<p>Milestones/outcomes: HPA: To know how to work out the products or reactants from a cracking reaction and to be able to explain the benefit of cracking and fractional distillation MPA: To know how fractional distillation separates crude oil into fractions and to be able to describe the processes of complete and incomplete combustion Transition: To know the general formula of alkanes and alkenes and to be able to identify an organic compound as an alkane or alkene from its chemical formula or structural formula</p> <p>Oracy: Use the terms volatile, viscosity, flammability</p> <p>Careers:</p>	<p>Milestones/outcomes: HPA: To know how the strength of an electromagnet can be changed and to be able to use flemings left hand rule to work out the direction of a force from polarity of magnets and direction of current MPA: To know the strength of a magnet is strongest at the poles and to be able to describe an electromagnet Transition: To know that opposites attract in magnets and to be able to draw a magnetic field diagram</p> <p>Oracy: Use the term magnetic field</p> <p>Careers:</p>	Milestones/outcomes:	Milestones/outcomes:	Milestones/outcomes:

Please note:

‘Separate only’ = content that needs to be covered only by students studying separate sciences (3 separate GCSEs)

‘combined only’ = content that needs to be covered only by students studying combined sciences: trilogy (2 separate GCSEs)

‘EXT’ = extension topic – these are optional topics that can be included into your curriculum with higher ability groups or if you have more curriculum time in your curriculum. These will not be assessed in the End of Year exams but will provide students with a broader curriculum and prepare students for studying Separate Science.

