Oasis Science Curriculum Overview

Curriculum
A Knowledge Rich Curriculum

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	**Topic: Particles** Scientific equipment Hazards and risks Using Bunsen burners Particle model – states of matter Brownian motion (EXT) Particle model- advantages and disadvantages (EXT) Changes of state Melting and Boiling points Expansion and contraction (EXT) Diffusion, osmosis, active transport Atoms and elements Compounds and mixtures Symbols and formulae Structure of an atom	**Topic: Types of reaction** Physical and Chemical reactions Solubility Rates of dissolving Filtration Crystallisation (linking to evaporation) Simple Distillation Chromatography Acids and Alkalis Indicators Neutralisation	**Topic: Forces** Identifying forces – contact vs non contact Balanced and unbalanced forces Resultant force Newton's Laws (EXT) Hooke's Law- practical and graph skills (EXT) Friction- advantages and disadvantage Streamlining- everyday examples and linked to particles Moments (EXT) Speed calculations Distance- time graph Velocity-time graph Gravity, weight and mass Solar system Day and night Seasons Galaxies and universe Light year	**Topic: Energy** Different types of energy stores Energy transfers Sankey diagrams (EXT) Efficiency calculations Conduction, convection and radiation Preventing heat loss- practical skills Renewable and non-renewable Renewables- advantages and disadvantages Nuclear energy Calculations: power and energy costs	**Topic: Interdependence and cells** 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) Animal cells Plant cells Prokaryotic vs eukaryotic Microscopes Microscope calculations (EXT) Specialised cells Stem cells Cells, tissues, organs, systems	**Topic: Reproduction and Variation** Male and female reproductive organs in humans and plants Gametes – humans and plants Fertilisation in humans Pregnancy and gestation (EXT) Menstrual cycle (EXT) Genetic and environmental variation Genetic cross diagrams (EXT) Genetic diseases and sexual determination (EXT) Adaptation Natural Selection Selective Breeding Endangered species and extinction Biodiversity (EXT) Extremophiles (EXT)
8	**Topic: Periodic table and materials** The periodic table – structure History of the periodic table (EXT) Metals and non-metals Alloys (EXT) Ceramics (EXT) Polymers (EXT) Composite (EXT**)** Atomic Structure Electronic Configuration Ar and Mr (EXT) Alkali metals (group 1) Halogens (Group 7) Noble Gases (Group 0) 15. Reactivity of Group 1 and 7 (EXT) Naming compounds (EXT) Writing formulae (EXT) Exothermic and endothermic reactions Testing for gases	**Topic: Chemical Reactions and the environment** Metals and oxygen Metals and acid reactions Acids and hydroxides Acids and carbonates Combustion Word and symbol equations (taught throughout this topic) Balancing equations (taught throughout this topic) Conservation of mass The Reactivity series Displacement reactions Extracting metals Rates of reaction (EXT) Catalysts (EXT) Fossil fuel formation Climate change Greenhouse effect (EXT) Carbon cycle Recycling	**Topic: Waves and Pressure** Producing sounds How sound travels Hearing sounds – The ear (EXT) Properties of sound waves Wave calculations Using sound: ultrasound and echowaves (EXT) Waves – EM waves Transverse and longitudinal (EXT) The eye and light Reflection Refraction Seeing colour (EXT) Pressure (over area) Pressure (in liquids) Pressure (in gases)	**Topic: Electricity and Magnetism** Static electricity (EXT) Conductors and Insulators Electrical circuits Current Potential difference Measuring potential difference Series and Parallel circuits Resistance in a circuit (EXT) Power in a circuit (EXT) Magnets Making Magnets Drawing magnetic fields Earth's magnetic field Electromagnets (EXT) Using Electromagnets (EXT)	**Topic: Energy from food** 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 Photosynthesis Leaf adaptations – Gas exchange Rood adaptation - Absorption of water Transpiration/translocation (EXT) Testing for starch	**Topic: Keeping Healthy** 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 (EXT) Aerobic respiration Anaerobic respiration Exercise and respiration Communicable vs non communicable diseases Microorganisms Pathogens Antibiotics Human defences Vaccination (EXT) Drugs & lifestyle choices (EXT)

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9	**Topic: Chemistry Fundamentals** **Knowledge:** Changing states of matter Atoms and elements Compounds and formulae Pure substances and solutions Separation techniques RP: Chromatography Changing Atomic Theories Protons, Neutrons and Electrons Electron configuration Isotopes and relative atomic mass The periodic table The modern periodic table Mini Quiz Metals and non-metals Uses of metals Corrosion (Triple only) Corrosion prevention (Triple only) Transition metals (Triple only) Typical properties (Triple only) Alloys Properties and uses of alloys (Triple only) Alkali metals Halogens Noble Gases Gas tests **Skills:** Calculate the number of protons, neutrons and electrons for different elements Naming apparatus Selecting appropriate apparatus Explaining why certain apparatus is used Accuracy (comparison to true value) Select the best hypothesis based on results	**Topic: Investigative Chemistry** **Knowledge:** Ionic bonding part 1 Ionic bonding part 2 Properties of ionic bonding Covalent bonding Properties of covalent structures Giant covalent structures Nanoparticles (Triple only) Metallic Bonding Comparing and contrasting types of bonding Word and symbol equations Balancing equations Conservation of mass Metals and oxygen Metals and acid Metals and water Redox reactions (Triple only) Acids and bases Acids - weak and strong (Triple only) Neutralisation RP: Soluble Salts RP: Titrations part 1 (Triple only) RP Titrations part 2 (Triple only) Testing for ions (Triple only) RP: Testing for ions part 1 (Triple only) RP: Testing for ions part 2 (Triple only) Atom economy (Triple only) Percentage yield (Triple only) Reacting masses (Triple only) Reactivity series and displacement reactions Ionic half equations for displacement (Triple only) Reactivity series and extraction methods Electrolysis of molten compounds (Triple only) Electrolysis of aqueous compounds (Triple only) RP: Electrolysis part 1 (Triple only) RP: Electrolysis part 2 (Triple only) **Skills:** Writing a method Reproducibility and repeatability Following a given method Following a given risk assessment Writing a risk assessment (hazards, risks, precautions) Explaining properties of types of bonding Reproducibility and repeatability	**Topic: Physics - Energy and Waves** **Knowledge:** Types of energy and energy transfers Open and closed systems Insulation RP: Investigating thermal insulators (Triple only) Non-renewable resources Renewable resources Comparison of energy resources Work done Power Efficiency calculations Gravitational potential energy Kinetic energy Elastic potential energy RP: Relationship between force and extension Mini Quiz Introduction to waves Waves equation Measuring speed of sound Measuring period of a wave RP: Measuring speed of a wave using a ripple tank EM Spectrum Radios (Triple only) RP: Investigating IR radiation (Triple only) Sound waves (Triple only) Uses of sound waves (Triple only) Reflection of light (Triple only) Refraction of light (Triple only) RP: Investigating reflection and refraction of light Lenses (Triple only) Magnification (Triple only) Colour (Triple only) **Skills:** Independent, dependent and control variables Explaining differences between waves Stating the resolution Using a manual or digital scale Explaining why certain apparatus is used Bar chart	**Topic: Forces** **Knowledge:** Scalar and vector quantities Types of forces Weight Resultant forces Vector diagrams Speed and velocity Circular motion Distance time graphs Acceleration and deceleration Velocity time graphs Terminal Velocity Newton's first law Newton's second law Inertia and inertial mass (Triple only) RP: Investigate Newton's Second Law of motion Newton's third law Stopping distances Energy transfers in stopping Momentum (Triple only) Momentum calculations (Triple only) Moments (Triple only) Levers and gears (Triple only) Static electricity (Triple only) Electric field patterns (Triple only) Sound waves (Triple only) Uses of sound waves for detection and exploration (Triple only) Magnets Magnetic fields Electromagnets **Skills:** Using a manual or digital scale Rearranging and using equations Stating the resolution Explaining why certain apparatus is used Sketch graph Using a manual or digital scale Making predictions from data Range electrolyte Gradient Area under a graph	**Topic: Cell Biology** **Knowledge:** Types of cells Specialised cells Tissues, organs and systems Introducing microscopes RP: Using Microscopes Types of microscope Multiplying bacteria (Triple only) Culturing microorganisms RP: Investigating Antiseptics (part 1) RP: Investigating antiseptics (part 2) Analysing Antibiotics Mini Quiz DNA The Human Genome (Triple only) Mitosis and the cell cycle Incredible stem cells Therapeutic cloning Cloning plants Cloning animals (Triple only) Asexual reproduction Sexual Reproduction and Meiosis Sexual vs asexual reproduction Examples of unusual reproduction Inheritance (genetic cross diagrams) Family trees Genetic diseases and sex determination Protein Synthesis (Triple only) **Skills:** Writing instructions Calculate uncertainty Creating own hypothesis Making scientific drawings Evaluating stem cells Explaining why certain apparatus is used	**Topic: Communicable Diseases** **Knowledge:** Viral diseases Bacterial diseases Fungal and protists Our barriers to diseases The immune system Vaccinations Medicines Antibiotic resistance Developing new drugs (part 1) Developing new drugs (part 2) Monoclonal antibodies (Triple only) Scatter Graphs and Health Frequency tables and histograms Analysis data Mini Quiz Plant diseases (Triple only) Parts of the brain (Triple only) Brain Surgery (Triple only) The Eye (Triple only) Myopia and hyperopia (Triple only) **Skills:** Plot and interpret scatter graphs showing data about health and diseases Analyse data health from frequency tables and histograms Using a given result table

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10	**Topic: Human Biology** **Knowledge:** Aerobic respiration Anaerobic respiration Fermentation The lungs The heart Blood vessels and blood flow Composition of blood Cardiovascular diseases Mini Quiz Disease data 1 Disease data 2 Digestion Enzymes RP: Testing for food groups RP: pH and Enzymes Reaction rates in the body Diffusion Kidneys and the function (Triple only) Kidneys and ADH (Triple only) Dissections and Data (Triple only) Diffusion and Surface area Diffusion in action **Skills:** Spotting errors (random, systematic, zero errors) Identifying trends in data from graphs. Independent, dependent and control	**Topic: Plant Biology** **Knowledge:** Food webs Predator and prey graphs Ecological Sampling techniques RP: Quadrats Distribution patterns Pyramids of biomass and tropic levels Decomposers (Triple only) Plant cells, tissues and organs Osmosis RP: Osmosis 1 RP: Osmosis 2 Active transport Transpiration & Translocation Transpiration investigation Photosynthesis RP: Photosynthesis Using glucose and nitrogen in plants Limiting factors (Triple only) Inverse square law (Triple only) Mini Quiz Tropisms (Triple only) Plant hormones (Triple only) RP: Germination 1 (Triple only) RP: Germination 2 (Triple only) Carbon Cycle Water cycle Decay (Triple only) Biogas generators (Triple only) RP: Decay part 1 (Triple only) RP: Decay part 2 (Triple only) Biodiversity and human impact Maintaining biodiversity Food security (Triple only) **Skills:** Creating own hypothesis Writing a method for ecological techniques Calibrating apparatus Categoric or continuous x-intercepts Median/Mode Scattergraph Using a scale Use and explain sampling techniques	**Topic: Nuclear Physics, Radiation and Magnetism** **Knowledge:** Atomic physics Radioactive decay The three types of decay Nuclear equations Half life Half life calculations Contamination and Irradiation Uses of radiation Background radiation Evaluating hazards Radiation Exam Questions Mini Quiz (needs to be updated) Nuclear Fission and Fusion (Triple only) Particle model - density and states RP: Calculating density Changes of state Heating and temperature Pressure in gases Work done and pressure (Triple only) Calculating Pressure (Triple only) Pressure at different depths (Triple only) Floating and sinking (Triple only) The Atmosphere (Triple only) Mini Quiz Specific heat capacity RP: Investigating specific heat capacity Latent heat Heating and cooling graphs **Skills:** Drawing magnetic fields. Calculating half-life Using a manual or digital scale	**Topic: Electricity and Astrophysics** **Knowledge:** Electrical Circuits Introduction Calculating current Current in circuits Potential Difference in circuits Resistance in circuits RP: Factors affecting resistance Ohm's Law Light Dependent Resistors Thermistors RP: investigating non-ohmic conductors Mini Quiz Mains electricity and AC & DC Plugs Power calculations Work done calculations Equations practice National Grid and Transformers Transformers structure and equation (Triple only) Transformers power equation (Triple only) Solar System (Triple only) Life Cycle of a star (Triple only) Orbits (Triple only) Orbits 2 (Triple only) Red Shift and Expanding Universe (Triple only) The Big Bang Theory (Triple only) Dark Mass and Dark Energy (Triple only) Black bodies (Triple only) Radiation and the Earth (Triple only) **Skills:** Draw electrical circuits and circuit symbols. Using and rearranging equations Naming apparatus Using a manual or digital scale Sketch graph Suggest explanations for the conclusion	**Topic: Reacting Substances** **Knowledge:** Exothermic and endothermic reactions RP Temperature Changes Reaction profiles Bond energies Chemical cells and voltage Rechargeable and non-rechargeable batteries Fuel Cells (Triple only) Half equations for fuel cells (Triple only) Measuring the rate of reaction Factors affecting rates of reaction Drawing rates of reaction graphs RP: Factors affecting rates of reaction Catalysts Mini Quiz Reversible reactions Chatelier Principle (Triple only) Factors affecting equilibrium (Triple only) Word equations and conservation of mass (D only) Relative Formula Mass (D only) Atom economy (D only) Percentage Yield (D only) Reacting Masses (D only) Calculating mass of a solute Calculating moles in a solution (Triple only) Using titration to calculate concentration (Triple only) RP: Titrations Part 1 RP: Titrations Part 2 Explaining concentration (Triple only) Calculating gas volume from relative formula mass (Triple only) Calcuating gas volumes from balanced equations (Triple only) **Skills:** Drawing graphs Drawing lines of best fit Calculating rates of reaction Calculations involving moles, mass and Mr Stating the resolution Spotting anomalies and reasons for these Tangents	**Topic: Humans and the Earth** **Knowledge:** 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 RP Analysing water samples Waste Water Sewage Treatment Mini Quiz Phytomining and bioleaching Life Cycle Assessment Reduce, Reuse, Recycle Ceramics (Triple only) Polymers (Triple only) Thermosetting and thermosetting polymers (Triple only) Glass (Triple only) Reducing our human impact (Triple only) The Haber process 1 (Triple only) Conditions graphs (Triple only) The Haber process 2 (Triple only) NPK Fertilisers **Skills:** Writing instructions Evaluating theories of how the atmosphere has changed Describing the effect of different factors on chemical processes e.g. Haber process Suggest explanations for the conclusion

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11	**Topic: Evolution and Systems** **Knowledge:** Natural selection and evolution Evolutionary trees Selective breeding Genetic engineering and modification The nervous system Reflex arcs RP: Investigating human reaction time Homeostasis Thermoregulation (Triple only) Mini Quiz The Endocrine system Negative feedback loops (Triple only) Controlling glucose Controlling water (Triple only) Diabetes Hormones and the Menstrual cycle Contraception Embryo screening IVF (Triple only) Comparing nervous and hormonal responses **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	**Topic: Organic Chemistry & polymers** **Knowledge:** Crude Oil Alkanes Alkenes Bromine Test Fractional Distillation The Fractions Cracking 1 Cracking 2 Ceramics (D only) Polymers (D only) Thermosetting and thermosoftening (D only) Glass (D only) Reducing our human impact (D only) Organic Compound diagrams (Triple only) Alkene reactions 1 (Triple only) Alkene reactions 2 (Triple only) The Alcohols (Triple only) Alcohol reactions (Triple only) Fermentation (Triple only) Carboxylic acid reactions (Triple only) Carboxylic acid and water (Triple only) Esters (Triple only) Addition Polymerisation (Triple only) Condensation Polymerisation (Triple only) Amino Acids and Polymerisation (Triple only) Polymers in food (Triple only) **Skills:** Testing for different chemicals. Writing balanced symbol equations Describing different steps in a process	**Topic: Application of forces** **Knowledge:** Magnets Magnetic fields Electromagnets The Motor Effect (Flemings' left hand rule) Magnetic Flux Density (Triple only) Generating electricity Radio waves (Triple only) Sound waves (Triple only) Uses of sound waves (Triple only) Applications of the motor effect and generator effect (Triple only) National Grid and Transformers (Triple only) Transformer structure (Triple only) Transformer power equation (Triple only) **Skills:** Analysing graphs Using a manual or digital scale Significant figures and rounding Calculate gradients Selecting appropriate apparatus Significant figures and rounding	**Topic: Revision**	**Topic: Exams**	

Please note:

'Triple only' = content that needs to be covered only by students studying separate sciences (3 separate GCSEs)

'Double 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 Triple Science.