Oasis Media City Subject Curriculum Plan

Subject: Science **Head of Subject**: H Patel **Date updated**: Summer 2020

This document is an overview of the learning that students will experience within their subject area. This is a working document that provides teachers, students and parents with a map of key content that will be delivered during lessons in each year group.

Year Half Term:		**1** (8 weeks)	**2** (7 weeks)	**3** (6 weeks)	**4** (6 weeks)	**5** (5 weeks)	**6** (7 weeks)
7	*Topic(s):*	**Introduction to science** ***1. Routines and Expectations, Mediacity way (2 lessons)*** 2. Variables 3. Using Scientific Equipment 4. Following a Method 5. Drawing Graphs (x2) 6. Maths in Science 7. Particle model – states of matter (inc. density) 8. Changes of state 9. Melting and Boiling points 10. Expansion and contraction (with ice as an exception) **11.** Brownian motion 12. Diffusion, osmosis, active transport 13. Mini-quiz 14. Atoms and elements 15. Compounds and mixtures 16. Symbols and formulae 17. Structure of an atom **Skills/working scientifically:** Introduce accuracy, precision, repeatability, reproducibility Evaluation of risks Introduction of variables	**Chemistry**: *Reactions* 1. Physical and Chemical reactions 2. Pure substances and solubility 3. Rates of dissolving 4. Solubility curves (EXT) 5. Filtration 6. Crystallisation (linking to evaporation) 7. Simple Distillation 8. Chromatography 9. Mini-quiz 10. Acids and Alkalis 11. Indicators 12. Neutralisation 13. Ionisation of acids (EXT) 14. The periodic table – structure 15. Metals and non-metals 16. Alloys 17. Ceramics, 18. Composites 19. Polymers, 20. Word and symbol equations ***21. Local context – GM scientists*** ***22. Revision (2 lessons)*** ***23. Assessment*** ***24. Assessment review*** 25. Growth lesson. **Skills/working scientifically:**	**Physics:** *Topic: Forces* 1. Identifying forces – contact vs non-contact 2. Balanced and unbalanced forces 3. Resultant force 4. Newton's Laws (EXT) 5. Hooke's Law- practical and graph skills 6. Friction- advantages and disadvantage 7. Streamlining- everyday examples and linked to particles (EXT) 8. Moments 9. Speed calculations 10. Distance- time graph 11. Velocity-time graph 12. Gravity, weight and mass 13. Solar system 14. Day and night 15. Seasons 16. Galaxies and universe 17. Light year **Skills/working scientifically:** Changing scientific theories Identifying types of variables Use a range of methods to carry out investigations Apply mathematical concepts	**Physics:** **Science week STEM project** *Topic: Energy* 1. Different types of energy stores 2. Energy in food 3. Energy transfers 4. Sankey diagrams (EXT) 5. Efficiency calculations 6. Heating and thermal equilibrium 7. Conduction, convection and radiation 8. Preventing heat loss- practical skills 9. Renewable and non-renewable 10. Renewables- advantages and disadvantages 11. Nuclear energy 12. Calculations: power and energy costs **Skills:** Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions	**Biology:** *Topic: Interdependence and cells* 1. Living things: MRS NERG 2. 5 Kingdoms and classes 3. Classification and keys 4. Food chains 5. Food webs 6. Pyramids of numbers 7. Pyramids of biomass (EXT) 8. Environment and habitats 9. Competition 10. Sampling techniques (EXT) 11. Animal cells 12. Plant cells 13. Prokaryotic vs eukaryotic 14. Microscopes 15. Microscope calculations (EXT) 16. Specialised cells 17. Stem cells 18. Cells, tissues, organs, systems **Skills/working scientifically:** Apply sampling techniques Apply mathematical concepts	**Revision for end of year exams** **End of year exams** *Topic: Reproduction and Variation* 1. Male and female reproductive organs in humans and plants 2. Gametes – humans and plants 3. Fertilisation in humans 4. Pregnancy and gestation 5. Effect of maternal lifestyle 6. Menstrual cycle 7. Pollination and seed dispersal 8. Quantitative investigations of dispersal mechanisms 9. Genetic and environmental variation 10. Genetic cross diagrams (EXT) 11. Genetic diseases and sexual determination (EXT) 12. Variation 13. Adaptation 14. Natural Selection 15. Selective Breeding 16. Endangered species and extinction

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		Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions Understand use of chemical nomenclature **Y7 Baseline test** • **Literacy lesson** • **Maths skills**	Present data using appropriate methods Interpret observations and data and draw conclusions	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 ***18. Local context: BAME scientists*** **19. Maths skills lesson**	Understand use of SI units • Use basic data analysis • Growth lessons • Mini-assessment • ***Local context – Famous scientists*** • **literacy lesson**	Understand use of SI units • ***Local context – Women in science*** • **Maths skills lesson**	17. Biodiversity 18. Extremophiles (EXT) **Skills/working scientifically:** Apply sampling techniques Changing scientific theories • Biology investigation • Chemistry investigation • Physics investigation • Growth lessons • **Literacy lesson**
	Key Words(1 p/wk):	Nucleus, proton, neutron, electron, diffusion, concentration, membrane, osmosis	Neutralisation, filtrate, solvent, solute, solution, ceramics.	Friction, Newtons, streamline, light year, planet, Springs.	Power, Joule, generator, renewable, energy, renewable, non-renewable	Producer, consumer, species, eukaryotic, prokaryotic	Genes, adaptation, testosterone, pollen, fertilisation, extremophile, endangered
	Link to context/ Character/ Big ideas	*BI 1:* *All matter in the Universe is made of very small particles*	*BI 1:* *All matter in the Universe is made of very small particles*	*2. Objects can affect other objects at a distance* *3. Changing the movement of an object requires a net force to be acting on it* *6. Our solar system is a very small part of one of billions of galaxies in the universe*	*4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event*	*7. Organisms are organised on a cellular basis and have a finite life span* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms*	*9. Genetic information is passed down from one generation of organisms to another* *10. The diversity of organisms, living and extinct, is the result of evolution*

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	Assessment Type:	Pre-post assessment, end of topic assessment, growth lessons	Pre-post assessment, end of topic assessment, growth lessons	Pre-post assessment, end of topic assessment, growth lessons	Pre-post assessment, end of topic assessment, growth lessons	Pre-post assessment, end of topic assessment, growth lessons	Pre-post assessment, end of topic assessment, growth lessons, end of year assessment
8	*Topic(s):*	**Science skills** **Routines and Expectations, Mediacity way (2 lessons)** *Topic: chemical reactions* 1. Atomic Structure 2. Electronic Configuration 3. Ar and Mr (EXT) 4. Alkali metals (group 1) 5. Halogens (Group 7) 6. Noble Gases (Group 0) 7. Reactivity of Group 1 and 7 (EXT) 8. Naming compounds 9. Writing formulae 10. Exothermic and endothermic reactions 11. Mini-quiz and recap 12. Testing for gases 13. Metals and oxygen 14. Metals and acid reactions 15. Acids and hydroxides 16. Acids and carbonates 17. Word and symbol equations 18. Balancing equations 19. Conservation of mass	*Topic: Reactions and the environment* 1. The Reactivity series 2. Displacement reactions 3. Extracting metals 4. Rates of reaction (EXT) 5. Thermal decomposition 6. Catalysts 7. Reaction profiles 8. Combustion 9. Composition of Earth 10. Structure of the Earth 11. The Rock Cycle 12. Igneous rocks 13. Sedimentary rocks 14. Metamorphic rocks 15. Fossil fuel formation 16. The Earth's Atmosphere 17. The carbon cycle 18. Climate change and the greenhouse effect 19. Finite resources and recycling **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 Growth lesson **20. Revision (2 lessons)** **21. Assessment.**	**Physics** *Topic: Waves and Pressure* 1. Producing sounds 2. How sound travels 3. Hearing sounds – structure of the ear 4. Properties of sound waves 5. Wave calculations 6. Using sound: ultrasound and echo waves 7. Waves – EM waves (inc water waves) 8. Transverse and longitudinal (EXT) 9. The eye and light 10. Reflection (diffuse and specular) 11. Refraction (inc. prisms) 12. Seeing colour (EXT) 13. Pressure (over area) 14. Pressure (in liquids) 15. Pressure (in gases) **Skills/working scientifically:** Apply mathematical concepts Present data using appropriate methods Interpret observations and data and draw conclusions Understand use of SI units • Growth lesson • ***Local context: BAME scientists*** • **Maths skills lesson**	*Topic: Electricity and Magnetism* **Science week STEM project** • 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 • Magnets • Making Magnets • Drawing magnetic fields • Earth's magnetic field • Electromagnets • Using Electromagnets (inc. introduction to D.C. motors) **Skills/working scientifically:** Apply mathematical concepts Changing scientific theories Understand use of SI units • ***Local context – UK scientists***	**Biology** *Topic: Energy from food* 1. Food groups 2. Balanced and unbalanced diets 3. Energy in food 4. Tissues and organs of the digestive system 5. Digestion 6. Absorption – diffusion, active transport, osmosis (EXT) 7. Enzymes in the digestive system 8. Photosynthesis 9. Leaf adaptations – Gas exchange 10. Root adaptation - Absorption of water 11. Transpiration/translocation (EXT) 12. Testing for starch *Topic: Keeping Healthy* 13. Sub cellular structures (recap) 14. Cells, tissues, organs and systems 15. The lungs 16. Breathing 17. Gas exchange	**Revision for end of year exams** **End of year exams** 1. The heart and blood 2. The circulatory system 3. The skeletal & muscular system 4. Aerobic respiration 5. Anaerobic respiration 6. Exercise and respiration 7. Communicable vs non communicable diseases 8. Microorganisms 9. Pathogens 10. Antibiotics 11. Human defences 12. Vaccination (EXT) 13. Drugs & lifestyle choices **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 **literacy lesson**

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		Skills/working scientifically: Changing scientific theories Understand use of chemical non-nomenclature Present data using appropriate methods Interpret observations and data and draw conclusions **Literacy lesson** **Maths skills**	**22. Assessment review** ***Local context – GM scientists***		• **literacy lesson** • **Revision (2 lessons)** • **Assessment.** • **Assessment review**	**Skills/working scientifically:** Present data using appropriate methods Interpret observations and data and draw conclusions 18. Growth lesson **19. Maths skills lesson** ***20. Local context – women in science***	
	Key Words (1 p/wk):	Nucleus, Hydrogen, protons, neutrons, electrons, Mendeleev, exothermic, endothermic	Complete combustion, concentration, nuclear, renewable, greenhouse effect, igneous, metamorphic, sedimentary	Decibels, wavelength, spectrum, ultra-violet, Pascals, retina, longitudinal, transverse	Components, electrons, volts, amperes, current, resistance	Surface area, concentration, active site, denatured, chloroplast, palisade.	Pathogen, lactic acid, glucose, antibodies, artery, capillary, atrium, ventricle.
	Link to context/ Character/ Big ideas	*1. All matter in the Universe is made of very small particles*	*1. All matter in the Universe is made of very small particles* *5. The composition of the earth and its atmosphere, and the processes occurring within them, shape the earth's surface and its climate*	*2. Objects can affect other objects at a distance* *3. Changing the movement of an object requires a net force to be acting on it* *4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event*	*4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event*	*7. Organisms are organised on a cellular basis and have a finite life span* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms*	*7. Organisms are organised on a cellular basis and have a finite life span* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms* *9. Genetic information is passed down from one generation of organisms to another*
	Assessment Type:	Pre-post assessment, end of topic assessment	Pre-post assessment, end of topic assessment	Pre-post assessment, end of topic assessment	Pre-post assessment, end of topic assessment	Pre-post assessment, end of topic assessment	end of year exam

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9	*Topic(s):*	**Science skills** ***Mediacity way*** ***Routines and expectations*** Methods Variables Graphs and presenting data Equations **Chemistry** States of matter Atoms and elements Compounds and formulae Pure substances and mixtures Separation techniques Changing Atomic Theories (Dalton, Bohr) Protons, Neutrons and Electrons Electron configuration Isotopes The periodic table The modern periodic table Mini-quiz Ions of Metals and non-metals Uses of metals Corrosion (EXT) Corrosion prevention (EXT) Transition metals (EXT) Properties of transition metals (EXT) Properties and uses of alloys (EXT) Alloys Periodic table groups 1, 7 and 0 Gas tests **3. literacy lesson** **4. Maths skills**	**Investigative Chemistry** Ions and ionic bonding Ionic compounds Covalent bonding and structures Giant covalent structures Fullerenes and Graphene Nanoparticles Metallic bonding Comparisons between different types of bonding Mini-quiz Word and symbol equations Conserving mass Balancing equations Metal reactions with water, acid, oxygen The Rock Cycle Composition of Earth Structure of the Earth Igneous rocks Sedimentary rocks Metamorphic rocks Fossil fuel formation The Earth's Atmosphere The carbon cycle Climate change Greenhouse effect Finite resources and recycling Redox, acids and Moles Ions Atom economy Electrolysis • Growth lesson • Assessment ***Local context: GM scientists***	**Physics** Energy and waves Energy types and transfers Renewable and non-renewable sources Insulation Comparing energy sources Power and work done Efficiency Kinetic energy and GPE Elastic potential energy Waves Measuring speed of sound EM spectrum Reflection Refraction **New Space topic:** **Solar system and day and night recap** **Phases of the moon** **Eclipses** **Gravity on other planets** **Space exploration** **5. literacy lesson** ***6. Local context: BAME scientists*** **7. Maths skills lesson**	**Science week** Forces Forces and effect of forces Scalars and vectors Resultant forces Speed and velocity Mass and weight Vector diagrams Distance time graphs Acceleration and terminal velocity Newtons laws Inertia Momentum Energy transferred in stopping Magnets and electromagnets Magnets and magnetic fields Moments Levers and gears Static electricity • ***Local context – UK scientists*** • **literacy lesson**	**Biology** Cell biology Cells Organisation Microscopes DNA Multiplying bacteria Cell cycle Cloning Cell division Sexual vs asexual reproduction inheritance Genetic diseases Stem cells Culturing microorganisms (EXT) Antiseptics (EXT) DNA structure (EXT) Protein synthesis (EXT) ***Local context: Women in science*** **8. Maths skills lesson**	**Revision** **End of year exams** Communicable diseases Pathogens Viral, fungal and bacterial diseases Barriers to disease Immune system Vaccination Antibiotic resistance Developing drugs The eye The Brain Plant diseases **literacy lesson**

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	Key Words(1 p/wk):	Isotopes, charge, lattice, properties, conductivity, mass number, atomic number.	Reactivity, electrostatic, intermolecular, moles, reactivity, electrode, delocalised.	Joules, watts, spring constant, wavelength, frequency, angle of incidence, energy stores, useful energy.	Newtons, Scale diagram, terminal velocity, stopping distance, field.	Eukaryotic, prokaryotic, organic bases, mitosis, cystic fibrosis, pluripotent.	Protest, virus, antibodies, natural selection, rose black spot fungus, HIV.
	Link to context/ Character/ Big ideas:	*1. All matter in the Universe is made of very small particles*	*1. All matter in the Universe is made of very small particles* *5. The composition of the earth and its atmosphere, and the processes occurring within them, shape the earth's surface and its climate*	*2. Objects can affect other objects at a distance* *4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event*	*2. Objects can affect other objects at a distance* *3. Changing the movement of an object requires a net force to be acting on it* *4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event*	*7. Organisms are organised on a cellular basis and have a finite life span* *9. Genetic information is passed down from one generation of organisms to another*	*7. Organisms are organised on a cellular basis and have a finite life span* *9. Genetic information is passed down from one generation of organisms to another* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms* *10. The diversity of organisms, living and extinct, is the result of evolution*
	Assessment Type:	Pre-post assessment, end of topic assessment	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment	end of year exam
10	*Topic(s):* ***Purple text indicates lessons that involves teaching and utilising maths skills***	Science skills Mediacity way Science skills **Biology** ***Cell biology (16 lessons)*** Cells Organisation **Microscopes** DNA **Multiplying bacteria** Cell cycle Cloning Cell division Diffusion and Osmosis Act. Transport.	**Biology** ***Organisation – continued (3 lessons)*** Gas exchange in plants Transpiration Translocation ***Infection and response – (16 lessons)*** Pathogens Communicable diseases Bacterial, viral diseases Protist and fungal diseases, Developing medicines, Antibiotic resistance, **Analysing data on health and disease**	**Chemistry** ***Periodic table (14 lessons)*** Atoms and elements States of matter Separation techniques Atomic structure Periodic table development Atomic theories Electron configuration **Isotopes** Ions Alkali metals Halogens Noble gases	***Quantitative Chemistry (6 lessons)*** **Atomic Mass and Formula Mass,** **Moles,** **Volume and Concentration,** **Conservation of Mass In Reactions,** **Reacting Masses.** ***Chemical changes (18 lessons)*** Acids and bases pH and neutralisation Reactivity series	**Physics** ***Energy (12 lessons)*** Energy transfers Energy stores Insulation Renewable energy Non-renewable energy **Work done and power** **Kinetic energy** **GPE** **Efficiency calculations** **Elastic potential energy** Springs ***Electricity (13 lessons)*** Circuit symbols Series and parallel	**Revision for end of year exams** **End of year exams** **Physics** ***Particle Model (8 lessons)*** States of matter **Changing states/heating and cooling graphs** **Specific latent heat** **Density** **Specific heat capacity** Particle motion in gases

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		Genetic diseases Stem cells ***Organisation (9 lessons)*** Cell organisation Heart Blood and blood vessels Digestive system Food tests Enzymes Enzymes in action pH and enzymes Plant tissues Lungs and Gas exchange in humans	**Using graphs and tables** Vaccinations CHD Non-communicable diseases Plant diseases ***Bioenergetics (6 lessons)*** Photosynthesis **Limiting factors of Photosynthesis** Aerobic respiration Anaerobic respiration Metabolism Fermentation ***Assessment*** ***Growth lessons*** ***Local context lesson: GM scientists***	***Bonding and structure (11 lessons*** Ionic structures and bonding Covalent bonding Simple covalent Giant covalent Fullerenes and Graphene Metallic bonding Comparing bonding types Alloys Use of metals ***Local context lesson: Famous/BAME scientists***	Extraction of metals Metal reactions with water, acid, oxygen Redox pH scale Acids and bases Strong and weak acids Displacement reactions Reactivity series Extraction of ores **Electrolysis of molten compounds** **Electrolysis of aqueous compounds** ***Local context lesson: UK scientists***	Current Potential difference Resistance **V = IR** LDRs Thermistors **IV characteristics** **Investigating resistance in wire** Mains electricity Plugs **Power equations** **Electrical energy equations** **Space topic (separate only)** ***Local context lesson: Women in science***	***Atomic structure (8 lessons)*** Atom structure Isotopes Nuclear radiation **Nuclear equations** Half life Radiation Irradiation and contamination Ionising radiation **Chemistry** Energy changes (4 lessons) Exothermic and endothermic reactions **Exo and endo Reaction profiles** **Measuring energy changes** **Bond energies**
	Key Words (1 p/wk):	Mitosis, meiosis, concentration gradient, lock and key, active site, denature.	Protest, virus, antibodies, rose black spot fungus, HIV, non-communicable, vector	.covalent, metallic, ionic, delocalised, alloy, energy levels.	Reduction, oxidation, displacement, ionisation, ore, reactivity series.	Dissipation, renewable, power, resistance, potential difference, current, charge.	Half life, activation energy, enthalpy, specific heat capacity, alpha, beta, gamma
	Link to context/ Character/ Big ideas	*7. Organisms are organised on a cellular basis and have a finite life span* *9. Genetic information is passed down from one generation of organisms to another*	*7. Organisms are organised on a cellular basis and have a finite life span* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms* *9. Genetic information is passed down from one generation of organisms to another*	*1. All matter in the Universe is made of very small particles*	*1. All matter in the Universe is made of very small particles*	*2. Objects can affect other objects at a distance* *4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event* *6. Our solar system is a very small part of one of billions of galaxies in the universe*	*1. All matter in the Universe is made of very small particles* *2. Objects can affect other objects at a distance*
	Assessment Type:	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment	End of year exam

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11	*Topic(s):*	**Baseline** **Chemistry 2** Rates of reaction Factors affecting rates Dynamic Equilibrium **Le Chateliers (H)** Investigating rates 1 Investigating rates 2 Organic Hydrocarbons Crude oil and Uses of crude oil Fractional distillation **Cracking (H)** Chemical analysis Purity and formulations Chromatography Test for common gases Atmosphere Early and developing atmosphere Greenhouse effect Global warming and climate change Human impact on atmosphere Reducing human impact Using resources Resources used by humans Water treatment **Phytomining/bioleaching (H)** LCA's/reduce,reuse,recycle **Physics 2** Forces Investigating springs Scalars and vectors	**Revision for PPE exams** **PPE exams** **PPE exam analysis, filling in the gaps.** **Physics 2** Forces Resultant forces Resolving resultant forces Distance time graphs Terminal velocity Newtons laws Stopping distances Reaction time Uniform acceleration (H) Inertia (H) Momentum (H) **Physics 2** Waves Intro to waves. wave equations refraction EM waves – uses EM waves – dangers Investigating IR radiation	**Physics 2** Magnetism Magnets Permanent and induced Electromagnets and solenoids **Biology 2** Homeostasis Homeostasis Nervous system Synapses and reflexes Endocrine system Blood glucose Diabetes Menstrual cycle Controlling fertility. **Biology 2** Inheritance DNA Reproduction Meiosis XY chromosomes Genetic diagrams Inherited disorders Variation Evolution Natural selection Selective breeding Anti-biotic resistance Genetic engineering Fossils Classification	**Revision for PPEs** **PPE exams** **PPE exam analysis** **Filling in the gaps** **Biology 2** Ecology Competition Biotic factors Adaptations Food chains and webs Predator prey relationships Measuring distribution of species Water cycle Carbon cycle Biodiversity Waste management Global warming Deforestation Conservation techniques **GCSE exam revision**	**GCSE exam revision** **Biology 1** **Chemistry 1** **Physics 1**	**GCSE exam revision** **Biology 2** **Chemistry 2** **Physics 2**

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		Distance speed and velocity Acceleration					
	Key Words(1 p/wk):	Equilibrium, Rf value, Phytomining, leachate, Potable, scalar, vector, velocity	Inertia, momentum, terminal velocity, wavelength, frequency, period, wave front.	Homozygous, heterozygous, zygote, sticky ends, glycogen, glucagon	Decomposers, carbon neutral, trophic levels, biotic, abiotic		
	Link to context/ Character/ Big ideas	*1. All matter in the Universe is made of very small particles* *5. The composition of the earth and its atmosphere, and the processes occurring within them, shape the earth's surface and its climate*	*2. Objects can affect other objects at a distance* *3. Changing the movement of an object requires a net force to be acting on it* *4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event*	*3. Changing the movement of an object requires a net force to be acting on it* *4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event* *7. Organisms are organised on a cellular basis and have a finite life span* *5. The composition of the earth and its atmosphere, and the processes occurring within them, shape the earth's surface and its climate* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms* *9. Genetic information is passed down from one generation of organisms to another* *10. The diversity of organisms, living and extinct, is the result of evolution*	*5. The composition of the earth and its atmosphere, and the processes occurring within them, shape the earth's surface and its climate* *8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms* *10. The diversity of organisms, living and extinct, is the result of evolution*	All big ideas	
	Assessment Type:	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment, November mock exam (PPE)	Pre-post assessment, end of topic assessment, required practical assessment	Pre-post assessment, end of topic assessment, required practical assessment, March mock exam (PPE)	GCSE exams	GCSE exams

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Key Questions:

1. What is the overarching intent for your curriculum?
   The curriculum is designed to build on knowledge from KS2, with Years 7 and 8 providing both an extension of learning from KS2 and a foundation for the forthcoming years at GCSE level. Y9 students learn a lot of GCSE related content but are officially in a foundation year, preparing for the GCSE curriculum. The use of the 12 Big Ideas, informed by research conducted by Harlen (2010), are a set of 12 diluted outcomes that describe the major understandings for all students to acquire by the time they leave school. The Big Ideas are used as a link through the curriculum, helping to focus the topics and design this curriculum.

2. How does this curriculum build student's knowledge of the world around them both locally and nationally?
   The curriculum is based on the National Curriculum and the AQA Combined Science trilogy specification. The use of the Big Ideas feeds into each topic and students are shown the Big idea in lessons to become familiar with these ideas whilst also helping to inform lesson planning. Real life examples are used in lessons where and when necessary, with the practicals are used to explore learning at greater depth and for students to apply learning into a practical context. News articles, current research and projects are used for students further explore specific concepts in detail, for example, during Science week in March students undergo a project that enables to explore a scientific issue that affects people locally and nationally, such as plastic pollution.

3. How is this curriculum designed to engage students and develop a passion for the subject?
   Many real life examples are used in lessons and the use of practicals naturally generate a lot of interest in Science. For example, microscopes, investigating speed and investigating rates of reaction are practicals, which commonly generate interest. The link to careers for some lessons will help students to put their science learning into perspective. Various phenomena, such as variation, space and health and disease will enable students to use personal experiences that relate to them whilst lesson sequences will enable progress to be made as we explore a lot of the fundamental knowledge in Y7 and Y8.

4. How does this curriculum cater for the needs of our students?

All students needs are catered for regardless of ability. Misconceptions and questions that students may have are addressed at the start of a new topic so that these misconceptions are not carried forward and, most importantly, corrected. The 7 guidelines proposed by the Education Endowment foundation were used to propose this curriculum, in particular the use of experiments to suit students who learn better by practical means. Content is regularly revisited during lessons. Assessments are

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reviewed; common topics that students struggled to grasp are then re-taught and revisited, with students then practising exam techniques in lessons to make them confident in answering the exam questions typically posed in exams.

5. How is assessment used to improve learning?

For summative assessment, all students will complete end of topic tests to assess learning that took place in that topic. This is assessed by the teacher and then reviewed by students to identify strengths and areas to learn further. The lesson that follows will involve the teacher re-teaching the content they have identified as an area to develop, with students completing growth tasks created by the teacher, which are designed to consolidate knowledge of the weaker areas. Regular low-stake recall quizzing is used for students to assess the learning that week and for previous knowledge, with the gaps in learning identified so that students then complete tasks that build their confidence and knowledge in those topics.

6. What skills will students develop that can be used in other subject areas and beyond their school life?

A multitude of skills learnt in Science can be applied to other subjects and beyond school life. These include the ability to summarise large pieces of information into succinct points, interpreting diagrams, reading and drawing graphs and tables to present data, using and processing numbers to calculate numerical responses, using practical skills to accurately measure, observe, record data and draw conclusions to test hypotheses. The ability to argue for and against, justifying conclusions and providing alternative arguments for a product or concept is a valued skill along with the other skills mentioned. A lot of the skills are used regularly in other subjects, such as calculating skills, presenting and interpreting data in Maths, forming and justifying an argument in English.

Examples of topics with British values: diet, genes and variation, contraception.

7. How is learning planned to progressively develop pupil's knowledge and understanding over time?

A large portion of knowledge required to access the GCSE curriculum is covered at a foundation level at KS3, including cells, chemical reactions, acids and alkalis and energy stores. As the students progress through the year groups they will learn and encounter new phenomena as well as revisiting previous content covered through interleaved practice at starts of lessons (discussed in Q8). As students move into KS4, with a large portion of basic knowledge covered at KS3, then explore them at GCSE level, and the lessons will involve revisiting KS3 content for that lesson to activate prior knowledge to access the deeper content.

The sequence of lessons is also planned so that key knowledge is taught first in a lesson before going deeper. For example, the structure of the atom is taught first before students learn about elements in Y7 and Y8. Cell structure is taught first before stem cells and organ systems so that students understand that all organ systems are made up of specialised cells. This way, confusion and insecure knowledge of sophisticated terminology and phenomena are minimised as students are instructed to use their prior and current knowledge.

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8. How is learning sequenced over time to ensure students retain knowledge and are more successful at recalling?
   Regular low-stake quizzing (Knowledge organisers) are used for students to revise and revisit previously taught material. This is assessed in a low stake quiz each week which students self-mark, set themselves feedback and act upon the feedback to fill in the gaps in their learning. This normally takes 30 minutes of a lesson. Every lesson will also have an interleaved 'Do now' task which includes current and previous knowledge, giving students the opportunity to revisit previous content. This strengthens the ability to recall facts, practice mathematical skills and use their knowledge to make progress in the next lesson.
   Teachers review assessments and identify gaps in learning. Growth tasks are used as part of the marking policy to provide students the opportunity to address their gaps in learning, using their knowledge and understanding of the content to answer the questions.

9. How is this curriculum adapted to cater for the needs of students with different starting points?
   Effective differentiation will be used in lessons to enable teachers to pitch their lesson to all students regardless of ability. A One-size-fits-all approach is not the correct method – students will have access to a number of support structures from teachers in lessons, for example, modelling is a frequent technique used in lessons to show what a good answer looks like. More able students will be encouraged to complete exam questions and other tasks independently with limited, if any, access to the modelling support. Students requiring extra support will be able to take advantage of the modelling so that they become aware of the question requires, how to build answers, and gain confidence and independence to access deeper knowledge.

10. How will you ensure teachers have the relevant knowledge, expertise and practical skills to deliver your curriculum effectively?
    All teachers are expected to regularly review the specification to ensure subject knowledge is up to date, relevant and strong. Team meetings are used to share good practice in teaching and learning, for example book looks, ways to teach certain topics and how the practical elements of the Science curriculum can be delivered in an effective way. Teachers will also have access to support directly from the exam board, Lead practitioners, access to feedback from previous exams to inform future planning and so students are taught effective exam practice, how to answer required practical questions and explore sophisticated phenomena.