Curriculum Intent:

The Science department at Kings College Guildford aims to:

- Deepen the educational experience of learners
- Build a solid foundation of subject knowledge and skills
- Allow students to develop understanding of the world around them and future challenges for society.
- Provide all of our learners with a broad and balanced experience based around the "Big Ideas" in Science.
- Inspire, enthuse and develop collaborative and practical skills
- Enable students to acquire the skills and knowledge necessary to encourage scientific thinking, enquiring minds and curiosity.
- Develop student understanding of the uses and implications of science in the real-world context.
- Develop students' scientific literacy for today, and for future studies and careers.
- Prepare our learners for future studies and careers.

Curriculum development:

- Move to 3 year KS3 and 2 Year KS4
- Use 3rd Year of KS3 to complete and consolidate KS3 curriculum as well as prepare students for GCSE content through use of appropriate stretch and challenge that form the foundations of the AQA KS4 specification.
- Collaborate with other faculties to sequence units in a way that complements delivery.
- Embedding of Direct Vocabulary Instruction and use of past paper questions into science teaching.
- Make use of homework to embed knowledge through the use of retrieval tasks.

The science curriculum at Kings College Guildford is in a period of transition, and is likely to see significant redevelopment ahead of next academic year, with a focus on improving the learning journey of students.

	Term 1	Term 2	Term 3		
	Introduction to Science	Particle model of matter	Atoms, Elements, Compounds		
	Links to KS2	3.5.1, 3.5.2,	3.5.4,		
Voor 7	Cells	Reproduction	Interdependence		
real /	3.8.2	3.9.2, 3.10.2,	3.9.1		
	Forces cause Movement	Energy changes, transfers and systems	Electric Circuits		
	3.1.1	3.3.2	3.2.1, 3.2.2		
	Reactants and Products	Pure and impure substances	Materials		
	3.6.1, 3.6.2, 3.6.3, 3.6.4	3.5.2,	3.6.1, 3.7.4		
Year 8	Nutrition and digestion	Respiration, photosynthesis and Gas exchange	Skeletal and Muscular		
	3.8.4	3.9.3, 3.9.4, 3.8.3, 3.8.4	3.8.1		
	Energy resources and heating	Electricity and Electromagnetism	Balanced and unbalanced forced		
	3.3.4	3.2.3, 3.2.4	3.1.2, 3.1.3, 3.1.4		
	The periodic table	Energetics	Balanced and unbalanced forced 3.1.2, 3.1.3, 3.1.4 Earth and atmosphere 2.7.1, 2.7.2, 2.7.4		
	3.5.3,	3.6.4,	3.7.1, 3.7.3, 3,7,4		
Voor 0	Inheritance, chromosomes, DNA and Genes	Health	Consolidation, End of Key Stage Assessment		
Teal 9	3.10.1, 3.10.3, 3.10.4	4.3			
	Space	Energy content and cost	Waves		
Pream Introduction to Science Links to KS2 Cells 3.8.2 Forces cause Movement 3.1.1 Reactants and Product 3.6.1, 3.6.2, 3.6.3, 3.6.4 Nutrition and digestion 3.8.4 Energy resources and I 3.3.4 3.3.4 Year 9 Inheritance, chromoso 3.10.1, 3.10.3, 3.10.4 Space 3.7.3 Atomic structure, Perior Year 10 Energy Year 11 Forces cause Movement	3.7.3	3.3.1, 3.3.3	3.4.1, 3.4.2, 3.4.3, 3.4.4		
	Atomic structure, Periodic Table and Bonding	Chemical Changes and Energy Changes	Rate and Extent of Chemical Changes		
	5.1, 5.2, 5.3	5.3, 5.4, 5.5,	5.6,		
Voor 10	Cells biology and Transport System	Health, Disease and Medical Development	Bioenergetics and Ecology		
real 10	4.1,4.2,	4.3	4.4, 4.7		
	Energy	Structure of Matter and Atomic Structure	Electricity and Magnetism		
	6.1	6.3, 6.4	6.2, 6.7		
Year 11	Earth and Atmosphere	Chemical Analysis, Industry and Organics	Consolidation, revision, exams		

5.7, 5.9, 5.10	5.7, 5.8, 5.10
Coordination and control	Evolution, Inheritance and Variation
4.5	4.6
Waves	Forces and motion
6.6	6.5

		Year 7			Mid - Year	End of Year		
Term 1	Sep	Oct	Nov	Dec	Identify the organelles found in plant and animal cells	Explain reproductive processes in plants and animals		
					Be able to explain the function of organelles in animal and	Understand the fundamentals of particle theory		
Science	ce Introduction to Science			ce	plant cells.	including state changes		
Biology	Cells and organisation							
Chemistry	The Particulate Nature of Matter			Matter	Explain the organisation of organisms.	Identify and describe different types of energy		
Physics	Forces and motion				Understand the stages involved in a scientific investigation	Describe and explain energy transfers in systems		
					Understand forces as pushes/pulls that effect the	Interpret and construct sankey diagrams to show energy		
Term 2	Jan	Feb	Mar	Apr	movement/shape of objects	transfers		
						Explain the difference between atoms, elements,		
Biology		Repro	duction		Jse the relationship linking speed, distance and time. mixtures and compounds			
Chemistry	Atom	ns, Elemer	nts, Compo	ounds	Draw and interpret motion graphs	Construct and explain simple food chains.		
	Ener	gy change	es, transfer	s and				
Physics		sys	tems		KS2 Consolidation	Recognise and draw simple circuits using symbols		
Term 3	May	June	July		Properties and changes of materials	KS2 Consolidation		
Biology	Relat	ionships i	in an Ecosy	/stem	Forces	Electricity		
Physics	Electricity	Y			Animals inc humans	Animals inc humans		
						properties and changes of materials		
						living things and their habitats		

	١	/ear 8			Mid- Year	End of Year
						Explain conduction, convection, radiation and methods of
Term 1	Sep	Oct	No	Dec	Recognise and explain examples of interdependence in ecosystems	insulation
					Understand current, potential difference and resistance in series and	
Bio	o Nutrition and digestion			estion	parallel circuits	Explain aerobic and anaerobic respiration using equations.
					Know the function of each nutrient group and the main stages of	
Chem	C	hemica	al react	ions	digestion.	Know the equation for photosynthesis.
	En	ergy re	esource	s and		Understand the process of photosynthesis and the factors
Phy	heating				Understand that atoms are rearranged in chemical reactions.	that affect it.
						Explain the difference between a pure and an impure
Term 2	Jan Feb Ma Ap		Ар	Construct simple word equations for reactions.	substances.	
		Resp	piration	,		
	pho	tosynt	hesis ar	nd Gas		
Bio		exc	hange		Describe different methods of generating electricity	Understand methods used to separate impure substances
		Pure a	nd impւ	ure		
Chem		sub	substances		Know different methods of thermal energy transfer.	Explain how the poles of magnets may interact.
		Electr	ricity an	d		
Phy	E	lectro	magnet	ism	KS2 + KS3 Consolidation	Know the key features of electromagnetism.
Term 3	Ma	Jun	July		Animals inc humans	Know the reactivity series of metals
Biol	Ske	eletal a	ind Mus	scular	properties and changes of materials	Know the properties of different materials.
Chem		Ma	terials		Electricity	KS2 + KS3 Consolidation
	Balaı	nced a	nd unba	alanced		
Phy		fc	orces		Year 7: Interdependence, Particle theory, Energy	properties and changes of materials
						living things and their habitats
						Animals inc humans
						Year 7: Cells, Energy transfers, particle theory, ecosystems

		Year 9			Mid-Year	End of Year
					Explain the features and functioning of the skeletal and	
Term 1	Sep	Oct	Nov	Dec	muscular systems.	Explain natural selection and evolution.
	Inherita	ince, chror	nosomes,	DNA and		
Bio		Ge	enes		Explain the effects of balanced and unbalanced forces.	Explain day length and seasons.
Chem		The peri	odic table		Understand that characteristics are inherited.	Understand and calculate the cost of electricity.
Phy		Sp	ace		Know the causes of variation	Calculate power of electrical devices.
Term 2	Jan	Feb	Mar	April	Know the structure of DNA	Understand the properties and uses of waves.
Bio Health					Understand the arrangement of elements on the periodic table.	Understand how sound is produced, travels and is detected.
Chem Energetics					Understand the relationship between gravity, mass and weight.	Ability to predict the outcome of reactions and knowledge of different types.
Phy	Ei	nergy cont	tent and co	ost	Explain the conditions on different planets.	Construct and interpret energy level diagrams.
Term 3	May	June	July		KS2 + KS3 Consolidation	Explain Earth's structure and atmosphere.
Bio		Conso	lidation		Animals inc humans	Understand the effect of human activity on the Earth.
Chem	E	Earth and a	atmosphe	re	Evolution and inheritance	Explain causes, spread, treatment and prevention of disease.
Phy		Wa	aves		Earth and Space	Understand behaviour of light
					Year 7: Cells and organisation, Forces, Reproduction, Atoms, Elements, Compounds	KS2 + KS3 Consolidation
					Year 8: Chemical reactions, Forces,	Animals inc humans
						Evolution and inheritance
						light
						Forces

Year 7: Cells and organisation, atoms, elements,

compounds, forces and motion

Year 8: Nutrition and digestion, chemical reactions forces, materials

		Year 10	C		Mid- Year	End of Year			
Ter	Septe	Octo	Nove	Dece	Explain the movement of substances into and out of cells by	Be able to explain the cause, symptoms and treatment of			
m 1	mber	ber	mber	mber	diffusion, osmosis and active transport	diseases affecting both plants and animal.			
						Ability to explain the factors that affect the rate of			
	Cells	biology	and Trans	sport	Explain use of microscopes including the purpose of different	photosynthesis and the importance of the process for all life on			
Bio		Sys	tem		lenses	Earth.			
					Ability to use models to summarise how the atom has changed	Ability to evolution the offect ventous biotic and objetic factors			
Che	Che Atomic structure, Periodic Table			ic Table	over time and the scientific discoveries as well as the scientists	Ability to explain the effect various blotic and abiotic factors			
m	m and Bonding				involved in the development of the atom.	can have on organisms within an ecosystem.			
					Ability to use knowledge of the periodic table and periodicity	Be able to explain various factors that affect reaction rates and			
					to predict and explain trends in the elements and their	how conditions can be altered to speed up or slow down a			
Phy		Ene	ergy		reactions.	reaction.			
	Januar Febr			Be able to explain ionic, covalent and metallic bonding and	De alla ta avalain the carlos decay and water avalas in datail				
Ter			Januar Febr			how the type of bonding links to the properties of the	Be able to explain the carbon, decay and water cycles in detail		
m 2	у	uary	March	April	compounds formed.	giving reasons for their importance.			
					Be able to evaluin ionic, covalent and metallic bonding and	Be able to explain how the equilibria of a reversible reaction			
					be able to explain former, covalent and metallic bonding and	can be shifted by altering pressure and or temperature due to			
	Healt	h, Disea	se and Mo	edical	now the type of bonding links to the properties of the	the energy changes involved or moles of gas present in a			
Bio		Develo	opment			reversible reaction.			
					Ability to summarise and explain different types of chemical	Ability to link kinetic theory to the particle model of matter and			
Che	Chemi	cal Char	iges and E	Energy	Ability to summarise and explain unreferring person chemical	calculate specific latent heat of fusion and or vaporisation			
m		Cha	nges		reactions with inclusion of chemical equations.	during state changes.			
					Ability to explain the energy changes involved in different				
Phy Structure of Matter and Atomic			atter and	Atomic	systems using Sankey diagrams to represent them and	Able to explain and use the specific heat capacity equation.			
S		Stru	cture		efficiency calculations from data.				
Ter					Be able to explain different energy resources and evaluate the	Ability to explain what isotopes are and the radioactivity that			
m 3	May	June	July		use of each method.	result from unstable isotopes.			

Bio	Bioenergetics and Ecology	Ability to explain the penetration power, dangers and uses of radioactivity and calculate half life
	Rate and Extent of Chemical	Ability to explain the magnetic field produced around bar
Che	Changes	magnets, wires, solenoids and electromagnet.
		Be able to explain the nature of magnetism and
Phy	Electricity and Magnetism	electromagnetism.

		Year 11			Mid Year	End of Year		
Term 1	September	October	November	December	Be able to explain the structure and function of the human endocrine and nervous system.	Understand the importance of variation and how it results from genes and environment.		
Biology	(Coordinatio	n and control		Understand the role of negative feedback in maintaining constant conditions.	Be able to comprehensively explain the theory of evolution brought about by the mechanism of natural selection.		
Chemistry		Earth and A	Atmosphere		Understand the importance of homoeostasis and be able to describe specific examples (blood sugar, water balance, temperature)	Understand how organisms are classified and be able to describe systems of classification.		
Physics		Wa	aves		Be able to comprehensively explain the changes in the Earth's atmosphere that have taken place over time and continue to take place as a result of human impact on the environment.	Understand the processes involved in producing potable water.		
Term 2	January	February	March	April	Evaluate the effects of different atmospheric pollutants.	Be able to define pure and impure substances and understand formulations as useful mixtures developed by industry.		
Biology	Evolut	ion, Inherit	ance and Var	iation	3e able to explain to properties and behaviour of both transverse and ongitudinal waves.Ability to comprehensively explain how various separat used and when to use them.			
Chemistry	Chemica	l Analysis, I	ndustry and (Organics	Understand the sources, uses, properties, dangers and detection of EM waves.	Understand the purpose of LCAS and be able to evaluate them.		
Physics		Forces a	nd motion			Develop understanding of forces and motion with a view to being able to draw and interpret motion graphs and use newtons laws to explain motion.		
Term 3	May	June	July			Ability to distinguish between and explain vectors and scalars.		
Biology								
Chemistry	Exams							
Physics								

5 Year Cu	rriculum	Map: Bio	logy								
Area	Big Idea	7	Area of Specificati on	8	Area of Specificati on	9	Area of Specificati on	10	Area of Specificati on	11	Area of Specificati on
Organism s	Cells are living	Cells Cell structure Speciallised cells	3.8.2			Cell Biology and Inheritance Cell structure Cell division Transport in cells	3.10.4 & 4.1 4.1.1 4.1.2 4.1.3				
	Bodies are systems			Tissues & organs Gas exchange	3.8.2 3.8.3	Organisatio n & Systems Principles of organisatio	3.8 & 4.2 4.2.1	Homeostasis and response Homeostasis	4.5 4.5.1		
				Cell Organisiatio n	384	n Animal tissues, organs and organ systems	4.2.2	Hormonal coordination in humans	4.5.3		

			System					
		Interdepende 3.9.1			Infection and response	4.3		
		Feeding relationships			Communicabl e diseases	4.3.1		
		Competition			Ecology	4.7		
Ecosyste ms	Organisms are independen t				Adaptations, interdepende nce and competition	4.7.1		
		Biotic & abiotic factors			Biodiversity and the effect of human interaction on ecosystems	4.7.3		
			Respiration 3.9.3		Bioenergetics	4.4		
			Aerobic respiration		Photosynthesi s	4.4.1		
	Ecosystems		Anaerobic respiration		Respiration	4.4.2		
	recycle		Photosynthe		Organisation			
	resources		sis 3.9.4		of an ecosystem	4.7.2		
					Plant tissues,			
					organs and systems	4.2.3		
Genes	Characterist ics are inherited	Human 3.10.2 Reproduction		Genetics 3.1 &4.6	,		Inheritance & variation	4.6
		Sexual & asexual		The developme nt of understandi			Reproducti on	4.6.1

	Menstrual cycle Embryo development			ng of genetics and evolution Classificatio n of living organisms	4.6.4	Variation and evolution	4.6.2
		Life Diversity	3.10.1			Evolution The developme nt of understandi	4.6.2
Species show variation		selective	3.10.1			ng of genetics and evolution Classificatio n of living	4.6.3
		breeding Natural selection	3.10.3			organisms	

5 Year C	Curriculum I	Map: Chemis	stry								
Area	Big Idea	7	Area of Specificatio n	8	Area of Specificatio n	9	Area of Specificatio n	10	Area of Specificatio n	11	Area of Specificatio n
Matte r	Structure determine s properties	Particle model of matter	3.5	Pure substances	3.5.2	Atomic structure and the periodic table	3.5.3 & 5.1	Structure & bonding	5.2	Carbon chemistry	5.7
		Particle model	3.5.1	Elements & compound s	3.5.4	Model of the atom, symbols, relative atomic mass, electronic charge and isotopes	5.1.1	Chemical bonds, ionic, covalent and metallic	5.2.1	Carbon compounds as fuels and feedstock	5.7.1
		Mixtures & solutions	3.5.2	Physical properties	3.5.3	The Periodic Table	5.1.2	bonding and structure & properties of substances	5.2.2	Identification of common gases	5.8.2
						Purity, formulations and chromatograph Y	5.8.1	Structure and bonding of carbon Electrolysis	5.2.3 5.4.3		

	Changing Substances	3.6	Reactants & products	3.6	Matter & Energy Changes	3.5, 3.6, 5.5 & 5.6	Rate of reaction & chemical changes	5.6 & 5.4	Quantitative chemistry	5.3
Reactions	Chemical & physical changes	3.5.3	Acid reactions	3.6.2	Exothermic and endothermic reactions	5.5.1	Reaction rates	5.6.1	Chemical measurements , conservation of mass and chemical equations	5.3.1
matter	pH scale & neutralisatio n	3.6.2	Metals & Non- metals	3.6.1	Rate of reaction	5.6.1	Reversible reactions and dynamic equilibrium	5.6.2	Use of amount of substance in relation to masses of pure substances	5.3.2
	Types of reaction	3.6.4	Chemical energy	3.6.3			Reactivity of metals Reactions of acids	5.4.1 5.4.2		
			Earth Structure	3.7.1	Using resources	3.7.4 & 5.10	Chemistry of the Atmospher	5.9		
Earth systems interact			Earth Processes & Potable water		Using the Earth's resources and obtaining potable water	5.10.1	The compositio n and evolution of the Earth's atmosphere	5.9.1		
			Climate	3.7.3	Life cycle assessment and recycling	5.10.2	Carbon dioxide and methane as greenhouse gases	5.9.2		

		Common	
		atmospheri	
		c pollutants 5.9.3	
		and their	
		sources	

5 Year C	5 Year Curriculum Map: Physics										
Area	Big Idea	7	Area of Specificatio n	8	Area of Specificatio n	9	Area of Specificatio n	10	Area of Specificatio n	11	Area of Specificatio n
		Forces	3.1	Forces cause movement	3.1	Forces	3.1 & 6.5			Forces and Motion	3.1 & 6.5.4
		Balanced or unbalance d	3.1.3	Speed	3.1.1	Forces and their Interaction s	6.5.1			Describing motion along a line	6.5.4.1
Forces	Forces predict motion	Friction		Motion graphs		Work done & energy transfer	6.5.2			Forces, acceleration s and Newton's Laws of motion	6.5.4.2
roices		Density & pressure	3.1.4			Forces & elasicity	6.5.3			Forces & breaking	6.5.4.3
										Momentum (HT)	6.5.5 (HT)
	Fields produce forces			Gravity	3.1.2			Magnetism & Electromagnetis m	3.2 <i>,</i> 3.3 & 6.7		
				Density & pressure	3.1.4			Magnetic Force	6.7.1		
				Universe	3.7.2			Current & magnetism			

								Motor effect	6.7.2		
	Energy is conserve d	Energy	3.3			Particle model of matter	3.1, 3.3 & 6.3			Energy	3.3 & 6.1
Energ		Energy transfers	3.3.2			Change of state & particle model of matter	6.3.1			Energy changes and stores in a syatem	6.1.1
		Work	3.3.3			Internal energy and energy transfers	6.3.2			Conservatio n and dissipation of energy	6.1.2
						Particle model and pressure	6.3.3			National and global energy resources	6.1.3
У	Electricity transfers	Electric Circuits	3.2	Electrical Energy	3.2 & 3.3			Electricity	3.2, 3.3 & 6.2		
		Voltage & resistance	3.2.1	Electricomagnet s	3.2.3			Current, potential difference and resistance	6.2.1		
	energy	Current	3.2.2	Magnetism	3.2.4			Series and parallel circuits	6.2.2		
				Energy costs	3.3.1			Domestic uses & safety	6.2.3		
								Energy transfers	6.2.4		
	Radiation			Light	3.4.2	Waves	3.4 & 6.6	Waves	3.4 & 6.6	Atomic Structure	3.5, 3.6 & 6.4
	energy			Reflection		Sound	3.4.1	Waves in air, fluids & solids	6.6.1	Atoms and isotopes	6.4.1

	Refraction	Wave effects	3.4.3	Electromagnetic Waves	6.6.2	Atoms and nuclear radiation	6.4.2
		Wave Properties	3.4.4				

KS3 Brain banks to be developed by end of summer term 2 in teams ready for September 2020

Physics		Chemistry		Biology	GAR & MOU
Thysics	KS2 Forces types weight	chemistry		Diology	
	mass force fields changing			20	
2 1 Forcos	shane/shaned	2 E Mattar	Voor 4 States of Matter	Organisms	
5.1 Forces	snape/speed,	3.5 Waller	fear 4 - States of Matter	Organisms	
2446		3.5.1 Particle		3.8.1	
3.1.1 Speed	No Brain Bank	model	No Brain Bank	Movement	No Brain Bank
		3.5.2			
		Separating			Brain Bank Combined with Musles and Skeleton,
3.1.2 Gravity	No Brain Bank	mixtures	No Brain Bank	3.8.2 Cells	Microscopes, organ systems and joints
3.1.3 Contact		3.5.3 Periodic		3.8.3	
forces	Year 5	table	No Brain Bank	Breathing	No Brain Bank
3.1.4		3.5.4		3.8.4	
Pressure	No Brain Bank	Elements	No Brain Bank	Digestion	No Brain Bank
3.2					
Electromagn				3.9	
ets		3.6 Reactions		Ecosystems	
3.2.1 Voltage		3.6.1 Metals		3.9.1	
and	Year 6 Electricity - (Unlimited	and non-		Interdepend	
resistance	Extra Download - £6.24 p/m)	metals	No Brain Bank	ence	No Brain Bank
					Year 5 Knowledge Orangiser - Plant and human
	Year 4 Electricity - (Unlimited	3 6 2 Acids		392 Plant	reproduction both on same under living things and
3 2 2 Current	Extra Download - $f6.24 \text{ p/m}$	and alkalis	No Brain Bank	reproduction	their habitats
2.2.2 current		262			
5.2.5		5.0.5 Chomical		202	
oto	No Prain Pank	chemical	No Brain Bank	5.5.5 Decemination	No Brain Bank
ets		energy		Respiration	
				3.9.4	
3.2.4		3.6.4 Types		Photosynthe	
Magnetism	Year 3 - Magnets	of reaction	No Brain Bank	sis	No Brain Bank
3.3 Energy		3.7 Earth		3.10 Genes	
3.3.1 Energy		3.7.1 Earth		3.10.1	
costs	No Brain Bank	structure	No Brain Bank	Variation	No Brain Bank
3.3.2 Energy	No Brain Bank	3.7.2	No Brain Bank	3.10.2	Year 5 Knowledge Orangiser - Plant and human

transfer		Universe		Human	reproduction both on same under living things and
				reproduction	their habitats
			Year 2 - the environment /		
			Geography - Climate change no	3.10.3	Evolution and Inheritance - year 6 Knowledge
3.3.3 Work	No Brain Bank	3.7.3 Climate	year/KS	Evolution	Organise (unlimited extra download - £6.24 p/m)
3.3.4 Heating		3.7.4 Earth		3.10.4	Evolution and Inheritance - year 6 Knowledge
and cooling	No Brain Bank	resources	No Brain Bank	Inheritance	Organise (unlimited extra download - £6.24 p/m)
3.4 Waves					
				Introduction	
3.4.1 Sound	Year 4 - Sound			to Science	\checkmark
3.4.2 Light	Year 6 - Light				
3.4.3 Wave					
effects	No Brain Bank				
3.4.4 Wave					
properties	No Brain Bank				

Blueprint Samples

- To be evaluated for use by subject teams ready for discussion in next department meeting on 18th of May
- Webinar to be arranged with Tony Sherbourne following this meeting.
- Blueprint samples to be trialled with groups of students during summer term as a tool for "Plugging gaps" if circumstances allow with a view to use in September with Year 7 cohort.

Super Science

- To be developed ahead of September by GAR with support of FOR to include KS2 consolidation topics.