Curriculum plan: Science

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INTENT:

“Look deep into nature, and then you will understand everything better”

Albert Einstein

The intent of the science department is to convey to students that science underpins everything.

At The King’s, we study:

- **Physics** to be able to understand the fundamental principles that govern all Energy and matter in the Universe. Physics gives us tools to understand nature from the scale of a sub-a-tomic particles up to the inter-galactic scale of the universe;
- **Chemistry** to be able to understand the nature of substances: how they are composed, their behaviors, and their physical and chemical properties. Chemistry allows us to identify unknown substances, monitor concentrations and synthesize new chemicals. Above all, chemistry is about finding solutions to the problems that concern us and our surroundings;
- **Biology** to be able to understand life and thereby understand ourselves. Biology allows us an understanding od the amazing complexity of many life processes and mechanisms. Biology encourages us to seek out reasons for strange, surprising and sometimes usual observations.

Science provides some incredibly challenging topics helping to gauge an awareness of topical issues and their impact on the climate, earth as well as human growth.

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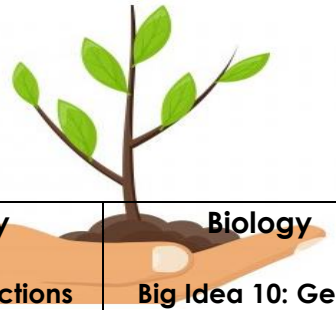
Please click on the icons to access our online portal where you can learn more about each topic*

Half term points

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
7	**Safety in science** **Big Idea 1: Forces** Speed and Gravity **Learning to include:** • how forces act as interactive pairs • balanced and unbalanced forces • calculating the speed of a moving object • interpreting distance time graphs • the effect gravitational field strength	**Chemistry** **Big Idea 5: Matter** Particle model & separating mixtures **Learning to include:** • the particle model • states of matter • melting, freezing, boiling • changes between each state of matter • how particles move • the effects of pressure on particles • solutions and solubility • filtering, evaporation, distillation, chromatography	**Biology** **Big Idea 9: Ecosystems** Interdependence and plant reproduction **Learning to include:** • food chains and webs • interdependence and bioaccumulation • ecosystems and niche • competition between organisms • flowers and pollination • fertilisation and germination • methods of seed dispersal	**Physics** **Big Idea 3: Energy** Energy costs and energy transfer **Learning to include:** • energy in foods and fuels • energy resources • calculating energy and power of appliances • conservation of energy and transferring energy • energy dissipation and efficiency	**Chemistry** **Learning Big Idea 7: Earth** Structure and the Universes **Learning to include:** • the structure of the earth • sedimentary rocks • igneous and metamorphic rocks • the rock cycle • ceramics • the solar system • the structure of the earth • the phases of the moon	**Physics** **Big Idea 4: Waves** Sound and Light **Learning to include:** • sound waves and speed • loudness and amplitude • frequency and pitch • the ear and hearing • light waves and speed • reflection • refraction • the eye and vision • colour

The King's CHURCH OF ENGLAND SCHOOL KIDSGROVE Curriculum plan: Science



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	Biology	Physics	Chemistry	Biology		
	Big Idea 8: Organisms Cells and organisms	**Big Idea 2: Electromagnets** Current and resistance	**Big Idea 6: Reactions** Metals & Non metals Acids and Alkali	**Big Idea 10: Genes** Variation and human reproduction		**Project** Independent research project based on Jurassic Park – Link: Evolution, Genetic information and DNA

	Learning to include:
	• levels of organisation in organisms
	• the structure of the skeleton
	• movement of joints
	• movement of muscles
	• how to observe cells
	• structure of animal and plant cells
	• how specialised cells are adapted
	• how substances move into and out of cells uni-cellular organisms
		Learning to include:
		• defining and explaining how potential difference affects components
		• the effect of resistance on components
		• series and parallel circuits
		• defining and explaining the effect of current electric charge
			Learning to include:
			• chemical reactions
			• acids & alkalis –
			  ○ indicators and PH
			  ○ acid strength
			  ○ neutralization
			• making salts
			• chemical reactions:
			  ○ metals and oxygen
			  ○ metals and water
			  ○ metal displacement reaction
				Learning to include:
				• variation between organisms
				• continuous and discontinuous variation
				• organisms adapting to change
				• adolescence
				• reproductive systems
				• fertilisation and implantation
				• development of a foetus
				• the menstrual cycle		

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Half term points

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2

8	**Safety in science**
	
	Big Idea 1: Forces
	Contract forces and pressure
	
	Learning to include:
	• friction and drag
	• the effect of squashing and stretching forces
	• turning forces
	• pressure in gases, liquids and solids
	• impact of stress on solids
	
	Bitesize
		Chemistry
		
		Big Idea 5: Matter
		Elements and the periodic table
		
		Learning to include:
		• elements, atoms, compounds
		• identifying chemical formulae
		• polymers
		• the periodic table
		• the properties of groups in the periodic table
		  ○ Group 1
		  ○ Group 7
		  ○ Group 0
		
		Bitesize
			Biology
			
			Big Idea 9: Ecosystems
			Photosynthesis
			
			Learning to include:
			• aerobic respiration
			• anaerobic respiration
			• biotechnology
			• the process of photosynthesis
			• the structure and function of leaves
			• investigating photosynthesis
			• the role of plant minerals
			
			Bitesize Bitesize
				Chemistry
				
				Big Idea 6: Reactions
				Chemical energy and types of reactions
				
				Learning to include:
				• atoms in chemical reactions
				• combustion
				• thermal decomposition
				• conservation of mass
				• exothermic and endothermic reactions
				• energy level diagrams
				• bond energies
				
				Bitesize
					Biology
					
					Big Idea 10: Genes
					Evolution and inheritance
					
					Learning to include:
					• the process of natural selection
					• the history and work of Charles Darwin
					• preserving biodiversity
					• inheritance
					• the structure of DNA
					• genetics and inherited characteristics
					• genetic modification
					
					Bitesize
						Chemistry
						
						Big Idea 7: Earth climate and Earths resources
						
						Learning to include:
						• global warming
						• the carbon cycle
						• climate change
						• extracting metals
						• recycling
						
						Bitesize

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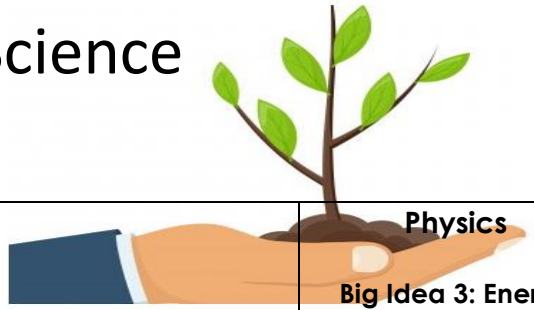

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	Biology	Physics		Physics	Physics	
	Big idea 8: Organisms Breathing and digestion **Learning to include:** • gas exchange • the mechanism of breathing • the effects of drugs, alcohol and smoking on the body • nutrient required by the body • testing foods • unhealthy diet and its impact • the structure of the digestive system • the role of bacteria and enzymes in digestion	**Big Idea 2: Electromagnets** Electromagnets: Magnetism and electromagnets **Learning to include:** • magnets and magnetic field • electromagnets • the use of electromagnets		**Big Idea 3: Energy** Work, heating and cooling **Learning to include:** • work energy and machines • energy and temperature • energy transfer between particles • energy transfer: radiation and insulation	**Big Idea 4: Waves** Wave effects and properties **Learning to include:** • sound waves, water waves and energy • radiation and energy • modelling waves	**Independent research project based on the Martian**