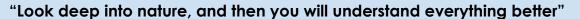


Curriculum plan: Science combined









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.





*The King's CHURCH OF ENGLAND CHURCH OF ENGLAND





	Please	click on the icons to a	ccess our online porta	I where you can learn	more about each top	oic			
	Half term points								
	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2			
	Cell Biology	Infection and response	Atomic structure and the periodic table	Quantitative Chemistry	Energy	Particle mo <mark>del of matter</mark>			
	<u> </u>	<u>•</u>	<u> </u>	<u>•</u>	<u>•</u>	6			
•	Learning to include: Cell structure and transport the use of microscopes animal and plant cells transport of substances exchanging materials Cell Division mitosis growth and differentiation stem cells	Learning to include: Communicable diseases health and disease preventing infections viral diseases bacterial diseases diseases caused by fungi and protists the human defence response growing bacteria plant diseases and defence Preventing and treating disease vaccinations antibiotics and painkillers discovering and developing drugs making and using monoclonal antibodies Non-communicable disease cancer smoking and the risk of disease diet, exercise and diseases alcohol and other carcinogens	Learning to include: Atomic structure atoms chemical equations methods of separation history of the atom and its structure ions, atoms and isotopes electronic structure The periodic table the development of the periodic table group 1 group 7 explaining trends the transition elements	Learning to include: Chemical calculations relative masses and moles equation and calculations from masses to balanced equations expressing concentrations yield and atom economy	Learning to include: Conservation and dissipation of energy	Learning to include Electric circuits			

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Organisation



Learning to include: Organisation and the digestive system

- tissues and organs
- the human digestive system
- the chemistry of food
- catalysts and enzymes
- the factors affecting enzymes
- making digestion efficient

Organising animals and plants

- the blood
- the structure of blood vessels
- the structure and function of the heart
- helping the heart
- breathing and gaseous exchange
- transport system in plants
- evaporation and transpiration

Bioenergetics



Learning to include: Photosynthesis

- the rate of photosynthesis
- how plants use glucose
- making the most of photosynthesis

Respiration

- aerobic respiration
- the body's response to exercise
- anaerobic respiration
- metabolism and the liver

Bonding, structure and



Learning to include: Structure and bonding

- states of matter
- atoms and ions
- bonding: ionic and covalent
- giant ionic and giant covalent structures
- metallic bonding
- nanoparticles and their application

Chemical changes



Learning to include: Chemical changes

- the reactivity series
- displacement reactions
- extracting metals
- making salts
- neutralisation and the PH scale

Electrolysis

- introduction to electrolysis
- changes at the electrodes
- the extraction of aluminium
- electrolysis of aqueous solutions



Topic 5: Energy Changes



learning to include: energy changes

- exothermic and endothermic reactions
- using energy transfers
- reaction profiles
- bond energy calculations
- chemical cells and batteries
- fuel cells

Electricity



Learning to include: Energy resources

- energy demands
- renewable energy: wind, water, sun and earth
- energy and the environment

Atomic structure



Learning to include: Radioactivity

- atoms and radiation
- the discovery and changes to the nucleus
- alpha, beta and gamma radiation
- activity and half-life
- nuclear radiation in medicine
- nuclear fission
- nuclear fusion
- nuclear issues

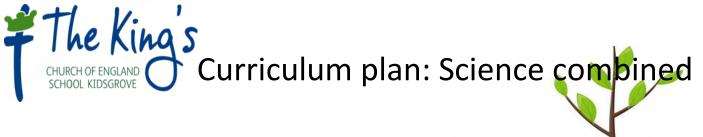








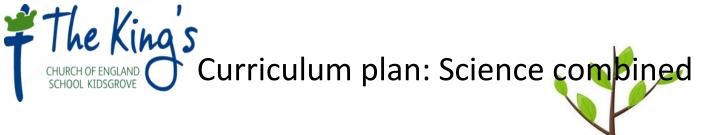






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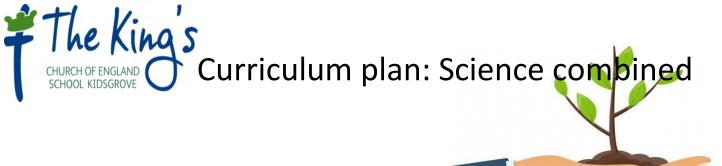
Half term points						
AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2	
Homeostasis and response	Inheritance, variation and evolution	Ecology	The rate and extent of chemical change	Chemical analysis	Using resources	
Learning to include: The human nervous system the principles of	Learning to include: Reproduction Types of reproduction	Learning to include: Adaptations, interdependence and competition	Learning to include: Rates and equilibrium rates of reaction	Learning to include: Chemical analysis • pure substances and	Learning to include: The Earth's resources Finite and renewable	
homeostasis the structure and function of the nervous system reflex actions the brain the eye and problems	cell division in sexual reproduction DNA and the genome inheritance genetic disorders and screening for genetic disorders	the importance of communities distribution and abundance competition in animals and plants adaptations in animals	collision theory factors that affect rates of reactions reversible reactions dynamic equilibrium the development of the periodic table	mixtures	resources water safe to drink treating waste water extracting metals fror	
Hormonal coordination principles of hormonal control controlling blood glucose treating diabetes negative feedback	 protein synthesis gene expression Variation and evolution Variation natural selections 	and plants Organising an ecosystem feeding relationships materials cycling the carbon cycle	• Group 1 • Group 7			
 human reproduction and artificial control of fertility infertility treatment plant hormones and their response 	 selective breeding genetic engineering cloning Genetics and evolution history of genetics theory of evolution evidence for evolution 	Biodiversity and ecosystems the human population explosion land, water and air pollution deforestation and peat destruction	Organic chemistry	Chemistry of the atmosphere		
	fossils and extinction classification the new system of classification	global warming trophic levels food production and security biomass transfer	Learning to include: Crude oil and fuels hydrocarbons fractional distillation burning hydrocarbons cracking hydrocarbons	Learning to include: The Earth's atmosphere history of our atmosphere our evolving atmosphere greenhouse gases global climate change atmospheric pollutants		
				<u>@</u>		







	Half term points								
AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2				
Forces	Waves	Required Practicals	Required Practicals	Required Practicals	Grade range end point:				
Learning to include: Forces in balance vectors and scalars forces between objects resultant force levers and gears centre of mass parallelogram of force resolution of force moments and equilibrium Motion speed-distance time graphs velocity and acceleration analysing motion graphs Forces and motion Force and acceleration Weight and terminal velocity Force and braking Momentum Forces and elasticity Impact forces Safety first	Learning to include: Wave properties the nature of waves the properties of waves reflection and refraction seismic waves ultrasound Electromagnetic waves The electromagnetic spectrum Light, infra-red, microwaves and radio waves Communication UV, X-rays and gamma rays Using X-rays in medicine Magnetism and Electromagnetics Learning to include: magnetic fields magnetic fields magnetic fields with electric currents the motor effect	Biology Learning to include:	Biology Learning to include: using a light microscope investigating the effect of a range of concentration on osmosis food tests the effect of PH on the rate of reactions of amylase enzymes investigating the effect of light intensity on the rate of photosynthesis investigating antiseptics Chemistry Learning to include: preparing a salt from an insoluble base investigating electrolysis of a solution investigating temperature change	Biology Learning to include: Investigate the effect of a factor on human reaction time measure the population size of a common species in a habitat investigating the effect of gravity on seedlings investigating the decay of milk Chemistry Learning to include: investigating the effect of concentration on the rate of a reaction calculating r values purifying and testing water	9-1				
		Physics Learning to include: electric circuits radioactivity forces and motion electromagnetism	Physics Learning to include: determining specific heat capacity investigating thermal insulators investigating resistance investigating electrical components calculating densities	Physics Learning to include: investigating the relationships between force and extension for a spring investigating the relationship between force and acceleration investigating plane waves in a ripple tank and waves in a solid investigating infrared radiations					



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