

The King's Curriculum plan: Science separate Connected

INTENT:



Albert Finstein

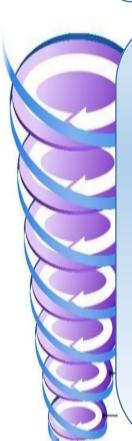
The intent of the science department is to convey to students that science underpins everything.

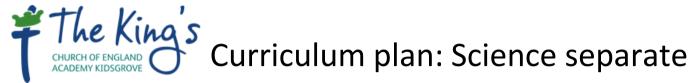
At The King's, we study:

- **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.







Connected

	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			
	Cell Division	Organisation	Infection and response	Infection and response	Bioenergetics	Required Prac <mark>tical</mark> Revision Biology paper 1			
	_					<u> </u>			
D	Learning to include: B2 Cell Division • mitosis • growth and differentiation • stem cells Organisation	Learning to include: B4 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 of classification	Learning to include: B5 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	disease exercise diet exercise and anaerobic respiration	B9 Respiration	Learning to include: Microscopy Microbiology Osmosis Enzymes Food test Photosynthesis Maths Skills Review			
	Learning to include: B3 Organisation and the digestive system • tissues and organs • the human digestive system • the chemistry of food • catalysts and enzymes • the factors affecting		B6 Preventing and treating disease						



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Electricity in the home Revisiting prior **Required Practical Energy Electric Circuits Atomic structure Revision Chemistry** learning: Energy paper 1 Learning to include: P7 Radioactivity P4 Electric circuits P5 Electricity in the home P1 Conservation and dissipation Making salts P2 Energy transfer by heating atoms and radiation alternating current current and charge of energy Electrolysis conduction the discovery and cables and plugs potential difference and changes in energy and Temperature changes infrared radiation changes to the nucleus electrical power and resistance energy conservation specific heat capacity alpha, beta and gamma potential difference component characteristics energy and work heating and insulating radiation series and parallel circuits electrical current and gravitational potential buildings activity and half-life energy transfer nuclear radiation in kinetic and elastic energy medicine stores nuclear fission energy dissipation nuclear fusion energy efficiency nuclear issues energy and power **Electricity Ouantitative chemistry** Chemical changes Chemical changes Atomic structure and the periodic table Maths Skills Review Learning to include: Learning to include: Learning to include: Learning to include: C1 Atomic structure Learning to include: C4 Chemical calculations C5 Chemical changes C6 Electrolysis atoms P3 Energy resources relative masses and moles the reactivity series introduction to electrolysis chemical equations energy demands equation and calculations displacement reactions changes at the methods of separation renewable energy: wind, from masses to balanced electrodes extracting metals history of the atom and its water, sun and earth equations making salts the extraction of structure energy and the expressing concentrations neutralisation and the pH aluminium environment ions, atoms and isotopes yield and atom economy scale electrolysis of aqueous solutions electronic structure

Connected

The periodic table



Learning to include: C2 The periodic table

- the development of the periodic table
- aroup 1
- group 7
- explaining trends
- the transition elements



Structure, bonding and matter



Learning to include: C3 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



C7 Energy changes



Learning to include: C7 Energy changes

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

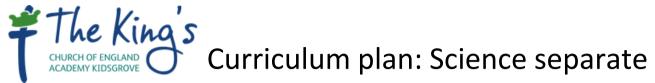


Chemistry of the atmosphere



Learning to include: The Earth's atmosphere

- history of our atmosphere
- our evolving atmosphere
- greenhouse gases
- global climate change atmospheric pollutants





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		Half ter	m points		
AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Homeostasis and response	Homeostasis and response	Inheritance, variation and evolution	Ecology	Required Practical Revision Biology P2	Grade range en point:
•	6	•	•	6	
Learning to include: The human nervous system the principles of homeostasis the structure and function of the nervous system reflex actions the brain the eye and problems Hormonal coordination principles of hormonal control	Learning to include: B13 Homeostasis in action controlling body temperature removing waste products the human kidney dialysis kidney transplants	Learning to include: Reproduction Types of reproduction cell division in sexual reproduction DNA and the genome inheritance genetic disorders and screening for genetic disorders protein synthesis gene expression	Learning to include: Adaptations, interdependence and competition • the importance of communities • distribution and abundance • competition in animals and plants • adaptations in animals and plants Organising an ecosystem	Learning to include: Reaction time Plant responses Field investigations Decay	9-1
 controlling blood glucose treating diabetes negative feedback human reproduction and artificial control of fertility infertility treatment plant hormones and their response Homeostasis in action		Variation and evolution Variation natural selections selective breeding genetic engineering cloning Genetics and evolution history of genetics theory of evolution	feeding relationships materials cycling the carbon cycle Biodiversity and ecosystems the human population explosion land, water and air pollution deforestation and peat	Maths Skills Review	
 controlling body temperature removing waste products the human kidney dialysis kidney transplants 		 evidence for evolution fossils and extinction classification the new system of classification 	destruction global warming trophic levels food production and security biomass transfer		



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Forces



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

Forces and pressure

- pressure and surfaces
- pressure in liquids at rest
- atmospheric pressure up thrust and flotation

Forces





Learning to include: P13 Electromagnetic waves

The electromagnetic spectrum

Waves

- Light, infra-red, microwaves and radio waves
- Communication
- UV, X-rays and gamma
- Using X-rays in medicine





Waves



Learning to include:

- reflection and refraction of liaht
- light and colour
- lenses





Magnetism and Electromagnetics



Learning to include: P15 Electromagnetism

- electromagnetism
- magnetic fields
- magnetic fields with electric currents
- the motor effect
- the generator effect
- transformers





Solar system/ Red shift



Learning to include: P16 Space

- formation of the solar system
- the life history of a star
- planets, satellites and orbits
- the expanding universe
- the beginning and future of the universe





Revisit prior learning from Y10

P1 -3 Energy





P4 & P5 Electricity





Required Practical Revision Physics paper 2

Learning to include:

- Force and extension
- Acceleration
- Waves
- Light
- Radiation and absorption





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The rate and extent of chemical change



Learning to include: C8 Rates and equilibrium

- rates of reaction
- collision theory
- factors that affect rates of reactions
- reversible reactions dynamic equilibrium



Organic chemistry



Learning to include: C9 Crude oil and fuels

- hydrocarbons
- fractional distillation
- burning hydrocarbons cracking hydrocarbons



Organic chemistry



Learning to include: C10 Organic reactions

- C10 Organic reactions
 reaction of alkenes
- structure and uses of organic molecules

Learning to include: C11 Polymers

- additional polymerisation
- condensation polymerisation
- Natural polymers
- DNA



Chemistry of the atmosphere



Learning to include: C13 The Earth's atmosphere

- history of our atmosphere
 our evolving atmosphere
- greenhouse gases
- global climate change
- atmospheric pollutants

Learning to include: C15 Using our resources

- rusting
- alloys and their uses
- properties of polymers
- glass, ceramics and composites
- the Haber process
- making fertilisers in the lab and in industry

Required Practical Revision Chemistry paper 2

Using resources

Learning to include: C14 The Earth's resources

- L4 The Earth's resources
 Finite and renewable
 resources
- water safe to drink
- treating waste water
- extracting metals from

Learning to include:

- Rates of reaction
- Chromatography
- Identifying ions
- Water purification













Chemical analysis



Learning to include: C12 Chemical analysis

- pure substances and mixtures
- analysing chromatograms
- testing for gases: positive and negative ions
- instrumental analysis



