KINGS' SCHOOL AL BARSHA

CURRICULUM OVERVIEW

Subject: Science

Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The National Curriculum for science aims to ensure that all pupils:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Programme of Study			
	Autumn 1 & 2	**Spring 1 & 2**	**Summer 1 & 2**
YEAR 7	Students will find out about: **Cells, Tissues and organs** How the body is organised. Cell structure and function. Specialised cells. **Energy** Energy cannot be created or destroyed. Different types of energy. Energy transfers. **Sexual Reproduction** The process of sexual and Asexual reproduction. Structure and function of sperm and eggs. **Particle model** The model of particles to explain the properties of solids, liquids and gases.	Students will learn about: **Atoms and elements** Periodic table. Elemental symbols. Trends in the table. **Ecosystem** Food chains and webs Feeding relationships Factors affecting the environment. **Forces** Understanding resultant force. Forces and movement **Sound** How sound is created. Amplitude. Pitch. The ear. **Mixtures and separation** How to separate mixture. Filtering and distillation. Solvents and solution.	Students will study: **Muscles and bone** Skeletal movement and bone structure. Antagonistic muscle groups. Three functions of the skeleton. **Acids and Alkalis** Testing for acids and alkalis using universal indicator. Testing household chemicals. **Current and Electricity** Simple circuits. Measuring current. Measuring voltage. **Food and Digestion** Digestive organs. Digestive process.
Recommended sites	www.escience@kings.com KS3 BBC Bitesize	www.escience@kings.com KS3 BBC Bitesize	www.escience@kings.com KS3 BBC Bitesize
Further Reading	Exploring Science 7	Exploring Science 7	Exploring Science 7
YEAR 8	**Food and Nutrition** Food groups and balanced diet.	**Periodic table** building on year 7 work. Patterns are discovered in the periodic	**Metal** Uses of metals. How were they discovered?

	Combustion The Fire triangle. Fluids. Solvents and solutions. Boiling points and melting points. **Energy Transfers** How energy is transformed from one type to another. **Plants and reproduction** Reproduction in flowering plants. **Rocks** Igneous, sedimentary and metamorphic rocks.	tables and reactive groups discussed. **Fluids** Particle model. Pressure in fluids. Drag. **Earth and Space** The Solar system and universe. Planets. **Breathing and respiration** How energy is released from food. **Periodic Table** How the periodic table has evolved over time.	Metal reactivity **Unicellular Organisms.** Discovering microbes. **Light** reflection. refraction. use of mirrors.
Recommended sites	www.escience@kings.com	www.escience@kings.com	www.escience@kings.com
Further Reading	Exploring Science 8	Exploring Science 8	Exploring Science 8
YEAR 9	**Working Scientifically skills** Skills for Science. **Genetics and Evolution** Theories of how life has evolved on planet Earth. **Making Materials** Polymers. Metals and alloys **Forces and Motion** Resultant force. Gravity. Mass	**Plant growth** Photosynthesis. plant tissues. **Reactivity** Endothermic and exothermic chemical reaction. Energies of reactivity. **Force Fields** Gravity. Electromagnetism. Electrostatics.	**GCSE 9-1** **Key concepts in Biology** Cells organs and tissues. Respiration. Mass transport. **States of matter** Understanding states of matter. Atoms, elements, compounds. Chemical equations. **Motion** Speed distance and time. Simple machines.

	Weight.		
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Further Reading	Exploring science 9	Exploring science 9	Edexcel (9-1) Combined science
Year 10 /11 **New (9-1)**	**Key concepts in Biology** **Cell and control** **Genetics** Microscopes. Cells. Bacteria. Enzymes and nutrition. Genetics and DNA. Meiosis . Genes and inheritance. **States of Matter** **Atomic Structure** **The Periodic Table** Separation techniques. Drinking water. Structure of the atom. Isotopes. Electron configuration. **Motion** **Forces** **Conservation of Energy** Vectors and scalars. Distance time. Velocity time. Mass and weight. Newton's second law.	**Natural selection** **Health and Disease Plant structure** Darwinian Evolution. Disease and immunity. Plant structure. Photosynthesis. **Ionic Bonding** **Acids and Alkalis** **Mass Calculations** Ionic bonding. Ionic lattices. Covalent bonding. Molecular compounds. Acids and alkalis. Bases and salts. Mass and empirical formula. calculations. **Waves** **Light (EM)** **Radioactivity** Electromagnetic spectrum. Atomic models. Electrons and orbits. Half life. Dangers of radioactivity.	**Animal Co ordination** **Exchange and transport** **Ecosystems** Hormones. Menstrual cycle. Insulin. Heart and circulation. Cellular respiration. Ecosystems. Abiotic factors. Water cycle. Carbon cycle. Nitrogen cycle. **Electrolysis** **Period Groups** **Fuels** Electrolysis. Reactivity. Ores. Oxides and reduction. Trends in the periodic table. Fuels and combustion. Changes in the atmosphere. **Energy** **Electricity** **Electromagnetism**

	Newton's Third law. Energy efficiency.		**Particle model** Energy work and power. Electrical circuits. resistance. Current and electricity. Transferring energy and efficiency. Electromagnetism and transformers. Particles and density. energy calculations.
Recommended sites	www.escience@kings.com KS4 BBC Bitesize	www.escience@kings.com KS4 BBC Bitesize	www.escience@kings.com KS4 BBC Bitesize
Further Reading	Edexcel Combined science (9-1)	Edexcel Combined science (9-1)	Edexcel Combined science (9-1)
Year 11	**The Building Blocks of cells** Cell organelles. DNA Genetic engineering. Mitosis and meiosis. Clones. Stem cells. Protein. manufacture. Mutations. **Atoms/ ionic compounds** Static electricity. Electrical currents.	**Organisms and Energy** Aerobic respiration. Photosynthesis. Limiting factors. Water transport in plants. Organisms and their environments. **Covalent compounds** **Periodic table** **Motion and Forces** **Momentum energy, work and power**	**Common Systems** Reactions. Quantitative chemistry. Nuclear Fission. Benefits and drawbacks for using radioactive materials. **Chemical reactions** **Quantitative Chemistry** Radioactivity. Nuclear reactions. Half life. Nuclear waste.
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Further Reading	Edexcel Additional Science Student book New scientist magazine	Edexcel Additional Science Student book New scientist magazine	Edexcel Additional Science Student book New scientist magazine
GCSE Specification	https://qualifications.pearson.com/en/qualifications/edexcel-gcses/science-2011-mixed.html		

Year 12	**AQA A-level Chemistry** Atomic structure. Amount of substance . Bonding page . Energetics page . Kinetics . Chemical equilibria. Le Chatelier's principle. Oxidation, reduction and redox equations . Thermodynamics . Rate equations . Equilibrium constant Electrode potentials and electrochemical cells.	**AQA A-level Biology** Biological molecules. Cells . Organisms exchange substances with their environment. Genetic information, variation and relationships between organisms. Energy transfers in and between organisms . Organisms respond to changes in their internal and external environments. Genetics, populations, evolution and ecosystems. The control of gene expression.	**AQA A-level Physics** Core content. Measurements and their errors . Particles and radiation. Waves . Mechanics and materials . Electricity. Further mechanics and thermal physics. Fields and their consequences. Nuclear physics. Astrophysics. Medical physics . Engineering physics . Turning points in physics.

	Acids and bases.		Electronics.
Recommended sites	The Periodic Table videos from the University of Nottingham A level resources from the University of Liverpool Animations of organic reactions mechanisms from ChemTube3d Chemguide A level chemistry notes (these are really good) A level resources from Knockhardy Publishing	S-cool website BiologyMad website Khan Academy website	Minute Physics : YOUTUBE Khan Academy website
Further Reading	Essential textbooks - The CGP guide in addition to either the Toole or Lowrie textbook is sufficient *CGP: A-Level Chemistry for AQA students with Online Editions *CGP: A-Level Chemistry: AQA Year 1 & 2 Complete Revision & Practice with Online Edition Wider Reading for interest: Catalyst, a science magazine for students aged 14-19 Resources for students	Essential textbooks - The CGP guide in addition to either the Toole or Lowrie textbook is sufficient *CGP: A-Level Biology for AQA Student Book Bundle: Year 1/AS with Online Editions *CGP: A-Level Biology: AQA Year 1 & 2 Complete Revision & Practice with Online Edition *Glenn Toole, Susan Toole :	Essential textbooks - The CGP guide in addition to either the Toole or Lowrie textbook is sufficient *CGP: A-Level Physics for AQA Student Book Bundle: Year 1/AS with Online Editions *CGP: A-Level Physics: AQA Year 1 & 2 Complete Revision & Practice with Online Edition Wider Reading for interest : A Brief History of Time - Stephen

	collated by Royal Society of Chemistry Chemistry World magazine from the RSC ChemNet (also from the RSC) New Scientist	A-level Biology for AQA Student Book. Oxford University Press (including Nelson Thornes). * Pauline Lowrie, Mark Smith : AQA A-level Biology Year 1 Student Book. Hodder Education. Wider Reading for interest : Charles Darwin- Origin of the Species Susan Greenfield - The Private Life of the Brain New Scientist Magazine Journal Nature Journal Biological Sciences Review Journal	Hawking Black Holes and Time Warps: Einstein's Outrageous Legacy - Kip Thorne The First Three Minutes - Steven Weinberg Just Six Numbers - Martin Rees In Search of the Big Bang - John Gribbin The Fifth Essence - Lawrence Krauss In Search of Schrodinger's Cat - John Gribbin
A level Specification	http://www.aqa.org.uk/subjects/science/as-and-a-level/chemistry-7404-7405 http://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402 http://www.aqa.org.uk/subjects/science/as-and-a-level/physics-7407-7408		