

## Subject Curriculum Vision: Science

### Science at AJK

#### **Why should all students learn your subject?**

At AJK, we aim to provide pupils with scientific knowledge and concepts that will enable them to engage, and understand the world around them, as well as to inspire a new generation to pursue STEM careers in the future.

We follow the ARK Network Mastery Curriculum to deliver a rigorous curriculum. As part of this, we use schemes of work to identify high leverage knowledge, that is important for pupils' further scientific study, and structure our curriculum to revisit topics over time with greater depth. Regular low-stakes quizzing and revisiting of key content in future units aims to embed this knowledge into long-term memory, so that pupils can draw upon it fluently when engaging with this disciplinary aspect of the subject. In addition, we believe strongly in the power of carefully sequenced practical work to embed and deepen understanding.

Our curriculum aims to:

- Critically consume data (including media sources) and draw valid conclusions
- Be curious about their surroundings
- Undertake practical work safely and skilfully
- Communicate ideas and opinions scientifically
- Develop optimism and excitement for what science can do for people and the planet
- Understand the impact science can make on communities and society for social justice.

#### **How we teach science at AJK**

Pupils in Years 1-6 study science for one hour a week. They study five topics per year, covering a mixture of biology, chemistry, and physics. Units provide pupils with opportunities to work scientifically, including by carrying out experiments and drawing conclusions from their data.

Pupils in Years 7-11 will study science for at least four hours a week. In Year 10, they will have the option to study separate science as an additional GCSE option.

#### **Combined science**

All pupils at AJK begin their study of GCSE content in Year 9. Our core offer is the 'AQA combined science trilogy', which gives pupils 2 GCSEs in science. However, all three disciplines of biology, chemistry and physics are taught and examined. There are 21 required practical activities which are also assessed in the examinations with questions relating to these practicals accounting for 15% of marks.

#### **Separate science**

Pupils who choose to pursue additional science will receive an extra GCSE, in the 'AQA GCSE science' course. Pupils will study all three disciplines of biology, chemistry, and physics, and receive a single GCSE for each. They will carry out 28 required practicals, which are assessed in the examinations with questions relating to these practicals, accounting for 15% of marks.

#### **Assessment**

Teachers assess pupils' understanding during lessons. Each lesson begins with a Do Now designed to revisit key knowledge from previous lessons, units, and years. These quizzes provide further formative opportunities to assess learning over time.

In the lesson, we teach scientific facts and deliberately practise these until we have mastery of them. We then apply our knowledge to increasing levels of complexity. As we develop our understanding, we bring together the interlinked disciplines in science to demonstrate understanding of the interconnectedness of science, this is demonstrated through extended writing.

<b>Science Curriculum Overview</b>			
<b>Year</b>	<b>Autumn</b>	<b>Spring</b>	<b>Summer</b>
1	Amazing animals Autumn and Winter	Everyday Materials	Spring and Summer Plants
2	Animals: Needs for Survival Uses of Materials	Habitats	Protecting our Environment Plants: Bulbs and Growth
3	Skeletons and Muscles Rocks and Fossils	Light and Shadows	Plants: Needs for Survival Forces and Magnets
4	Teeth and Digestion States of Matter	Classification and Environments	Sound Electricity
5	Earth and Space Forces	Materials: Properties and Changes	Life Cycles Growing Old
6	Light and Perception Classification	Evolution and Inheritance	Electricity Circulation and Lifestyle
7	The Scientific Method Cells Particles Forces Reproduction	Atoms, elements & compounds Gravity Feeding relationships	Energy transfers Mixtures Electrical circuits
8	Tissues & Organs Acids & alkalis Movement & pressure Respiration & Photosynthesis	Changing substances Magnetism The Diversity of Life Earth systems	Nutrition Light
9	C1 Atomic structure C2 Periodic table B1 Cells & Organisation B2 Cell Division P1 Conservation & dissipation of energy P2 Energy transfer by heating	C3 Structure & bonding B3 Organisation & the digestive system B4 Organising animals & plants P3 Energy resources P6 Molecules & matter	C5 Chemical changes B9 Respiration B16 Adaptations, interdependence & competition P5 Electricity in the home P4 Electric circuits
10	C4 Chemical calculations C6 Electrolysis B5 Communicable diseases B6 Preventing & treating disease B7 Non-communicable diseases B8 Photosynthesis P2 Energy transfer by heating P6 Molecules & matter P7 Radioactivity P16 Space Physics**	B10 The human nervous system B13 Reproduction C7 Energy Changes C9 Crude oil & fuels P8 Forces in Balance P9 Motion	C8 Rates & equilibrium B14 Variation & Evolution P10 Forces & motion P11 Force & Pressure
11	C12 The Earth's resources B15 Genetics and evolution B11 Hormonal coordination B12 Homeostasis B17 Organising an ecosystem B18 Biodiversity and ecosystems	C10 Chemical analysis P12 Waves P14 Light P15 Electromagnetism	Revision
<b>Biology A-Level</b>			
12	Biological molecules Nucleic acids Cell structure Transport across cell membranes	DNA, genes & protein synthesis Genetic diversity Biodiversity Photosynthesis	Nervous coordination & muscles Homeostasis

	Cell recognition & the immune system Exchange Mass transport	Respiration Energy & ecosystems Response to stimuli	
13	Inherited change Populations and evolution Populations in ecosystems	Gene expression Recombinant DNA technology	Exam preparation Required practicals Revision
<b>Chemistry A-Level</b>			
12	Atomic structure Amount of substance Bonding Oxidation, reduction, redox Periodicity Group 2 & 7 elements Energetics	Alcohols Organic analysis Thermodynamics	Kinetics Equilibrium constant
13	Electrode potential Acids, bases & buffers Periodicity 2 Transition metals Nomenclature and isomerism Carbonyl group compounds Amines Aromatic chemistry Amines	Transition metals Reactions of inorganic compounds Organic synthesis & analysis Polymerisation Amino acids, proteins, DNA Chromatography Structure determination	Exam preparation Required practicals Revision
<b>Physics A-level</b>			
12	Forces in equilibrium On the move Skills in AS Physics Materials Waves Newton's laws of motion Force & momentum Work, energy, & power Electric current	Waves Optics Quantum phenomena Mathematical skills Electric current DC circuits Matter and radiation	Quarks & leptons Gravitational fields Electric fields Motion in a circle Simple harmonic motion Capacitors Magnetic fields
13	Gravitational fields Capacitors Magnetic fields Electromagnetic induction Radioactivity Mathematical skills Electric fields Thermal physics Gases	Turning point in Physics	Exam preparation Required practicals Revision
<b>BTEC Applied Science</b>			
12	Unit 1: Principles of Applied Science I Unit 2: Practical Science Procedures	Unit 3: Science Investigation Skills Unit 8: Anatomy and Physiology	Unit 17: Microbiology Unit 21: Medical Physics
13	Unit 5: Principles of Applied Science II Unit 4: Lab Techniques and their Application	Unit 6: Investigative Project Unit 7: Contemporary issues in Science	Optional units