Science Department Handbook

2022-2023

Westbury ACADEMY

Science Department Vision

The vision of the science department is to develop student's understanding and love of science to develop competent scientists ready for GCSE and beyond.

The science department believes in the potential of every child and works to develop the mindset and skills necessary to be a successful learner. In the science department, every child matters and we continue to strive to help students achieve their very best through excellent learning and teaching to prepare students to be the best they can be at GCSE and Entry Level.

Aims in Science

All students are given the opportunity to access a broad, balanced science curriculum, which makes a relevant and strong contribution to education as a whole. The aims of the Science curriculum are:

- To develop students' scientific and mathematical knowledge
- To ensure a rich practical provision which develops working scientifically and the technical skills necessary for success
- To develop an approach towards problem solving
- To develop literacy to enable effective communication of science (and beyond)
- To develop independent learning
- To develop knowledge and understanding of how science relates to everyday life.

Objectives in Science

- Provide a quality science curriculum that delivers the National Curriculum in each key stage, targeted to our pupils' specific needs.
- Provide students with the skills they will need in everyday life and for the world of work.
- Provide specific opportunities for students to take on responsibility for their own learning by encouraging the development of research, practical and investigative skills.
- Provide opportunities for - and teach - students how to work independently and as a group.
- Provide opportunities for students to apply their knowledge, skills and understanding in a range of situations.

Staff and Responsibilities

Mr Mitchell
Head of Department

Mr Alexander
Science teacher

Caroline Bezzano
Science Technician

Ben Hutchinson
Teaching Assistant

Line Management and role responsibilities

Teacher of Science – CA (SENCo)

Key responsibilities Foci

- Progress of own teaching
- GCSE Chemistry
- Entry level science

Head of Science – RM

Key responsibilities Foci

- GCSE Chemistry
- GCSE Physics
- Entry level Science
- Overall Progress
- Quality assurance Overall

3rd Teacher of Science (when applicable)

Key responsibilities Foci

- Progress of own teaching groups
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Science Technician/CB

Key responsibilities Foci

- Record pupil data
- Ordering of stock
- Practical preparation
- Classroom TA
- Resources preparation

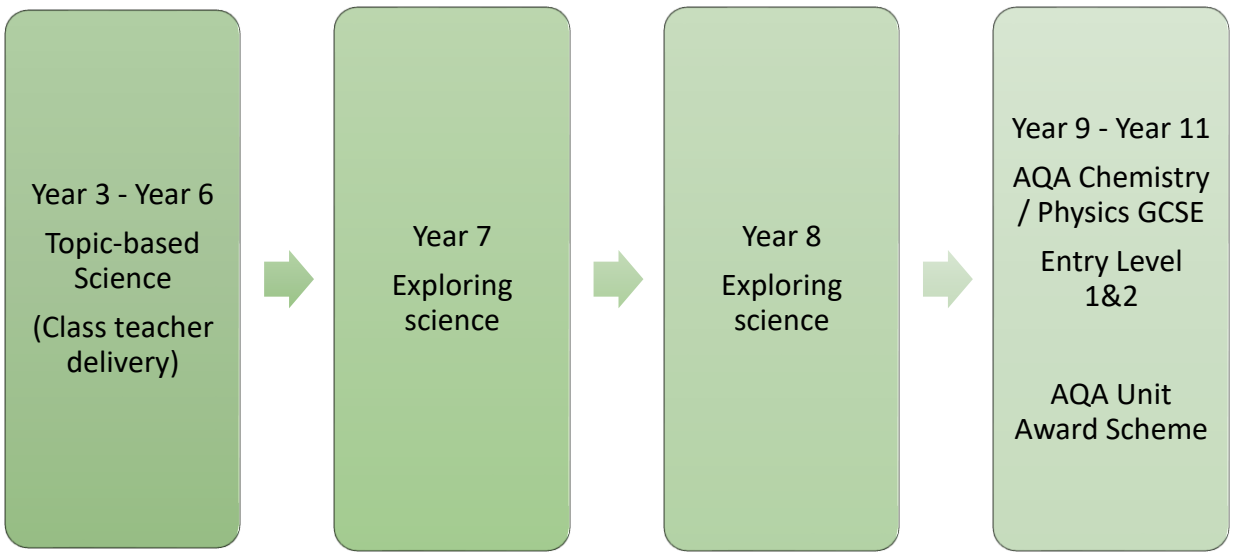
Science teaching Assistant/BH

Key responsibilities Foci

- Classroom TA
- Practical preparation
- Resources preparation

Curriculum Overview

In Preparation Phase Year 3 – Year 6 cover Science through their topic-based curriculum and this coverage and pitch of the learning is based on the individual cohorts. Year 7&8 pupils are placed in sets based on ability level they then follow the exploring science programme of study delivered in science labs by a specialist teacher.



In Year 9 students are placed into two sets. One set follows the AQA chemistry GCSE the other set work towards entry level certificate levels 1&2. They complete the course over 2 years.

In Year 11, pupils will be able to undertake a GCSE in physics, if the teacher determines the pupil is capable. Pupils who have completed their entry certificate will have the option to use and extend their knowledge and undertake the AQA Chemistry GCSE.

Key information

The AQA KS3 Programme of Study can be found here:
http://www.aqa.org.uk/subjects/science/ks3/ks3-science-syllabus

The AQA Entry level certificate can be found here:
https://www.aqa.org.uk/subjects/science/elc/science-5960

The AQA KS4 Chemistry course can be found here:
http://www.aqa.org.uk/subjects/science/gcse/chemistry-8462

The AQA KS4 Physics course can be found here:
http://www.aqa.org.uk/subjects/science/gcse/physics-8463

Programme of study

2022/2023

Year 7	**Winter term**		**Spring term**	**Summer term**	**Extra topic**
Teacher 1	Starter Lessons	The particle	Solutions	Simple chemical reactions	Cells
Teacher 2	Forces		Electricity + Magnetism	Acids + Alkalis	Environment + feeding habitats

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Year 8	**Winter term**	**Spring term**	**Summer term**	**Extra topic**
Teacher 1	Microbes + Disease	Solar System	Rocks weathering + The rock cycle	Variation + Classification
Teacher 2	Food + Digestion	Light + Sound	Energy resources	Ecological resources

Year 8	**Winter term**	**Spring term**	**Summer term**	**Extra topic**
Teacher 1	Reproduction	Light + Sound	Magnets + Electricity	Space
Teacher 2	Energy resources	Microbes + Disease	Rock cycle	Food + Digestion

Year 9a GCSE	**Winter term**		**Spring term**	**Summer**
Teacher 1	Atomic structure	Periodic table	Structure and bonding	Rates of reaction
Teacher 2	Chemical Analysis	The Earth's atmosphere	The Earth's resources	Using our resources

Year 9b Entry	**Winter term**	**Spring term**	**Summer**
Teacher 1	Chemistry in our world		STEM Topics
Teacher 2	The Human Body		STEM Topics

Year 10a GCSE	**Winter term**	**Spring term**	**Summer**
Teacher 1	Rates and equilibrium	Crude oil and fuel	Organic reaction/polymers
Teacher 2	Chemical changes	Electrolysis	Energy changes

10c Just need test and TDA : pupils have completed some of unit 6 with Robin Ashman (will need quick recap)

Year 10 Entry	**Winter term**	**Spring term**	**Summer**
RM/10b	Energy forces and the structure of matter		Chemistry in our world
CA/10c	Energy forces and the structure of matter		Chemistry in our world

Year 11b Entry	**Winter term**	**Spring term**	**Summer term**
RM	Energy forces and the structure of matter		Chemistry in our world

Year 11a PHYSICS	**Winter term**	**Spring term**	**Summer term**
RM	Due to time restraints, pupils will be exposed to a taster selection of physics topics with the possibility of entering for GCSE physics at the end of year 11.		

KS3 Short term plans

Year 7 Topics	
The Particle model	Properties of Solids, Liquids and gases
	The Particle Theory
	The changing states of matter
	Diffusion
	Gas pressure
	Expansion and contraction
Separating mixtures	Operation survival (Filtration)
	Solutions
	Solubility
	Filtration
	Evaporation (Rock from rock salt)
	Distillation
	Chromatography
Simple chemical reactions	Getting a reaction (Physical + Chemical)
	Potions lesson (identifying signs of a chemical reaction)
	Fizzy pop (reaction between metals + acids)
	Testing for gases (Hydrogen, Oxygen + Carbon dioxide)
	On fire (reacting metals with oxygen)

	Bath bombs
	Fire triangle
	Burning candle investigation
	Combustion (word equations)
Cells	Human organs
	Using a microscope
	Looking at animal and plant cells
	Building a life (differences between animal and plant cells)
	Specialised cells
	All systems go (Tissue, organs + systems)
	Cell division
	A seedy story (Plant reproductive organs)
Acids + Alkalis	Tangy tastes 9 (Taste test practical)
	Making a natural indicator (red cabbage practical)
	Litmus + Universal indicator (Rainbow Fizz)
	Testing soil pH practical
	Making salts
	Pupils design an acid + alkali PPT for KS2
Forces	Contact + non-contact forces
	Up thrust + floating (what floats practical)
	Volume (science skills lesson)
	Hooke's Law (stretching and squashing practical)
	Weighing in (gravity lesson)
	Resultant force (Tug of war)

	Air resistance (Paper helicopters)
	Friction (Jelly practical)
Environment and feeding habitats	Habitat
	Animal adaptation
	Plant adaptation
	Environments (choice chamber)
	Predator/Prey
	Scavengers + parasite
	Food chains + food webs
	Extra practical Pooters + sweepnets
Electricity	Static electricity
	Safety and symbols
	What material let electricity through (investigation)
	Measuring current (drawing simple circuits)
	Measuring voltage, *potential difference*
	Series + Parallel
	Using electricity (wiring a plug)
	Magnets + magnetic field
	Electromagnets
	Using electromagnets

Year 8 Topics	
	How do animals reproduce sexually?

Reproduction	
	Reproductive organs
	SEX (fertilisation and twins)
	IVF
	The menstrual cycle
	Being pregnant
	Caring for a new born
	Growing up
Energy resources	(What is energy) Forms of energy
	Energy transfers
	Joules (Practical: Energy in food)
	Power station (Generating electricity)
	Formation of Fossil Fuels
	Introduction to renewable energy
	Renewable energy (advantages and disadvantages PPT)
	Using less (reduce and reuse, discussion)
Light	Travelling light (Practical: Shadow investigation)
	Eyes and cameras
	Reflection
	Refraction
	Making rainbows
	Make it white
	Total internal reflection
Microbes + Disease	What are microbes
	Microbe structure
	Microbes in action

	Under attack
	Stopping the spread
	Defence against infection
	Covid: what we now know
Sound	Sound advice (how does sound travel)
	Music to your ears (how are different sounds made)
	Sound travelling light (What are the similarities between sound and light)
	Ear Ear (How do we hear sounds)
	What is noise
	Using sound
Rock cycle	The structure of the Earth
	Sedimentary rocks (practical make some fossils)
	Weathering, erosion transport
	Igneous and metamorphic rock
	The rock cycle
	Ceramics
Universe	The night sky
	The solar system
	The Earth (Why do we have days, nights and years)
	Moonshine (why does the shape of the moon seem to change)
Food + digestion	On a diet
	Keeping it balanced
	Different diets
	Special diets
	You've got guts
	Break down
	In the blood

Math/Science skills

Topic	Math skill needed
Atomic structure and the periodic table	Standard form and making estimates
Structure, bonding and the properties of matter	Visualise and represent 2d and 3d shapes
Chemical quantities and calculations	Change the subject of an equation
Chemical changes	Make order of magnitude calculations
Energy changes	Recognise and use expressions in decimal form
The rate and extent of chemical change	Use the slope of a tangent as a measure of rate of change
hydrocarbons	Visualise and represent 3d models
Chemical analysis	Use an appropriate number of significant figures
The atmosphere	Use ratios, fractions and percentages
Sustainable development	Translate information between graphical and numerical form

Assessment Overview

In Year 7&8 students will be assessed informally throughout the course and given effective feedback. At the end of the topic, pupils will perform an assessment to highlight their progression.

In Year 9 students will begin their Chemistry GCSE/Entry level certificate depending on ability level. Progress will be monitored informally throughout the course; GCSE students will also complete end of unit tests. Entry level will be required to complete a test and practical at the end of each unit.

Year 10 and 11 students will continue to work towards completing their respective courses.

KS4 Chemistry

Examboard: AQA

Course title: GCSE Chemistry

Specification code: 8462

Assessment: Chemistry paper 1 50%, Chemistry paper 2 50%

KS4 Physics

Examboard: AQA

Course title: GCSE Physics

Specification code: 8463

Assessment: Physics paper 1 50%, Physics paper 2 50%

Entry level certificate (Science)

Exam board: AQA

Specification code: 5960

Assessment:

Single award based on 3 components, each component includes test and practical accredited over 3 levels

Double award based on 6 components, each component includes test and practical accredited over 3 levels