Science Curriculum Overview

Curriculum Intent

The aim of the Science Department at Brentford School for Girls is to offer a science curriculum that develops curiosity, excitement and a better understanding about the world around us and our role in it. The curriculum guides students through the specific disciplines of Biology, Chemistry and Physics, and ensures students are able to build on their own learning with a progression of skills, effective pedagogy, vocabulary rich teaching and the inclusion of enrichment activities. Our curriculum also focusses on providing our students with a set of skills and experiences that develops their ability to think critically, work scientifically and to also prepare them to progress into advanced areas of studies in science.

The Brentford scientist….

- Is **Inquisitive** and curious about scientific phenomenon and processes
- **Reflects** on ideas and has confidence to explore, challenge and change them
- Is **Flexible** in their approach to gain a deeper understanding of the world around them.
- Is **Ambitiou**s and possesses the skills to face whatever life may hold
- Is **Confident** about her place in the world and her and her role in shaping it.

KS3 Science Curriculum Overview

Year 7 Science Curriculum Overview

HT 1	HT 2	HT 3	HT 4	HT 5	HT 6
Induction – developing investigative skills **7A Cells, Tissues, Organs and Systems** ● Doctors past and present ● Life processes ● Conventions in writing (L%C) ● Organs ● Tissues ● Microscopes (WS) ● Cells ● Organ systems ● Transplants **7K Forces** ● Forces ● Different forces ● Springs ● Making notes (L&C) ● Friction ● Pressure ● SI units (WS) ● Balanced and unbalanced ● Safety standards	**7H Atoms, Elements and Molecules** ● Our material world ● Sorting resource data (WS) ● The air we breath ● Earth's elements ● Metals and non-metals ● Facts and opinions (L&C) ● Making compounds ● Chemical reactions ● Problems with elements **7I Energy** ● Energy changes ● Energy from food ● Fair comparisons and ratios (WS) ● Energy transfers and stores ● Fuels ● Summarising (L&C) ● Other energy resources ● Using resources ● Making changes	**7F Acids and Alkali** ● Chemistry in the home ● Hazards ● Controlling risk (WS) ● Indicators ● Acidity and alkalinity ● Writing titles (L&C) ● Neutralisation ● Neutralisation in daily life ● Danger at home **7L Sound** ● Animal sounds ● Making sounds ● Moving sounds ● Line graphs and scatter graphs (WS) ● Detecting sound ● Remembering (L&C) ● Comparing waves ● Animals and noise	**7G The Particle Model** ● Sorting rubbish ● Making comparisons ● Solids, liquids and gases ● Hypotheses and theories (WS) ● Particles ● Brownian motion ● Diffusion ● Air pressure ● Waster	**7B Sexual reproduction in animals** ● Escaped zoo animals ● The scientific method (WS) ● Animal sexual reproduction ● Reproductive organs ● Becoming pregnant ● Making notes (L&C) ● Gestation and birth ● Growing up ● The work of zoos **7E Mixtures and Separation** ● Mixtures and separation ● Writing a method (L&C) ● Mixtures ● Solutions ● Safety when heating (WS) ● Evaporation ● Chromatography ● Distillation ● Safe drinking water	**7J Current Electricity** ● Discovering electricity ● Switches and current ● Models in science (WS) ● Models for circuits ● Series and parallel circuits ● Using tables (L&C) ● Changing the current ● Using electricity ● A world without electricity **7D Ecosystems** ● Exploring the world ● Variation ● Charts and graphs ● Adaptations ● Effects of the environment ● Effects on the environment ● Transfer in food chains

Deeper Learning • Investigating if plants respire • Using microscopes • Doctors past and present	**Deeper learning** • Classifying metals • The properties and uses of alloys • Fuels and our environment • Careers in Chemistry – Chemical Engineer	**Deeper learning** • British science week activities • Comparing the hazards of acids • Design a label • Careers in Physics – Sound Engineer	**Deeper learning** • Investigating mixtures • The story of Robert Brown	**Deeper learning** • Careers in Health services – Maternity Nurse, Midwife • Writing a scientific method	**Deeper learning** • Building circuits • Careers in science – Electrical Engineer, Environmental officer • Climate change – how can you help?
Extra-Curricular activities Science club Robotics club Science support club			**Key resources/ websites** BBC Bitesize Exploring Science Seneca learning		

Year 8 Science Curriculum Overview

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
8A Food and nutrition • Food and advertising • Nutrients • Use of nutrients • Weighing and bias (L&C) • Balanced diets • Digestion • Surface area (WS) • Absorption • Packaging and the law **8K Energy Transfers** • Living in extremes • Temperature changes • Transferring energy • Controlling transfers • Accuracy and	**8D Unicellular organisms** • The Black Death • Unicellular or multicellular • Microscopic fungi • Modal verbs (L&C) • Bacteria • Pie charts (WS) • Protoctists • Decomposers and carbon • Black Death hypothesis	**8F The Periodic Table** • Fireworks • Dalton's atomic model • Chemical properties • Using sentences (L&C) • Mendeleev's table • Anomalous results (WS) • Physical trends • Chemical trends • Firework ban **8J Light** • Seeing things • Light on the move • Drawing and conventions (WS) • Reflection • Refraction	**8C Breathing and respiration** • Water sports and breathing • Aerobic respiration • Gas exchange system • Means and ranges (WS) • Getting oxygen • Cause and effect (L&C) • Comparing gas exchange • Anaerobic respiration • Fitness training **8E Combustion** • Engines • Burning fuels • Oxidation • Fire safety • Fair testing (WS)	**8B Plants and their reproduction** • Useful plants • Classification and biodiversity • Accuracy and estimates (WS) • Types of reproduction • Pollination • Fertilisation and dispersal • Structuring paragraphs (L&C) • Germination and growth • Animals using plants	**8L Earth and Space** • Changing ideas • Gathering the evidence • Scientific arguments • Seasons • Magnetic earth • Gravity in space • Making comparison (WS) • Beyond the Solar System • Studying space **8H Rocks** • Disaster! • Rocks and their uses • Igneous and

precision (WS) ● Power and efficiency ● Paying for energy ● Keeping warm		● Cameras and eyes ● Colour ● Invisibility cloaks	● Air pollution ● Global warming ● Reducing pollution		metamorphic ● Assessing sources (L&C) ● Weathering and erosion ● Sedimentary rocks ● Theories in geology (WS) ● Materials in the Earth ● Living in danger
Deeper learning ● Food tests ● Designing an energy efficient home ● What does a food scientist do?	**Deeper learning** ● Unicellular organisms crash course ● Career profile - Microbiologist	**Deeper learning** ● British science week activities		**Deeper learning** ● Combustion crash course	**Deeper learning** ● Fluids crash course
Extra-Curricular activities: Science club Robotics club **Key resources / websites: BBC bitesize Activelearn Google classroom**					

KS4 Science Curriculum Overview

Year 9 Science Curriculum Overview

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Induction – developing investigative skills					
Biology **Key concepts in biology** • Microscopes • Plants and animal cells • Core practical – Using microscopes • Specialised cells • Inside bacteria • Enzymes and nutrition • Enzyme action • Enzyme activity • Core practical – pH and enzymes • Transporting substance • Core practical – Osmosis in potato slices **Cells and control** • Mitosis • Growth in animals • Growth in plants • Stem cells • The nervous system • Neurotransmission speeds **Genetics** • Meiosis • DNA DNA extraction • Alleles • Inheritance • Gene mutation • Variation		**Chemistry** **States of matter and mixtures** • States of matter • Mixtures • Filtration and crystalisation • Paper chromatography • Distillation • Core practical – Investigating inks • Drinking water **Atomic structure** • Structure of an atom • Atomic number and mass number • Isotopes **The Periodic table** • Elements and the periodic table • Atomic number and the periodic table • Electronic configuration and the periodic table **Bonding and Type of Substance** • Ionic bonds • Ionic lattices • Properties of ionic compounds • Covalent bonds • Molecular compounds • Allotropes of carbon • Properties of metals • Bonding metals **(Triple Science: Acids)**		**Physics** **Motion** • Vectors and scalars • Distance/time graphs • Acceleration • Velocity/time graphs **Forces and Motion** • Resultant forces • Newton's First Law • Mass and weight • Newton's Second Law • Core practical – Investigating acceleration • Newton's Third Law • Momentum • Stopping distances • Crash hazards **Conservation of energy** • Energy stores and transfers • Energy efficiency • Keeping warm • Stored energies • Non-renewable resources • Renewable resources **Waves** • Describing waves • Wave speeds • Core practical – Investigating waves • Refraction	

Deeper Learning ● Investigating cells ● Enzymes and digestion	● Why is stem cell technology important? ● The Human Genome Project	**Deeper learning** ● British science week activities ● Mendeleev and the Periodic table ● The History of the atom ● Where does drinking water come from?	**Deeper learning** ● Developing practical skills ● Energy saving devices ● The life of Sir Isaac Newton ● Waves – their
Extra-Curricular activities Science club Robotics club		**Key resources / websites** GCSEPod BBC Bitesize Activelearn Google classroom	

Year 10 Science Curriculum Overview

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Biology **Natural Selection & Genetic Modification** ● Evidence for human evolution ● Darwin's theory ● Classification ● Breeds and varieties ● Genes in agriculture and medicine **Health, disease and the development of medicines** ● Health and disease ● Non-communicable diseases ● Cardiovascular disease ● Pathogens ● Spreading pathogens ● Physical and chemical barriers ● The immune system ● Antibiotics **Plant structures and their functions** ● Photosynthesis ● Factors that affect photosynthesis ● Core practical – Light intensity and photosynthesis ● Absorbing water and mineral ions ● Transpiration and translocation **Animal coordination, control and homeostasis** ● Hormones ● Hormonal control of metabolic rate ● The menstrual cycle ● Hormones and the menstrual cycle ● Control of blood glucose ● Type 2 diabetes		**Chemistry** **Acids and alkalis** ● Acids, alkalis and indicators ● Looking at acids ● Base and salts ● Core practical – Preparing copper sulfate ● Alkalis and balancing equation ● Core practical – Investigating neutralization ● Alkalis and neutralization ● Reactions of acids with metals and carbonates ● Solubility **Calculations involving masses** ● Masses and empirical formulae ● Conservation of mass ● Moles **Electrolytic processes ,Obtaining and using metals, Reversible reactions & equilibria** ● Electrolysis ● Core practical – Electrolysis of copper sulfate solution ● Products from electrolysis ● Reactivity ● Ores ● Oxidation and reduction ● Life cycle assessment and recycling ● Dynamic equilibrium **Groups in the periodic table ,Rates of reaction and Heat energy changes in chemical reactions** ● Group 1 ● Group 7 ● Halogen reactivity ● Group 0 ● Rates of reaction ● Factors affecting reaction rates	**Physics** **Light & electromagnetic spectrum** ● Electromagnetic waves ● Core practical – Investigating refraction ● The electromagnetic spectrum ● Using the long wavelengths ● Using the short wavelengths ● EM radiation dangers **Radioactivity** ● Atomic models ● Inside atoms ● Electrons and orbits ● Background radiation ● Types of radiation ● Radioactive decay ● Half-life ● Dangers of radioactivity **Energy-forces doing work and Forces and their effects** ● Work and power ● Objects affecting each other ● Vector diagrams **(Triple Science: Astronomy)**	

	● Core practical – Investigating reaction rates ● Catalysts and activation energy ● Exothermic and endothermic reactions ● Energy changes in reactions **(Triple Science: Transition metals, alloys, chemical cells and fuel cells)**	
Deeper learning ● The work and life of Charles Darwin ● How drugs are made – Preclinical and clinical trial	**Deeper learning** ● British science week activities ● Metal uses and recycling ● Life cycle assessment of materials	**Deeper learning** ● Developing practical skills ● How does a Nuclear powerplant work?
Extra-curricular activities Science club Robotics club		**Key Resources / websites** GCSEPod BBC Bitesize Activelearn Google classroom

Year 11 Science Curriculum Overview

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Biology **Exchange & transport in animals** ● Efficient transport and exchange ● The circulatory system ● The heart ● Cellular respiration ● Core practical – Respiration rates **Ecosystems & material cycles** ● Ecosystems ● Abiotic factors and communities ● Core practical – Quadrats and transects ● Biotic factors and communities ● Parasitism and mutualism ● Biodiversity and human ● Preserving biodiversity ● The water cycle ● The carbon cycle ● The nitrogen cycle		**Chemistry** **Fuels ,Earth & atmospheric science** ● Hydrocarbons in crude oil and natural gas ● Fractional distillation of crude oil ● The alkane homologous series ● Complete and incomplete combustion ● Combustible fuels and pollution ● Breaking down hydrocarbons ● The early atmosphere ● The changing atmosphere ● The atmosphere today ● Climate change **(Triple science: Hydrocarbons, Alcohols and carboxylic acids, Polymers, Qualitative analysis, Bulk and surface properties of matter).**		**Physics** **Electricity & Circuits** ● Electricity circuits ● Current and potential difference ● Current, change and energy ● Resistance ● More about resistance ● Core practical – Investigating resistance ● Transferring energy ● Power ● Transferring energy by electricity ● Electrical safety **Magnetism & the Motor effect and Electromagnetic induction** ● Magnets and magnetic fields ● Electromagnetism ● Magnetic forces ● Transformers ● Transformers and energy **Particle model & Forces and Matter** ● Particles and density ● Core practical – Investigating densities ● Energy and change of state ● Energy calculations ● Core practical – Investigating water ● Gas temperature and pressure	

		● Bending and stretching ● Core practical – Investigating springs ● Extensions and energy transfer **(Triple science: Static electricity)**
Deeper learning ● Investigating Photosynthesis ● Using field-work techniques –Quadrats and Transects ● Humans and Biodiversity	**Deeper learning** ● British science week activities ● Fuels and pollution ● Fuels for cars ● Global warming	**Deeper learning** ● Building electric circuits ● Electrical safety ● The National Grid ● Measuring the density of different materials
Extra curricular activities Science club Robotics club	**Key Resources / websites** GCSEPod BBC Bitesize Activelearn Google classroom	