THE BARLOW RC HIGH SCHOOL

SERVE · PRAY · ACHIEVE · RESPECT

Rise up, take courage, and do it.

Programme of Study

Science

KS2 Underpinning Concepts	Term	Year 7	Year 8	Year 9	Year 10	Year 11	KS5 & CEIAG Opportunities	Links to SMSC
Biology KS2 Topics: Life cycles and reproduction Nutrition and health Classification of living things Adaptation and habitats **Chemistry KS2 Topics:** States of matter Simple properties of materials Changes of state And reversible / irreversible changes **Physics KS2 Topics:** Forces and magnets Light and sound Electricity Earth and space **Scientific Enquiry (Working Scientifically) KS2 Focus:** Asking questions Planning fair tests Making observations and measurements	***Autumn 1***	**Working scientifically** Laboratory Safety, Using Lab Equipment, Using Scales and Measuring Accurately, using a Bunsen Burner, Recording, Analysing and Evaluating Data **Cell Biology** Understanding Cells, Using Microscopes, Specialised Cells, Unicellular Organisms **Matter** Atoms, particles, compounds and mixtures. Particle behaviour, and factors that influence.	**Acids & Alkalis** Indicators & p H, Neutralisation, Making Salts **Electricity** Charging Up, Circuits & Current, Potential Difference, Resistance, Series and Parallel Circuits Magnets & Electromagnets	**Inheritance** **DNA & Genes**: Genetic instructions and variation. **Inheritance**: How traits are passed on. **Gene Technology**: DNA modification and its impacts. **Earth** **Air and Water: Composition of Air**: Gases in the atmosphere and their roles. **Pollution:** Sources and effects of pollutants like CO_2, NO_x, SO_2. **Water Purification:** Filtration, distillation, and water safety. **Solubility and Solutions:** Dissolving, saturation, and crystallisation. Exploring Element Trends and Reactions	**B2 – Organisation** Nutrients, Food Tests, Unhealthy Diet, Digestive System, Gut Bacteria, Enzymes, Drugs, Alcohol, Smoking, lifestyle diseases **C2 – Bonding, structure and properties of matter** Bonding, and how it links to properties. Bonding types, examples, and uses. Applications of this knowledge, and how it benefits society.	**P5 – Forces** Newton's Laws, speed, acceleration; Distance-time and velocity-time; Momentum, conservation and safety **C3 – Quantitative Chemistry** Yield and Atom Economy, efficiency and sustainability in chemical manufacturing. **C6 – Rate and Extent of Chemical Change** Factors affecting speed (temperature, concentration, catalysts)	**KS5 Pathways:** **A-Level Sciences**: Biology, Chemistry, Physics. **Applied Science**: BTEC Level 3 Applied Science. **Other STEM Subjects**: Psychology, Environmental Science, Geology. **Vocational Routes**: Health & Social Care, Engineering, Animal Care. **Career Pathways:** **STEM Careers** Medicine, Nursing, Engineering, Veterinary Science, Pharmacology. **Technical Careers** Lab Technician, Forensics, IT & Data Analysis. **Apprenticeships** Science-based roles in healthcare, engineering, and manufacturing. **Further Education** Access to science-related university courses.	**Spiritual Development:** Reflection, knowledge and respect for differentviews and perspectives when learning about themselves, others and the world around them. Use of imagination and creativity when looking at problems of the 21st century, and how Science plays a role. **Moral Development:** Ability to recognise the impact of scientific decisions/processes in a variety of social, moral and ethical issues, and the ability to understand and appreciate the viewpoints ofothers on these issues, and why they are made. **Social Development:** Use of a range of social skills in different contexts e.g. Pair/peer work, whole class discussions, presentations. Frequent opportunities to reflect on work/learning promotes a culture of development. **Cultural Development:** Frequent links to wider contexts via intro sheets (job roles), articles (cultural scenarios) provide a chance to develop a cultural learning around the knowledge. Add to this the annual celebrations of BHM, as well as women in STEM, and British Science week.
	Autumn 2	**Matter** Atoms, particles, compounds and mixtures. Particle behaviour, and factors that influence. **Energy** - Food and Fuels, Energy	**Electricity** Charging Up, Circuits & Current, Potential Difference, Resistance, Series and Parallel Circuits	**Earth** **Air and Water: Composition of Air**: Gases in the atmosphere and their roles. **Pollution:** Sources and effects	**B3 – Infection and response** Pathogens, genes, lifestyle. Defences: Barriers and immune response. Prevention: Vaccines, hygiene, public health;	**B6 – Genetics** DNA & Genes: Genetic instructions and variation. Inheritance: How traits are passed on. Gene Technology: DNA		

Drawing conclusions		Resources, Energy, Temperature, Energy Transfer: Particles, Radiation & Forces, Power **Generating Electricity:** Wind, solar, hydro, fossil fuels. **Efficiency and Conservation:** Reducing energy waste. **Environmental Impact:** Carbon footprint and sustainability	Magnets & Electromagnets **The Periodic Table** Metals & Non-Metals, Groups & Periods, Group 1 Elements, Group 7 Elements, Group 0 Elements	of pollutants like CO_2, NO_x, SO_2. **Water Purification:** Filtration, distillation, and water safety. **Solubility and Solutions:** Dissolving, saturation, and crystallisation. Exploring Element Trends and Reactions **Light** Reflection, Refraction, The Eye & the Camera, Colour	Influences: Genetic, lifestyle, environmental. Treatment: Medicines and clinical trials. **C4 – Chemical changes** Metals & Acids - Metal reactions with Acids, Oxygen, Water & Displacement Reactions, Extracting Metals, Ceramics, Polymers, Composites **P3 – Particle model of matter** States of Matter: Solid, liquid, gas, and changes of state. Particle Model: Explaining properties and behaviour of matter. Density: Calculations and practical applications. Internal Energy and Heating: Specific heat capacity, latent heat.	modification and its impacts **P6 – Waves** Types of Waves: Transverse and longitudinal. Wave Properties: Frequency, wavelength, amplitude, speed. Electromagnetic Spectrum: Uses and dangers of EM waves. Radiation: Infrared, UV, X-rays, and their applications.		
	Spring 1	**Motion & Pressure** Speed, Motion Graphs, Pressure, Turning Forces **Reproduction** Puberty, Reproductive Systems, Fertilisation, Pregnancy and Birth, Growth and Development	**Forces** Deformation, Friction & Drag, Non-Contact Forces, Force Balance, Gravity & Weight	**Adaptation and Inheritance** Competition, Variation, Inheritance, Natural Selection, Extinction	**B4 – Bioenergetics** Using Food and Controlling Growth Photosynthesis: Making food from sunlight; Respiration: Releasing energy; Enzymes: Supporting digestion and metabolism **C5 – Energy changes** Types (e.g., synthesis, neutralisation, precipitation)	**C9 – Chemistry of the Atmosphere** Air and Water: Composition of Air: Gases in the atmosphere and their roles. Pollution: Sources and effects of pollutants like CO_2, NO_x, SO_2. **C10 – Using resources** Water Purification: Filtration, distillation, and water safety Sustainability: Life cycle assessments, recycling. **B7 – Ecology** Energy Transfer: Movement of		

						energy through ecosystems. Food Webs: Feeding relationships and energy flow. Interdependence: Species and environmental reliance.		
	Spring 2	**Reproduction** Puberty, Reproductive Systems, Fertilisation, Pregnancy and Birth, Growth and Development **Separation Techniques** Mixtures, Solutions, Solubility, Filtration, Evaporation & Distillation, Chromatography	**Reactions** Word Equations, Burning Fuels, Thermal Decomposition, Conservation of Mass, Exothermic & Endothermic Reaction	**B1: Cells** Understanding Cells, Using Microscopes, Specialised Cells, Unicellular Organisms	**B5 – Homeostasis** Nervous System: Reflexes and coordination; Hormonal Control: Homeostasis and the endocrine system; Reproduction: Fertility and contraception **C7 – Organic Chemistry** Alkanes and alkenes Fractional Distillation Cracking	**P2 – Electricity** Electric Circuits Circuit Components, Current, Voltage, Resistance, Ohm's Law and calculations. Series and Parallel Circuits: Differences and applications **B7 – Ecology** Energy Transfer: Movement of energy through ecosystems. Food Webs: Feeding relationships and energy flow. Interdependence: Species and environmental reliance.		
	Summer 1	**Separation Techniques** Mixtures, Solutions, Solubility, Filtration, Evaporation & Distillation, Chromatography **Beyond Earth - Light and Space** **Body systems** Levels of Organisation, Gas Exchange, Breathing, The Skeleton, Movement: Joints, Movement: Muscles	**Ecosystems -** Food Chains & Web, Competition, Flowers & Pollination, Fertilisation & Germination, Seed Dispersal **Photosynthesis** Enzyme-driven energy capture.	**C1: The Periodic Table** Metals & Non-Metals, Groups & Periods, Group 1 Elements, Group 7 Elements, Group 0 Elements	**B5 – Homeostasis** Nervous System: Reflexes and coordination; Hormonal Control: Homeostasis and the endocrine system; Reproduction: Fertility and contraception **P4 – Atomic structure and decay** Atoms: Isotopes and radiation; Radiation Types: Alpha, beta, gamma; Uses & Risks: Medical, industrial, nuclear safety **C8 – Chemical analysis** Purity and Formulations:	**P2 – Electricity** Electric Circuits Circuit Components, Current, Voltage, Resistance, Ohm's Law and calculations. Series and Parallel Circuits: Differences and applications **P7 – Magnetism** Applications and uses of magnetism to benefit humanity		

					Identifying pure substances. Chromatography: Separating mixtures. Qualitative Tests: For ions and gases.			
	Summer 2	**Body Systems** Levels of Organisation, Gas Exchange, Breathing, The Skeleton, Movement: Joints, Movement: Muscles **Health and Lifestyle** Nutrients, Food Tests, Unhealthy Diet, Digestive System, Gut Bacteria	**Photosynthesis** Enzyme-driven energy capture. **Sound** Waves, Sound & Energy Transfer, Loudness & Pitch, Detecting Sound, Echo es & Ultrasound	**Energy -** Food and Fuels, Energy Resources, Energy, Temperature, Energy Transfer: Particles, Radiation & Forces, Power Renewable vs non-renewable. Generating Electricity: Wind, solar, hydro, fossil fuels. Efficiency and Conservation: Reducing energy waste. Environmental Impact: Carbon footprint and sustainability.	**P4 – Atomic structure and Decay** Radioactive Materials Atoms: Isotopes and radiation; Radiation Types: Alpha, beta, gamma; Uses & Risks: Medical, industrial, nuclear safety **P5 – Forces** Newton's Laws, speed, Acceleration Distance-time and velocity-time; Momentum, conservation and safety	Revision and Exams		