**Curriculum Intent**

**Prompt Questions – Term 1 2023/2024**

To support your mapping of curriculum **intent** please respond to the prompt questions below.

Use these within department meetings and conversations over the course of Term 1 2023/2024.

* Is your curriculum broad and balanced? How do you know?

A broad and balanced curriculum provides children with the skills, knowledge and understanding they need to develop into well-rounded, informed individuals.

The department have mapped out subject journeys for Biology, Chemistry and Physics so that it is highly visible where key concepts are developed. Additionally, coverage of the big ideas for each subject are has been mapped across both key stages so it is clear how frequently students are revisiting each big idea. The key investigative skills have been identified and mapped across the 5-year curriculum journey.

The curriculum is ambitious, covering the National Curriculum and providing explicit opportunities for students to develop investigative skills, literacy skills, and build their science capital. At KS3 it is taught through thematic units rather than subject-specific units which enables teachers to ground the science in the real-life experiences of students. Each unit has a Theme which relates to a real-life scenario, and is then broken down into individual lesson questions. Pupils develop component knowledge throughout the topic which then enables them to answer the Big (composite) Question at the end of the lessons/ topic. At the KS4 the exam board specification forms the basis for the component knowledge. Learning is sequenced to form a spiral curriculum which complements the curriculum plan for KS3. There is a clear rationale to the sequencing with more challenging concepts found in Y11 and the most fundamental learning falling at the beginning of the curriculum plan. Again Big Questions are used which help students to identify the composite knowledge and how each lesson contributes to a bigger picture. Scientific enquiry skills are successfully and rigorously developed across both key stages. Significant work has been done to ensure that practical work is purposeful and that it is clear to teachers and learners which skills are being developed. Practical activities have been mapped across both key stages and, where there is a similar practical repeated in KS4, there is evidence of progression in terms of the demand of the activities set.

* What do you want students to know by the end of KS3 – why is it important? (consider KS3 as a whole i.e. not year 7 and year 8 as separate)

We operate a 5 year spiral curriculum and as such students will build upon the ‘big ideas’ every year. By the end of KS3 we want students to have an appreciation that science is not a series of fragmented ideas but an interleaving discipline.

* What are the topics that you want your students to know, why, what will you leave out, why?

The National Curriculum is covered and extended through the use of cultural capital sheets. Every topic at both KS3 and KS4 has a cultural capital summary, identifying scientists who have been instrumental in developing understanding in the field, links to wider knowledge and scientific careers. These support disadvantaged students and other students from a science-poor background in gaining further knowledge of the stories of science, and show that the department is aware of their responsibilities in meeting the 4th Gatsby benchmark (linking the curriculum to careers). Additionally the department engages in a wide range of visits and works with external organisations to ensure that learners are able to meet other scientists and hear about science in the workplace.

* What are the key concepts/ideas which are necessary building blocks

The department has identified the ‘Big ideas’ in the science curriculum. These ideas are built into a coherent picture of how the world works to avoid a fragmented perception of science. These are:

Forces predict motionLet

Forces act through fields

Energy is conserved in transfers

Electricity transfers energy

Energy travels as radiation

Structure determines properties

Reactions rearrange matter

Earth systems interact

Cells carry out life processes

Bodies work as systems

Organisms interact in communities

Ecosystems cycle matter and energy

Characteristics are inherited

Species show variation

* Is your curriculum challenging and ambitious enough for students? Where relevant how have you built on KS2

The National Curriculum is covered in full and at KS3 is well-sequenced, ensuring that prior learning is revisited and developed. Component knowledge for each unit is mapped and cross-referenced to prior learning in KS2 or KS3 for teacher planning purposes, ensuring that the level of challenge is appropriate.

* How are you sequencing your curriculum/lessons to ensure students can remember and understand prior knowledge?

The department has identified the ‘Big ideas’ in the science curriculum. These ideas are built into a 5 year curriculum to form a coherent picture of how the world works to avoid a fragmented perception of science. Learning is sequenced to form a spiral curriculum which complements the curriculum plan for KS3. There is a clear rationale to the sequencing with more challenging concepts found in Y11 and the most fundamental learning falling at the beginning of the curriculum plan. Teachers teach in specialisms and there is consistency in the approach to sequencing across the three disciplines.

* How does the curriculum fit the context of your school?

We operate a non excuses culture. Students follow the national curriculum whilst improving science/ cultural capital through cultural capital sheets, visits, trips, competitions. The work of Mary Myatt has heavily influenced our strategy through high challenge, low threat techniques (big questions, retrieval roulette).

There is a focus on improving literacy skills in KS3 and this is now also becoming more evident at KS4 with the provision of glossaries for all topics. At KS3 spelling tests are utilised and opportunities are identified for reading aloud, and KS4 spelling tests have been developed ready for implementation in September. At KS3, structure strips are used to support students in constructing extended pieces of writing, and again these will be utilised in KS4 from September as part of the range of scaffolding.

* What does the department know about the knowledge new year 7s bring with them?

The curriculum at KS3 is well-sequenced, ensuring that prior learning is revisited and developed. Component knowledge for each unit is mapped and cross-referenced to prior learning in KS2 or KS3 for teacher planning purposes, ensuring that the level of challenge is appropriate.

* How does your curriculum influence T&L?

The identification of ‘big ideas’ has led to the development of a spiral, bespoke curriculum. All decisions/ techniques are research based, trialed and then reviewed and amended if necessary.

* What is the rationale for your assessment approach and how do you use the data?

Learning drills are well-established in the department and are a feature of every lesson. This empowers students to develop their long-term retrieval practice and the value of learning is established at the start of every lesson. A consistent bank of retrieval questions (retrieval roulette) has been sourced and further-developed by the department, and these will be utilised to make the learning drills more consistent between teaching staff. Students are assessed at the end of each topic using tests compiled using the assessment builder from Pearson. Tests are rigorous, using exam language consistently, and ramped to allow all students to access them. Students complete a follow-up activity to enable them to reflect and fill gaps in their knowledge.

Teachers will complete a mini action plan for each class after each assessment, identifying areas which need revisiting. These will be targeted during learning drills at the start of lessons, and retaught during designated blocks of lessons which will be used to close gaps in pupils’ prior knowledge.

* How does the department encourage high expectations and allow for students to revise and repeat previous learning?

The department have very high expectations of learners and model the ‘St Anne’s Way’. There is a consistent approach to the delivery of lessons within science. Homework tasks are standardised for all learners, utilising the Seneca Learning online platform and forms quizzes which enable staff to immediately identify areas which need to be addressed through T&L. Work-books are well-organised using a topic title page, which contains a checklist and details of the homework and practical tasks to be completed, as well as a cultural capital page which gives students a broader view of each topic. Curriculum planning is designed to teach to the top with a range of scaffolding to support lower attainers and those with additional needs. All students are supported to take GCSEs in either combined or separate science. Learning drills are embedded as ‘do now’ tasks at the start of every lesson and ensure the core knowledge is stored in the long term memory. Assessment data informs planning and ‘review weeks’ so that areas of misconception can be addressed.

* How are staff encouraged to develop their subject and pedagogical knowledge through CPD?

Teachers meet regularly to discuss pedagogy and to support each other (fortnightly meetings for physics and chemistry). A wide range of CPD has been undertaken by the department both during lockdown and during normal term time and this is enthusiastically shared. The department has a CPD library and has developed a support programme for staff which is research based. Staff attend hub meetings and all members of staff are examiners in their specialism for the Edexcel exam board.

VH has completed the NPQSL and level 1 coaching. Ell has completed the NPQML, SBo and Amu are studying for the NPQML. AMu is also studying for a masters in STEM Education. ACa is a member of IOP.

* What criteria are used to decide on timetabling priorities such as which classes will be taught by non-specialists?

At KS3 staff teach all three specialisms. The detailed curriculum plans and resources allow non specialists to be supported, they can concentrate on pedagogy. At KS4, from September, we will have a full complement of specialists. In some cases teachers teach outside of their degree specialism but this is monitored and appropriate support and CPD is sourced.

* What information and support would be given to a new member of the team?

There is a Department Handbook which is shared with all staff. This includes details of staffing, curriculum maps, policies, resourcing etc. Trainees/ NQTs are allocated a subject specialist mentor and a CPD mentor to ensure the department provision complements whole school support. Staff induction meetings allow for information to be shared regarding lesson resources etc. The shared drive is well organized and contains all resources.

* Do all your team share the vision for the curriculum – can they articulate if asked?

All staff were involved in curriculum planning to ensure buy in and a sense of ownership. The curriculum is well resourced and the leadership of the department have secured buy-in from the team, meaning the resources are well-utilised.

* How does your subject fit within the wider curriculum? Can your pupils use their subject knowledge across the curriculum? How do you know? Are links explicit?

Cross curricular links are explicitly mapped and topics have been sequenced to ensure they support whole school curriculum.

* What are your action points moving forwards?

Interdisciplinary links will be mapped to identify common themes across the three specialisms. These will then identify opportunities to develop greater depth and practice retrieval.

Develop and embed prior learning tasks to assess previous knowledge at the start of a topic.

* How do you keep your knowledge and leadership of the curriculum up-to-date?

Teachers meet regularly to discuss pedagogy and to support each other. A wide range of CPD has been undertaken by the department both during lockdown and during normal term time and this is enthusiastically shared. The department has a CPD library and has developed a support programme for staff which is research based. Staff attend hub meetings and all members of staff are examiners in their specialism for the Edexcel exam board. Network meetings are regularly attended.

**Curriculum Mapping Document**

* Please can you also populate the document below (by the Friday 10th July). This will aid a whole school overview of curriculum provision and be incorporated into the Curriculum Policy for parents (this is the summary document as a RESULT of all your discussions. You will have something more substantial.
* I have ‘modelled’ a few boxes in relation to science to hopefully illustrate the type of thing we are looking for
* Only populate the CIAG box if relevant.
* Please ensure we only have one sheet completed for each year group

**Key Stage 3: Year 7**

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| **Term 1** | **Overall Curriculum Goals - developing the following Big Ideas:**   * **Forces predict motion · Forces act through fields · Energy is conserved in transfers · Electricity transfers energy · Energy travels as radiation** * **Structure determines properties · Reactions rearrange matter · Earth systems interact · Cells carry out life processes · Bodies work as systems** * **Organisms interact in communities · Ecosystems cycle matter and energy · Characteristics are inherited · Species show variation** | | | | | | | | | | |
| WC 11/09 & 18/09 | WC 25/09 &02/10 | | WC 09/10 & 16/10 | | WC 30/10 & 6/11 | WC 13/11 & 20/11 | WC 27/11 & 4/12 | | WC 11/12 & 18/12 | |
| Becoming a St Anne’s Scientist   * Safety * Hazard symbols * equipment | Theme Park (7K & 8L)   * Weight and Mass * Friction   Springs | | Theme Park (7K & 8L)   * Balanced and Unbalanced forces * Pressure | | Theme Park (7K & 8L)   * Magnetism   Electrostatic  Assessment 1  Close the Gap | What a State! (7G)   * Solids, liquids and gases * Particle model * State changes | What a State! (7G)   * Heating curves * Brownian Motion   Diffusion | | What a State! (7G)   * Air Pressure * Reversible Reactions   Assessment 2  Close the Gap | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | | |
| **Half Term 1** forces, resistance, mass, weight, gravity, magnetism, springs, proportional, friction, pressure, balanced, unbalanced, gravitational field | | | | | | **Half Term 2** Brownian motion, compressed, diffusion, equipment:, hazard, particle, pressure, reversible, safety, state, volume | | | | |
| **Term 2** | WC 08/01 & 15/01 | WC 22/01 & 29/01 | | WC 05/02 & 12/02 | | | WC 26/02 & 04/03 | | WC 11/03 & 18/03 | | WC 25/03 |
| A&E (7A & 7C)   * Life Processes * Cells * Specialised Cells * Microscopes | A&E (7A & 7C)   * Tissues * Organs and Transplants * Blood * Muscles and breathing | | A&E (7A & 7C)   * Skeleton * Muscles and moving * Drugs * Organ Systems * Assessment 3   Close the Gap | | | Recipe for Life (7H & 8F)   * Elements, compounds and mixtures * Atoms * Periodic Table | | Recipe for Life (7H & 8F)   * Making Compounds * Chemical Reactions * Word Equations | | Recipe for Life (7H & 8F)  Assessment 4  Close the Gap |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | | |
| **Half Term 3** organism, movement, reproduction, sensitivity, growth, respiration, excretion, nutrition, cell, tissue, organ, organ system, microscope, nucleus, cell membrane, cytoplasm, cell wall, chloroplast, vacuole, gas exchange, respiration, blood, capillaries | | | | | | **Half Term 4** particles, element, compound, mixture, periodic table, atoms, properties, metal, non-metal, flexible, malleable, conductor, magnetic, melting point, boiling point,, reactants, products, thermal decomposition | | | | |
| **Term 3** | WC 15/04 & 22/04 | | WC 29/04 & 06/05 | | WC 13/05 & 20/05 | | WC 03/06 & 10/06 | | WC 17/06 & 24/06 | | WC 01/07 & 08/07 |
| SAS Survival (8K)   * Conduction * Convection * Radiation * Insulation | | SAS Survival (8K)   * Energy Transfers     Assessment 5  Close the Gap  Herbology (7D & 8B)   * Adaptations | | Herbology (7D & 8B)   * Variation   Useful Plants   * Adaptations of a leaf * Food chains and webs | | Herbology (7D & 8B)   * Environmental effects and pyramids * Classification * Types of reproduction * Pollination and seed dispersal | | Herbology (7D & 8B)   * Germination     Assessment 6  Close the Gap  Potions(7F)   * Hazard symbols * Acids and Alkalis * indicators | | Potions (7F)   * Neutralisation * Neutralisation equations   Close the Gap  Assessment 7 |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | | |
| **Half Term 5** temperature, energy, joules, evaporation, radiation, conduction, convection, emit, reflected, absorbed, insulator, transfer, efficiency  habitat, species**,** variation, continuous, discontinuous, | | | | | | **Half Term 6** adaptation, competition, predator, prey, food chain, food web, energy, pyramid of number, biodiversity, sexual, asexual, fertilisation, zygote, pollination, seed dispersal, germination  Hazard, acid, alkali, neutralisation, indicator | | | | |
| **CEIAG** | | | | | | | | | | | |
| Cultural capital sheets to introduce each unit.  careers displays around the whole department  British Science week, BioBakes, BioArtAttack  Visits – Chester Zoo | | | | | | | | | | | |

**Key Stage 3: Year 8**

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| **Term 1** | **Overall Curriculum Goals - developing the following Big Ideas:**   * **Forces predict motion · Forces act through fields · Energy is conserved in transfers · Electricity transfers energy · Energy travels as radiation** * **Structure determines properties · Reactions rearrange matter · Earth systems interact · Cells carry out life processes · Bodies work as systems** * **Organisms interact in communities · Ecosystems cycle matter and energy · Characteristics are inherited · Species show variation** | | | | | | | | |
| WC 11/09 & 18/09 | WC 25/10& 02/11 | | | WC 09/11 & 16/11 | WC 30/10 & 6/11 | WC 13/11 & 20/11 | WC 27/11 & 4/12 | WC 11/12 & 18/12 |
| Superheroes (8J & 7L)   * Waves * Light * Reflection * Refraction * Dispersion * Colours | * Dispersion * Colours * Lenses * Sound * Assessment 1 * Close the Gap | | | Man vs Food (8A)   * Nutrients and their uses * Food Tests   Balanced diets and deficiency diseases   * Digestion | * Digestive Enzymes * Absorption * `` * Assessment 2 * Close the Gap | * Living in a greenhouse (8E) * Burning Fuels * Oxidation * Fire Safety * Air pollution * Global Warming | Assessment 3  Close the Gap  Titanic (8i)   * Particle model * Changing state | Titanic (8i)   * Pressure * Density * Floating & sinking * Drag   Assessment 4  Close the Gap |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | |
| **Half Term 1** light, waves, transparent, translucent, transmitted, absorbed, reflected, refracted, scattered, lens, cornea, optic nerve, iris, pupil, cone cells, rod cells, spectrum, dispersion, sound, frequency, volume, pitch, hertz, amplitude, echolocation, nutrients, starch, fat, protein, iodine, biuret, energy, growth, repair, deficiency, kwashiorkor, scurvy, rickets, anaemia, obesity, digestion, | | | | | **Half Term 2** enzymes, reactants, products, fossil fuels, oxidation, conservation of mass,, exothermic, flammable, extinguisher, pollution, combustion, acid rain, global warming, catalytic converter  Particle, forces, properties, diffusion, Brownian motion, expanding, contracting, density, mass, volume, melting, freezing, boiling, sublimation, evaporation, condensation, pressure, density, drag, friction, streamlined | | | |
| **Term 2** | WC 8/01 & 15/01 | | WC 22/01 & 29/01 | WC 05/02 & 12/02 | | WC 26/02 & 04/03 | WC 11/03 & 18/03 | WC 25/03 | |
| Manchester Marathon (8C & 8D)   * Types of respiration * Gas exchange systems * Comparing gas exchange * Diffusion and surface area | | Manchester Marathon (8C & 8D)   * Yeast * Bacteria * Decomposers * Carbon cycle | Manchester Marathon (8C & 8D)   * Water cycle   Assessment 5  Close the Gap  Formula 1 (8G)   * Metal properties | | Formula 1 (8G)   * Corrosion * Metals and water * Metals and acids * Pure metals and alloys   Assessment 6  Close the Gap | Shipwrecked (7I)   * Energy from food * Energy transfers and stores * Fuels | Shipwrecked (7I)   * Renewable energy resources * Using resources   Close the Gap  As Close the Gap  Assessment 7 | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | |
| **Half Term 3** respiration, aerobic, anaerobic, oxygen, glucose, carbon dioxide, surface area, capillary, erythrocyte, diffusion, concentration, decomposition, precipitation, evaporation, condensation | | | | | **Half Term 4** Energy, joule, kilojoule, fuel, renewable, non-renewable, fossil fuel, coal, oil, natural gas, biofuels, nuclear | | | |
| **Term 3** | WC 15/04 & 22/04 | | WC 29/04 & 06/05 | WC 13/05 & 20/05 | | WC 03/06 & 10/06 | WC 17/06 & 24/06 | WC 01/07 & 08/07 | WC 15/07 |
| Let’s talk about it (7B)   * Life cycles * Puberty * Reproductive organs * Gametes | | Let’s talk about it (7B)   * Menstrual cycle * fertilisation * Gestation and birth   Assessment 8  Close the Gap | CSI (7E)   * Methods * Mixtures * Solutions   Filtration | | CSI (7E)   * Evaporation * Chromatography * Distillation   Assessment 9  Close the Gap | Short Circuit (7J)   * Electricity * Switches and current * Conductors and insulators * Series and parallel circuits | Short Circuit (7J)   * Changing the current (resistance) * Using electricity * Static electricity | Assessment 10  Close the Gap |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | |
| **Half Term 5** reproduction, offspring, gamete, specialised, sperm, egg, fertilisation, foetus, labour, uterus, oviduct, ovary, cervix, bladder, urethra, vagina, gland, sperm duct, penis, testis, scrotum, menstrual cycle, puberty, mixture, suspension, colloid, dispersed, opaque, transparent, solution, filter, solute, solvent | | | | | **Half Term 6** mixture, suspension, colloid, dispersed, opaque, transparent, solution, filter, solute, solvent, saturated, solubility, evaporation, boiling, chromatography, chromatogram, distillation, desalination  Electricity, energy, current, ammeter, circuit, series, parallel, cell, switch, conductor, insulator,,voltmeter, resistance, resistor, fuse, live wire, neutral wire, earth wire, circuit breaker, static | | | |
| **CEIAG** | | | | | | | | | |
| Cultural capital sheets to introduce each unit.  Careers displays around the whole department  British Science week, BioBakes, BioArtAttack  Nurse/Midwife for Let’s Talk About It  Action4Conservation  Charlotte Beswick Medical Event (Manchester University) | | | | | | | | | |

**Key Stage 3: Year 9**

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| **Term 1** | **Overall Curriculum Goals - developing the following Big Ideas:**   * **Forces predict motion · Forces act through fields · Energy is conserved in transfers · Electricity transfers energy · Energy travels as radiation** * **Structure determines properties · Reactions rearrange matter · Earth systems interact · Cells carry out life processes · Bodies work as systems** * **Organisms interact in communities · Ecosystems cycle matter and energy · Characteristics are inherited · Species show variation** | | | | | | | | |
| WC 11/09 & 18/09 | WC 25/09 & 02/10 | WC 09/10 & 16/10 | WC 30/11 & 06/11 | | WC 13/11 & 20/11 | WC 27/11 & 04/12 | | WC 11/12 & 18/12 |
| * Short Circuit (7J)Electricity * Switches and current * Conductors and insulators * Series and parallel circuits * Changing the current (resistance) | Short Circuit (7J)   * Using electricity * Static electricity     Assessment 10  Close the Gap | * Jurassic Park (9A & 9B)Environmental variation * Inherited variation * DNA * Genes and extinction | Jurassic Park (9A & 9B)   * Natural Selection * Reactions in plants * Plant adaptations * Plant products | | Jurassic Park (9A & 9B)   * Growing crops * Farming problems   Assessment 1  Close the Gap | * Living in a material world (9E & 9F)Ceramics * Polymers * Composite materials | | Living in a material world (9E & 9F)   * Problems with materials * Recycling materials * Reactivity |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | |
| **Half Term 1** adaptation, biodiversity, characteristic, chromosome, classification, decomposer, ecosystem, endangered, evolution, fertilisation, gamete, gene, germination, nucleus, photosynthesis, species, zygote | | | | **Half Term 2** biodegradable, crystals, displacement, elastic, electrolysis, endothermic, exothermic, flammable, hydrocarbon, implosion, impurity, lattice, oxidising, polymerisation, result, sacrificial, thermal decomposition, vulcanisation | | | | |
| **Term 2** | WC 08/01 & 15/01 | WC 22/01 & 29/01 | WC 05/02 & 12/02 | | WC 26/02 & 04/03 | WC 11/03 & 18/03 | | WC 25/03 | |
| Living in a material world (9E & 9F)   * Displacement * Extracting metals * Types of explosion   Assessment 2  Close the Gap | May the force be with you (9I & 9J)   * Forces * Balanced and unbalanced forces | May the force be with you (9I & 9J)   * Energy stores * Energy transfer * Speed/distance/time * Formula * Distance – time graphs | | May the force be with you (9I & 9J)   * Ramps and pulleys * Work done * Formula – workdone/ force/ distance moved * Conservation of energy   Assessment 3  Close the Gap | Our World (8L & 8H)   * Seasons * Gravity in space * Beyond the solar system | | Our World (8L & 8H)   * Materials in the earth * Extraction of metals from ores   Assessment 4  Close the Gap | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | |
| **Half Term 3** accelerate, balanced, deform, dissipate, efficiency, electricity, electromagnet, fulcrum, lever, moment, nucleus, parallel, pivot, pulley, series, voltage, voltmeter, weight, work | | | | **Half Term 4** accelerate, balanced, deform, dissipate, efficiency, electricity, electromagnet, fulcrum, lever, moment, nucleus, parallel, pivot, pulley, series, voltage, voltmeter, weight, work | | | | |
| **Term 3** | WC 15/04 & 22/04 | WC 29/04 & 06/05 | WC 13/05 & 20/05 | | WC 03/06 & 10/06 | WC 17/06 & 24/06 | | WC 01/07 & 08/07 | |
| Key Concepts in Biology CB1   * Microscopes * Plant and animal cells * Core practical – using microscopes (method, prepare a slide, calculations) * Specialised cells * Bacteria | * Transporting substances * Core practical – osmosis (%change, conclusion, variables)   Assessment CB1a  Close the Gap | Topic 1.1 Atomic Structure   * Atomic structure * History of the atom * Atomic number * Mass number   Isotopes | | * Topic.1.1 The Periodic Table * Mendeleev   Elements and the periodic table  Atomic number and the periodic table  Atomic number and the periodic table  Assessment Topic 1.1  Close the Gap | Motion CP1   * Vectors & Scalars * Distance and displacement * Speed and velocity * Acceleration | | * Distance/time graph * Velocity/time graph * Assessment CP1   Close the Gap | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | |
| **Half Term 5** microscope, objective lens, magnification, resolution, cells, eukaryotic, prokaryotic, specialised, nucleus, cell membrane, cytoplasm, ribosome, mitochondria, cell wall, chloroplast, vacuole , enzyme, biological catalyst, active site, denature, substrate, polymer, monomer, temperature, pH, substrate concentration, collision, enzyme - substrate complex, diffusion, osmosis, active transport, gradient  Atom, element, subatomic, proton, neutron electron, nucleus, mass, charge, periodic table, isotopes, property, chemical, physical, predictions | | | | **Half Term 6** Period, group, electronic configuration, shells  Scalars, vectors, speed, velocity, resultant force, balance, unbalanced, centripetal force, mass, weight, gravitational field strength, inertial mass, equilibrium, collisions, momentum, stopping distance, reaction times, crumple zone, force, weight, magnitude, vector quantities, mass, scalar quantities, distance, speed, velocity, acceleration, momentum, speed, light gates, distance/time graph, deceleration, acceleration, gradient, velocity/ time graph | | | | |
| **CEIAG** | | | | | | | | | |
| Cultural capital sheets to introduce each unit.  Careers displays around the whole department  British Science week, BioBakes, BioArtAttack  Brilliant Club  Zoologist talk  Cambridge University Physics Event | | | | | | | | | |
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**Key Stage 4: Year 10**

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| **Term 1** | **Overall Curriculum Goals - developing the following Big Ideas:**   * **Forces predict motion · Forces act through fields · Energy is conserved in transfers · Electricity transfers energy · Energy travels as radiation** * **Structure determines properties · Reactions rearrange matter · Earth systems interact · Cells carry out life processes · Bodies work as systems** * **Organisms interact in communities · Ecosystems cycle matter and energy · Characteristics are inherited · Species show variation** | | | | | | | | | |
| WC 11/09 & 18/09 | WC 25/09 & 02/10 | | WC 09/10 & WC 16/10 | | WC 30/10 & 06/11 | WC 13/11 & 20/11 | WC 27/11 & 4/12 | | WC 11/12 & 18/12 |
| * Enzymes and nutrition   Enzyme action and activity  Core practical – pH and enzymes (variables, conclusion)  Cells and Control CB2   * Mitosis | * Percentile Growth Charts * Nervous System * Synapses and reflexes | | Suggested practical – reaction times (variables, conclusion)   * Assessment CB2 * Close the Gap | | Genetics CB3   * Meiosis * DNA * Suggested practical -DNA Extraction (Method, safety) | * Alleles * Inheritance | Gene mutation   * Assessment CB3   Close the Gap | | Review CB 1, 2 & 3 |
| Review Topic 1.1 | Topic 1.2   * Ions * Ionic bonds * Ionic lattices | | * Ionic lattices * Covalent bonds * Covalent bonds * Molecular compounds | | * Review ionic and covalent bonding * Bonding models | * Assessment Topic 1.2   Close the Gap | Topic 1.3 Calculations involving masses   * Calculating concentration * Relative formula mass | | * Empirical formula * Conservation of mass |
| Conservation of energy CP3   * Energy stores and transfers * Energy efficiency | * Sankey diagrams * Insulation | | * Stored energies * Non-renewable resources * Renewable resources   Assessment CP3  Close the Gap | | Review Key concepts and CP1 | Waves CP4   * Properties of waves * Wave speeds | * Core Practical – Investigating waves (method, calculations) * Refraction | | Assessment CP4  Close the Gap  Review CP2 |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | |
| **Half Term 1** mitosis, chromosomes, stem cells, interphase, prophase, metaphase, anaphase, telophase, cytokinesis,meiosis, gametes, genome, gene, chromosome, DNA, complementary, bases, hydrogen bonds,  Bonds, ions, cations, anions, electrons, electrostatic forces, ionic compounds, lattice structure, properties, melting point, boiling, anode, cathode, covalent, molecular., valency, polymer, monomer, intermolecular, allotropes, fullerenes, graphene, delocalised, metallic, malleable, conduct  Energy, chemical, thermal, kinetic, elastic potential, gravitational potential, atomic, nuclear, conservation of energy, Sankey diagram, joules, conservation, dissipated, lubrication, insulation, conduction, thermal, convection, fluid, radiation, infrared, absorbed, emitted, thermal conductivity, kinetic, nuclear fuels, renewable | | | | | **Half Term 2** alleles, homozygous, heterozygous, dominant, recessive, genotype, phenotype, Punnett squares, inheritance, mutation, variation, continuous, discontinuous  Bonding, ionic, simple molecular, giant covalent, metallic, empirical formula, molecular formula, relative formula mass, conservation of mass, Avogadro constant,  Waves, transverse, sound, longitudinal, seismic, electromagnetic, frequency, hertz, period, wavelength, amplitude, velocity, refraction , interface, | | | | |
| **Term 2** | WC 08/01 & 15/01 | | WC 22/01 & 29/01 | | WC 05/02 & 12/02 | WC 26/02 & 04/03 | WC 11/03 & 18/03 | | WC 25/03 | |
| Natural Selections and Genetic Modification CB4   * Evidence for human evolution * Darwin | | * Classification * Breeds and varieties | | * Genes in agriculture and medicine | Assessment CB4  Close the Gap | CB3 review | | CB4 review | |
| * Moles   ·Stoichiometry | | * Assessment Topic 1.3   Close the Gap | | * Review Topic 1 | Topic 6 Groups in the periodic table     1. Group 1 2. Group 7   Halogen reactivity | 1. Group 0   Assessment Topic 6  Close the gap    Topic 7 Rates of reaction  Factors affecting reaction rates | | * Core practical – investigating reaction rates (method, calculations, conclusion) * Catalysts and activation energy * Exothermic and endothermic reactions | |
| Review CP3 & 4 | | Light and the EM Spectrum CP5   * Electromagnetic spectrum * Core practical – Investigating refraction (method, measuring angles, conclusion0 | | * The electromagnetic spectrum * Uses of EM waves | * Dangers of EM waves   Assessment CP5  Close the Gap | RadioactivityCP6   * Atomic model * Inside atoms * Electrons and orbits | | * Background radiation * Types of radiation | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | |
| **Half Term 3** evolution, fossils, binomial system, species, classification, *Ardipithecus ramidus, Australopithecus afarensis,* natural selection, competition, kingdom, genus, domain, eukaryote, archaea, bacteria  Particle model, solid, liquid, gas, physical, chemical, melting, insoluble, filtration, cystallisation, solution, solute, solvent, filtrate, residue, risk assessment, hazard, chromatography, stationary phase, mobile phase, chromatogram  Electromagnetic wave, frequencies, visible light, ultraviolet, transverse, vacuum, infrared, refraction, electromagnetic spectrum, visible spectrum, microwaves, radio waves, x-rays, gamma rays, fluorescence, gamma, radiotherapy, mutations, radiation | | | | | **Half Term 4** Artificial selection, selective breeding, genetic engineering, recombinant DNA, restriction enzyme, plasmid, ligase, vector, sticky ends  Distillation, mixture, evaporates, condensed, fractional distillation, precipitates, aquifers, sedimentation, chlorination,  Particle theory, elements, atoms, subatomic particles, electrons, alpha particles, nucleus, nucleons, protons, neutrons, relative mass, mass number, isotopes, electronic configuration, emission spectrum, ionization, radioactivity, ionizing radiation, penetrating radiation | | | | |
| **Term 3** | WC 15/04 & 22/04 | | WC 29/04 & 06/05 | | WC 13/05 & 20/05 | WC 03/06 & 10/06 | WC 17/06 & 24/06 | | 01/07 & 09/07 | |
| Health, disease and the development of medicines CB5   * Health and disease * Non-communicable disease | | * Pathogens * Spreading pathogens   Suggested practical – agar plates & fingerprints (risk assessment, conclusion)   * Physical and chemical barriers | | * The immune system * Antibiotics and drug development | * Cardiovascular disease   Assessment CB5  Close the Gap | Review Paper 1  CB 1,2 & 3 | | Review Paper 1  CB 1,4 & 5 | |
| 1. Energy changes in reactions     Assessment Topic 7  Close the Gap | | Topic 8 Fuels   1. Hydrocarbons in crude oil and natural gas   2. Fractional distillation of crude oil | | Alkane homologous series   * Combustible fuels and pollution * Breaking down hydrocarbons | The early atmosphere  The changing atmosphere  Climate change  The greenhouse effect | Assessment Topic 8  Close the Gap  Review Paper 2 Topic 1 | | Review Paper 2 Topic 6,7,8 | |
| * Radioactive decay * Half life | | * Dangers of radioactivity   Assessment CP6  Close the Gap | | Review Paper 5 (CP1-6) | Review Paper 5 (CP1-6) | Forces and Energy CP7 & 8   * Work and power * Objects affecting each other | | * Vector diagrams   Assessment CP7 & 8  Close the Gap | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | |
| **Half Term 5** health, pathogen, communicable, non-communicable, deficiency, cholera, tuberculosis, chalara dieback, malaria, HIV, AIDs, bacteria, fungi, virus, protist, pathogen, lymphocyte, antibody, antigen, vaccination, barriers  Aqueous solution, acidic, alkaline, neutral, pH scale, polyatomic ions, dissociate, neutralise,, state symbols, crystallization,  Radioactive decay, nuclear equation, becquerels, half-life, mutation, contaminated, irradiated | | | | | **Half Term 6** cardiovascular disease, heart attack, body mass index, waist:hip ratio, artery, stroke, antihypertensives, anticoagulants, stent  Ions, neutralisation,,titration, burette, pipette, end-point, reactivity series, effervescence, ionic equation, carbonates, precipitation, precipitate, insoluble  Energy, work done, power, watts, contact forces, non-contact forces, vectors, action-reaction forces, force field, gravitational field, magnetism, static electricity, magnet, electric field, resultant force, | | | | |
| **CEIAG** | | | | | | | | | | |
| Cultural capital sheets to introduce each unit.  Careers displays around the whole department  British Science week, BioBakes, BioArtAttack  Why Study? Talks  Medical Mavericks (PE & Health&Social) | | | | | | | | | | |

**Key Stage 4: Year 11**

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| **Term 1** | **Overall Curriculum Goals - developing the following Big Ideas:**   * **Forces predict motion · Forces act through fields · Energy is conserved in transfers · Electricity transfers energy · Energy travels as radiation** * **Structure determines properties · Reactions rearrange matter · Earth systems interact · Cells carry out life processes · Bodies work as systems** * **Organisms interact in communities · Ecosystems cycle matter and energy · Characteristics are inherited · Species show variation** | | | | | | | | | | | | | | | | | |
| WC 11/09 & 18/09 | | WC 25/09 & 02/10 | | | WC 09/10 & 16/10 | | | WC 30/10 & 6/11 | | | WC 13/11 & 20/11 | | WC 27/11 & 04/12 | | WC 11/12 & 18/12 | | |
| Exchange and transport in animals CB8   * Efficient transport and exchange * The circulatory system * The heart | | * The heart * Suggested practical – heart dissection (risk assessment) * Cellular respiration | | | * Core practical – respiration rates (method, variables, conclusion)   Assessment CB8  Close the Gap | | | Animal coordination, control and homeostasis CB7   * Hormones * Hormonal control of metabolic rate | | | * Menstrual cycle * Hormones and the menstrual cycle | | * Control of blood glucose * Type 1 Diabetes | | * Type 2 diabetes * Suggested practical – testing for glucose (method, conclusion)   Assessment CB7  Close the Gap | | |
| Topic 2 States of matter   * States of matter * Mixtures * Filtration and crystallisation | | 1. Paper chromatography 2. Distillation 3. Core practical – investigating inks (method, conclusion0 | | | Drinking water  Review  Assessment Topic 2  Close the gap | | | Topic 3.1 Acids and Alkalis  ·Indicators  ·Acids and bases  Concentration Calc  Reactions of acids | | | Core practical – investigating neutralisation (method, risk assessment, equations  Alkalis and balancing equations | | Core practical – preparing copper sulfate (method, risk assessment, conclusion)  Solubility  Titrations | | Assessment Topic 3.1  Close the Gap      Review Topic 1.2, 1.3 and 7 | | |
| Electricity and circuits CP9   * Symbols * Current * Potential difference | | * Energy and charge * Resistance * Core practical – investigating resistance (method, calculations, conclusion) * Transferring energy | | | * Power * Transferring energy by electricity | | | * Electrical safety * Assessment CP9   Close the Gap | | | Review CP1, 2, 3 & 4 | | Magnetism CP10 & 11   * Magnets and magnetic fields   Electromagnetism | | * Magnetic forces * Transformers | | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | | | | | | | | | |
| **Half Term 1** gas exchange, respiration, aerobic, anaerobic, alveoli, plasma, platelets, lymphocytes, erythrocytes, haemoglobin, antibodies, atria, ventricle, artery, capillary, vein, cardiac output, stroke volume  Electrolysis, electrolyte, electrodes, cations, anions, cathode, anode, oxidation, reduction, half equation, displacement, redox, native state, extraction, bioleaching, leachate, phytoextraction, corrosion, recycling  Atom, nucleus, protons, neutrons, electrons, shells, current, series, parallel, circuit, amperes, ammeter, potential difference, voltage, volts, charge, coulombs, resistance, ohms, diodes, energy transfer, power watts, national grid, mains electricity, direct voltage, alternating voltage, | | | | | | | | | | **Half Term 2** hormones, endocrine, pituitary, thyroid, adrenal, pacers, testes, ovaries, metabolic rate, thyroxine, adrenaline, menstrual cycle, FSH, oestrogen, LH, progesterone, ovulation, menstruation, diabetes, insulin, pancreas, glucose, glycogen, glucagon, homeostasis  Periodic table, alkali metals, reactivity, halogens, diatomic, salts, halide, displacement, redox, oxidation, reduction, noble gases, inert, rate of reaction, activation energy, exothermic, endothermic, catalysts, protein, active site, denature, neutralization, displacement  Safety, circuit breakers, magnet, magnetic fields, plotting compasses, electromagnet | | | | | | | |
| **Term 2** | WC 8/01 & 15/01 | | | WC 22/01 & 29/01 | | | WC 05/02 & 12/02 | | | | WC 26/02 & 04/03  MOCKS | | | WC 11/03 & 18/03  MOCKS | | | WC 25/03 | |
| Plant structures and their functions CB6   * Photosynthesis * Factors that affect photosynthesis * Core practical – light intensity and photosynthesis (method, variables, conclusion, calculating rate) | | | * Absorbing water and mineral ions * Transpiration and translocation   Assessment CB6  Close the Gap | | | Ecosystems and material cycles CB9   * Ecosystems * Abiotic factors and communities * Core practical – Quadrats and transects (method, calculations) | | | | * Biotic factors and communities * Parasitism and mutualism * Biodiversity and humans * Preserving biodiversity | | | * Water cycle * Carbon cycle * Nitrogen cycle | | | Assessment CB9  Close the Gap | |
| Topic 4 Extracting Metals  LCA  Recycling  Reactivity Series  Reactivity of metals | | | Displacement  Redox  Extracting metals  Biological methods | | | * Dynamic equilibrium * Le Chatelier’s principle   Topic 4 Assessment  Close the gap | | | | Topic 3.2 Electrolysis  Molten electrolysis  half equations | | | Aqueous electrolysis  Core practical – electrolysis of copper sulfate (method, conclusion) | | | Topic 3.2 Assessment  Close the gap | |
| * Transformers and energy * Assessment CP10&11   Close the Gap | | | Particle model & matter CP12   * States of matter * Density   Core practical – investigating densities (method, calculations) | | | * Energy changes and changes of state * Energy calculations * Core practical – investigating water (method, calculations) | | | | * Gas temperature and pressure * Bending and stretching * Core practical – investigating springs (method, calculations, conclusion) | | | * Extension and energy transfers * Assessment CP12   Close the Gap | | | Review CP 6,7 8,9 | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | | | | | | | | | |
| **Half Term 3** photosynthesis, glucose, biomass, producer, chloroplast, endothermic, stomata, guard cell, limiting factors, inverse square law, root hair cell, diffusion, osmosis, active transport, xylem, phloem, transpiration, translocation  Crude oil, natural gas, hydrocarbons, fractional distillation, evaporate, condense, viscosity, ignite, alkanes, homologous, molecular formulae, structural formulae, combustion, complete, incomplete  Fleming’s left hand rule, magnetic flux density, tesla, transformers, potential; difference, induction, alternating current | | | | | | | | | | **Half Term 4** ecosystem, community, population, habitat, interdependent, abundance, quadrat, belt transect, biotic, abiotic, competition, predation, mutualism, parasitism, eutrophication, indigenous, non-indigenous, biodiversity, conservation, water cycle, desalination, potable, carbon cycle, nitrogen cycle, crop rotation  Impurities, pollutants, cracking, alkene, saturated, unsaturated, composition, atmosphere, volcanic activity, photosynthesis, infrared, emit, absorb, greenhouse effect, global warming,  Sublimation, states of matter, kinetic theory, compressed, density, thermal energy, specific heat capacity, specific latent heat, pascals, kelvin, elastic, inelastic, extension, linear relationship, directly proportional, spring constant, work done | | | | | | | |
| **Term 3** | WC 15/04 | WC 22/04 | | WC 29/04 | WC 06/05 | | WC 13/05 | WC 20/05 | | WC 03/06 | | | WC 10/06 | WC 17/06 | WC 24/06 | | 01/07 | 08/07 |
| Revision  GCSE Exams | | | | | | | | | | | | | | | | | |
| **Key Vocabulary/Concepts/ideas** | | | | | | | | | | | | | | | | | |
| **Half Term 5** | | | | | | | | | | **Half Term 6** | | | | | | | |
| **CEIAG** | | | | | | | | | | | | | | | | | | |
| Cultural capital sheets to introduce each unit.  Careers displays around the whole department  British Science week, BioBakes, BioArtAttack | | | | | | | | | | | | | | | | | | |