**Curriculum Mapping 2022-23**  **Subject:** **Science Faculty** **Curriculum Leader (s)**

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|  | **KS3 Curriculum**1. Teaching crucial knowledge.
2. Exposing to key vocabulary.
3. Developing cultural capital.
4. Enabling the development of knowledge.
5. Challenging misconceptions.
6. Emphasising inter-connectedness.
7. Teaching and development of skills.
 | **KS4 Curriculum**1. Transition to education after KS4
2. Developing further on the attitudes and attributes for success.
3. Building on all areas from KS3 and Accelerated Curriculum.
4. Guidance for next stage of education
 | **KS5 Curriculum**1. Transition to HE/FE/Employment (including apprenticeship).
2. Developing further on the attitudes and attributes for success.
3. Building on all areas from KS3 and KS4.
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|  | **Year 7** | **Year 8** | **Year 9** | **Year 10** | **Year 11** | **Year 12** | **Year 13** |
| **Spiral****Curriculum** | **Vertically integrated across Key Stages – Each KS** |
| **Skills** | Thinking scientifically* How theories develop
* Evaluating risk
* Using units
* Use equations
* Consider evidence quality
* Analysis data
* Using models

Working scientifically* Designing
* investigations
* Make predictions
* Using scientific equipment
* Record evidence
* Interpret evidence
* Present evidence
* Develop explanations Evaluating data

Learner development* Collaborate effectively
* Communicate effectively
* Develop resilience
* Questioning
* Respect others
* Safety in the Lab
 | Thinking scientifically* How theories develop
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Learner development* Collaborate effectively
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* Respect others
* Safety in the Lab
 | Practical Skills* Investigating motion
* Investigating
* properties of Materials
* Investigating electrical Properties
* Investigating electrical Circuits
* Investigating Waves
* Investigating quantum effects

Mathematical skills to be delivered.* Arithmetic and numerical computation
* Handling data
* Algebra
* Graphical work
* Geometry and trigonometry

Biology Mathematical skills* Arithmetic and numerical computation
* Handling data
* Algebra
* Graphs
* Geometry and trigonometry

Biology Practical skills* Independent thinking
* Use and application of scientific methods and practices
* Numeracy and the application of mathematical concepts in a practical context
* Instruments and equipment
* Practical endorsement skills

Medical Science practical skills* Investigating body systems
* Physiological tests
* Biochemical testing
* Microbiology
* Blood analysis

Medical science mathematical skills * numerical methods to process data
* Collecting and handling data
* Statistical methods to analysis data
* Graphical skills

Chemistry practical skills• Determination of molar ratios• Titrations• Determination of enthalpy• Quantitative Chemistry• Synthesis of haloalkanes• Determination of rates of reaction – continuous method | Practical Skills* Investigating
* Ionising radiation
* Investigating Gases
* Investigating
* Capacitors
* Investigating simple harmonic Motion
* Research skills

Mathematical skills to be delivered.* Arithmetic and numerical computation
* Handling data
* Algebra
* Graphical work
* Geometry and trigonometry

Biology Mathematical skills* Arithmetic and numerical computation
* Handling data
* Algebra
* Graphs
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Biology Practical skills* Independent thinking
* Use and application of scientific methods and practices
* Numeracy and the application of mathematical concepts in a practical context
* Instruments and equipment
* Practical endorsement skills

Chemistry practical skills• Identification of organic unknowns• Determination of rates order – clock method• Electrochemical cells• Determination of buffer pHMedical Science practical skills* Investigating body systems
* Biochemical testing
* Microbiology
* Blood analysis
* Colorimetry
* chromatography

Medical science mathematical skills * numerical methods to process data
* Collecting and handling data
* Statistical methods to analysis data
* Graphical skills
 |
| **Knowledge & Understanding** **Key Topics per half Term** ***Note – we were a pioneer school for the Oxford University Press (OUP) new scheme of work in 2021-22 for Year 7.*** ***We decided NOT to adopt the OUP scheme and therefore some overlap looks evident in Year 7 & 8. This is not the case*** | T1 Cells – the building blocks of lifeHow cells work for an organismHow plants are adapted to reproduceReproduction in humansT2 Mixing, dissolving & separatingUsing laboratory equipmentDistillationSolubilityChromatographyT3 Forces & their effectsTypes of forcesThings forces doUseful and unwanted frictionLevers and turning forcesT4 Eating, drinking & breathingA healthy dietThe digestive systemThe breathing systemT5 Elements, compounds & reactionsElements and atomsThe periodic tableUsing simple modelsReactionsT6 Energy transfer & sound | T1 Eating drinking & breathing & Getting the energy the body needs – *select lessons based on OUP experience in Year7*A healthy dietThe digestive systemThe breathing systemSkeletonMusclesAerobic respirationAnaerobic respirationT2 Contact and no –contact forcesGravity and space travelElectrostatic and magnetic forcesPressure, floating and sinkingT3 Mixing dissolving and separating – *not taught in the OUP Year 7 course*Elements and atomsThe periodic tableUsing simple modelsReactionsT4 Looking at plants and ecosystemsHealthy plantsProducersRelationships in the environmentT5 Magnetism and electricityHow magnets workElectromagnetsExplaining electric circuitsSeries and parallel circuitsT6 Explaining physical and chemical changes – *select lessons based on OUP experience in Year 7*Acids, alkalis and indicatorsReactions of acids and alkalisCombustionExplaining the properties of states of matter using the particle modelParticles in Physical and chemical changes | T1 Obtaining useful materialsMetal oresReactivityReaction energy and catalystsSpecial materialsT2 Waves and energy transferEnergy transfersEnergy in the homeWater wavesLight wavesT3 Using our Earth sustainablyThe atmosphereDamage to the Earth’s resourcesRecyclingThe rock cycleT4 Revisiting The BIG IDEAS for KS3 Science – teaching staff to select key topics/concepts that require revisiting before the end of KS3 assessment.Cellular basis of lifeHeredity & life cyclesOrganisms & their environmentVariation, adaptation & EvolutionHealth & diseaseSubstances and propertiesParticles and structureChemical reactionsEarth chemistryDynamic EarthMatterForces and MotionSound, light and wavesElectricity &magnetismEarth in spaceT5 Preparing for GCSE ScienceT6 Preparing for GCSE Science | OverviewQ Half T1 & T2 B2T3 & T4 P2P HalfT1 & T2 C2T3 & T4 B2*The 3 papers shown above contain the following content*Biology Paper 2Coordination and controlGeneticsVariation and evolutionEcology Chemistry Paper 2Rate and extent of chemical changeHydrocarbonsChemical analysisThe atmosphereSustainable developmentPhysics Paper 2ForcesWavesElectromagnetism*The final term in year 10 is dedicated to revisiting and revising topics covered in year 9*T5 Revisiting Chemistry paper 1 and Physics paper 1 T6 Revision Q Chemistry paper 1 and Physics paper 2P Biology paper 2 andPhysics paper 1**See adjacent KS4 Year 11 column for the key topics in B1 C1 & P1** | OverviewQ HalfT1 & T2 P2T3 & T4 B1 & C2 & P1*Reviewing these papers*T5 & T6 B1 & C1 & P1*Revision*P HalfT1 & T2 B2T3 & T4 C2 & P1 & B1*Reviewing these papers*T5 & T6 B1 & C1 & P1*Revision* **See adjacent KS4 Year 10 column for the key topics in B2 C2 & P2** Biology Paper 1Cell biologyPhotosynthesisMoving and changing materialsHealth mattersChemistry Paper 1Atomic structure and the periodic tableStructure bonding and the properties of matterChemical quantities and calculationsPhysics Paper 1EnergyElectricityParticle model of matterAtomic structure | PhysicsT1 – Foundations of Physics and Circuits* Physical quantities and units
* Making measurements and analysing data
* Nature of quantities
* Charge and current
* Energy, power and resistance

T2 - Forces & Motion and more circuits* Motion
* Forces in action
* Work, energy and power
* Electrical circuits

T3 – Forces and motion / Waves* Materials
* Newton’s laws of motion and momentum
* Waves

T4 – Electrons, waves and photons* Waves
* Quantum

T5 – Revision / Photons* Quantum investigation
* A/S revision
* Thermal Physics
* Circular motion

T6 – Newtonian world* Thermal Physics / gases
* Oscillations

Medical science T1 human health & disease* Understanding biological principles
* Understanding the function of body systems

T2 human health & disease* Understanding how external factors impact the body
* Reporting data on human heatlh

T3 Physiological measurement techniques* Understanding the function of physiological measurement tests
* Understand how to deal with patients
* Carry out physiological tests

T4 Physiological measurement techniques* Report on physiological measurement testing

Medical science research methods * Understand research methods
* Collect data

T4 medical science research methods* Understand data analysis
* Process collected data

T5 * Communicate and present research data
* Exam preparation for unit 1

T6 Clinical laboratory techniques * Understand microbiology testing
* Carry out microbiology investigations

BiologyT1 – Biological moleculesT2 – CellsT3 - Organisms exchange substances with their environmentT4 – Genetic information, T5 - variationT6 - relationships between organismsChemistryT1 – • Atoms, compounds, molecules and equations, • Amount of substance • Electrons, bonding and structureT2 – • Acid–base and redox reactions• Basic concepts of organic chemistryT3-• The periodic table and periodicity • Group 2 and the halogens• HydrocarbonsT4 - • Qualitative analysis • Enthalpy changes• Alcohols and haloalkanes • Organic synthesisT5 - • Reaction rates and equilibrium (qualitative)• Analytical techniques (IR and MS)T6 - • Aspirin synthesis and Research techniques | PhysicsT1 – Newtonian world * Oscillations
* Gravitational fields

T2- Astrophysics/ Particles* Astrophysics
* Cosmology Capacitors
* Electric fields

T3 – Particles Medical Physics* Electromagnetism
* Nuclear and particle physics
* Medical imaging

T4 – Exam RevisionMedical science T1 Medicines and treatments of disease* Understanding the management of medicine
* Understand how medicine

Clinical laboratory techniques* Understand clinical testing
* Carry out clinical laboratory techniques

T2 Medicines and treatments of disease* Understand the principles of cancer
* Provide information about medicines

Clinical Laboratory techniques * Process data from clinical tests

T3 medicines and treatment of disease* Presentations of coursework

Clinical Laboratory techniques* Producing scientific report based on controlled assessment

T4 Medical case study* Understand physiological information
* Understand how research can support diagnosis and treatment

Completion of coursework elements for unit 3 & 4T5 Medical case study* Understand how physiological tests support diagnosis

Submission of units 4 & 5 courseworkT6* Preparation for unit 6 exam

BiologyT1 – Energy transfers in and between organismsT2 – Organisms respond to changes in their internal and external environmentsT3 – Genetics, populations, evolution and ecosystemsT4 – The control of gene expressionT5 & T6 – revision and exam preparationChemistryT1 – • Reaction rates and equilibrium (quantitative)• Aromatic compounds• Carbonyl compoundsT2 – • pH and buffers • Enthalpy, entropy and free energy• Carboxylic acids and esters• Nitrogen compoundsT3-• Redox and electrode potentials• Polymers • Organic synthesisT4 - • Transition elements • Chromatography and spectroscopy (NMR)T5 & T6 – revision and exam preparation |
| **Common Assessment of Progress and Performance** **(CAPP)**  | Pupil data for **CAPP** reports will be determined from end of unit assessments that will take place every half term. Summative assessments taken place at the end of each term. Data collect takes place within the following months:* December
* March
* Jun
 | Pupil data for **CAPP** reports will be determined from end of unit assessments that will take place every half term. Summative assessments taken place at the end of each term. Data collect takes place within the following months:* November
* January
* Jun
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* January
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* April
* July
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* March
* May
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* January
* March
 |
| **Wider Curriculum including extracurricular opportunities** **e.g SMSC, Careers and Employability, Literacy and Numeracy**  | Reproduction unit provides opportunity for SMSCSex Education in Year 7 as part of the reproduction unit taught in science lessons. The content of this unit includes anatomy and physiology relating to sexual reproduction, sexual intercourse, pregnancy and childbirth. It also includes physical changes to the body that occur at puberty as well as the menstrual cycle. At KS3 students also study specialised cells including the role and adaptations of sperm and egg cells, they also study disease and prevention of disease which includes the transmission of sexually transmitted infections [STIs]. Students watch a BBC documentary entitled ‘The Human Body’ which allows presentation of what bodies looks like and presents an opportunity to discuss what ‘normal’ bodies look like. **Throughout the KS3 units** of work there are opportunities to discuss careers in science. To discuss opportunities within scientific fields at key points in the curriculum. | Healthy DietExerciseEcologyCombustion These units provide opportunity for SMSCEthical issues are discussed  Rising Stars extracurricular lessons – lessons that enhance/enthuse**Throughout the KS3 units** of work there are opportunities to discuss careers in science. To discuss opportunities within scientific fields at key points in the curriculum. | Robotics club – STEM  London South East Challenge Day Earth’s resourcesSustainabilityRecyclingHealth and disease These units provide opportunity for SMSCEthical issues are discussedStudents also have healthy relationships workshops during science lesson at the end of Year 9. These sessions include revising and developing knowledge on anatomy and physiology, FGM, puberty and adolescence, sexually transmitted infections: diagnosis, prevention and treatment, contraception availability and correct use, and some social and emotional aspects of relationships including legal information and the impact of social pressure. | Students also have healthy relationships workshops during science lessons at the end of Year 10. The sessions focus on the law around healthy and unhealthy intimate relationships with regards to sexual harassment, sexual violence and rape. They also cover social and emotional aspects of relationships with a deeper consideration of consent.Ethical issues are discussed**Throughout the KS4 units** of work there are opportunities to discuss careers in science. To discuss opportunities within scientific fields at key points in the curriculumGCSE in action talks | Ethical issues are discussed**Throughout the KS4 units** of work there are opportunities to discuss careers in science. To discuss opportunities within scientific fields at key points in the curriculumGCSE in action talks | Roles of scientists within the healthcare sectionExternal speakers linked to medical science unitsMathematical skills developed across all 4 KS5 coursesBiology/Physics/Chemistry in Action lectures Science media documentariesBiology ecology tripWork experience within the science departmentCareers lecturesUCAS references  | Biology/Physics/Chemistry in Action lecturesExternal speakers – Royal Society of ChemistryPresentations of their research to a wider audience |
| **Attitudes & Attributes****Growth Mindset,****Independent Learning** **Personal development** | * Communication skills
* Group work/team work
* Problem solving through practicals and application tasks
* Developing resilience
* Positive organisation
* Taking initiative
* Facing challenge through competitions
* Independent study – developing revision techniques and a positive work ethic
 |  |

**Intent –** Implementation – Impact

Intent - The ambitions and plans that are in place up to the point of delivery

Implementation – the means for how these are delivered and assessed

Impact – the achievements of students as evidence by work produced, attitudes to learning, participation in extra curricular, summative assessment and final outcomes

Our definitions

**Spiral Curriculum**

How the building blocks of our curriculum are constructed and built upon through students’ journey through school