**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. | |
|  | **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 * 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 * 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 * 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 * 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 | 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 * 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   Chemistry practical skills  • Identification of organic unknowns  • Determination of rates order – clock method  • Electrochemical cells  • Determination of buffer pH  Medical 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 life  How cells work for an organism  How plants are adapted to reproduce  Reproduction in humans  T2 Mixing, dissolving & separating  Using laboratory equipment  Distillation  Solubility  Chromatography  T3 Forces & their effects  Types of forces  Things forces do  Useful and unwanted friction  Levers and turning forces  T4 Eating, drinking & breathing  A healthy diet  The digestive system  The breathing system  T5 Elements, compounds & reactions  Elements and atoms  The periodic table  Using simple models  Reactions  T6 Energy transfer & sound | T1 Eating drinking & breathing & Getting the energy the body needs – *select lessons based on OUP experience in Year7*  A healthy diet  The digestive system  The breathing system  Skeleton  Muscles  Aerobic respiration  Anaerobic respiration  T2 Contact and no –contact  forces  Gravity and space travel  Electrostatic and magnetic forces  Pressure, floating and sinking  T3 Mixing dissolving and separating – *not taught in the OUP Year 7 course*  Elements and atoms  The periodic table  Using simple models  Reactions  T4 Looking at plants and ecosystems  Healthy plants  Producers  Relationships in the environment  T5 Magnetism and electricity  How magnets work  Electromagnets  Explaining electric circuits  Series and parallel circuits  T6 Explaining physical and chemical changes – *select lessons based on OUP experience in Year 7*  Acids, alkalis and indicators  Reactions of acids and alkalis  Combustion  Explaining the properties of states of matter using the particle model  Particles in Physical and chemical changes | T1 Obtaining useful materials  Metal ores  Reactivity  Reaction energy and catalysts  Special materials  T2 Waves and energy transfer  Energy transfers  Energy in the home  Water waves  Light waves  T3 Using our Earth sustainably  The atmosphere  Damage to the Earth’s resources  Recycling  The rock cycle  T4 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 life  Heredity & life cycles  Organisms & their environment  Variation, adaptation & Evolution  Health & disease  Substances and properties  Particles and structure  Chemical reactions  Earth chemistry  Dynamic Earth  Matter  Forces and Motion  Sound, light and waves  Electricity &magnetism  Earth in space  T5 Preparing for GCSE Science  T6 Preparing for GCSE Science | Overview  Q Half  T1 & T2 B2  T3 & T4 P2  P Half  T1 & T2 C2  T3 & T4 B2  *The 3 papers shown above contain the following content*  Biology Paper 2  Coordination and control  Genetics  Variation and evolution  Ecology  Chemistry Paper 2  Rate and extent of chemical change  Hydrocarbons  Chemical analysis  The atmosphere  Sustainable development  Physics Paper 2  Forces  Waves  Electromagnetism  *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 2  P Biology paper 2 and  Physics paper 1  **See adjacent KS4 Year 11 column for the key topics in B1 C1 & P1** | Overview  Q Half  T1 & T2 P2  T3 & T4 B1 & C2 & P1  *Reviewing these papers*  T5 & T6 B1 & C1 & P1  *Revision*  P Half  T1 & T2 B2  T3 & 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 1  Cell biology  Photosynthesis  Moving and changing materials  Health matters  Chemistry Paper 1  Atomic structure and the periodic table  Structure bonding and the properties of matter  Chemical quantities and calculations  Physics Paper 1  Energy  Electricity  Particle model of matter  Atomic structure | Physics  T1 – 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   Biology  T1 – Biological molecules  T2 – Cells  T3 - Organisms exchange substances with their environment  T4 – Genetic information, T5 - variation  T6 - relationships between organisms  Chemistry  T1 –  • Atoms, compounds, molecules and equations, • Amount of substance  • Electrons, bonding and structure  T2 –  • Acid–base and redox reactions  • Basic concepts of organic chemistry  T3-  • The periodic table and periodicity  • Group 2 and the halogens  • Hydrocarbons  T4 -  • Qualitative analysis  • Enthalpy changes  • Alcohols and haloalkanes  • Organic synthesis  T5 -  • Reaction rates and equilibrium (qualitative)  • Analytical techniques (IR and MS)  T6 -  • Aspirin synthesis and Research techniques | Physics  T1 – 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 Revision  Medical 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 & 4  T5 Medical case study   * Understand how physiological tests support diagnosis   Submission of units 4 & 5 coursework  T6   * Preparation for unit 6 exam   Biology  T1 – Energy transfers in and between organisms  T2 – Organisms respond to changes in their internal and external environments  T3 – Genetics, populations, evolution and ecosystems  T4 – The control of gene expression  T5 & T6 – revision and exam preparation  Chemistry  T1 –  • Reaction rates and equilibrium (quantitative)  • Aromatic compounds  • Carbonyl compounds  T2 –  • pH and buffers  • Enthalpy, entropy and free energy  • Carboxylic acids and esters  • Nitrogen compounds  T3-  • Redox and electrode potentials  • Polymers  • Organic synthesis  T4 -  • 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 | 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 * July | 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 * April * July | 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 * March * May | 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 * March * July | 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 * March |
| **Wider Curriculum including extracurricular opportunities**  **e.g SMSC, Careers and Employability, Literacy and Numeracy** | Reproduction unit provides opportunity for SMSC  Sex 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 Diet  Exercise  Ecology  Combustion    These units provide opportunity for SMSC  Ethical 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 resources  Sustainability  Recycling  Health and disease    These units provide opportunity for SMSC  Ethical issues are discussed  Students 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 curriculum  GCSE 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 curriculum  GCSE in action talks | Roles of scientists within the healthcare section  External speakers linked to medical science units  Mathematical skills developed across all 4 KS5 courses  Biology/Physics/Chemistry in Action lectures  Science media documentaries  Biology ecology trip  Work experience within the science department  Careers lectures  UCAS references | Biology/Physics/Chemistry in Action lectures  External speakers – Royal Society of Chemistry  Presentations 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