

Intent

Breadth and diversity: The science curriculum offers a wide variety of out of lesson learning opportunities, including STEM club, RAF Cosford Trip, Hobson's Brewery Trip, Environment Club and the yearly Science Fair where pupils from feeder schools are actively included as well as pupils at LCS.

Inclusive, accessible, aspirational and inspiring: Our 5-year knowledge rich science curriculum aims to develop scientific knowledge and conceptual understanding through the specific disciplines of Biology, Chemistry and Physics. Developing an understanding of the nature, processes and methods of science through different types of science enquiries helps students to answer scientific questions about the world around them. The department's aim is not just focused on exams and substantive knowledge, but developing disciplinary knowledge and using science to understand the world around us, our own lives and the future we have ahead of us. We endeavour to excite and enthuse our pupils in Science and share information on career opportunities and links to STEM. Practical skills are an important feature of our teaching and we strive to develop independence and their ability to formulate an investigation, using scientific method and analysing results, linking to the bigger picture. Enjoyment in Science is key to ensure full engagement and to maximise progress within and throughout lessons. We offer Triple Science as an option subject, available to all.

Themes and concepts are used as strands that run through the curriculum: Year 7 and 8 are taught in tutor groups (mixed ability), where the initial focus is on safety and familiarity of the Science labs and equipment. We then follow the order in the map below; and have developed our own scheme of work around this, based around lessons from the 'Activate' and 'Spotlight on Science' schemes. In Y9 pupils are split into mixed ability groups and the whole cohort is taught in Science at the same time. We focus on the key concepts in Science building on the information and skills learnt in Y7 and 8 and preparing them for Years 10 and 11, where we follow the EDEXCEL GCSE 9-1 Science Syllabus.

Well-structured development of knowledge and skills: The department have worked hard to develop a bespoke scheme of work for Biology, Chemistry and Physics. Pupils (from September 2022 onwards) are taught in mixed ability groups in Y9, based on Y7 and 8 data. All pupils complete the same End of Topic and End of Year tests. This ensures inclusivity and fairness across all year groups. These groups are amended in Y10, to accommodate Triple Science. We monitor these groups throughout years 10 and 11 as an ongoing entity, using group dynamics and attainment as a focus. Changes are unusual but can be accommodated if necessary.

20-21 we analysed the order of content in years 7 and 8, introduced Practical Investigation Skills Sheets and looked at the way in which we deliver practical lessons.

21-22 we analysed groupings (sets/mixed ability) and made changes by having mixed Y11 sets.

22-23 we maintained Y7 and 8 in tutor groups. This was not ideal in Y8 as the groups are large and had additional pupils throughout the year. Mixed Y9 worked well and in Y10 although we moved these groups around in the summer as teaching higher tier content was becoming more tricky.

23-24 Y7 continue to be timetable in tutor groups. Y8 were half mixed groups, based on ATL and trying to establish positive working environments with large classes, whilst still undertaking effective practical lessons. We kept with mixed sets in Y9 and Y10 until Christmas, where we then set a higher tier group and 3 mixed foundation groups for combined science. Y11 remained in the sets they were in at the end of their Y10. A lot of work was done on updating our curriculum map and challenging the order we had set, tweaking where necessary, with a view to delaying the start of GCSE specific content to the Xmas of Y9 (as of Sept 24). We looked in depth at the misconceptions we were finding and the issues around fitting content in the order we have. <https://pstt.org.uk/?s=misconceptions> to support this.

Curriculum Map

Key: **MUM** – Mid Unit Mark **EUT** – End of Unit Test

Biology

½ Term	1 8 weeks	2 7 weeks	3 5 weeks	4 5 weeks	5 7 weeks	6 7 weeks
7 1h/ week	Microscopes and cells (MUM) – label diagram OR cell model	Microscopes and cells (EUT)	Body Systems (MUM) – Organ system project	Body Systems (EUT)	Reproduction Year 7 Exam 9 (MUM) Research project – pregnancy/gestation OR Seed Dispersal Practical	Reproduction (EUT)
8 1h/ week	Health and Lifestyle (MUM) – Burning foods conclusion OR Drugs leaflet	Health and Lifestyle (EUT)	Ecosystems (MUM) – Greenhouse design project	Ecosystems (EUT)	Adaptations (MUM) - Drawing graphs for continuous / discontinuous data OR Research Extinct/ Endangered animal	Adaptations (EUT) Year 8 Exam
9 1h/ week			Key Concepts, Microscopes and cells (MUM) – Calculation Water flea worksheet Year 9 Exam	Enzymes Food tests Transporting Substances (MUM) – Osmosis Core practical (EUT)	Mitosis and asexual reproduction (MUM) adv/ disadvantages of asexual reproduction Growth and Stem Cells OR 6-mark question ethics of STEM cells	Nervous System, Eye, Brain (MUM)- Measuring impulse speed (EUT)
10 3h/ fortnight	Genetics (MUM) – Method of DNA extraction	Genetics Punnet squares, family pedigrees (EUT)	Natural Selection (MUM) – 6-mark Artificial selection/GM comparison (EUT)	Health and Disease (MUM) – Immune system response graph and questions (pg 115) (EUT)	Plant Structures (MUM) – light intensity core practical, full sheet	Plant Structures (EUT) Year 10 Exam
10 Triple 4h fortnight	Genetics (MUM) – Method of DNA extraction (EUT)	Genetics Punnet squares, family pedigrees, Mutations, Genetic diseases (EUT)	Natural Selection, Evolution, classification, GM Crops (MUM) – 6-mark Artificial selection/GM comparison (EUT)	Health and Disease (MUM) – Immune system response graph and questions (pg 115) (EUT)	Plant Structures (MUM) – light intensity core practical, full sheet	Plant Structures, Plant adaptations (EUT) Year 10 Exam
11 3h/ fortnight	Animal Coordination/ Exchange and transport (MUM) – research on causes and differences between Type I and Type II diabetes (EUT)	Exchange and transport (MUM) – respiration rates practical, method, graph of temperature results and results analysis (EUT)	Ecosystems (MUM) – 6-mark question differences biotic / abiotic factors and how measured OR research how bio-diversity can be preserved Mock Exams	Ecosystems/ Revision (EUT)	Key Concepts Revisited. The Bigger Picture. Core practical's revisited.	Revision
11 Triple 5h fortnight	Animal Coordination, Thermoregulation and Osmoregulation. (MUM) – research on causes and differences between	Exchange and transport, Surface area to volume ratio and Ficks law. (MUM) – respiration rates practical, method, graph of	Ecosystems (MUM) – 6-mark question differences between biotic and abiotic factors and how they are measured OR	Ecosystems/ Revision (EUT)	Key Concepts Revisited. The Bigger Picture. Core practical's revisited.	Revision

	Type I and Type II diabetes (EUT)	temperature results and results analysis (EUT)	research how biodiversity can be preserved - Mock Exams			
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Chemistry

½ Term	1 8 weeks	2 7 weeks	3 5 weeks	4 5 weeks	5 7 weeks	6 7 weeks
7 1h/ week	Investigation Skills and Reactions MUM – Bunsen burner safety	Investigation Skills and Reactions EUT	Substances and separating techniques MUM – Mixture v Pure Investigation	Substances and separating techniques EUT	The Periodic Table MUM – Group 1 observations	The Periodic Table EUT Year 7 Exam
8 1h/ week	Reactions MUM – Burning fuels	Reactions EUT	Acids and Alkalis MUM – pH table	Acids and Alkalis EUT Metals and the Earth	Metals and the Earth MUM – research project on limiting the impact of climate change	Metals and the Earth EUT Year 8 Exam
9 1h/ week	SI units!		9 Exam States of Matter/Pure & Mixtures MUM – Purity of Gold WS	Separating subs EUT	Atomic Structure MUM – Atomic Structure label sheet	The Periodic Table EUT
10 3h/ fortnight	Ionic Bonding MUM – Ionic bonding WS	Covalent Bonding Metallic Bonding EUT	Acids and Alkalis MUM – Titration WS	Acids and Alkalis EUT	Calculations MUM – Masses/Moles WS or ‘round up’ sheet Year 10 Exam	Electrolysis MUM – Electrolysis WS
10 Triple 5h fortnight	Acids and Alkalis MUM – Titration WS	Acids and Alkalis/ Calculations EUT (A&A) MUM – Masses/Moles WS	Calculations/Electrolysis MUM – ‘round up’ sheet MUM – Electrolysis WS	Ores, Equilibrium and Metals MUM – Metal Displacement WS	Year 10 Exam/Calcs and Electrolysis/ Quantitative EUT (C&E)	Quantitative MUM – Titration Calculations WS EUT
11 3h/ fortnight	Ores and Equilibrium EUT	Groups in the PT & Reactions MUM – 6mQ group 7 EUT	Fuels MUM – Combustion Investigation	Earth and Atmosphere Mock Exams EUT (F, E&A)	Key Concepts Revisited Core practicals revisited	Revision/Exams
11 Triple 5h fortnight	Groups in the PT & Reactions/Fuels MUM – Noble Gas Research EUT	Fuels, Earth and Atmosphere/HCs, Alcohols & Carboxylic Acids MUM – Combustion Investigation EUT	Hydrocarbons, Alcohols, Carboxylic Acids, Polymers/ Mock Exams MUM – Additional Polymers WS EUT	Testing for Ions, Naonparticles MUM – Testing substances investigation EUT	Key Concepts Revisited Core practicals revisited	Revision/Exams

Physics

½ Term	1 8 weeks	2 7 weeks	3 5 weeks	4 5 weeks	5 7 weeks	6 7 weeks
7 1h/ week	Forces and Motion MUM – Friction Investigation (variables and tables)	Forces and Motion EUT Energy	Energy MUM – Conduction Investigation (Planning)	Year 7 Energy EUT Waves and Sound	Waves and Sound MUM – ultrasound 6 mark question (exam technique) EUT Light	Light EUT Year 7 Exam
8 1h/ week	Space MUM – Planets Poster (independent research)	Space EUT Electricity MUM – Static Electricity leaflet (presentation)	Electricity MUM – Series and Parallel (concluding) Magnetism	Magnetism MUM – Electromagnet investigation. (graph skills) EUT	Pressure MUM – Sinking objects (whole investigation) EUT	Pressure EUT Year 8 Exam
9 1h/ week			Motion MUM – Velocity/time graph EUT Year 9 Exam	Motion -EUT Forces and Motion MUM – F=M/A Investigation	Force and Motion EUT	Energy MUM – Stored Energies Investigation EUT
10 3h/ fortnight	Waves and EMS MUM – EMS poster EUT	Radioactivity MUM – Modelling Half-life Graphs/Tyes of radiation	Radioactivity EUT Work, force, power	Work, force, power MUM – Resultant forces Question EUT Y10 Exam Revision	Year 10 Exam Electricity MUM – resistance investigation	Electricity EUT
10 Triple 5h fortnight	Electromagnetic Spectrum, Conduction and Magnetism. MUM – Drawing Magnetic Fields.	Electromagnetic Spectrum	Radioactivity MUM – Modelling Half-life Graphs	Radioactivity EUT	Year 10 Exam Astronomy EUT	Work, power, energy EUT
11 3h/ fortnight	Electromagnetic Induction MUM – Electromagnetism question EUT	Particle model Mum- density core practical	Particles Models Revision Mock Exams	Forces and Matter EUT- Particle model and forces and matter	Revisit topics. Carry out core practicals. Use past papers to explore misconceptions. Key Concepts Revisited The Bigger Picture	Revision/Exams
11 Triple 4h fortnight	Particles and Matter					

Impact: *How does the curriculum you have implemented achieve what you intended – consider progress, examination performance, option numbers, pupil voice, study at A level/degree etc.*

Our curriculum enables pupils to be taught by a specialist throughout their time at LCS and being taught all subjects all the time (not in blocks). This enables them to consistently have a broad and balanced curriculum and enables them to manage their time effectively. They can revise all subjects throughout the year and have access to their specialist teacher throughout, to enable them to go over any misconceptions along the way. All pupils are taught by a specialist, and therefore have 3 teachers for their Science lessons.

Year 7 and 8 are taught in mixed ability groups, where the initial focus is on safety and familiarity of the Science labs and equipment. We then follow the bespoke order detailed above and have developed our own scheme of work around this, based around lessons from the 'Activate' and 'Spotlight on Science' schemes. Y9, 10 and 11 follow the EDEXCEL GCSE 9-1 Science Syllabus, with Key Concepts being covered in Y9 in Biology, Chemistry and Physics. The department have worked hard to develop a bespoke scheme of work for Biology, Chemistry and Physics. Pupils (from September 2022 onwards) are taught in mixed ability groups in Y9, based on Y7 and 8 data. All pupils complete the same End of Topic and End of Year tests. This ensures inclusivity and fairness across all year groups. These groups are amended in Y10, to accommodate Triple Science. As of September 2022, we will be analysing how this has gone (as we are 2 years into this), with a view to change Year 11 groups to accommodate higher and foundation tier candidates as necessary.

Examination performance shows an upward trend in terms of attainment and progress (see exam analysis sheets completed yearly).

All pupils study science. The Entry Level qualification is available to those pupils who would benefit from it; however, we strive to enable all pupils to attempt the full (double award) GCSE in Combined Science where possible.

Triple Science is an option subject, where pupils study an additional 5 hours per fortnight in Science. Our numbers are healthy, with roughly 20-25% of the cohort opting to take on this additional qualification.

Pupil voice: pupils are regularly given opportunity to give their feedback in terms of what they enjoy, what we do well, and what they would like to see change. On the whole this feedback is positive, with pupils clearly enjoying Science, finding it challenging and exciting at the same time.

A number of pupils go on to study Science at A-Level (actual figure unknown: no school data).

Highlighted colours refer to place in the NC (see NC document)

MUM – Mid Unit Mark

EUT – End of Unit Test

Biology

½ Term	1	2	3	4	5	6
7	Microscopes and cells MUM – label diagram OR cell model	Microscopes and cells EUT	Body Systems MUM – Organ system project	Body Systems EUT Year 7 Exam	Reproduction MUM – research project – pregnancy/gestation OR Seed Dispersal Practical	Reproduction EUT
8	Health and Lifestyle MUM – Burning foods conclusion OR Drugs leaflet	Health and Lifestyle EUT	Ecosystems MUM – Greenhouse design project	Ecosystems EUT	Adaptations MUM- Drawing graphs for continuous and discontinuous data OR Research Extinct/ Endangered animal	Adaptations EUT Year 8 Exam
9	Microscopes and cells MUM – Calculation Water flea worksheet	Enzymes/ Transporting Substances MUM – Osmosis Core practical	Transporting Substances/Year 9 Exam EUT	Mitosis, (Meiosis) and asexual/(sexual reproduction) MUM – advantages/disadvantages of asexual reproduction OR Table of comparison	Growth and Stem Cells MUM- 6 mark question ethics of STEM cells	Nervous System MUM- Measuring impulse speed EUT
10	Genetics MUM – Method of DNA extraction EUT	Natural Selection MUM – 6 mark Artificial selection/GM comparison EUT	Health and Disease MUM – Immune system response graph and questions (pg 115 in textbook) EUT	Plant Structures MUM – light intensity core practical full sheet	Plant Structures EUT Year 10 Exam	Animal Coordination MUM – research leaflet/poster on causes and differences between Type I and Type II diabetes
11	Animal Coordination/Exchange and transport EUT	Exchange and transport MUM – respiration rates practical, method, graph of temperature results and results analysis EUT	Ecosystems MUM – 6 mark question differences between biotic and abiotic factors and how they are measured OR research how biodiversity can be preserved Mock Exams	Ecosystems/ Revision EUT	Key Concepts Revisited. The Bigger Picture. Core practical's revisited.	Revision

Chemistry

½ Term	1	2	3	4	5	6
7	Investigation Skills and Reactions MUM – Bunsen burner safety	Investigation Skills and Reactions EUT	Particles, Elements, Atoms etc MUM – Mixture v Pure Investigation	Particles, Elements, Atoms etc / Year 7 Exam EUT	The Periodic Table MUM – Group 1 observations	The Periodic Table EUT
8	Reactions MUM – Burning fuels	Reactions EUT	Acids and Alkalis MUM – pH table	Acids and Alkalis EUT	Metals and the Earth MUM – research project on limiting the impact of climate change	Metals/Year 8 Exam EUT
9	States of Matter/Pure & Mixtures MUM – Purity of Gold WS	Separating subs/Atomic Structure EUT (SoM and SS) MUM – Atomic Structure label sheet	The Periodic Table/Year 9 Exam EUT (Atomic Struct/PT)	Ionic Bonding MUM – Ionic bonding WS	Covalent Bonding MUM – Covalent bonding WS	Metallic Bonding MUM – identifying substances EUT
10	Acids and Alkalis MUM – Titration WS	Acids and Alkalis EUT	Calculations MUM – Masses/Moles WS	Electrolysis MUM – Electrolysis WS	Ores and Equilibrium /Year 10 Exam MUM – Metal Displacement WS	Calcs, Electrolysis, Ores and Equilibrium

			MUM – 'round up' sheet			EUT
Triple	Acids and Alkalis MUM – Titration WS	Acids and Alkalis/Calculations EUT (A&A) MUM – Masses/Moles WS	Calculations/Electrolysis MUM – 'round up' sheet MUM – Electrolysis WS	Ores, Equilibrium and Metals MUM – Metal Displacement WS	Year 10 Exam/Calcs and Electrolysis/ Quantitative EUT (C&E)	Quantitative MUM – Titration Calculations WS EUT
11	Groups in the PT & Reactions MUM – Noble Gas Research EUT	Fuels MUM – Combustion Investigation	Earth and Atmosphere/Mock Exams EUT (F, E&A)	Key Concepts Revisited Core practicals revisited	Key Concepts Revisited Core practicals revisited	Revision/Exams
Triple	Groups in the PT & Reactions/Fuels MUM – Noble Gas Research EUT	Fuels, Earth and Atmosphere/HCs, Alcohols & Carboxylic Acids MUM – Combustion Investigation EUT	Hydrocarbons, Alcohols, Carboxylic Acids, Polymers/Mock Exams MUM – Additional Polymers WS EUT	Testing for Ions, Nanoparticles MUM – Testing substances investigation EUT	Key Concepts Revisited Core practicals revisited	Revision/Exams

Physics

½ Term	1	2	3	4	5	6
7	Forces and Motion MUM – Distance/time graph	Forces and Motion/Energy EUT (Forces) MUM – Investigating Conduction	Energy MUM – Energy resources Poster EUT	Year 7 Exam/Sound MUM – Investigating Speed of Sound	Sound/Light EUT (Sound) MUM – Law of Reflection investigation	Light MUM – Refraction Investigation EUT
8	Space MUM – Planets Poster	Space/Electricity EUT (Space) MUM – Static Electricity Leaflet	Electricity MUM – Series and Parallel Investigation EUT	Magnetism MUM – Leaflet – Uses of Magnetism	Magnetism/Pressure EUT (Magnetism) MUM – Investigating Pressure in Solids	Year 8 Exam/Pressure MUM – Building a Dam EUT
9	Vector and Scalars MUM – Velocity/time graph EUT	Forces and Motion MUM – F=M/A Investigation	Year 9 Exam/Forces and Motion EUT	Energy MUM – Kinetic/GPE investigation	Energy/Waves EUT (Energy) MUM – Ripple Tank Investigation	Waves MUM – Refraction Investigation EUT
10	Electromagnetic Spectrum MUM – EMS poster EUT	Radioactivity MUM – Safety in Radiation Worksheet	Radioactivity MUM – Modelling Half-life Graphs EUT	Work, Power, Vector Diagrams MUM – Resultant Forces Questions EUT	Year 10 Exam/Electricity MUM – Series and Parallel Circuit Investigation	Electricity MUM – Resistance Investigation EUT
11	Electromagnetic induction and Magnetism. MUM – Drawing Magnetic Fields.	Electromagnetic induction EUT Particles and Matter MUM – Density Investigation	Mock Exams/Particles and Matter MUM – Specific Heat Capacity Investigation	Particles and Matter MUM – Hookes Law EUT	Key Concepts Revisited The Bigger Picture Core practicals revisited	Revision/Exams
Triple	Astronomy MUM – Satellites Explanation Sheet EUT					