

SCIENCE

Programme of Study: 2021-2022

Discovery - KS3:

Curriculum intent:

In Science we aim for our students to be big thinkers; to be scientifically literate; to be able to make accurate inferences from the data they are provided with every day and to make informed choices that will create a better future for themselves and our global community.

Science at KS3

We aspire for our students to discover a love of Science at the very start of their career at Easthampstead Park that we, as their teachers, will strive to nurture and grow.

Students will study Biology, Chemistry and Physics topics that provide an excellent foundation for further study, whilst enthusing the students about the scientific process itself. In designing our curriculum, we have included all the aspects that make Science fantastic; whether it be investigating, observing, experimenting or testing out ideas and critically thinking about them. The way scientific ideas flow through the course will support our students in building a deep understanding of Science.

Students will be taught topics from all three disciplines in each block of learning and will be assessed on the breadth of their knowledge through a written test that will cover aspects of all three. The sequencing of the topics is such that key ideas develop in depth and complexity over time. For example, students first meet the particle model soon after they begin in year 7. They will then begin to classify particles as atoms, elements and compounds. They learn how elements are organised in the Periodic table in year 8 and then how particles transform through the rock cycle later that year.

Our students will be confident “do-ers” of Science. They will practice using apparatus and techniques through regular practical work. We have identified key skill areas that students will master over time. We will encourage the development of skills through regular opportunities for working scientifically in lesson time. We will talk, read and write about Science and represent Science both mathematically and visually through models. Our teachers will lead by example and demonstrations will generate opportunities for students to question and be questioned. Students will be able to work resiliently and independently, but also learn from each other in group or whole-class activities. Communication skills will be assessed each time. These include; use of scientific conventions, scientific vocabulary and numerical manipulation.

The key skill areas are:

1. Scientific explanations and interpretation
2. Planning
3. Carrying out
4. Presenting scientific data

5. Evaluating evidence and arguments
6. Communication

Home Learning

Students shall be provided with topic summary sheets. Students' engagement with and recall of the information on these sheets will be assessed as part of class time activities. Teachers will be explicit with the students which parts of the information will be assessed and when.

Tassomai was introduced in the last academic year as the main home learning tool in Science. It provides students with daily, low stakes quizzes that require students to retrieve knowledge on targeted topics or across the Science curriculum. All students are expected to complete the "Daily Goal" on Tassomai 3-5 days a week. Where a topic area is less well understood, students will be directed to BBC Bitesize for more support. Students also have access to extra resources on Active Learn which supports our curriculum closely.

Curriculum map

	Term 1	Term 1-2	Term 2-3	Term 3-4	Term 4-5	Term 5-6
Year 7	Introduction to Science	Block 1: 7A 7G 7I	Block 2: 7B 7H 7K	Block 3: 7C 7E 7L	Block 4: 8B 7F 7J	Projects: 7D and 8E
<i>Students learn how to:</i>	Working Scientifically is introduced	7A Cells, Tissues, Organs and Systems 7G The Particle Model 7I Energy	7B Sexual Reproduction in Animals 7H Atoms, Elements and Compounds 7K Forces	7C Muscles and Bones 7E Mixtures and Separation 7L Sound	8B Plants and their Reproduction 7F Acids and Alkalis 7J Current Electricity	7D Ecosystems 8E Combustion

<i>Assessment</i>	Bunsen Burner Certificate	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	End of Year 7 Test Project assessment Low-Stakes Quick quiz assessment at end of each topic
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	Term 1-2	Term 2	Term 3	Term 4-5	Term 5	Term 6
Year 8	Block 1: 7L 8A 8F 8I	Block 2: 8B 8G 8J	Block 3: 8C 8H 8K	Block 4: 9A 9E 9I	Block 5: 9B 9F 9J	Project: 8L
<i>Students learn how to:</i>	7L Sound 8A Food and Nutrition 8F The Periodic Table	8B Plants and their Reproduction 8G Metals and their Uses 8J Light	8C Breathing and Respiration 8H Rocks 8K Energy Transfers	9A Genetics and Evolution 9E Making Materials 9I Forces and Motion	9B Plant Growth 9F Reactivity 9J Force Fields and Electromagnets	8L Earth and Space
<i>Assessment</i>	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Block Test	Low-Stakes Quick quiz assessment at end of each topic End of Year 8 Test	Project assessment Low-Stakes Quick quiz assessment at end of each topic

<p>Cross curricular linking: Year 7</p> <p>7A History- Ancient Civilisations, PE Anatomy; 7G Geography - air pressure, pollution, Art - modelling; 7I Geography and DT - energy sources, environment; 7B PSCE/Citizenship; 7H Geography - the atmosphere, History - development of ideas; 7J DT - electronics; 7C PE- fitness, exercise, breathing, Art - anatomy, PSCE/Citizenship - drugs; 7F Geography - liming fields, pollution; 7K PE - sports. DT - presentation skills; 8E History - the Industrial Revolution; 7L Music - instruments, DT - soundproofing;</p> <p>Numeracy and Literacy skills to be taught explicitly throughout and highlighted in assessments</p>	<p>Cross curricular linking: Year 8</p> <p>8A Art and English - advertising, PE - energy from food; 8I History - development of ideas, English - debating an issue; 8B Art - plants for textiles and dyes, decoration, English - plant poetry; 8G History - Bronze and Iron Age, DT - metal work; 8J Drama - stage lighting, Art - use of colour, ICT - graphics; 8H Geography - geological maps, mining; 8K DT - design of buildings and appliances, Geography - coping with different environments; 9B Geography - The Green Revolution; Geography - use of compasses</p> <p>Numeracy and Literacy skills to be taught explicitly throughout and highlighted in assessments</p>
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Destiny: Years 9 10 and 11

Curriculum intent:

In Science we aim for our students to be big thinkers; to be scientifically literate; to be able to make accurate inferences from the data they are provided with every day and to make informed choices that will create a better future for themselves and our global community.

Science at KS4

Examination board: AQA

Specification title: Trilogy (Years 9, 10 and 11)

Assessment objectives:

AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.

AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.

AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.

Throughout Science at KS4 we want students to increasingly question the natural world around them.

Year 9 Science is an exciting time as students begin to work scientifically in more demanding contexts that expect an increasing depth of understanding. We will guide students to see the links between the traditional Biology, Chemistry and Physics disciplines so they can transfer and apply scientific ideas in a range of situations. For example, the scientific idea of Energy underpins all three disciplines and we will explore this explicitly at the start of the year.

In years 10 and 11, topics have been grouped into blocks of Biology, Chemistry and Physics. Students will rotate through the topics within each block and the breadth of their knowledge will be assessed through a written test at the end. The sequencing of the topics has been designed to allow thinking skills to develop over time, to provide increasingly abstract cognitive demand and to facilitate progression into Science subjects at KS5.

Alongside the demands of preparing for their GCSE qualifications, students and teachers will celebrate curiosity within the classroom. In our planning, we will provide opportunities for problem-solving and putting resilience into practice. Teachers will use precise questioning in class to test conceptual knowledge and skills, and assess students regularly to identify those students with gaps in learning, so that all students keep up.

It is expected that students will build upon the scientific enquiry skills they developed at KS3. They will take part in “required practicals” that will eventually form the basis of assessment at GCSE. Questions in the written exams will draw on the knowledge and understanding students have gained by carrying out the practical activities. Many questions will also focus on investigative skills and how well students can apply what they know to practical situations often in novel contexts. Communication skills will be assessed each time. These include; use of scientific conventions, scientific vocabulary and numerical manipulation.

The key skill areas are:

1. Scientific explanations and interpretation
2. Planning
3. Carrying out
4. Presenting scientific data

5. Evaluating evidence and arguments
6. Communication

We intend for our students to become ambassadors for Science. Our teachers will encourage this through fostering links with other STEM subjects (Science, Technology, Engineering and Mathematics), guiding them to paths into further study and an increasing range of extra-curricular opportunities with our partners in the community and the Enterprise program currently in place in school.

Home Learning

Students shall be provided with knowledge organisers. Students' engagement with and recall of the information on these sheets will be assessed as part of class time activities. Teachers will be explicit with the students which parts of the information will be assessed and when.

Tassomai was introduced in the last academic year as the main home learning tool in Science. It provides students with daily, low stakes quizzes that require students to retrieve knowledge on targeted topics or across the Science curriculum. All students are expected to complete the "Daily Goal" on Tassomai at least 5 days a week. Where a topic area is less well understood, students will be directed to GCSEPod and Seneca for more support. Students also have access to extra resources on Kerboodle which supports our curriculum closely.

Year 9 Curriculum map

	Term 1	Term 2-3	Term 3-4	Term 5-6
Year 9	Block 1: Energy B4 C5 P1	Block 2: Year 9 Chemistry 7E C1 C2 9E	Block 3: Year 9 Physics 9I P2 9J P7 8I	Block 4: Year 9 Biology 8D B2 8C B3 9A
<i>Student s learn how to:</i>	B4 Bioenergetics C5 Energy Changes P1 Energy	7E Mixtures and Separation C1 Atomic Structure and the Periodic Table C2 Bonding, structure, and the properties of matter 9E Making Materials	9I Forces and Motion P2 Electricity 9J/P7 Force Fields and Electromagnets 8I Fluids	8D Unicellular Organisms B2 Organisation 8C Breathing and Respiration B3 Infection and Response 9A Genetics and Evolution

<i>Assessment</i>	Low-stakes quizzes every 3-4 lessons End of Block 1 Test	Low-stakes quizzes every 3-4 lessons End of Block 2 Test	Low-stakes quizzes every 3-4 lessons	Low-stakes quizzes every 3-4 lessons End of Block 3+4 Test/End of Year 9 Exam
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Years 10 and 11 Curriculum map:

	Term 1	Term 2-3	Term 4	Term 5-6
Year 10	Block 1: Year 10 Physics P2 P7	Block 2: Year 10 Biology B1 B5 B7	Block 3: Year 10 Chemistry C4 C7	Block 4: Year 10 Physics Part 2 P4 P5a
<i>Students learn how to:</i>	P2 Electricity P7 Magnetism and Electromagnetism	B1 Cell biology B5 Homeostasis B7 Ecology	C4 Chemical Changes C7 Organic Chemistry	P4 Atomic Structure P5a Forces
<i>Assessment</i>	Low-stakes quizzes every 3-4 lessons End of Block 1 Test	Low-stakes quizzes every 3-4 lessons End of Block 2 Test	Low-stakes quizzes every 3-4 lessons	End of Year Exams Biology Paper 1 Chemistry Paper 1 Physics Paper 1

	Term 1	Term 2	Term 3	Term 4	Term 5
Year 11	Block 1: Year 11 Physics P6	Block 2: Year 11 Biology	Block 3: Year 11 Chemistry	PPEs	Targeted Revision Programme
<i>Students learn how to:</i>	P6 Waves	B6 Inheritance, variation and evolution	C6 The rate and extent of chemical change C9 Chemistry of the atmosphere C10 Using Resources	Revision and Directed Improvement and Reflection Time	Revision and Directed Improvement and Reflection Time

Assessment	Low-stakes quizzes every 3-4 lessons Physics Paper 2	Low-stakes quizzes every 3-4 lessons Biology Paper 2	Low-stakes quizzes every 3-4 lessons Chemistry Paper 2	PPEs Biology Paper 1/2 Chemistry Paper 1/2 Physics Paper 1/2	Low-stakes quizzes every 3-4 lessons
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EPCS 6:

Science A-level minimum requirements

Level 55 or above in GCSE Science - Combined or Two Separate Sciences

Level 5 or above in GCSE Mathematics

Level 5 or above in GCSE English Language

EPCS 6:CHEMISTRY

Programme of Study: 2018-2019

Exam board(s) and Specification(s) details: OCR A (H432)

Curriculum map:

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 12	Foundations in Chemistry: Atoms, Moles,	Electrons, Bonding and structure	Periodic Table	Energy	Organic Chemistry	Organic Analysis and synthesis

<i>Students learn how to:</i>	Atoms and reactions; reacting masses, volume and gas calculations	Shells, orbitals, bonding, intramolecular forces, shapes	Periodicity, Group 2 and 7 elements,	Enthalpy, Equilibrium, Kinetics	Basic Organic, isomers, alkanes, alkenes, alcohols, haloalkanes, reaction mechanism	Infra-red and mass spectroscopy; practical techniques
<i>Assessment</i>	End of topic test	End of topic test	End of topic test	End of topic test	End of topic test	Full AS mock paper
Year 13	Aromatic Chemistry; Organic Reactions; polymers	Analysis, Chromatography, NMR spectroscopy; combined techniques	Kinetics; Equilibrium; Acids and bases	Thermodynamics; Redox;	Transition metals Revision and Exam practice using past papers	
<i>Students learn how to:</i>	Structure of and reactions of benzene, Reactions of carbonyls, condensation polymers	Analysis by tlc, NMR spectroscopy to determine structure of organic compounds	Orders of reactions; K_p , pH of strong and weak acids, pH of buffers	Lattice Energy, Born Haber cycles, SEP, redox titrations,	transition metals Review difficult topics and use mark schemes effectively to maximise their grade	
<i>Assessment</i>	End of topic test	Organic Paper 2 mock	End of topic test	Physical Chemistry Paper 2 mock	Paper 3 mock	

EPCS 6: PHYSICS

Programme of Study: 2020-2021

Exam board(s) and Specification(s) details: AQA 7408

Curriculum map:

	Term 1	Term 2	Term 3-4	Term 4	Term 5
Year 13					
<i>Students learn about:</i>	Electricity Plus 3.6 Further mechanics 3.6.1 Periodic motion 3.6.2 Thermal physics	3.8 Nuclear physics 3.8.1 Radioactivity	3.7 Fields and their consequences 3.7.1 Fields 3.7.3 Electric fields	3.9 Astrophysics 3.9.1 Telescopes 3.9.2 Classification of stars 3.9.3 Cosmology	Exam practice using past papers
<i>Assessment</i>	End of topic tests	End of topic tests	End of topic tests PPE (Paper 1,2,3,3a)	End of topic tests PPE (Paper 1,2,3,3a)	

EPCS 6: BIOLOGY

Programme of Study: 2020-2021

Exam board(s) and Specification(s) details: AQA AS and A-level Biology 7401, 7402

Curriculum map:

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 12	<p>A. 3.1 - Biological molecules</p> <p>B. 3.2 - Cells</p>		<p>C. 3.3 - Organisms exchange substances with their environment.</p> <p>D. 3.4 - Genetic information, variation and relationships between organisms</p>			<p>Essays</p> <p>Statistics</p> <p>Required Practicals</p> <p>Preparation for Y13</p>
Students learn how to:	<p>A - Biological molecules</p> <p>3.1.1 Monomers and polymers.</p> <p>3.1.2 Carbohydrates.</p> <p>3.1.3 Lipids.</p> <p>3.1.4 Proteins.</p> <p>3.1.5 Nucleic acids are important information-carrying molecules.</p> <p>3.1.6 ATP.</p> <p>3.1.7 Water</p>	<p>B - Cells</p> <p>3.2.1 Cell structure.</p> <p>3.2.2 All cells arise from other cells.</p> <p>3.2.3 Transport across cell membranes.</p> <p>3.2.4 Cell recognition and the immune system.</p>	<p>C - Organisms exchange substances with their environment</p> <p>3.3.1 Surface area to volume ratio.</p> <p>3.3.2 Gas exchange.</p> <p>3.3.3 Digestion and absorption.</p> <p>3.3.4 Mass transport</p>	<p>D. Genetic information, variation and relationships between organisms</p> <p>3.4.1 DNA, genes and chromosomes.</p> <p>3.4.2 Protein synthesis.</p> <p>3.4.3 Genetic diversity can arise as a result of mutation or during meiosis.</p> <p>3.4.4 Genetic diversity and adaptation.</p> <p>3.4.5 Species and taxonomy.</p> <p>3.4.6 Biodiversity within a community.</p> <p>3.4.7 Investigating diversity.</p>		

	3.1.8 Inorganic ions.					
Assessment	Mid-Point Test End of topic test Req Practical	Mid-Point Test End of topic test PPE Req Practical	Mid-Point Test End of topic test Req Practical	Mid-Point Test End of topic test PPE Req Practical	Mid-Point Test End of topic test Req Practical	Assessed Essays
	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 13	3.5 Energy transfers in and between organisms	3.6 Organisms respond to changes in their internal and external environments	3.6 Organisms respond to changes in their internal and external environments 3.7 Genetics, populations, evolution and ecosystems 3.8 The control of gene expression	3.7 Genetics, populations, evolution and ecosystems 3.8 The control of gene expression		
Students learn how to:	3.5.1 Photosynthesis. 3.5.2 Respiration. 3.5.3 Energy and Ecosystems. 3.5.4 Nutrient cycles 3.6.1 Stimuli, both internal and external are detected and lead to a response. effectors.	3.6.2 Nervous coordination. 3.6.3 Skeletal muscles are stimulated to contract by nerves and act as	3.6.4 Homeostasis is the maintenance of a stable internal environment. 3.7.1 Inheritance. 3.7.2 Populations. 3.7.4 Populations in ecosystems. 3.8.4 Gene technologies allow the study and alteration of gene function allowing a better understanding of organism function and the design of new industrial and medical processes.	3.8.1 Alteration of the sequence of bases in DNA can alter the structure of proteins. 3.8.2 Gene expression is controlled by a number of features. 3.8.3 Using genome projects. After core content is complete: <ul style="list-style-type: none"> ● Revision ● Exam practise - Questions and essay ● Statistics and numeracy practice ● Required Practical Checks 		
Assessment	Mid-Point Test End of topic test	Mid-Point Test End of topic test	Mid-Point Test End of topic test	PPE	Exams	

	Req Practical	PPE Req Practical	Req Practical		
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