

SCIENCE

Programme of Study: 2019-2020

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.

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 aim to raise the profile of the key skill areas through formal, formative assessments each block that, over the course of the key stage, will enable students to demonstrate their progress. Students will be provided with a level ladder that will clearly show their strengths, achievements and their areas for development so that they can reflect, improve and plan the next steps in their learning. Communication skills will be assessed each time. These include; use of scientific conventions, scientific vocabulary and numerical manipulation.

Curriculum map

	Term 1	Term 1-2	Term 2-3	Term 4-5	Term 5
Year 7	Introduction to Science	Block 1: 7A 7G 7I	Block 2: 7B 7H 7J	Block 3: 7C 7F 7K	Impact projects: 7D/8E
<i>Student s 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 7J Current Electricity	7C Muscles and Bones 7F Acids and Alkalis 7K Forces	7D Ecosystems 8E Combustion
<i>Assessment</i>	Bunsen Burner Certificate	One Working Scientifically Written Assessment in exercise book One End of Block Test	One Working Scientifically Written Assessment in exercise book One End of Block Test	One Working Scientifically Written Assessment in exercise book One End of Block Test	Project assessment - format tbc One Mini-Test

	Term 1-2	Term 2-3	Term 4-5	Term 5	Term 6
Year 8	Block 1: 8A 8F	Block 2: 7L 8B 8G 8J	Block 3: 8H 8K 9B	End of Key Stage	Impact project: 8L

				Revision and Exams	
<i>Students learn how to:</i>	8A Food and Nutrition 8F The Periodic Table	7L Sound 8B Plants and their Reproduction 8G Metals and their Uses 8J Light	8H Rocks 8K Energy Transfers 9B Plant Growth		8L Earth and Space
<i>Assessment</i>	One Working Scientifically Written Assessment in exercise book One End of Block Test	One Working Scientifically Written Assessment in exercise book One End of Block Test	One Working Scientifically Written Assessment in exercise book One End of Block Test		Project assessment - format tbc One Mini-Test

<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 PSICHE/Citizenship; 7H Geography - the atmosphere, History - development of ideas; 7J DT - electronics; 7C PE- fitness, exercise, breathing, Art - anatomy, PSICHE/Citizenship - drugs; 7F Geography - liming fields, pollution; 7K PE - sports. DT - presentation skills; 8E History - the Industrial Revolution</p> <p>Numeracy and Literacy skills to be taught explicitly throughout and highlighted in assessments</p>	<p>Cross curricular linking: Year 8</p> <p>7L Music - instruments, DT - soundproofing; 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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Year 9 - Foundation Pathway

<p>Curriculum intent:</p> <p>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.</p> <p>Science at KS4</p>
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Examination board: AQA

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

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.

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 aim to raise the profile of the key skill areas through formal, formative assessments related directly to required practicals that, over the course of the key stage, will enable students to demonstrate their progress. Students will be provided with a level ladder that will clearly show their strengths, achievements and their areas for development so that they can reflect, improve and plan the next steps in their learning. Communication skills will be assessed each time. These include; use of scientific conventions, scientific vocabulary and numerical manipulation.

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.

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Curriculum map

	Term 1	Term 2-3	Term 3-4	Term 5-6	Term 6
Year 9	Block 1: Energy B4 C5 P1	Block 2: Physics P2 P7	Block 3: Chemistry C1 C3	Block 4: Biology B2 B3	End of Year Revision and Exam
<i>Students learn how to:</i>	B4 Bioenergetics C5 Energy Changes P1 Energy	P2 Electricity P7 Magnetism and Electromagnetism	C1 Atomic Structure and the Periodic Table C3 Quantitative Chemistry C4 Chemical Change	B2 Organisation B3 Infection and Response	
<i>Assessment</i>	One Written Assessment based on Working Scientifically in Required Practicals One End of Block Test	One Written Assessment based on Working Scientifically in Required Practicals One End of Block Test	One Written Assessment based on Working Scientifically in Required Practicals One End of Block Test	One Written Assessment based on Working Scientifically in Required Practicals One End of Block Test	

Destiny - KS4:

<p>Exam board and Specification details: AQA Trilogy Combined Science</p> <p>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.</p>
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Curriculum map:

	Term 1-2	Term 3-4	Term 5-6	Term 6
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Year 10	Block 1: Biology B4 B5 B7	Block 2: Chemistry C3 C4 C7 C8 C10	Block 3: Physics P3 P4 P5a P6 P7	End of Year Revision and Exam
<i>Students learn how to:</i>	B4 Bioenergetics B5 Homeostasis and Response B7 Ecology	C3 Quantitative Chemistry C4 Chemical Changes C7 Organic Chemistry C8 Chemical Analysis C10 Using Resources	P3 Particle Model of Matter P4 Atomic Structure P5a Forces P6 Waves P7 Magnetism and Electromagnetism	
<i>Assessment</i>	KS3-4 Transition Test One Written Assessment based on Working Scientifically in Required Practicals One End of Block Test	One Written Assessment based on Working Scientifically in Required Practicals One End of Block Test	One Written Assessments based on Working Scientifically in Required Practicals One End of Block Test	

	Term 1-2	Term 3	Term 4-5
Year 11	Block 1: B6 C6 P5b	Mock Revision and Exams	Targeted Revision Programme
<i>Students learn how to:</i> <i>Higher content in Bold</i>	B6 Inheritance, Variation and Evolution C6 The rate and extent of chemical change C9 Chemistry of the Atmosphere P5b Motion		
<i>Assessment</i>	Two Written Assessments based on Working Scientifically Required Practicals One End of Block Test		

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 and Energy	Organic Chemistry	Organic Analysis and synthesis	Revision
<i>Students learn how to:</i>	Atoms and reactions; reacting masses, volume	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	Further practical aspects of chemistry (PAGs).

	and gas calculations					
<i>Assessment</i>	Half term test	Mock AS paper Module 2	Half term test	End of term 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		
<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		
<i>Assessment</i>	Half term test	Organic Paper 2 mock	Half term test	Physical Chemistry Paper 2 mock		

EPCS 6: PHYSICS

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						
<i>Students learn how to:</i>	Measurement and errors Mechanics and materials Particles and radiation	Mechanics and materials Particles and radiation	Mechanics and materials Particles and radiation	Electricity Waves	Electricity Waves	Review and revision planning
<i>Assessment</i>		PPE	End of topic test	End of term test	End of topic test	
Year 13						
<i>Students learn</i>	Further mechanics	Further mechanics	Fields	Fields	Fields	

<i>how to:</i>	Thermal physics Nuclear physics	Thermal physics Nuclear physics	Nuclear Physics	Astrophysics	Astrophysics	
<i>Assessment</i>		End of topic tests	PPE (Paper 1,2,3,3a)	PPE (Paper 1,2,3,3a)		

EPCS 6: BIOLOGY

Programme of Study: 2019-2020

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	A. 3.1 - Biological molecules B. 3.2 - Cells		C. 3.3 - Organisms exchange substances with their environment. D. 3.4 - Genetic information, variation and relationships between organisms			Theory consolidation Required Practicals Preparation for Y13
<i>Students learn how to:</i>	A - Biological molecules 3.1.1 Monomers and polymers. 3.1.2 Carbohydrates. 3.1.3 Lipids. 3.1.4 Proteins. 3.1.5 Nucleic	B - Cells 3.2.1 Cell structure. 3.2.2 All cells arise from other cells. 3.2.3 Transport across cell membranes.	C - Organisms exchange substances with their environment 3.3.1 Surface area to volume ratio. 3.3.2 Gas exchange. 3.3.3 Digestion and absorption. 3.3.4 Mass transport	D. Genetic information, variation and relationships between organisms 3.4.1 DNA, genes and chromosomes. 3.4.2 Protein synthesis. 3.4.3 Genetic diversity can arise as a result of mutation or during meiosis.		

	acids are important information-carrying molecules. 3.1.6 ATP. 3.1.7 Water 3.1.8 Inorganic ions.	3.2.4 Cell recognition and the immune system.		3.4.4 Genetic diversity and adaptation. 3.4.5 Species and taxonomy. 3.4.6 Biodiversity within a community. 3.4.7 Investigating diversity.		
Assessment	End of topic test	End of topic test PPE	End of topic test	End of topic test PPE	End of topic test	End of topic test PPE
	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	3.7 Genetics, populations, evolution and ecosystems 3.8 The control of gene expression	Essay practise		
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. 3.6.2 Nervous coordination. 3.6.3 Skeletal muscles are stimulated to contract by nerves and act as effectors. 3.6.4 Homeostasis is the maintenance of a	3.7.1 Inheritance. 3.7.2 Populations. 3.7.4 Populations in ecosystems. 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. 3.8.4 Gene technologies allow the study and alteration of gene function allowing a	<ul style="list-style-type: none"> • Revision • Exam practise - Questions and essay 		

		stable internal environment.	better understanding of organism function and the design of new industrial and medical processes.		
Assessment	End of topic test	End of topic test PPE	End of topic test	PPE	Exams