

## SCIENCE

### Programme of Study: 2020-2021

#### 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 4-5	Term 5
Year 7	Introduction to Science	Block 1: 7F, 7A, 7I	Block 2: 7B 7G 7J	Block 3: 7C 7H 7K	Impact projects: 7D/8E
<i>Student s learn how to:</i>	Working Scientifically is introduced	7A Cells, Tissues, Organs and Systems 7F Acids and Alkalis 7I Energy	7B Sexual Reproduction in Animals 7G The Particle Model 7J Current Electricity	7C Muscles and Bones 7H Atoms, Elements and Compounds 7K Forces	7D Ecosystems 8E Combustion
<i>Assess ment</i>	Bunsen Burner Certificate	Quick quiz assessment at end of each topic	Quick quiz assessment at end of each topic	Quick quiz assessment at end of each topic	Project assessment - format tbc Quick quiz assessment at end of each topic

	Term 1-2	Term 2	Term 3	Term 4-5	Term 5	Term 6
Year 8	Introduction to Science  Block 1: 7F, 8H, 7C	Block 2: 8A, 8F	Block 3: 8B, 8G, 8J	Block 4: 7L, 8K, 9B	End of Key Stage Revision and Exams	Impact project: 8L
<i>Students learn how to:</i>	7F Acids and Alkalis 8H Rocks 7A Cells, Tissues, Organs and Systems	8A Food and Nutrition 8F The Periodic Table	8B Plants and their Reproduction 8G Metals and their Uses 8J Light	8K Energy Transfers 7L Sound 9B Plant Growth	Revision skills Revisit KS3 topics (Y7 and 8)	8L Earth and Space
<i>Assessment</i>	Quick quiz assessment at end of each topic	Quick quiz assessment at end of each topic  Transition Review	Quick quiz assessment at end of each topic	Quick quiz assessment at end of each topic	End of Key Stage Exams	Project assessment - format tbc  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 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

Curriculum intent:
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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)

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.

## Curriculum map

	Term 1	Term 2-3	Term 3-4	Term 5-6	Term 6
Year 9	Block 1: End of KS3	Block 2: Energy 9B B4 C5 8K P1	Block 3: Chemistry C1 C2 C3	Block 4: Biology B2 B3	End of Year Revision and Exam
<i>Student s learn how to:</i>	7F Acids and Alkalis 8H Rocks 7C Muscles and Bones	9B Plant Growth B4 Bioenergetics C5 Energy Changes 8K Energy Transfers P1 Energy	C1 Atomic Structure and the Periodic Table C2 Bonding, structure, and the properties of matter C3 Quantitative Chemistry	B2 Organisation B3 Infection and Response	
<i>Assessment</i>	Low-stakes quizzes every 3-5 lessons	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons End of block test	

## Destiny - KS4:

Exam board and Specification details: AQA Trilogy Combined Science

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.

Curriculum map:

	Term 1-2	Term 3-4	Term 5-6	Term 6
Year 10	Block 1: Year 10 Physics	Block 2: Year 10 Biology	Block 3: Year 10 Chemistry	End of Year Revision and Exam
<i>Students learn how to:</i>	P5 Forces P3 Particle Model of Matter P4 Atomic Structure	B1 Cell biology B2 Organisation B3 Infection and response	C2 Bonding, Structure, and the Properties of Matter C4b Chemical Changes - Electrolysis C7 Organic Chemistry C8 Chemical Analysis	
<i>Assessment</i>	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons End of block test	

	Term 1-2	Term 2-3	Term 3	Term 4	Term 5
Year 11	Block 1: Year 11 Physics	Block 2: Year 11 Chemistry	Block 3: Year 11 Biology	Block 4: Year 11 Physics	Targeted Revision Programme
<i>Students learn how</i>	P5 Forces P3 Particle Model of Matter P4 Atomic Structure	C3 Quantitative chemistry C4b Chemical Changes - Electrolysis	B6 Inheritance, variation and evolution	P7 Magnetism and electromagnetism P6 Waves	

<i>to:</i> <i>Higher content in Bold</i>		C6 The rate and extent of chemical change  C9 Chemistry of the atmosphere			
<i>Assessment</i>	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons End of block test	Low-stakes quizzes every 3-4 lessons	

## 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
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Year 12	Foundations in Chemistry: Atoms, Moles,	Electrons, Bonding and structure	Periodic Table and Energy	Organic Chemistry	Organic Analysis and synthesis	Reactions of Carbonyls, Esters and Acyl chlorides. Students will synthesise aspirin.
<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	Further practical aspects of chemistry (PAGs).
<i>Assessment</i>	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 <sub>p</sub> , 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	
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## 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	Term 4	Term 5	Term 6
Year 12						
<i>Students learn about:</i>	3.1 Measurement and errors 3.1.1 Use of SI units and their prefixes 3.1.2 Limitation of physical measurement 3.1.3 Estimation of physical quantities  3.2 Particles and radiation 3.2.1 Particles	3.2 Particles and radiation 3.2.1 Particles 3.2.2 E/m radiation and quantum phenomena  3.4 Mechanics and materials 3.4.1 Force, energy and momentum	3.2 Particles and radiation 3.2.2 E/m radiation and quantum phenomena  3.4 Mechanics and materials 3.4.2 Materials	3.3 Waves 3.3.1 Progressive and stationary waves  3.5 Electricity 3.5.1 Current electricity	3.3 Waves 3.3.2 Refraction, diffraction and interference  3.5 Electricity 3.5.1 Current electricity	Review and revision planning

	3.4 Mechanics and materials 3.4.1 Force, energy and momentum					
<i>Assessment</i>	End of topic tests	PPE	End of topic tests	End of term tests	End of topic tests	
	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 13						
<i>Students learn about:</i>	3.6 Further mechanics 3.6.1 Periodic motion 3.6.2 Thermal physics  3.8 Nuclear physics 3.8.1 Radioactivity	3.6 Further mechanics 3.6.2 Thermal physics  3.8 Nuclear physics 3.8.1 Radioactivity	3.7 Fields and their consequences 3.7.1 Fields  3.8 Nuclear Physics 3.8.1 Radioactivity	3.7 Fields and their consequences 3.7.2 Gravitational fields 3.7.3 Electric fields  3.9 Astrophysics 3.9.1 Telescopes 3.9.2 Classification of stars 3.9.3 Cosmology	3.7 Fields and their consequences 3.7.4 Capacitance 3.7.5 Magnetic fields  3.9 Astrophysics 3.9.1 Telescopes 3.9.2 Classification of stars 3.9.3 Cosmology	
<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:**

	<b>Term 1</b>	<b>Term 2</b>	<b>Term 3</b>	<b>Term 4</b>	<b>Term 5</b>	<b>Term 6</b>
<b>Year 12</b>	<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>Theory consolidation</p> <p>Required Practicals</p> <p>Preparation for Y13</p>
<b>Students learn how to:</b>	<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>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>		

	3.1.7 Water 3.1.8 Inorganic ions.			3.4.6 Biodiversity within a community. 3.4.7 Investigating diversity.	
<b>Assessment</b>	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
	<b>Term 1</b>	<b>Term 2</b>	<b>Term 3</b>	<b>Term 4</b>	<b>Term 5</b>
<b>Year 13</b>	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	
<b>Students learn how to:</b>	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 stable internal environment.	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 better understanding of organism function and the	<ul style="list-style-type: none"> <li>• Revision</li> <li>• Exam practise - Questions and essay</li> </ul>	

			design of new industrial and medical processes.		
<b>Assessment</b>	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	PPE	Exams