

Biology Department Curriculum 2020-21

Intent:

The Science curriculum is intended to teach pupils about the incredible world that they live in and how they grow as humans and develop and thrive in the incredible, diverse and ever changing planet we live on. Pupils will gain a range of skills and knowledge throughout their science lessons including teamwork and practical skills when completing scientific experiments and debating and literary techniques when considering the impact of scientific theories and practices. Development of pupil's scientific knowledge will be vital to pupil's progression and the sciences are separated into Biology, Chemistry and Physics, to ensure pupils are able to fully comprehend the breadth and depth of this awe inspiring subject. The schemes of work have been carefully planned to ensure pupils develop in depth knowledge and understanding of the sciences and are scaffolded to ensure that complex concepts are accessible and are explicitly developed from Key Stage 3 into Key Stage 4. Practical work is at the heart of the 3 sciences and pupils complete a vast, variety of investigations throughout both Key Stages, to allow pupils to fully immerse themselves into their learning journey. Pupils will have many opportunities to develop their spiritual, moral, ethical, social and cultural understanding and discuss their personal interpretations and ideas, to develop themselves as a well-rounded, scientifically aware citizen of the world.

Implementation:

In Science pupils are taught using a range of learning resources, scientific equipment and modelling practices. Pupils will explore the sciences through practical experimental work, research and independent work using a variety of resources, such as laptops, interactive presentations, whiteboards, online learning experiences and visualisers to model key concepts and examples. Pupils will also experience science in action with regular practical activities, both inside and outside of the classroom, where they can undertake scientific investigations to explain key ideas, develop their understanding and practical skills. There are regular real-life opportunities of scientific experiences both in the classroom, during lessons, CSI experiences and science clubs, as well as externally at the Big Bang Show and university events. Pupil progress is facilitated through detailed planning of lessons and practical activities, revision classes and scaffolded concepts across the Key Stages.

Impact:

Science is a very popular subject at Studley with an average of 60 students a year opting to take our Triple Science provision. We know that each individual pupil begins their scientific journey at Studley at a different starting point and we have built a curriculum that supports positive pupil progress and skill development across the Sciences. Progression is measured through both formative and summative assessments, including practice papers, teacher questioning, regular feedback, classroom observation and individual discussions. The practical nature of Science equally allows pupils to develop a range of life skills, such as decision making, evaluating, team working, independent questioning and the ability to work safely and precisely with complex equipment. These transferable skills will be vital in their further education, apprenticeships and the world of work, as well as preparing them for building their own independent lives in their future. We aim to create learners that are accountable, considerate, compassionate and able to articulate their opinions in a factual and balanced manner, which will not only support their studies at Studley but throughout their adult lives.



Programme of Study for Key Stage 4 (for the current year 9, 10 and 11):

At Key Stage 4 Science can be studied in 2 ways depending on how deeply students wish to pursue the subject at 16+. All pupils will follow AQA specifications.

Pupils take their options in Year 8.

Pupils in Year 9 will start the KS4 AQA Specification. Pupils will have opted for either Triple Award Science or Combined Science.

There are two Options:

1) Triple Award = Separate Sciences, GCSE Biology, GCSE Chemistry and GCSE Physics.

Therefore pupils will be awarded 3 GCSEs grades 9 to 1.

2) Combined Science “Trilogy” = this double award is equivalent to two GCSEs. Pupils will study some Biology, some Chemistry and some Physics. Pupils will then be awarded Two GCSEs grades 9 to 1.

Total – 6 lessons each week (2 Biology, 2 Chemistry and 2 Physics).



Triple Award

This is great preparation for those pupils wanting to study any science at AS and A level. Pupils will cover more content than GCSE Combined Sciences.

Pupils need to be working at a Grade 4 or above.

Each week pupils will have lessons of Biology, Chemistry and Physics. These will be taught by specialist teachers. Lessons will cover the new AQA specification and will cover subject content supported by integrated practical work.

At the end of Year 11 pupils sit 2 Biology papers, 2 Chemistry papers and 2 Physics Papers. Each paper is 1 hour 45 minutes long. Pupils can sit foundation or higher tier. Each paper is 100 marks. All papers will assess Knowledge and understanding as well as scientific ability.

Pupils will be awarded 3 grades 9 to 1

Biology Content	Chemistry Content	Physics Content
<ul style="list-style-type: none">● Cell Biology● Organisation● Infection and response● Bioenergetics● Homeostasis and response● Inheritance, variation and evolution	<ul style="list-style-type: none">● Atomic structure and the periodic table● Bonding, structure and the properties of matter● Quantitative chemistry● Chemical changes● Energy Changes● The rate and extent of chemical change● Organic chemistry● Chemical Analysis● Chemistry of the Atmosphere● Using resources.	<ul style="list-style-type: none">● Forces● Energy● Waves● Electricity● Magnetism and electromagnetism● Particle model of matter● Atomic structure● Space physics



Combined Science

This double award is equivalent to two GCSEs similar to the current core and additional science which many families are familiar with.

Each week pupils will have 2 lessons of Biology, Chemistry and Physics. These will be taught by specialist teachers. Lessons will cover the new AQA specification and will cover subject content supported by integrated practical work.

At the end of Year 11 pupils sit 2 Biology papers, 2 Chemistry papers and 2 Physics Papers. Each paper is 1 hour 15 minutes long. Pupils can sit foundation or higher tier. All papers will assess Knowledge and understanding as well as scientific ability.

Each paper is worth 70 marks with a range of questions including questions accessible to the lowest ability students.

Pupils will be awarded 2 grades 9 to 1 e.g. 9-9, 9-8 through to 2-1,1-1.

Biology Content	Chemistry Content	Physics Content
<ul style="list-style-type: none">● Cell Biology● Organisation● Infection and response● Bioenergetics● Homeostasis and response● Inheritance, variation and evolution● Ecology.	<ul style="list-style-type: none">● Atomic structure and the periodic table● Bonding, structure and the properties of matter● Quantitative chemistry● Chemical changes● Energy Changes● The rate and extent of chemical change● Organic chemistry● Chemical Analysis● Chemistry of the Atmosphere● Using resources.	<ul style="list-style-type: none">● Forces● Energy● Waves● Electricity● Magnetism and electromagnetism● Particle model of matter● Atomic structure



YEAR 9 CORE 3 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 4	CELLS DIFFUSION	OSMOSIS ACTIVE TRANSPORT ENZYMES	ENZYMES	DISEASES	PHOTOSYNTHESIS	PLANT ORGANS TRANSPIRATION
	ASSESSMENT POINT: REQUIRED PRACTICAL 1 MICROSCOPES	ASSESSMENT POINT: REQUIRED PRACTICAL 2 OSMOSIS REQUIRED PRACTICAL 3 FOOD TESTS	ASSESSMENT POINT: REQUIRED PRACTICAL 4 EFFECT OF ph/temp ON AMYLASE	ASSESSMENT POINT CLASS PRACTICALS ON AGAR PLATES	ASSESSMENT POINT: REQUIRED PRACTICAL 5 EFACT OF LIGHT INTENSITY ON POND WEED	ASSESSMENT POINT: CLASS PRACTICALS ON SEEDS/PLANTS
	SKILLS FOCUS: CONTENT NUMERACY PRACTICAL WORK	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK	SKILLS FOCUS: CONTENT NUMERACY LITERACY GRAPHS PRACTICAL WORK ANALYSIS	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS CITIZENSHIP MORAL ETHICS	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS ENVIRONMENT MORAL VALUES	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS
YEAR 9 TRIPLE 4 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 5	CELLS DIFFUSION	OSMOSIS ACTIVE TRANSPORT ENZYMES	ENZYMES	DISEASES	PHOTOSYNTHESIS	PLANT ORGANS PLANT DISEASES HORMONES TRANSPIRATION
	ASSESSMENT POINT: REQUIRED PRACTICAL 1 MICROSCOPES	ASSESSMENT POINT: REQUIRED PRACTICAL 3 OSMOSIS	ASSESSMENT POINT: REQUIRED PRACTICAL 5 EFFECT OF ph/temp ON AMYLASE	ASSESSMENT POINT: REQUIRED PRACTICAL 2 ZONES OF INHIBITION ON	ASSESSMENT POINT: REQUIRED PRACTICAL 6 EFACT OF LIGHT INTENSITY ON POND WEED	ASSESSMENT POINT: REQUIRED PRACTICAL 8 AUXIN



		REQUIRED PRACTICAL 4 FOOD TESTS		BACTERIAL AGAR PLATES		
	SKILLS FOCUS: CONTENT NUMERACY PRACTICAL WORK	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS	SKILLS FOCUS: CONTENT NUMERACY LITERACY GRAPHS PRACTICAL WORK ANALYSIS	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS CITIZENSHIP MORAL ETHICS	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS ENVIRONMENT MORAL VALUES	SKILLS FOCUS CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS
YEAR 10 CORE 3 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 4	PHOTOSYNTHESIS PLANT ORGANS PLANT DISEASES HORMONES TRANSPIRATION	HEART & BLOOD NERVOUS SYSTEM	NERVOUS SYSTEM	FEMALE HORMONES	RESPIRATION & METABOLISM (TOPIC 4.6 AND 4.7 ENVIRONMENT/ADAP TATIONS NORMALLY TAUGHT IN YEAR 10 MAY HAVE TO BE LEFT UNTIL END OF YEAR 11)	DISEASES
	ASSESSMENT POINT: REQUIRED PRACTICAL 5 EFFECT OF LIGHT INTENSITY ON POND WEED	ASSESSMENT POINT:	ASSESSMENT POINT: REQUIRED PRACTICAL 6 RULER DROP	ASSESSMENT POINT:	ASSESSMENT POINT: REQUIRED PRACTICAL 7 QUADRATS	ASSESSMENT POINT: CLASS PRACTICALS ON AGAR PLATES
	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS	SKILLS FOCUS	SKILLS FOCUS	SKILLS FOCUS	SKILLS FOCUS	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS



	ENVIRONMENT MORAL VALUES					CITIZENSHIP MORAL ETHICS
YEAR 10 TRIPLE 4 LESSONS A FORTNIGHT. TWO SUBJECTS WILL GET 5	PHOTOSYNTHESIS PLANT ORGANS PLANT DISEASES HORMONES TRANSPIRATION	HEART & BLOOD NERVOUS SYSTEM	EYE BRAIN SKIN EDOCRINE SYSTEM PANCREASE/DIABE TES	KIDNEY FEMALE HORMONES	RESPIRATION METABOLISM (TOPIC 4.6 AND 4.7 ENVIRONMENT/ADAP TATIONS NORMALLY TAUGHT IN YEAR 10 MAY HAVE TO BE LEFT UNTIL END OF YEAR 11)	DISEASES
	ASSESSMENT POINT: REQUIRED PRACTICAL 6 EFFECT OF LIGHT INTENSITY ON POND WEED REQUIRED PRACTICAL 8 AUXIN	ASSESSMENT POINT: REQUIRED PRACTICAL 7 RULER DROP	ASSESSMENT POINT:	ASSESSMENT POINT:	ASSESSMENT POINT REQUIRED PRACICAL 9 QUADRATS REQUIRED PRACTICAL10 LIPASE DECAY	ASSESSMENT POINT: REQUIRED PRACTICAL 2 ZONES OF INHIBITION ON BACTERIAL AGAR PLATES
	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS ENVIRONMENT MORAL VALUES	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS	SKILLS FOCUS: CONTENT	SKILLS FOCUS: CONTENT	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS	SKILLS FOCUS: CONTENT NUMERACY GRAPHS PRACTICAL WORK ANALYSIS CITIZENSHIP MORAL ETHICS
YEAR 11 CORE 3 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 4	RESPIRATION MITOSIS/MEIOSIS DNA GENOME VARIATION SEXUAL	MENDEL INHERITED DISORDERS STEM CELLS	GM GENETIC ENGINEERING 4.7 ADAPTATION, ENVIR	THEORY OF EVOLUTION CLASSIFICATION SPECIATION FOSSILS		



	REPRODUCTION SELECTIVE BREEDING		ONMENT			
	ASSESSMENT POINT:	ASSESSMENT POINT:	ASSESSMENT POINT: REQUIRED PRACICAL 7 QUADRATS	ASSESSMENT POINT:	ASSESSMENT POINT:	ASSESSMENT POINT:
	SKILLS FOCUS CONTENT	SKILLS FOCUS CONTENT	SKILLS FOCUS CONTENT NUMERACY	SKILLS FOCUS CONTENT	SKILLS FOCUS	SKILLS FOCUS
YEAR 11 TRIPLE 4 LESSONS A FORTNIGHT. TWO SUBJECTS WILL GET 5	KIDNEY IVF MITOSIS/MEIOSIS DNA GENOME VARIATION SEXUAL REPRODUCTION SELECTIVE BREEDING	CLONNING MENDEL INHERITED DISORDERS STEM CELLS	GM GENETIC ENGINEERING 4.7 ADAPTATION,ENVIR ONMENT	THEORY OF EVOLUTION CLASSIFICATION SPECIATION FOSSILS EXTINCTION	PLANT HORMONES AND GROWTH	
	ASSESSMENT POINT:	ASSESSMENT POINT:	ASSESSMENT POINT: REQUIRED PRACICAL 9 QUADRATS REQUIRED PRACTICAL10 LIPASE DECAY	ASSESSMENT POINT:	ASSESSMENT POINT: Required Practical 8 Auxin	ASSESSMENT POINT:
	SKILLS FOCUS CONTENT	SKILLS FOCUS CONTENT	SKILLS FOCUS CONTENT NUMERACY	SKILLS FOCUS CONTENT	SKILLS FOCUS	SKILLS FOCUS