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Physics 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.

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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

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Biology Content	Chemistry Content	Physics Content
• Cell Biology • Organisation • Infection and response • Bioenergetics • Homeostasis and response • Inheritance, variation and evolution	• 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.	• 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.

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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
• Cell Biology • Organisation • Infection and response • Bioenergetics • Homeostasis and response • Inheritance, variation and evolution • Ecology.	• 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.	• 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	**Energy**	**Energy**	**Electricity**	**Electricity**	**Particle model of matter**	**Particle model of matter**
	ASSESSMENT: Required practical on SHC & Investigating ways of reducing energy loss.	ASSESSMENT: Required practical on SHC & Investigating ways of reducing energy loss.	ASSESSMENT: Required practical IV graphs, resistance in wires. Parallel and series circuits.	ASSESSMENT: Required practical IV graphs, resistance in wires. Parallel and series circuits.	ASSESSMENT: Required practicals on investigating the density of regular and irregular objects	ASSESSMENT: Required practicals on investigating the density of regular and irregular objects
	SKILLS FOCUS: Numeracy	SKILLS FOCUS: Numeracy	SKILLS FOCUS: Numeracy	SKILLS FOCUS: Numeracy	SKILLS FOCUS: Numeracy	SKILLS FOCUS: Numeracy

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	Content Practical Work	Content Practical Work	Graphs Content Practical Work	Graphs Content Practical Work	Content Graphs Equations Practical work	Content Graphs Equations Practical work
YEAR 9 TRIPLE 4 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 5	**Energy**	**Energy**	**Electricity**	**Electricity**	**Particle model of matter**	**Particle model of matter**
	ASSESSMENT: Required practical on SHC & Investigating ways of reducing energy loss.	ASSESSMENT: Required practical on SHC & Investigating ways of reducing energy loss.	ASSESSMENT: Required practical IV graphs, resistance in wires. Parallel and series circuits. Resistance in parallel and series circuits.	ASSESSMENT: Required practical IV graphs, resistance in wires. Parallel and series circuits. Resistance in parallel and series circuits.	ASSESSMENT: Required practical Density,	ASSESSMENT: Required practical Density,
	SKILLS FOCUS: Numeracy Content Practical Work	SKILLS FOCUS: Numeracy Content Practical Work	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work
YEAR 10 CORE 3 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 4	**Atomic Structure &** **Particle Model of Matter**	**Atomic Structure &** **Particle Model of Matter**	**Forces**	**Forces**	**Waves**	**Waves**
	ASSESSMENT:	ASSESSMENT:	ASSESSMENT:	ASSESSMENT: Required Practical - Spring Constant, F	ASSESSMENT Required Practical - Calculating Wave	ASSESSMENT Required Practical - Calculating Wave speed,

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	Content tests about radiation and atomic structure. Required practicals on investigating the density of regular and irregular objects	Content tests about radiation and atomic structure. Required practicals on investigating the density of regular and irregular objects	Required Practical - Spring Constant, F =ma (Newtons Laws),	=ma (Newtons Laws),	speed, Frequency, wavelength (Ripple Tank)	Frequency, wavelength (Ripple Tank)
	SKILLS FOCUS: Numeracy Graphs - Half life Content Some practical work with Geiger Counters	SKILLS FOCUS: Numeracy Graphs - Half life Content Some practical work with Geiger Counters	SKILLS FOCUS: Numeracy Graphs - Speed, Velocity, Acceleration Content Practical work	SKILLS FOCUS: Numeracy Graphs - Speed, Velocity, Acceleration Content Practical work	SKILLS FOCUS Numeracy - Equations Content Graphs Practical work	SKILLS FOCUS Numeracy - Equations Content Graphs Practical work
YEAR 10 TRIPLE 4 LESSONS A FORTNIGHT. TWO SUBJECTS WILL GET 5	**Atomic Structure & Particle Model of Matter**	**Atomic Structure & Particle Model of Matter**	**Forces**	**Forces**	**Waves**	**Waves**
	ASSESSMENT: Content tests about radiation and atomic structure. Required practicals on investigating the density of regular and irregular objects	ASSESSMENT: Content tests about radiation and atomic structure. Required practicals on investigating the density of regular and irregular objects	ASSESSMENT: Numeracy Graphs - Speed, Velocity, Acceleration Content & Practical work	ASSESSMENT: Numeracy Graphs - Speed, Velocity, Acceleration Content & Practical work	ASSESSMENT: Required Practical - Calculating Wave speed, Frequency, wavelength (Ripple Tank)	ASSESSMENT: Required Practical - Calculating Wave speed, Frequency, wavelength (Ripple Tank)

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	SKILLS FOCUS: Numeracy Graphs - Half life Content Some practical work with Geiger Counters	SKILLS FOCUS: Numeracy Graphs - Half life Content Some practical work with Geiger Counters	SKILLS FOCUS: Numeracy Graphs - Speed, Velocity, Acceleration Content Practical work	SKILLS FOCUS: Numeracy Graphs - Speed, Velocity, Acceleration Content Practical work	SKILLS FOCUS: Numeracy - Equations Content Practical work	SKILLS FOCUS: Numeracy - Equations Content Practical work
YEAR 11 CORE 3 LESSONS A FORTNIGHT. ONE SUBJECT WILL GET 4	**Waves & Forces**	**Waves & Forces**	**Electromagnets**	**Electromagnets**	**Revision & recap of all required practicals**	**Revision & recap of all required practicals**
	ASSESSMENT: Required Practical - Calculating Wave speed, Frequency, wavelength (Ripple Tank) Required Practical - F =ma (Newtons Laws),	ASSESSMENT: Required Practical - Calculating Wave speed, Frequency, wavelength (Ripple Tank) Required Practical - F =ma (Newtons Laws),	ASSESSMENT: Required Practical - Making an electromagnet	ASSESSMENT: Required Practical - Making an electromagnet	ASSESSMENT: Recap of Required Practicals	ASSESSMENT: Recap of Required Practicals
	SKILLS FOCUS: Numeracy - equations Graphs Content Practical work with ripple tank	SKILLS FOCUS: Numeracy - equations Graphs Content Practical work with ripple tank	SKILLS FOCUS: Numeracy - equations Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy - equations Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy - equations Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy - equations Content Graphs Equations Practical work
YEAR 11 TRIPLE	**Waves & Forces**	**Waves & Forces**	**Electromagnets**	**Electromagnets**	**Space**	**Revision & recap of all required practicals**

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4 LESSONS A FORTNIGHT. TWO SUBJECTS WILL GET 5						
	ASSESSMENT: Required Practical - Calculating Wave speed, Frequency, wavelength (Ripple Tank) Required Practical - F =ma (Newtons Laws),	ASSESSMENT: Required Practical - Calculating Wave speed, Frequency, wavelength (Ripple Tank) Required Practical - F =ma (Newtons Laws),	ASSESSMENT: Required Practical - Making an electromagnet, Electric motors	ASSESSMENT: Required Practical - Making an electromagnet, Electric motors	ASSESSMENT: Content Tests	ASSESSMENT: Recap of Required Practicals
	SKILLS FOCUS: Numeracy Graphs Content Practical work with ripple tank	SKILLS FOCUS: Numeracy Graphs Content Practical work with ripple tank	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy Content Graphs Equations Practical work	SKILLS FOCUS: Numeracy - equations Content Graphs Equations Practical work