



# FRAMEWORK FOR LEARNING



## CREATIVE

An education where imagination, curiosity and resilience enable us to ignite our learning.

## HAPPY

A shared belief that optimism, empathy and responsibility are the foundations for a respectful, safe and inclusive community.

## SUCCESSFUL

Individuals who are ready to learn, practise being reflective, and are motivated to become champions.

## SUBJECT

### SCIENCE

## INTENT

"Every brilliant experiment, like every great work of art, starts with an act of imagination." - **Jonah Lehrer**

The Scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world, and with developing skills associated with Science as a process of enquiry. It will develop the natural curiosity of the child, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence.

At CHS south we aim to create Scientists that are curious about the natural world and understand the importance of scientific process. We are passionate about developing a curriculum that is accessible to all and one that enriches through cultural capital and extra-curricular opportunities which are provided throughout the 5-year course.

We encourage students to be inquisitive throughout their time at the school and beyond. The curriculum is designed to ensure that students can acquire key scientific knowledge through practical experiences, using equipment, conducting experiments, building arguments and explaining concepts confidently. The school's approach to science takes account of the school's own context, ensuring access to people with specialist expertise and places of scientific interest as part of the school's commitment to learning outside the classroom.



## YEAR GROUP

## YEAR 11 – COMBINED SCIENCE (TRILIOGY)

## RATIONAL / NARRATIVE

In Year 11, pupils move on to the unit 2 section of the AQA syllabus. They will have mock exams on unit 1 Biology, Chemistry and physics at the end of the first term and complete the course in summer 1. They will then revise for their GCSE's in unit 1 and 2 Physics, Chemistry and Biology. The numbers below reference the AQA specification which can be accessed via this link (this is the programme of study followed in years 10 and 11): <https://filestore.aqa.org.uk/resources/science/specifications/AQA-8464-SP-2016.PDF>

## TERM KNOWLEDGE

AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
<p><b>Phys 6.5 Forces</b>                      6.5.1.1 Scalar and vector quantities                      6.5.1.2 Contact and noncontact forces                      6.5.1.3 Gravity                      6.5.1.4 Resultant forces                      6.5.2 Work done and energy transfer                      6.5.3 Forces and elasticity                      Required practical activity 18: force and extension of a spring                      6.5.4.1.1 Distance and displacement                      6.5.4.1.2 Speed                      6.5.4.1.3 Velocity                      6.5.4.1.4 The distance–time relationship                      6.5.4.1.5 Acceleration                      6.5.4.2.1 Newton's First Law                      6.5.4.2.2 Newton's Second Law                      Required practical activity 19: force and acceleration                      6.5.4.2.3 Newton's Third Law                      6.5.4.3.1 Stopping distance                      6.5.4.3.2 Reaction time                      6.5.4.3.3 Factors affecting braking distance 1</p>	<p><b>Chem 5.6 The rate and extent of chemical change</b>                      5.6.1.1 Calculating rates of reactions                      5.6.1.2 Factors which affect the rates of chemical reactions                      5.6.1.3 Collision theory and activation energy                      5.6.1.4 Catalysts                      5.6.2.1 Reversible reactions                      5.6.2.2 Energy changes and reversible reactions                      5.6.2.3 Equilibrium                      5.6.2.4 The effect of changing conditions on equilibrium (HT only)                      5.6.2.5 The effect of changing concentration (HT only)                      5.6.2.6 The effect of temperature changes on equilibrium (HT only)                      5.6.2.7 The effect of pressure changes on equilibrium (HT only)</p> <p><b>Chem 5.7 Organic chemistry</b>                      5.7.1.1 Crude oil,</p>	<p><b>5.9 Chemistry of the atmosphere</b>                      5.9.1.1 The proportions of different gases in the atmosphere                      5.9.1.2 The Earth's early atmosphere                      5.9.1.3 How oxygen increased                      5.9.1.4 How carbon dioxide decreased                      5.9.2.1 Greenhouse gases                      5.9.2.2 Human activities which contribute to an increase in greenhouse gases in the atmosphere                      5.9.2.3 Global climate change                      5.9.2.4 The carbon footprint and its reduction                      5.9.3.1 Atmospheric pollutants from fuels                      5.9.3.2 Properties and effects of atmospheric pollutants</p> <p><b>Chem 5.10 Using resources</b>                      5.10.1.1 Using the Earth's resources and sustainable development                      5.10.1.2 Potable water                      Required practical activity 13: water samples and analysis</p>	<p><b>Phys 6.7 Magnetism and electromagnetism</b>  <b>6.7.1.1</b> Poles of a magnet                      6.7.1.2 Magnetic fields                      6.7.2.1 Electromagnetism                      6.7.2.2 Fleming's left-hand rule (HT only)                      6.7.2.3 Electric motors (HT only)</p> <p><b>Bio 4.6 Inheritance, variation and evolution</b>                      4.6.1.1 Sexual and asexual reproduction                      4.6.1.2 Meiosis                      4.6.1.3 DNA and the genome                      4.6.1.4 Genetic inheritance                      4.6.1.5 Inherited disorders                      4.6.1.6 Sex determination                      4.6.2.1 Variation                      4.6.2.2 Evolution                      4.6.2.3 Selective breeding                      4.6.2.4 Genetic engineering                      4.6.3.1 Evidence for evolution                      4.6.3.2 Fossils                      4.6.3.3 Extinction                      4.6.3.4 Resistant bacteria                      4.6.4 Classification of living organisms</p>	<p><b>Bio 4.7 Ecology</b>                      4.7.1.1 Communities                      4.7.1.2 Abiotic factors                      4.7.1.3 Biotic factors                      4.7.1.4 Adaptations                      4.7.2.1 Levels of organisation                      Required practical activity 7 - sampling                      4.7.2.2 How materials are cycled                      4.7.3.1 Biodiversity                      4.7.3.2 Waste management                      4.7.3.3 Land use                      4.7.3.4 Deforestation                      4.7.3.5 Global warming                      4.7.3.6 Maintaining biodiversity</p> <p>GCSE exams and revision</p> <p>GCSE exams and revision</p> <p><b>Required practical activity 7 (Measure the population size of a common species in a habitat)</b></p>	<p>GCSE exams and revision</p>



	<p>6.5.4.3.4 Factors affecting braking distance 2</p> <p>6.5.5.1 Momentum is a property of moving objects (HT only)</p> <p>6.5.5.2 Conservation of momentum (HT only)</p> <p><b>Bio 4.5 Homeostasis and response</b></p> <p>4.5.1. Homeostasis</p> <p>4.5.2 The human nervous system</p> <p>4.5.3 Hormonal coordination in humans</p> <p>4.5.3.2 Control of blood glucose</p> <p>4.5.3.3 Hormones in human reproduction</p> <p>4.5.3.4 Contraception</p> <p>4.5.3.5 Hormones and fertility</p> <p>4.5.3.6 Feedback systems</p>	<p>hydrocarbons and alkanes</p> <p>5.7.1.2 Fractional distillation and petrochemicals</p> <p>5.7.1.3 Properties of hydrocarbons</p> <p>5.7.1.4 Cracking and alkenes</p>	<p>5.10.1.3 Waste water treatment</p> <p>5.10.1.4 Alternative methods of extracting metals (HT only)</p> <p>5.10.2.1 Life cycle assessment</p> <p>5.10.2.2 Ways of reducing the use of resources</p> <p><b>Phys 6.6 Waves</b></p> <p>Waves 6.6.1.1 Transverse and longitudinal waves</p> <p>6.6.1.2 Properties of waves</p> <p>Required practical activity 20: (observations of waves)</p> <p>6.6.2.1 Types of electromagnetic waves</p> <p>6.6.2.2 Properties of electromagnetic waves</p> <p><b>Required practical activity 21 (absorption and emission of IR)</b></p> <p>6.6.2.3 Properties of electromagnetic waves 2</p> <p>6.6.2.4 Uses and applications of electromagnetic waves</p> <p><b>Chemistry 5.8 Chemical analysis</b></p> <p>5.8.1.1 Pure substances</p> <p>5.8.1.2 Formulations</p> <p>5.8.1.3 Chromatography</p> <p>Required practical activity 12: Chromatography.</p> <p>5.8.2.1 Test for hydrogen</p> <p>5.8.2.2 Test for oxygen</p> <p>5.8.2.3 Test for carbon dioxide</p> <p>5.8.2.4 Test for chlorine</p>			
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## SKILLS

MS 3b, c Students should be able to recall and apply equations. Students should be able to apply equations given on the Physics equation sheet.

(elastic potential energy =  $0.5 \times \text{spring constant} \times \text{extension}^2$ )

Required practical activity 18: investigate the relationship between force and extension for a spring.

MS 1, 3c Throughout this section (Forces and motion), students should be able to use ratios and proportional reasoning to convert units and to compute rates.

MS 4a, b, c, d, f The acceleration of an object can be calculated from the gradient of a velocity–time graph.

MS 3a Students should recognise and be able to use the symbol for proportionality,  $\propto$

Required practical activity 19: investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration produced by a constant force.

AT skills covered by this practical activity: physics AT 1, 2 and 3.

WS 1.2 Make models of alkane molecules using the molecular modelling kits.

MS 1a Recognise and use expressions in decimal form.

MS 1c Use ratios, fractions and percentages.

MS 1d Make estimates of the results of simple calculations.

MS 4a Translate information between graphical and numeric form.

MS 4b Drawing and interpreting appropriate graphs from data to determine rate of reaction. MS 4c Plot two variables from experimental or other data.

MS 4d Determine the slope and intercept of a linear graph.

MS 4e Draw and use the slope of a tangent to a curve as a measure of rate of change.

AT skills covered by this practical activity: biology AT 1, 3 and 4.

AT 5 An opportunity to investigate the catalytic effect of adding different metal salts to a reaction such as the decomposition of hydrogen peroxide

WS 1.2, 1.3, 1.6 Students should be able to: evaluate the quality of evidence in a report about global climate change given appropriate information describe uncertainties in the evidence base recognise the importance of peer review of results and of communicating results to a wide range of audiences.

WS 1.3 Students should be able to: Describe actions to reduce emissions of carbon dioxide and methane Give reasons why actions may be limited.

MS 2h Translate information between graphical and numeric form.

**Required practical activity 13: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.**

AT skills covered by this practical activity: chemistry AT 2, 3 and 4.

AT 1 WS 2.3, 2.4, 2.6, 2.7, 3.1, 3.5 describe a method to measure the speed of sound waves in air

MS 2c, 4a, MS 1c, 3a Students should be able to complete a Punnett square diagram and extract and interpret information from genetic crosses and family trees. Students should be able to use direct proportion and simple ratios to express the outcome of a genetic cross.

## Homeostasis and response

Evaluate information around the relationship between obesity and diabetes, and make recommendations, taking into account social and ethical issues. Interpret and explain simple diagrams of negative feedback control.

Show why issues around contraception cannot be answered by science alone.

Model behaviour of chromosomes

Use probability, proportion and ratios in relation to inheritance.

Interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops.



<h2>ASSESSMENT</h2>	<p>WS 1.3 Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues</p>		<p>AT 1, AT 4 WS 2.3, 2.4, 2.6, 2.7, 3.1, 3.5 describe a method to measure the speed of ripples on a water surface. Required practical activity 20: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.</p>			
	<p>Students will be assessed on: EOT with teacher assessment – <b>Describing the forces that act on an accelerating object that reaches terminal velocity.</b></p> <p>EOT with teacher assessment – <b>Evaluating methods for the control of blood glucose.</b></p> <p><b>MOCK EXAMS – unit 1 (Biology).</b></p>	<p>Students will be assessed on: EOT with teacher assessment – <b>Planning an investigation that investigates the rate of reaction.</b> EOT with teacher assessment – <b>describing reversible reaction using Le-Chateliers principle.</b></p> <p>EOT with teacher assessment – <b>describing fractional distillation</b></p> <p><b>MOCK EXAMS Unit 1, Chemistry and Physics</b></p>	<p>Students will be assessed on: EOT with teacher assessment – <b>comparison of longitudinal and transverse waves.</b></p>	<p>Students will be assessed on: EOT with teacher assessment – <b>describing the direction of the force in a current carrying wire.</b> EOT with teacher assessment – <b>Writing a description about the changing atmosphere.</b> <b>MOCK EXAMS Unit 2, Biology Chemistry and Physics</b></p>	<p>Students will be assessed on: EOT with teacher assessment – method for EOT with teacher assessment – <b>comparing meiosis and mitosis</b></p>	<p>Students will be assessed on:</p>
<h2>HOME LEARNING</h2>	<p>Weekly homework – unit 1 retrieval.</p> <p>One per week</p> <p>Revision booklet relevant to the mock GCSE exams. Students will sit unit 1 Biology mock.</p>	<p>Weekly homework – unit 1 retrieval.</p> <p>Revision booklet relevant to the mock GCSE exams. Students will sit two unit 1 exam papers. Unit 1 Chemistry and Physics.</p>	<p>Weekly homework – unit 1 retrieval.</p> <p>One per week</p>	<p>Weekly homework – unit 1 retrieval.</p> <p>Revision booklet relevant to the mock GCSE exams. Students will sit two unit 2 exam papers. Unit 2 Chemistry and Physics.</p>	<p>Weekly homework – past paper questions.</p> <p>One per week</p>	<p>Weekly homework – past paper questions.</p> <p>One per week</p>



## READING, WRITING, TALK, NUMERACY

**Reading:**  
Every day and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments.

**Talk**  
Students will discuss:  
- the use of contraception and IVF. They will debate the ethical and economic implications of offering IVF on the NHS.  
-the developments of microscopy techniques have enabled IVF treatments to develop.  
- the social and ethical issues associated with IVF treatments.  
-evaluate from the perspective of patients and doctors the methods of treating infertility

**Reading**  
Students will read about the formation of organic fuels and how their use leads to issues like global warming.

**Writing and talk**  
Student will have to use writing and talk to describe organic sources include fossil fuels, which are a major source of feedstock for the petrochemical industry. They will discuss how chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents.

**Reading:**  
Students will discover how embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise. Students will learn about the theory of evolution by natural selection and use this to explain the need for microbial research (such as vaccines, disease control).

**Talk**  
Discuss evolution of viruses like COVID-19 and how mutations allow pathogens to evade immunity.

**Writing:**  
Students will explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues.

**Writing and talk:**  
Students will discuss and evaluate human effects on the Earth and the Earth's atmosphere. Students will discuss and describe how they can reduce their carbon footprints and contribute to lowering global emissions in the future.

**Writing:**  
Students will write about ways of disposing of products at the end of their useful life in ways that ensure that materials and stored energy are utilised. Pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised.

**Talk:**  
Students will discuss the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products.

## TIER 2 VOCABULARY

Analyse  
Balance  
Calculate  
Comment  
Compare  
Data  
Formula  
Method  
Period  
Research  
Develop  
Interpret  
Outline  
Significant  
Estimate

Analyse  
Calculate  
Compare  
Context  
Formula  
Justify  
Method  
Occur  
Summarise  
Apply  
Concept  
Principle  
Prove

Analyse  
Annotate  
Available  
Benefit  
Compare  
Identify  
Illustrate  
Issue  
Justify  
Research  
Summarise  
Argue  
Consider  
Evaluate  
Factor  
Criticise

Calculate  
Define  
Describe  
Design  
Explain  
Identify  
Determine  
Draw

Analyse  
Annotate  
Area  
Calculate,  
Data  
Formula  
Find  
Method  
Distribute,  
Evaluate

Balance  
Calculate  
Choose  
Compare  
Complete  
Define  
Describe  
Design  
Determine  
Draw  
Estimate  
Evaluate  
Explain  
Give  
Identify  
Justify



## TIER 3 VOCABULARY

		Develop Economy Income Indicate Interpret Evident Examine Prove			Label Measure Name Plan Plot Predict Show Sketch Suggest Use Write
Regulation Homeostasis Optimal Stimulus Receptor Effector Response Reflex Neurone Endocrine Glands Diabetes Menstrual Plasmid Diabetes Activation Energy Reversible Dynamic Endothermic Exothermic Equilibrium Mole Concentration	Resultant force Acceleration Speed Velocity Momentum Inertia Alkane Alkene Polymer Fractional distillation Saturated Hydrocarbon	Frequency Wavelength Infra-red Ultraviolet Gamma Radio wave Microwave X-ray Classification Evolution Evidence for evolution Fossils Extinction Chromatography Formulation Melting point Boiling point	Induced magnetism Electromagnetism Flux Flemings left hand rule solenoid Magnetic field Greenhouse effect Global warming Composition	Sustainable Biotic Abiotic Potable Biodiversity Adaptation Deforestation Trophic level	

## PSPSMC, BRITISH VALUES AND DIVERSITY

### Social, Moral and Spiritual:

Reading: Students will read material from a range of medical and scientific sources to identify factors affecting health.

Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues

- the use of contraception and IVF. They will debate the ethical and economic implications of offering IVF on the NHS.
- the developments of microscopy techniques have enabled IVF treatments to develop.
- the social and ethical issues associated with IVF treatments.
- evaluate from the perspective of patients and doctors the methods of treating infertility

Student will have to use writing and talk to describe organic sources include fossil fuels, which are a major source of feedstock for the petrochemical industry. They will discuss how chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents.

Discuss evolution of viruses like COVID-19 and how mutations allow pathogens to evade immunity.



Students will write about ways of disposing of products at the end of their useful life in ways that ensure that materials and stored energy are utilised. Pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists' study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised.

Students will discuss the use of limited resources, use of energy, waste, and environmental impact in the manufacture of these products.

Students will discuss and describe how they can reduce their carbon footprints and contribute to lowering global emissions in the future.





## YEAR GROUP

## YEAR 11 – SEPARATE SCIENCE BIOLOGY

## RATIONAL / NARRATIVE

In year 11, some pupils will follow the separate science route shown below and learn the Science material with separate teachers. The route through separate science and the content is shown below for each of the subjects. The material that is specific only to separate science is underlined in *italic*. The numbers below reference the AQA specification which can be accessed via this link (this is the programme of study followed in year 11):

<https://filestore.aqa.org.uk/resources/biology/specifications/AQA-8461-SP-2016.PDF>

## TERM KNOWLEDGE

AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
<b>Bio 4.5 Homeostasis and response</b> 4.5.1. Homeostasis 4.5.2 The human nervous system 4.5.3 Hormonal coordination in humans 4.5.3.2 Control of blood glucose 4.5.3.3 Hormones in human reproduction 4.5.3.4 Contraception 4.5.3.5 Hormones and fertility 4.5.3.6 Feedback systems <i>Biology</i> 4.5.2.2 <i>The brain</i> 4.5.2.3 <i>The eye</i> 4.5.2.4 <i>Control of body temperature</i> 4.5.3.3 <i>Maintaining water and nitrogen balance in the body</i> 4.5.4 <i>Plant hormones</i>	<b>Bio 4.6 Inheritance, variation and evolution</b> 4.6.1.1 Sexual and asexual reproduction 4.6.1.2 Meiosis 4.6.1.3 DNA and the genome 4.6.1.4 Genetic inheritance 4.6.1.5 Inherited disorders 4.6.1.6 Sex determination 4.6.2.1 Variation <i>Biology</i> 4.6.1.3 <i>Advantages and disadvantages of sexual and asexual reproduction</i> 4.6.1.5 <i>DNA structure</i> 4.6.2.5 <i>Cloning</i> 4.6.3.1 <i>Theory of evolution</i> 4.6.3.2 <i>Speciation</i> 4.6.3.3 <i>The understanding of genetics</i>	<b>Bio 4.6 Inheritance, variation and evolution</b> 4.6.2.2 Evolution 4.6.2.3 Selective breeding 4.6.2.4 Genetic engineering 4.6.3.1 Evidence for evolution 4.6.3.2 Fossils 4.6.3.3 Extinction 4.6.3.4 Resistant bacteria 4.6.4 Classification of living organisms	Bio 4.7 Ecology 4.7.1.1 Communities 4.7.1.2 Abiotic factors 4.7.1.3 Biotic factors 4.7.1.4 Adaptations 4.7.2.1 Levels of organisation Required practical activity 7 - sampling	4.7.2.2 How materials are cycled 4.7.3.1 Biodiversity 4.7.3.2 Waste management 4.7.3.3 Land use 4.7.3.4 Deforestation 4.7.3.5 Global warming 4.7.3.6 Maintaining biodiversity <i>Biology</i> 4.7.2.3 <i>Decomposition</i> 4.7.2.4 <i>Impact of environmental change</i> 4.7.4 <i>Trophic levels in an ecosystem</i> 4.7.5 <i>Food production</i>	GCSE exams and revision



## YEAR GROUP

## YEAR 11 – SEPARATE SCIENCE CHEMISTRY

## RATIONAL / NARRATIVE

In year 11, some pupils will follow the separate science route shown below and learn the Science material with separate teachers. The route through separate science and the content is shown below for each of the subjects. The material that is specific only to separate science is underlined in *italic*. The numbers below reference the AQA specification which can be accessed via this link (this is the programme of study followed in year 11) :

<https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-8462-SP-2016.PDF>

## TERM KNOWLEDGE

AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Chem 5.6 The rate and extent of chemical change Collision theory and activation energy 5.6.1.4 Catalysts 5.6.2.1 Reversible reactions 5.6.2.2 Energy changes and reversible reactions 5.6.2.3 Equilibrium 5.6.2.4 The effect of changing conditions on equilibrium (HT only) 5.6.2.5 The effect of changing concentration (HT only) 5.6.2.6 The effect of temperature changes on equilibrium (HT only) 5.6.2.7 The effect of pressure changes on equilibrium (HT only)	Chem 5.6 The rate and extent of chemical change <i>chemistry</i> 4.7.2 <i>Reactions of alkenes and alcohols</i> 4.7.3 <i>Synthetic and naturally occurring polymers</i> <b>Chemistry 5.8 Chemical analysis</b> 5.8.1.1 Pure substances 5.8.1.2 Formulations 5.8.1.3 Chromatography Required practical activity 12: Chromatography. 5.8.2.1 Test for hydrogen 5.8.2.2 Test for oxygen 5.8.2.3 Test for carbon dioxide 5.8.2.4 Test for chlorine <i>Chemistry</i> 4.8.3 <i>Identification of ions by chemical and spectroscopic means</i>	<b>C5.9 Chemistry of the atmosphere</b> 5.9.1.1 The proportions of different gases in the atmosphere 5.9.1.2 The Earth's early atmosphere 5.9.1.3 How oxygen increased 5.9.1.4 How carbon dioxide decreased 5.9.2.1 Greenhouse gases 5.9.2.2 Human activities which contribute to an increase in greenhouse gases in the atmosphere 5.9.2.3 Global climate change 5.9.2.4 The carbon footprint and its reduction 5.9.3.1 Atmospheric pollutants from fuels 5.9.3.2 Properties and effects of atmospheric pollutants	<b>Chem 5.10 Using resources</b> 5.10.1.1 Using the Earth's resources and sustainable development 5.10.1.2 Potable water Required practical activity 13: water samples and analysis 5.10.1.3 Waste water treatment 5.10.1.4 Alternative methods of extracting metals (HT only) 5.10.2.1 Life cycle assessment 5.10.2.2 Ways of reducing the use of resources	Exams revision	



## YEAR GROUP

## YEAR 11 – SEPARATE SCIENCE PHYSICS

## RATIONAL / NARRATIVE

In year 11, some pupils will follow the separate science route shown below and learn the Science material with separate teachers. The route through separate science and the content is shown below for each of the subjects. The material that is specific only to separate science is underlined in *italic*. The numbers below reference the AQA specification which can be accessed via this link (this is the programme of study followed in year 11):

<https://filestore.aqa.org.uk/resources/physics/specifications/AQA-8463-SP-2016.PDF>

## TERM KNOWLEDGE

AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
<p><b>Phys 6.5 Forces</b></p> <p>6.5.1.1 Scalar and vector quantities</p> <p>6.5.1.2 Contact and noncontact forces</p> <p>6.5.1.3 Gravity</p> <p>6.5.1.4 Resultant forces</p> <p>6.5.2 Work done and energy transfer</p> <p>6.5.3 Forces and elasticity</p> <p>Required practical activity 18: force and extension of a spring</p> <p>6.5.4.1.1 Distance and displacement</p> <p>6.5.4.1.2 Speed</p> <p>6.5.4.1.3 Velocity</p> <p>6.5.4.1.4 The distance–time relationship</p> <p>6.5.4.1.5 Acceleration</p>	<p>6.5.4.2.1 Newton's First Law</p> <p>6.5.4.2.2 Newton's Second Law</p> <p>Required practical activity 19: force and acceleration</p> <p>6.5.4.2.3 Newton's Third Law</p> <p>6.5.4.3.1 Stopping distance</p> <p>6.5.4.3.2 Reaction time</p> <p>6.5.4.3.3 Factors affecting braking distance 1</p> <p>6.5.4.3.4 Factors affecting braking distance 2</p> <p>6.5.5.1 Momentum is a property of moving objects (HT only)</p> <p>6.5.5.2 Conservation of momentum (HT only)</p> <p><i>Physics</i></p> <p><i>4.5.4 Moments, levers and gears</i></p> <p><i>4.5.5 Pressure and pressure differences in fluids</i></p>	<p><b>Phys 6.6 Waves</b></p> <p>Waves</p> <p>6.6.1.1 Transverse and longitudinal waves</p> <p>6.6.1.2 Properties of waves</p> <p>Required practical activity 20: (observations of waves)</p> <p>6.6.2.1 Types of electromagnetic waves</p> <p>6.6.2.2 Properties of electromagnetic waves</p> <p><b>Required practical activity 21 (absorption and emission of IR)</b></p> <p>6.6.2.3 Properties of electromagnetic waves 2</p> <p>6.6.2.4 Uses and applications of electromagnetic waves</p> <p><i>Physics</i></p> <p><i>4.6.1.3 Reflection of waves</i></p> <p><i>4.6.1.4 Sound waves</i></p> <p><i>4.6.1.5 Waves for detection and exploration</i></p> <p><i>4.6.2.5 Lenses</i></p> <p><i>4.6.2.6 Visible light</i></p> <p><i>4.6.3 Black body radiation</i></p>	<p><b>Phys 6.7 Magnetism and electromagnetism</b></p> <p><b>6.7.1.1</b> Poles of a magnet</p> <p>6.7.1.2 Magnetic fields</p> <p>6.7.2.1 Electromagnetism</p> <p>6.7.2.2 Fleming's left-hand rule (HT only)</p> <p>6.7.2.3 Electric motors (HT only)</p> <p><i>Physics 4.7</i></p> <p>4.7.2.4 Loudspeakers</p> <p>Induced potential, transformers and the National Grid</p>	<p>Space physics</p> <p>4.8.1 Solar system; stability of orbital motions; satellites</p> <p>4.8.2 Red-shift</p>	<p>GCSE exams and revision</p>