Biddulph High School Curriculum Intent

To deliver a broad and enriching curriculum through engaging and challenging lessons that provide a wide range of opportunities for all students to achieve their potential.
Students will all be prepared to take their next steps in a diverse and ever changing future ready to make a positive contribution to society.
Through a broad programme of extracurricular activities students will have the opportunities to showcase their talents and experience new challenges.
We value individuals and all that they can offer as well as supporting each other with kindness and empathy.

Curriculum Intent for Science:

The lessons in the Science department provoke students' curiosity through exciting lessons; creating an environment where students will need to critically think and provide logical reasoning using various methods of investigation, such as observation, comparison, experimentation, and mathematical manipulation of data.

All teachers will follow the schemes of work and resources provided by the department. This will ensure that all students receive the same high-quality provision. All units of work will provide a clear outline of the knowledge and skills required and assessments will ensure that this knowledge has been retained and that skills can be evidenced.

Teachers will ensure that gaps are closed through regular monitoring within the classroom. DINT activities will allow for interleaving and recap of previous learning. Misconceptions will be identified through effective questioning and the regular inspection of student work.

Physics **Long Term Overview**						
Year Group	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
12						
13						

Physics **Medium Term Overview**			
Year 12	***Autumn Term 1***	**Unit Title: Introduction to A level Physics, Forces and motion**	**No of Lessons: 27**
Overview	Our Physics course is designed to inspire your learners. The course will develop their interest in and enthusiasm for the subject, including developing an interest in further study and careers associated with Physics. The course uses a content-led approach, is laid out clearly in a series of teaching modules with additional guidance added where required to clarify assessment requirements •and embeds practical requirements within the teaching modules. Physics is a practical subject. The development and acquisition of practical skills is fundamental. The Physics A course provides learners with the opportunity to develop experimental methods and techniques for analysing empirical data. Skills in planning, implementing, analysing and evaluating, as outlined in 1.1, will be assessed in the written papers.		
Assessment	**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology.**		
<u>Essential Knowledge (what must students know):</u>	**<u>Essential Skills (what must students be able to demonstrate):</u> Students will be able to:**	**Lessons to cover**	
		quantities and derived units	
		scalar and vector quantities + adding vectors	

Students will be able to answer the following questions: What are derived units? What happens when we have multipole vector quantities? What must we know in order to explain the motion of an object? **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	Module 2: Foundations of physics The aim of this module is to introduce important conventions and ideas that permeate the fabric of physics. Understanding of physical quantities, S.I. units, scalars and vectors helps physicists to effectively communicate their ideas within the scientific community (HSW8, 11). Module 3: Forces and motion The term force is generally used to indicate a push or a pull. It is difficult to give a proper definition for a force, but in physics we can easily describe what a force can do. A resultant force acting on an object can accelerate the object in a specific direction. The subsequent motion of the object can be analysed using equations of motion. Several forces acting on an object can prevent the object from either moving or rotating. Forces can also change the shape of an object. There are many other things that forces can do. In this module, learners will learn how to model the motion of objects using mathematics, understand the effect forces have on objects, learn about the important connection between force and energy, appreciate how forces cause deformation and understand the importance of Newton's laws of motion. This section provides knowledge and understanding of key ideas used to describe and analyse the motion of objects in both one-dimension and in two-dimensions. It also provides learners with opportunities to develop their analytical and experimental skills. The motion of a variety of objects can be analysed using ICT or data-logging techniques (HSW3). Learners also have the opportunity to analyse and interpret experimental data by recognising relationships between physical quantities (HSW5). The analysis of motion gives many opportunities to link to How Science Works. Examples relate to detecting the speed of moving vehicles, stopping distances and freefall (HSW2, 9, 10, 11, 12)	resolving vectors and More on vectors Distance time and speed displacement and velocity acceleration More on velocity time graphs equations of motion car stopping distances free fall and g Projectile motion Chapter 3 practice questions Exam builder Chapter 3 force mass and weight centre of mass free-body diagrams drag and terminal velocity couples and torques moments and equilibrium triangle of forces density and pressure Archimedes' principle Chapter 4 practice questions **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.

Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the energy investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 12	***Autumn Term 2***	**Unit Title:** Module 3: Forces and motion	**No of Lessons:27**
Overview **Assessment**		Module 3: Forces and motion The term force is generally used to indicate a push or a pull. It is difficult to give a proper definition for a force, but in physics we can easily describe what a force can do. A resultant force acting on an object can accelerate the object in a specific direction. The subsequent motion of the object can be analysed using equations of motion. Several forces acting on an object can prevent the object from either moving or rotating. Forces can also change the shape of an object. There are many other things that forces can do. In this module, learners will learn how to model the motion of objects using mathematics, understand the effect forces have on objects, learn about the important connection between force and energy, appreciate how forces cause deformation and understand the importance of Newton's laws of motion. **Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology.**	

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons to cover**
Students will be able to answer the following questions: How can we describe the motion of an object mathematically? How can we detect the speed of a moving car? **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	**Students will be able to:** Module 3: Forces and motion The term force is generally used to indicate a push or a pull. It is difficult to give a proper definition for a force, but in physics we can easily describe what a force can do. A resultant force acting on an object can accelerate the object in a specific direction. The subsequent motion of the object can be analysed using equations of motion. Several forces acting on an object can prevent the object from either moving or rotating. Forces can also change the shape of an object. There are many other things that forces can do. In this module, learners will learn how to model the motion of objects using mathematics, understand the effect forces have on objects, learn about the important connection between force and energy, appreciate how forces cause deformation and understand the importance of Newton's laws of motion. Words like energy, power and work have very precise meaning in physics. In this section the important link between work done and energy is explored. Learners have the opportunity to apply the important principle of conservation of energy to a range of situations. The analysis of energy transfers provides the opportunity for calculations of efficiency and the subsequent evaluation of issues relating to the individual and society (HSW2, 5, 8, 9, 10, 11, 12) This section provides knowledge and understanding of Newton's laws – fundamental laws that can be used to predict the motion of all colliding or interacting objects in applications such as sport (HSW1, 2). Newton's law can also be used to understand some of the safety features in cars, such as air bags, and to evaluate the benefits and risks of such features (HSW9). Learners should be aware that the introduction of mandatory safety features in cars is a consequence of	Work done and energy conservation of energy kinetic energy and gravitational potential energy Power and efficiency Chapter 5 practice questions Exam builder Chapter 4 springs and Hookes law Elastic potential energy deforming materials stress-strain and the young's modulus Chapter 6 practice questions Exam builder Chapter 6 Newtons first law linear momentum Newtons 2nd law Impulse Collisions in 2 dimensions Chapter 7 practice questions Exam builder Chapter 7 **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will

	the scientific community analysing the forces involved in collisions and investigating potential solutions to reduce the likelihood of personal injury (HSW10, 11, 12). There are many opportunities for learners to carry out experimental work and analyse data using ICT techniques (HSW3).	build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the practical work **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 12	***Spring Term 1***	**Unit Title: Module 4 Electrons Waves and Photons**	**No of Lessons:27**
Overview	The aim of this module is to ultimately introduce key ideas of quantum physics. Electromagnetic waves (e.g. light) have a dual nature. They exhibit both wave and particle-like behaviour. The wave–particle dual nature is also found to be characteristic of all particles (e.g. electrons). Before any sophisticated work can be done on quantum physics, learners need to appreciate what electrons are and how they behave in electrical circuits. A basic understanding of wave properties is also required. In this module, learners will learn about electrons, electric current, electrical circuits, wave properties, electromagnetic waves and, of course, quantum physics. Learners have the opportunity to appreciate how scientific ideas of quantum physics developed over time (HSW7) and their validity rested on the foundations of experimental work (HSW1 and HSW2).		
Assessment			

	Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the unit	
Essential Knowledge (what must students know): Students will be able to answer the following questions: **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	**Essential Skills (what must students be able to demonstrate):** **Students will be able to:** This short section introduces the ideas of charge and current. Understanding electric current is essential when dealing with electrical circuits. This section does not lend itself to practical work but to introducing important ideas. The continuity equation (I = Anev) is developed using these key ideas. This section concludes with categorising all materials in terms of their ability to conduct. This section provides knowledge and understanding of electrical symbols, electromotive force, potential difference, resistivity and power. The scientific vocabulary developed here is a prerequisite for understanding electrical circuits in 4.3. There is a desire to use energy saving devices, such as LED lamps, in homes. Learners have the opportunity to understand the link between environmental damage from power stations and the impetus to use energy saving devices in the home (HSW10) and how customers can make informed decisions when buying domestic appliances (HSW12). There are many opportunities for learners to use spreadsheets in the analysis and presentation of data (HSW3), to carry out practical activities to understand concepts (HSW4) and to analyse data to find relationships between physical quantities (HSW5).	**Lessons to cover** current and charge moving charges kirchoffs 1st mean drift velocity circuit symbols potential difference and emf the electron gun resistance i-v characteristics Diodes resistance and resistivity the thermistor the LDR electrical power and energy paying for electricity Chapter 9 practice questions Exam builder Chapter 9 Kirchhoff's laws combining resistors analysing circuits **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank

		of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 12	***Spring Term 2***	**Unit Title: Module 4 Electrons Waves and Photons**	**No of Lessons: 27**
Overview	The aim of this module is to ultimately introduce key ideas of quantum physics. Electromagnetic waves (e.g. light) have a dual nature. They exhibit both wave and particle-like behaviour. The wave–particle dual nature is also found to be characteristic of all particles (e.g. electrons). Before any sophisticated work can be done on quantum physics, learners need to appreciate what electrons are and how they behave in electrical circuits. A basic understanding of wave properties is also required. In this module, learners will learn about electrons, electric current, electrical circuits, wave properties, electromagnetic waves and, of course, quantum physics. Learners have the opportunity to appreciate how scientific ideas of quantum physics developed over time (HSW7) and their validity rested on the foundations of experimental work (HSW1 and HSW2).		

Assessment	**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the unit**

Essential Knowledge (what must students know):

Practical skills: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks

Examination technique: understanding key command words within examination style questions to build confidence in student responses

Essential Skills (what must students be able to demonstrate):

Students will be able to:

This section provides knowledge and understanding of electrical circuits, internal resistance and potential dividers. LDRs and thermistors are used to show how changes in light intensity and temperature respectively can be monitored using potential dividers. Setting up electrical circuits, including potential divider circuits, provides an ideal way of enhancing experimental skills, understanding electrical concepts and managing risks when using power supplies (HSW4). Learners are encouraged to communicate scientific ideas using appropriate terminology (HSW8). This section provides ample opportunities for learners to design circuits and carry out appropriate testing for faults and there are opportunities to study the many applications of electrical circuits (HSW1, 2, 3, 5, 6, 9, 12).

This section provides knowledge and understanding of wave properties, electromagnetic waves, superposition and stationary waves. The wavelength of visible light is too small to be measured directly using a ruler. However, superposition experiments can be done in the laboratory to determine wavelength of visible light using a laser and a double slit. There are opportunities to discuss how the double-slit experiment demonstrated the wave-like behaviour of light (HSW7). The breadth of the topic covering sound waves and the electromagnetic spectrum

Lessons to cover

- internal resistance
- potential dividers
- sensing circuits
- Chapter 10 practice questions
- Exam builder Chapter 10
- progressive waves
- wave properties
- reflection and refraction
- diffraction and polarisation
- intesity
- electromagnetic waves
- polarisation of EM waves
- refractive index
- total internal reflection
- Chapter 11 practice questions
- Exam builder Chapter 11

Homework

Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large

	provides scope for learners to appreciate the wide ranging applications of waves and their properties. (HSW1, 2, 5, 8, 9, 12)	amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self- management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 12	***Summer Term 1***	**Unit Title: Module 4 Electrons Waves and Photons**	**No of Lessons:9**
Overview **Assessment**	**Students should be able to explain fundamental principles around electrostatics and charge. This will then develop to show how charges move and how an electrical current is developed by the movement of electrons. Circuit characteristics will be analysed for both series and parallel circuits. Circuit components and their symbols will be used to show how circuits would be constructed and what affects these components would have on the potential difference and current within the circuit. Students will then be able to look at these circuits practically and will be able to gain data to show how series and parallel circuits are affected by the addition of various components.**		

	Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the module	
Essential Knowledge (what must students know): Students will be able to answer the following questions: **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	**Essential Skills (what must students be able to demonstrate):** **Students will be able to:** This section provides knowledge and understanding of wave properties, electromagnetic waves, superposition and stationary waves. The wavelength of visible light is too small to be measured directly using a ruler. However, superposition experiments can be done in the laboratory to determine wavelength of visible light using a laser and a double slit. There are opportunities to discuss how the double-slit experiment demonstrated the wave-like behaviour of light (HSW7). The breadth of the topic covering sound waves and the electromagnetic spectrum provides scope for learners to appreciate the wide ranging applications of waves and their properties. (HSW1, 2, 5, 8, 9, 12) This section provides knowledge and understanding of photons, the photoelectric effect, de Broglie waves and wave–particle duality. In the photoelectric effect experiment, electromagnetic waves are used to eject surface electrons from metals. The electrons are ejected instantaneously and their energy is independent of the intensity of the radiation. The wave model is unable to explain the interaction of these waves with mater. This	**Lessons to cover** superposition of waves interference young's double slit stationary waves harmonics stationary waves in air columns Chapter 12 practice questions Exam builder Chapter 12 the photon model the photoelectric effect Einstein's photo electric equation wave particle duality Chapter 13 practice questions Exam builder Chapter 13 Module 4 revision **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.

	single experiment led to the development of the photon model and was the cornerstone of quantum physics. Learners have the opportunity to carry out internet research into how the ideas of quantum physics developed (HSW1, 2, 7) and how scientific community validates the integrity	
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment** Directing students to become involved with work experience offered to them in the final weeks of Year 12	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 12	***Summer Term 2***	**Unit Title: Module 4 Electrons Waves and Photons mocks and consolidation**	**No of Lessons: 27**
Overview **Assessment**	**Student should be able to consolidate their knowledge from the electricity module. Form this the unit will focus on the practical elements that will be incorporated into the GCSE examinations. The focus will be to build the students ability to plan carry out and evaluate an experiment. This will be carried out using the materials provided by the examination board to show students what OCR want them to understand and articulate. This skill set will then be developed moving into year 10 and 11.**		

	Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the module

Essential Knowledge (what must students know):
Students will be able to answer the following questions:

Practical skills: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks

Examination technique: understanding key command words within examination style questions to build confidence in student responses

Essential Skills (what must students be able to demonstrate):

Students will be able to:
This section provides knowledge and understanding of wave properties, electromagnetic waves, superposition and stationary waves. The wavelength of visible light is too small to be measured directly using a ruler. However, superposition experiments can be done in the laboratory to determine wavelength of visible light using a laser and a double slit. There are opportunities to discuss how the double-slit experiment demonstrated the wave-like behaviour of light (HSW7). The breadth of the topic covering sound waves and the electromagnetic spectrum provides scope for learners to appreciate the wide ranging applications of waves and their properties. (HSW1, 2, 5, 8, 9, 12)

This section provides knowledge and understanding of photons, the photoelectric effect, de Broglie waves and wave–particle duality. In the photoelectric effect experiment, electromagnetic waves are used to eject surface electrons from metals. The electrons are ejected instantaneously and their energy is independent of the intensity of the radiation. The wave model is unable to explain the interaction of these waves with mater. This

Lessons to cover

- Breadth Paper
- Breadth Paper
- Depth Paper
- Depth Paper
- Mock Revision
- Mock Revision
- Mock Revision
- Mock Revision
- temperature
- solids liquids and gases
- internal energy
- specific heat capacity
- specific latent heat
- Chapter 14 practice questions
- Exam builder Chapter 14
- PAG 11.2
- PAG 11.2

Homework

Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.

	single experiment led to the development of the photon model and was the cornerstone of quantum physics. Learners have the opportunity to carry out internet research into how the ideas of quantum physics developed (HSW1, 2, 7) and how scientific community validates the integrity	
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment** End of year trips that are based in science – physics of theme park rides The big bang science fair	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Physics **Medium Term Overview**

Year 13	*Autumn Term 1*	**Unit Title:** Module 5: Newtonian world and astrophysics	**No of Lessons: 27**
Overview	Module 5: Newtonian world and astrophysics The aim of this module is to show the impact Newtonian mechanics has on physics. The microscopic motion of atoms can be modelled using Newton's laws and hence provide us with an understanding of macroscopic quantities such as pressure and temperature. Newton's law of gravitation can be used to predict the motion of planets and distant galaxies. In the final section we explore the intricacies of stars and the expansion of the Universe by analysing the electromagnetic radiation from space. As such, it lends itself to the consideration of how the development of the scientific model is improved based on the advances in the means of observation (HSW1, 2, 5, 6, 7, 8, 9, 11). In this module, learners will learn about thermal physics, circular motion, oscillations, gravitational field, astrophysics and cosmology.		
Assessment	**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology.**		

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons to cover**
Students will be able to answer the following questions: **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	**Students will be able to:** This section provides knowledge and understanding of temperature, mater, specific heat capacity and specific latent heat with contexts involving heat transfer and change of phase (HSW1, 2, 5, 7). Experimental work can be carried out to safely investigate specific heat capacity of materials (HSW4). It also provides an opportunity to discuss how Newton's laws can be used to model the behaviour of gases (HSW1) and significant opportunities for the analysis and interpretation of data (HSW5).) There are many examples of objects travelling at constant speed in circles, e.g. planets, artificial satellites, charged particles in a magnetic field, etc. The physics in all these cases can be described and analysed using the ideas developed by Newton. The concepts in this section have applications in many contexts present in other sections of this specification, such as planetary motion in section 5.4.3 (HSW1, 2, 5, 9). This section provides knowledge and understanding of circular motion and important concepts such as centripetal force and acceleration.	temperature solids liquids and gases internal energy specific heat capacity specific latent heat Chapter 14 practice questions Exam builder Chapter 14 ideal gases gas laws root mean squared speed the boltzmann constant Chapter 15 practice questions Exam builder Chapter 15 angular velocity and the radian angular velocity and the radian angular acceleration angular acceleration

	Oscillatory motion is all around us, with examples including atoms vibrating in a solid, a bridge swaying in the wind, the motion of pistons of a car and the motion of tides. (HSW1, 2, 3, 5, 6, 8, 9, 10, 12) This section provides knowledge and understanding of simple harmonic motion, forced oscillations and resonance.	exploring centripetal forces Chapter 16 practice questions Exam builder Chapter 16 oscillations and simple harmonic motion analysing simple harmonic motion simple harmonic motion and energy **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the energy investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self- management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 13	***Autumn Term 2***	**Unit Title:** Module 5: Newtonian world and astrophysics	**No of Lessons:27**
Overview		Module 5: Newtonian world and astrophysics The aim of this module is to show the impact Newtonian mechanics has on physics. The microscopic motion of atoms can be modelled using Newton's laws and hence provide us with an understanding of macroscopic quantities such as pressure and temperature. Newton's law of gravitation can be used to predict the motion of planets and distant galaxies. In the final section we explore the intricacies of stars and the expansion of the Universe by analysing the electromagnetic radiation from space. As such, it lends itself to the consideration of how the development of the scientific model is improved based on the advances in the means of observation (HSW1, 2, 5, 6, 7, 8, 9, 11). In this module, learners will learn about thermal physics, circular motion, oscillations, gravitational field, astrophysics and cosmology.	
Assessment		**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology.**	
<u>Essential Knowledge (what must students know):</u> Students will be able to answer the following questions: How can we describe the motion of an object mathematically? How can we detect the speed of a moving car?		**<u>Essential Skills (what must students be able to demonstrate):</u>** **Students will be able to:** This section provides knowledge and understanding of Newton's law of gravitation, planetary motion and gravitational potential and energy. Newton's law of gravitation can be used to predict the motion of orbiting satellites, planets and even why some objects in our Solar system have very little atmosphere with the opportunity to analyse evidence and look at causal relationships (HSW1, 2, 5, 7). Geostationary satellites have done much to improve telecommunications around the world. They are expensive; governments and industry have to make difficult decisions when building new ones. Learners have the opportunity to discuss the societal benefits of satellites and the risks they pose when accidents do occur (HSW9, 10).	**Lessons to cover** gravitational fields newtons laws of gravitation gravitational field strength (point mass) keplers laws satellites gravitational potential GPE Chapter 18 practice questions Exam builder Chapter 18 objects in the universe objects in the universe life cycle of stars hertzsprung russle diagrams

Practical skills: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	This section provides knowledge and understanding of stars, Wien's displacement law, Stefan's law, Hubble's law and the Big Bang. Learners have the opportunity to appreciate how scientific ideas of the Big Bang developed over time and how its validity is supported by research and experimental work carried out by the scientific community (HSW2, 7, 8, 11).	energy levels in atoms spectra analysing starlight stellar luminosity Chapter 19 practice questions Exam builder Chapter 19 astronomical distances the doppler effect hubbles law big bang theory evolution of the universe Chapter 20 practice questions Exam builder Chapter 20 module 5 summary **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others**

modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.		Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the practical work **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self- management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 13	***Spring Term 1***	**Unit Title:** Module 6: Particles and medical physics	**No of Lessons:27**
Overview **Assessment**	In this module, learners will learn about capacitors, electric field, electromagnetism, nuclear physics, particle physics and medical imaging. **Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the unit**		

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons to cover**
Students will be able to answer the following questions: **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks	**Students will be able to:** This section introduces the basic properties of capacitors and how they are used in electrical circuits. The use of capacitors as a source of electrical energy is then developed. This section introduces the mathematics of exponential decay, which is also required for the decay of radioactive nuclei in 6.4. This section provides knowledge and understanding of capacitors and exponential decay. Experimental work provides an excellent way to understand the behaviour of capacitors in electrical circuits and the management of safety and risks when using power supplies (HSW4). There are many opportunities for learners to use spreadsheets in the analysis and presentation of data (HSW3). The varied uses of capacitors give the opportunity for the consideration of their use in many practical applications (HSW2, 5, 6, 9)	capacitors capacitors in circuits energy stored by capacitors discharging capacitors uses of capacitors Chapter 21 practice questions Exam builder Chapter 21 electric fields coulombs law uniform electric fields and capacitance charged particles in uniform electric fields electric potential energy

Examination technique: understanding key command words within examination style questions to build confidence in student responses	This section provides knowledge and understanding of Coulomb's law, uniform electric fields, electric potential and energy This section provides knowledge and understanding of magnetic fields, motion of charged particles in magnetic fields, Lenz's law and Faraday's law. The application of Faraday's law may be used to demonstrate how science has benefited society with important devices such as generators and transformers. Transformers are used in the transmission of electrical energy using the national grid and are an integral part of many electrical devices in our homes. The application of Lenz's law allows discussion of the use of scientific knowledge to present a scientific argument (HSW1, 2, 3, 5, 6, 7, 8, 9, 11, 12).	Chapter 22 practice questions Exam builder Chapter 22 magnetic fields understanding mag fields charged particles in mag fields electromagnetic induction faradays and Lenz's law faradays and Lenz's law transformers Chapter 23 practice questions Exam builder Chapter 23 alpha scattering **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity**

modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.		Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self- management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 13	***Spring Term 2***	**Unit Title:** Module 6: Particles and medical physics	**No of Lessons: 27**
Overview	In this module, learners will learn about capacitors, electric field, electromagnetism, nuclear physics, particle physics and medical imaging.		
Assessment	**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the unit**		
Essential Knowledge (what must students know): **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	**Essential Skills (what must students be able to demonstrate):** **Students will be able to:** This section provides knowledge and understanding of the atom, nucleus, fundamental particles, radioactivity, fission and fusion. Nuclear power stations provide a significant fraction of the energy needs of many countries. They are expensive; governments have to make difficult decisions when building new ones. The building of nuclear power stations can be used to evaluate the benefits and risks to society (HSW9). Ethical, environmental and decision making issues may also be discussed (HSW10 and HSW12). The	**Lessons to cover** the nucleus antiparticles quarks beta decay Chapter 24 practice questions Exam builder Chapter 24 radioactivity nuclear decay eqs half-life and activity radioactive decay calculations modelling radioactive decay radioactive dating PAG 7.2	

	development of the atomic model also addresses issues of scientific development and validation (HSW7, 11). This section provides knowledge and understanding of X-rays, CAT scans, PET scans and ultrasound scans. This section shows how the developments in medical imaging have led to a number of valuable non-invasive techniques used in hospitals. Not all hospitals in this country are equipped with complex scanners. Learners have the chance to discuss the ethical issues in the treatment of humans and the ways in which society uses science to inform decision making (HSW10 and 12).	PAG 7.2 Einstein's mass energy eq binding energy nuclear fission nuclear fusion Chapter 26 practice questions Exam builder Chapter 26 x rays x-rays with matter cat scans the gamma camera pet scans ultrasound acoustic impedance **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all modules. These will also be linked to possible routes post 18 in terms of both academic	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity**

pathways and the apprenticeship routes available as well.		Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self- management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 13	***Summer Term 1***	**Unit Title:** Module 6: Particles and medical physics an exam preparation	**No of Lessons:18**
Overview **Assessment**	In this module, learners will learn about capacitors, electric field, electromagnetism, nuclear physics, particle physics and medical imaging. **Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology, as well as an assessment task at the end of the unit**		
<u>Essential Knowledge (what must students know):</u> Students will be able to answer the following questions: **Practical skills**: planning a method, collecting reliable data, evaluating the data and its merits/drawbacks **Examination technique:** understanding key command words within examination style	**<u>Essential Skills (what must students be able to demonstrate):</u>** **Students will be able to:** This section provides knowledge and understanding of wave properties, electromagnetic waves, superposition and stationary waves. The wavelength of visible light is too small to be measured directly using a ruler. However, superposition experiments can be done in the laboratory to determine wavelength of visible light	**Lessons to cover** doppler imaging Chapter 27 practice questions Exam builder Chapter 27 module 6 summary module 6 paper Exam Revision Exam Revision Exam Revision	

questions to build confidence in student responses	using a laser and a double slit. There are opportunities to discuss how the double-slit experiment demonstrated the wave-like behaviour of light (HSW7). The breadth of the topic covering sound waves and the electromagnetic spectrum provides scope for learners to appreciate the wide ranging applications of waves and their properties. (HSW1, 2, 5, 8, 9, 12) This section provides knowledge and understanding of photons, the photoelectric effect, de Broglie waves and wave–particle duality. In the photoelectric effect experiment, electromagnetic waves are used to eject surface electrons from metals. The electrons are ejected instantaneously and their energy is independent of the intensity of the radiation. The wave model is unable to explain the interaction of these waves with mater. This single experiment led to the development of the photon model and was the cornerstone of quantum physics. Learners have the opportunity to carry out internet research into how the ideas of quantum physics developed (HSW1, 2, 7) and how scientific community validates the integrity	Exam Revision Exam Revision Exam Revision Exam Revision Exam Revision **Homework** Students will be asked throughout the course to reflect on a range on past examination questions from the topics covered in class. They will need to create a bank of resources that support their areas of development highlighted from the examination questions. This will build independence and reflection upon the large amount of content delivered throughout this course.
Careers Link Students will look at a range of careers links to subject specific content throughout all	**Enrichment**	**MY PB** **Social Me- active listening, speaking effectively, working with others**

modules. These will also be linked to possible routes post 18 in terms of both academic pathways and the apprenticeship routes available as well.		Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from the density and specific heat capacity investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Physics **Medium Term Overview**			
Year 13	***Summer Term 2***	**Unit Title: Students leave for examinations**	**No of Lessons: course complete**