

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: Physics

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
9	KS3 Energy, Calculations and transfers	KS3 Renewables, generating electricity, Magnets and waves	KS3 Colour and filters KS3 Review P1.1 – P1.2.4	P1.2.1-1.3.5 OCR P1 Quiz OCR P1 Review	P3.1.1 -3.2.7 Electricity	OCR P3 Quiz OCR P3 Review PAG 1 Materials PAG 5 Specific heat capacity
10						
11					Examinations	
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Physics Medium Term Overview			
Year 9	<i>Autumn Term 1</i>	Unit Title: ENERGY KS3	No of Lessons: 10
Overview	This unit builds on the work from Y7 &8. It teaches a range of skills that will be utilised in the GCSE specification that follows. Students will look at 'Energy'. Students will look at energy types, transfers, conservation and how we can insulate to better make use of the energy we have available. Students will be able to see the real world benefits of being energy aware. This will lead to students questioning the efficiency of energy transfers and how we can better make use of energy in the future.		
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: What is energy? How is energy transferred thermally? What are the different types of energy? How do we assess energy transfers practically? Terminology: Key terms: Conduction, convection, radiation, efficiency, conservation of energy, Heat vs temperature 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		<u>Essential Skills (what must students be able to demonstrate):</u> Students will be able to: • Explain conduction • Explain convection • Explain radiation • List the types of energy • Calculate the amount of energy in a system and across a transfer • Explain and calculate efficiency • Understand the importance of energy conservation and improving how we use energy in the future.	Lessons to cover 1. Conduction and convection 2. Radiation and energy from the sun 3. Heat energy and temperature 4. Energy conservation and insulation 5. Energy types 6. Energy transfers 7. Energy transfer investigation (planning) 8. Energy transfer investigation (carry out) 9. Energy calculation 10. efficiency Homework Students will be asked at the start of the module to research ways in which you can insulate the home. This can then be used to aid their planning of the energy transfer practical. They will then write a piece after the practical to show their understanding of how a home should be insulated and what the benefits of this are financially and for the environment.

Careers Link Students will look at the efficiency of houses and where energy is lost. This will be linked to construction and the selection of materials to meet building specifications. Students will research these materials as part of an extended homework piece. The importance of material selection and how this ties to construction will then be highlighted during the practical work.	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
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Physics Medium Term Overview			
Year 9	<i>Autumn Term 2</i>	Unit Title: Electricity, Magnets and waves KS3	No of Lessons:10
Overview	This unit builds on the work from Y7 &8. It teaches a range of skills that will be utilised in the GCSE specification that follows. Students will look at 'Electricity, Magnets and waves'. Students will look at electricity generation, the cost of electricity, electromagnets and magnetic fields, motors and waves in matter. Students will be able to see the real world costs of electricity, why magnetism is important and how waves interact with the matter in the world around us. This will lead to students questioning the efficiency of electric generation, use and how we can better make use of energy in the future.		
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): Students will be able to answer the following questions: What is renewable energy? How do we know how much electricity costs us? How do electromagnets work? What is the law of reflection?	Essential Skills (what must students be able to demonstrate): Students will be able to: - list renewable and non-renewable types of energy. - Define renewable	Lessons to cover - renewable energy - generating electricity - electricity use and cost - electromagnets - magnetic poles and fields - Dc motors including practical - Pressure waves	

Why does light change direction as it travels through different media? Terminology: Key terms: renewable, non-renewable, kilowatt-hour, electromagnet, induced magnetism, peak/crest, trough, amplitude wavelength, frequency 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	• Explain how we produce electricity • Calculate the cost of electricity • Understand electromagnetism • Draw a magnetic field pattern • Identify the key parts of a waveform • Understand the law of reflection • Explain why light refracts as it travels through different media	8. Waves in water 9. Light and matter (reflection practical) 10. Light and matter (refraction practical) Homework students will be asked to look at the energy bill of their own home. Can they find out what a kilowatt-hour is? Why do we use this unit? Why is the cost of electricity so important to them and their future?
<u>Careers Link</u> energy costs will be linked directly to energy providers, this will allow discussions around how energy is billed and how a company would calculate the cost, the need to read meters and why people may want to work in the energy sector	<u>Enrichment</u>	<u>MY PB</u> 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 9	Spring Term 1	Unit Title: Module 1 Matter - Atoms	No of Lessons:10
Overview	Students should be able to consolidate and demonstrate their understanding of the Ks3 content. Students will then move on to being able to describe the evolution of the atomic model, Density and the heating of materials. This Knowledge then form the basis of their GCSE P1 module and the start point for their GCSE course. Students will see how the advancements in technology allowed scientist to refine their atomic model theories, how density can be calculated for irregular object and how we can assess the energy stored in materials.		
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: What is the current accepted atomic model? How has this model changed over time? What allowed scientists to find evidence for these changes to the atomic model? What is Density? How do we calculate density? How could we carry out an experiment to find the density of an object? What is specific heat capacity? How can we calculate specific heat capacity? How could we carry out an experiment to find the specific heat capacity of a material? What is specific latent heat? How do we calculate specific latent heat? Terminology: Key terms: Peer review, billiard model, Plum pudding model, Nuclear atom, orbital shells		Essential Skills (what must students be able to demonstrate): Students will be able to: • Explanation of the evolution of the atomic model including the theories of Dalton, JJ Thomson, Ernest Rutherford and Niels Bohr. • Understanding of how to use and manipulate the formula for Density • Understanding of how to use and manipulate the formula for Specific heat capacity • Understanding of how to use and manipulate the formula for Specific latent heat	Lessons to cover 1. Ks3 colour 2. Ks3 Filters 3. Ks3 review 4. P1.1.1 Atoms 5. P1.1.2 Atoms 6. P1.2.1 Density 7. P1.2.2 Density PAG 8. P1.2.3 Specific Heat Capacity 9. P1.2.3 Specific Heat Capacity PAG 10. P1.2.4 Specific Latent Heat Homework Seneca topic based homework to be set every fortnight. This will be selected to consolidate current learning and to retrieve past content. Over the course of the module the number of retrieval questions will increase, if the Students that achieve blow expectations will be issued with an additional assignment

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		
<u>Careers Link</u> Materials selection in construction – specific heat capacity of water is important in its selection for use in plumbing due to its high specific capacity.	<u>Enrichment</u>	<u>MY PB</u> 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 9	<i>Spring Term 2</i>	Unit Title: Module 1 Matter - Pressure	No of Lessons: 7
Overview	Students should be able to explain what pressure is and how external factors such as temperature can have an effect upon pressure. Students will explore the links between volume and pressure, how the atmosphere creates pressure and how this compares to the pressure created by liquids. This unit will build directly upon the last further developing the students understanding of the particle models for solids liquids and gases and how the density of these states of matter has an impact on the pressure they may create. 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		
Assessment			

Essential Knowledge (what must students know): Students will be able to answer the following questions: What is pressure? How do gases create pressure? What happens to pressure as volume changes? Why is pressure and volume an example of an inversely proportional relationship? What creates atmospheric pressure? What is liquid pressure? What causes an object to float? What causes an object to sink? Terminology: Key terms: Pascals, density, collisions, kinetic energy, speed, velocity, weight, upthrust. Practical skills: evaluating the equipment used to measure and interpret pressure 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: - Explain what causes pressure - Explain how pressure in gases are created - Why collisions and kinetic energy is important to amount of pressure exerted on a container - Understand and explain the relationship between pressure and volume - Compare and contrast atmospheric pressure and liquid pressure - Describe the conditions needed for an object to float or sink	Lessons to cover - P1.3.1 Gas pressure - P1.3.2 Pressure and volume - P1.3.3 Atmospheric pressure - P1.3.4 Liquid pressure - P1.3.5 Floating and sinking - OCR P1 Quiz - P1 Review Homework Seneca topic based homework to be set every fortnight. This will be selected to consolidate current learning and to retrieve past content. Over the course of the module the number of retrieval questions will increase, if the Students that achieve low expectations will be issued with an additional assignment
Careers Link Weather balloons – linked with KMF sent into space as seen in the D and T department. Could look at how this is used in meteorology. Boat construction – how can we make a dense metal ship float?	Enrichment KMF sent into space project recordings used within lessons. External programme in which BHS achieved the highest recorded altitude. Students see how the change in atmospheric pressure	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
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Physics Medium Term Overview			
Year 9	<i>Summer Term 1</i>	Unit Title: Electricity	No of Lessons:9
Overview	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.		
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 module		
<u>Essential Knowledge (what must students know):</u> Students will be able to answer the following questions: How is a static charge generated? When is static charge useful? When can static charge be a nuisance? What conditions are needed for an electrical current to flow? What happens to the P.d in a series circuit? What happens to the current in a series circuit?	<u>Essential Skills (what must students be able to demonstrate):</u> Students will be able to: - Describe how a static charge can be created - Draw the field lines of positive and negative point charges	Lessons to cover - P3.1.1 Electrostatics - P3.1.2 Electric current - P3.2.1 Simple circuits - P3.2.2 Series and parallel circuits - P3.2.3 Resistance - P3.2.4 Graphs of P.D and current - P3.2.5 LDR and Thermistor - P3.2.6 Net resistance - P3.2.7 Sensing circuits	

What happens to the P.d in a parallel circuit? What happens to the current in a parallel circuit? How does a thermistor work? How does and LDR work? Why are LDR's and thermistors useful in sensing circuits Terminology: Key terms: Point charge, electric field, resistor, filament bulb, diode, variable resistor, light dependant resistor, thermistor, voltmeter, ammeter insulator 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	• Explain what conditions are needed in order for a current to flow in a circuit • Describe the differences for P.d and current in series and parallel circuits • Draw and explain the characteristics of a filament lamp, fixed resistor or a wire and a diode. (I/v graphs) • Calculate net resistance in series and parallel circuits	Homework Seneca topic based homework to be set every fortnight. This will be selected to consolidate current learning and to retrieve past content. Over the course of the module the number of retrieval questions will increase, if the Students that achieve blow expectations will be issued with an additional assignment
Careers Link Electrical engineering – these principles form the basic understanding to go on and study to become an electrician/ to progress into the world of electrical engineering. This is highlighted through the future pathway slides in the Physics scheme of work	Enrichment Directing students to become involved with the first tech robotic opportunities open to them	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 9	Summer Term 2	Unit Title: Electricity 2	No of Lessons: 10
Overview	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.		
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 module		
Essential Knowledge (what must students know): Students will be able to answer the following questions: Terminology: Key terms: Point charge, electric field, resistor, filament bulb, diode, variable resistor, light dependant resistor, thermistor, voltmeter, ammeter insulator 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: • calculate and manipulate the formula for electrical power • The ability to write a method that could be followed in order to complete the practical endorsements tested in the final GCSE examinations • The ability to carry out a practical safely and collect reliable data • The ability to interpret data collected from an experiment and evaluate its validity • Draw conclusions from data collected experimentally • Evaluate the successes and failures within an experimental method and suggest ways in which it can be reviewed/ improved	Lessons to cover 1. P3.2.8 Electrical power 2. Module 3 OCR quiz 3. Module 3 review 4. PAG 1 Materials Plan (Density) 5. PAG 1 Materials carried out (Density) 6. PAG 1 Materials write up (Density) 7. PAG 5 Energy Plan (SHC) 8. PAG 5 Energy carried out (SHC) 9. PAG 5 Energy write up 9SHC) Homework Seneca topic based homework to be set every fortnight. This will be selected to consolidate current learning and to retrieve past content. Over the course of the module the number of retrieval questions will increase, if the Students that achieve blow expectations will be issued with an additional assignment

<u>Careers Link</u> Electrical engineering – these principles form the basic understanding to go on and study to become an electrician/ to progress into the world of electrical engineering. This is highlighted through the future pathway slides in the Physics scheme of work Materials selection in construction – specific heat capacity of water is important in its selection for use in plumbing due to its high specific capacity.	<u>Enrichment</u> End of year trips that are based in science – physics of theme park rides The big bang science fair	<u>MY PB</u> 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