|  |  |
| --- | --- |
| **YEAR 2022-2023 Second TERM**  **‘An ambitious curriculum that meets the needs of all’**  **Medium Term Planning - Topic: Magnetism and Induction** | |
| **Curriculum Intent** | **In addition to working further on objectives from Year 13 Magnetism and Induction, pupils will be taught, following National Curriculum guidelines, the following this term:** |
| **Skills/Assessment Objective Links** |
| **Spiritual, moral, social, and cultural development** | **SMSC:**  Listening to each other and valuing each person’s contributions in discussions, working together in lessons to problem solve and achieve a shared goal. Learning about different scientists and learning how their understanding of the world evolved.  **PSHE/British Values:**  Working together in practical and problem-solving work. The practical work in this section requires two people to work together to take the measurements whilst holding the equipment in place.  **Skills Builder:** development of practical skills through the numerous practical activities. |
| **Numeracy** | Constant numerical development in every lesson. Measuring skills, graph skills, problem solving. Exam questions build on topics with mechanics components frequently brought in. |
| **Literacy** | **Vocabulary Tier 2: permanent and induced magnets, electromagnet, motor, generator, tesla**  **Vocabulary Tier 3: electromagnetic induction, induced magnetism, solenoid, Flemings LHR, RHR, magnetic flux density, cyclotron, magnetic flux linkage, AC generators.**  **Reading:** Reading of the booklet and questions. Students need to be able to read the methods for practical lessons and ensure they complete them in the right order, using the right equipment.  **Writing:** Students are exposed to a number of questions, both numerical and short and long written answers. Students need to be able to write in a concise way whilst using the key words.  **Oracy:** Class discussions are incredibly important in physics where students regularly participate in class discussion to discuss abstract concepts. Students need to be able to express their understanding of concepts and theories. |
| **Becoming future ready** | **Careers/Employability:**  Electrical engineering, and form of work with electricity, power station design and national grid development and design, MRI machines and operators, magnetic levitation development, superconductor research. |
| **Adaptation** | Throughout this topic, quality first teaching will provide differentiation:  **By product:**  different learners are asked different questions, different level of detailed responses are expected and the level of scaffolding for the problem solving questions are varied.  **By resource:**   All booklets are the same, however, extra scaffolding and extension may be provided from the new Kerboodle resources.  **By Intervention**: by providing different levels of supervision and support  **By Progressive Questioning:** exploring pupils’ understanding through interactive dialogue.  **By Grouping:** according to prior attainment, gender, social preference, preferred learning style.  **By Task:**Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range.  **By Offering Optional Activities:** In class or as homework, to extend learning.  This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work. |
| **QFT/SEND Provision** |
| **Implementation**  **Curriculum Delivery** | * To be able to:  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | |  | **Magnetic Fields** | | | 1.     How Important is the Earth’s Magnetic Field? | | | | 2.     What are permanent and induced magnets? | | | | 3.     How do you find the field of a magnet? | | | | 4.     What is induced when a current flows in a wire? | | | | 5.     What is the magnetic field of a solenoid? | | | |  |  |  | |  | **Electromagnets** | | | 1.     How can you make a solenoid and how can you increase its strength? | | | | 2.     How do you make an electromagnet? | | | | 3.     How do you make an electromagnet stronger? | | | |  |  |  | |  | **Fleming's Left Hand Rule** | | | 1.     What is Flemings Left Hand Rule? | | | | 2.     What is the motor effect? | | | | 3.     What is the motor effect formula? | | | | 4.     From GCSE: The operation of a motor. | | | |  |  |  | |  | **Building a Motor** | | | 1.     Can you build a motor? | | | | 2.     Explain the operation of a motor. | | | |  |  |  | |  | **Required Practical 10** | | | 1.     Completion of Required Practical & Write Up | | | |  |  |  | |  | **Magnetic Flux Density** | | | 1.     How do you define Magnetic Flux Density? | | | | 2.     How do charges move in a magnetic field? | | | | 3.     How does circular motion link to charges in a magnetic field? | | | | 4.     How does a Cyclotron work? | | | |  |  |  | |  | **Magnetic Flux Linkage** | | | 1.     What is Magnetic Flux Linkage? | | | | 2.     How does the magnetic Flux Linkage vary in a rotating coil? | | | |  |  |  | |  | **Electromagnetic Induction** | | | 1.     What is electromagnetic induction? | | | | 2.     What is Faradays Law? | | | | 3. What is Lenz's Law? | | | |  | **AC Generators** | | | 1.     How does an AC Generator Work? | | | | 2.     Can you draw the graphs for flux linkage and induced EMF for an AC Generator? | | | |  |  |  | |  | **Peak and RMS Current & PD and Oscilloscopes** | | | 1.     How do you calculate Irms and Vrms. | | | | 2.     What is an oscilloscope & what are the main controls? | | | | 3.     How can you measure Vrms and the frequency of a supply using an oscilloscope? | | | |  |  |  | |  | **Transformers** | | | 1.       How do transformers work & what is the formula? | | | | 2.       What is the efficiency of a transformer? | | | | 3.       How is the efficiency of a transformer improved? | | | | | |  |  * Red denotes interleaving; aspects of knowledge covered previously. |
| **Learning Outcomes (Knowledge)** |
| **Current learning to be developed in the future within:** |  |
| **Assessment** | Refer to assessment maps for formative and summative assessment opportunities. |
| **Impact** | Attainment and Progress – Refer to assessment results / data review documentation. |

