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**LANGDON PARK SIXTH FORM**

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| **Subject: Physics** | **Year: Y13** | **Topic: 3.7.5 Electromagnetic Induction** |

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| ***What and Why*** “How is voltage produced in a generator? How does a transformer work? Why is the voltage stepped up in the National Grid? Why is it possible to charge up an electric toothbrush without any wires?” |

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| **Key terms**Back emfCoilEddy currents | Faraday’s lawFleming’s right hand ruleFlux linkageGenerator | Hysteresis curveInduced emfLaminated coreLenz’s law | Magnetic flux densityNational GridTeslaTransformer |

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| **Specification point** | **Pre-reading** | **Application and Assessment (date)** | **Home learning**  | **Extension – Cultural Capital and Reading** |
| **3.7.5.4:** I can define Faraday’s law and Lenz’s law. To describe the emf induced in a coil rotating in a magnetic field.I can sketch a flux linkage and a flux density graph versus time.**3.7.5.5:** Use an oscilloscope as a dc and ac voltmeter, to measure time intervals, frequencies, display ac waveforms and determine root-mean-squarecurrent or pd**3.7.5.6**: I can describe the functioning and inefficiencies of a transformer and how to reduce this.Explain transmission of electrical power at high voltage including calculations of power loss in transmission lines. | Use the Oxford AQA A2 textbook p.140 to 155. Look at other textbooks in the library for alternative ideas, explanations and diagrams.**YouTube Videos:**(1) [How Giant Tesla Coils Work (with ArcAttack)](https://www.youtube.com/watch?v=4m6EjnEYEEg)(2) [Lenz's Law Demonstration - Penn Physics](https://www.youtube.com/watch?v=k2RzSs4_Ur0)(3) [Explaining how the national grid works](https://www.youtube.com/watch?v=P0j5VeRtGKo) **Websites:**[**https://en.wikibooks.org/wiki/A-level\_Physics\_(Advancing\_Physics)/Generators**](https://en.wikibooks.org/wiki/A-level_Physics_%28Advancing_Physics%29/Generators)[**https://courses.lumenlearning.com/physics/chapter/23-7-transformers/**](https://courses.lumenlearning.com/physics/chapter/23-7-transformers/) | **Practicals:**(1) Required practical 11:Investigation, using a search coil and oscilloscope, of the effect on magnetic flux linkage of varying the angle between the search coil and magnetic field direction(2) Investigating Lenz’s law(3) Analysing transformers**Assessment**:Minitest on Electromagnetic Induction (2nd week Dec)Multiple choice test on Capacitors, Magnetic Fields and Electromagnetic Induction (1st week Jan) | (1) Use data from the transformer investigation to verify the transformer equations and calculate the efficiency of the laboratory transformerMake notes on each topic and complete the exam style practice questions | (1) What is a 3 phase generator ata power station and how does theNational Grid deal with powersurges at various times(2) Visit edf energy centre. Kent**Reading:**The Invisible Rainbow: A History of Electricity and LifeBy Arthur Firstenberg |

**Pre-assessment content review**

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| I feel secure in | I need to focus on | My action plan |

**Pre-assessment skills review**

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| I feel secure in | I need to focus on | My action plan |

**Post-assessment review**

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| Weaknesses in content knowledge | Skills I need to focus on | My action plan |
| Retest / review – teacher and student comment |

**Revision planning**

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| Spec point | Notes complete | Revision materials | Past paper Qs  | Timed conditions |
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