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| **Lesson Number: 25.5** | | |
| **Lesson Title: Transformers** | | |
| **Specification Reference** | | **3.7.5.6** |
| **Learning Objectives** | | |
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| **Opportunities for Assessment** | | |
| Page 424 questions | | |
| **Starter:** | Slide #1 is a recap of transformers and their uses and limitations, note that pupils who did not do further physics at GCSE will have no prior knowledge of calculations | |
| **Main:** | Slides #2 and #3 describe the design of a transformer – do not dwell too long on the picture as it appears again in slide #6  Slides #4 - #6 derive the transformer formula and the picture on slide #6 enables discussion / examples to be created to practice it’s use  Demonstration:   * Connect a bulb (low voltage, low power) in a holder to a wire 2m in a loop * Connect a wire (2m) from positive to negative of an Low Voltage power supply set to 2V * Coil both wires around U shaped laminated cores * Turn on the power supply (this will make one core an electromagnet) and clip the cores together – the bulb should light up * Repeat with differing numbers of coils in the secondary coil   Slides #7 - #9 go through the efficiency of a transformers and designs that assist in making them almost 100% efficient. Slide #9 also explains why transformers draw very little current when plugged in but not used to power something. – Extension, ask pupils why this is and see if they can work it out  Slide #10 explains why the National Grid uses step up transformers and recaps the formula for the power of an AC supply as an example | |
| **Plenary:** | Slide #11 is a summary | |

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| **Homework:** | Page 424 questions | |
| **Differentiation / Extension / S&C** | | |
| Inside a phone charger / use of diodes page 423 converting AC to DC | | |
| **Numeracy / Literacy** | | **SMSC / Fundamental British Values** |
| Transformer formula  Use of ratios | | AC / DC safety and chargers in the home |
| **RESOURCES:** | | |
| Demonstration:   * Low voltage power supply (AC) * 2m insulated wires * Low voltage, low power bulb in holder connected to a loop of wire (2m) * 2 x U-shaped laminated iron cores | | |
| **Risk Assessment** e.g. CLEAPSS card reference | | |
| None although the primary coil is a short circuit so keep to 2V and turn off when not in use; trip switch in LV power supply may trip out. | | |
| **Working Scientifically (HSW)** | | |
| AC to DC transformers / National Grid | | |

Pictures courtesy of:

Slide #3, #6 & #7 – Wikipedia