|  |  |  |
| --- | --- | --- |
| **Lesson Number: 23.4** | | |
| **Lesson Title: Dielectrics** | | |
| **Specification Reference** | | **3.7.4.2** |
| **Learning Objectives** | | |
| Dielectric action in a capacitor  Relative permittivity and dielectric constant.  Students should be able to describe the action of a simple polar molecule that rotates in the presence of an electric field. | | |
| **Opportunities for Assessment** | | |
| Page 391 questions | | |
| **Starter:** | Slide #1 links back to static electricity and inducing a dipole effect in neutral molecules | |
| **Main:** | Slide #2 shows how a dielectric fits between the plates and what its function is  Slides #3 and #4 explain the calculation of the dielectric constant as well as some examples  Slide #5 contains important exam points on capacitor design and then defines the formula based on them – note that the permittivity of free space is epsilon nought  Slide #6 is a brief outline of the three main polarisation methods – see page 390 of the course book for more details (possible research homework)  Slide #7 highlights the order in which the three mechanisms decrease in an alternating field | |
| **Plenary:** | Slide #8 is a summary | |

|  |  |  |
| --- | --- | --- |
| **Homework:** | Page 391 questions, research polarisation mechanisms | |
| **Differentiation / Extension / S&C** | | |
| Discuss the idea of inertia and why the polarisation mechanisms decrease in the order that they do | | |
| **Numeracy / Literacy** | | **SMSC / Fundamental British Values** |
| Formula use and ratios | | Capacitor applications and design, linking physics to engineering |
| **RESOURCES:** | | |
| Optional – An old capacitor, large style, opened up to see the construction | | |
| **Risk Assessment** e.g. CLEAPSS card reference | | |
| None | | |
| **Working Scientifically (HSW)** | | |
| Page 391 – capacitor applications | | |

Photo on slide #1 courtesy of <https://www.flickr.com/photos/patdavid/4455723092>

Slide #1 illustration by Papa November [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0) or GFDL (http://www.gnu.org/copyleft/fdl.html)], via Wikimedia Commons