Syllabus:

All Handouts and Lectures for this unit:

Labs:

**Atomic and Nuclear:**

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| Objectives | Chin Wag | Other Stuff |
| Review electromagnetic waves and spectrum |  |  |
| Understand black body radiation, and Planck's equation. |  |  |
| Do calculations with photons. |  |  |
| Understand the difference between wave and photon descriptions of light, and what is meant by complementarity. |  |  |
| Understand and solve problems with the photo-electric effect |  |  |
| Understand de Broglie's matter wave hypothesis, and solve calculations with matter waves. |  |  |
| Describe early atomic models of Thomson and Rutherford. |  |  |
| Solve problems of closest approach. |  |  |
| Understand the Bohr atom and make energy level calculations. |  |  |
| Understand and do calculations with the Heisenberg uncertainty principle. |  |  |
| Understand the Copenhagen Interpretation. |  |  |
| Understand the issues behind the Einstein-Bohr debate. |  |  |
| Introduction to Nuclear Physics - atomic notation, neutrons, isotopes, and the chart of the nuclides. |  |  |
| Calculating the binding energy of a nucleus, and what it means. |  |  |
| Understand radioactivity, and know what the types of radiation are. |  |  |
| Predict the effects of a particular decay on the nucleus. |  |  |
| Understand what a decay series is. |  |  |
| Calculate the energy of an alpha decay. |  |  |
| Understand what is meant by "tunneling" |  |  |
| Understand what Beta decay is |  |  |
| Understand Gamma decay, and do calculations with Gamma decay. |  |  |
| Do calculations with activity. |  |  |
| Do calculations with decay rate, activity and half life. |  |  |
| Understand how radiometric dating works |  |  |
| Understand the stability of a nucleus |  |  |
| Be able to use nuclear reaction notation and balance nuclear reactions. |  |  |
| Calculate the energy released or required for a nuclear reaction. |  |  |
| Understand a what a nuclear fission reaction is. |  |  |
| Understand the events leading up to the dropping of the bomb on Hiroshima. |  |  |
| Understand what a nuclear fusion reaction is. |  |  |
| Understand the curve of binding energy and how to predict fusion vs fission. |  |  |
| Understand basic issues surrounding nuclear power. |  |  |

**Digital Information Storage: (Where do we put this??)**

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| --- | --- | --- |
| Convert binary to base ten. |  |  |
| Convert base ten to binary. |  |  |
| Understand the advantages of digital storage. |  |  |
| Understand what is meant by sample rate, and bit depth. |  |  |
| Understand how data is stored on a CD. |  |  |
| Do calculations with pit depth and wavelength. |  |  |
| Do resolution calculations using the Rayleigh Criterion. |  |  |
| Know about other media for storage of digital information. |  |  |
| Solve basic problems with capacitance |  |  |
| Understand what a CCD device is, and how it works. |  |  |
| Do capacitance calculations with CCD devices. |  |  |
| Do magnification, area and voltage calculations with CCD devices. |  |  |