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| **Lesson Number: 27.3** |
| **Lesson Title: Fission and fusion** |
| **Specification Reference** | **3.8.1.7, 3.8.1.8** |
| **Learning Objectives** |
| Appreciation that  applies to all energy changes,Simple calculations involving mass difference and binding energyFission and fusion processesSimple calculations from nuclear masses of energy released in fission and fusion reactionsAppreciation that knowledge of the physics of nuclear energy allows society to use science to inform decision making |
| **Opportunities for Assessment** |
| Questions page 480 |
| **Starter:** | Slide #1 is an introduction to fusion power and links back to GCSE work that students have done – Next lesson the reactor is discussed in detail so this is only a memory-jogging exercise |
| **Main:** | Slide #2 shows a fission reaction – Note that the daughter nuclei are not set and various are created which then follow decay chainsSlide #3 explains the induced fission reaction – interestingly this is another example of discoveries being made by accident; neutron bombardment experiments were being done to increase atomic number and to try and find new isotope when two were found to split unexpectedlySlide #4 graphically shows the idea of a chain reaction – link this to possible disasters if not controlled and nuclear bombsSlides #5 - #6 shows the p-p chain which is the main fusion occurring in main sequence starsSlide #7 - #8 explains mass loss and gives a simple problem for pupils to solveSlides #9 - #11 go into a little detail about fusion reacts performed on Earth and the moral choices we as humans need to make – Homework ideas can be to research the current fusion experiments being performed, the new plant being built in France or possibly the moral implications of fission power |
| **Plenary:** | Slide #12 is a summary |

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| **Homework:** | Questions page 480; research fusion plants; create a discussion / presentation on the dangers of nuclear power |
| **Differentiation / Extension / S&C** |
| Research in detail the current understanding of fusion using more complex ideas e.g. lasers to push the particles together |
| **Numeracy / Literacy** | **SMSC / Fundamental British Values** |
| Use of  | Nuclear power – a moral argument |
| **RESOURCES:** |
| None |
| **Risk Assessment** e.g. CLEAPSS card reference |
| None |
| **Working Scientifically (HSW)** |
| N/A |

Pictures courtesy of:

Slide #1 - U.S.NRC. - http://www.nrc.gov/reading-rm/basic-ref/students/animated-bwr.html (Public Domain)

Slides #2, #5, #8 & #9 – Wikipedia (Public Domain)