|  |
| --- |
| **Lesson Number: 27.1** |
| **Lesson Title: Energy and Mass** |
| **Specification Reference** | **3.8.1.6** |
| **Learning Objectives** |
| Appreciation that applies to all energy changesSimple calculations involving mass difference and binding energy. |
| **Opportunities for Assessment** |
| Questions page 474 |
| **Starter:** | Slide #1 is a thought provoking question – can students describe what mass and energy actually are? (Harder than it sounds) |
| **Main:** | Slide #2 introduces Albert Einstein and his most famous works – This can form differentiated homework ranging from a simply Biography to research on relativitySlide #3 shows how profound Einstein’s formula actually is… another analogy is a spring gets more massive when it is pulled or pushed from its resting positionSlides #4 - #7 go through several sub-atomic particle interactions and the associated energy changes that occurSlide #8 links the work done to the strong force – Realisation that the strong force holding two nucleons together is about 200N is quite astonishing to most students |
| **Plenary:** | Slide #9 is a summary |

|  |  |
| --- | --- |
| **Homework:** | Questions page 474; research Albert Einstein |
| **Differentiation / Extension / S&C** |
| Links back to fundamental forces and Year 1 particle physics; research relativity |
| **Numeracy / Literacy** | **SMSC / Fundamental British Values** |
| Mass / Energy formula | Understanding concepts of things we cannot see |
| **RESOURCES:** |
| None |
| **Risk Assessment** e.g. CLEAPSS card reference |
| None |
| **Working Scientifically (HSW)** |
| N/A |

Pictures courtesy of:

Slide #1 Energy ball - [Brenda Clarke](https://www.flickr.com/photos/brenda-starr/); https://www.flickr.com/photos/brenda-starr/4415583424

Slide #1 Mass – Pixabay (Public Domain)

Slide #2 – Wikipedia (Public Domain)

Slide #3 – Pixabay (Public Domain)

Slide #4 - By Manticorp (Own work) [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons

Slide #5 - By Christian Nölleke (Own work) [GFDL (http://www.gnu.org/copyleft/fdl.html) or CC-BY-SA-3.0 (http://creativecommons.org/licenses/by-sa/3.0/)], via Wikimedia Commons

Slide #6 – Wikipedia (Public Domain)

Slide #7 - By Master-m1000 [Public domain], via Wikimedia Commons