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| **Lesson Number: 27.1** | | |
| **Lesson Title: Energy and Mass** | | |
| **Specification Reference** | | **3.8.1.6** |
| **Learning Objectives** | | |
| Appreciation that applies to all energy changes  Simple 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 relativity  Slide #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 position  Slides #4 - #7 go through several sub-atomic particle interactions and the associated energy changes that occur  Slide #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 | |

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| **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

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