



Mass and Energy

Checklist statement



I can explain that $E = mc^2$ applies to all energy changes.

I can apply $E = mc^2$, define all terms and know their standard units.

I can perform calculations involving mass difference and binding energy.

I can define the atomic mass unit, u .

I can convert between atomic mass units and energy using $1 u = 931.5 \text{ MeV}$.

I can describe fission and fusion processes.

I can calculate the energy released in fission and fusion reactions using nuclear masses.

I can interpret a graph of average binding energy per nucleon against nucleon number.

I can identify regions on the binding energy graph where energy is released by fission or fusion.

I can explain how understanding nuclear energy allows science to inform societal decision-making.

Induced Fission

Checklist statement



I can explain how fission is induced by thermal neutrons.

I can explain the possibility of a chain reaction and the concept of critical mass.

I can describe the functions of the moderator, control rods and coolant in a thermal nuclear reactor.

I can explain moderation in terms of elastic collisions.

I can explain factors affecting the choice of materials for moderators, control rods and coolants.

I can give examples of materials used for moderators, control rods and coolants.

Safety Aspects

Checklist statement ✓

I can describe the fuel used in nuclear reactors.

I can explain the need for remote handling of nuclear fuel.

I can explain the purpose of shielding in nuclear power stations.

I can describe emergency shutdown procedures in nuclear reactors.

I can explain the production, remote handling and storage of radioactive waste materials.

I can discuss the balance between risks and benefits in the development of nuclear power.