

Episode 526: Preparation for nuclear fission topic

This topic does not lend itself to much practical work; there are a few analogue demonstrations which can be valuable.

Students may have strong feelings about nuclear technology – power stations and bombs. You could make this a focus of your coverage of this area: the physics ideas won't tell you what's right or wrong, but they should allow you to make more informed judgments on questions such as nuclear waste disposal or the use of depleted uranium in weaponry.

Episode 527: Nuclear transmutation

Episode 528: Controlling fission

Main aims

Students will:

1. Use balanced equations to represent transmutation, fission and fusion events.
2. Calculate mass and energy changes in such events.
3. Understand how a chain reaction can arise in fissile material.
4. Explain how a controlled chain reaction is managed in a nuclear power reactor.

Prior knowledge

Students should already be familiar with standard notation for nuclides and with balanced nuclear equations. They should know how to calculate energy changes from changes in nuclide masses.

Where this leads

If your students are to study an astronomy topic, this work forms a basis for understanding nuclear processes in stars. Mass-energy calculations using $E = mc^2$, as well as the ability to balance nuclear equations, will also be useful in any study of particle physics.

