

# Y10 Fission and Fusion

## **Nuclear Fission**

- a) Nuclear fission is the splitting of an atomic nucleus.
- b) There are two fissionable substances in common use in nuclear reactors, uranium-235 and plutonium-239.

You should be aware that the majority of nuclear reactors use uranium-235.

- c) For fission to occur the uranium-235 or plutonium-239 nucleus must first absorb a neutron.
- d) The nucleus undergoing fission splits into two smaller nuclei, releasing two or three neutrons and energy.
- e) These neutrons may go on to start a chain reaction.

You should be able to sketch or complete a labelled diagram to illustrate how a chain reaction may occur.

## **Nuclear Fusion**

- a) Nuclear fusion is the joining of two atomic nuclei to form a larger one.
- b) Nuclear fusion is the process by which energy is released in stars.
- c) Stars form when enough dust and gas from space is pulled together by gravitational attraction. Smaller masses may also form and be attracted by a larger mass to become planets.
- d) During the “main sequence” period of its life cycle a star is stable because the forces within it are balanced.
- e) A star goes through a life cycle. This life cycle is determined by the size of the star.

You should be familiar with the chart that shows the life cycles of stars.

- f) Fusion processes in stars produce all of the naturally occurring elements. These elements may be distributed throughout the Universe by the explosion of a massive star (supernova) at the end of its life.

You should be able to explain how stars are able to maintain their energy output for millions of years.

You should be able to explain why the early Universe contained only hydrogen but now contains a large variety of different elements.

You should know that elements heavier than iron are formed in a supernova.