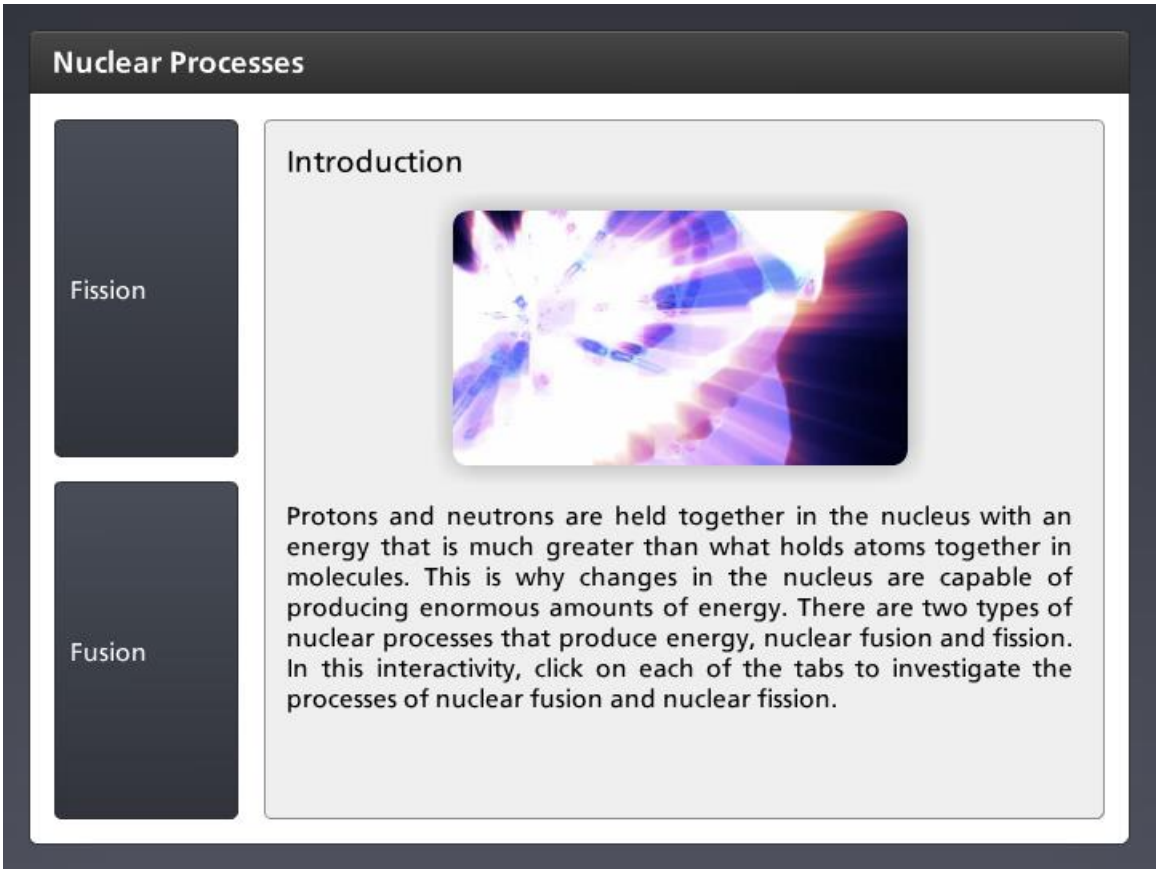
Module 2: Atomic Structure and the History of Atomic Theory
Topic 5 Content: Nuclear Processes Presentation Notes

Introduction



Protons and neutrons are held together in the nucleus with an energy that is much greater than what holds atoms together in molecules. This is why changes in the nucleus are capable of producing enormous amounts of energy. There are two types of nuclear processes that produce energy, nuclear fusion and fission. In this interactivity, click on each of the tabs to investigate the processes of nuclear fusion and nuclear fission.

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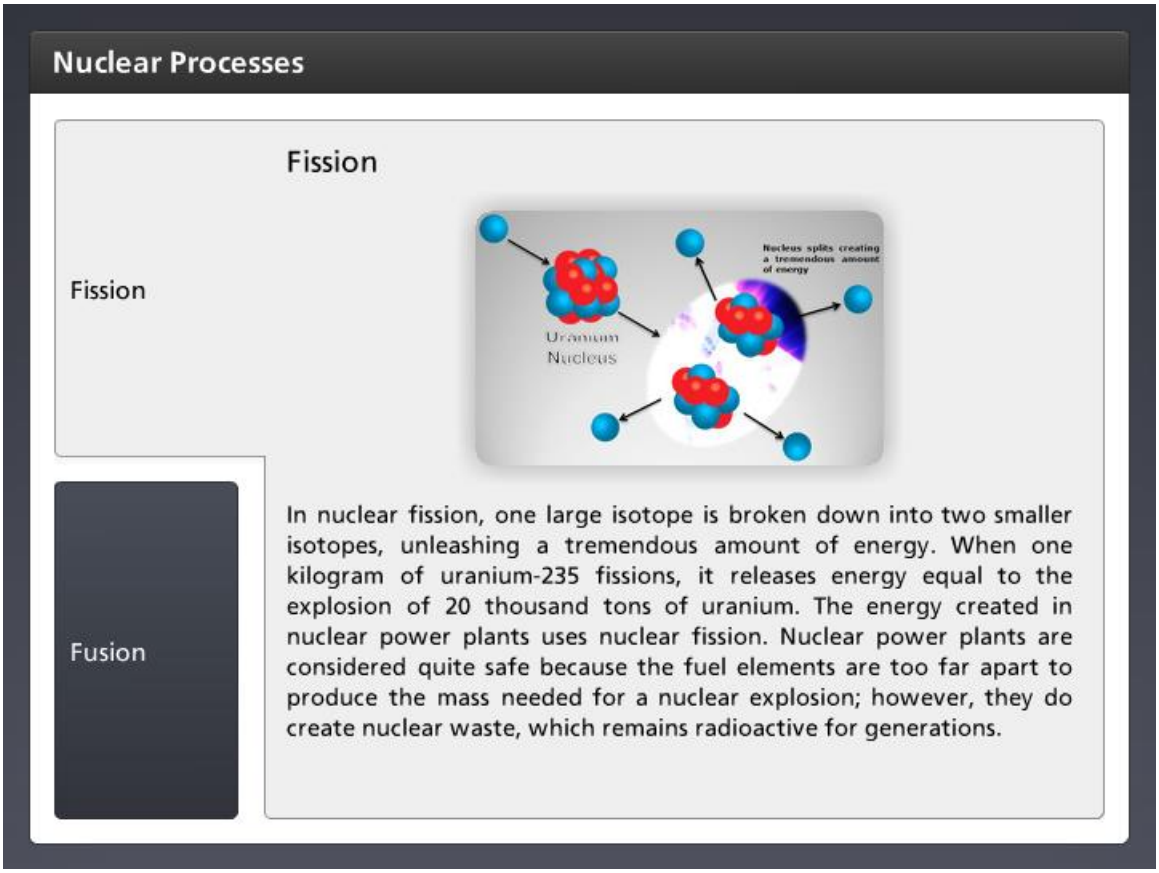
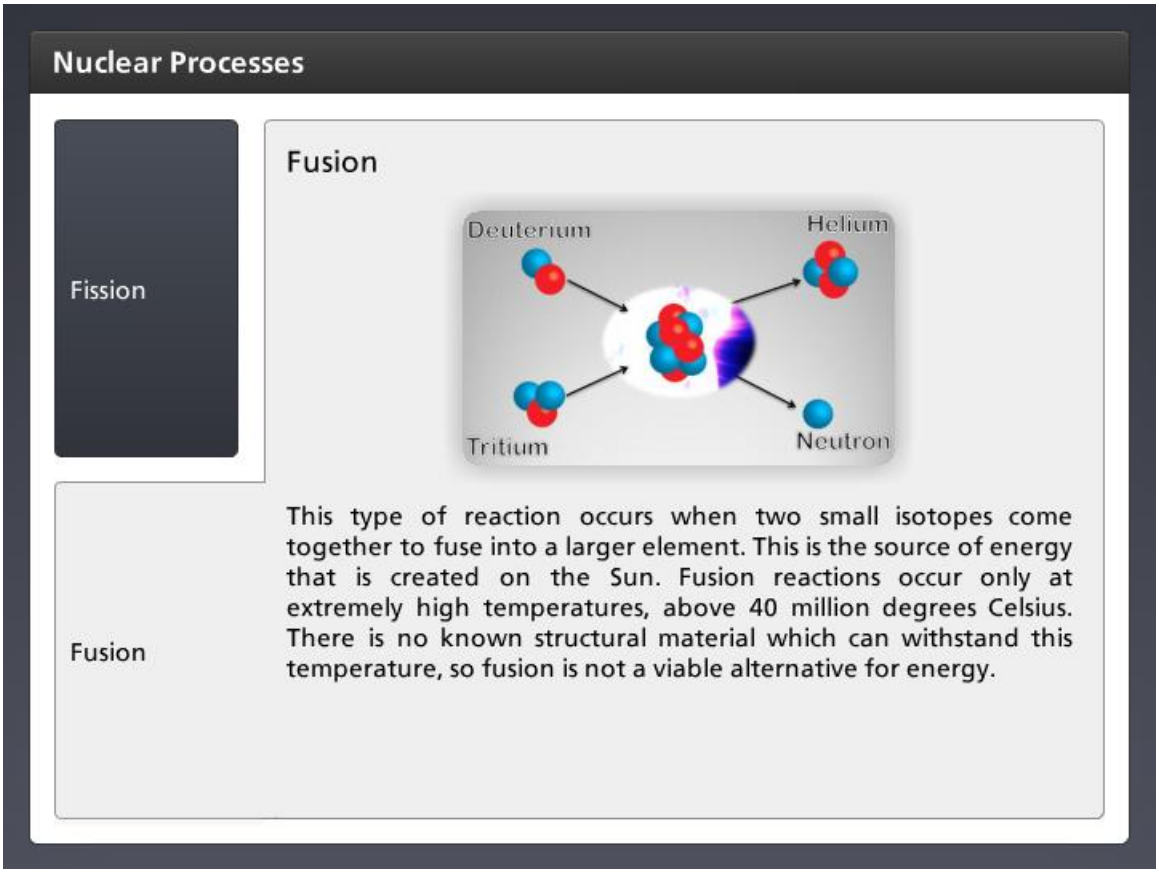
Fission



In nuclear fission, one large isotope is broken down into two smaller isotopes, unleashing a tremendous amount of energy. When one kilogram of uranium-235 fissions, it releases energy equal to the explosion of 20 thousand tons of uranium. The energy created in nuclear power plants uses nuclear fission. Nuclear power plants are considered quite safe because the fuel elements are too far apart to produce the mass needed for a nuclear explosion; however, they do create nuclear waste, which remains radioactive for generations.

Fusion



This type of reaction occurs when two small isotopes come together to fuse into a larger element. This is the source of energy that is created on the Sun. Fusion reactions occur only at extremely high temperatures, above 40 million degrees Celsius. There is no known structural material which can withstand this temperature, so fusion is not a viable alternative for energy.