

Use with textbook pages 312–321.

Radioactivity

Vocabulary

CANDU reactor
chain reaction
energy
induced
isotope

neutron
nuclear fission
nuclear fusion
nuclear reaction

proton
subatomic particles
Sun
unstable

Use the terms in the vocabulary box to fill in the blanks. You may use each term only once.

- _____ is the splitting of a heavy nucleus into two lighter nuclei.
- Heavy nuclei, like those of uranium-238, tend to be _____ due to the repulsive forces between the many protons.
- Nuclear fission is usually accompanied by a very large release of _____.
- A _____ occurs when an atom's nucleus changes by gaining or releasing particles or energy. Atoms are changed from one _____ into another, producing different elements.
- In a nuclear reaction, _____, (e.g. protons, neutrons, and electrons) and gamma rays, can be emitted from the nucleus.
- A nuclear reaction is _____ by bombarding a nucleus with alpha particles, beta particles, or gamma rays.
- A _____, ${}_1^1p$, is the same thing as a hydrogen-1 nucleus.
- A _____, ${}_0^1n$, has a charge of 0 and a mass number of 1.
- A _____ is an ongoing nuclear reaction in which some products go on to cause more nuclear reactions to occur.
- The Canadian deuterium uranium reactor, _____, is used for nuclear power generation. It is one of the safest nuclear reactors in the world.
- _____ is the process in which two smaller nuclei join together to make a bigger one. This process occurs at the core of the _____ and other stars.

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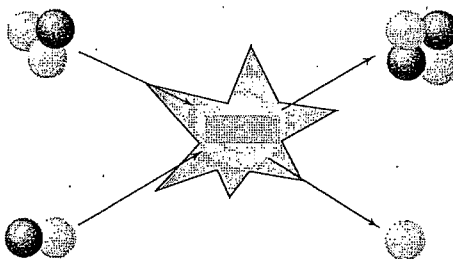
Comparing nuclear fission and fusion

1. Complete the following table.

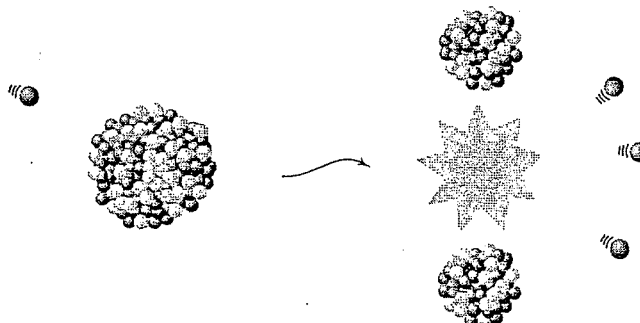
	Nuclear fission	Nuclear fusion
Give a description of the process.		
What is produced as a result of this nuclear process?		
Are the products radioactive?		
What is needed for this nuclear reaction to occur?		
Where does this process occur?		
Give an example of a nuclear equation.		

2. Identify the following diagrams as nuclear fission or nuclear fusion. Label the parent isotope(s), daughter isotope(s), neutron(s), and energy.

(a) _____



(b) _____



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Nuclear fission and fusion reactions

Remember the following two rules when working with nuclear equations:

- I. The sum of the mass numbers does not change.
- II. The sum of the charges in the nucleus does not change.

Identify each nuclear equation (nuclear fission or nuclear fusion) and then complete the nuclear equation.

