

Unit 7B Nuclear Fission

Note-Taking Guide and Questions to Consider **TEACHER**

➤ Main Ideas, Key Points, Questions:

After watching the video segment, write down key points, main ideas, and big questions.

➤ Objective(s):

- *Describe the conditions under which nuclear fission occurs.*
- *Understand and calculate the amount of energy released when nuclear fission occurs.*

➤ Notes:

During the video segment, use words, phrases, or drawings to take notes.

➤ Summary:

After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"

Answer the following.

1. Define nuclear fission in your own words.

An unstable nucleus breaks apart into two or more smaller, more stable nuclei.

2. What determines whether small nuclei are stable?

Small nuclei are stable if they have the same number of protons and neutrons.

3. Why are nuclei unstable if they have fewer neutrons than protons?

The strong nuclear force keeps the nucleus together. Neutrons add to the strong nuclear force causing stability, while positively charged protons repel one another causing instability.

4. When there are more than 83 protons in the nucleus, the nucleus is unstable because the strong nuclear force cannot hold it together.

5. How does a nuclear reaction inside of a nuclear reactor begin?

A large nucleus captures a slow-moving neutron, which makes the nucleus unstable and begins the fission reaction.

6. Write Albert Einstein's famous equation that relates energy and mass. $E = \Delta mc^2$

E is binding energy, Δm is the mass defect, and c is the speed of light.

7. Briefly describe how nuclear energy in a power plant is converted to electricity.

When fission takes place, the energy that holds the nucleus together is released.

This energy heats up water, which creates steam.

The steam turns a turbine attached to a generator and causes an electrical current to be created.

8. The amount of radioactive material required to maintain a chain reaction is called what?

critical mass