

Name: _____ Date: _____ Period: _____

Nuclear Energy Webquest: Nuclear Fission and Fusion

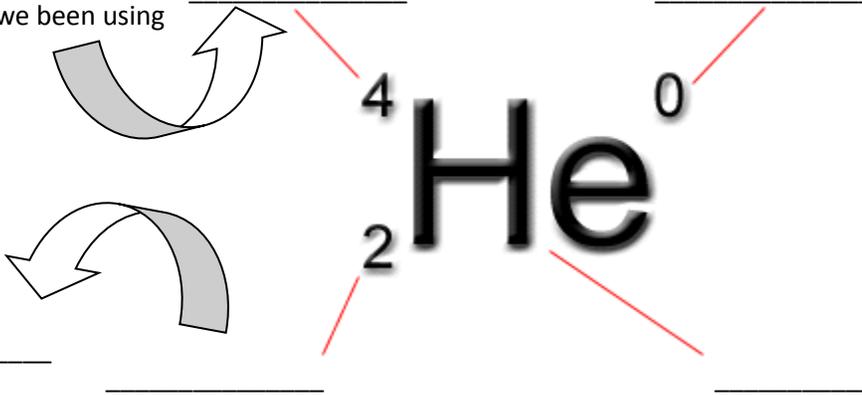
Purpose: To gain knowledge of fission and fusion processes.

Go to the website: <http://library.thinkquest.org/C003971/data/html/main.html>

Welcome to the Reactor Bin!

1. Read the paragraph and click on **The Atom** in the 1st paragraph. Read the text on the page above the diagram and fill in the blanks below.

What term have we been using for this number?



2. Read the paragraph beneath the picture. Once you are finished, click on "On to components of an atom."
3. More review! Read the paragraphs and fill in the table:

| | Protons | Neutrons | Electrons |
|---|---------|----------|-----------|
| Charge | | | |
| Location in the atom | | | |
| Contribute/related to atomic mass or atomic number? | | | |

Look at the compact list of sites below the information. Find **Reactions** and click on **Nuclear**.

4. Complete the sentence: "Nuclear reactions _____"

_____."

5. Click on "Take a look at fission."
6. In your own words, define fission:

7. What are the two isotopes usually used in fission? Write the isotope names.

8. Click on the [here] link to view the visual representation of fission. **Look at the pictures carefully!** The fission fuel nucleus breaks up into:
 - ① _____
 - ② _____
9. If a neutron begins the fission process, what will the newly released neutrons that are a result of the fission process go on to do? Look at the diagram carefully and THINK!
10. Click the back button to navigate away from the picture and back to the fission page.
11. Click on “How fission works” in lower right-hand corner.” **Read the information.**
12. How is a fission reaction started?

What does “bombard” mean?

13. What is released in great quantities during the fission process?
14. The resulting chemical elements from the fission process are highly _____. What isotopes are produced? _____
15. Click on “What fission is used for.” **Read the first mini-paragraph.** What is fission used for? _____

17. **Read the second paragraph.** What is an environmental drawback of using fission as an energy source?
18. Click on “Miscellaneous Information.” **Read this page.**
19. List at least two potential dangers from a nuclear accident, AKA a core *meltdown*.
20. What benefits and drawbacks accompany the normal operation of a nuclear power plant? List at least one of each.
21. Click on “What fusion is all about.” **Read the first paragraph.**
21. Finish the sentence: “Technically, fusion is short for Nuclear Fusion, _____

_____”
22. The result of fusion is a _____. This is often unstable, so this nucleus will often undergo _____.
23. Complete the sentence: “Fusion also refers to _____

_____ via fusion reactors.”

24. Click on the [here] link to view the visual representation of the fusion process. **Look at the picture carefully!** What happens to the larger nucleus after it has formed from the two smaller nuclei?

25. Click on the back button to navigate away from the picture. Click on "The fusion reaction." **Read the first paragraph.** What accounts for the difference in mass between the starting particles and ending particles?

What is bonding energy?

26. Click on "What is cold fusion?" **Ignore this page.** Click on "Where does fusion occur? **Read this page.**

27. What is the minimum mass needed to induce fusion? _____.

28. What would Jupiter need to do to be able to induce fusion? _____.

29. In order for nuclei to fuse, they must get very close to each other because _____.

_____.

Why is it difficult to get the nuclei close to each other?

What are the two conditions given under which nuclei can fuse? Which one rarely occurs?

30. Why does fusion not occur outside of stars?

That's the end of the website! Below, summarize fission and fusion.

Fission is the _____ of an atomic nucleus. It is started when a nucleus is bombarded by a _____. The result is:

Fusion is the process in which two lighter nuclei _____.

Almost all natural fusion occurs in _____.

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Nuclear Energy Webquest: Using Nuclear Reactions as a Source of Energy

Purpose: To understand and debate the pros and cons of nuclear energy.

Go to the website: http://tonto.eia.doe.gov/kids/energy.cfm?page=nuclear_home-basics

1. Read the first section, *Nuclear Energy is Energy from Atoms*. List the two ways that nuclear energy can be released.

Which of the two is used in nuclear power plants? _____

2. Read the second section *Nuclear Fuel – Uranium*. What is the isotope of uranium that is used? _____

Where does the majority of our supply of the proper type of uranium come from? _____

3. Draw and label the diagram of fission that you see to the right of the screen (*How Fission Splits the Uranium Atom*).

4. Read the first paragraph of the third section, *Nuclear Power Plants Generate About 1/5 of US Electricity*. How many power plants were running in the United States in 2010? _____

5. Read the section titled *Nuclear Power Comes From Fission*. Describe how a nuclear power plant uses the heat given off of the fission reaction to make electricity.

Describe the fuel used by nuclear power plants.

7. Read the *Types of Nuclear Reactors* section. What are the two types of reactors used in the United States?

8. Read the remaining sections of the site. Using information from the entire website, make a pro/con list for using nuclear energy. You must have at least five pieces of information in each column.

| Pros | Cons |
|------|------|
| | |