Unit 5: Nuclear Energy/Radioactivity Socratic Seminar

REMEMBER this is your assessment for Unit 5. Please be sure to do your best work!

Standards:

SPS3 Students will distinguish the characteristics and components of radioactivity.

a. Differentiate among alpha and beta particles and gamma radiation.

b. Differentiate between fission and fusion.

c. Explain the process half-life as related to radioactive decay.

d. Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.

Directions

Complete the questions in BOLD and choose 5 more to research for Socratic Seminar next week. You are required to have the following:

- ❑ **5 bullet points with 2 citations of evidence to support for each question**
- ❑ **4 sources (2 are provided and you MUST vet and find 2 more on your own)**
- ❑ **During Socratic Seminar you MUST speak a minimum of 3 times for a 100**
- ❑ **Make sure to read over the attached rubrics under grading expectations.**

Questions to Answer

1. **What is the difference between alpha, beta, gamma radiation and neutron radiation? Which are the most dangerous?**
2. **What is the difference between nuclear fusion and nuclear fission?**
3. **What does radioactive decay and "half life" mean?**
4. **What are the advantages and disadvantages of nuclear energy?**
5. **What is a "chain reaction" in nuclear terms?**
6. Why is it useful to know the half life of certain elements?
7. What does quantum tunneling have to do with radioactive decay?
8. How does the theory of parallel universes relate to fusion?
9. How are black holes related to radiation?
10. How does radiation explain Spiderman?
11. What is a Higgs Boson particle?
12. What is the Standard Model Theory of particle physics?
13. What is a quark and what does it have to do with nuclear energy?
14. What is the difference between normal hydrogen, deuterium and tritium?
15. What does "critical mass" refer to?
16. What is the difference between "radiation" and "nuclear radiation"?
17. One sometimes hears reference to "cold fusion" - what was it?
18. What percentage of the world's energy could be obtained from renewable sources?

19. If less than 100% can be obtained from renewable sources, from where should the rest be obtained?
20. What opinion do environmentalists have about nuclear energy?
21. Do any environmental organisations support nuclear energy?
22. Do you think that nuclear power plants are inherently unstable?
23. Do you think that nuclear power stations could literally "blow up" like a nuclear bomb?
24. What options do we have for dealing with nuclear waste?
25. Which is more dangerous to human life over the next two hundred years - spent nuclear fuel or carbon dioxide/global warming?
26. Would you rather live next to a nuclear power plant than a coal-fired one? Why?
27. Could nuclear energy help the third world to develop carbon-free economies?
28. No energy source is completely carbon free. In what parts of the nuclear generation process is carbon dioxide released?
29. Given the fact that human beings make mistakes and that low-probability unexpected accidents and events occur - should we simply accept that we will have a significant nuclear accident every twenty to thirty years?
30. Is nuclear energy a boon or a bane for society?

Sources

The Pros and Cons of Nuclear Power

10 Pros and Cons of Nuclear Power

Grading Expectations

Discussion Rubric

Socratic Seminar Rubric