

Appendix B Classroom Topics

Topics for discussion or for written reports

1. Describe the three modes of radioactivity decay; explain the changes in atomic number and mass number for each; and diagram an example of each.
2. Describe how radioactive decay is related to energy states in the nucleus.
3. Describe nuclear stability in terms of the neutron to proton ratio.
4. Explain the shape of the chart of the nuclides.
5. Describe the distinction between fission and fusion reactions.
6. Describe the role of neutrons in causing and sustaining nuclear fission.
7. Give several examples of radioactive isotopes; predict how much will remain at the end of their third half life.
8. Give examples of reactions producing transuranic elements.
9. Define the purpose of accelerators; compare and contrast linear accelerator, cyclotron and synchrotron.
10. List and define the four basic interactions between particles.
11. Demonstrate parity symmetry using a plane mirror as a prop.
12. Describe the nuclear evolution of the Universe in terms of time and temperature.
13. Use the World Wide Web to find a nuclear laboratory and learn about the research being done there. Report your findings to your class.

Possible Misconceptions

1. Radioactivity was introduced first to the earth during World War II.
2. Atoms cannot be changed from one element to another.
3. Fission and fusion are the same; fission is more powerful than fusion.
4. Neutrons and protons have no internal structure.
5. Nuclear power plants produce harmful waste while other forms of electrical generation do not.
6. Radiation causes cancer. It cannot be used to cure cancer.
7. Once a material is radioactive it is radioactive forever.

Topics about Nuclear Science related to societal issues

1. Is radioactivity important for society?
2. Is radioactivity unnatural and sinister?
3. Should we build nuclear power plants using newer technology?
4. Should we pursue the development of fusion power?
5. What should be done about the radioactive waste from medical applications?
6. What should be done with old nuclear weapons?
7. How does nuclear power affect the Earth's CO₂ level? Does it contribute to global warming?