

**Assignment #1**, Physics 274  
Due In Class: Monday 19 Sep 2011

For each question, provide a written discussion of how you went about solving the problem. You can use the solutions to the in-class problems as a format model. Don't just write down the final answer! No credit will be given unless to justify how you obtained your answer.

1. Determine the *first four* (only!) isotopes in the decay chain for the following radioactive elements:
  - (a) Sr-90
  - (b) U-230
  - (c) Pb-206
  - (d) O-15
  - (e) State the half-life of each initial isotope in (a)-(d), and discuss which would present the highest radiological hazard. Why?
2. (a) Determine the complete decay chain of  ${}_{90}^{232}\text{Th}$ .  
(b) Argue why it isn't possible for the final decay product to be Pb-206 (don't just say "because it isn't!"; use what we learned in class).
3. A Fermi problem! How many atoms are there in the Earth? Provide a detailed argument, supported with numerical estimates.