1. Which naturally occurring type of radiation has the greatest penetrating power?
   a. alpha  
   b. beta  
   c. gamma  
   d. neutron  
   Gamma rays are high energy radiation, and can pass through some matter 14/21 correct

2. Which naturally occurring radioactive particles are the size of a helium nucleus?
   a. alpha particles  
   b. beta particles  
   c. gamma radiation  
   d. neutrons  
   Alpha particles consist of 2 protons and 2 neutrons – the same as a He nucleus 14/21

3. What type of radiation is given off in this nuclear reaction?
   \[ ^{210}_{84}\text{Po} \rightarrow ^{206}_{82}\text{Pb} + \text{____} \]  
   a. alpha  
   b. beta  
   c. gamma  
   d. neutron  
   To balance the equation, you need an atomic number of 2 and a mass number of 4. That’s 2 protons and 2 neutrons: an alpha particle 12/21

4. What type of radiation is given off in this nuclear reaction?
   \[ ^{14}_{6}\text{C} \rightarrow ^{14}_{7}\text{N} + \text{____} \]  
   a. alpha  
   b. beta  
   c. gamma  
   d. neutron  
   To balance this equation, the particle needs an atomic number of -1, which is how we represent a neutron being converted into a proton. 13/21

5. Which feature or process is unique to nuclear power plants when compared to conventional coal-burning power plants?
   a. formation of steam  
   b. smoke stacks  
   c. generators  
   d. control rods  
   Control rods are used to contain the fission reaction in a nuclear power plant. They are not present in conventional power plants. 19/21
6. Which of these is **not** a realistic risk associated with nuclear power plants?
   a. storage of spent fuel rods
   b. the likelihood of nuclear explosion  The fuel is not enriched enough
   c. a meltdown from loss of coolant to sustain a nuclear explosion
   d. thermal pollution of the coolant source 11/21

7. You have a radioisotope with a half-life of 5 days. How many days will it take before the radioisotope is completely gone?
   a. 5 days
   b. 50 days
   c. 500 days
   d. The isotope will never be completely gone. 20/21

8. Which is **not** true of radioactive half-life? Radioactive half-life is
   a. the time required for the level of radioactivity in a sample to be cut in half.
   b. independent of the amount of radioactive material present.
   c. increased by heating the isotope. Half-life is independent of temperature, pressure, chemical form, or the starting amount 16/21
   d. independent of the physical or chemical form of the isotope.

9. Which does **not** contribute to your annual radiation dose?
   a. the type of structure you live in
   b. the amount of time you spend riding in jet planes
   c. the number of dental X-rays you get each year
   d. the number of hours you spend listening to the radio Radio waves are not gamma rays, cosmic rays or X-Rays. Note that housing materials contain radioactive earth elements and plane trips expose you to more cosmic rays 16/21

10. Which is true about radioactivity? Radioactivity
    a. is used to treat certain cancers.
    b. damages white blood cells.
    c. deforms DNA.
    d. All of these choices are true. 21/21! Well done.