Period 11 Activity Sheet: Ionizing Radiation and Health

11.1 How Is Ionizing Radiation Detected?

1) Ionizing radiation in a cloud chamber
   
   Your instructor will show you radiation events in a cloud chamber.
   
   a) How does a cloud chamber detect radiation? Why are alcohol and the dry ice needed?

   b) How do the trails of alpha particles compare with those of beta particles? Why?

   c) What could be the source for events that occur away from any of the radioactive sources?

   d) Compare the penetrating ability and the ionizing ability of alpha, beta, and gamma radiation.

2) Detection of ionizing radiation
   
   a) What do film badges do?

   b) List three ways we've seen in class to detect ionizing radiation.
11.2 What Are Natural Sources of Radioactivity?

3) Radiation exposure
   a) What factors determine the extent of our exposure to ionizing radiation?

   b) What is the average person's annual dose of ionizing radiation?

   c) How does the radiation exposure of a typical chest X-ray compare to the average annual exposure?

4) Radioactivity in household products
   Your instructor will show you some natural and man-made radioactive sources.
   a) List these sources and the results when you place a Geiger counter detector near each source.

   b) Does your exposure to these products constitute a danger to your health?
c) The radiation exposure from an old orange FiestaWare plate is about 0.002 mrems/hour. Estimate the annual radiation exposure of a person who ate 3 meals a day using a FiestaWare plate. What percent is this exposure from the plate of the 200 mrem annual exposure of the average person?

5) Radon

a) What is radon?

b) What is a "radioactive daughter"?

c) How long do you have to leave a radon test kit in a location to determine if you have a radon problem?

d) Can you use a Geiger counter or similar device to check if you have a radon problem? Why or why not?
e) Why are radon daughters dangerous?

f) Why is radon of particular concern in locations like central Ohio?