Penetrating Powers of Ionizing Radiation-Teacher Answer Key

1. Hypothesize whether each has the ability to penetrate (pass through) your skin and body.

   Alpha particles: **Alpha particles cannot penetrate most matter. A piece of paper or the dead outer layers of skin is sufficient to stop alpha particles.**

   Beta particles: **Beta particles are capable of penetrating the skin and causing radiation damage, such as skin burns. They can be stopped by a layer or two of clothing or by a few millimeters of a substance such as aluminum.**

   Gamma rays: **Gamma rays are very penetrating. Several feet of concrete or a few inches of lead may be required to stop gamma rays.**

   X-rays: **X-rays are generally lower in energy (less penetrating) than gamma rays. Most diagnostic medical x-rays are stopped by a few millimeters of lead.**

2. Did the demonstration confirm your predications above? Explain.

   Answers will vary.

3. How might people be exposed to ionizing radiation?

   Exposure may occur from man-made sources like abandoned mines, mills, nuclear test sites or radioactive waste sites; contaminated water sources and building materials from these sites; and radioactive materials that are not disposed of properly. Exposure may also occur from natural (background) radiation sources like the sun, the atmosphere and the soil.

4. How can people prevent or reduce their exposure to ionizing radiation?

   The main radiation protection concepts are time (reducing time near a source), distance (increasing our distance from a source) and shielding (placing a barrier between us and the radiation source). It's also important to have homes and water supplies tested for radiation contamination and fixed if any problems are identified.

5. What is the difference between radiation exposure and radioactive contamination? **Radiation exposure occurs when a person is near a radiation source. Though the radiation penetrates the body, it does not remain on the skin or in the body. Receiving an x-ray is an example of radiation exposure.**

   Radioactive contamination occurs when radioactive materials are deposited on or get in objects (building materials or surfaces), people, or the environment (air, water, soil, animals and plants). For example, if radioactive dust, powder, or liquid lands on us or our clothing, or if it gets in and remains inside our body, we are contaminated.