

Shedding Light on Nuclear Radiation Episode 2: Alpha Radiation Name: _____

Part A:

1. Radioactive substances that emit alpha radiation are called _____.

Part B:

2. Fill in the table below.

| Isotopes of Uranium, U | | | |
|------------------------|------------------|----------------|---------------|
| Isotope | Atomic Number, Z | Mass Number, A | Abundance (%) |
| uranium-234 | | | |
| uranium-235 | | | |
| uranium-238 | | | |

3. Briefly describe an alpha particle.

4. Write down the nuclear equation for the alpha decay of U-238.

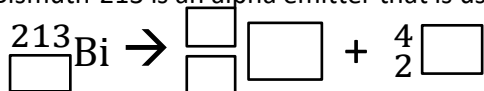
5. Why are alpha particles deadly to living cells? _____

6. Why are alpha particles generally harmless when they are emitted from a source outside of the body?

7. Complete the following nuclear equations. You will need a periodic table.

(mass number = number of protons + neutrons) (atomic number = number of protons)

- (a) Bismuth-213 is an alpha emitter that is used in certain specialized cancer treatments.



- (b) Plutonium-238 is an alpha emitter that is used as a heat source in space probes.

- (c) Neptunium-237 is an alpha emitter that is used as a raw ingredient in the production of Pu-238.

- (d) Americium-241 is an alpha emitter that is used in many types of smoke alarms.

- (e) Polonium-210 is an alpha emitter used in some devices to eliminate static electricity in processes such as rolling paper, manufacturing sheet plastics, and spinning synthetic fibres.

Part C:

8. What is an RTG? Give an example of where you might find one. _____

9. How are cancer cells different to normal healthy cells? _____

10. Briefly describe the use of radium-223 in the treatment of certain types of bone cancer. _____

11. Alpha radiation is a type of "ionizing radiation". What is ionizing radiation? _____
