

## Worksheet # C13: The Atomic Nucleus and Radioactivity

1. What is radioactivity? \_\_\_\_\_

\_\_\_\_\_

2. What are the three types of radioactivity ?

Name of ray	Symbol	Charge	Can be stopped by ....

3. An alpha particle is just a \_\_\_\_\_ nucleus. A beta particle is a fast moving \_\_\_\_\_ . A gamma ray is a form of \_\_\_\_\_ radiation like \_\_\_\_\_ .

4. A fun question: Pretend you are given three radioactive cookies: one alpha, one beta, and the other gamma. Pretend that you have to eat one, hold one in your hand, and put the other in your pocket. Which would you eat, hold, and pocket if you want to do yourself the least amount of radioactive damage?

Eat: \_\_\_\_\_ Why? \_\_\_\_\_

Hold: \_\_\_\_\_ Why? \_\_\_\_\_

Pocket: \_\_\_\_\_ Why? \_\_\_\_\_

5. Keeping the nucleus together: There are two forces at work in a nucleus. What are they?

\_\_\_\_\_ and \_\_\_\_\_

a. Which one is attractive? \_\_\_\_\_

What does it attract? \_\_\_\_\_

b. Which one is repulsive? \_\_\_\_\_

What does it repulse? \_\_\_\_\_

c. Which one works over shorter distances? \_\_\_\_\_

d. Which one works over longer distances? \_\_\_\_\_

6. Another way to say  $^{14}_6\text{C}$  is “carbon-14”. What’s the other way to say each of these?

a.  $^3_1\text{H}$  \_\_\_\_\_

b.  $^{238}_{92}\text{U}$  \_\_\_\_\_

c.  $^{206}_{82}\text{Pb}$  \_\_\_\_\_

d.  $^4_2\text{He}$  \_\_\_\_\_ (aka an \_\_\_\_\_ particle)

7. Practicing Alpha and Beta Decay: Fill in the missing elements and particles.

a.  $^{235}_{92}\text{U} \rightarrow ^{231}_{90}\text{Th} + \text{_____}$

b. \_\_\_\_\_  $\rightarrow ^{218}_{84}\text{_____} + ^4_2\text{He}$

c.  $^{231}_{90}\text{Th} \rightarrow ^{231}_{91}\text{Pa} + \text{_____}$

d. \_\_\_\_\_  $\rightarrow ^{214}_{84}\text{_____} + ^0_{-1}\text{e}$

e.  $^{211}_{84}\text{Po} \rightarrow ^{207}_{82}\text{Pb} + \text{_____}$

f.  $^{230}_{90}\text{_____} \rightarrow \text{_____} + ^4_2\text{He}$

g.  $^{227}_{89}\text{_____} \rightarrow \text{_____} + ^0_{-1}\text{e}$

h.  $^{230}_{90}\text{_____} \rightarrow ^{226}_{88}\text{_____} + \text{_____}$

8. How are you doing with these?

\_\_\_\_\_ I’m doing great - these are easy.

\_\_\_\_\_ I’m doing all right - these are okay.

\_\_\_\_\_ I’m doing so-so - these are kind of tough.

\_\_\_\_\_ I’m doing crummy - these are really hard .