Chemistry: Matter and Change

Activity 4.4 Unstable Atoms

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Purpose: To see how overcrowding in an atom's nucleus causes instability.

Materials: toppler game, chips (red and blue), and pencil

Procedure:

1. Go to your lab tables and set up your Toppler game.

2. Start by placing 1 proton(red) in the middle, at the top.

3. Then have your partner place a red or blue on top of the red. If it is red, move it down the next stair step. If blue, then move the red below it down a stair step.

4. Continue placing the chips, while following the above rules, until it starts to wobble. Write down your observations.

5. Then, play again until it topples over.

6. Put the game back nicely, please.

Observations/Results:

1. Why did it go wobbly? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Are there more blues than

reds?\_\_\_\_\_\_\_\_\_\_

Conclusion:

1. What is nuclear radiation?

2. What is radioactive decay?

3. What did the red chips represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Blue? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. What is strong force?

5. How does an atom become unstable?

6. Guess whether or not the atom's isotope is unstable.

a. Osmium: 76 protons and 114 neutrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Technetium: 43 protons and 55 neutrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. Actinium: 89 protons and 138 neutrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What is an alpha particle?

8. What is another name for an alpha particle?

9. What is a beta particle?

10. What is a gamma ray?

11. Why are gamma rays so strange?