Name: $\qquad$ Date: $\qquad$ Chemistry $\sim$ Ms. Hart Class: Anions or Cations

## Lab \#25: Radioactive Decay: A Modeling Lab

## Purpose:

1. To determine the half-life of a radioactive isotope called Pennyium.
2. To draw an exponential decay curve.
3. To create an understanding of radioactive decay of elements with radioactive isotopes.

## Background:

1. In this lab, the pennies represent $\qquad$ .
2. When a penny is facing upward (heads), it is removed because it has $\qquad$ and turned into a new kind of atom.
3. The time it takes to remove exactly $1 / 2$ of the pennies is called the $\qquad$ .

We will read this half-life from a graph that we draw.

## Procedure:

Already done for you by Ms. Hart = Count out exactly 100 pennies and put them into a zip-top bag and seal it. Record 100 pennies under time trial o on the data chart on the answer sheet.

1. Shake the bag.
2. Unzip the bag and pour out the pennies on your desk (don't let any fall!)
3. Remove all of the pennies where the head side is pointing up. Set them aside.
4. Count the remaining pennies and record that number under the next time trial on the data chart. 5. Repeat steps 2-5 until there are no pennies left in the bag. Record the number remaining in the bag each time you remove those with the letter pointing up.

## Note:

- Never put pennies that you took out (heads up) back in the bag.
- If none of the pennies have the head side pointing up, record the same number twice.


## Data:

| TIME <br> (TRIAL) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| NUMBER <br> OF <br> PENNIES <br> IN BAG | 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |

Observations: What do you notice happening as you work through your procedure? Make some comments below.

## Data Graph:

- Choose an appropriate title, label the axis, choose an appropriate scale

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

## Conclusion/Reflections:

1. Using your graph, determine how many times trials (estimate a decimal if you need to) it took to remove 50 pennies. This is your HALF-LIFE of Pennyium. ©
2. How does this activity that uses Pennyium relate to actual radioactive isotopes?
3. Use Table $\mathbf{N}$ to report TWO radioisotopes of your choice and their half-lives.
4. What fraction of a radioactive sample remains after one half-life?
5. What fraction remains after two half-lives? Explain.
6. What fraction remains after three half-lives? Explain.
