

Name \_\_\_\_\_

Period \_\_\_\_\_

## Half Life Lab

### Introduction:

What is Half Life? Many isotopes of elements on the periodic table are naturally radioactive. This means they give off alpha, beta, or gamma radiation and actually turn into different elements. This is called radioactive decay. Half life is the time needed for half the atoms in a sample to decay.

### Pre-Lab:

1. Briefly describe three kinds of radiation.
2. Suppose you have a 600 g radioactive sample with a half life of 3 years.
  - a. How much of this isotope would be left after 3 years?
  - b. After 6 years?
  - c. Would there ever come a time when all of the sample is gone? Explain.

### Procedure:

1. Count-out about 200 pennies and place them in a shoebox. Record the number of pennies as "Pennies Remaining" at "start" in Table 1.
2. Shake the box for about 5 seconds, then open it and remove all pennies that are "heads up". Count the pennies and record in Table 1. You may have to slide them around to get a good count. (Do not record "Time Passed" - that will come later).
3. Repeat this procedure many times, until only 1 or 0 pennies remain.
4. Put away materials and do the calculations and questions in the Discussion section below.

### Discussion:

1. In this lab, the pennies represented \_\_\_\_\_.
2. Each shake of the box represented one \_\_\_\_\_.
3. Complete Table 1 now by adding 5 sec to each shake in "Time Passed"
4. Plot data from Table I in Figure 1. Connect the data points with a smoothly curved line.
5. In the graph's x-axis, write "1", "2", and so on to indicate the first, second (and so on) half lives of the pennies.
6. How would you describe the shape of your plot?
7. What is the meaning of the graph you just created?
8. Approximately what percentage of pennies were removed with each new shake? Why?
9. Each shake represents the "half life" of the pennies. What is meant by "half life"?

10. Table 1. Lab Data

SHAKE #	Number of Pennies Removed	Number of Pennies Remaining	Time Passed (sec)
Start	-----		
1			
2			
3			
4			
5			
6			
7			
8			
9			

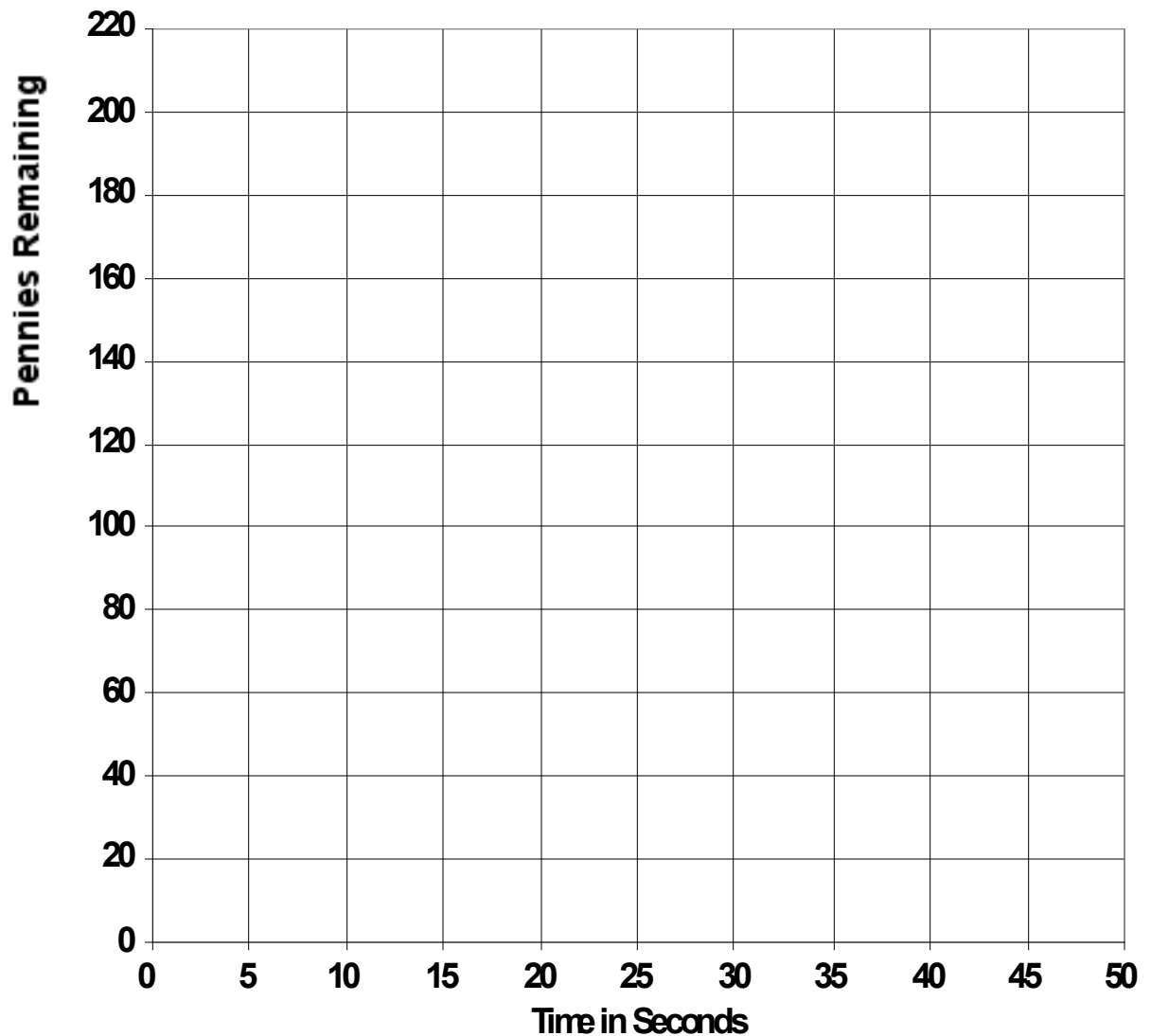


Figure 1. Pennies Remaining vs. Time