## Radioactivity and Half-life (Coin-Flip)Mini-Lab

 WHAT TO TURN IN:
 Data Table
 Graph
 Questions #1-7

Purpose: To simulate the chemical conversion of a radionuclide over time and to graph the data and relate it to radioactive decay and half-lives.

Materials: penny, graph paper, pencil, paper, ruler

## Procedure

- 1. Flip a penny 100 times and record in the data table the total number of heads that result.
- 2. In trial #2 flip the penny the same number of times that "heads" was observed in trial #1.
- 3. Record the resulting number of heads.
- 4. In trial #3 flip the penny the same number of times that "heads" was observed in trial #2.
- 5. Continue until no more "heads" are seen.

DATA TABLE		
Trial #	Number of flips	Number of heads
1	100	
2		
3		
4		
5		
6 etc Trials continue until no more "heads" are obtained.		

## GRAPH

Use graph paper to plot the trial number on the x-axis versus the number of flips on the y-axis. Draw a smooth line through the points. Remember that graphs must be titled, the axes must be properly labeled and the intervals must have even spacing.

## QUESTIONS

1) Examine the graph. Is the rate of the number of heads produced over time linear or nonlinear? Is the rate constant over time, or does it change?

- 2) Why does each trial reduce the number of heads by approximately one-half?
- 3) Why do nuclear reactions violate the Law of Conservation of Mass?
- 4) Compare and contrast alpha particles, beta particles, and gamma radiation as they relate to nuclear decay. Be specific.
- 5) List three units used to measure radioactivity and its effects on the body.
- 6) What is reprocessing?
- 7) Compare and contrast fission and fusion.