Radioactivity and Half-Life Lab

WHAT TO TURN IN:
Hypothesis, Data table, Calculations (N/A), Error Analysis (N/A), Conclusion, Questions 1-3

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

MATERIALS: penny or other coin, graph paper, pencil, ruler

PROCEDURE
1) Flip a penny 100 times.
2) Record in your data table the total number of heads that result.
3) In trial 2, flip the penny the same number of times that you had heads in trial 1.
4) Record the resulting number of heads.
5) In trial 3, flip the penny the same number of times as you had heads in trial 2.
6) Continue until you obtain no more heads.

DATA TABLE

Trial #	Number of flips	Number of heads
1	100	
2		
3		
4		
5		
6…		

Trials continue until you obtain no more heads.

GRAPH – must use graph paper
1) Plot the trial number on the x-axis and the number of flips on the y-axis.
2) Draw a smooth curved line through the points.
3) Remember that graphs must be titled, the axes must be properly labeled, and the intervals must have even spacing.

QUESTIONS
1) Examine your graph. Is the rate of the number of heads produced over time linear or non-linear? 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) A half life is the time required for one half of the atoms of a radioisotope to emit radiation and to decay to products. What value represents one half-life for the process of flipping coins: the number of flips, the number of heads, or the number of trials?