Name:

PHYSICS

Half-Life Research Activity

Directions: Complete the exploratory activity below. Then, research and answer the questions that follow.

Materials

- 50 pennies or other coins
- Cup or other container (that can hold all 50 coins)

Prediction

Read through the procedures below. Prior to performing the activity, write down how many rolls you think it will take to be left with 25 pennies.

Procedures

1. Take the 50 pennies and place them in the cup or container.
2. Shake the pennies and then dump them onto the table.
3. Remove and set aside all the pennies that are heads-up.
4. Record the number of pennies remaining in the data chart.
5. Take the remaining pennies and place them in the cup or container.
6. Repeat steps 2-5 until there are no remaining pennies.

Data

10 points *(add rows if needed)*

Roll Number	Pennies Remaining
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

Analysis

8 points

1. How many rolls did it take for all of the pennies to be removed?

2. How many rolls did it take for approximately half of pennies to remain?

3. How many rolls did it take for approximately half of half of the pennies to remain?

4. Did you notice any type of pattern in your results? Explain.

Application Questions

10 points

1. In physics, there is a term called "Half-Life." What is the definition of that term?

2. How is half-life related to nuclear reactions?

3. What equation do physicists use to calculate the number of atoms remain after time *t* (i.e. what equation represents half-life)?

4. How is half-life useful in the "real world"?

5. In the penny activity, what represents the "half-life" of the quantity of pennies? Explain.