LAB: **HALF LIFE – PENNIUM**

Name Key 2017

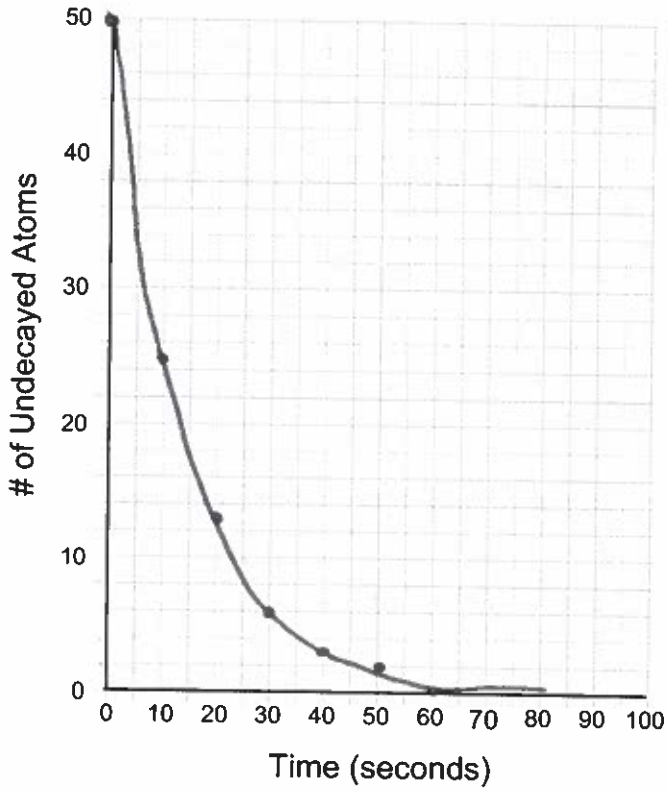
This simulation provides examples of the rates at which radioactive isotopes decay. Answer all of the questions on your lab sheet. Prepare your lab station for the next class.

Procedure 1: 50 ATOMS OF PENNIUM

- Place 50 atoms of **PENNIUM** (pennies) in the bag.
- Seal the bag and gently shake for **10 seconds**.
- Gently pour out pennies onto the desk.
- When you pour them out, count the atoms with "**tails**" showing – these atoms have "decayed."
- Return only the pennies with the **"heads"** up back to the bag. Reseal the bag.
- Don't throw away decayed pennies – just set them aside.
- Gently shake the sealed bag for 10 seconds and repeat the above procedure.
- Continue shaking, counting, and setting aside pennies until all the atoms have decayed.
- Graph the number of undecayed atoms (parents) vs. time.

Procedure 1 – Pennium (Tails) (Heads) Daughters Parents

Half life number	Total time	# of Decayed Atoms	# of Undecayed Atoms
0	0 sec.	0	50
1	10	25	25
2	20	37	13
3	30	44	6
4	40	47	3
5	50	49	1
6	60	50	0
7			
8			
9			
10			



Procedure 2: 20 ATOMS OF PENNIUM

Repeat Procedure 1 above, but this time use 20 atoms of **PENNIUM** (pennies) and shake the bag for **5 seconds** between pouring instead of 10 seconds.

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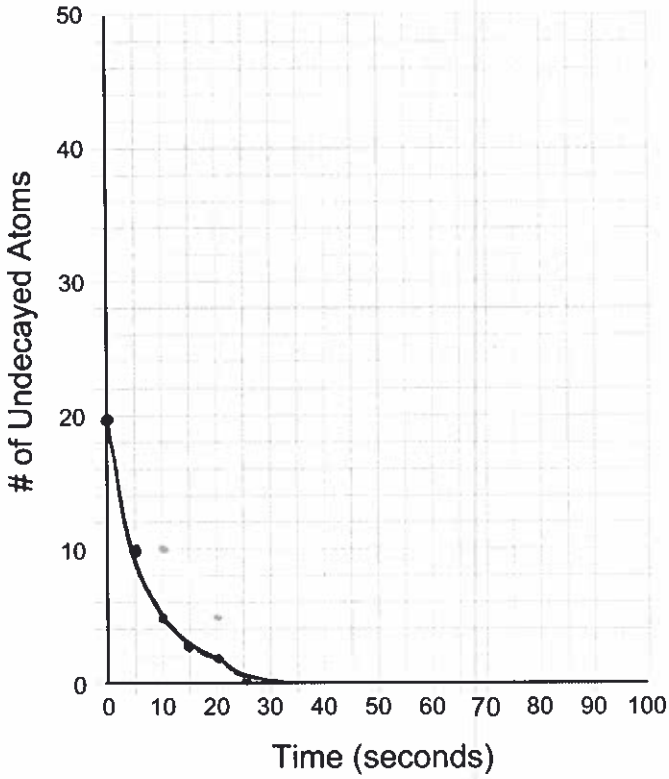
Procedure 2 – Pennium (Tails) (Heads)
Daughter Parent

Half life number	Total time	# of Decayed Atoms	# of Undecayed Atoms
0	0 sec.	0	20
1	5	10	10
2	10	15	5
3	15	17	3
4	20	19	1
5	25	20	0
6			
7			
8			
9			
10			



Questions

1. In the experiment, what was the **half-life** of the element **pennium** in Procedure 1?

   10 s

2. In the experiment, what was the **half-life** of the element **pennium** in Procedure 2?

   5 s

3. After **two half-lives**, what **fraction** of the atoms of **pennium** (Procedure 1) **had not decayed** (undecayed)?

   ~ 1/4

4. **Compare the shape** of the two graphs you drew.

   same

5. Does half-life depend on **how much** of an element you started with? Explain.

   No, the half-life depends on the radioisotope

6. Does the ~~decay~~ shape curve depend on **how much** you started with or the half-life? Explain. when starting w/more the graph will be mor spread out.

   No, the rate of decay will remain the same. Half will decay every half-life no matter how long the half-li