South Pasadena • Chemistry

Name _____
Period ___ Date ___/___/___

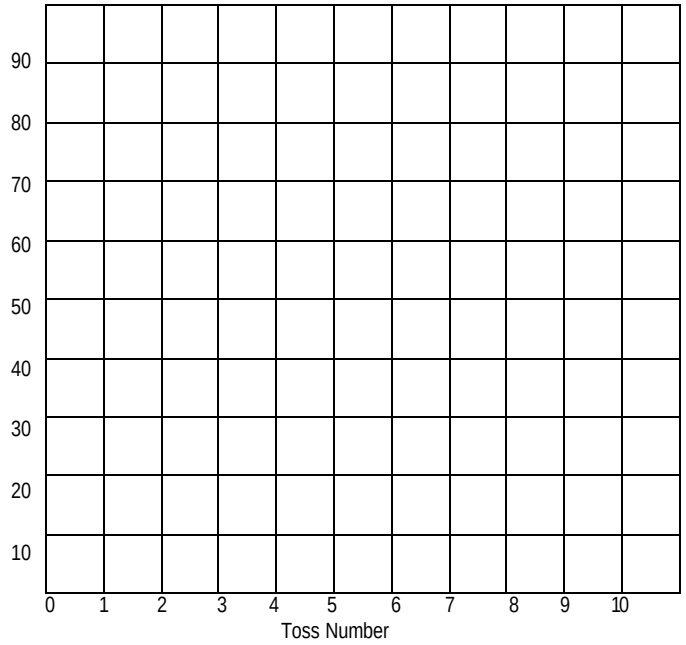
Unit 6 • The Nucleus – Radioactivity

H A L F - L I F E

1. As a class, we collect data as though we are radioactive atoms. Fill in the data chart below:

Toss#	1	2	3	4	5	6	7	8	9	10	
# standing											
# standing											
# standing											
Total											

Graph this data:



2. How long does it take for half the "atoms" to decay? _____ toss(es). This is the half-life.

3. Using a different color, plot a graph for a group of atoms that have a half-life of 3 tosses.

4. ^{24}Na has a half-life of 15 hours. If we start with 64 grams of ^{24}Na, fill in the chart for how much ^{24}Na we will have after each time interval.

Time	0 h	15 h	30 h	45 h	60 h	75 h	90 h	105 h
Mass of ^{24}Na	64 g							

half-lives

5. ^{257}Lr has a half-life of 8 seconds. If we begin with 80 μg of ^{257}Lr, how long will it take before only 5 μg remains? _____ seconds

Time	0 s	8 s	16 s	24 s	32 s	40 s	48 s	56 s
Mass of ^{257}Lr	80 μg							

half-lives

6. A sample of ^{253}Fm decays to 6.25% of its activity in 18 days. What is its half-life?

Time	0 d							
Mass of ^{253}Fm	100%	50%	25%	12.5%	6.25%			

half-lives

7. ^{24}Na has a half-life of 15 hours. If we need to have 2 grams of ^{24}Na after 45 hours, how much must we begin with?

Time								45 h
Mass of ^{24}Na								2 g

half-lives

8. ^{257}Lr has a half-life of 8 seconds. How long will it take for 75% of the sample to decay?

Time								
Mass of ^{257}Lr								

half-lives

9. ^{14}C has a half-life of 5570 years and is used to date fossils. A sample is only 3% as radioactive as it should be compared to carbon from a living organism. How old is the fossil?

Time								
Mass of ^{14}C								

half-lives

10. ^{24}Na has a half-life of 15 hours. If we start with 90 grams of ^{24}Na, how much will we have after 75 hours?

Time								
Mass of ^{24}Na								

half-lives