FLINN SCIENTIFIC

Name_____

Radioactivity Half-life Simulation

Data Table

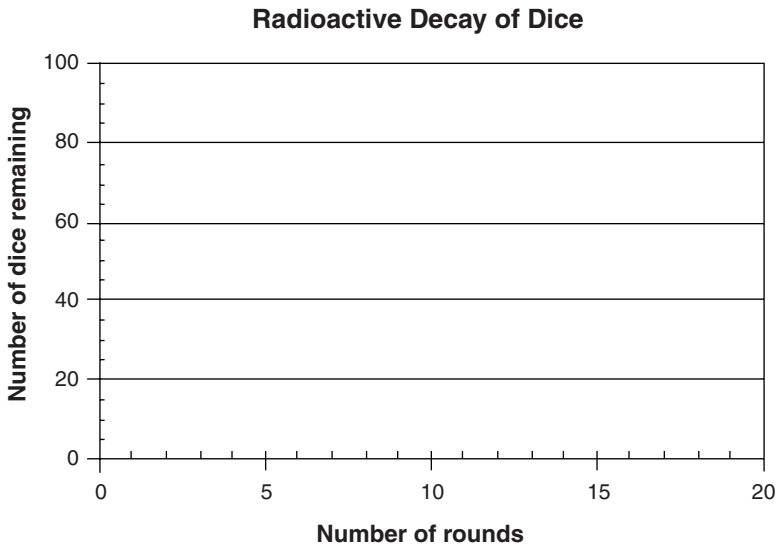
Number of sides on the dice				
Assigned "decay number"				
Round	**Number of dice (initial)**	**Number of dice that "decayed"**	**Number of dice remaining[1]**	**Data[2]**
1	100			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

[1]*The number of dice remaining will equal the number of initial dice for the next round.*

[2]*Record the number of dice that decay from each roll of 10 dice here. After the required number of rolls has been completed to match the initial number of dice for each round, add up the total number of dice that decayed and record the result.*

Post-Lab Questions *(Use a separate sheet of paper to answer the following questions.)*

1. Graph the results obtained for the "radioactive decay" of dice. Note: Include a point on the graph for "100" as the number of dice "remaining" after zero rolls of the dice (Round zero).



2. Determine the half-life: Choose two points on the y-axis, where the first point is about twice as large as the second point (e.g., 80 dice and 40 dice). How many rounds are needed for one-half of the dice to decay?
3. Verify the half-life value by choosing another set of two points on the y-axis. Is the half-life a "constant" for the decay of the dice?
4. Compare the value of the half-life with that obtained by another group using the same-sided dice but a different "decay number." Does the half-life depend on the "decay number" that was assigned? Explain, based on probability.
5. Using the value of the half-life determined in Questions #2 and 3, predict how many dice should have remained after 15 rounds. Compare this with the number of dice that actually remained (see the Data Table). What factors might account for any difference between the predicted and actual number of dice remaining after 15 rounds?
6. Using the concept of half-life, predict the number of rounds that would be needed to reduce the number of dice from 10,000 to 625 using 6-sided dice and one "decay" number. Repeat the calculation using 10-sided dice and two "decay" numbers.
7. Does the "decay curve" for dice have the same general shape as the decay curve for Sr-90 (see the Pre-Lab Questions)? Would the shape of the decay curve be different if you had started with 1000 dice instead of 100?