

Name\_\_\_\_\_ Per.\_\_\_\_\_

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## Half-life Activity

Directions:

- 1) Place all of the m&m pieces in the plastic tray.
- 2) Organize them in 10 groups of 10 to confirm you have 100.
- 3) Place them all in the paper cup and shake it carefully.
- 4) Spread them out from the cup back into the tray.
- 5) Remove all of the m&m pieces that have the “m” side up. These have gone through decay. Put them back into the zip-lock bag.
- 6) Count those that remain and record in the table below.
- 7) Repeat steps 3-6 until all of the m&m pieces have gone through decay.

Decay Event	m&m pieces remaining
0	100
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

- 8) Using Excel make an x-y scatter plot of the data in the table above.

Questions:

1. How good is our assumption that half of our radioactive “nuclei” decay in each half-life? Explain.

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2. If you started with a sample of 600 radioactive nuclei, how many would remain undecayed after three half-lives?

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3. If 175 undecayed nuclei remained from a sample of 2800 nuclei, how many half-lives have passed?

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4. How many half-lives would it take for  $6.02 \times 10^{23}$  nuclei to decay to 6.25% ( $3.76 \times 10^{22}$ ) of the original number of nuclei?

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5. Is there any way to predict when a specific piece of candy will land marked side up or “decayed?” If you could follow the fate of an individual atom in a sample of radioactive material, could you predict when it would decay? Explain.

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6. Strontium-90 has a half-life of 28.8 years. If you start with a 10-gram sample of strontium-90, how much will be left after 115.2 years? Justify your answer.