Radioactive Candy

Procedure (*You will work with one partner for this activity.* Record all data on your data sheet)

1. You will be supplied with a plastic cup of M&Ms. Count the number of "atoms" you start with.
2. How many trials do you predict it will take until all of your "atoms" have decayed? Write this prediction on your paper.
3. Return the atoms to the cup and shake gently. Pour out candy on to a paper towel on your table.
4. Count the number of pieces with the print side up. These atoms have "decayed."
5. Return only the pieces with the print side down to the cup.
6. Record the number of decayed and undecayed atoms.
7. Consume the "decayed" atoms.
8. Gently shake the cup again.
9. Continue shaking, counting, and consuming until all the atoms have decayed.
10. Using the supplied graph paper, graph the number of **undecayed** atoms vs. number of trials.

Analysis:

1. How accurate was your prediction of number of trials?

2. How good is our assumption that half of our radioactive "nuclei" decay in each half-life? Explain.

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

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

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.

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.