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Unit 7D
Half Life
Modeling Radioactive Decay Lab TEACHER

In today's activity, you will be modeling radioactive decay by using materials that have a 50% probability of being one one side or another. Your teacher will provide these materials.

Materials:

- 50% probability particles
- Graph paper

Procedure:

Count the total number of particles with which you begin. This will be your starting mass. You will shake your sample to disturb your particles and remove all of the particles that are either upside down or rightside up- your choice. Shake your sample to disturb the particles, and remove all of the particles that are either upside down or rightside up -- your choice. Be sure to count how many particles you are removing.

Repeat this process four more times, removing all of your decayed particles each time. Once you have completed your procedure five times, you should make three line graphs:

- **Non-Decayed Particles vs. Half-Lives**
- **Decayed Particles vs. Half-Lives**
- **A graph of both Non-Decayed Particles AND Decayed Particles vs. Half-Lives**

Questions to consider:

1. **Define the term half-life.**

   Half-life is the amount of time it takes for half of a radioactive substance to decay.

2. **What happened to the number of non-decayed particles after each half-life occurred?**

   About half of the particles decayed; the number of non-decayed particles decreased.

3. **Describe the shape of your non-decayed particles vs. half-life graph. What does this indicate about how radioactive decay occurs?**

   It has the shape of an exponential curve. This means that approximately half of the substance will decay each time a half-life passes.

questions continued on next page

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Modeling Radioactive Decay

The particles with a 50% probability of landing on one side can be:

- *M&M's® or Skittles®*
- *Coins*
- *Puzzle pieces*
- *Dice (odd or even sides)*

It is preferable that each group of students has roughly 100 particles to use in the investigation. However, if you do not have enough materials, you can make your groups larger: provide 10 students with 10 particles each, and have students graph the combined data from each individual student after each half-life.

The student graphs should look something like the following: