

Name: _____

Date: _____

Radioactivity and Half-Lives

This exercise illustrates radioactive decay. You will obtain 200 pennies that represent atoms of a radioactive nuclide. Each tails up penny is a decayed atom; heads up pennies are the ones that have not decayed.

Hypothesis:

Make a data table that displays the number of half-lives you believe it will take for all of the pennies to decay and your prediction for the number of pennies remaining after each half-life. Include a few statements about how you came up with your numbers.

Procedure:

1. Place 200 pennies in a foam cup. Assume all of them are heads at the start.
2. Shake the cup vigorously and spread the pennies out on the table.
3. Carefully remove all the tails up pennies. Count the remaining pennies (heads up) and place them inside the cup. These represent the number of pennies that did not decay during a half-life period of time. Record this number in a third column in your data table.
4. Repeat steps 1 through 3 until no pennies are left in the cup.

Data:

Construct a table that shows the half-life and number of pennies remaining for each toss.

Analysis:

Construct a graph using your data table. Your first curve will be titled Predicted Number of Heads vs. Half-Lives. The second curve will be titled Actual Number of Heads vs. Half-Lives.

Determine the percentage of pennies that decayed each trial.

Discussion:

When may the number of atoms (pennies) be a limitation in predicting decay rate?

Are the percentages of pennies that decayed each trial expected? Explain.