NUCLEAR REACTIONS LICORICE HALF-LIFE SIMULATION

PURPOSE: To illustrate basic concepts of half-life decay and determine absolute dating techniques.

MATERIALS: Licorice sticks or whips, graph paper, scissors or other cutting device, ruler and pencil

PROCEDURE: 1. Select a piece of licorice, which is somewhat equal in length to the vertical axis of the graph paper. Place the licorice so that one end is at zero on the vertical axis and label the other end 100 percent.

2. Determine a suitable length of time to illustrate radioactive decay. (for example, allow 100 seconds of real time to represent 100 years of scale time) Set up time units along the horizontal axis.

3. At your first time interval after zero cut the licorice in half, place one half aside for later and place the remaining half on the graph and label it as 50 percent on the vertical axis. This represents the analogy the licorice is “decaying.”

4. At the next time interval cut the remaining licorice half in half, placing it on the graph paper and labeling the percentage value it represents.

5. Continue cutting the licorice in half and marking the percentage values until you are unable to cut any smaller pieces or until no licorice remain. Indicate on the graph where you feel accuracy is becoming questionable.

6. Connect all points with a best-fit line.

7. Obtain three random lengths of licorice, marking each length in a different color on your graph. For each piece, determine the amount of time needed to result in that amount of licorice remaining and label it on your graph.

8. Explain what you observed as you were cutting and marking the licorice on your graph. Explain what your graph shows and how this represents half-life decay.

9. Using your data on the random licorice lengths, write a discussion to explain effective half-life time spans.

10. Using your data on the random licorice lengths, describe how to interpret intervals not equal to specific fractions. Consume or dispose of the licorice, staple your lab report in order to the back of this lab sheet.