

## The Half-Life of Diet Cola Foam Activity

The measurement of the half-life of a radioactive isotope allows scientists, archaeologists, and geologists to determine what isotope is in a sample. They may then determine what proportion of the radioisotope has decayed and use this proportion to determine how old the sample is.

In the following activity, your group of three will calculate the half-life of Diet Coke foam to see how this physical characteristic may be measured.

### Group Materials:

- A graduated cylinder
- A stopwatch
- 2 L of Diet Coke
- Masking tape
- Pen or marker

### Instructions

1. Place a strip of masking tape along the vertical scale of the graduated cylinder.
2. Shake up a little bit, and then pour Diet Coke into the cylinder. Allow the foam to settle a little bit.
3. Mark the height of the liquid level.
4. Continue to mark the liquid level at 5-second intervals until as much foam turns into liquid as possible and then continue waiting for another two minutes to mark the final liquid height. This final height will be  $H_{(\max)}$ .
5. Remove the tape from the cylinder. Measure from the end point ( $H_{(\max)}$ ) to the measured levels (i.e. Height of Foam =  $H_{(\max)} - H_{(t)}$ ) and record in an appropriate table.
6. Repeat the experiment a second time and graph Foam Height versus Time.

### Discussion

1. What is the half-life of Diet Coke foam? How do you know?
2. How long would it take for less than 1% of the foam to remain? How long, in seconds, is this?
3. What represents the parent atoms in this activity? What represents the daughter atoms?