

The Case of the Melting Ice

Frosty the Snowman Meets His Demise

Frosty the Snowman lies melting in the funnels at your lab station. There were no eyewitnesses, but there are several suspects. All the suspects have holes in their alibis. You need to determine the exact time at which Frosty was put into the funnels to melt away, leaving no trace.

On a separate sheet of paper, immediately record the volume of Frosty's melted remains (water) in your graduated cylinder and note the time on the clock. Make a data table and at regular intervals (you decide how long) record the time on the clock and the volume of water in the graduated cylinder. Stop after about 30 minutes, unless Frosty has completely melted earlier.

Analysis:

1. What are the units for the **rate** at which Frosty melted?

2. Think about making a graph from your data. To determine which axis you will use for volume and which axis for time, recall that slope is rise (y-axis) over run (x-axis). Look at which units you decided to use for the rate of melting.

Y-axis _____

X-axis _____

3. What volume will you start with at the origin of your graph? Why did you choose that number?

4. **Estimate** when you think Frosty met his demise. Explain how you got your estimate.

5. Using your answers to questions 1 through 4, set up your graph and graph your data.

6. **Using your graph**, find the exact time Frosty start to melt. How close is this time to the time you estimated in question 4? _____

7. Describe the shape of your graph.

8. What does your graph tell you about the rate at which Frosty melted and the rate of radioactive decay?

9. Write the equation for the beta decay of carbon-14.

10. Speculate: Do you think any isotopes but carbon-14 could be used for radio dating? Why do you think that?

You can check your answer at this site. **Radiometric Dating**
<http://www.dc.peachnet.edu/~pgore/geology/geo102/radio.htm>