

SECTION 3

Enrichment

Graphing Scientific Data

Experimental data provide information about the variables from specific measurements. Graphs can be prepared from data. A straight line or curve is drawn using the data points as a guide. The data points are not connected in a “dot-to-dot” manner. Rather, the line that best fits the data is drawn.

Often scientists need to know what the value of a variable will be at a point that was not measured. Interpolation is a method used to approximate values that are between points of a graph. Extrapolation is a method for approximating values that are beyond the range of the data. Data must be extrapolated when values needed are not in the range of the measurements obtained.

The data in the table below were obtained from an experiment conducted to find out how the volume of a gas changes when its temperature changes. Use this data to construct and interpret a graph.

Procedure

1. Draw a graph on a piece of graph paper.
2. Mark the x -axis for the independent variable and the y -axis for the dependent variable.
3. Plot a point for each temperature/volume set of data in the table. Draw the line that best fits the data points.
4. Extend the line to include all temperatures from 0 K to 600 K.

Conclude and Apply

1. Use your graph to predict values for the volume of a gas at 0 K, 140 K, 273 K, 400K, and 600 K and place these values in the data table.
2. Suppose you had drawn the graph in a “dot-to-dot” fashion. Why would it be difficult to extrapolate from this type of graph?

3. Why isn't it necessary for all of the data points to be on the drawn line of the graph?

4. Write a sentence that describes the relationship between the temperature and the volume of a gas.

Table 1

Temperature (K)	Volume (cm ³)
0	a.
100	71
140	b.
210	155
273	c.
280	195
360	257
400	d.
600	e.