

## 1.2 Activity: Graphing Relationships

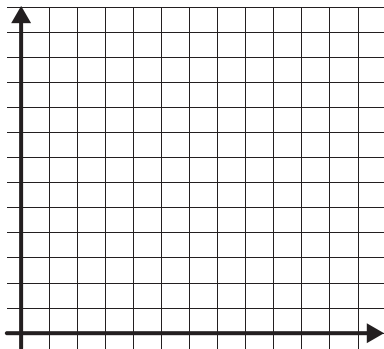
### Question

Can you produce a graph given a set of experimental data?

### Background

A beaker full of water is placed on a hotplate and heated over a period of time. The temperature is recorded at regular intervals. The following data was collected.

Temperature (°C)	Time (min)
22	0
30	2
38	4
46	6
54	8
62	10
70	12



### Procedure

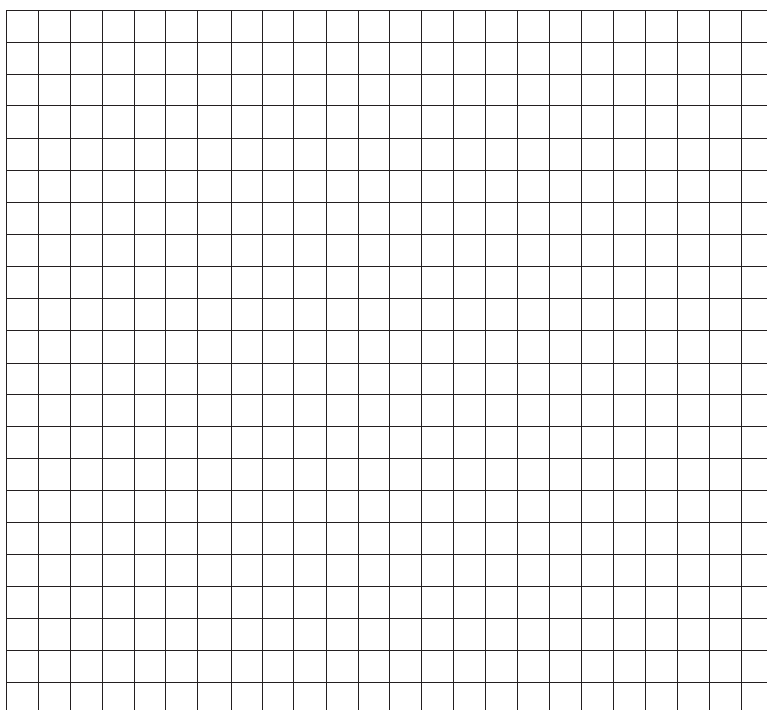
1. Use the grid above to plot a graph of temperature against time. (Time goes on the x-axis.)

### Results and Discussion

1. What type of relationship was studied during this investigation?
2. What is the constant (be sure to include the units)?
3. What temperature was reached at 5 minutes?
4. Use the graph to determine the relationship between temperature and time.
5. How long would it take the temperature to reach 80°C?
6. What does the y-intercept represent?
7. Give a source of error that might cause your graph to vary from that expected.

11. Use the grid provided to plot graphs of mass against volume for a series of metal pieces with the given volumes. Plot all three graphs on the same set of axes with the independent variable (volume in this case) on the x-axis. Use a different colour for each graph.

Volume (mL)	Copper (g)	Aluminum (g)	Platinum (g)
2.0	17.4	5.4	42.9
8.0	71.7	21.6	171.6
12.0	107.5	32.4	257.4
15.0	134.4	40.5	321.8
19.0	170.2	51.3	407.6

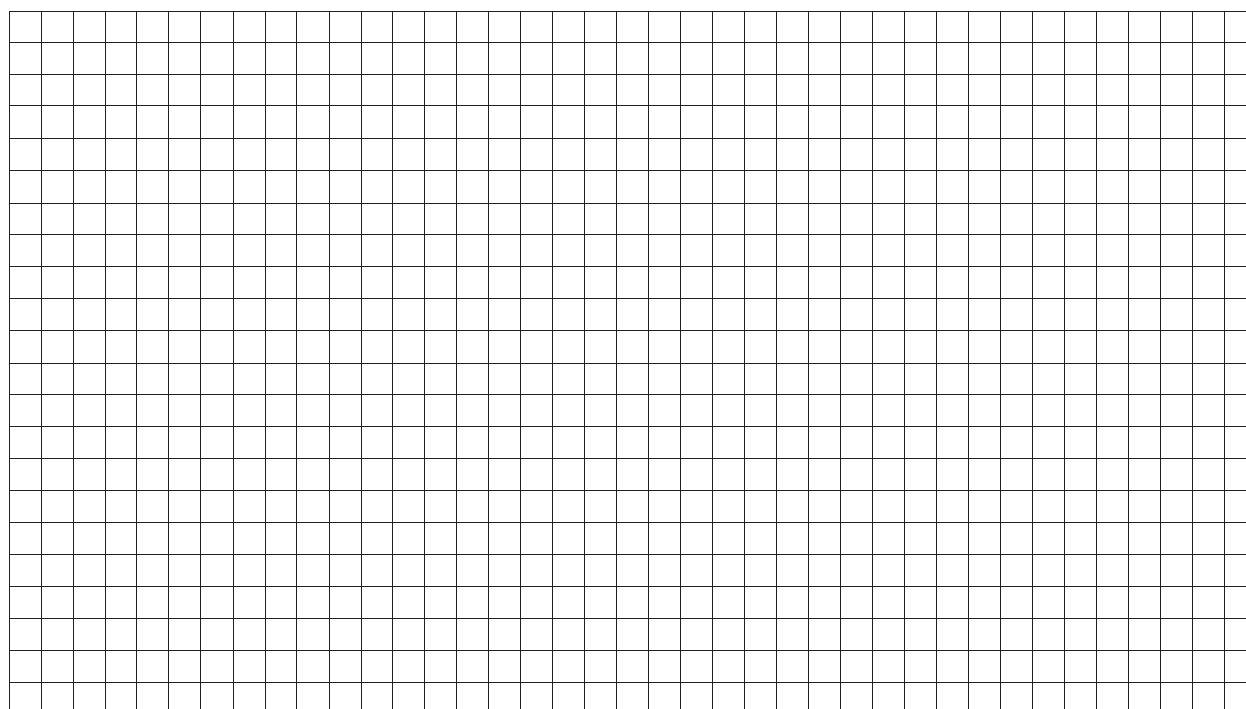


(a) Determine the constant for each metal.

(b) The constant represents each metal's density. Which metal is most dense?

12. Use the grid provided to plot two separate graphs, (a) and (b), for each the following sets of data. Be sure to draw a *smooth curve* through the points. Indicate the type of relationship represented by each graph.

Initial Rate (y) (mol/L/s)	Concentration (mol/L)	Volume (y) (L)	Pressure (kPa)
0.003	0.05	5.0	454
0.012	0.10	10.0	227
0.048	0.20	15.0	151
0.075	0.25	20.0	113
0.108	0.30	25.0	91
0.192	0.40	30.0	76



13. Many science departments use a still to produce their own distilled water. Data representing the volume of distilled water produced over a particular period of time might look like the data shown in the table.

<b>Volume of Distilled Water (L)</b>	<b>Distillation Time (h)</b>
0.8	0.4
1.6	0.8
2.4	1.2
5.0	2.5
7.2	3.6
9.8	4.9

- (a) Plot this data on your own piece of graph paper. Where should time be plotted?
- (b) Determine the constant for your graph. Show all work on the graph.
- (c) Determine the relationship between volume and time.
- (d) Assume the still was left on overnight. What volume of water would be collected if a period of 14 h passed?
- (e) How long would it take to produce 12.5 L of water with this still?