|  | Objectives <br> 1. Explain why we use graphs <br> 2. Identify the key features of a line graph <br> 3. Distinguish between direct, indirect, and inverse graphs <br> 4. Calculate gradient using data from graphs <br> 5. Use data to construct graphs |
| :--- | :--- |

A substance is a solid at $15^{\circ} \mathrm{C}$. A student heated a sample of the solid substance and recorded the temperature at one-minute intervals in the data table below.

| Time (min) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Temperature $\left({ }^{\circ} \mathrm{C}\right)$ | 15 | 32 | 46 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 60 | 65 |

1a. On the grid below, mark an appropriate scale on the axis labelled "Temperature $\left({ }^{\circ} \mathrm{C}\right)$."
An appropriate scale is one that allows a trend to be seen.
1b. Plot the data from the data table. Circle and connect the points.

Example:



2a. Complete the data table below for the following Group 18 elements: $\mathrm{He}, \mathrm{Ne}, \mathrm{Ar}, \mathrm{Kr}$, and Xe .

| Atomic <br> Number | Element | First Ionization Energy <br> $(\mathrm{kJ} / \mathrm{mol})$ |
| :---: | :---: | :---: |
| 2 | He |  |
| 10 | Ne |  |
| 18 | Ar |  |
| 36 | Kr |  |
| 54 | Xe |  |

Using the data from the table above, construct a line graph on the grid provided following the directions:
2b. Mark an appropriate scale on the axis labelled "First lonization Energy ( $\mathrm{kJ} / \mathrm{mol}$ )."
2c. Plot the data from the table above. Circle each point and connect the points.

Example:



2d. Based on your graph above, describe the trend in the first ionization energy of Group 18 elements as the atomic number increases.

3a. Record the electronegativity for the elements with atomic numbers 11 through 17.

| Atomic Number | Electronegativity |
| :---: | :---: |
| 11 |  |
| 12 |  |
| 13 |  |
| 14 |  |
| 15 |  |
| 16 |  |
| 17 |  |

3b. On the grid below, mark an appropriate scale on the axis labelled "Electronegativity". 3c. On the same grid, plot the data from the data table. Circle and connect the points.

Example:



## Atomic Number

3d. Based on your graph above state the trend in electronegativity as the atomic number increases.
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