Limonene in fruit peels

*Education in Chemistry*
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**Percentage of an amount**
One of the molecules responsible for the citrus flavour in fruit such as lemons, oranges and mandarins is called limonene and it can be extracted and purified. The result is a strongly smelling clear oily liquid. Starting with 200 g of orange peel, 2.4 g of limonene was produced. What is the percentage of limonene in orange peel?

\[
\text{percentage of limonene in orange peel} = \frac{\text{part}}{\text{whole}} \times 100\%
\]

\[
= \frac{2.4}{200} \times 100\% = 1.2\%
\]

To visualise this with a bar model consider the following diagram:

1) Complete the table to show the percentage of limonene in different fruit.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Mass of limonene (g)</th>
<th>Mass of fruit peel (g)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>2.40</td>
<td>200</td>
<td>1.20</td>
</tr>
<tr>
<td>Mandarin</td>
<td>4.21</td>
<td>156</td>
<td>2.70</td>
</tr>
<tr>
<td>Lemon</td>
<td>1.59</td>
<td>122</td>
<td>1.30</td>
</tr>
<tr>
<td>Blood orange</td>
<td>1.67</td>
<td>209</td>
<td>0.80</td>
</tr>
</tbody>
</table>

2) What type of graph would be best to display the data?

A bar chart, because the data is in categories.
3) Draw an appropriate graph to display the data.

4) The percentage of limonene in lemons is typically about 1.8%. Complete the table to show the amount of limonene in different amounts of lemon peel.

Divide 97 by 100 to get 1%:  = 0.97 g

Then scale up: 1.8 x 0.97 g = 1.75 g

<table>
<thead>
<tr>
<th>Amount of lemon peel (g)</th>
<th>Amount of limonene (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>1.75</td>
</tr>
<tr>
<td>28</td>
<td>0.50</td>
</tr>
<tr>
<td>164</td>
<td>2.95</td>
</tr>
</tbody>
</table>