

SUBJECT: Pie-charts – used for illustrating proportions (or share) within a total

KEY-WORDS: chart, data, 360°, fraction, angle

LINK-WORDS: chart, showing data

NOTES

A visual way to show how a set of data is “shared” between subsets. First popularised by Florence Nightingale to show how more soldiers died AFTER battle in the hospital than on the actual battlefield to persuade MPs to finance nurses and cleaner wards! They are visually easy to read for comparison purposes, but their size has no relevance to the data – it is the size of the angles that is important!

A pie-chart does not show what the total in a set is – eg both of these would have an identical pie-chart:

Dog - 15	Europe - 1500
Cat - 6	Asia - 600
Horse - 4	USA - 400
Fish - 4	Africa - 400
Other - 7	Sth America - 700

So labelling and titles is essential!

EXAMPLE

The population of the UK is distributed as follows: England – 54 million, Scotland – 5 million, Wales – 3 million, Northern Ireland – 2 million. Show this as a pie-chart.

Divide 360 by the TOTAL number of data to get an angle size for ONE unit.

$$\begin{aligned} \text{Total} &= 54 + 5 + 3 + 2 \\ &= 64. \quad 360 \div 64 = 5.625^\circ \text{ per million} \end{aligned}$$

Multiply each section value by this angle:

$$\text{England} - 54 \times 5.625 = 303.75^\circ$$

$$\text{Scotland} - 5 \times 5.625 = 28.125^\circ$$

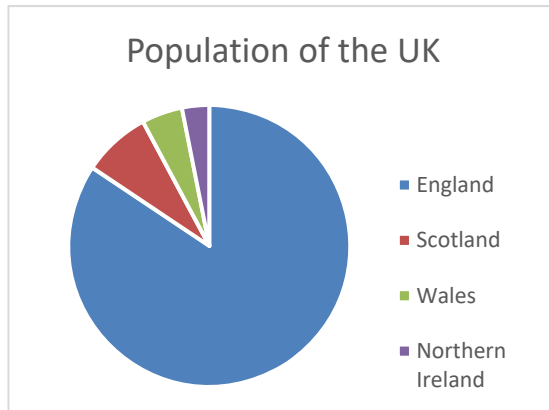
$$\text{Wales} - 3 \times 5.625 = 16.875^\circ$$

$$\text{N. Ireland} - 2 \times 5.625 = 11.25^\circ$$

CHECK – they should total to 360. (But could be slight rounding error, not important if less than 1°.)

Now draw these angles within a circle – starting with a vertical line from the centre as 0 and work your way around.

CHECK – last angle should equal last value without the need to draw it.



DO's

- Remember the steps –
- 1 – divide 360 by the total
- 2 – multiply each section by this angle to get angle for each section
- 3 – draw the angles and add a title & legend

DON'T

- Don't forget to check that your angles add to 360.
- Don't assume that a pie-chart can give you totals – it DOESN'T. It only gives you a comparative picture of the ratios of each section.
- DON'T OVER-USE PIE-CHARTS – bar charts will often be more suitable.**

RELEVANT SUBJECTS

ALL. Anywhere where you want to visually show data.

EXAMPLES and LINKS- BBC Bitesize going through some examples:

www.bbc.co.uk/schools/gcsebitesize/maths/statistics/representingdata1rev2.shtml