

Stem-and-leaf diagrams, population pyramids and choropleth maps

About 55 minutes Calculator allowed 45 marks



Hints online, answers free with an
account:
[mathswariz.uk/worksheets/stats-
stem-and-leaf-diagrams-
population-pyramids-and-
choropleth-maps/](https://mathswariz.uk/worksheets/stats-stem-and-leaf-diagrams-population-pyramids-and-choropleth-maps/)

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

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|--|---|
| <p>A1 Needed today [2 marks]</p> <p>Maya groups some lengths, in cm, using these classes:
$5 < l \leq 10$, $11 < l \leq 15$,
$15 < l \leq 20$. Explain what is wrong, and write better classes.</p> <p>_____</p> <p>_____</p> | <p>A2 Last lesson [2 marks]</p> <p>A pie chart shows how students travel for 1080 people. The bus sector is 115° and the car sector is 95°. How many more people chose bus than car?</p> |
|--|---|

- | | |
|---|--|
| <p>A3 From chapter 4 [2 marks]</p> <p>At sixth form P, 64 of the 200 students study a language. At sixth form Q, 87 of the 500 students do. Gail says, "More students study a language at Q, so a greater proportion of students study a language at Q." Is Gail correct? Show your working.</p> <p>_____</p> <p>_____</p> | <p style="text-align: right;">Answer</p> <p>A4 Maths skill [2 marks]</p> <p>A number x is truncated to a whole number. The result is 936. Write down the error interval for x.</p> <p style="text-align: right;">Answer</p> |
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B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

The diagram shows the times, in seconds, 11 boys and 11 girls took to solve a puzzle. (a) Find each group's median and range. (b) Compare the two groups.

Boys		Girls
7 3	2	1 4 5 8 9
8 5 4 1	3	2 3 6 9
7 4 2	4	1 5
6 1	5	

Key: 1 | 3 | 2 means 31 s (boys) and 32 s (girls)

Hint With 11 values, the median is the 6th. Count the leaves out from the stem.

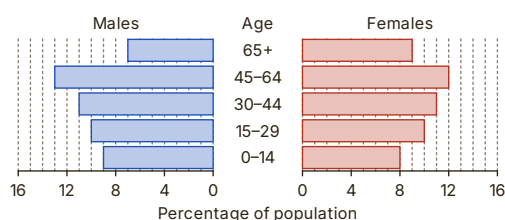
B1 The diagram shows the heights, in cm, of 9 plants grown in the sun and 9 in the shade. Compare the heights of the two groups. Use the median and the range. [4 marks]

Sun		Shade
9 4	1	1 3 5 6 8
8 6 5 2	2	1 2 4 9
7 3 1	3	

Key: 4 | 1 | 3 means 14 cm (sun) and 13 cm (shade)

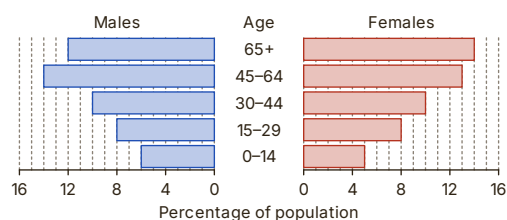
EXAMPLE 2

The population pyramid shows the 40 000 people of Town P. (a) What percentage of the people are females aged 65 and over? (b) How many males aged 0–14 live in Town P?



Hint The bars show percentages of the whole town, not numbers of people.

B2 The population pyramid shows the 25 000 people of Town Q. How many people aged 65 and over live in Town Q? [2 marks]



Answer

EXAMPLE 3

The table gives the percentages from the population pyramids of Towns P and Q. Compare the ages in the two towns, and the genders of those aged 65 and over.

	Males P	Females P	Males Q	Females Q
0–14	9%	8%	6%	5%
15–64	34%	33%	32%	31%
65+	7%	9%	12%	14%

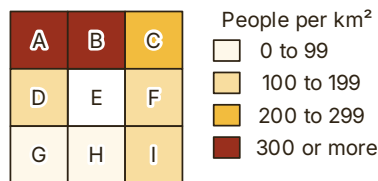
Hint Add the males and the females in an age group first. Then compare the two towns.

B3 The table gives the percentages from the population pyramids of two villages, A and B. Compare the ages in the two villages, and the genders of those aged 60 and over. [3 marks]

	Males A	Females A	Males B	Females B
0–19	14%	13%	18%	17%
20–59	18%	19%	22%	21%
60+	17%	19%	10%	12%

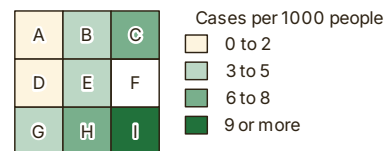
EXAMPLE 4

The map shows the population density of areas A to I. (a) Area E has 9900 people in 36 km². Work out its density and give its band. (b) Ola says the north is more crowded than the south. Is she correct?



Hint Density is people ÷ area. For (b), read the bands of the top row and of the bottom row.

B4 The map shows flu cases per 1000 people in districts A to I. (a) District F has 52 cases in 6500 people. Find its rate per 1000 people and its band. (b) Kit says flu is more common in the west than in the east. Is he correct? [4 marks]



EXAMPLE 5

Give an advantage of showing two classes' test marks in a back-to-back stem-and-leaf diagram, not two grouped bar charts.

Hint What does a grouped chart lose?

B5 A choropleth map shows the average house price in each district of a town. Give two limitations of the map. [2 marks]

C Practice

- C1** Town R has 30 000 people, 18% aged 65 and over. Town S has 60 000 people, 12% aged 65 and over. Dee says more people aged 65 and over live in Town R. Is she correct? [3 marks]
- C3** A map shades density in the bands 0 to 49, 50 to 99, 100 to 149 and 150 or more people per km². Area J has 4320 people in 32 km². Give its band. [2 marks]

Answer

- C4** A choropleth map shows flu as cases per 1000 people, not as the number of cases. Give a reason why. [2 marks]

D Exam-style questions

- D1** 15 students sat a memory test in the morning and 15 others sat it in the evening. The diagram shows their scores.

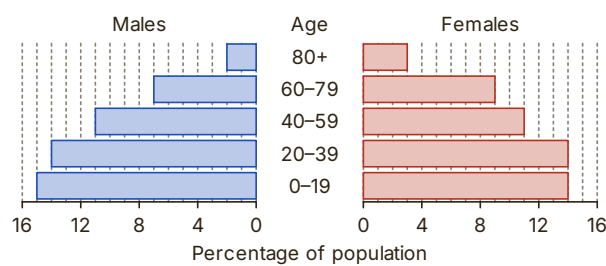
Morning		Evening
	2	1 3 5 8 9
8 4	3	1 3 4 6 8
9 7 5 1	4	0 2 5 9
8 5 3 2	5	1
7 4 3 1	6	
0	7	

Key: 8 | 3 | 1 means 38 (morning) and 31 (evening)

- (a)** Compare the scores of the two groups. Use the median and the range. [4 marks]
- (b)** Kim says more than half of the morning group scored over 50. Is Kim correct? Give a reason. [2 marks]

Total for D1: 6 marks

D2 The population pyramid shows the 8 million people of Country Z.



(a) What percentage of the people are aged under 40? [1 mark]

Answer

(b) How many females aged 60 and over live in Country Z? [2 marks]

Answer

(c) Lia says more females than males aged 80 and over live in Country Z. Is Lia correct? Give a reason. [2 marks]

Total for D2: 5 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

E1 Town A has 24 000 people, and 15% of them are aged 65 and over. Town B has 16 000 people. A population pyramid of the two towns together shows 18% aged 65 and over. What percentage of Town B is aged 65 and over? [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1 Hint 1 Work out the number of people aged 65 and over in the two towns together.
- E1 Hint 2 Together: $0.18 \times 40\,000 = 7200$. Town A: $0.15 \times 24\,000 = 3600$.
- E1 Hint 3 Town B has $7200 - 3600 = 3600$ of its 16 000 people aged 65 and over.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can compare two groups from a back-to-back stem-and-leaf diagram.
- I can turn a pyramid's percentages into numbers of people.
- I can read a choropleth map and its key to judge a claim.