Year 8 · Statistics: Making Sense of Data

Name: _____ Date: _____

Hi! This sheet helps you read graphs and tables like a real statistician, finding the middle, the spread, the shape, and spotting when a graph is trying to trick you. Take your time and show your thinking.

Warm-up

1. Find the median of these scores: 4, 7, 9, 2, 6.

2. Find the range of these heights (cm): 12, 18, 5, 22, 9.

3. A dot plot has a long tail stretching to the right and most dots bunched on the left. Is it positively or negatively skewed?

4. Find the median of this even-sized set: 3, 8, 10, 15.

Practice

5. Ten students recorded how many minutes they read one night: 20, 25, 30, 15, 40, 35, 25, 30, 45, 20. Find the median and the range.

6. Aroha's netball team scored these goals over 7 games: 12, 15, 9, 14, 11, 13, 10. Find the median number of goals and the range, then write one sentence describing the team's scoring.

7. A newspaper histogram shows house sale prices in Avondale. Most bars are tall on the left (lower prices) and a few short bars stretch far to the right (very expensive houses). Describe the shape of the data and say where the middle of the data lies compared with the highest prices.

8. Weekly water use (litres) for 7 households was: 22, 24, 23, 25, 21, 24, 78. Identify the outlier by eye, then find the range with and without it. Which range better describes the typical spread?

9. A social media post shows a bar graph titled 'Best Sports at Our School' but the vertical axis has no numbers or label. Explain why this graph cannot be interpreted accurately, and name one thing that should be added.

10. Mele records daily coffee sales at her Avondale café over one week: Mon 40, Tue 42, Wed 45, Thu 48, Fri 60, Sat 75, Sun 30. Describe the trend across the week and identify the most and least popular days.

Challenge

11. Two classes sat the same test (out of 75). Class A: 55, 60, 62, 65, 68, 70, 72. Class B: 40, 63, 64, 66, 67, 69, 71. Find the median and range for each class. Identify any outlier, and explain which class performed more consistently once the outlier is considered.

12. A company advert shows a bar graph of 'Customer Satisfaction' where Brand X's bar looks about twice as tall as Brand Y's. On closer look, the vertical axis starts at 90% (not 0%): Brand X = 96% and Brand Y = 94%. Explain how the graph is misleading and how it should be drawn to be fair.

Answer key (for parents and tutors)

1. Find the median of these scores: 4, 7, 9, 2, 6.
   Put them in order: 2, 4, 6, 7, 9. There are 5 values, so the middle one is the 3rd value. Median = 6.

2. Find the range of these heights (cm): 12, 18, 5, 22, 9.
   Range = largest − smallest = 22 − 5 = 17 cm.

3. A dot plot has a long tail stretching to the right and most dots bunched on the left. Is it positively or negatively skewed?
   The right tail tapers more slowly (stretches out), so the data is positively skewed.

4. Find the median of this even-sized set: 3, 8, 10, 15.
   Already in order. With 4 values, the median is the mean of the middle two (8 and 10). Median = (8 + 10) ÷ 2 = 9.

5. Ten students recorded how many minutes they read one night: 20, 25, 30, 15, 40, 35, 25, 30, 45, 20. Find the median and the range.
   Order the data: 15, 20, 20, 25, 25, 30, 30, 35, 40, 45. There are 10 values, so the median is the mean of the 5th and 6th values (25 and 30). Median = (25 + 30) ÷ 2 = 27.5 minutes. Range = 45 − 15 = 30 minutes.

6. Aroha's netball team scored these goals over 7 games: 12, 15, 9, 14, 11, 13, 10. Find the median number of goals and the range, then write one sentence describing the team's scoring.
   Order the data: 9, 10, 11, 12, 13, 14, 15. There are 7 values, so the median is the 4th value = 12 goals. Range = 15 − 9 = 6 goals. Sample sentence: The team typically scored about 12 goals per game, and their scores were fairly consistent, only varying by 6 goals across the season.

7. A newspaper histogram shows house sale prices in Avondale. Most bars are tall on the left (lower prices) and a few short bars stretch far to the right (very expensive houses). Describe the shape of the data and say where the middle of the data lies compared with the highest prices.
   The shape is positively skewed (right-skewed): the right tail tapers more slowly because of a few very expensive houses. The middle of the data (the median) sits toward the left, among the more common lower prices, well below the few high prices in the long right tail.

8. Weekly water use (litres) for 7 households was: 22, 24, 23, 25, 21, 24, 78. Identify the outlier by eye, then find the range with and without it. Which range better describes the typical spread?
   By eye, 78 is an outlier, it is far larger than the cluster of values around 21–25. Range with the outlier = 78 − 21 = 57 litres. Range without it = 25 − 21 = 4 litres. The range without the outlier (4 litres) better describes the typical spread, because 57 is heavily inflated by one unusual value.

9. A social media post shows a bar graph titled 'Best Sports at Our School' but the vertical axis has no numbers or label. Explain why this graph cannot be interpreted accurately, and name one thing that should be added.
   Without a labelled and numbered vertical axis, you cannot tell how many students each bar represents or what the values actually are, you can only compare bar heights roughly, and even that may be misleading. It could be hiding how small the real differences are. To fix it, add a numbered scale and a label on the vertical axis (for example 'Number of students'), and check that the scale starts at 0.

10. Mele records daily coffee sales at her Avondale café over one week: Mon 40, Tue 42, Wed 45, Thu 48, Fri 60, Sat 75, Sun 30. Describe the trend across the week and identify the most and least popular days.
    Sales rise steadily from Monday to Saturday, peaking at 75 on Saturday, then drop sharply to 30 on Sunday. The most popular day is Saturday (75 coffees) and the least popular is Sunday (30 coffees). Trend: sales build up through the week toward the weekend, then fall away on Sunday.

11. Two classes sat the same test (out of 75). Class A: 55, 60, 62, 65, 68, 70, 72. Class B: 40, 63, 64, 66, 67, 69, 71. Find the median and range for each class. Identify any outlier, and explain which class performed more consistently once the outlier is considered.
    Class A (already ordered): 7 values, median = 4th value = 65. Range = 72 − 55 = 17. Class B (already ordered): 7 values, median = 4th value = 66. Range = 71 − 40 = 31. Class B has an outlier of 40, which is much lower than the rest of its scores (63–71). This outlier makes Class B's range look large. Without the 40, Class B's range = 71 − 63 = 8,

which is smaller than Class A's range of 17. So although Class B looks more spread out, once the outlier is taken into account Class B was actually the more consistent class, and both classes had very similar medians (65 and 66).

12. A company advert shows a bar graph of 'Customer Satisfaction' where Brand X's bar looks about twice as tall as Brand Y's. On closer look, the vertical axis starts at 90% (not 0%): Brand X = 96% and Brand Y = 94%. Explain how the graph is misleading and how it should be drawn to be fair.
By starting the vertical axis at 90% instead of 0%, the graph exaggerates a tiny difference. The real gap is only 96% – 94% = 2 percentage points, but the truncated axis makes Brand X's bar appear roughly twice the height of Brand Y's, suggesting a much bigger difference than actually exists. To be fair, the axis should start at 0%, which would show both bars nearly the same height, correctly reflecting that the two brands are very close in satisfaction. The starting value of the axis should also be clearly labelled.