Year 6 · Statistics: Graphing Data Over Time

Name: _____ Date: _____

Hi there! This sheet is all about time-series (line) graphs, the kind that show how something changes over time. You'll read them, build them, and decide when they're the best graph to use. Have your ruler and pencil ready!

Warm-up

1. On a time-series graph, which axis (the horizontal one or the vertical one) always shows the time?

2. A line graph shows the temperature in Avondale was 13°C at 8am and 19°C at 11am. By how many degrees did it rise?

3. You want to show how a kūmara plant's height changed each week for 8 weeks. Is a time-series graph a good choice? Why?

4. On a time-series graph the points for Monday to Friday are joined with lines. If the line goes downward from one day to the next, what does that tell you?

Practice

5. Mia recorded the number of library books borrowed at Avondale School each day: Monday 20, Tuesday 25, Wednesday 30, Thursday 22, Friday 35. Describe how you would set up a time-series graph for this data (what goes on each axis and a sensible scale).

6. Using Mia's data above, between which two days did the number of books borrowed drop the most, and by how many?

7. Rangi measured the water level in his rain tank on the 1st of each month (in litres): Jan 400, Feb 350, Mar 300, Apr 380, May 500. On his time-series graph, describe the overall trend from January to May.

8. A café owner has two sets of data: (a) how her daily coffee sales changed over one week, and (b) the favourite ice-cream flavours of 60 customers. Which set suits a time-series graph and which suits a bar graph? Explain.

9. Here are the midday temperatures for a week in Auckland: Mon 18°C, Tue 21°C, Wed 24°C, Thu 24°C, Fri 20°C, Sat 17°C, Sun 19°C. What was the highest temperature, and on how many days was the temperature 20°C or above?

10. Leah plots a point on her time-series graph at the position '3pm, 12 people'. Explain in words exactly what this point means.

Challenge

11. Two shops record their afternoon customers on the same time-series graph. Shop A: 1pm 10, 2pm 15, 3pm 25, 4pm 20. Shop B: 1pm 20, 2pm 18, 3pm 15, 4pm 22. At what time did the two shops have the same number of customers, and how would you show both shops clearly on one graph?

12. Sam has yearly rainfall totals for Auckland for 10 years and wants to see if rainfall is generally increasing or decreasing over time. He also has to present the average rainfall of 5 different NZ cities for one year. Which graph best suits each task, and for the 10–year data explain what a 'trend line' would add.

Answer key (for parents and tutors)

1. On a time-series graph, which axis (the horizontal one or the vertical one) always shows the time?
   The horizontal axis, the x-axis, always shows the time. The vertical axis (y-axis) shows the other measurement, such as temperature or amount.

2. A line graph shows the temperature in Avondale was 13°C at 8am and 19°C at 11am. By how many degrees did it rise?
   19 – 13 = 6. The temperature rose by 6°C.

3. You want to show how a kūmara plant's height changed each week for 8 weeks. Is a time-series graph a good choice? Why?
   Yes. A time-series graph is a good choice because the data is measured over time (each week), and a line graph clearly shows how the height changes and whether it is going up or down.

4. On a time-series graph the points for Monday to Friday are joined with lines. If the line goes downward from one day to the next, what does that tell you?
   A downward line means the value went down (decreased) from one day to the next, for example, fewer visitors or a lower temperature.

5. Mia recorded the number of library books borrowed at Avondale School each day: Monday 20, Tuesday 25, Wednesday 30, Thursday 22, Friday 35. Describe how you would set up a time-series graph for this data (what goes on each axis and a sensible scale).
   Put the days (Monday to Friday) along the horizontal x-axis. Put the number of books on the vertical y-axis. The values range from 20 to 35, so a sensible scale is going up in 5s: 0, 5, 10, 15, 20, 25, 30, 35. Plot a point above each day at the correct height, then join the points with straight lines.

6. Using Mia's data above, between which two days did the number of books borrowed drop the most, and by how many?
   The values change like this: Mon→Tue up 5, Tue→Wed up 5, Wed→Thu down 8 (30 to 22), Thu→Fri up 13. The only drop is Wednesday to Thursday, a fall of 30 – 22 = 8 books. That is the biggest (and only) drop.

7. Rangi measured the water level in his rain tank on the 1st of each month (in litres): Jan 400, Feb 350, Mar 300, Apr 380, May 500. On his time-series graph, describe the overall trend from January to May.
   The level falls from January (400) to March (300), then rises again to May (500). So the trend is: a decrease over the first three months, then an increase over the last two months, ending higher than it started (500 is more than 400).

8. A café owner has two sets of data: (a) how her daily coffee sales changed over one week, and (b) the favourite ice-cream flavours of 60 customers. Which set suits a time-series graph and which suits a bar graph? Explain.
   Set (a), daily coffee sales over a week, suits a time-series (line) graph because it is measured over time and we want to see how it changes. Set (b), favourite flavours, suits a bar graph because the flavours are separate categories, not time, and bars let us compare the size of each group.

9. Here are the midday temperatures for a week in Auckland: Mon 18°C, Tue 21°C, Wed 24°C, Thu 24°C, Fri 20°C, Sat 17°C, Sun 19°C. What was the highest temperature, and on how many days was the temperature 20°C or above?
   The highest temperature was 24°C (on Wednesday and Thursday). Days at 20°C or above: Tuesday (21), Wednesday (24), Thursday (24), Friday (20) = 4 days.

10. Leah plots a point on her time-series graph at the position '3pm, 12 people'. Explain in words exactly what this point means.
    It means that at 3pm (read from the x-axis) there were 12 people (read from the y-axis). The point sits directly above the 3pm mark and level with the 12 mark, showing the two measurements at that moment.

11. Two shops record their afternoon customers on the same time-series graph. Shop A: 1pm 10, 2pm 15, 3pm 25, 4pm 20. Shop B: 1pm 20, 2pm 18, 3pm 15, 4pm 22. At what time did the two shops have the same number of customers, and how would you show both shops clearly on one graph?
    Compare each time: 1pm A=10 B=20, 2pm A=15 B=18, 3pm A=25 B=15, 4pm A=20 B=22, none are exactly equal at the recorded times. However, between 2pm and 3pm Shop A rises (15→25) while Shop B falls (18→15), so their lines cross between 2pm and 3pm, meaning they were equal at some point in that interval. To show both clearly, draw

two separate lines on the same axes using different colours (or one solid and one dashed line) and add a key/legend saying which line is Shop A and which is Shop B.

12. Sam has yearly rainfall totals for Auckland for 10 years and wants to see if rainfall is generally increasing or decreasing over time. He also has to present the average rainfall of 5 different NZ cities for one year. Which graph best suits each task, and for the 10-year data explain what a 'trend line' would add.
For the 10-year rainfall (data over time), a time-series (line) graph is best because it shows changes across the years and any pattern. For comparing 5 cities in one year (separate categories), a bar graph is best. A trend line is a single straight line drawn to follow the general direction of the plotted points; it smooths out the ups and downs so Sam can see the overall pattern, for example, whether rainfall is slowly increasing or decreasing over the 10 years, even if individual years jump around.