



Selecting appropriate displays

Mana Maths

Selecting Appropriate Displays - Notes and Steps

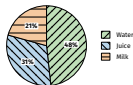


Key idea



Categorical data (drink, sport) suits a **bar graph**, **pie chart**, or **pictogram** — no numerical scale between categories.

Pie chart



Pie chart or pictogram?

A **pie chart** shows proportions of a whole; a **pictogram** shows a count of repeated icons.

Common mistake

A pie chart with many categories gets crowded — a bar graph reads frequencies more clearly.



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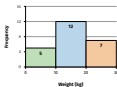
Grouped Numbers: Histogram vs Dot Plot



Key idea

A **histogram** groups continuous numbers into equal intervals, so its bars **touch**. A **dot plot** shows individual values, one dot each.

Histogram



Quick test

Small data set, values matter $\Rightarrow$ dot plot. Larger/grouped data $\Rightarrow$ histogram.

Common mistake

A histogram's bars touch (continuous scale); a bar graph's have gaps (categories).



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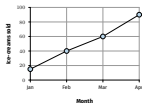
Change Over Time and Relationships



Key idea

A **line graph (time series)** tracks one variable over time. A **scatter plot** looks for a link between **two** variables on the same subjects.

Line graph



Scatter plot

Needs two numerical variables on the same subjects, e.g. sleep hours and a concentration score.

Common mistake

A pie chart cannot show change over time — it only shows proportions at one moment.



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Comparing Groups: Box-and-Whisker Graph

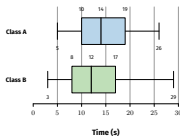


Key idea



A **box-and-whisker graph** shows the five-number summary (min, Q_1 , median, Q_3 , max). Put groups on the same scale to compare their centre and spread.

Side-by-side box-and-whisker plots



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Start Tasks



Categories (like flavours or sports) suit a bar graph or pie chart. Change over time suits a line graph. Numbers grouped into intervals suit a histogram.

1. Choose the best display for ice-cream flavour: bar graph or line graph.

2. Choose the best display for monthly temperature: line graph or pie chart.

3. Choose the best display for books read by students: dot plot or histogram.

4. Choose the best display for jersey colours: pie chart or histogram.

5. Choose the best display for scores grouped into 10-mark bands: histogram or pie chart.

6. Choose the best display for weekly seedling height: line graph or bar graph.

Start Tasks Answers



1. Bar graph

2. Line graph

3. Dot plot

4. Pie chart

5. Histogram

6. Line graph

7. Dot plot

8. Bar graph

Start Tasks



A pictogram uses rows of repeated pictures to show a count. A scatter plot shows the relationship between two numerical variables.

7. Choose the best display for number of siblings: dot plot or line graph.

8. Choose the best display for how students travel to school: bar graph or line graph.

9. Choose the best display for pencil lengths in 2 cm bands: histogram or bar graph.

10. Choose the best display for trophies shown as rows of icons: pictogram or line graph.

11. Which display best shows parts of a whole: pie chart or dot plot?

12. Which display best shows change over time: line graph or pie chart?

Start Tasks Answers



9. Histogram

10. Pictogram

11. Pie chart

12. Line graph

13. Dot plot

14. Histogram

15. Scatter plot

16. Bar graph

Start Tasks



A histogram has no gaps between its bars because the data is a continuous scale; a bar graph has gaps because its categories are separate.

13. Which display shows one dot per small whole-number value: dot plot or histogram?

14. Which display shows grouped data with no gaps: histogram or bar graph?

15. Choose the best display for arm span vs height: scatter plot or pie chart.

16. Which display has gaps between its bars because it shows separate categories: bar graph or histogram?

Build Tasks



Name the display and give one clear reason linked to the type of data or to what needs to be shown.

1. A café records how many coffees it sells each day for 20 days. Which display is best, and why?

2. A survey asks students their favourite music genre. Which display is best for showing the frequencies, and why?

3. A gardener records the masses of tomatoes and sorts them into 25 g intervals. Which display is best, and why?

4. A student records how many runs their team scored in each cricket match this season. Which display is best, and why?

Build Tasks Answers



1. Line graph – coffee sales recorded on consecutive days shows a trend over time.

2. Bar graph – favourite music genre is categorical data, and a bar graph makes the frequency of each genre easy to compare.

3. Histogram – the tomato masses are continuous data grouped into equal intervals, so the bars sit with no gaps.

4. Line graph – runs scored match-by-match across a season shows how performance changes over time.

Build Tasks



Name the display and give one clear reason linked to the type of data or to what needs to be shown.

5. A hospital compares the recovery times of two treatments and wants to show the median and spread of each. Which display is best, and why?

6. A class records the number of pets each student owns. Which display is better: dot plot or pie chart? Explain.

7. A scientist measures the temperature of a cooling liquid every minute for 20 minutes. Which display is best, and why?

8. A shop groups customer incomes into \$10,000 bands. Which display is better: histogram or bar graph? Explain.

Build Tasks Answers



5. Box-and-whisker graph (two box plots) – it shows the median and interquartile range of each treatment group side by side.

6. Dot plot – number of pets is small whole-number data, so a dot plot shows each individual value; a pie chart hides the actual counts.

7. Line graph – temperature measured every minute is continuous data collected over time, showing the cooling trend.

8. Histogram – incomes grouped into equal intervals are continuous data, so the bars have no gaps.

Build Tasks



Some situations have two reasonable-looking displays – choose the one that keeps individual values visible or makes the comparison clearest.

9. A student wants to show what fraction of the class prefers each of 3 sports. Which display is best, and why?

10. A coach wants one display that compares the median and spread of sprint times for two squads. Which display is best, and why?

11. A teacher writes the exact spelling test score out of 10 for each student in a small class. Which display is better: dot plot or histogram? Explain.

12. A report shows the number of visitors to a museum each month for a year. Which display is better: line graph or pie chart? Explain.

Build Tasks Answers



9. Pie chart – the fraction of the class preferring each of the 3 sports is a parts-of-a-whole comparison.

10. Box-and-whisker graph (two box plots) – it lets you read off and compare the median and spread of each squad directly.

11. Dot plot – exact scores out of 10 is a small range of individual whole-number values, so a dot plot keeps every value visible.

12. Line graph – museum visitors each month over a year shows the trend over time; a pie chart cannot show change over time.

Build Tasks



Some displays are chosen because they make a particular point clear, not just because the data allows it.

13. A council wants to show the number of medals won by five regions using an easy-to-read display built from repeated icons. Which display is best, and why?

14. A researcher wants to see whether there is a relationship between study hours and exam mark. Which display is best, and why?

15. A company tracks its share price at the close of trading every day for six months. Which display is best, and why?

16. A survey asks each student to choose one favourite subject from a list of seven. Which display is best for comparing how many students chose each subject, and why is it better than a pie chart here?

Build Tasks Answers



13. Pictogram – repeated icons make small whole-number counts (medals) easy to read at a glance.

14. Scatter plot – comparing two numerical variables (study hours, exam mark) to look for a relationship needs a scatter plot.

15. Line graph – share price recorded every day over six months is a long time series, showing the trend.

16. Bar graph – with seven categories, a bar graph lets you read and compare exact frequencies directly, while a pie chart only shows proportions and gets crowded with many sectors.

Push Tasks



Explain your reasoning in terms of the type of data and what the display needs to show.

1. A student uses a pie chart to show the maximum temperature each day for a week. Explain why that is a poor choice.

2. A student uses a line graph for favourite ice-cream flavours. Explain why that is a poor choice.

3. A researcher has exact long-jump distances for 16 athletes. Which display would you choose, and why?

4. The same long-jump distances are grouped into 10 cm intervals. Which display would you choose, and why?

Push Tasks Answers



1. A pie chart shows parts of a whole, not change over time – for a week of daily temperatures you need a line graph to see the day-to-day trend.

2. A line graph implies a trend along a continuous scale, but ice-cream flavours are unordered categories – a bar graph correctly shows category frequencies with no implied order or connection.

3. Dot plot – with exact individual jump distances for a modest number of athletes (16), a dot plot keeps every value visible.

4. Histogram – once grouped into intervals the data is continuous, so the bars have no gaps.

Push Tasks



Explain your reasoning in terms of the type of data and what the display needs to show.

5. A principal wants one display that compares the median and interquartile range of reading ages for two classes. Which display is best, and why?

6. A student says a bar graph and a histogram are basically the same. Give one reason why that is wrong.

7. Which display is best for showing how petrol price changes each week across a year? Explain.

8. Which display is best for showing the proportion of students in each of 4 house groups? Explain.

Push Tasks Answers



5. Box-and-whisker graph (two box plots) – it displays the median and IQR of each class directly and lets you compare them side by side.

6. A bar graph has gaps between bars for separate categories; a histogram has no gaps because it shows continuous data grouped into intervals (any one valid difference is acceptable).

7. Line graph – petrol price recorded weekly across a year shows the trend over time.

8. Pie chart – the proportion of the whole group in each house is a parts-of-a-whole comparison.

Push Tasks



A display can be technically possible and still be the wrong choice – weigh up what it hides as well as what it shows.

9. Which display is best for showing the distribution of travel times to school when the times are grouped into intervals? Explain.

10. Which display is best for showing the exact number of books read by each student in a small class? Explain.

11. A teacher wants to compare the spread of test scores for Year 9 and Year 10 using one display. Which display is best, and why?

12. A student chooses a pie chart for grouped exam-score intervals because there are categories. What is the better display, and why?

Push Tasks Answers



9. Histogram – travel times grouped into intervals are continuous data with no gaps between bars.

10. Dot plot – exact counts for a small class keep every individual value visible; a histogram would hide them by grouping.

11. Box-and-whisker graph (two box plots) – comparing the spread (and median) of two groups is exactly what side-by-side box plots are built to show.

12. Histogram – the score intervals are equal-width numerical groups, not unrelated categories, so a histogram (not a pie chart) is appropriate.

Push Tasks



Compare displays that are easy to confuse: think about what each one preserves about the individual data values.

13. A weather report wants to show rainfall each month over five years. Which display is best, and why?

14. A dot plot and a histogram can both be used for numerical data. Give one situation where the dot plot is the better choice.

15. Give one situation where a histogram is better than a dot plot.

16. Choose the best display for each case and justify briefly: favourite pet, resting heart rate measured every minute, and house prices grouped into \$50,000 bands.

Push Tasks Answers



13. Line graph – monthly rainfall over five years is a long time series showing the trend over time.

14. A dot plot is better when the data set is small and every individual value should stay visible (e.g. exact scores for a small class).

15. A histogram is better when the data set is large or continuous, so grouping into intervals makes the overall pattern clearer than plotting every single dot.

16. Favourite pet: bar graph (categorical). Resting heart rate every minute: line graph (change over time). House prices grouped into \$50,000 bands: histogram (grouped continuous data).