

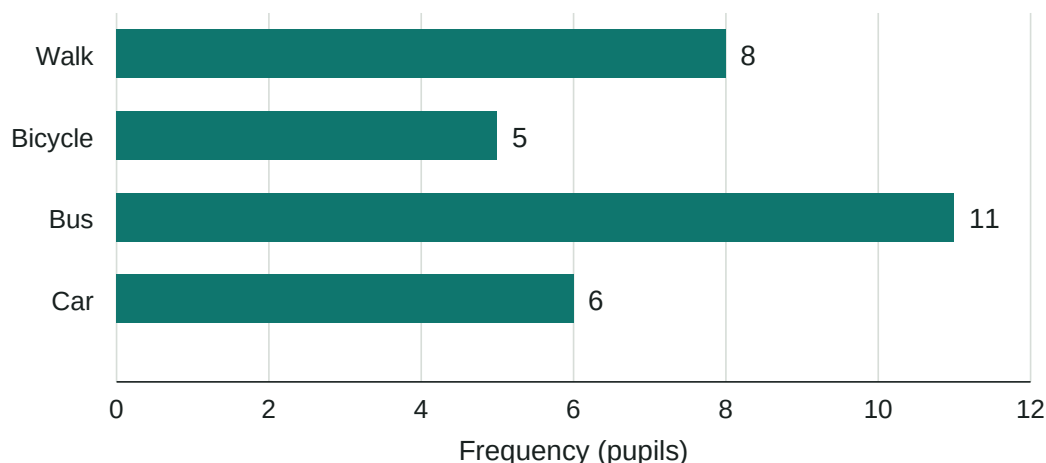
Histogram vs Bar Chart

Worked examples and practice questions | Student page 1 of 2

Name: _____ Class: _____ Date: _____

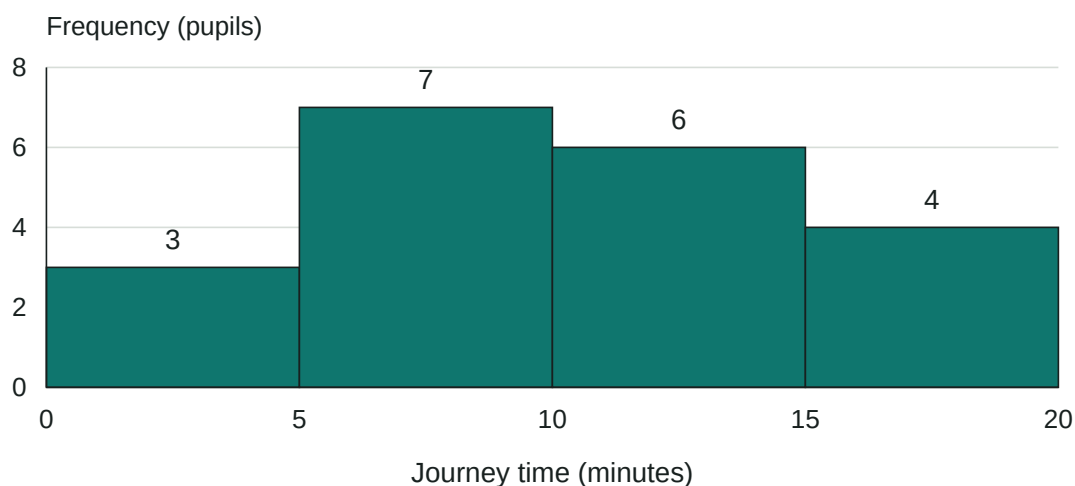
Use a bar chart to compare distinct categories: leave gaps. Use a histogram to group numerical measurements into ordered intervals: adjacent bins touch. For equal-width bins, frequency can be the height. With unequal widths, height = frequency / bin width (frequency density).

How 30 pupils travel to school



Sample categories: Walk 8, Bicycle 5, Bus 11, Car 6. Total: 30 pupils. Each bar is a category; changing their order does not change the counts.

Journey times for 20 pupils



Raw times (minutes): 2, 2.8, 4.1, 5, 5.6, 6.2, 7, 8.1, 8.5, 9.7, 10, 10.9, 11.4, 12.2, 13.6, 14.8, 15, 16.3, 18.1, 19.4

Bins and counts: $0 \leq t < 5$: 3; $5 \leq t < 10$: 7; $10 \leq t < 15$: 6; $15 \leq t \leq 20$: 4. Each bin includes its lower boundary; only the final bin includes its upper boundary.

Both datasets are fictional and were created for this lesson. The two examples use separate samples.

Five practice questions

Student page 2 of 2 | Use the examples on page 1. Suggested time: 20-30 minutes.

Name: _____ Class: _____

1. Choose a chart for (a) pupils' favourite school subjects and (b) their measured journey times. Explain each choice.

2. In the travel-mode bar chart, which category has the highest frequency? How many more pupils use that mode than a bicycle?

3. In the journey-time histogram, which interval has the highest frequency, and how many pupils are in it?

4. Which bin contains a journey time of exactly 10 minutes? What percentage of the 20 pupils took at least 10 minutes?

5. Extension: merge the first two histogram bins into $0 \leq t < 10$. Find its frequency and frequency density. Why would frequency heights be misleading when the remaining bins are 5 minutes wide?

Recreate the histogram: chartmaker.tools/histogram-maker?example=histogram-vs-bar-chart

The lesson link loads all 20 values and a custom bin width of 5. Try changing the width to 10.

Teacher answers and working

Keep this page separate when handing out the student worksheet.

Question 1

(a) A bar chart, because subjects are distinct categories. (b) A histogram, because measured times are numerical measurements that can be grouped into ordered intervals.

Question 2

Bus has the highest frequency: 11 pupils. The difference is $11 - 5 = 6$ pupils.

Question 3

The modal interval is $5 \leq t < 10$ minutes, with 7 pupils. This identifies a group of times, not a single most common exact time.

Question 4

Exactly 10 minutes belongs to $10 \leq t < 15$. There are $6 + 4 = 10$ pupils with times of at least 10 minutes, so $(10 / 20) \times 100 = 50\%$.

Question 5

The merged bin has frequency $3 + 7 = 10$ and width 10 minutes. Its frequency density is $10 / 10 = 1$ pupil per minute. The remaining densities are $6 / 5 = 1.2$ and $4 / 5 = 0.8$. With unequal widths, use density for height so each bar's area represents frequency; raw frequency heights would overstate the wider bin's area.

Teaching notes

Questions 1-3 check chart selection and reading frequencies. Question 4 checks interval boundaries and percentages. Question 5 extends the lesson to unequal bin widths. Accept equivalent notation and explanations.

After merging the first two bins, the areas are $10 \times 1 = 10$, $5 \times 1.2 = 6$, and $5 \times 0.8 = 4$. These recover the frequencies and total 20 pupils.

ChartMaker's Histogram Maker uses equal-width bins and frequency heights; the unequal-width extension is a calculation exercise.

Full lesson: chartmaker.tools/lessons/histogram-vs-bar-chart