

D1.3

Bar charts and frequency tables

objectives

- Plan how to organise small sets of data.
- Construct frequency tables for discrete data.
- Construct bar charts, on paper and using a computer, to represent data.
- Solve a problem by extracting and interpreting data in tables and bar charts.

starter

Vocabulary

statistics
data
frequency
survey

Say that this lesson is about tables and charts and how to read and understand them.

Q What do you call the table that you would use:

- to find times of buses or trains;
- to find out what eight nines are;
- to find out what lesson you should be at?

Say that tables of *statistics* contain a lot of numbers or measurements: for example, measurements of length, area, height, weight or capacity. Sometimes we count things like the number of people or the number of times an event happens. In each case, the numerical information is called *data*.

Say that you will collect some information very quickly. Ask 12 different pupils what their favourite musical instrument is. Write the words randomly on the board:

guitar drums drums guitar flute piano
flute guitar drums guitar tin whistle accordion

Q How many different instruments did our group of pupils choose?

Q Which instrument is the most popular among them?

Say that it is not easy to understand information when it is jumbled up. It is much easier when the information is organised in a table. Construct this table, basing yours on the data you have collected from the class.

Instrument	Frequency
drums	3
tin whistle	1
guitar	4
flute	2
accordion	1
piano	1
TOTAL	12

Explain that the word *frequency* means 'how many' or 'how often'. The table tells you how many pupils chose each instrument. It is called a *frequency table*.

Say that it is now easy to see what fraction of the pupils chose each instrument, especially as the frequency table shows the total number of pupils in your *survey*.

Q What fraction of the total chose the guitar? What fraction chose drums?

main activity

Vocabulary

bar chart
horizontal axis
vertical axis
label
title
scale
spreadsheet

Resources

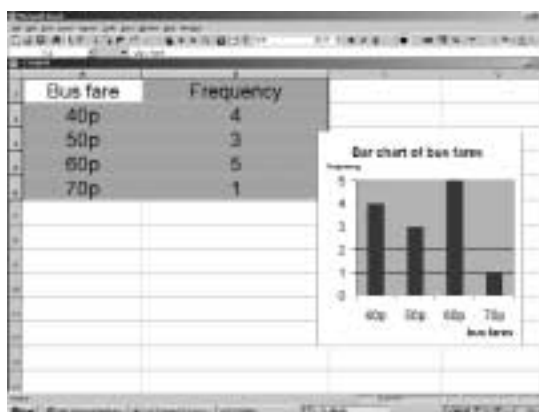
OHT D1.3a
Resource D1.3b
computer with data
projector and
spreadsheet
rulers for pupils

Show **OHT D1.3a**. Say that this shows a jumble of 12 pupils' bus fares. They have then been tidied up into a table. Point out that the bars on the bar chart represent the frequencies.

- Q Which fare appears most often in the data?
- Q Which fare appears least often?
- Q What fraction of the pupils pay a bus fare of 60p?
- Q Which form of the data did you use to answer these questions: the jumbled data, the frequency table or the bar chart? (the graph is better for the first two questions and the table for the third)

Point out the features of the *bar chart*: the *horizontal axis*, the *vertical axis*, the *label* on each axis, and the *title* of the chart. Explain that the *scale* on the axis that shows the frequency has been chosen so that the maximum value of the data (the bus fare that the pupils pay the most often) will fit on the graph. Point out that each bar has its own label to show what it represents.

Before the lesson, prepare a simple spreadsheet based on the data. Show pupils how to use it to present different forms of bar charts.



Show the class that the bars may be horizontal or vertical but that each form represents the same data and gives the same information. Demonstrate how a change to one of the frequencies in the table produces a corresponding change to the height of the relevant bar.

Give out copies of **Resource D1.3b**.

- Q What information does this bar chart show?

Discuss responses. Establish that the title and labels help to explain the meaning. Say that the data represent the colours of the cubes in a box.

- Q How many red cubes are in the box? (25)
- Q How many more red cubes than pink cubes are there? (20)
- Q Estimate how many cubes there are altogether in the box. (93)
- Q Estimate how many cubes are not pink. (88)

Refer to the frequency table below the bar chart. Say that this is another way of representing the same data. Remind them that *frequency* means 'how many'.

- Q What do we need to add to the table so that it represents the same information as the bar chart? (the number of cubes of each colour)

Ask pupils to complete the table in pairs. Check answers by taking feedback.

Say that the second table gives information about another box of cubes.

Q How many brown cubes are in the box? (25)

Q How many more brown cubes than green cubes are there? (8)

Say that you want them to put the same information on a bar chart.

Q What will need to go on the horizontal axis? (the colours of the cubes)

Q How tall will the tallest bar be? (25 units)

Q How tall will the shortest bar be? (10 units)

Establish that the bars will range in height from 10 to 25.

Discuss how the vertical scale could be labelled: for example, if it were labelled in twos the highest division would be 10 – too small. If it were labelled in tens the highest division would be 50 – too big.

Ask pupils to work in pairs to agree their scale and to draw their bar chart, using their rulers to help. Remind them that they will need to estimate the height of some of the bars.

other tasks

Springboard 7

Units 4 and 12

Unit 4 section 1: Bar charts and line graphs

- | | |
|-------------------------------|----------|
| 1 Lotta bottle | page 145 |
| 2 The dice-rolling experiment | page 146 |
| Star challenge 1: Space probe | page 147 |

Unit 12 section 2: Pie charts and bar graphs

- | | |
|---------------------------------|----------|
| 1 The darts competition | page 398 |
| Star challenge 2: Tree planting | page 399 |

plenary

Resources

OHT D1.3c
calculators
mini-whiteboards

Show **OHT D1.3c**, a bar chart showing how many people went to a school play.

Discuss with the class how to use the graph to make the estimates of the amounts raised on the two days. Ask pupils to do the calculation mentally and to write the answer on their whiteboards.

Discuss what information is needed to work out the cost and what kind of calculation to do. Remind pupils how to use their calculators to key in amounts of money and how to interpret the display.

Remember

- The bars of a bar chart show how many of each item there are. The axis for frequency will have a scale.
- A bar chart should have a title and each axis should be labelled.
- Each bar should have a label to show what it represents.
- A frequency table can contain the same information as a bar chart.
- A frequency table should have a title.
- The total of the count should be included in a frequency table.