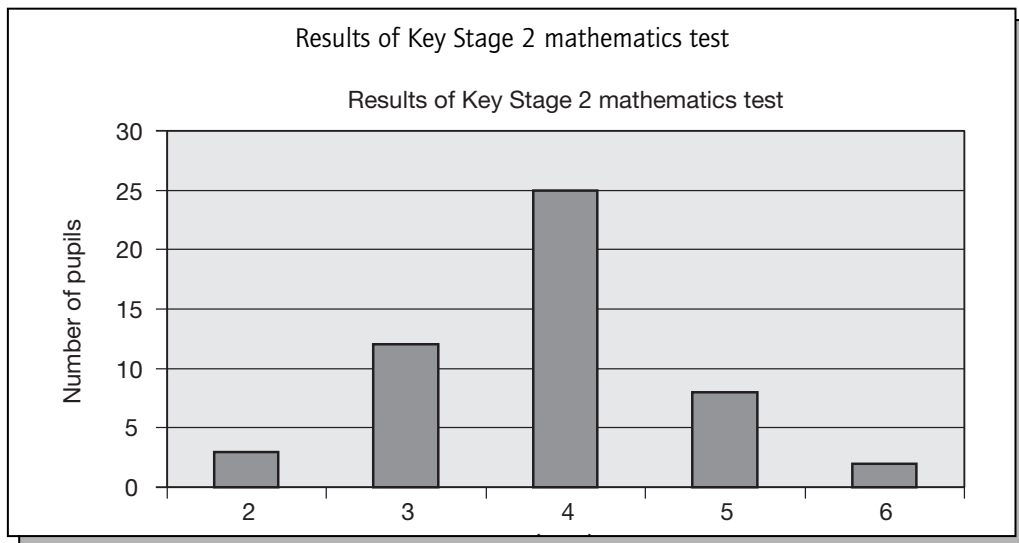# Check-Up

4

Bar charts and frequency tables for discrete data

The assessment coordinator in a primary school enters the numbers of pupils achieving various levels in the Key Stage 2 mathematics test into an Excel worksheet and generates the bar chart shown.

Results of Key Stage 2 mathematics test

Results of Key Stage 2 mathematics test

Use the bar chart to reconstruct the data that gave rise to it. Enter the data into this frequency table:

Level					
No. of pupils					

Answer to check-up 4

| Level	2	3	4	5	6
No. of pupils	3	12	25	8	2

Discussion and explanation of check-up 4

The data in this frequency table arises from what is technically called a *discrete variable*. This means that the variable (in this case, the level obtained in the Key Stage 2 mathematics test) divides the population being considered (in this case, the set of pupils in this school who took the Key Stage 2 mathematics test) into a number of *discrete* (separate) subsets. The *values* of the variable (2, 3, 4, 5, 6) are shown along the horizontal axis. In this example the subsets produced are the pupils achieving level 2, those achieving level 3, and so on. Each pupil belongs to one and only one subset. In an example like this, a bar chart is a very appropriate way of displaying the information, showing at a glance how the pupils are distributed across the various subsets. The vertical axis here shows the actual number of pupils. It is easy to read off, for example, that 25 pupils achieved level 4, because the height of the level 4 column is 25 on the vertical scale.

Alternatively, the teacher may decide to show the *percentage* of pupils in each level, rather than the number of pupils. In this case, with 50 pupils, the data entered and the corresponding bar chart would be as shown below. The bar chart, of course, looks identical to the previous version, apart from the labelling of the vertical axis. The column for level 5, for example, now indicates that 16% of pupils achieved this level, whereas previously it indicated that 8 pupils achieved this level.

If there is a large number of different subsets, it is usual to group the data in some way in order to produce between 5 and 12 subsets.

| Level	2	3	4	5	6
% of pupils	6	24	50	16	4

Result of Key Stage 2 mathematics test for 50 pupils
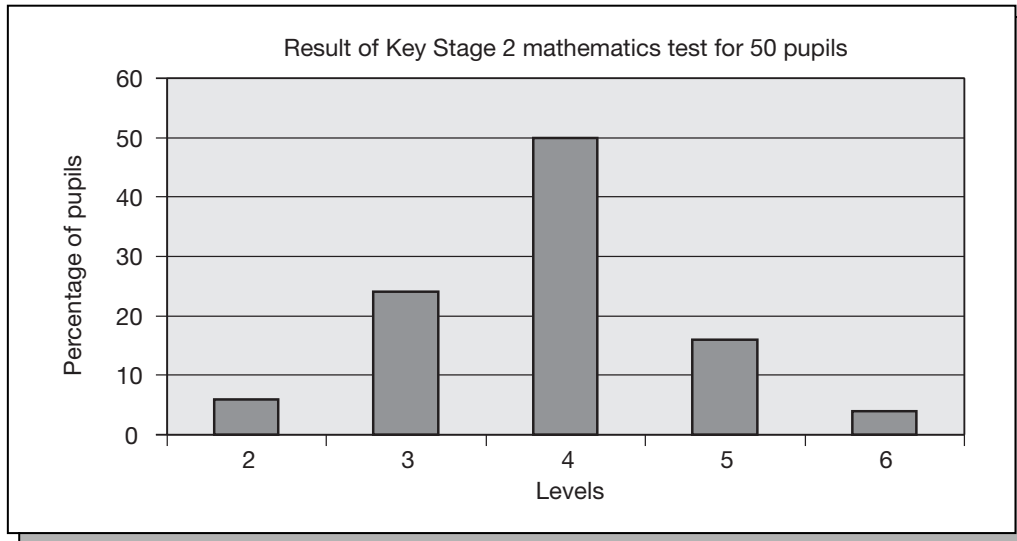
Summary of key ideas

◆ A bar chart is usually an appropriate way of displaying pictorially a set of data arising from a discrete variable.

◆ A discrete variable divides a population into a number of discrete (separate) subsets, with each individual in the population belonging to one and only one subset.

◆ The values of the variable are usually shown on the horizontal axis.

◆ The height of a column, shown by the scale on the vertical axis, usually represents the frequency, that is the number of individuals in the various subsets.

◆ The frequencies can also be expressed as percentages of the population.

Further practice

4.1 The bar chart shows the numbers of pupils in Years 7–11 in a secondary school. Decide whether the following statements are true or false.

Number on roll in years 7–11
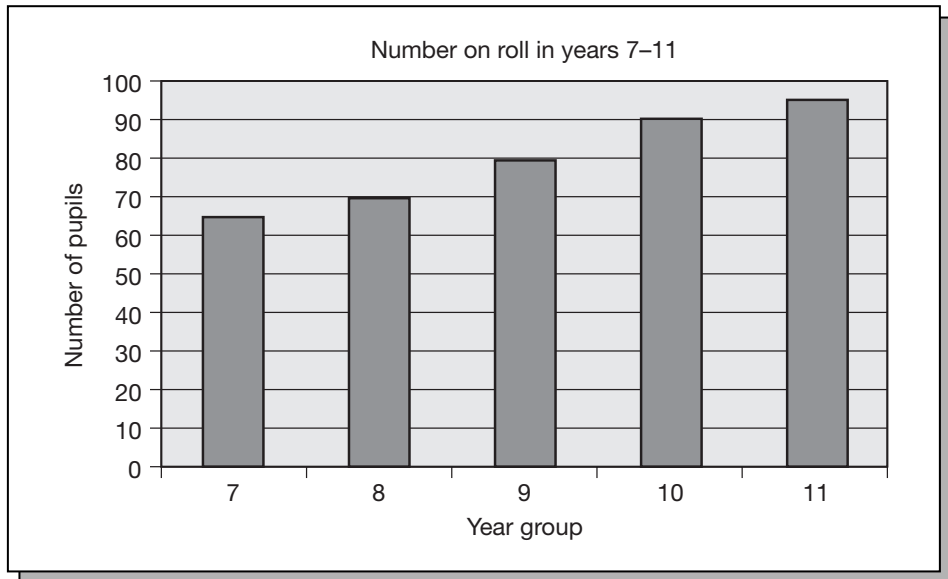
a) The year with the most pupils is Year 11.

b) Year 11 has 10 more pupils than Year 10.

c) There are 400 pupils in total in Years 7–11.

d) About 25% of the pupils are in Year 7.

e) The intake to the school has risen gradually over the last five years.