PART 3

UNIT
4

AUTUMN
first half

HANDLING DATA

SUGGESTED TIME   **3 hours**

TEACHING OBJECTIVES

- Solve problems by representing and interpreting data on a bar chart and bar line graph: axes in 2s, 5s, 10s, 20s, 100s.

- Extract information from tables and charts.

- Find the mode of a small data set.

- Find and use the range of a set of values.

SECTION 1   Bar charts and bar line graphs

SECTION 2   Charts and tables

SECTION 3   Mode and range

HOMEWORK

- The Star Challenges are suitable as homework activities.
- Topical issues can provide a source of data interpretation exercises.
- Practise mental arithmetic skills.

Unit **4**

Checklist for pupils

Bar charts and bar line graphs

You will:
- read data from bar charts and bar line graphs ☐

Charts and tables

You will:
- read data from other kinds of charts and tables ☐

Mode and range

You will:
- find the mode and range of sets of data ☐

SECTIONS 1 AND 2: BAR CHARTS AND LINE GRAPHS CHARTS AND TABLES

DIRECT TEACHING POINTS

- These two sections focus on reading information, calculating with the information and interpreting data rather than drawing graphs.

- You need to teach pupils how to read two-way tables, for example, Star Challenge 3.

- The exercises may be supplemented or replaced with topical examples drawn from newspapers and magazines.

- Examples involving interpretation of data are also suitable for class or group discussion – use OHP to display the graphs and questions.

- Explain 'frequency' as the number of times an event occurs – give examples.
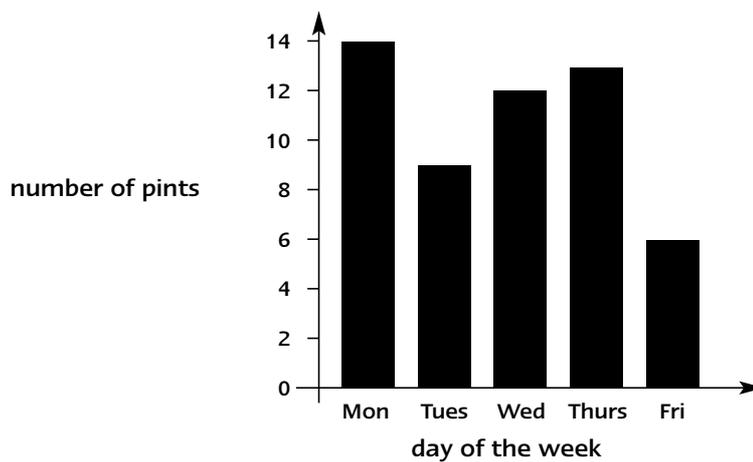
KEY VOCABULARY TO LEARN AND USE

frequency   bar chart   line graph
bar line graph

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Bar charts and bar line graphs

1 Lotta bottle

Milk delivered to school canteen

This is a **bar chart**.

Answer the following:

1 On which day is most milk delivered? ....

2 How much is delivered on Friday? ....

3 How much is delivered on Tuesday? ....

4 Complete this table:

Day	Mon	Tue	Wed	Thur	Fri
Number of pints					

5 The school pays 40p a pint for the milk.
What is the canteen's milk bill each week? ....

6 Why would you expect less milk to be delivered on a Friday?

....
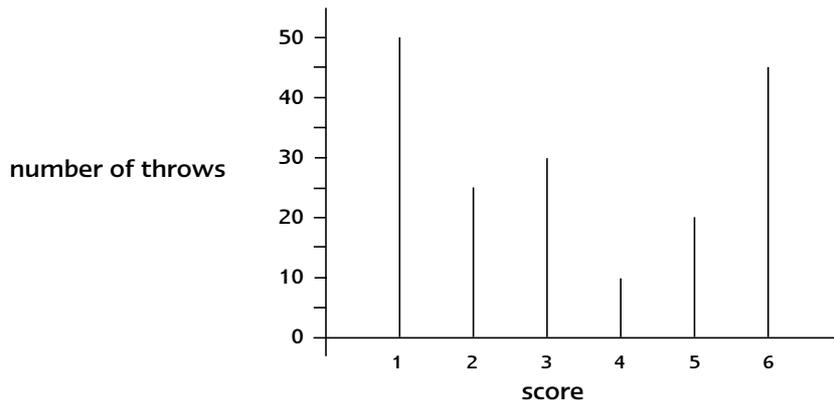
UNIT
4

Bar charts and bar line graphs

2 The dice-rolling experiment

Malika and Susan did an experiment with a dice.
They rolled the dice lots of times and kept a record of the score each time.

Dice-rolling experiment

number of throws

This is a **bar line graph.**

1 Which number was thrown most often? ....

2 How many times was this number thrown? ....

3 Which number was thrown the least? ....

4 Complete this table:

Score	1	2	3	4	5	6
Frequency						

5 How many times was the dice rolled? ....

6 Is this a 'fair' dice?

Explain your answer. ....

....

....

Bar charts and bar line graphs
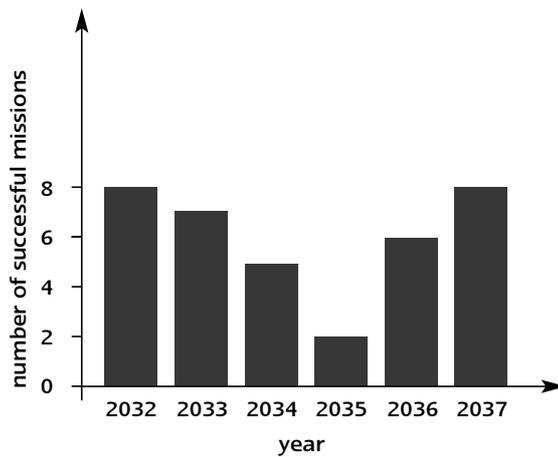
STAR CHALLENGE
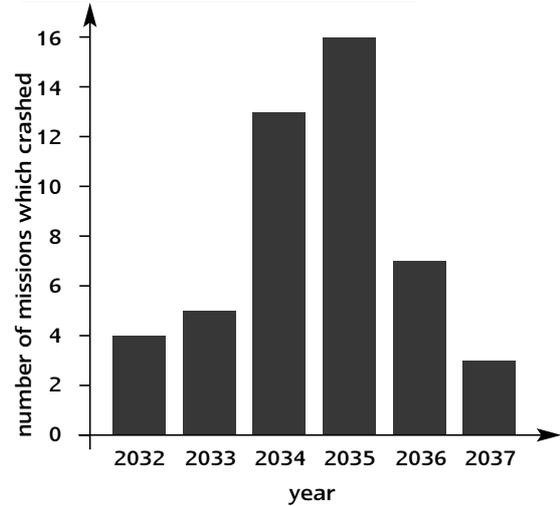
1 Space probe

★ ★ ○

23–24 marks 2 stars
20–22 marks 1 star

Successful space missions

Unsuccessful space missions

1 In which year were there only five successful missions?............ (1 mark)

2 How many successful missions were there in 2033?................ (1 mark)

3 How many crashes were there in 2033?   .... (1 mark)

4 What was the total number of missions in 2033?   .... (1 mark)

5 *Copy and complete this table:*   .... (18 marks)

Year	2032	2033	2034	2035	2036	2037
Successful missions						
Crashed missions						
Total number of missions						

6 In which year was there the least number of crashes?   (1 mark)

....

7 What was the most unsuccessful year for the space probe?   (1 mark)

....

UNIT
4

Charts and tables

1 **May days**

May						
M	T	W	Th	F	S	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Look at the calendar and answer the following questions:

1 What day is 9 May? ....

2 Ahmed gets his pocket money on Saturdays.
How many times will he get his pocket money during this month?

....

3 What is the date of the third Monday of the month?

....

4 What day will 3 June be? ....

5 There is a school holiday on 7 May. Half term is the week marked with a
long box: | 21   22   23   24   25   26   27 |
How many days should you go to school this month? ....

6 Monday is the first day of the week.
How many complete weeks are there in this May? ....

7 What is the date on the second Saturday
after 6 May? ....

8 Mary pays £40 rent every Wednesday.
How much rent does she pay this May? ....

UNIT

4

Charts and tables

STAR CHALLENGE

2 **Second-hand cars**

★ ●

5–6 correct 1 star

This table shows the prices of second-hand cars of different ages and different makes.

Make / Year	Vauxhall Astra	VW Golf	Ford Escort	Mazda 323	Renault 12
1994	£3600	£3125	£3375	£3125	£2500
1995	£4125	£3825	£3600	£4150	£3025
1996	£4725	£4350	£4500	£4825	£4205
1997	£5375	£5150	£5350	£5850	£4750
1998	£6025	£5525	£5975	£6350	£5175

Look at the chart and answer the following questions:

1 How much would you pay for a 1996 Mazda?

....

2 How much would you pay for a 1997 Golf?

....

3 Linda has £4000 to spend. What year is the newest Ford Escort that she can buy?

....

4 Which of these cars is the most expensive 1994 model?

....

5 Which of these cars is the most expensive 1998 model?

....

6 Estimate how much a 1993 VW Golf might cost.

Explain your answer.

....

....

UNIT
4

STAR CHALLENGE

3

Charts and tables

How many miles?

6–7 marks 1 star

This table shows the distances in miles between five towns.

	Exeter	Plymouth	Taunton	Penzance	Bristol
Exeter		45	34	112	84
Plymouth	45		75	78	125
Taunton	34	75		147	51
Penzance	112	78	147		196
Bristol	84	125	51	196	

Look at the chart and answer the following questions:

1 How many miles is it from Taunton to Penzance? (1 mark)

....

2 How many miles is it from Exeter to Bristol? (1 mark)

....

3 Which two of these towns are furthest apart? (1 mark)

....

4 Scott drives from Plymouth to Exeter.
He then drives from Exeter to Taunton and finally back to Plymouth.
Work out the total distance he drives. (1 mark for answer,
3 marks for correct working out)

Show your working:

Total distance:

....

SECTION 3: MODE AND RANGE

- Explain the meaning of 'mode'. Emphasise that it is a value from the data – the most common one.

- Show examples of single mode, two modes (bimodal) etc.

- Explain 'range' and illustrate the calculation – many pupils describe range as '27 to 35' instead of 8 (= 35 − 27). Pupils need to realise that range measures how spread out the data is.

- Revise all mental work.

KEY VOCABULARY TO LEARN AND USE

mode   range

UNIT

4

Mode and range

1 The mode

GUESS
WHAT?

The mode is the most common value.

Example

red, green, green, blue.

The mode is 'green'.

Find the mode of each set:

1	4	5	5	7			mode = ...
2	red	green	orange	red			mode = ...
3	8	6	6	3	3	6	mode = ...
4	bird	dog	cat	dog	dog	cat	mode = ...

Example

It is possible to have two modes.

4, 7, 7, 8, 8, 5

There are two modes.

The modes are 7 and 8.

Example

It is possible to have no mode.

4, 4, 7, 7, 8, 8, 5, 5

There is no mode.

All values are equally common.

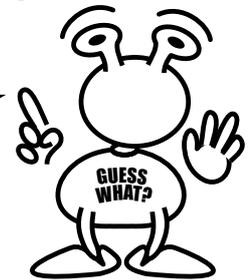| 5 | 10 | 3 | 2 | 3 | 5 | 2 | mode = ... |
6	5	4	2	3	0	10	mode = ...
7	pink	yellow	blue	pink	green		mode = ...
8	tiger	lion	tiger	elephant	lion		mode = ...
9	−1	3	0	4	5		mode = ...
10	2	3	−2	−3	2	3	mode = ...

Mode and range

2 The range

Example Work out the range of this set:

2, 7, 7, 8, 8, 5

Range = largest − smallest
8 − 2

GUESS WHAT?

Work out the range of each set:

1 1   4   4   5   6   range = ...

2 3   9   7   7   3   range = ...

3 2   7   5   10   5   range = ...

4 2   8   15   5   range = ...

Work out the mode and range of each set:

5 5   3   2   2   mode = ...   range = ...

6 10   9   8   8   4   mode = ...   range = ...

7 4   4   4   6   6   5   mode = ...   range = ...

8 5   7   9   10   6   5   mode = ...   range = ...

9 8   9   10   8   7   9   mode = ...   range = ...

10 20   30   14   16   10   9   mode = ...   range = ...

11 This chart shows the number of pairs of Bovva Boots sold last week in different sizes:
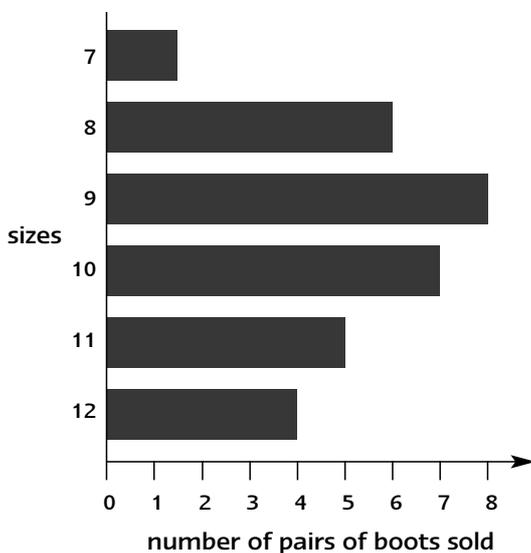
Work out:

(a) the most common size of boots (the mode) that were sold last week

....

(b) the range of sizes sold

....

sizes

number of pairs of boots sold

UNIT
4

Mode and range

STAR CHALLENGE

4

Reading from tables and charts

★ ★ ○

| 11 correct | 2 stars |
| 8–10 correct | 1 star |

1 Some Year 7 pupils were asked which animal they would *not* like to meet. Here is what they said:

Worst animal	Number of pupils
Snake	8
Tiger	3
Shark	6
Bear	2
Spider	10
Wolf	7

(a) How many pupils chose 'shark'?

....

(b) How many pupils were asked?

....

(c) What was the most common choice (the mode)?
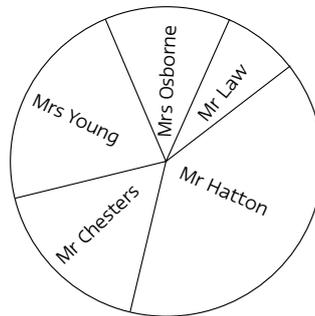
....

2 Some Year 7 pupils were asked which maths teacher told the worst jokes. The pie chart shows their choices.

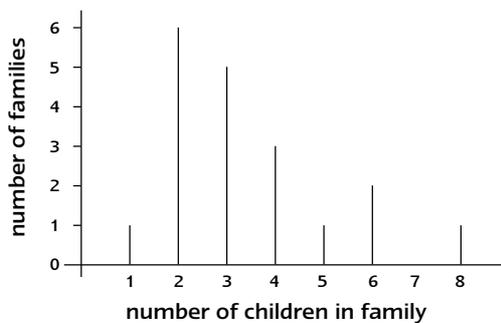(a) Which teacher was chosen the least?

....

(b) Which teacher was chosen by the most pupils (the mode)?

....

Mrs Osborne · Mr Law · Mrs Young · Mr Hatton · Mr Chesters

3 Some Year 7 pupils were asked how many children there were in their family.

Family sizes

number of families (y-axis: 0–6)
number of children in family (x-axis: 1–8)

(a) How many families have two children?

....

(b) How many families have eight children?

....

(c) What is the mode?

....

(d) What is the range of family sizes?

....

Mode and range

STAR CHALLENGE

5 **Working with mode and range**

★ ○———

| All correct 1 star |

1 Class 7XY did a survey of the price of a tin of beans in the local shops.

The prices were: 24p   25p   26p   27p   24p   25p   26p   26p

Work out:

(a) the modal price (the mode)   ....

(b) the range of prices   ....

2 During the twelve days of Christmas, the midday temperatures in °C were:
2   −2   4   −2   0   1   −5   −6   −4   1   1   0

Work out:

(a) the modal temperature (the mode)   ....

(b) the temperature range   ....

UNIT

4

Unit **4** Answers

Section 1 — Bar charts and bar line graphs

1 Lotta bottle

1 Monday **2** 6 pints **3** 9 pints

4

Day	Mon	Tue	Wed	Thur	Fri
Number of pints	14	9	12	13	6

5 £21.60 **6** Before weekend when there is no school.

2 The dice-rolling experiment

1 1 **2** 50 **3** 4

4

Score	1	2	3	4	5	6
Frequency	50	25	30	10	20	45

5 180 **6** No – would expect roughly same number of each score.

Section 2 — Charts and tables

1 May days

1 Wednesday **2** 4 **3** 21 May **4** Sunday

5 17 days **6** 3 **7** 19 May **8** £200

Section 3 — Mode and range

1 The mode

1 5 **2** red **3** 6 **4** dog

5 2 and 3 **6** no mode **7** pink

8 tiger and lion **9** no mode **10** 2 and 3

2 The range

1 5 **2** 6 **3** 8 **4** 13

5 mode = **2**, range = **3** **6** mode = **8**, range = **6**

7 mode = **4**, range = **2** **8** mode = **5**, range = **5**

9 mode = **8 and 9**, range = **3** **10** **no mode**, range = 21

11 (a) **9** (b) **5**

Unit 4 Answers

Star Challenge answers

1 Space probe

| 23–24 marks 2 stars |
| 20–22 marks 1 star |

1 2034 **2** 7 **3** 5 **4** 12

5

Year	2032	2033	2034	2035	2036	2037
Successful missions	8	7	5	2	6	8
Crashed missions	4	5	13	16	7	3
Total number of missions	12	12	18	18	13	11

6 2037 **7** 2035

2 Second-hand cars

| 5–6 correct 1 star |

1 £4825 **2** £5150 **3** 1995

4 Vauxhall Astra **5** Mazda 323 **6** about £2500

3 How many miles?

| 6–7 marks 1 star |

1 147 miles **2** 84 miles

3 Penzance and Bristol **4** 45 + 34 + 75 = 154 miles

4 Reading from tables and charts

| 11 correct   2 stars |
| 8–10 correct   1 star |

1 (a) 6 (b) 36 (c) spider

2 (a) Mr Law (b) Mr Hatton

3 (a) 6 (b) 1 (c) 2 (d) 7

5 Working with mode and range

| All correct 1 star |

1 (a) 26p (b) 3p

2 (a) 1°C (b) 10°C