

## Unit 10

### Ratio, proportion, data handling and problem solving

Five daily lessons

*National  
Numeracy Strategy*

Year 6

Spring term

#### Unit Objectives Year 6

- **Solve simple problems involving ratio and proportion.**
- **Solve a problem by** representing, **extracting and interpreting data in tables, graphs, charts** and diagrams, including those generated by a computer, for example: line graphs; frequency tables and bar charts with grouped discrete data.

Page 27

Pages 115, 117

Year 5

#### Link Objectives

Year 7

- Solve simple problems using ideas of ratio and proportion ('one for every' and 'one in every').
- Solve a problem by representing and interpreting data in tables, charts, graphs and diagrams, including those generated by a computer.

(Key objectives in bold)

- Understand the relationship between ratio and proportion; use direct proportion in simple contexts; use ratio notation, reduce a ratio to its simplest form and divide a quantity into two parts in a given ratio; solve simple problems about ratio and proportion using informal strategies.
- Interpret diagrams and graphs (including pie charts) and draw simple conclusions based on the shape of graphs and simple statistics for a single distribution.

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

#### Resources needed to teach this unit:

- Resource sheet 10.1
- Resource sheet 10.2
- Activity sheet 10.1
- OHT 10.1
- OHT 10.2
- OHT 10.3
- OHT 10.4
- OHT 10.5
- OHT 10.6
- OHT 10.7
- OHT 10.8
- Whiteboards
- OHP calculator
- Bags of bricks
- Counting stick
- Centimetre squared paper
- Related Key Stage 2 National test questions

department for  
**education and skills**

Place Value Chart

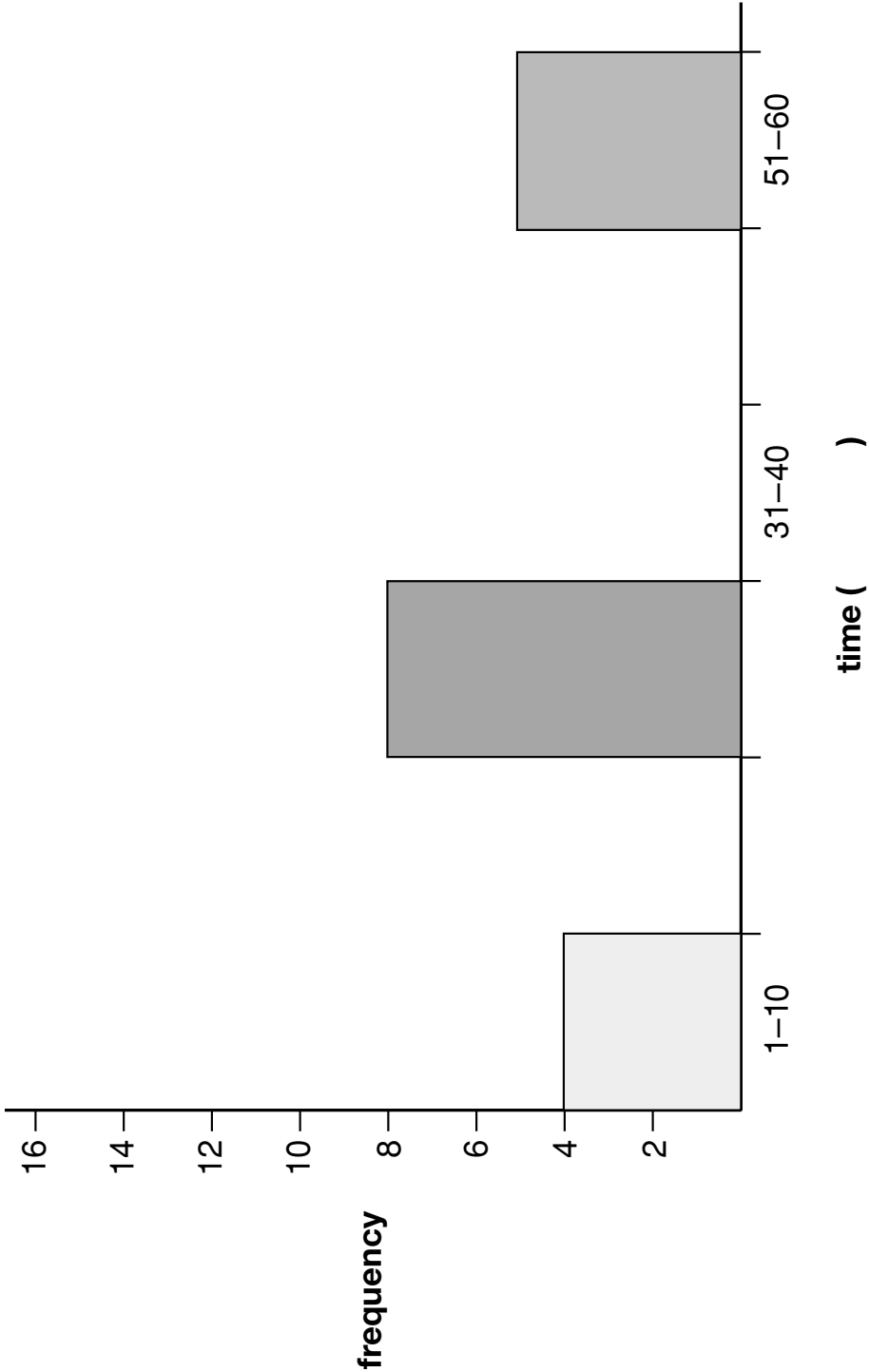
1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

## Fractions, decimals and mixed numbers cards

$\frac{1}{2}$	1.99	1.7	$\frac{4}{5}$	$\frac{8}{10}$
0.7	$\frac{5}{5}$	0.5	0.01	$\frac{1}{3}$
0.1	$\frac{3}{4}$	1.75	1.25	0.3
$1\frac{1}{4}$	$1\frac{3}{4}$	1.1	$\frac{4}{10}$	1.6
$\frac{2}{10}$	$\frac{9}{10}$	$\frac{1}{4}$	0.75	1.5
0.25	$1\frac{2}{5}$	1.4	$1\frac{1}{2}$	$\frac{1}{5}$

Journey times to school in minutes

Complete the bar chart and the frequency table.



time ( )	frequency
1-10	
	9
31-40	13
	7
51-60	

Mixing Squash



10 ml of blackcurrant

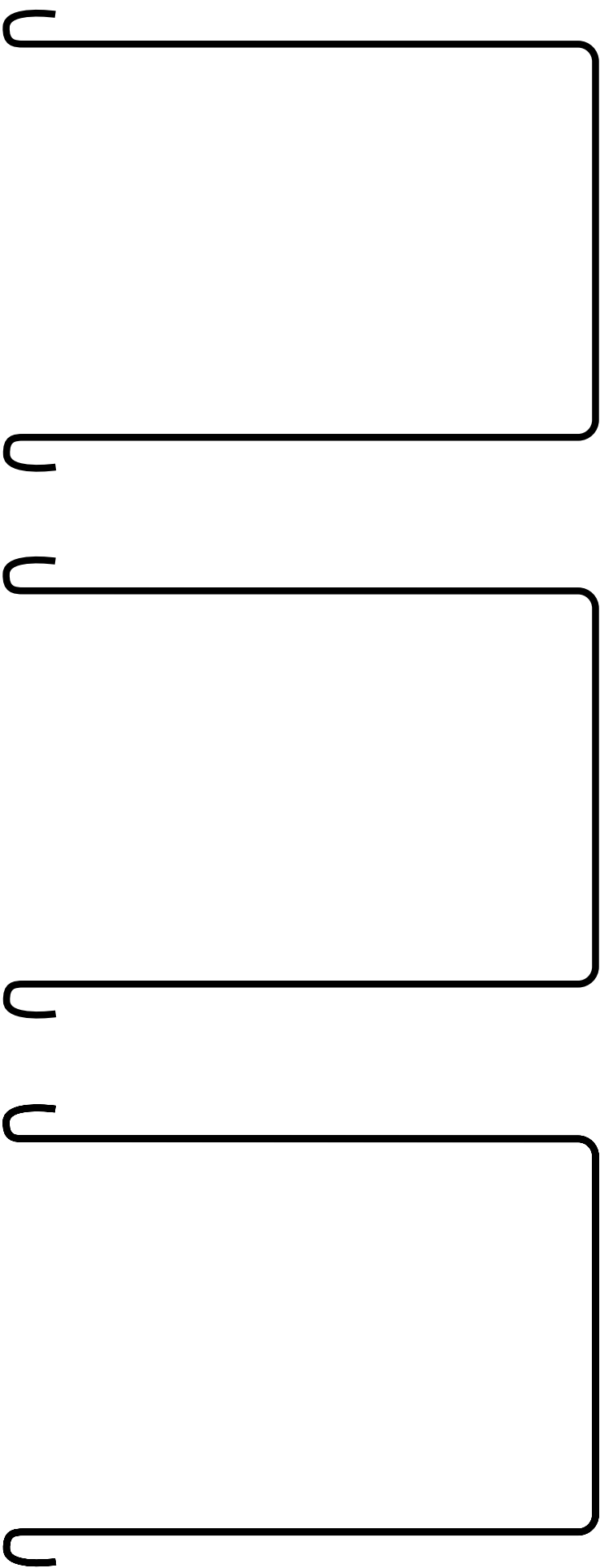


90 ml of water

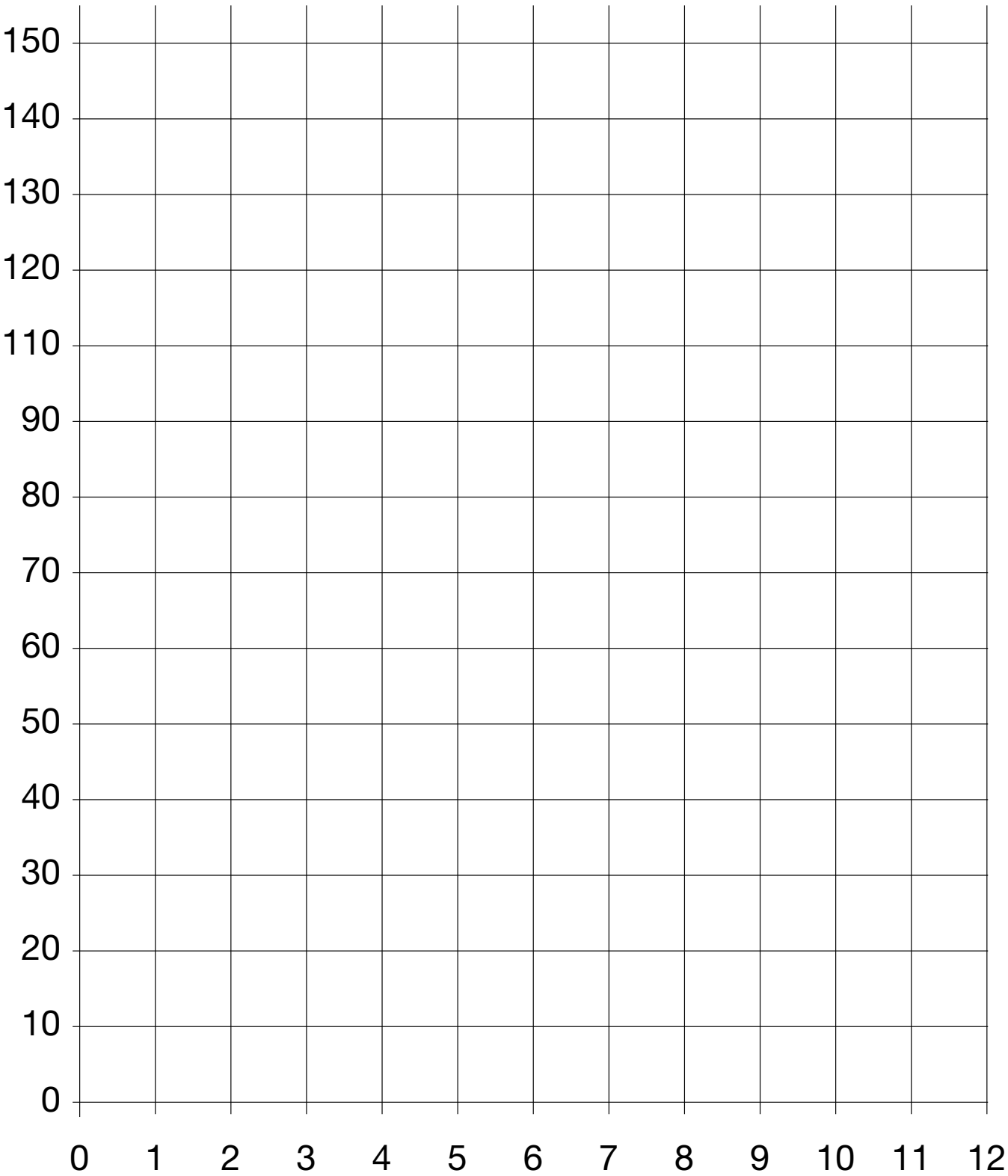


100 ml of drink

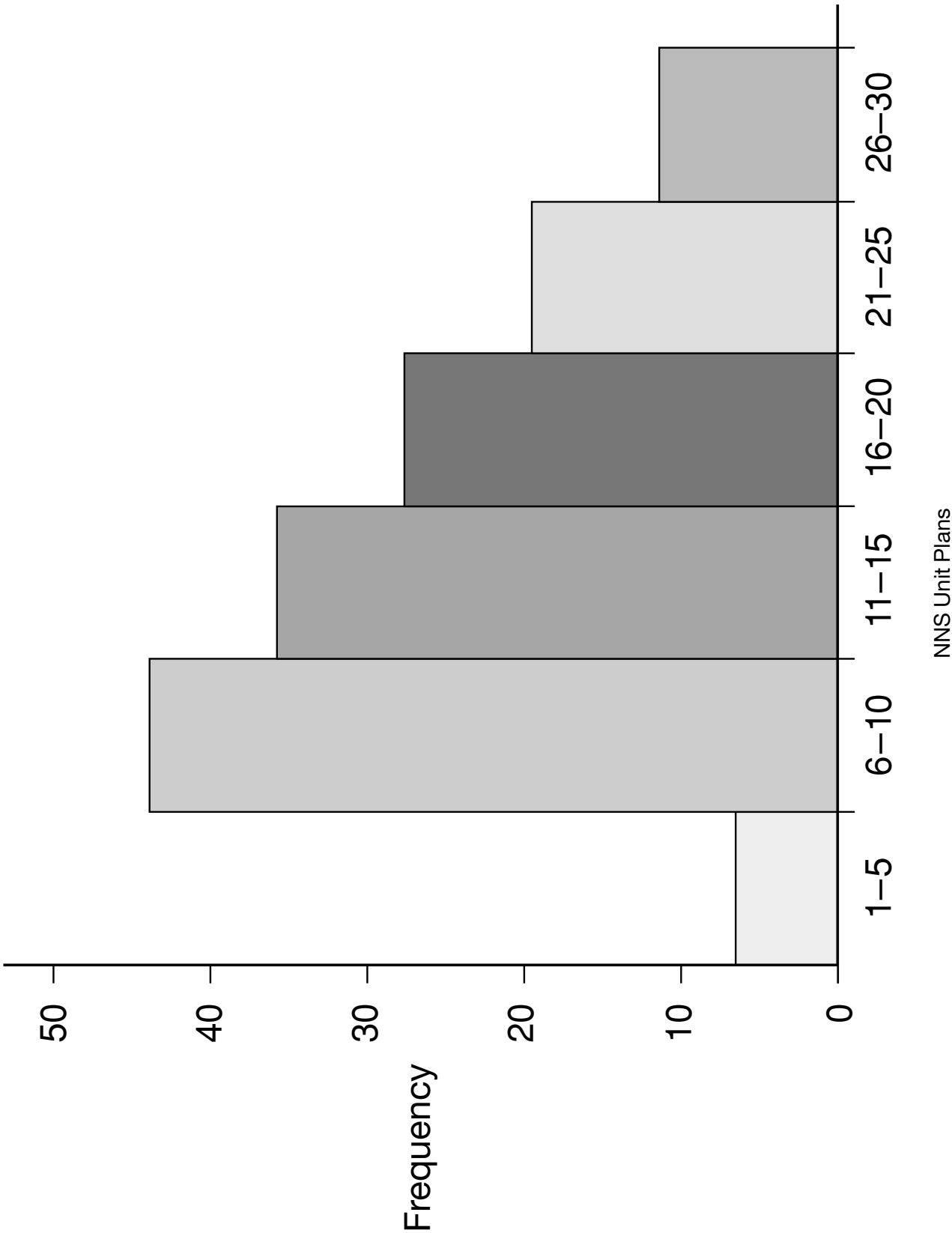
**Mixing Squash**



Square Numbers

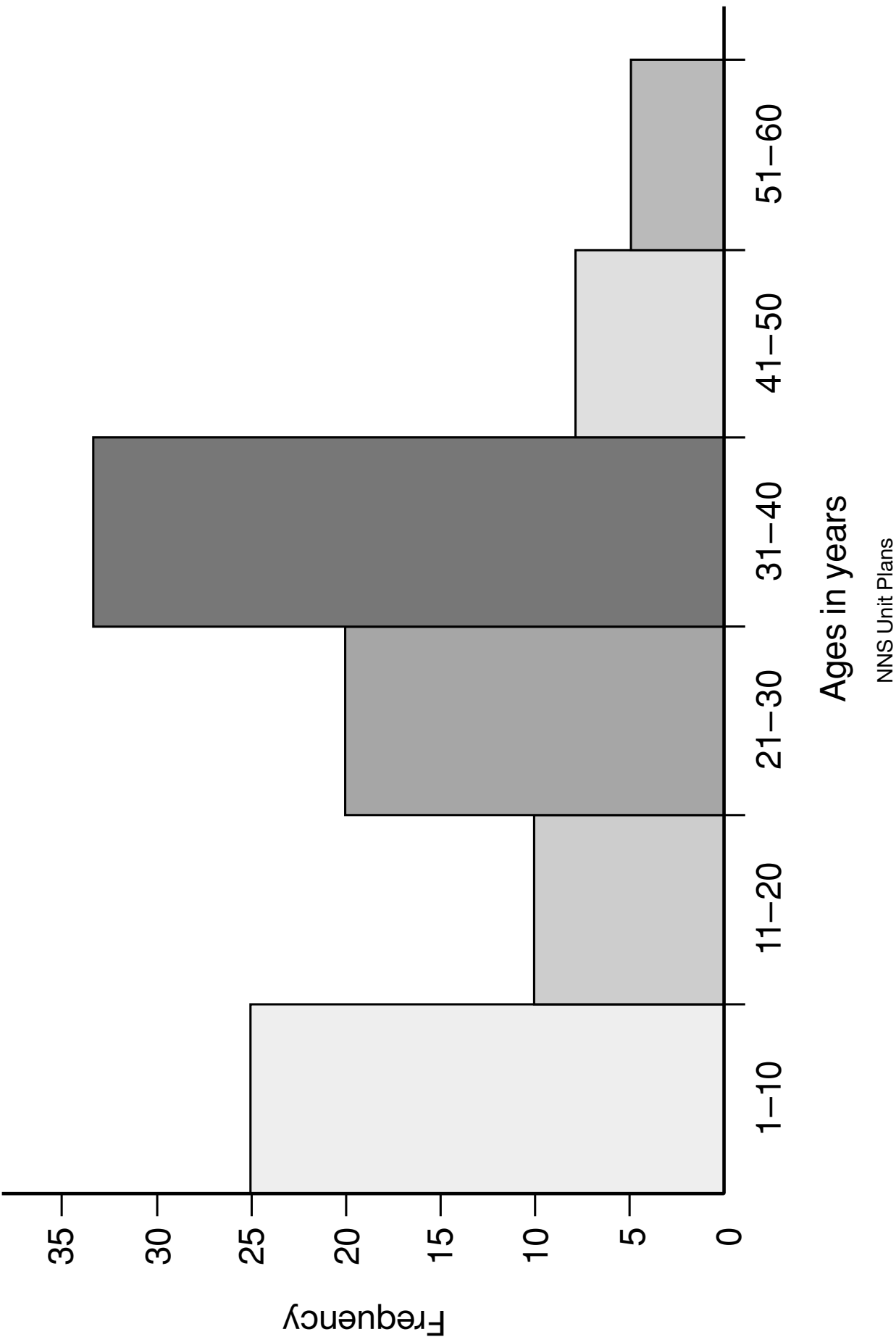


Bar Chart

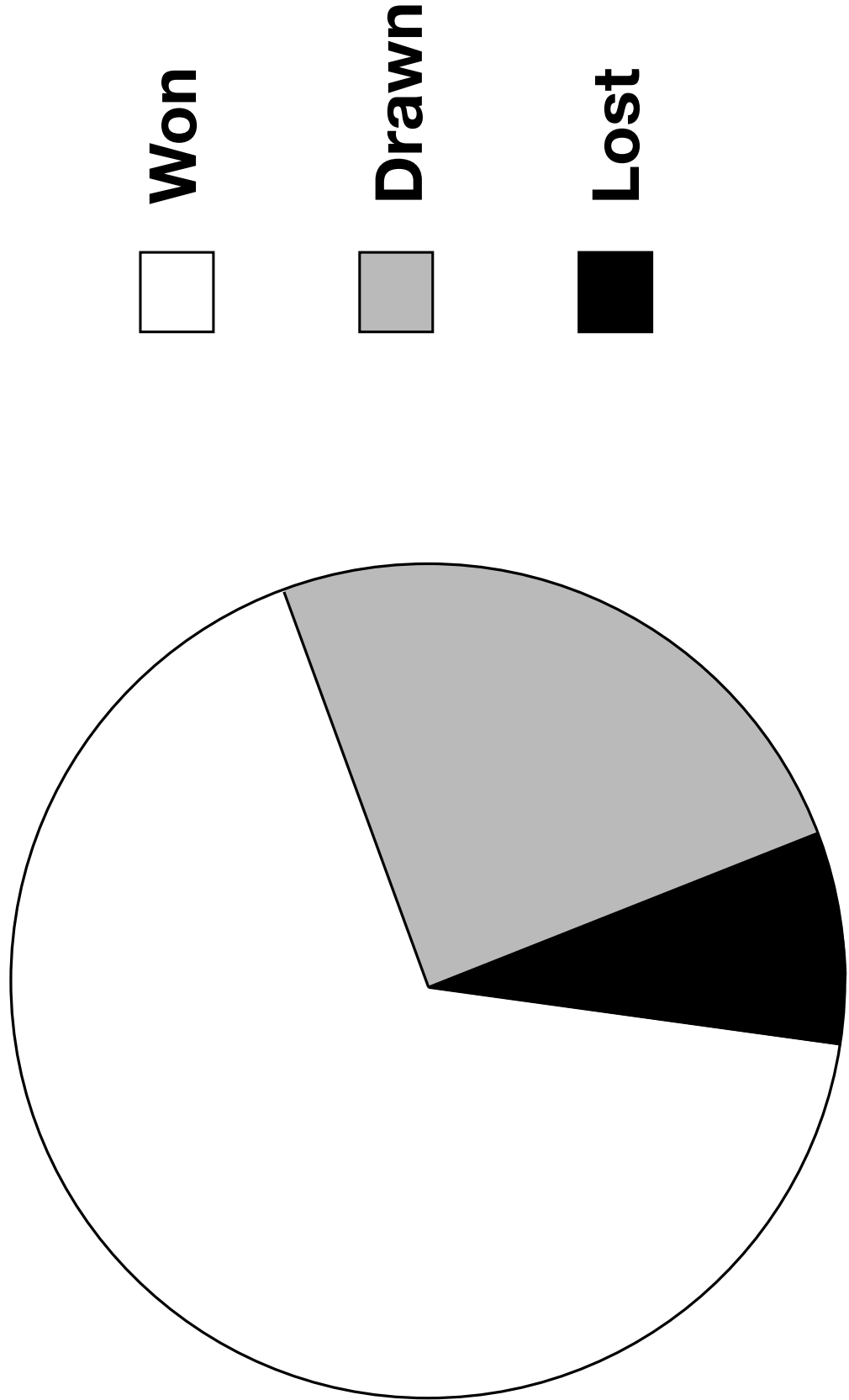




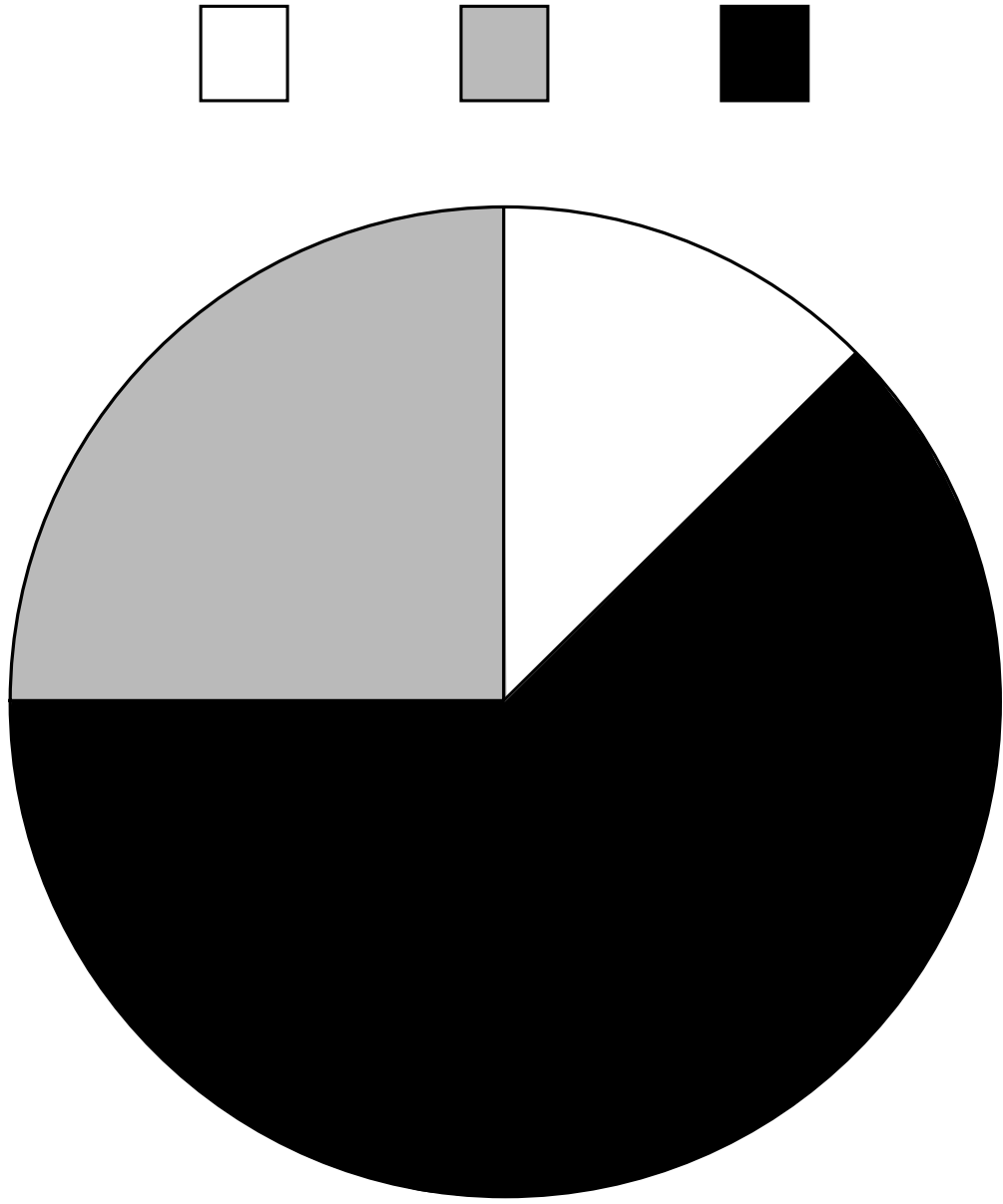
**Ages of people in the audience at a cinema**



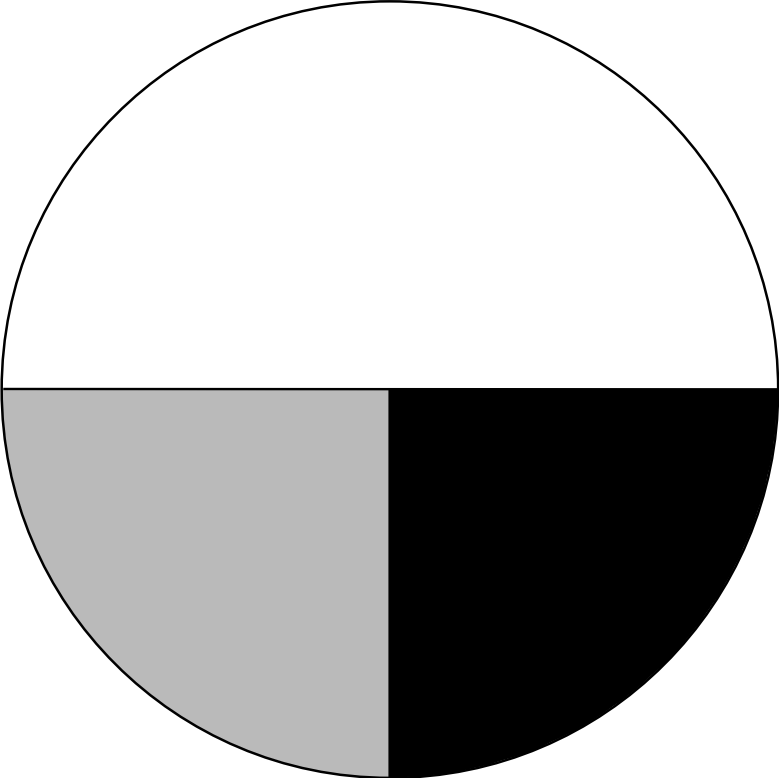
Games won, drawn and lost by Bigtown United



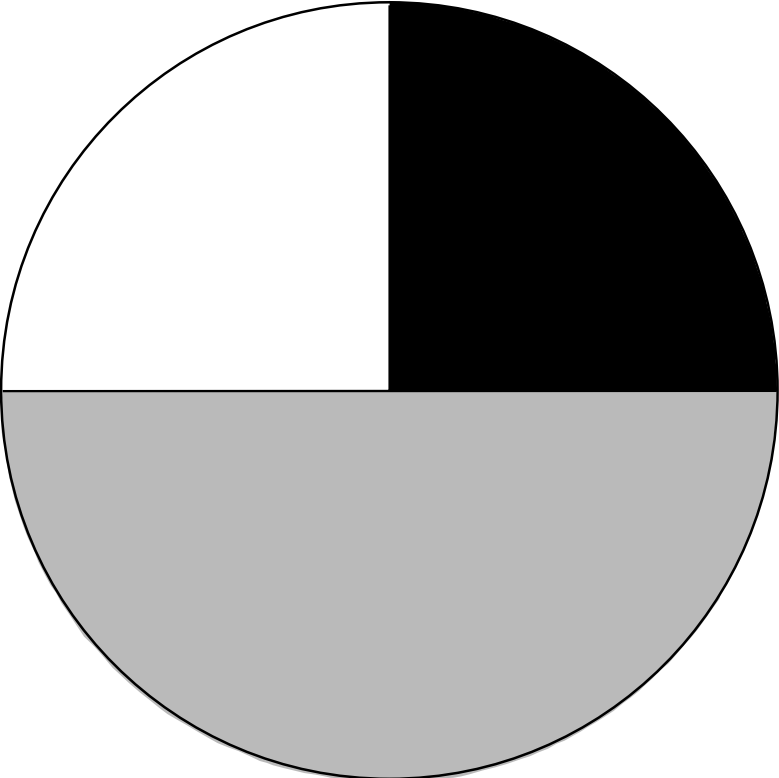
56 people were surveyed



Games, won, drawn and lost



Team A



Team B



Won



Drawn



Lost

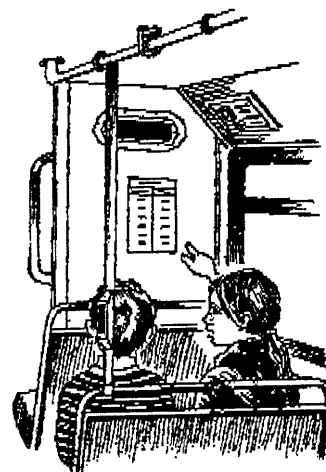
## Related Key Stage 2 national test questions:

## 2001 Test A

3

This table shows the increase in bus fares.

Bus Fares	
old fare	new fare
42p	48p
52p	57p
60p	72p
75p	85p
90p	£1.05
£1.20	£1.28

Sohan's **new** bus fare is **72p**.

How much has his bus fare gone up?


 p

3a

1 mark

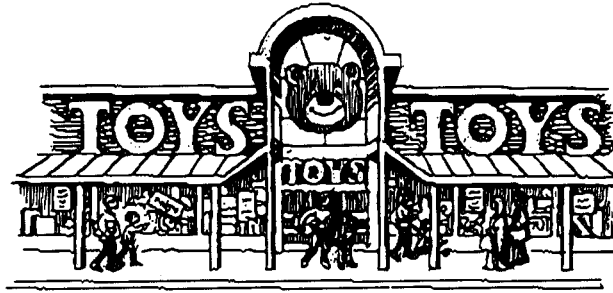
Millie says,

***'My bus fare has gone up by 10p'.***How much is Millie's **new** bus fare?

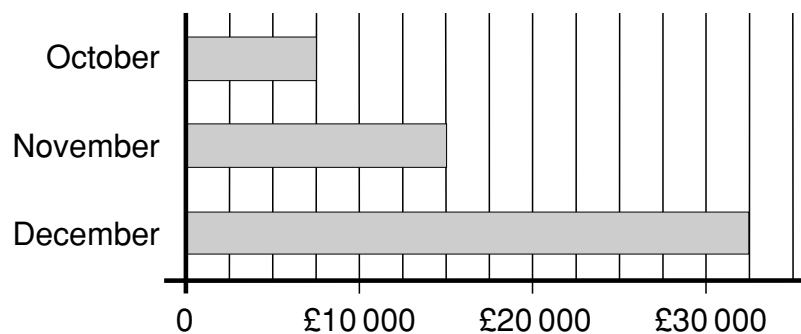

3b

1 mark

Total



The chart shows the amount of money spent in a toy shop in three months.



How much **more** money was spent in the shop in **December** than in **November**?



£

22a

1 mark

Stepan says,

***'In November there was a 100% increase on the money spent in October'.***

Is he correct?  
Circle Yes or No.



Yes / No

Explain how you can tell from the chart.



.....

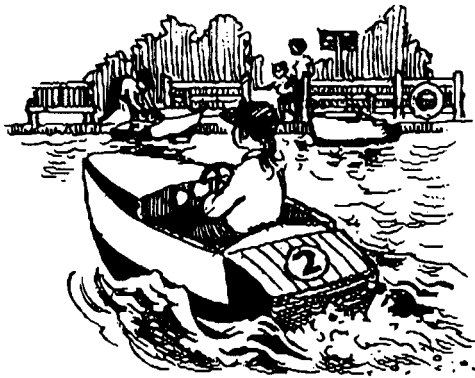
.....

.....

22b

1 mark

Total



Boat Hire	
<b>Motor boats</b> £1.50 for 15 minutes	<b>Rowing boats</b> £2.50 for 1 hour

How much does it cost to hire a **rowing boat** for three hours?



£

9a

1 mark

Sasha pays **£3.00** to hire a **motor boat**.  
 She goes out at **3:20 pm**.

By what time must she **return**?



pm

9b

1 mark

Total

2001 Test B

19

Here is a recipe for raspberry ice cream.

raspberry ice cream  
for 8 people

$\frac{1}{2}$  litre of cream

1 kg raspberries

250 g sugar



This recipe is for **8 people**.

Josie makes enough raspberry ice cream for **12 people**.

How much **cream** does she use?



litre

19

1 mark

Fred makes raspberry ice cream in the same way.

He uses  **$2\frac{1}{2}$  kg** of **raspberries**.

How much **sugar** does he use?



Show  
your **method**.  
You may get  
a mark.

g

19

2 marks

Total



2001 Test B

22

The rule for this sequence of numbers is 'add 3 each time'.

1    4    7    10    13    16 ...

This sequence continues in the same way.

Mary says,

***'No matter how far you go there will never be a multiple of 3 in the sequence.'***

Is she correct?  
Circle Yes or No.



Yes / No

Explain how you know.



.....

.....

.....

22

1 mark

Total



This table shows the numbers of children who went walking, sailing or climbing at an outdoor centre.

	May	June	July
walking	25	80	75
sailing	15	42	50
climbing	18	27	23

How many children went **sailing** in **May, June** and **July** altogether?




7a

1 mark

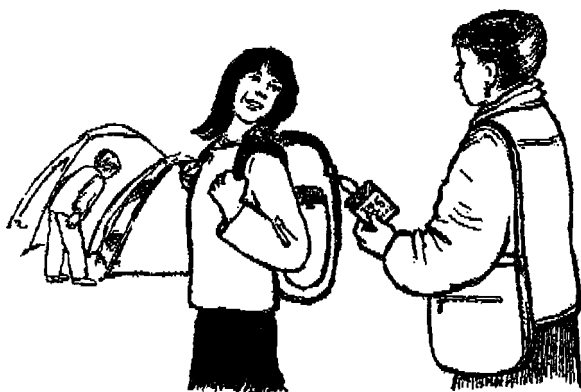
How many **more** children went **walking** in **June** than **climbing** in **June**?




7b

1 mark




Total
















A camping shop sells **tents**, **sleeping bags** and **backpacks**.

This chart shows how many of each they sold in June.

**Items sold in June**

	is 4 tents		is 4 sleeping bags		is 4 backpacks
---	------------	---	--------------------	--	----------------

tents	 
sleeping bags	   
backpacks	      

The shop had **20** sleeping bags at the **beginning of June**.

How many of these sleeping bags did the shop have left at the **end of June**?




10a

1 mark

In **July**, the shop sold **three times as many tents** as in June.

How many tents did the shop sell in **July**?




10b

1 mark

**Total**



Peanuts cost **60p** for **100 grams**.

What is the cost of **350 grams** of peanuts?



Show  
your **method**.  
You may get  
a mark.

15a

2 marks

Raisins cost **80p** for **100 grams**.

Jack pays **£2** for a bag of raisins.

How many **grams of raisins** does he get?



Show  
your **method**.  
You may get  
a mark.

**g**

15b

2 marks

**Total**

## 2000 Test A

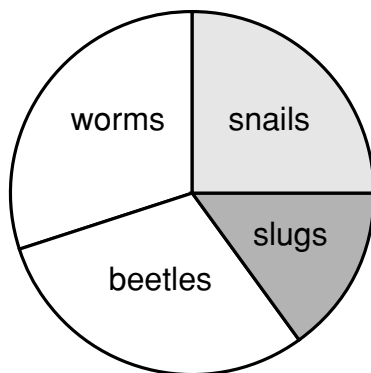
17

Tony and Gemma looked for snails, worms, slugs and beetles in their gardens.



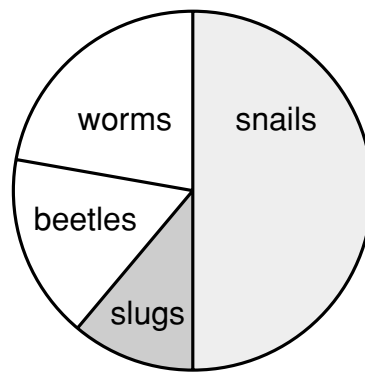
They each made a pie chart of what they found.

Tony's pie chart



Total 80

Gemma's pie chart



Total 36

**Estimate** the number of **worms** that **Tony** found.




17a

1 mark

Who found more **snails**?  
Circle Tony or Gemma.



Tony / Gemma

Explain how you know.



.....

.....

.....

17b

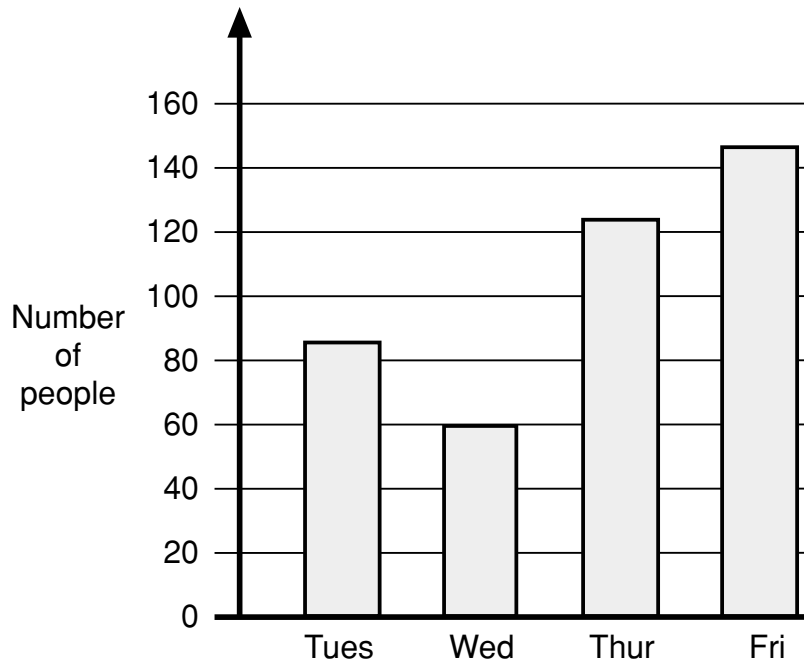
1 mark

Total

## 2000 Test B

10

This bar chart shows how many people went to a school play.



Estimate the number of people who went there on **Thursday** and **Friday** altogether.




10a

1 mark

Each person paid **£2.25** for a **ticket** to get in.

How much **ticket money** was collected on **Wednesday**?



£

Show  
your **method**.  
You may get  
a mark.

10b

2 marks

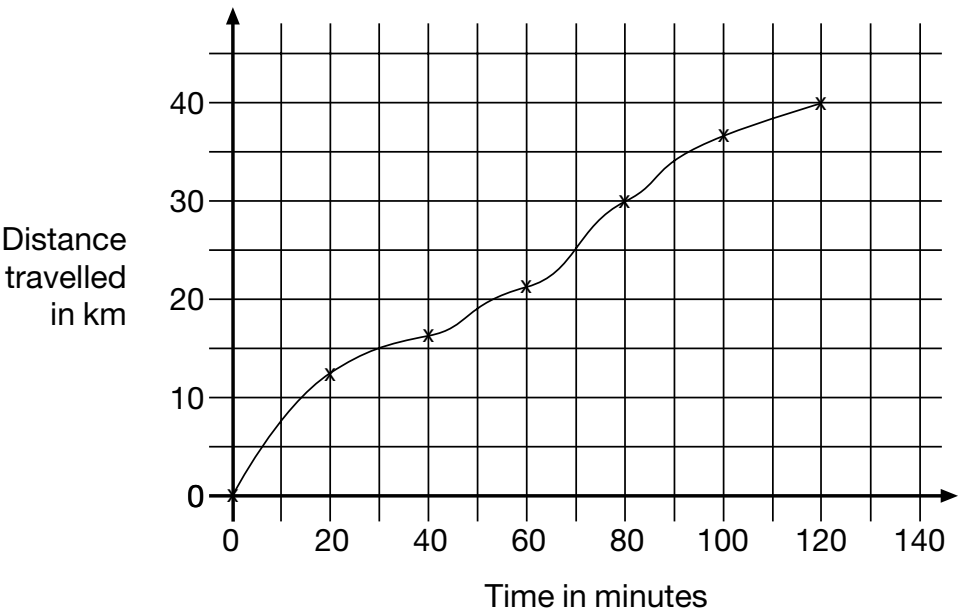
Total

2000    **Test B**

**19**

Carol went on a **40-kilometre** cycle ride.

This is a graph of how far she had gone at different times.




How many minutes did Carol take to travel the **last 10 kilometres** of the ride?



minutes

19a  
1 mark

Use the graph to estimate the distance travelled in the **first 20 minutes** of the ride.



km

19b  
1 mark

Carol says,

***'I travelled further in the first hour than in the second hour'.***

Explain how the graph shows this.



.....

.....

.....

19c  
1 mark

**Total**

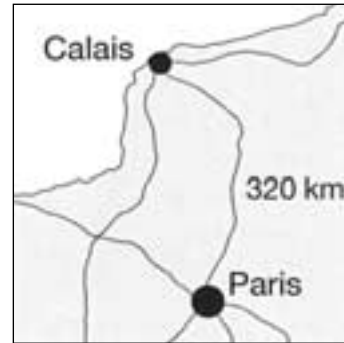
2000 Test B

21

Here is a map of part of France.

The map shows that the distance from Calais to Paris is **320 kilometres**.

**5 miles** is approximately **8 kilometres**.



Use these facts to calculate the approximate distance in **miles** from Calais to Paris.



Show your **method**.  
You may get a mark.

miles

Samira bought this present in France.

She paid **44.85 French Francs** for it.

**9.75 French Francs** equal £1.



44.85 FF

What was the cost of the present in **pounds** and **pence**?



Show your **method**.  
You may get a mark.

£

21a

2 marks

21b

2 marks

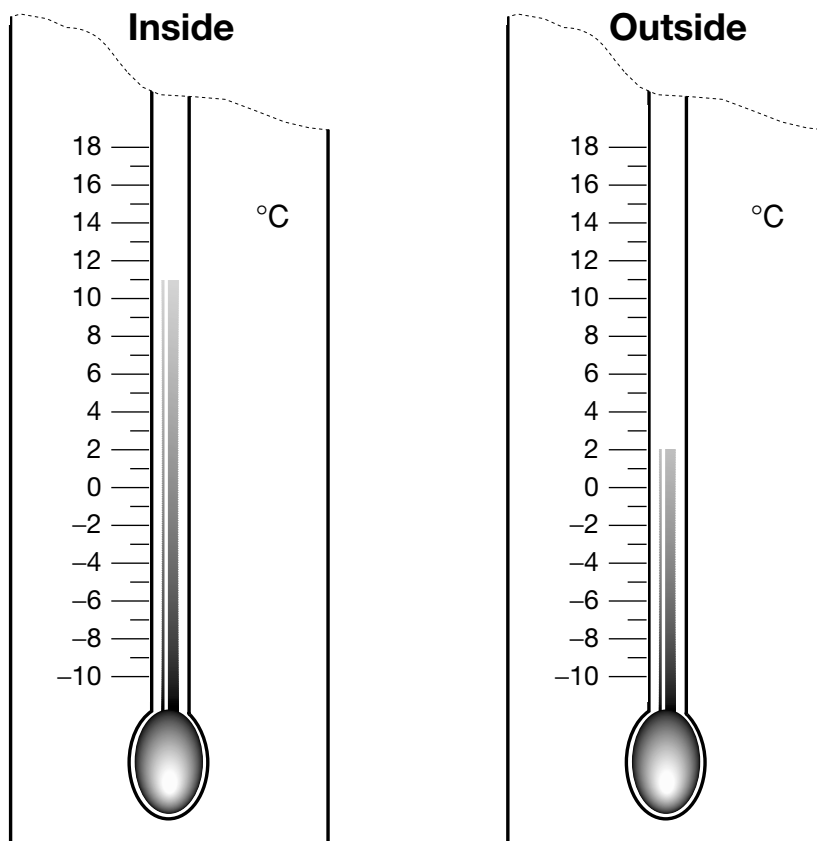
Total



# 2002 Test B

8

Two thermometers show the temperature inside and outside a greenhouse on a day in January.



How many degrees **warmer** was it inside the greenhouse than outside?


 °C

8a

1 mark

Later the temperatures were

inside	outside
-1°C	-8°C

What is the difference between these two temperatures?


 °C

8b

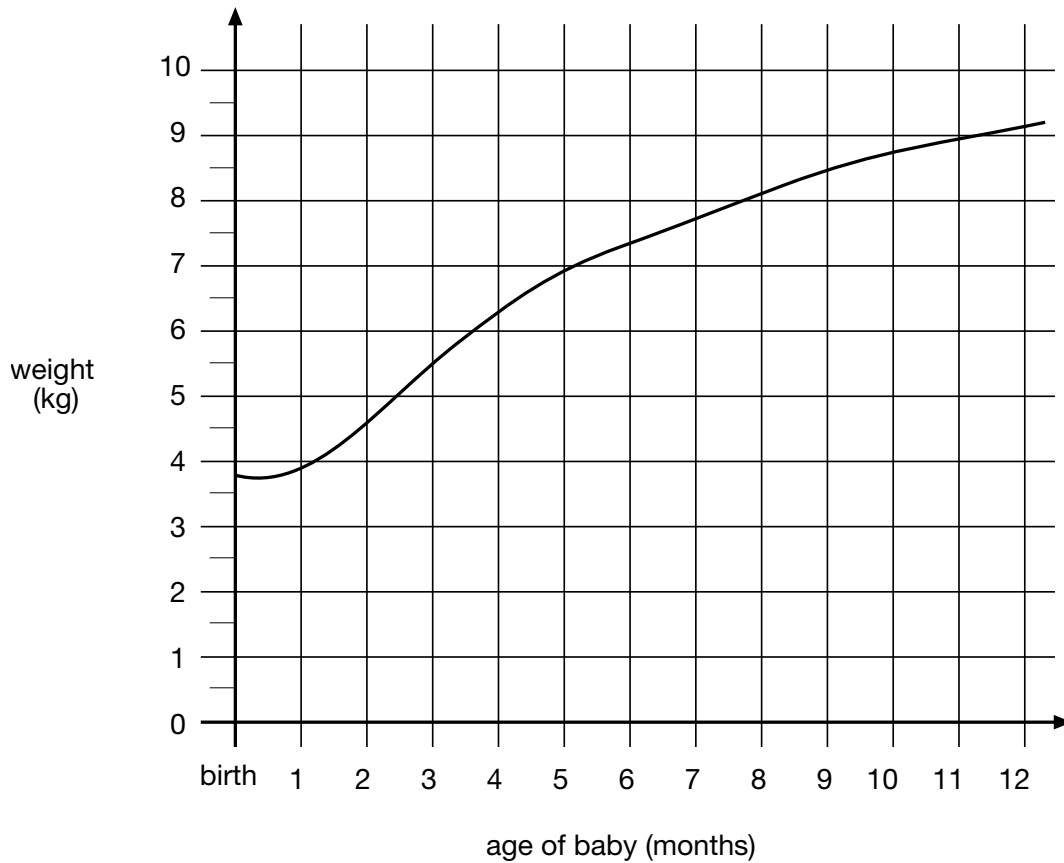
1 mark

Total

## 2002 Test B

17

This graph shows how the weight of a baby changed over twelve months.



From the graph, what was the weight of the baby at **10 months**?

 kg

1 mark 17a

How much **more** did the baby weigh at 5 months than at birth?

 kg

1 mark 17b

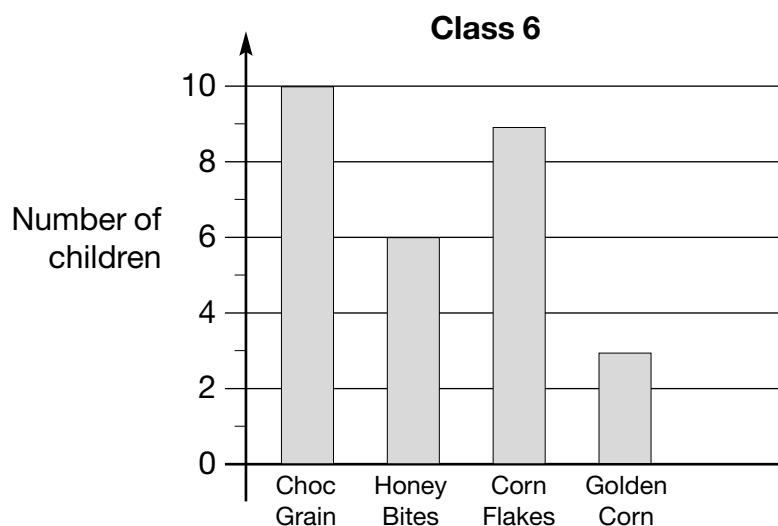
Total

# 2002 Test B

3

Tom does a survey of children's favourite breakfast cereals.

These are the results for Class 6



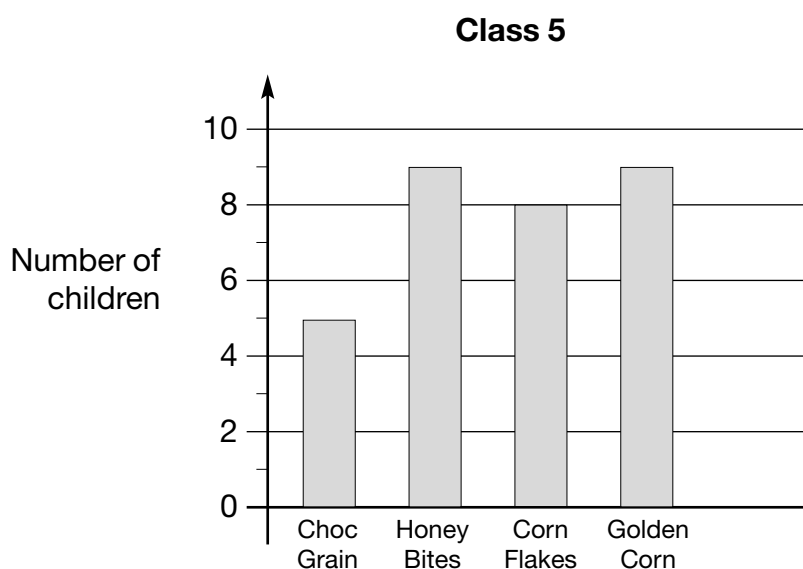
How many **more** children in Class 6 prefer **Choc Grain** than **Golden Corn**?




3a

1 mark

These are the results for Class 5



How many children in **both** classes like **Honey Bites** best?




3b

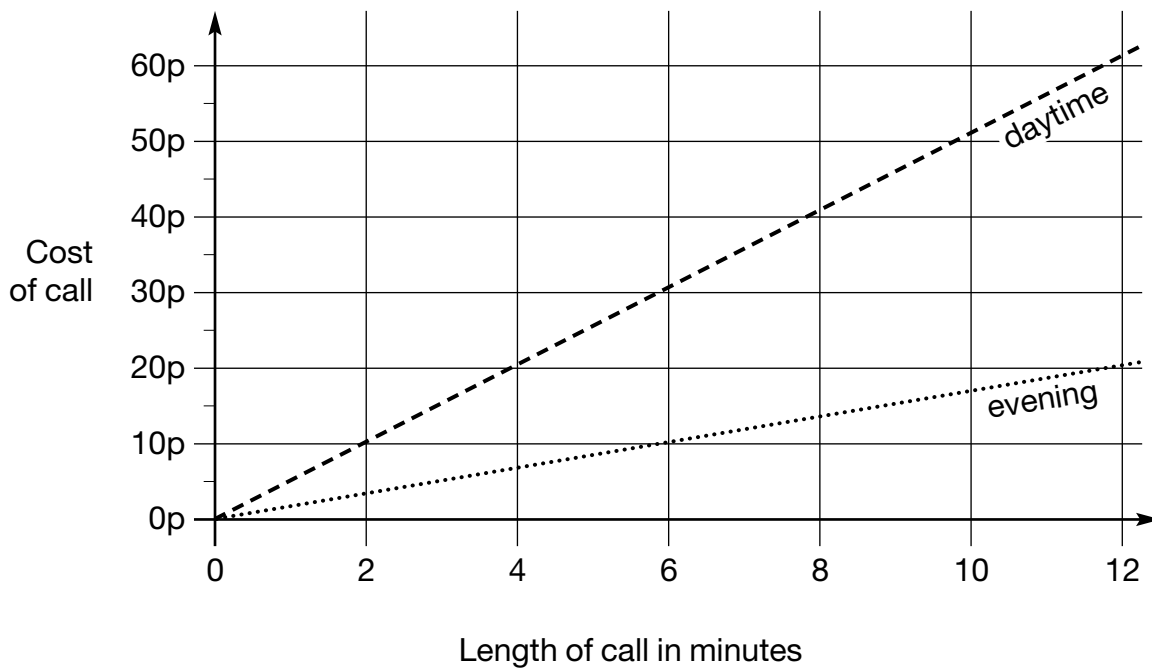
1 mark

**Total**

## 2002 Test A

10

This graph shows the cost of phone calls in the daytime and in the evening.



How much does it cost to make a **9 minute** call in the **daytime**?


 p

1 mark

10a

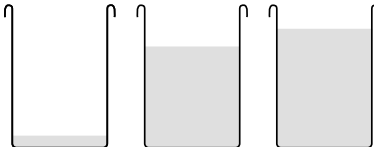
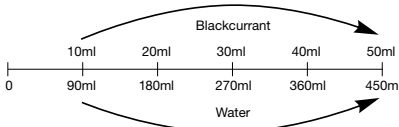
How much **more** does it cost to make a **6 minute** call in the **daytime** than in the **evening**?


 p

1 mark

10b

Total

Planning sheet	Day One	Unit 10 <i>Ratio, proportion, data handling and problem solving</i>	Term: <i>Spring</i>	Year Group: 6																																																																
Oral and Mental		Main Teaching		Plenary																																																																
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions																																																																
<p>Convert between km and mm, kg and g, litres and millilitres.</p> <p>Multiply or divide numbers by 10, 100 or 1000.</p>	<ul style="list-style-type: none"><li>Briefly revise the relationship between standard metric units.<div><p><b>Q</b> How many times bigger is a metre than a millimetre? ... a litre than a millilitre? ... a kilogram than a gram?</p></div></li><li>Display the enlarged Resource sheet 10.1 place value chart or OHT.<div><table><tr><td>1000</td><td>2000</td><td>3000</td><td>4000</td><td>5000</td><td>6000</td><td>7000</td><td>8000</td><td>9000</td></tr><tr><td>100</td><td>200</td><td>300</td><td>400</td><td>500</td><td>600</td><td>700</td><td>800</td><td>900</td></tr><tr><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>0.1</td><td>0.2</td><td>0.3</td><td>0.4</td><td>0.5</td><td>0.6</td><td>0.7</td><td>0.8</td><td>0.9</td></tr><tr><td>0.01</td><td>0.02</td><td>0.03</td><td>0.04</td><td>0.05</td><td>0.06</td><td>0.07</td><td>0.08</td><td>0.09</td></tr><tr><td>0.001</td><td>0.002</td><td>0.003</td><td>0.004</td><td>0.005</td><td>0.006</td><td>0.007</td><td>0.008</td><td>0.009</td></tr></table><p>Point to a single digit number, e.g. 5.</p><div><p><b>Q</b> What is 5km in m?</p></div><p>Point to 5000.</p><p>Point to 0.7.</p><div><p><b>Q</b> What is 0.7 litres in ml?</p></div><p>Point to 700.</p><p>Establish that the answers are 1000 times bigger and demonstrate how the place value chart can help to find the answer.</p><p>Repeat using different values and units. Extend to two and three decimal places.</p><div><p><b>Q</b> What is 0.04kg in g?</p><p><b>Q</b> What is 0.008km in m?</p></div></div></li></ul>	1000	2000	3000	4000	5000	6000	7000	8000	9000	100	200	300	400	500	600	700	800	900	10	20	30	40	50	60	70	80	90	1	2	3	4	5	6	7	8	9	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	<p>Solve simple problems involving ratio and proportion.</p>	<ul style="list-style-type: none"><li>Hold up a bag of bricks. Say: 'The bag contains red and blue bricks. For every red brick there are two blue bricks.'</li><div><p><b>Q</b> If the bag contains four red bricks how many blue bricks are there?</p><p><b>Q</b> If the bag contains ten blue bricks how many red bricks are there?</p><p><b>Q</b> If the bag contains 18 bricks how many red and blue bricks are there?</p></div><p>Discuss children's responses and methods. Demonstrate using bricks to ensure everyone understands. Repeat with different numbers and ratios.</p><li>Explain that ratio is a way of comparing two quantities. Say: 'To make a drink I need 10ml of blackcurrant <i>for every</i> 90ml of water.' Show OHT 10.1.<div></div><div><p><b>Q</b> How much blackcurrant will I need to make two drinks? How much water will I need?</p><p><b>Q</b> How much water will I need if I use 50ml of blackcurrant?</p></div><p>Discuss children's answers.</p><li>Demonstrate how to use a number line and multiplication to help answer the questions.<div></div></li></li></ul>	<ul style="list-style-type: none"><li>Get the children to count up in 10ml to represent quantities of blackcurrant, and count up in 90ml to represent the water. Use the number line to ask other questions.<div><p><b>Q</b> What quantity of water with 30 ml of blackcurrant?</p><p><b>Q</b> What quantity of blackcurrant with 40ml of water?</p><p><b>Q</b> What quantity of drink can I make with 20ml, 70ml of blackcurrant?</p></div><p>Discuss children's responses. Remind children that the ratio of blackcurrant to water is 10ml to every 90ml, 20ml to every 180ml etc. The ratio of water to blackcurrant is 90ml to every 10ml etc.</p><li>Using the number line get the children to work in pairs to write, and then solve simple ratio problems, e.g.<ol style="list-style-type: none"><li>To mix purple paint I need 600ml of blue for every 400ml of red paint. How much red and blue paint do I need to make 3 litres of paint, 7 litres, 9 litres etc?</li><li>50g of sugar for every 125g of flour. How much flour for 200g of sugar? How much sugar for 200g of flour?</li></ol></li></li></ul>	<ul style="list-style-type: none"><li>Collect answers and discuss solutions. Demonstrate how the number line can be used to answer the 200g of flour question. Identify and correct errors and misunderstandings. Emphasise vocabulary used e.g. 'for every'.</li><li>Emphasise that ratio compares one part to another. Ask children to provide different examples of ratios, using 'for every'. Discuss their examples.</li></ul> <div><p><b>By the end of the lesson the children should be able to:</b></p><ul style="list-style-type: none"><li><b>Solve simple problems involving ratio using a number line.</b></li></ul><p>(Refer to supplement of examples, section 6, page 27.)</p></div>
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RESOURCES

Resource sheet 10.1

VOCABULARY

ratio (for every)

RESOURCES

OHT 10.1


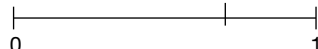
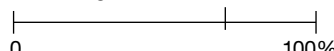
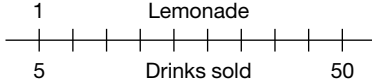
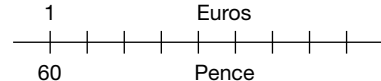
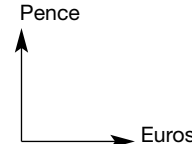
Bag of bricks

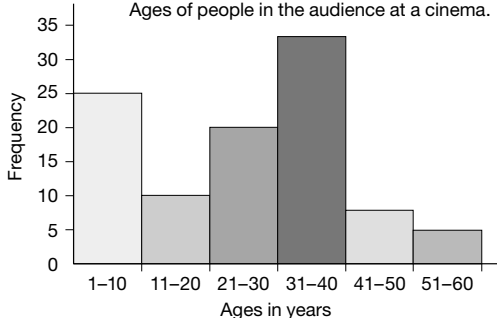
RESOURCES  
Resource sheet 10.1

VOCABULARY  
ratio (for every)

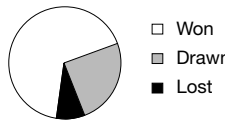
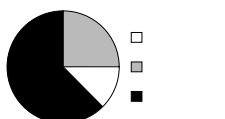
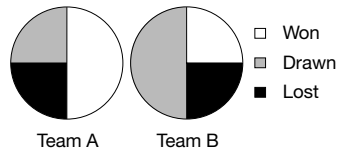
RESOURCES  
OHT 10.1  
Bag of bricks

Planning sheet	Day Two	Unit 10 <i>Ratio, proportion, data handling and problem solving</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
Count in and identify positive and negative numbers; order fractions, mixed decimals.  <				

Planning sheet	Day Three	Unit 10 <i>Ratio, proportion, data handling and problem solving</i>	Term: <i>Spring</i>	Year Group: 6	
Oral and Mental		Main Teaching		Plenary	
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions	
<p>Know some fractions as percentages/decimals.</p> <p>Find simple percentages.</p>	<ul style="list-style-type: none"><li>Draw three number lines on the board as below (one above the other)</li><li>Give the children a fraction, (e.g. <math>\frac{3}{4}</math>) .</li><li>Ask them to write the equivalent decimal and percentage (e.g. 0.75, 75%).</li><li>Get the children to mark these values on the number lines.</li></ul> <div><p>Fractions <math>\frac{3}{4}</math></p></div> <div><p>Decimals 0.75</p></div> <div><p>Percentages 75%</p></div> <p>Repeat giving children fractions, decimals and percentages to place on the lines.</p> <ul style="list-style-type: none"><li>Emphasise the link between percentages and fractions. Use this to solve simple percentages e.g. 75% of 12 is the same as <math>\frac{3}{4}</math> of 12.</li><li>Ask questions involving equivalences. Use the number lines to assist.</li></ul> <div><p><b>Q</b> Is 20% of 80 the same as <math>\frac{1}{5}</math> of 80?</p></div> <p>Children answer ‘thumbs up’ for ‘yes’ and ‘thumbs down’ for ‘no’.</p>	<p>Solve simple problems involving ratio and proportion.</p> <p>Represent, extract and interpret data in a line graph.</p> <p>Recognise that intermediate points have meaning.</p>	<ul style="list-style-type: none"><li>Say: ‘One in every five cans of drink sold is lemonade.’ Ask children what this means. Remind them of the differences between ratio (part to every part) and proportion (part in every whole). Draw the number line below on the board.</li></ul> <div><p>1 Lemonade</p></div> <p>5 Drinks sold 50</p> <p>With the class fill in the numbers counting up in 5s the drinks sold, then the lemonade. Remind children that proportion can be represented as a fraction, in this case <math>\frac{1}{5}</math> of cans sold is lemonade.</p> <div><p><b>Q</b> What other fractions can we make?</p></div> <p>Compare <math>\frac{1}{5}</math>, <math>\frac{2}{10}</math>, <math>\frac{3}{15}</math> etc. and establish these represent the same proportion and are equivalent fractions.</p> <ul style="list-style-type: none"><li>Repeat using other examples, e.g. ‘Two in every three pupils have a pet.’ ‘One in every six pets is a rabbit.’</li></ul> <p>Discuss these statements and represent them on a number line to generate the equivalent fractions.</p> <ul style="list-style-type: none"><li>Refer back to the number lines on the board and ask:</li></ul> <div><p><b>Q</b> If 50 cans were sold what number of cans were lemonade?</p><p><b>Q</b> In a class of 36 how many pupils had pets?</p><p><b>Q</b> What number of rabbits would there be of 30 pets?</p></div> <p>Discuss answers and solutions. Ask children for examples of similar statements to find equivalent fractions and for problems to solve using the number lines.</p>	<ul style="list-style-type: none"><li>Explain that one euro is worth about 60p, or there is 1 euro for every 60p. Draw the number line below.</li></ul> <div><p>1 Euros</p></div> <p>60 Pence</p> <p>Get the children to complete the line and ask questions about the conversion. Explain that this time the intermediate points have meaning.</p> <div><p><b>Q</b> What is 90p worth?</p><p><b>Q</b> What are 4.5 euros worth?</p></div> <ul style="list-style-type: none"><li>Explain that the number line can be represented another way. Give out centimetre squared paper and on the board draw axes:</li></ul> <div><p>Pence</p></div> <p>Euros</p> <p>Say we want the euros axis to go up to 10 euros.</p> <div><p><b>Q</b> How long should the pence axis be?</p></div> <p>Discuss the axes and get children to draw them on the squared paper.</p> <div><p><b>Q</b> What points can we plot on the graph?</p></div> <p>Establish that the number line can help and plot points. Join these with a straight line. Discuss how the graph can be used to convert euros to pence and pence to euros.</p> <p>Collect answers and discuss methods.</p>	<ul style="list-style-type: none"><li>Say there are 1.4 US dollars for every £1.</li></ul> <div><p><b>Q</b> What number line should we draw to help us convert dollars and £s.</p></div> <p>Discuss how the number line helps and that the intermediate points have meaning.</p> <p>HOMEWORK – Children to draw a conversion graph for dollars and £s for up to £20.</p> <div><p><b>By the end of the lesson the children should be able to:</b></p><ul style="list-style-type: none"><li><b>Solve simple problems using ratio and proportion;</b></li><li><b>Use a line graph to represent, extract and interpret data;</b></li><li><b>Recognise the value of intermediate points.</b></li></ul><p>(Refer to supplement of examples, section 6, pages 27, 117.)</p></div>
VOCABULARY equivalent		VOCABULARY conversion chart  RESOURCES Centimetre squared paper			

Planning sheet	Day Four	Unit 10 <i>Ratio, proportion, data handling and problem solving</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>Recognise square numbers to at least <math>12 \times 12</math>.</p> <p>VOCABULARY square number</p> <p>RESOURCES OHT 10.3 OHP calculator</p>	<ul style="list-style-type: none"> <li>Discuss homework. Get children to use their graphs to convert given amounts. <div> Q What is 5 dollars in £s?  Q What is £12 in dollars? </div> <p>Ensure children understand that intermediate points on line have meaning and they can use the line to connect given amounts.</p> </li> <li>Get class to chant through square numbers: 1 squared is 1, 2 squared is 4, up to 12 squared. Repeat. <div> Q What is 7 squared?  Q What squared gives 81? </div> </li> <li>Show OHT 10.3. Explain that you want to plot the square numbers on the coordinate grid. <div> Q How should we label the axes? </div> <p>Establish that the vertical axis is the squared numbers.</p> <div> Q Where should we plot 5 squared? </div> <p>Identify the point (5, 25) on the grid and mark it with an x. Repeat for other values getting children to come up to graph. Ensure (0,0) is included.</p> </li> <li>Join up the points with a curve. <div> Q Why is the graph not a straight line? </div> <p>Establish that we are not multiplying the 1, 2, 3... by the same number each time.</p> <div> Q Do the intermediate values have any meaning? </div> <p>Agree they do. Use the graph to find 6.5 squared say and compare the estimate from the graph to the answer on the OHP calculator. Repeat for other values. Emphasise the inaccuracy because of the limited scale on the vertical axis.</p> </li> </ul>	<p>Solve a problem by representing, extracting and interpreting data in frequency tables and bar charts with grouped discrete data.</p> <p>VOCABULARY distribution frequency interpret</p> <p>RESOURCES Activity sheet 10.1 OHT 10.4 OHT 10.5</p>	<ul style="list-style-type: none"> <li>Show OHT 10.4. Explain that normally a bar chart has gaps between the bars but this time the data has been grouped. Say that the first bar represents the numbers or frequency corresponding to the group 1 to 5, the second bar 6 to 10 etc. <div> Q What data could have been grouped? </div> <p>Discuss examples. Say that the groups represent marks in a test.</p> <div> Q Was the test an easy one? </div> <p>Say that the groups represent thorns on the stems of roses.</p> <div> Q Were there more long or short stems? </div> <p>Say that the groups represent the numbers of wood lice under logs.</p> <div> Q What were the most wood lice seen under the logs? </div> <p>Discuss other contexts for the graphs.</p> </li> <li>Show OHT 10.5. <div> <p>Ages of people in the audience at a cinema.</p>  <p>Give time for children to discuss the graph in pairs.</p> <div> Q Which age group were there most of?  Q How many people saw the film together?  Q Were there more people over 30 or 30 and under?  Q Which age group were there the least of? </div> </div> <li>Give out Activity sheet 10.1. Ask children to complete the table and the bar chart. <div> Q What three statements can you make using the information from the table or bar chart? </div> </li> </li></ul>	<ul style="list-style-type: none"> <li>Check that the children have completed their bar charts and frequency tables correctly. Discuss their statements and correct any mistakes and misunderstandings.</li> <li>Show OHT 10.5 again. <div> Q How many eighteen-year-olds went to see the film? Can we tell? Why not?  Q What other questions could we not answer and why?  Q What type of film might this have been? Give reasons for your answers. </div> <p>Suggest that it could be a child's film because a lot of children and 'parents' went.</p> <div> <p><b>By the end of the lesson the children should be able to:</b></p> <ul style="list-style-type: none"> <li><b>Represent, extract and interpret data from frequency tables and bar charts using grouped discrete data.</b></li> </ul> <p>(Refer to supplement of examples, section 6, page 115.)</p> </div> </li> </ul>



Planning sheet	Day Five	Unit 10 <i>Ratio, proportion, data handling and problem solving</i>	Term: <i>Spring</i>	Year Group: 6	
Oral and Mental		Main Teaching		Plenary	
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions	
<p>Find pairs of numbers with a sum of 100; multiples of 10 with a sum of 1000; decimals with a sum of 0.1, 1 or 10.</p>	<ul style="list-style-type: none"><li>Quickly give children a single-digit number and ask them to show the complement to 10 on their whiteboards. Extend to multiples of 10 to make 100 and ensure children understand the connection, e.g. <math>7 + 3 = 10</math>; <math>70 + 30 = 100</math></li></ul> <p>Move to any two-digit number complements.</p> <div><p>Q What is the complement to 100 of 47?</p></div> <p>Emphasise that as <math>7 + 3 = 10</math> we know the units digit and have a total of 10 so the tens digits must sum to 9 to make the 90. Work through <math>47 + 53</math> as an example.</p> <p>Give children a two-digit number for them to record complements to 100 on whiteboards.</p> <div><p>Q What would happen if we multiplied our pairs of complements by 10?</p><p>Q What number would they make?</p><p><math>470 + 530 = 1000</math></p></div> <ul style="list-style-type: none"><li>Work through examples of complements of 1000 using complements of 100 multiplied by 10.</li></ul> <div><p>Q Could we divide by 10/100/1000 to find complements involving decimals?</p></div> <p>Build up pattern on the board, e.g.</p> <p><math display="block">\begin{array}{rcl} 630 + &amp; 370 &amp; = 1000 \\ 63 + &amp; 37 &amp; = 100 \\ 6.3 + &amp; 3.7 &amp; = 10 \\ 0.63 + &amp; 0.37 &amp; = 1 \\ 0.063 + &amp; 0.037 &amp; = 0.1 \end{array}</math></p> <ul style="list-style-type: none"><li>Give children a two-digit number, ask them to record complement to 100 on their whiteboards or on paper then the complements that correspond to make 1000, 10, 1 and 0.1.</li></ul>	<p>Solve a problem by representing, extracting and interpreting data using simple pie charts.</p>	<ul style="list-style-type: none"><li>Show OHT 10.6.</li></ul> <div><p>Q What information can we get from this pie chart?</p></div> <p>Games won, drawn or lost by Bigtown United.</p>  <p>Ask the children to estimate:</p> <div><p>Q What proportion of games were won?</p><p>Q What proportion of games were drawn?</p><p>Q What proportion of games were lost?</p></div> <p>Agree that about a quarter of the games were drawn and about a twelfth of the games were lost as the sector representing lost games fits into the drawn sector about three times.</p> <div><p>Q What must the three fractions sum to?</p></div> <p>Establish the sum must be 1</p> <p><math>1 - \frac{1}{4} = \frac{3}{4}</math>.</p> <div><p>Q What is <math>\frac{3}{4} - \frac{1}{12}</math>?</p></div> <p>Work through with class converting <math>\frac{3}{4}</math> to <math>\frac{9}{12}</math> and establishing that <math>\frac{8}{12}</math> represents <math>\frac{2}{3}</math>.</p> <p>Tell the children that 48 games were played in total. Ask them to use the fractions <math>\frac{1}{4}</math>, <math>\frac{1}{12}</math> and <math>\frac{2}{3}</math> to answer the following:</p> <div><p>Q How many games were won?</p><p>Q How many games were lost?</p><p>Q How many games were drawn?</p><p>Q How many more games were won than lost?</p></div> <ul style="list-style-type: none"><li>Show the children OHT 10.7. 56 people were surveyed:</li></ul> 	<div><p>Q What could this be a survey of?</p></div> <p>Suggested answer: favourite take-aways, etc.</p> <p>With the class agree the proportions represented by each sector and get children to calculate the respective numbers of people surveyed.</p> <ul style="list-style-type: none"><li>Explain that we can use pie charts to compare different sets of data.</li></ul> <p>Show the children OHT 10.8.</p>  <p>Discuss the two pie charts.</p> <div><p>Q Which team was the more successful?</p></div> <p>Collect answers and discuss assumption.</p> <div><p>Q How can we justify our choice of team?</p></div> <div><p>Q What extra information do we need?</p></div> <p>Establish that we need to know how many games were played.</p> <p>Suppose team B played 48 games and team A played 36 games.</p> <p>Win – 3 points, Draw – 1 point, Loss – 0 points.</p> <div><p>Q Which team was more successful?</p></div> <p>Get children to work out the points for each team. Emphasise the importance in knowing what total the pie chart represents.</p>	<ul style="list-style-type: none"><li>With whiteboards check understanding by asking children to sketch pie charts for:<ul style="list-style-type: none"><li>A team with an equal distribution of wins, draws and lost matches.</li><li>A team with no losses and twice as many draws as wins.</li><li>A team which has won <math>\frac{3}{4}</math> of its matches and drawn and lost an equal proportion of the others.</li></ul></li></ul> <div><p><b>By the end of the lesson the children should be able to:</b></p><ul style="list-style-type: none"><li><b>Extract and interpret data from a pie chart;</b></li><li><b>Solve a problem by drawing inferences and conclusions from extracted data.</b></li></ul><p>(Refer to supplement of examples, section 6, page 115.)</p></div>

VOCABULARY  
complement

RESOURCES  
Whiteboards

VOCABULARY  
proportion  
sector  
pie chart

RESOURCES  
OHT 10.6  
OHT 10.7  
OHT 10.8  
Whiteboards

VOCABULARY  
complement

RESOURCES  
Whiteboards

VOCABULARY  
proportion  
sector  
pie chart

RESOURCES  
OHT 10.6  
OHT 10.7  
OHT 10.8  
Whiteboards