



# Numeracy

Applications of Mathematics

Mary Russell School



Name:.....

Class:.....

Teacher:.....

## Contents

Quick Recap	3
Writing numbers in words	5
Four Operations	7
Addition	8
Subtraction	14
Multiplication	17
Division	20
Mixed Problems	24
Percentages	26
Time	30
Capacity	38
Scales	41
Information Handling	46

## Quick Recap

### Times Tables

<b>1 X</b>	<b>2 X</b>	<b>3 X</b>	<b>4 X</b>	<b>5 X</b>
1 x 1 = 1	2 x 1 = 2	3 x 1 = 3	4 x 1 = 4	5 x 1 = 5
1 x 2 = 2	2 x 2 = 4	3 x 2 = 6	4 x 2 = 8	5 x 2 = 10
1 x 3 = 3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	5 x 3 = 15
1 x 4 = 4	2 x 4 = 8	3 x 4 = 12	4 x 4 = 16	5 x 4 = 20
1 x 5 = 5	2 x 5 = 10	3 x 5 = 15	4 x 5 = 20	5 x 5 = 25
1 x 6 = 6	2 x 6 = 12	3 x 6 = 18	4 x 6 = 24	5 x 6 = 30
1 x 7 = 7	2 x 7 = 14	3 x 7 = 21	4 x 7 = 28	5 x 7 = 35
1 x 8 = 8	2 x 8 = 16	3 x 8 = 24	4 x 8 = 32	5 x 8 = 40
1 x 9 = 9	2 x 9 = 18	3 x 9 = 27	4 x 9 = 36	5 x 9 = 45
1 x 10 = 10	2 x 10 = 20	3 x 10 = 30	4 x 10 = 40	5 x 10 = 50
1 x 11 = 11	2 x 11 = 22	3 x 11 = 33	4 x 11 = 44	5 x 11 = 55
1 x 12 = 12	2 x 12 = 24	3 x 12 = 36	4 x 12 = 48	5 x 12 = 60
<b>6 X</b>	<b>7 X</b>	<b>8 X</b>	<b>9 X</b>	<b>10 X</b>
6 x 1 = 6	7 x 1 = 7	8 x 1 = 8	9 x 1 = 9	10 x 1 = 10
6 x 2 = 12	7 x 2 = 14	8 x 2 = 16	9 x 2 = 18	10 x 2 = 20
6 x 3 = 18	7 x 3 = 21	8 x 3 = 24	9 x 3 = 27	10 x 3 = 30
6 x 4 = 24	7 x 4 = 28	8 x 4 = 32	9 x 4 = 36	10 x 4 = 40
6 x 5 = 30	7 x 5 = 35	8 x 5 = 40	9 x 5 = 45	10 x 5 = 50
6 x 6 = 36	7 x 6 = 42	8 x 6 = 48	9 x 6 = 54	10 x 6 = 60
6 x 7 = 42	7 x 7 = 49	8 x 7 = 56	9 x 7 = 63	10 x 7 = 70
6 x 8 = 48	7 x 8 = 56	8 x 8 = 64	9 x 8 = 72	10 x 8 = 80
6 x 9 = 54	7 x 9 = 63	8 x 9 = 72	9 x 9 = 81	10 x 9 = 90
6 x 10 = 60	7 x 10 = 70	8 x 10 = 80	9 x 10 = 90	10 x 10 = 100
6 x 11 = 66	7 x 11 = 77	8 x 11 = 88	9 x 11 = 99	10 x 11 = 110
6 x 12 = 72	7 x 12 = 84	8 x 12 = 96	9 x 12 = 108	10 x 12 = 120

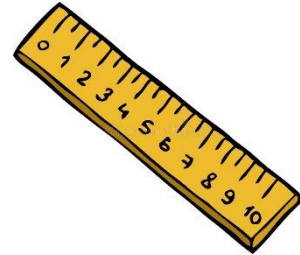
## Measurement

The units we use for measuring distances are millimetres (mm), centimetres (cm), metres (m) and kilometres (km).

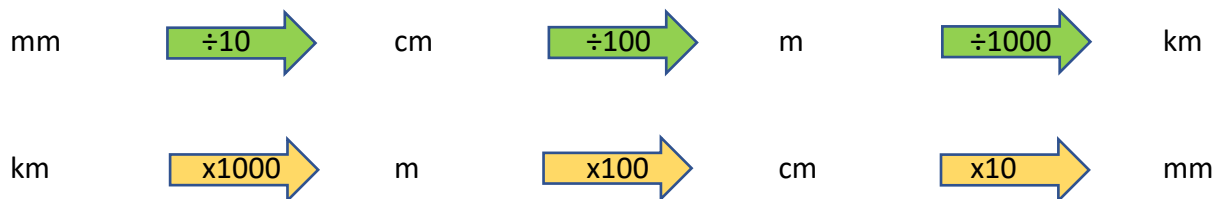
$$1\text{cm} = 10\text{mm}$$

$$1\text{m} = 100\text{cm}$$

$$1\text{km} = 1000\text{m}$$



To convert between units:

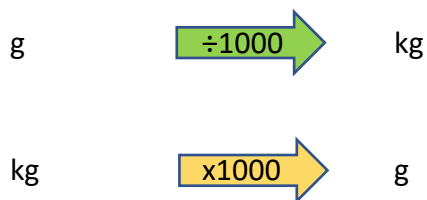


The units we use for measuring weight are grams (g) and kilograms (kg).

$$1\text{kg} = 1000\text{g}$$



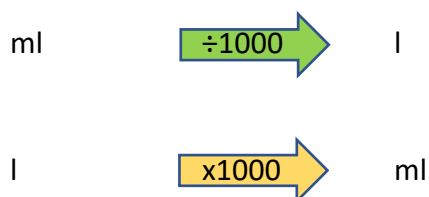
To convert between them:



The units we use for measuring liquids are millilitres (ml) and litres (l)

$$1\text{l} = 1000\text{ml}$$

To convert between them:



## Writing Numbers

### Learning Intention

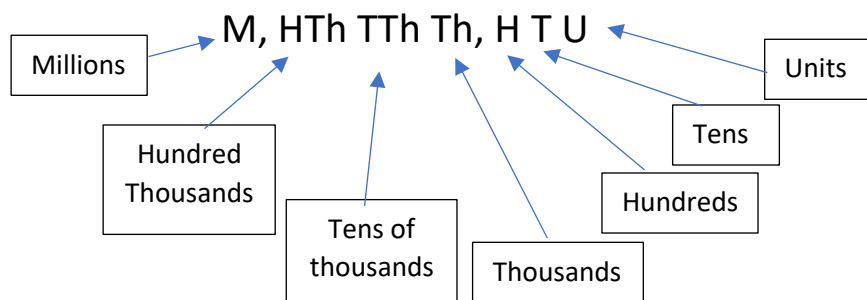
To write numbers in words and figures

### Success Criteria

- ✓ Understand place value
- ✓ Given figures be able to write numbers in words
- ✓ Given numbers in words be able to write in figures



Think back to place value, here's a reminder of the columns:



Writing numbers in words

For example:

2,300 - Two thousand, three hundred.

45,850 – Forty five thousand, eight hundred and fifty

2,458 – Two thousand, four hundred and fifty eight

Complete the following:

6,700 - .....

7,380 - .....

9,450 - .....

11,468 - .....

5,467 - .....

Writing numbers in figures

For example:

Three thousand, six hundred and twenty two – 3,622

Fifteen thousand, nine hundred and four – 15,904

Complete the following:

Seven thousand, six hundred and fifty - .....

Three thousand, five hundred and twenty seven - .....

Fourteen thousand, two hundred and ninety - .....

How did you get on?

- ✓ Do you remember and understand place value?
- ✓ Can you write numbers in words?
- ✓ Can you write numbers in figures?

Now you're ready to try assessment question 5a.

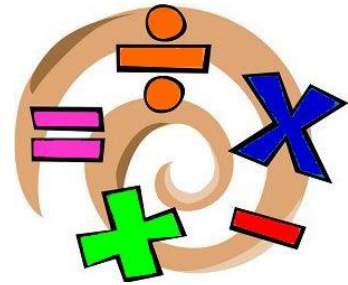
## Four Operations

### Learning Intention









To use +, -, x and ÷ to solve problems

### Success Criteria

- ✓ Select the appropriate operation to carry out calculations
- ✓ Use the selected operation appropriately
- ✓ Remember the units



The four operations are addition, subtraction, multiplication and division. Here are some other words for them:

			
addition add plus more and total increase sum together	subtraction subtract minus take away decrease take from reduce fewer	multiplication multiply product times lots of multiplied by times table groups of	division share group divide divide into divided by divisible by share equally
			

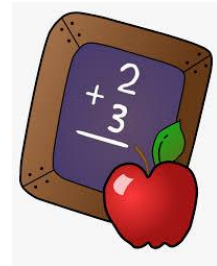
## Addition

If we set out addition calculations as 'house sums' it means that the columns (HTU) are in the correct order. We start with the units column at the left hand side.

For example,

$$\begin{array}{r} \text{HTU} \\ 329 \\ +223 \\ \hline \underline{552} \\ 1 \end{array}$$

9 + 3 = 12, write the 2 and carry the 1. 2 + 2 = 4, 4 + 1 (that has been carried) = 5. 3 + 2 = 5



Now try these **without** a calculator:

$\begin{array}{r} 21 \\ +23 \\ \hline \end{array}$	$\begin{array}{r} 45 \\ +62 \\ \hline \end{array}$	$\begin{array}{r} 24 \\ +76 \\ \hline \end{array}$
$\begin{array}{r} 124 \\ +44 \\ \hline \end{array}$	$\begin{array}{r} 523 \\ +79 \\ \hline \end{array}$	$\begin{array}{r} 457 \\ +28 \\ \hline \end{array}$
$\begin{array}{r} 685 \\ +784 \\ \hline \end{array}$	$\begin{array}{r} 784 \\ +489 \\ \hline \end{array}$	$\begin{array}{r} 398 \\ +416 \\ \hline \end{array}$
$\begin{array}{r} 247 \\ +485 \\ \hline \end{array}$	$\begin{array}{r} 684 \\ +374 \\ \hline \end{array}$	$\begin{array}{r} 924 \\ +758 \\ \hline \end{array}$
$\begin{array}{r} 758 \\ +286 \\ \hline \end{array}$	$\begin{array}{r} 846 \\ +298 \\ \hline \end{array}$	$\begin{array}{r} 748 \\ +385 \\ \hline \end{array}$
$\begin{array}{r} 285 \\ +865 \\ \hline \end{array}$	$\begin{array}{r} 146 \\ +978 \\ \hline \end{array}$	$\begin{array}{r} 785 \\ +292 \\ \hline \end{array}$



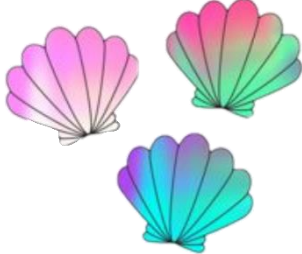
We can also be asked problems in words for example:

Lauren collects shells, she has 86 shells. Her friend, Rachel, gives her 79. How many shells does she have in total?

For this we have to work out which operation to use, the clue is the word 'total', so we're adding, it's best to set the numbers out in a house sum:

6 + 7 = 15, write the 5, carry the 1.  
8 + 7 + 1 = 16

$$\begin{array}{r} 86 \\ +79 \\ \hline 165 \\ \hline 1 \end{array}$$



Try the questions below and show your working in the box opposite **without** a calculator:

Question	Working and Answer
Sophie and Ted are collecting football stickers. Ted has 56 and Sophie has 63. How many do they have altogether?	
A total of 93 fans attended the pre-game signing of the grand final. A further 59 fans arrived five minutes later. How many fans attended the signing altogether?	
A total of 68 fans watched the first game of the Championship in the corporate box. The next time they played, there were 73 fans watching in the corporate box. How many fans were in the corporate box in both games?	
Chloe Watson is 180cm and Maddy Robinson is 165cm tall. How tall are the girls altogether?	
Two netball players need to get on a plane to travel for their next netball match. Kimberlee buys a plane ticket for £37 return. Her team mate, Laura, buys a first-class plane ticket for £74 return. If the coach needs to pay for their flights, how much needs to be paid?	

We might also have to add more than two numbers together. For example,

Amy Steel loves her fruit salad. She goes to the shops and buys 12 bananas, 13 apples and 27 oranges. How much fruit did she buy in total?

We put the numbers in a house sum and add as before:

$2 + 3 + 7 = 13$ . Write 3 and carry 1.  
 $1 + 1 + 2 + 1 = 5$

$$\begin{array}{r} 12 \\ 13 \\ +27 \\ \hline 52 \\ \hline \end{array}$$



Amy bought 52 pieces of fruit.

Try the questions below **without** a calculator and show your working in the box opposite:

Question	Working and Answer
How many Championship games were played if Clare played 44, Laura played 34 and Gretel played 29?	
In 2018, Susan scored 18 goals. In 2019, she scored 23 goals. In 2020, she scored 26 goals. Over these 3 years, how many goals did Susan score?	
For his birthday, Jacob received £15 from his gran, £25 from his uncle and £50 from his mum. How much did he receive in total?	
Megan is making a cake and needs to go shopping for some ingredients. The flour costs 42p, butter 33p and egg 24p. How much does she spend on ingredients?	
Alfie is growing vegetables in his garden, he has 12 carrots, 23 spring onions and 28 potatoes. How many vegetables has he grown in total?	

### Addition with a calculator

Now you can use the calculator. For example:

$$£1546 + £2485 = £4031$$



Now try these and write the answers in the box opposite:

Question	Answer
$£5,678 + £6,849$	
$£4,753 + £7,462$	
$\$4,759 + \$6,852$	
$\$84,264 + \$7,154$	
$£68,795 + £3,942$	
$£15,248 + £2,457$	
$£45,549 + £7,892$	
$\$78,654 + \$24,675$	
$£36,465 + £48,685$	

Let's try some wordy questions – you can use a calculator here.

For example,

There are 657 trees in a forest, another 156 are planted.

How many trees are there in total?

$$657 + 156 = 813 \text{ trees}$$



We can use the decimal point in our calculator to add amounts of money for example,

Lucy bought some fruit at the supermarket, she bought bananas at £1.05 and apples at £2.45. How much did she spend altogether?

$$£1.05 + £2.45 = £3.50$$



Remember  
Money has 2 decimal places!!

Try these questions below and write the working and answers in the box opposite.

**You can use a calculator!**

Question	Working and Answer
Jessica found 634 shells on the beach; Georgia found 503 shells. How many shells do the girls have altogether?	
Hollie, Taylor and Lily are going out for lunch. Hollie's costs £4.50, Taylor's costs £4.20 and Lily's costs £3.75. How much do the girls pay for lunch altogether?	
An empty pan weighs 2.7kg, 3.6kg of potatoes are put in the pan. What does it weigh altogether?	
Three judges in the skating competition award Anya with scores of 8.6, 9.4 and 8.7. What is her combined score?	

Gemma walked 1.6km from her home to the supermarket, she then walked 1.3km to the dentist, and 1.5km back home. How far did she walk altogether?	
A delivery van weighs 458.9kg and the parcels inside weigh 67.8kg. What is the total weight?	
Sylvia bought a top for £7.85 and a pair of trousers for £15.99. What did she spend altogether?	
There were 103 people on a train, at the first stop, 46 people got on the train. How many people are on the train now?	

## Subtraction

The easiest way to set out a subtraction calculation is as we did above with our columns lined up. We must make sure the big number is on the top and the smaller number is underneath, then to carry out the subtraction we may need to borrow from the next column. For example,

$$\begin{array}{r} \phantom{0}^6 \phantom{0}^1 \\ 475 \\ - 258 \\ \hline 217 \end{array}$$

We cannot do 5 take away 8, so we need to borrow from the 7.

7 then becomes 6 and 5 becomes 15.

Now try these **without** a calculator:

45 <u>-27</u>	34 <u>-29</u>	74 <u>-46</u>
135 <u>-47</u>	427 <u>-154</u>	842 <u>-137</u>
487 <u>-439</u>	365 <u>-78</u>	682 <u>-56</u>
485 <u>-76</u>	385 <u>-98</u>	584 <u>-475</u>
627 <u>-428</u>	547 <u>-279</u>	673 <u>-194</u>

### Subtraction with a calculator

We can use the calculator to help us to do some subtraction calculations.

For example:

$$£1,576 - £985 = £591$$



Try the following with a calculator, write the answers in the box opposite:

Question	Answer
£5,964 - £2,452	
£5,493 - £3,845	
\$4,746 - \$2,914	
\$7,957 - \$3,184	
£2,716 - £2,475	
£4,854 - £2,746	
£5,168 - £3,892	
£56.25 - £24.61	
£61.74 - £23.26	
£76.50 - £78.30	
£84.62 - £18.46	
£84.75 - £69.21	
£63.95 - £48.27	



Now let's try some wordy questions.

For example,

There are 310 passengers on a plane from Edinburgh to Madrid via Amsterdam, 56 got off in Amsterdam. How many passengers are left on the plane?

Set out as above:

$$\begin{array}{r} 2 \ 10 \ 1 \\ 310 \\ - \ 56 \\ \hline 254 \end{array}$$

We cannot do  $0 - 6$ , so we borrow from the 1. This makes the 1 a 0 and the 0 into 10.  $10 - 6 = 4$ . Now we cannot do  $0 - 5$ , so we borrow again. 3 becomes 2 and 0 becomes 10.  $10 - 5 = 5$  and  $2 - 0 = 0$ .

There are 254 passengers left on the plane.

Now try these without a calculator:

Question	Answer
The Smith family set out of a journey of 272 miles. After travelling 149 miles, they break down. How far do they still have to travel?	
Bob bought a bike for £450, he later sold it for £375. How much money did he lose?	
There were 156 cars in a race, 124 completed the race. How many didn't complete the race?	
Megan is 183cm and her sister Molly is 164cm tall. How much taller is Megan than Molly?	
Michael's tortoise is 88 years old. Michael is 19, how much older than him is his tortoise?	



## Multiplication

Times tables are very useful here! If you need a wee reminder, you'll find all the times tables at the beginning of the booklet.



We can do multiplications without a calculator, for example:

$$\begin{array}{r} 43 \\ \times 4 \\ \hline 172 \end{array}$$

Firstly we do  $4 \times 3 = 12$ , we need to carry the 1. Then, we do  $4 \times 4 = 16$ , add on the 1 = 17.

Now try these **without** a calculator:

$\begin{array}{r} 26 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 32 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 45 \\ \times 5 \\ \hline \end{array}$
$\begin{array}{r} 34 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 63 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 28 \\ \times 4 \\ \hline \end{array}$
$\begin{array}{r} 33 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 83 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 46 \\ \times 8 \\ \hline \end{array}$
$\begin{array}{r} 53 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 46 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 58 \\ \times 9 \\ \hline \end{array}$
$\begin{array}{r} 42 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 57 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 74 \\ \times 7 \\ \hline \end{array}$
$\begin{array}{r} 66 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 93 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 67 \\ \times 4 \\ \hline \end{array}$

### Multiplication with a calculator

We can do more difficult multiplication calculations with a calculator:

For example:

$$16.3 \times 6 = 97.8$$

Note: we can also do this without a calculator as we did above.

$$16.3$$

$$\begin{array}{r} 16.3 \\ \times 6 \\ \hline \end{array}$$

$$97.8$$

Try the following and write the answer in the box opposite – you **can** use a calculator if you like!

Question	Answer
25.4 x 7	
48.5 x 8	
62.4 x 4	
85.9 x 6	
77.6 x 8	
94.8 x 3	
84.7 x 9	
68.7 x 8	
91.4 x 6	
74.3 x 7	
69.4 x 5	

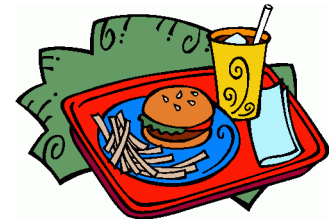
Now let's try some wordy multiplication problems.

For example,

Chloe spends £3.65 on her lunch every day.

How much does this cost her per week?

$£3.65 \times 7 = £25.50$  - Chloe spends £25.50 on her lunches every week.



Now try these questions and write your working and answer in the box opposite - you can use a calculator if you wish.

Question	Working and Answer
A car travels at an average speed of 45 miles per hour. How far will it travel in 4 hours?	
Martha likes to cycle, the track she cycles on is 12km long. She cycles this track every day for a week (7 days). How far has she cycled?	
Samuel earns £8.50 per hour. How much will he earn if he works for 35 hours?	
Rebecca is wallpapering her living room; she needs 6 rolls of wallpaper. Each roll costs £13.42, how much does she spend in total?	
Michael is selling some books. He has 45 books and is selling them for £6.50 each. How much money will he make if he sells all his books?	

## Division

Division is the opposite of multiplication, so your times tables are useful here too!

We can use the 'bus stop' method, for example:

$$763 \div 7$$

$$\begin{array}{r} 109 \\ 7 \overline{) 763} \end{array}$$

Think – how many 7s go into 763. So how many 7s go into 7? 1. Then how many 7s go into 6? 0 remainder 6. How many 7s go into 63? 9.

Now try these, write your working and answer in the box opposite:

Question	Answer
$48 \div 6$	
$72 \div 9$	
$49 \div 7$	
$270 \div 6$	
$471 \div 3$	
$204 \div 6$	
$203 \div 7$	
$608 \div 8$	

You can also use a calculator to tackle some more difficult questions, for example:

$$453 \div 6 = 75.5$$

Remember the divide button  
looks like



Now try these on your calculator:

247.1 ÷ 7	
436.8 ÷ 7	
157.2 ÷ 3	
168.7 ÷ 7	
385.2 ÷ 9	
324.5 ÷ 11	
836.8 ÷ 16	
1,839.6 ÷ 21	
907.2 ÷ 28	
5,400.2 ÷ 62	
62,626.2 ÷ 74	
23,363.2 ÷ 49	

Now let's try some wordy questions, for example:

Alan earns £247 for working 26 hours. How much does he earn per hour?

$$247 \div 26 = \text{£}9.50 \text{ per hour}$$



Now try the questions below and write your working and answer in the box opposite.

You can use a calculator if you like.

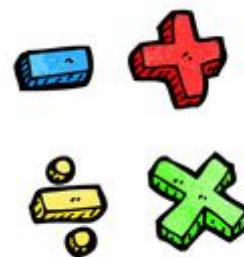
Question	Working and Answer
George wants to cycle a route which is 100km long. He hopes to complete this in 4 days. How far will he need to cycle each day?	
Andrea has a budget of £200 to purchase 40 swimming floats. How much can she spend on each one?	
£228.20 is shared equally between 7 people. How much does each person get?	
900g of flour is needed for 6 cakes, how much flour is needed per cake?	
There are 50 toes in the swimming pool, given that each person has 10 toes, how many people were there?	

Amber took 4 friends to pick strawberries, together they picked 85 strawberries. If they divide them equally between them, how many will each person get?

*Hint – read the question carefully!*

John has 55 cakes; he wants to serve them on plates which each hold 11 cakes. How many plates will he need?

## Mixed Problems



Here you may have to add, subtract, multiply or divide.

You need to decide which operation to use and complete the calculation.

For example,

*Two tables are placed together to form a larger one. If the first table is 67.4 cm long and the second table is 56.8 cm long, what is the total length?*

Here we are adding so  $67.4 + 56.8 = 124.2\text{cm}$

Now try the questions below, write your working and answer in the box opposite:

You can use a calculator.

Question	Working and Answer
A piece of wood is 37.4 cm long. If 12.7 cm is cut off from one end what length remains?	
A child places 5 toy bricks of length 14.6 cm in a straight line. What is the total length?	
A piece of ribbon 114.8 cm long is shared equally among 7 girls. What length should each girl receive?	
Three boxes weigh 4.6 kg, 7.9 kg and 18.2 kg. What is the total weight?	
A bottle of Coca-Cola holds 2 litres. What volume remains after a glass of 0.35 litres has been removed?	



<p>What length of shelf is needed to hold books with thicknesses of 6.3 cm, 7.4 cm, 1.8 cm, 2.8 cm and 4.9 cm?</p>	
<p>Billy does 10 press ups in 26.8 seconds. On average, how long does he take for each press up?</p>	
<p>Six spoonfuls of medicine each holding 5.1 ml are removed from a bottle containing 50 ml. How much medicine is left in the bottle?</p>	
<p>Michael is preparing a sandwich buffet. He has 5 loaves of bread each containing 18 slices of bread. He needs 2 slices of bread per sandwich. How many sandwiches can he make? <i>Hint: there are 2 steps to solving this!</i></p>	

How did you get on?

- ✓ Can you select the appropriate operation to carry out calculations?
- ✓ Can you use the selected operation appropriately?
- ✓ Did you remember the units?

Now you're ready to try assessment questions 2, 5b, 6, 8, 9.

## Percentages

### Learning Intention

To calculate percentages of an amount and use this to solve problems

### Success Criteria

- ✓ Understand how to calculate a percentage
- ✓ Calculate the percentage
- ✓ Use this to solve problems
- ✓ Remember the units



PERCENT literally means PER HUNDRED, so we're going to be dividing by 100 here. You can use a calculator.

For example,

Find 25% of £120

$$25 \div 100 \times 120 = \text{£}30$$

Find 20% of 160kg

$$20 \div 100 \times 160 = 32\text{kg}$$

Now try the following questions, write your working and answers in the box opposite. You **can** use a calculator.

Question	Working and Answer
30% of £60	
5% of 98kg	

16% of 54ml	
64% of £85	
50% of 166m	
16% of £250	
15% of 300miles	
7% of 400m	
31% of £720	
34% of 340litres	
16% of £240	
52% of £63	
33% of 900m	
37% of 7kg	
4% of £63	

## Percentage Rise/Fall

Sometimes we need to calculate percentages to solve problems.

For example,

A mobile phone costs £150, it is on sale with a 20% discount.

- (a) How much is the discount?  
 (b) How much does the phone cost now?

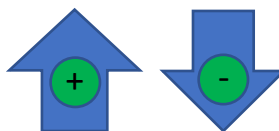
- (a)  $20 \div 100 \times 150 = 30$   
 (b)  $150 - 30 = \text{£}120$

So here we are calculating the percentage as normal then either adding or subtracting from the original amount.

We need to think about whether we add or subtract.

If its an increase, then we add.

If it's a decrease, then we subtract.



Try the questions below, write your working and answer in the box opposite.

Question	Working and Answer
A bat colony has 40 bats. Over the breeding season, the population increases by 30%. (a) How many new bats were born? (b) How many bats are there in the colony now?	
A petri dish contains 240 bacteria. These increase overnight by 23% (a) How many extra bacteria are there? (b) How many bacteria are there altogether the next morning?	
A company gives all its workers a 5% pay rise. Joan earns £240 per week. (a) How much extra does Joan earn? (b) What does Joan earn with her new payrise?	

<p>A clothes shop reduces its prices by 15%. A coat originally cost £45.</p> <p>(a) How much has the coat been reduced by?</p> <p>(b) What is the new price of the coat?</p>	
<p>James earns £1200 per month. Martha earns 20% more.</p> <p>(a) How much more does Martha earn?</p> <p>(b) How much does Martha earn?</p>	
<p>David bought a car for £4500, after a year it lost 20% of its value.</p> <p>(a) How much value did it lose?</p> <p>(b) How much is it worth now?</p>	
<p>The Gravel King is selling 4kg bags of gravel with 25% added extra free. What weight of gravel is in the bag now?</p> <p><i>Hint: follow the same steps as above</i></p>	

How did you get on?

- ✓ Do you understand how to calculate a percentage?
- ✓ Can you calculate percentages?
- ✓ Can you use this to solve problems?
- ✓ Did you remember the units?

Now you're ready to try assessment question 1

# Time

## Learning Intention

To convert between 12- and 24-hour times and solve problems involving time

## Success Criteria

- ✓ Understand how to convert between 12- and 24-hour time
- ✓ Remember am/pm for morning and afternoon times
- ✓ Remember 4 digits for 24-hour time
- ✓ Use your knowledge of time to calculate time intervals and add on time



## 12- and 24-hour time

There are two ways of writing time, 12-hour time and 24-hour time, for example,

8.30pm is the same as 2030 hours – both of these mean half past 8 in the evening.

12-hour time

24-hour time

Converting between 12-hour time and 24-hour time:

### AM

For am times (in the morning), 12- and 24-hour times look very similar:

9.15am = 0915 hours

10.40am = 1040 hours

We just need to remember that 24-hour time ALWAYS has 4 digits.

### PM

For pm times (in the afternoon), we need to add on 12 to the hours:

So, for example

1.30pm

7.15pm

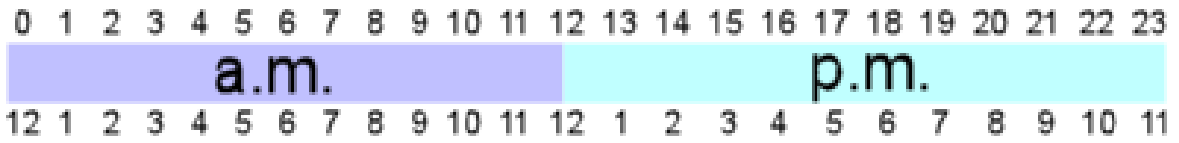
$1 + 12 = 13$

$7 + 12 = 19$

so it becomes 1330 hours

so it becomes 1915 hours

## 24-hour time



## 12-hour time



Now convert the following 12-hour times to 24-hour time:

12-hour time	24-hour time
10.30am	
7.15pm	
9.20am	
12am (midnight)	
1.50am	
11.45am	
6.20pm	
4.45am	
7.30pm	
9.35pm	
7.10am	

3.30pm	
7.30pm	
9.20am	
3.50am	
6.45pm	
8.55pm	
10.45am	
11.25pm	
12pm (midday)	
12.45am	

Now let's convert 24-hour time to 12-hour time:

Remember to write am or pm!



12-hour time	24-hour time
	1240 hours
	0000 hours
	2145 hours
	0755 hours



	1235 hours
	1440 hours
	0645 hours
	2230 hours
	0530 hours
	1715 hours
	0925 hours
	1130 hours
	1950 hours
	0430 hours
	1845 hours
	0030 hours
	1200 hours
	1355 hours
	2020 hours
	2350 hours
	1010 hours

## Time Intervals



It's also very useful to be able to work out how much time has passed, or to 'add' on time.

For example,

*Sally went for a walk at 2.10pm and got home at 4.25pm.*

*How long was she walking for?*

You may already be able to do this mentally but if not, the method below will always work.

	Hours	Minutes
2.10pm – 3.00pm	0	50
3.00pm – 4.00pm	1	0
4.00pm – 4.25pm	<u>0</u>	<u>25</u>
TOTAL	1 hour	75 minutes
	<u>2 hours 15 minutes</u>	

We know that there are 60 minutes in 1 hour so 75 minutes is 1 hour and 15 minutes.

Try the questions below and write your working and answer in the box opposite:

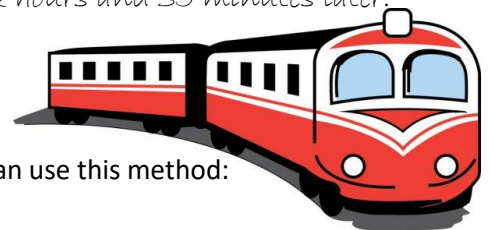
Question	Answer
Jenny started watching TV at 7.30pm and stopped at 9.15pm. How long was she watching TV for?	
Mike was playing his game from 11.30am to 1.10pm, how long was he playing his game?	
Ken played football with his friends from 10.20am to 12.00pm. How long was he playing football?	

Lauren took part in a sponsored cycle which started at 1120 hours. She finished at 1450 hours. How long was she cycling for?	
Rhonda read her book from 5.40pm until 7.20pm. How long was she reading her book?	
Rosie likes to work in her garden. She started at 9.50am and finished at 5.40pm. How long was she gardening for?	
Toby plays music from 7.10pm until 11.30pm. How long is he playing music for?	

We can also be asked to 'add' on time.

For example,

*A train left Aberdeen at 9.50am and arrived in Edinburgh 2 hours and 35 minutes later. What time did it arrive?*



As above, you may be able to do this mentally but if not then you can use this method:

9.50am + 2 hours 35 mins

2 hours after 9.50am is 11.50am

11.50am + 35 mins

12.25pm

The train arrived in Edinburgh at 12.25pm.

First, add the hours  
then the minutes

Try the following questions and write your working and answer in the box opposite:

Question	Answer
Chloe got on the bus at 10.45am, her journey took 55 minutes. When did she arrive?	
Chris met his friends at 1435 hours. He stayed for 2 hours 15minutes. When did he leave?	
Pippa walked her dog for 35 minutes. She left at 5.45pm, when did she get home?	
James was baking a cake; it needs to go in the oven for 45 minutes. He puts it in at 3.20pm, when will it be ready to come out?	
Jack worked for 2 hours and 55 minutes. He started at 12.35pm, when did he finish?	
It took Gemma 3 hours 20 minutes to complete her painting. She started at 9.45am. When did she finish?	

Ian played golf for 3 hours 35 minutes. He teed off at 10.50am, when did he finish?	
---	--

How did you get on?

- ✓ Do you understand how to convert between 12- and 24-hour time?
- ✓ Did you remember am/pm for morning and afternoon times?
- ✓ Did you remember 4 digits for 24-hour time?
- ✓ Did you use your knowledge of time to calculate time intervals and add on time?

Now you're ready to try assessment question 3

## Capacity

### Learning Intention

To convert between ml and l and solve problems involving capacity

### Success Criteria

- ✓ Understand how to convert between ml and l
- ✓ Remember  $1000\text{ml} = 1\text{l}$
- ✓ Solve problems involving capacity



Capacity is essentially the amount that something can hold and this is generally measured in millilitres (ml) or litres (l).

The important thing to remember is there are 1000ml in 1l, from the recap pages at the front of the booklet:

To convert between them:

ml  $\xrightarrow{\div 1000}$  l

l  $\xrightarrow{\times 1000}$  ml

For example,

What is 1420ml in l?

$$1420 \div 1000 = 1.42\text{l}$$

What is 2.35l in ml?

$$2.35 \times 1000 = 2350\text{ml}.$$

Try the following questions below and write your working and answer in the box opposite:

Question	Working and Answer
What is 1850ml in l?	

What is 2.37l in ml?	
What is 4500ml in l?	
What is 1250ml in l?	
What is 6.5l in ml?	
What is 2.845l in ml?	
What is 560ml in l?	

We can use our knowledge of capacity to solve problems.

For example,

*How many 200ml cups can you fill from a 1l jug?*

Convert 1l to ml

$$1 \times 1000 = 1000$$

Now divide:

$$1000 \div 200 = 5 \text{ cups}$$



Now try the following questions, write your working and answer in the box opposite:

Question	Working and Answer
You have 1l of water, can you fill 4 cups that each hold 300ml?	

<p>Three different sized cups hold 200ml, 250ml and 300ml. If you have 1l of water, could you fill all 3 cups?</p>	
<p>You have a 2l bottle of diet coke. How many 250ml cups can you fill from it?</p>	
<p>Michael has 1l of orange juice to split equally between 4 glasses. How much juice is in each glass?</p>	
<p>George has 3 containers which hold 450ml, 350ml and 250ml. She has 1l of soup, will she be able to fill all her containers?</p>	

How did you get on?

- ✓ Do you understand how to convert between ml and l?
- ✓ Do you remember 1000ml = 1l?
- ✓ Can you solve problems involving capacity?

Now you're ready to try assessment question 4.



## Reading Scales

### Learning Intention

To read scales accurately

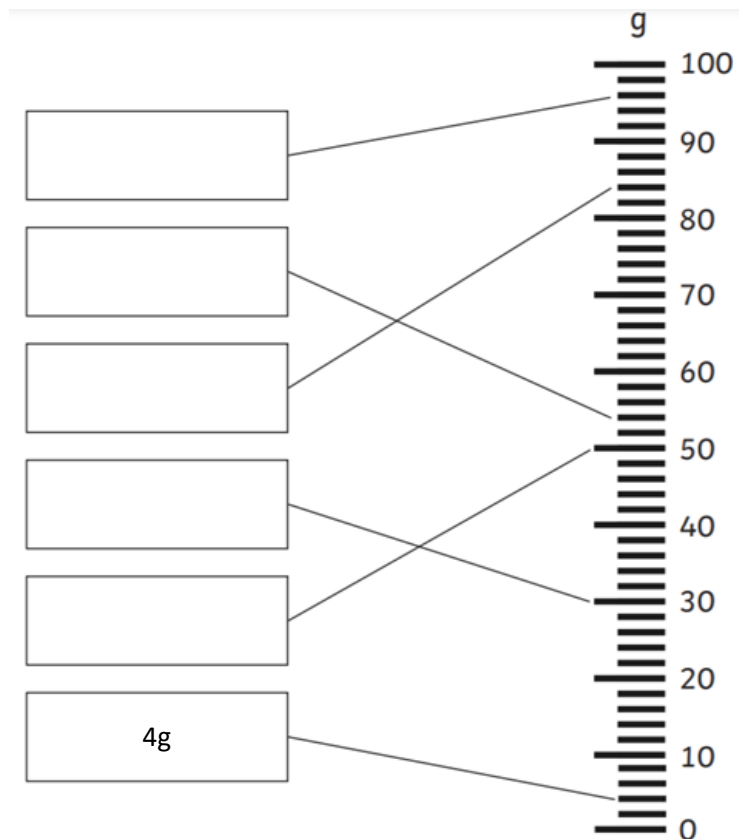
### Success Criteria

- ✓ Work out the increments that scale goes up in
- ✓ Interpret what the scale points to
- ✓ Remember your units



Scales are very useful as they display measurements of weights, liquids and temperatures.

When we read scales, we must first work out what the scale is going up in (the increments). With this scale below, can you see that 0 is marked at the bottom and there's 5 little sections until you get to 10? This means that the scale goes up in 2s so every little line is 2. Try to complete the boxes below, the first one is 4g.

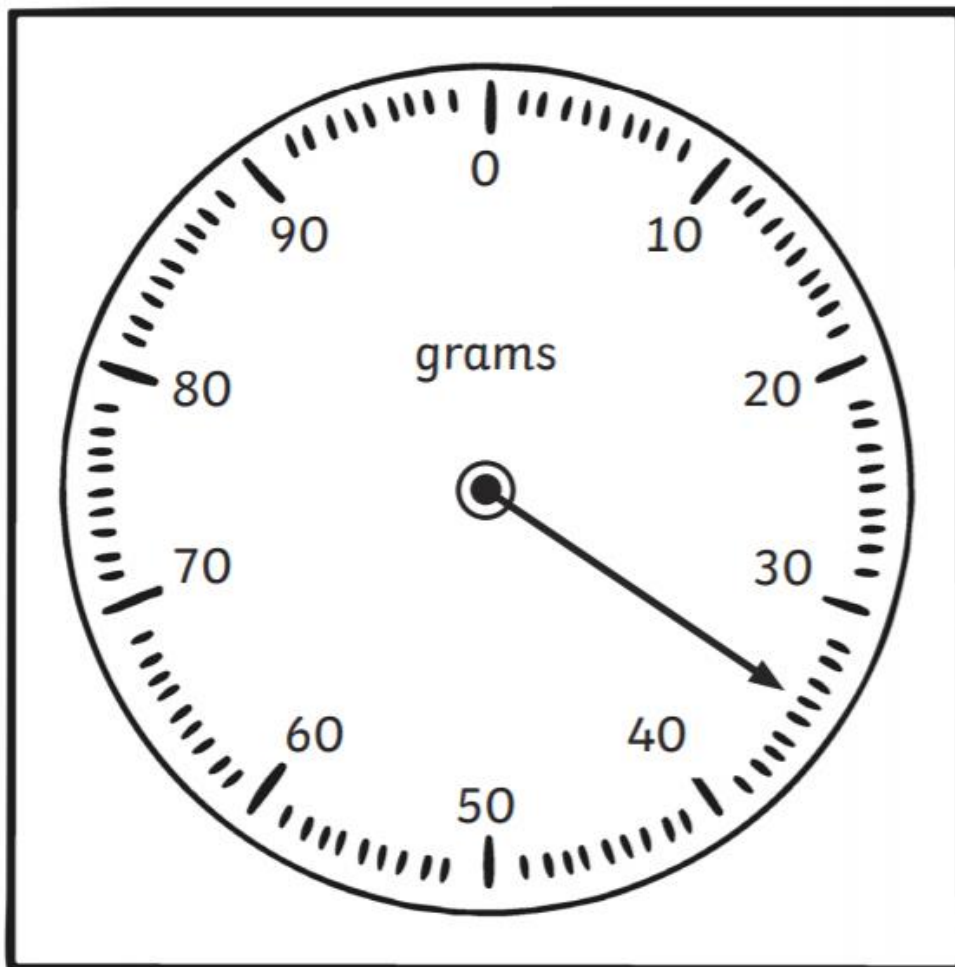


Scales can be circular like the one below. As we did with the last question, we need to work out what the scale goes up in. Here there are 10 little sections between 0 and 10 so each little section is 1.

What is the scale pointing to?

Now use a ruler to draw arrows on the scale to show:

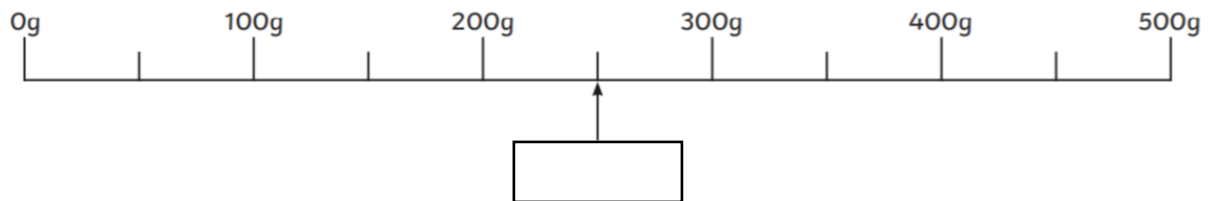
- a) 22g
- b) 48g
- c) 65g
- d) 7g
- e) 99g



Now try the following scales:

Remember to work out what the scales go up in.

Q1



Q2



A	
B	
C	
D	

Q3



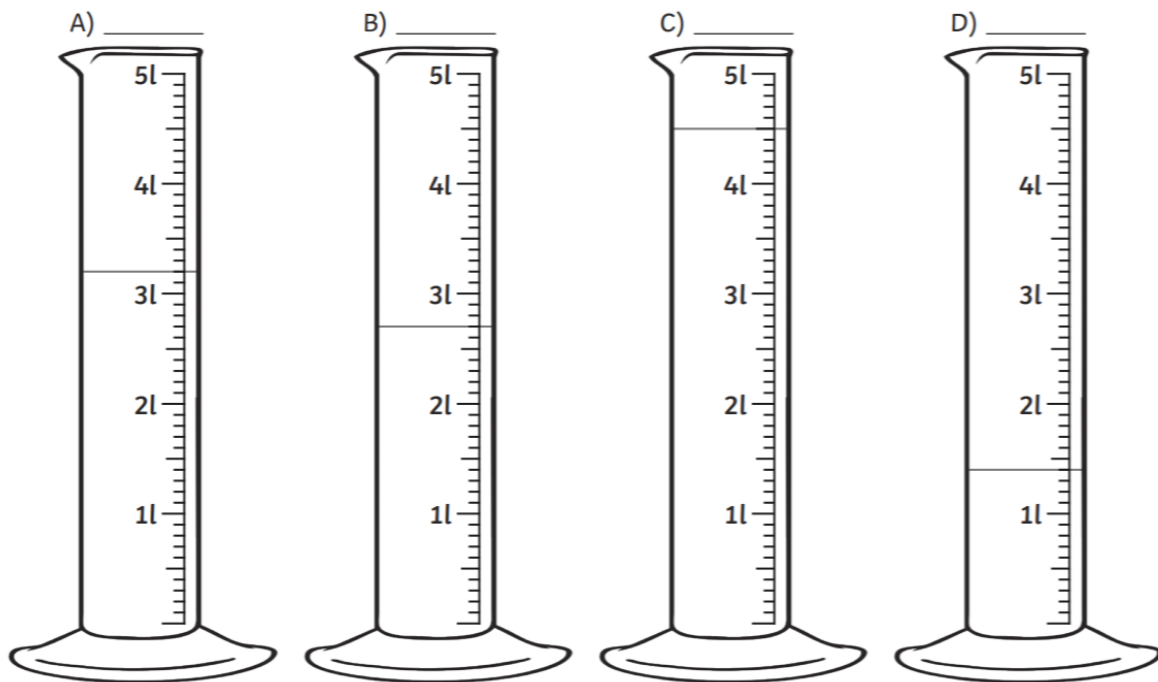
A	
B	
C	
D	

Q4



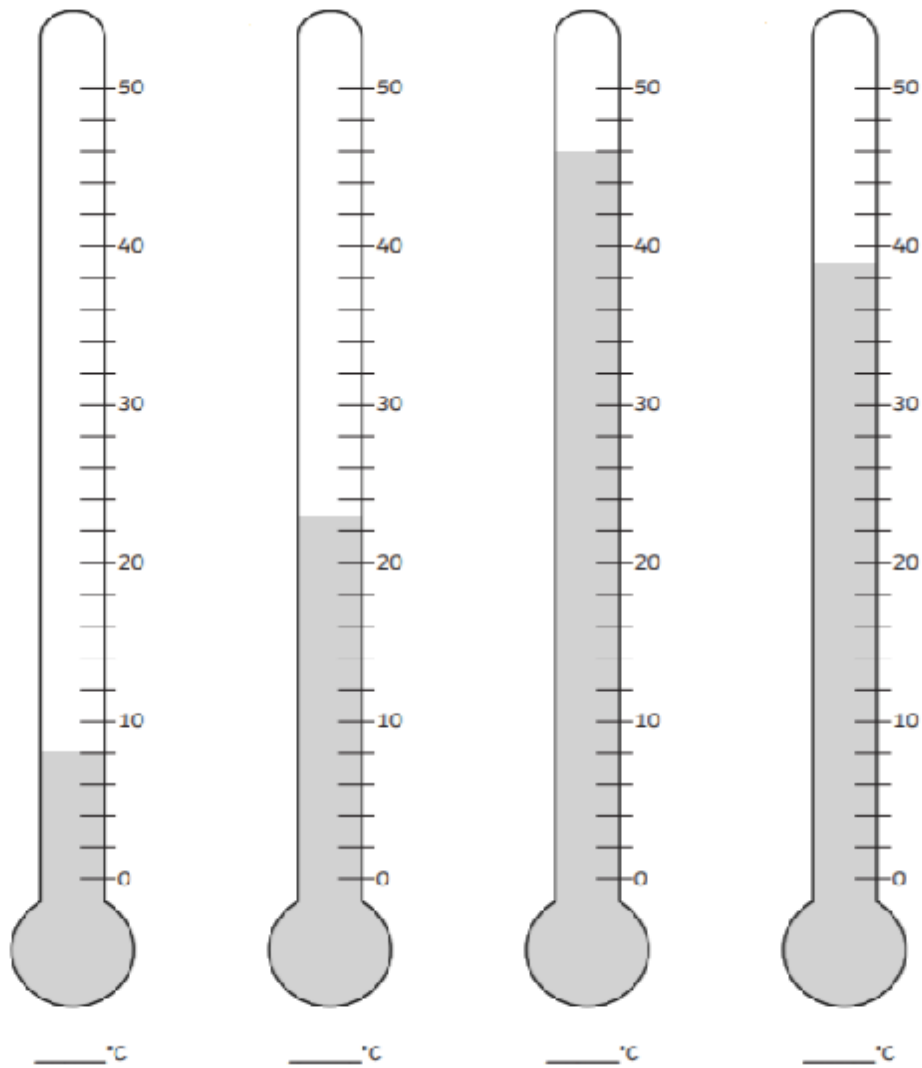
A	
B	
C	
D	

Q5



A	
B	
C	
D	

Q6



How did you get on?

- ✓ Did you work out the increments that scale goes up in?
- ✓ Did you interpret what the scale points to?
- ✓ Did you remember your units?

Now you're ready to try assessment question 7

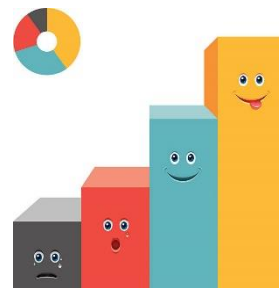
## Information Handling

### Learning Intention

To interpret graphs, charts and tables and be able to answer questions on them

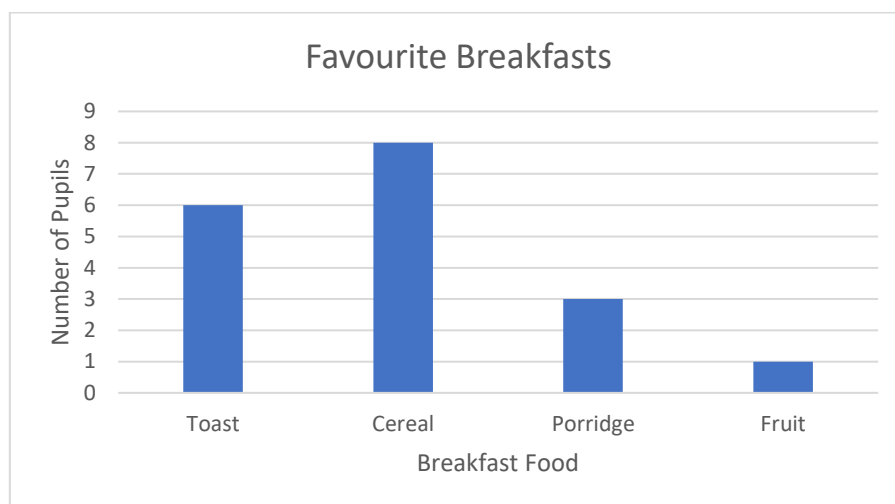
### Success Criteria

- ✓ Understand how to read graphs, charts and tables
- ✓ Read scales correctly
- ✓ Answer questions based on the graphs, charts and tables



### Bar Charts

In the Manage Money and Data unit, we organise data into frequency tables and draw graphs. In this unit, we interpret that information. Bar Charts are a good way of displaying information and look like:



This displays the information gathered from a survey on what pupils liked for breakfast in Breakfast Club.

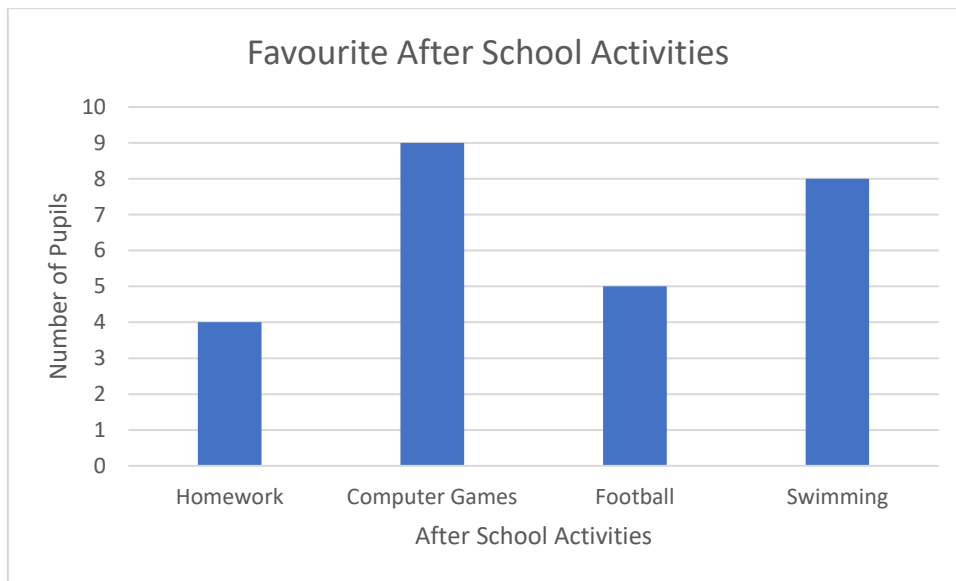
We can see that the most popular choice of breakfast is cereal with 8 pupils choosing this option.

The least popular choice was fruit with just 1 pupil choosing this option.

(a) How many pupils chose porridge?

(b) How many more pupils chose toast than fruit?

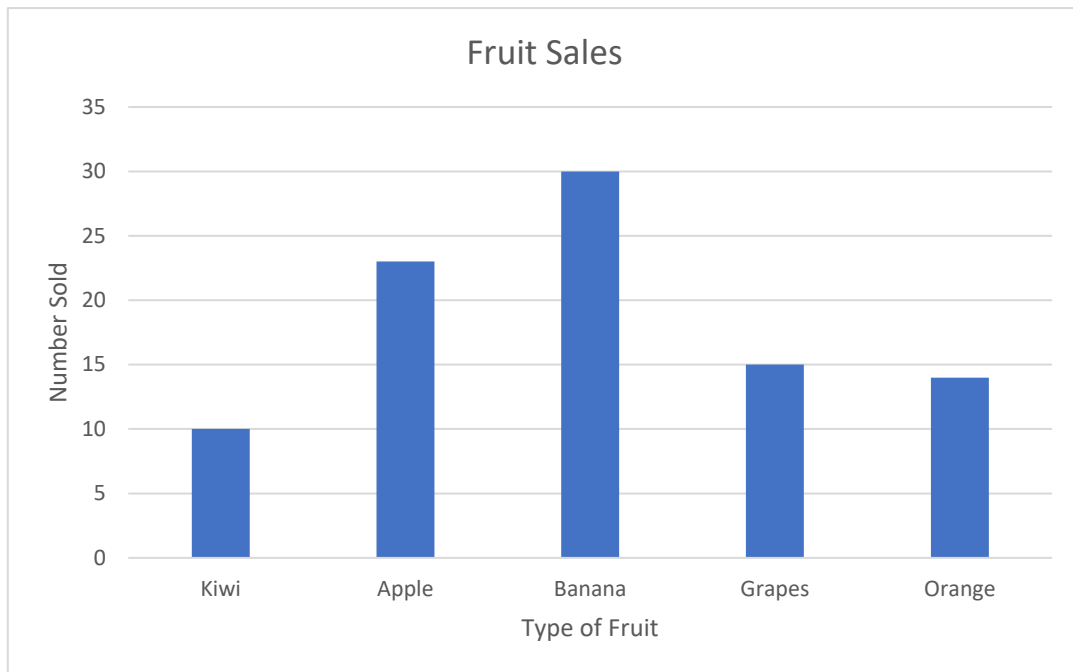
1. Below is a bar chart showing favourite after school activities:



Now answer the following questions based on the bar chart:

Question	Answer
What is the most popular activity?	
What is the least popular activity?	
How many pupils chose football?	
How many more chose swimming than homework?	
How many pupils were asked altogether?	

2. Below is a graph of fruit sold in a supermarket.



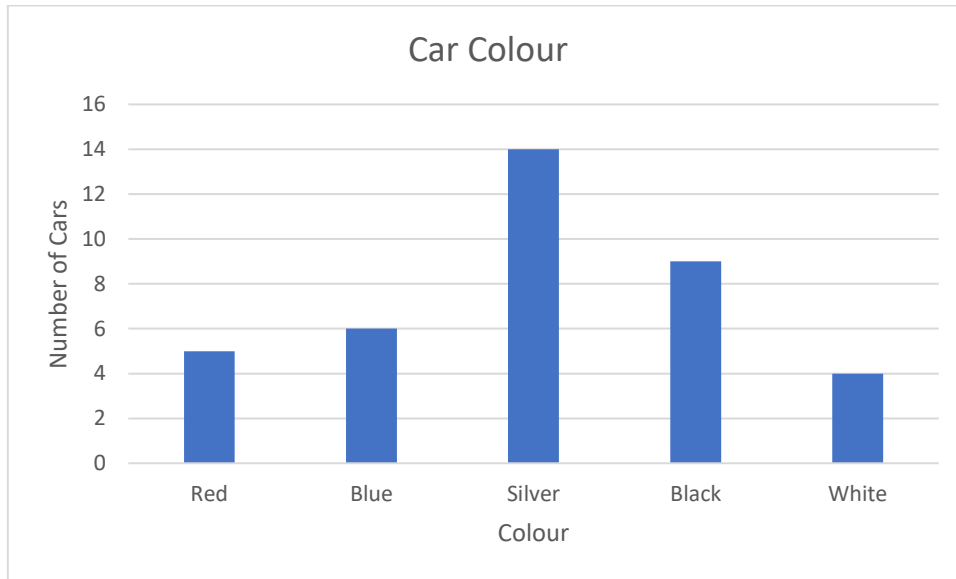
Now try some questions based on the bar chart:

Question	Answer												
How many of each fruit were chosen?	<table border="1"> <thead> <tr> <th>Fruit</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Kiwi</td> <td></td> </tr> <tr> <td>Apple</td> <td></td> </tr> <tr> <td>Banana</td> <td></td> </tr> <tr> <td>Grapes</td> <td></td> </tr> <tr> <td>Orange</td> <td></td> </tr> </tbody> </table>	Fruit	Number	Kiwi		Apple		Banana		Grapes		Orange	
	Fruit	Number											
	Kiwi												
	Apple												
	Banana												
	Grapes												
Orange													
How many more apples than oranges were sold?													
What was the most popular fruit?													
What was the least popular fruit?													



How many pieces of fruit were sold altogether?

3. A survey was done on the colours of cars in the car park. Here is a bar chart of the results:



Now try the questions below:

Question	Answer	
How many of each colour of car were in the car park?	Colour	Number
	Red	
	Blue	
	Silver	
	Black	
	White	
If a car was chosen at random, what colour is it most likely to be? <i>Hint: this is the same as the most common colour</i>		

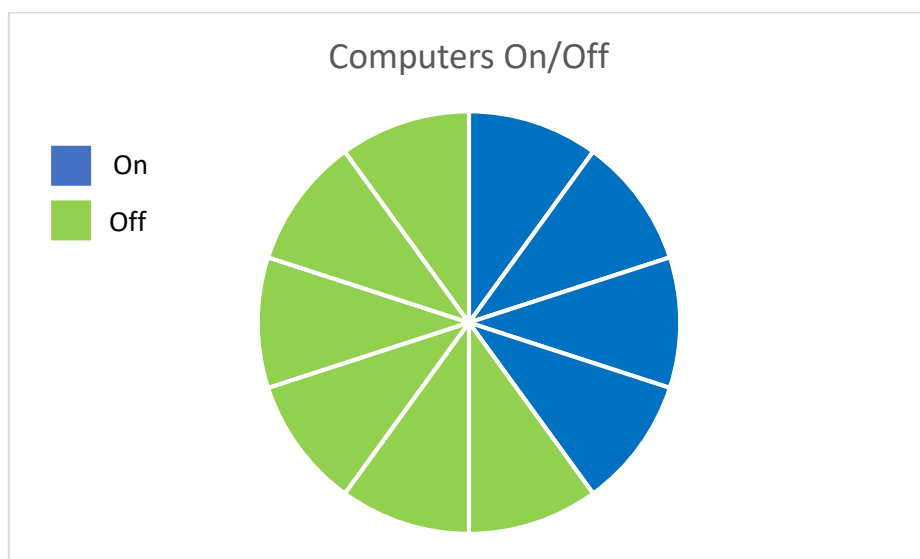
How many cars were in the carpark altogether?	
How many more black cars than blue cars were in the car park?	

### Pie Charts

Pie Charts are another way of displaying data.

For example,

The pie chart below shows whether computers in a computer lab were left on or off.



(a) What fraction of the computers were left on?

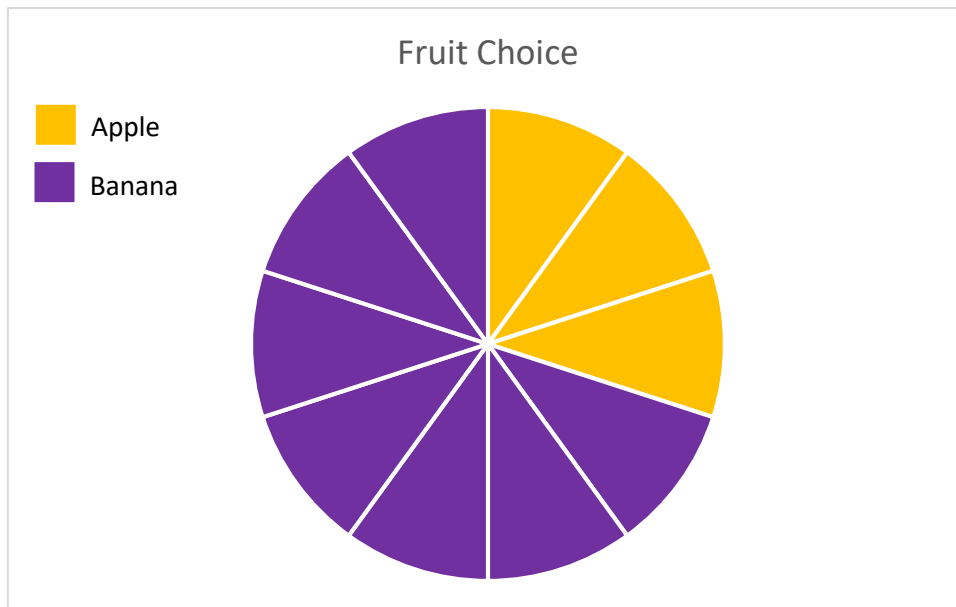
We can see from the pie chart that 4 of the 10 segments are shaded so that means  $\frac{4}{10}$  of the computers are left on.

(b) If there are 20 computers in the lab. How many are on?

So here we need to find  $\frac{4}{10}$  of 20

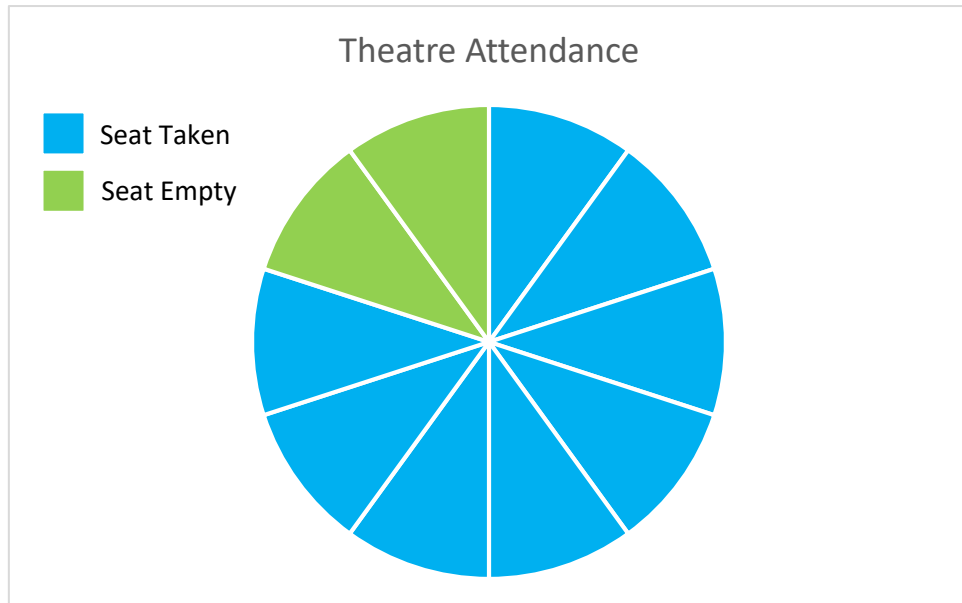
$20 \div 10 \times 4 = 8$  computers.

1. 50 pupils were offered an apple or a banana. The pie chart below shows what they chose:



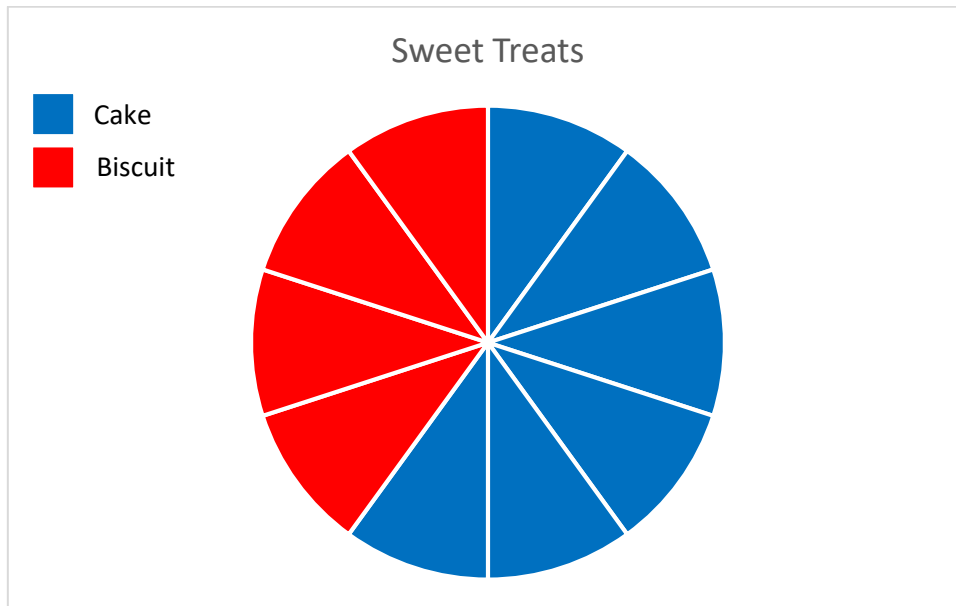
Question	Answer
What fraction of pupils chose a banana?	
How many people chose a banana?	
What fraction of pupils chose an apple?	
How many people chose an apple?	
The next day the pupils were offered an apple or a banana again. This time $\frac{2}{5}$ of them chose an apple. How many pupils is this?	

2. A theatre can hold 80 people. The pie chart below shows how many seats were taken at a recent event:



Question	Answer
What fraction of seats were taken?	
How many seats were taken?	
What fraction of seats were empty?	
How many seats were empty?	
For another showing, $\frac{7}{8}$ of the seats were taken. How many seats is this?	

3. 60 people were asked whether they preferred a cake or a biscuit. The results are displayed in the pie chart below:



Question	Answer
What fraction of people preferred a cake?	
How many people preferred a cake?	
What fraction of people preferred a biscuit?	
How many people preferred a biscuit?	
Another 60 people were asked the same question and $\frac{5}{6}$ of them preferred a cake. How many people is this?	

## Tables

Sometimes information is displayed in a table and we need to be able to interpret this information.

For example:

Here are results from a long jump competition, all measurements in cm:



	1st Jump	2nd Jump	3rd Jump	4th Jump
Abby	145	164	154	187
Karla	187	197	168	201
Stacey	149	168	179	189
Flo	155	175	187	177

(a) How far did Karla jump on her 2<sup>nd</sup> jump?

Looking at the table, go along Karla's row until you get to her 2<sup>nd</sup> jump, 197cm.

(b) Who won the competition?

We're looking for the longest jump so 201cm – Karla won.

(c) Who improved with every jump?

Looking at the table, Stacey jumps further every time so she improved with every jump.

1. The table below shows who is able to babysit on which nights:

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Clare	✓			✓		✓	
Rebecca		✓				✓	
Carol	✓		✓		✓	✓	✓
Michael			✓	✓	✓		

Looking at the table, answer the following questions:

Question	Answer
What nights can Clare babysit?	
Who can babysit on a Wednesday night?	
Who can babysit on the most nights?	
Which nights have the least choice for a babysitter?	
Which night has the most choice for a babysitter?	
Who could babysit on a Friday if Carol is unavailable?	

2. The table below shows eye colour information for pupils in S6:

Eye Colour	Number of boys	Number of girls
Blue	7	8
Brown	5	6
Green	2	4



Now answer the following questions:

Question	Answer
How many boys have green eyes?	
How many girls have blue eyes?	
How many girls are in the class?	
How many pupils have brown eyes?	
How many pupils are in S6 altogether?	



3. Below is a table shows some college students.  
It shows their age, height and the distance they live from college.



	Age	Height (cm)	Disatnce from college (miles)
Anya	24	164	2
Nathan	22	178	4
Sarah	26	170	3
Lucy	19	168	1

The college is launching a project and is looking for students to take part. They need someone who is 24 or younger, taller than 165cm and lives 2 miles or less from college.

Question	Answer
Who can take part in this project?	
Why can't the others take part?	

How did you get on?

- ✓ Do you understand how to read graphs, charts and tables?
- ✓ Did you read scales correctly?
- ✓ Did you answer questions based on the graphs, charts and tables?

Now you're ready to try assessment questions 10, 11 and 12.