# St Robert Southwell Catholic Primary School

*Aiming For Excellence - Being The Best We Can Be*

## Year 4 Maths Knowledge Organiser: Number

### Place Value

#### Year 4 Objectives

- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.

#### Key Vocabulary

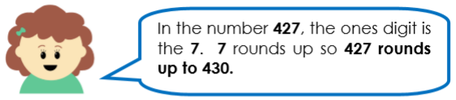
| | | |
|---|---|---|
| compare | increase | place value |
| decrease | less than < | positive |
| digit | negative | represent |
| greater than > | numeral | rounding |
| hundreds | ones | sequence |
| | | tens |

### Modelled Examples / Concrete Pictorial Abstract

#### Rounding

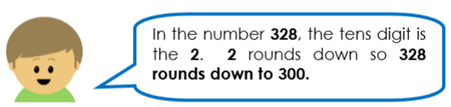
***Rounding to the nearest 10***

To round a number to the nearest 10, you should look at the ones digit. If the ones digit is 5 or more, round up. If the ones digit is 4 or less, round down.



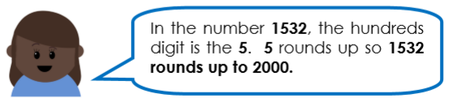

***Rounding to the nearest 100***

To round a number to the nearest 100, you should look at the tens digit. If the tens digit is 5 or more, round up. If the tens digit is 4 or less, round down.




***Rounding to the nearest 1000***

To round a number to the nearest 1000, you should look at the hundreds digit. If the hundreds digit is 5 or more, round up. If the hundreds digit is 4 or less, round down.

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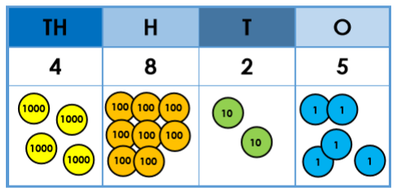
#### Place Value of Digits

Place value helps us know the value of a digit, depending on its place in the number.

| TH | H | T | O |
|---|---|---|---|
| 4 | 8 | 2 | 5 |



In the number above, the 4 digit is in the thousands place so it really means 4000.

The 8 digit is in the hundreds place so it really means 800.

The 2 digit is in the tens place so it really means 20.

The 5 digit is in the ones place so it means 5.

#### Negative Numbers

If you count backwards from zero, you reach negative numbers.

**Positive** numbers are any numbers **more than** zero e.g. 1, 2, 3, 4, 5.

**Negative** numbers are any numbers **less than** zero e.g. –1, -2, -3, -4, -5.

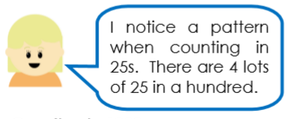
#### Roman Numerals

| | |
|---|---|
| I = 1 | X = 10 |
| II = 2 | XX = 20 |
| III = 3 | XXX = 30 |
| IV = 4 | XL = 40 |
| V = 5 | L = 50 |
| VI = 6 | LX = 60 |
| VII = 7 | LXX = 70 |
| VIII = 8 | LXXX = 80 |
| IX = 9 | XC = 90 |
| X = 10 | C = 100 |

#### Counting in 25s and 1000s

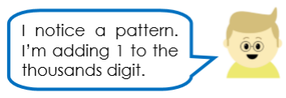
***Counting in 25s***

25, 50, 75, 100, 125, 150, 175, 200




**Counting in 1000s**

1000, 2000, 3000, 4000, 5000




#### 1000 More or 1000 Less

To find 1000 more or less than a number, you first need to find the digit in the thousands place.

| TH | H | T | O |
|---|---|---|---|
| 5 | 6 | 3 | 9 |

Finding 1000 more will increase the thousands digit by 1. So in this example, the 5 will become a 6. ***1000 more than 5639 is 6639.***

Finding 1000 less will decrease the thousands digit by 1. So in this example, the 5 will become a 4. ***1000 less than 5639 is 4639.***

| TTH | TH | H | T | O |
|---|---|---|---|---|
| 0 | 9 | 6 | 3 | 9 |

Finding 1000 more when the number has a 9 in the thousands place is slightly different. Adding 1 to the thousands place would give 10, so to show that, the ten thousands increases by 1 and a 0 is put in the thousands place. ***1000 more than 9639 is 10, 639.***

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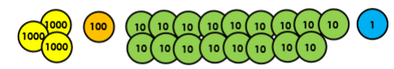
#### Partitioning

Numbers can be partitioned (broken apart) in more than one way...

**3271** = 3000 + 200 + 70 + 1

**3271** = 2000 + 1200 + 60 + 11

**3271** = 3000 + 100 + 170 + 1



#### Ordering and Comparing Numbers

When we put numbers in order, we need to compare the value of their digits.

**3518** **3736** **2845**

First, look at the thousands digits in each number. 2 is the smallest thousand digit so 2845 is the smallest number. The other two numbers both have a 3 in the thousands place so we then need to compare the hundreds digit. 5 is smaller than 7 therefore 3518 is smaller than 3736.

We can compare numbers using symbols:
**< = less than and > = greater than**

2845 < 3518 3736 > 3518

#### Quick Quiz

1. 3647 + 1000 =
2. What is the value of the digit 4 in the number 2489?
3. Round 726 to the nearest hundred
4. Complete the sequence 25, __, 75, ___, 125
5. Write 47 in roman numerals

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## Addition and Subtraction

### Year 4 Objectives

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

### Key Vocabulary

add total combined more increase plus altogether sum **+**

minus take away reduce less than difference decrease fewer than **−**

### Modelled Examples / Concrete Pictorial Abstract

**Add and Subtract 1s, 10s, 100s, and 1,000s**

| TH | H | T | O |
|---|---|---|---|
| 2 | 6 | 3 | 8 |

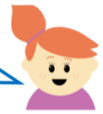
If I add ones to a number, I need to add it to the digit in the ones column.

The same applies if you are adding tens, hundreds or thousands - you add to the digit in that place value column.

If I add a multiple of 100 to the number above, the tens and ones will not change. The thousands will only change when the hundreds totals more than 9.

**Estimate Answers**

Estimating means to get a rough idea of an answer . We can use estimation to help us check if an answer to a calculation is correct.



I am calculating 3,478 + 2,983.
I think the answer is 4,461.

I am also calculating 3,478 + 2,983.
I think the answer is 6,461.

Millie and Darcey could check their answers by doing the calculation again. However, if they have made a mistake, they may just make the same mistake again.

Instead, they could use **rounding** to check if their answer is correct.

We can round the numbers to the nearest hundred. So 3,478 + 2,983 becomes 3,500 + 3,000.

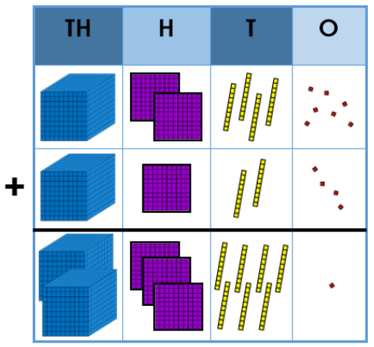
3,500 + 3,000 = 6,500.

Now we compare our estimate to the actual answers given. The answer 6,461 is very close to the estimate of 6,500 so that tells us it is more likely to be correct.

| Concrete | Pictorial | Abstract |
|---|---|---|

**Addition - Formal Written Methods**

Using base 10 to show column addition:



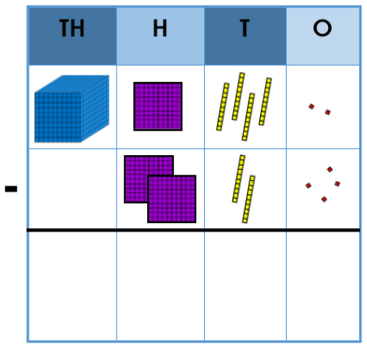

| | | | | |
|---|---|---|---|---|
| | 1 | 2 | 4 | 7 |
| + | 1 | 1 | 2 | 4 |
| | 2 | 3 | 7 | 1 |

1

With column addition and subtraction, you must always start the calculation with the column on the right. 7 + 4 is 11. We can not put 11 in the ones column so a ten is placed under the tens column and the one is placed in the ones column. We then add the extra ten when we add that column.

**Subtraction - Formal Written Methods**

Using base 10 to show column subtraction:




| | | | | |
|---|---|---|---|---|
| | 1 | 1 | 4 | 2 |
| - | | 2 | 2 | 4 |
| | | | | |

In the ones column, we don't have enough ones to subtract 4 from 2. To complete the calculation, we need to exchange a ten for ten ones.

To show this, the 4 is changed to a 3 because we now have 3 tens. The 2 becomes a 12. 42 is the same as 30 + 12. We still have the same amount, but it has been regrouped. Now, we can start subtracting.

12 - 4 = 8 so 8 is written in the ones column.

In the tens column, 3 - 2 = 1 so 1 is written in the tens column.

| | | | ~~3~~ | $^{1}2$ |
|---|---|---|---|---|
| | 1 | 1 | ~~4~~ | |
| - | | 2 | 2 | 4 |
| | | | 1 | 8 |

Looking at the hundreds column, we do not have enough to subtract 2 from 1. We need to exchange the thousand for ten hundreds. To show this, the 1 (thousand) is changed to a 0 as we now have 0 thousands. The 1 (hundreds) becomes an 11. 11 hundreds is the same as 1 thousand and 1 hundred. Now, we can finish the subtraction. 11 - 2 = 9.

| | ~~0~~ | $^{1}1$ | ~~3~~ | $^{1}2$ |
|---|---|---|---|---|
| | ~~1~~ | | ~~4~~ | |
| - | | 2 | 2 | 4 |
| | | 9 | 1 | 8 |

### Quick Quiz

1. 4758 + 2876 =
2. _____ + 3647 = 8945
3. Reduce 5683 by 3 tens
4. Calculate the sum of 2095 and 378
5. How could you check the answer to the sum 8917 – 3748 = 5169

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## Multiplication and Division

### Year 4 Objectives

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1;
- multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

### Key Vocabulary

| | |
|---|---|
| Array | groups of |
| Calculate | lots of |
| Commutative law | multiplication |
| divide | multiply |
| division | operation |
| efficient | remainder |
| exchange | share |
| factor | times |

### Modelled examples / Concrete Pictorial Abstract

#### Multiplication Tables

| | | | | | |
|---|---|---|---|---|---|
| 1 x 6 = 6 | 2 x 6 = 12 | 3 x 6 = 18 | 4 x 6 = 24 | 5 x 6 = 30 | 6 x 6 = 36 |
| 7 x 6 = 42 | 8 x 6 = 48 | 9 x 6 = 54 | 10 x 6 = 60 | 11 x 6 = 66 | 12 x 6 = 72 |

| | | | | | |
|---|---|---|---|---|---|
| 1 x 7 = 7 | 2 x 7 = 14 | 3 x 7 = 21 | 4 x 7 = 28 | 5 x 7 = 35 | 6 x 7 = 42 |
| 7 x 7 = 49 | 8 x 7 = 56 | 9 x 7 = 63 | 10 x 7 = 70 | 11 x 7 = 77 | 12 x 7 = 84 |

| | | | | | |
|---|---|---|---|---|---|
| 1 x 9 = 9 | 2 x 9 = 18 | 3 x 9 = 27 | 4 x 9 = 36 | 5 x 9 = 45 | 6 x 9 = 54 |
| 7 x 9 = 63 | 8 x 9 = 72 | 9 x 9 = 81 | 10 x 9 = 90 | 11 x 9 = 99 | 12 x 9 = 108 |

| | | | | | |
|---|---|---|---|---|---|
| 1 x 11 = 11 | 2 x 11 = 22 | 3 x 11 = 33 | 4 x 11 = 44 | 5 x 11 = 55 | 6 x 11 = 66 |
| 7 x 11 = 77 | 8 x 11 = 88 | 9 x 11 = 99 | 10 x 11 = 110 | 11 x 11 = 121 | 12 x 11 = 132 |

| | | | | | |
|---|---|---|---|---|---|
| 1 x 12 = 12 | 2 x 12 = 24 | 3 x 12 = 36 | 4 x 12 = 48 | 5 x 12 = 60 | 6 x 12 = 72 |
| 7 x 12 = 84 | 8 x 12 = 96 | 9 x 12 = 108 | 10 x 12 = 120 | 11 x 12 = 132 | 12 x 12 = 144 |

#### Division Facts

| | | | | | |
|---|---|---|---|---|---|
| 6 ÷ 6 = 1 | 12 ÷ 6 = 2 | 18 ÷ 6 = 3 | 24 ÷ 6 = 4 | 30 ÷ 6 = 5 | 36 ÷ 6 = 6 |
| 42 ÷ 6 = 7 | 48 ÷ 6 = 8 | 54 ÷ 6 = 9 | 60 ÷ 6 = 10 | 66 ÷ 6 = 11 | 72 ÷ 6 = 12 |

| | | | | | |
|---|---|---|---|---|---|
| 7 ÷ 7 = 1 | 14 ÷ 7 = 2 | 21 ÷ 7 = 3 | 28 ÷ 7 = 4 | 25 ÷ 7 = 5 | 42 ÷ 7 = 6 |
| 49 ÷ 7 = 7 | 56 ÷ 7 = 8 | 63 ÷ 7 = 9 | 70 ÷ 7 = 10 | 77 ÷ 7 = 11 | 84 ÷ 7 = 12 |

| | | | | | |
|---|---|---|---|---|---|
| 9 ÷ 9 = 1 | 18 ÷ 9 = 2 | 27 ÷ 9 = 3 | 36 ÷ 9 = 4 | 45 ÷ 9 = 5 | 54 ÷ 9 = 6 |
| 63 ÷ 9 = 7 | 72 ÷ 9 = 8 | 81 ÷ 9 = 9 | 90 ÷ 9 = 10 | 99 ÷ 9 = 11 | 108 ÷ 9 = 12 |

| | | | | | |
|---|---|---|---|---|---|
| 11 ÷ 11 = 1 | 22 ÷ 11 = 2 | 33 ÷ 11 = 3 | 44 ÷ 11 = 4 | 55 ÷ 11 = 5 | 66 ÷ 11 = 6 |
| 77 ÷ 11 = 7 | 88 ÷ 11 = 8 | 99 ÷ 11 = 9 | 110 ÷ 11 = 10 | 121 ÷ 11 = 11 | 132 ÷ 11 = 12 |

| | | | | | |
|---|---|---|---|---|---|
| 12 ÷ 12 = 1 | 24 ÷ 12 = 2 | 36 ÷ 12 = 3 | 48 ÷ 12 = 4 | 60 ÷ 12 = 5 | 72 ÷ 12 = 6 |
| 84 ÷ 12 = 7 | 96 ÷ 12 = 8 | 108 ÷ 12 = 9 | 120 ÷ 12 = 10 | 132 ÷ 12 = 11 | 144 ÷ 12 = 12 |

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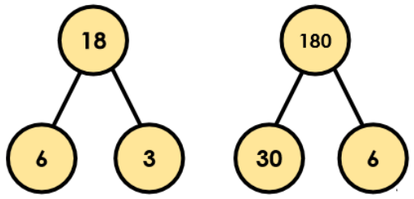
#### Related Facts from Times Tables




| | |
|---|---|
| 3 x 6 = 18 | 6 x 3 = 18 |
| 18 ÷ 3 = 6 | 18 ÷ 6 = 3 |
| 30 x 6 = 180 | 60 x 3 = 180 |
| 180 ÷ 30 = 6 | 180 ÷ 60 = 3 |

#### Multiply Three Numbers

**4 x 3 x 6 = 72**

"I would solve this by multiplying 4 by 3, which is 12. Then, I multiply 12 by 6, which is 72."

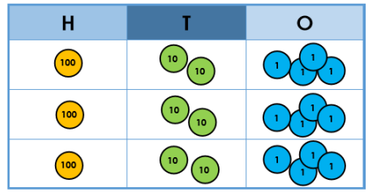
"Because multiplication is commutative, you can multiply the numbers in any order and you will get the same answer."

| | |
|---|---|
| 4 x 3 x 6 = 72 | 3 x 6 x 4 = 72 |
| 4 x 6 x 3 = 72 | 6 x 4 x 3 = 72 |
| 3 x 4 x 6 = 72 | 6 x 3 x 4 = 72 |

| Concrete | Pictorial | Abstract |
|---|---|---|

#### Multiplication - Formal Written Method

Pupils begin by using place value counters to understand written multiplication:



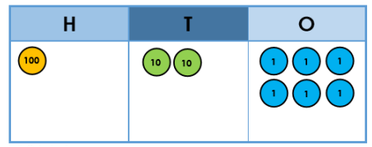

| | | | |
|---|---|---|---|
| | 1 | 2 | 4 |
| x | | | 3 |
| | 3 | 7 | 2 |
| | 1 | | |

Pupils transfer this understanding to a formal written method.

Multiply each digit from the 3 digit number by the 1 digit number, starting with the ones. 4 x 3 = 12. Twelve ones cannot go in the ones column so exchange ten ones for one ten and place it into the tens column. Keep the 2 ones in the ones column. Then, multiply the tens digit by 3. The extra ten must be added; there are now 7 tens altogether. Finally, multiply the hundreds digit by 3 and put the answer in the hundreds column - 3 hundreds. The answer is 372.

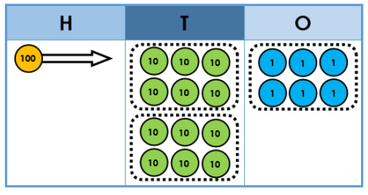
#### Division - Formal Written Method

Pupils begin by using place value counters to understand written division:




**126 ÷ 6**

Start with the hundreds column. As the 100 counter cannot be split into groups of 6, exchange it for 10 lots of 10 and put these counters into the tens column.




Then, put the 10s counters into as many equal groups of 6 as possible. We can now see that there are two groups of 6 tens. Next, put the ones counters into groups of 6. There is 1 group of 6 in total, making the answer 21.

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Pupils transfer this understanding to a formal written method.

| | | | |
|---|---|---|---|
| | 0 | | |
| 6 | 1 | 1 2 | 6 |

Start by looking at how many groups of 6 you can make with 1 hundred. You cannot make any complete groups of 6 so place a zero in the hundreds column. Then, exchange the 1 hundred for 10 tens so there are now 12 tens.

| | | | |
|---|---|---|---|
| | 0 | 2 | |
| 6 | 1 | 1 2 | 7 |

You can make two groups of 6 tens using 12 tens. Therefore, place 2 in the tens column.

| | | | |
|---|---|---|---|
| | 0 | 2 | 1 |
| 6 | 1 | 1 2 | 6 |

Finally, look at the ones digit. With 6 ones, you can make 1 group of 6 ones. This means that a 1 is placed in the ones column. The answer is 21.

### Quick Quiz

1. Solve mentally 7 x 8 x 5 = ___
2. Explain how using related facts you could solve 70 x 8 mentally
3. ____ x 5 x 9 = 270
4. Use a formal written method to solve 576 x 8
5. Use a formal written method to solve 228 divided by 6

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## Fractions

### Year 4 Objectives

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to ¼ ½ ¾
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

### Key Vocabulary

decimal, denominator, equal, equivalent, fraction, half, hundredths, numerator, quarter, tenths, third, unit

## Modelled examples / Concrete Pictorial Abstract

### Hundredths

Hundredths are 10 times smaller than tenths. Their place on the place value chart is to the right of the tenths column. A zero is used as a place holder to show there are no tenths.

| H | T | O | • | t | h |
|---|---|---|---|---|---|
| | | 0 | • | 0 | 1 |

Hundredths can be found by dividing 1-digit numbers by 100.

8 ÷ 100 = 0.08 or 8 hundredths

| H | T | O | • | t | h |
|---|---|---|---|---|---|
| | | 8 | • | | |
| | | 0 | • | 0 | 8 |

There are 10 hundredths in 1 tenth.

| 1/100 | 2/100 | 3/100 | 4/100 | 5/100 | 6/100 | 7/100 | 8/100 | 9/100 | 10/100 |
|---|---|---|---|---|---|---|---|---|---|

One tenth

Hundredths can be written as a fraction and as a decimal number.

$\frac{1}{100}$ = 0.01

### Solve Problems Involving Fractions

When finding a fraction of a quantity or number; First divide by the denominator then, multiply the answer by the numerator.

Ranjit got $\frac{5}{9}$ of the 108 questions correct on his test. What was his score?

I need to find $\frac{5}{9}$ of 108

Divide by the denominator: 108 ÷ 9 = 12

Multiply by the numerator: 12 x 5 = 60.

Ranjit scored 60 on his test.

A baker made 640 cupcakes. He sold $\frac{7}{16}$ of them on Monday.

How many cupcakes does he have left?

640 ÷ 16 = 40 40 x 7 = 280.

640 - 280 = 360 cupcakes

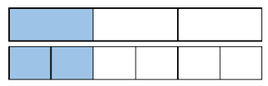
### Equivalent Fractions

Equivalent fractions have different denominators and numerators but are the same amount.

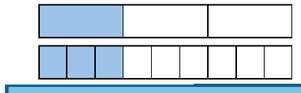
$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$

Equivalent fractions can be found by multiplying the numerator and the denominator by the same number.

$\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$

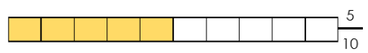


$\frac{1}{3} \times \frac{2}{2} = \frac{3}{9}$



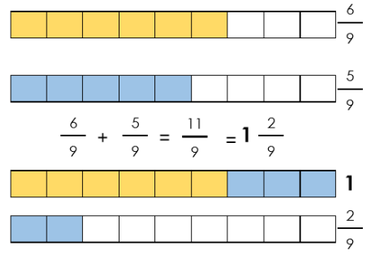
### Add Fractions

When adding fractions with the same denominator, the denominator does not change. The numerators only are added.



$\frac{5}{10} + \frac{4}{10} = \frac{9}{10}$

Sometimes when adding two fractions, the answer will be greater than one whole.



$\frac{6}{9} + \frac{5}{9} = \frac{11}{9} = 1\frac{2}{9}$

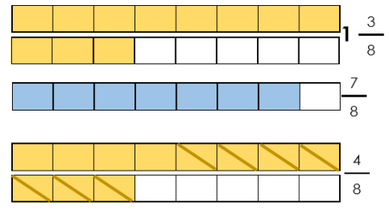
### Subtract Fractions

When subtracting fractions with the same denominator, the denominator does not change. The numerators only are subtracted.

$\frac{8}{10} - \frac{5}{10} = \frac{3}{10}$

When subtracting from more than one whole, the whole will need to be divided into the number of parts shown by the denominator.

$1\frac{3}{8} - \frac{7}{8} = \frac{4}{8}$



### Quick Quiz

1. What is 9 tenths subtract 3 tenths?
2. _____ + 3/5 = 5/5
3. Round 1.6 to the nearest whole number
4. What is ¾ as a decimal?
5. Order these decimals from smallest to greatest 2.34, 3.00, 2.09, 2.88

### Dividing by 10

| Tens | Ones | | Tens | Ones | Tenths |
|---|---|---|---|---|---|
| 8 | 5 | ÷ 10 | | 8 • | 5 |

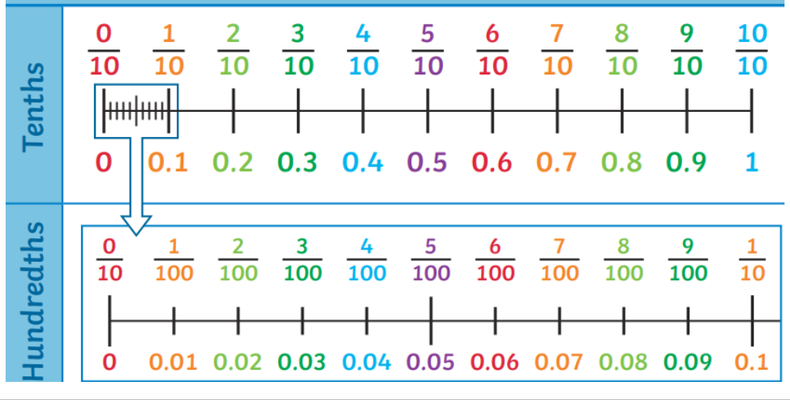
÷ 10

### Dividing by 100

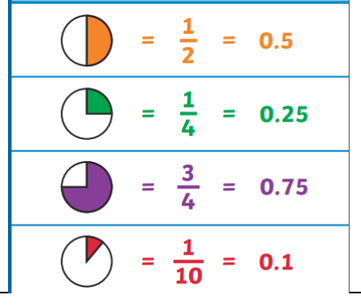
| Tens | Ones | | Tens | Ones | Tenths | Hundredths |
|---|---|---|---|---|---|---|
| 8 | 5 | ÷ 100 | | 0 • | 8 | 5 |

÷ 100

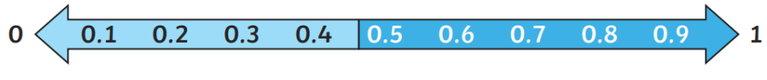
### Tenths and Hundredths




### Fraction and Decimal Equivalents




### Rounding Decimals




If the tenths digit is **1, 2, 3 or 4,** we round **down** to the nearest whole number.

If the tenths digit is **5, 6, 7, 8 or 9,** we round **up** to the nearest whole number.

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# Year 4 Maths Knowledge Organiser - Position & Direction

## Position & Direction

### Year 4 Objectives

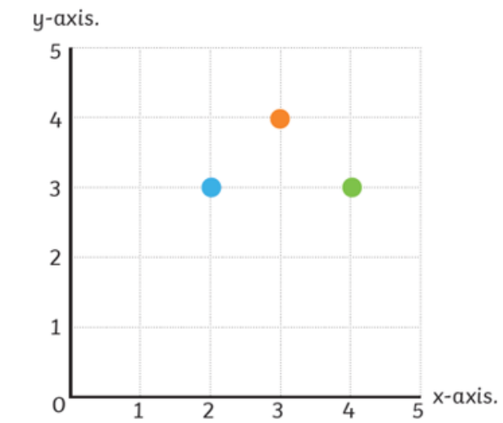
- Describe positions on a 2-D grid as coordinates in the first quadrant
- Describe movements between positions as translations of a given unit to the left/right and up/down
- Plot specified points and draw sides to complete a given polygon

### Key Vocabulary

| | |
|---|---|
| Co-ordinate | Vertices |
| Quadrant | Position |
| X-axis | 2D-Shapes |
| Y-axis | Polygon |
| Translation | Brackets |
| Vertex | |

### Modelled Examples / Concrete Pictorial Abstract

#### Position in the First Quadrant




Coordinates are a useful way to locate a position on a map or grid.

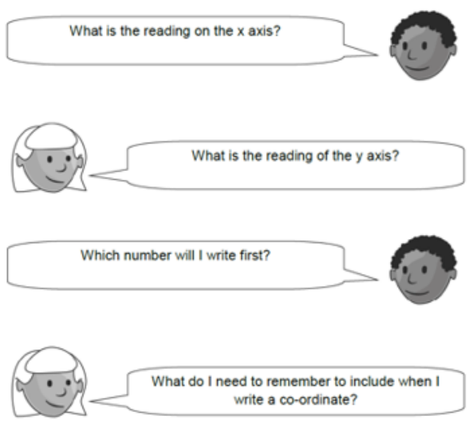
The numbers across the horizontal line of the grid are on the **x-axis**.

The numbers on the vertical line of the grid are on the **y-axis**.

We always read or write the number on the x-axis before the **y-axis**.

The x and y position are written in brackets with a comma.

The coordinate of the blue spot is **(2, 3)**.



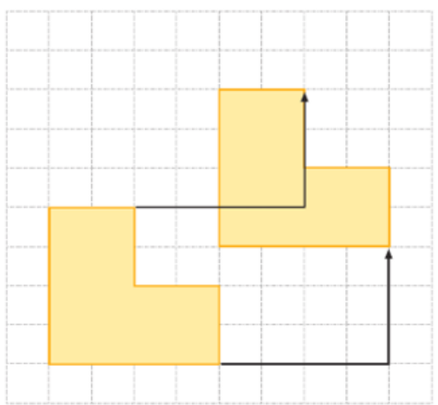

To help you remember which point to read or write first, simply remember to move 'along the corridor and up the stairs'.

In other words, move on the x-axis and then move on the y-axis.

#### Translation

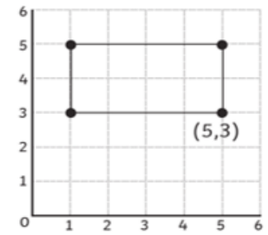
In maths, translation means moving an object on a grid. The object is moved without changing the size, turning or reflecting it.

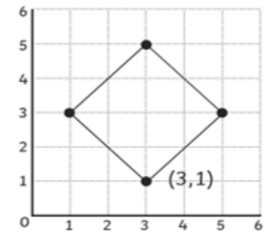
When translating an object on a grid, it can move up or down, left or right.



#### Plotting 2D Shapes

Each vertex (corner) of a 2D polygon can be represented as a coordinate on a 2D grid.



**Quick Quiz**

1. True or False: We always read or write the number on the Y-axis before the X-axis?
2. What does translation mean?
3. What are the coordinates for the 'orange dot'?
4. What is another word for 'corner'?
5. Always, Sometimes, Never: The number of points is equal to the number of vertices when they are joined together?

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# Year 4 Maths Knowledge Organiser - Geometry- Properties of Shape

## Geometry

### Year 4 Objectives

- Compare and classify geometric shapes, including quadrilaterals, based on their properties and sizes.
- Identify acute and obtuse angles and compare and order angles up to two right angles by size.
- Identify lines of symmetry in 2-D shapes presented in different orientations.
- Complete a simple symmetric figure with respect to a specific line of symmetry.

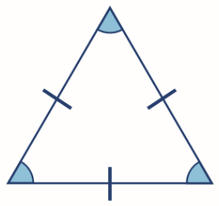
### Key Vocabulary

| | | |
|---|---|---|
| Angle | Diagonal | Reflection |
| Right angle | Parallel | Mirror line |
| Acute | Perpendicular | Isosceles |
| Obtuse | Two-dimensional | Equilateral |
| Horizontal | Polygon | Scalene |
| Vertical | Line of symmetry | Quadrilateral |
| parallelogram | Trapezium | Rhombus |

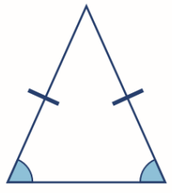
## Modelled Examples / Concrete Pictorial Abstract

### Triangles

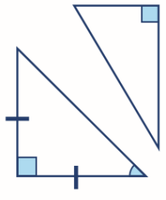
Triangles have 3 sides and 3 vertices. The total of the angles in a triangle is 180°.



An equilateral triangle is a regular polygon. It has sides of equal length and each angle is 60°.

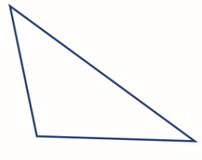


An isosceles triangle has two sides of equal length and two angles of equal size.



A right-angled triangle always has one 90° angle.

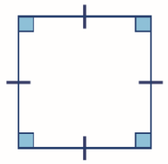
It can be isosceles or scalene.



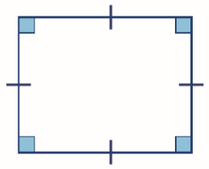
A scalene triangle has no equal sides or angles.

### Quadrilaterals

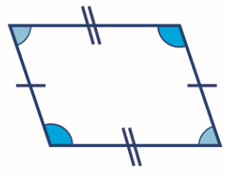
A quadrilateral is a polygon with four sides.



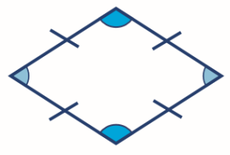
A square has four sides of equal length and four right angles (90°). A square is also a rectangle, a rhombus and a parallelogram.



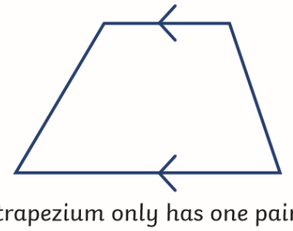
A rectangle has two pairs of parallel, equal sides and four right angles. A rectangle is also a parallelogram.



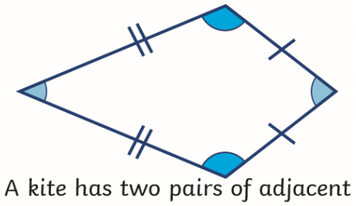
A parallelogram has two pairs of parallel, equal sides and opposite equal angles.



A rhombus has four sides of equal length and opposite equal angles. A rhombus is also a parallelogram.



A trapezium only has one pair of opposite parallel sides.



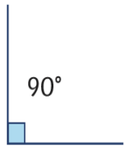
A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.

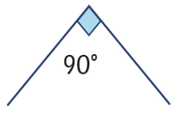
### Angles

An angle is created when two straight lines meet at a point or intersect.

**Right angle**

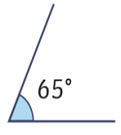
The intersection of perpendicular lines creates a right angle.

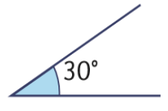



**Acute angle**

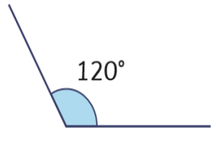
Any angle measuring more than 0 degrees and less than 90 degrees is acute.

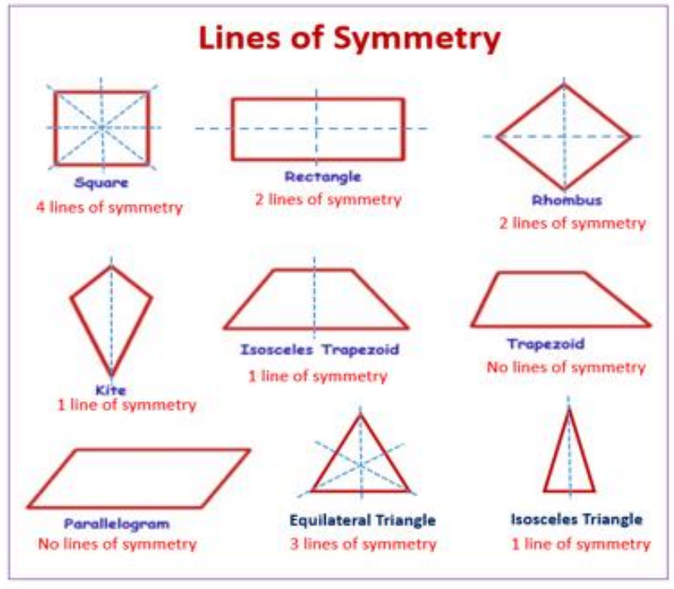



**Obtuse angle**

Any angle measuring more than 90 degrees but less than 180 degrees is obtuse.




**Quick Quiz**

1. How many degrees does an obtuse angle have?
2. What is a scalene triangle?
3. What is the difference between a parallelogram and a trapezium?
4. Does the orientation of a shape change the lines of symmetry?
5. An acute angle is less than 90 degrees. True or false?

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## Year 4 Maths Knowledge Organiser - Measurement

## Measurement

### Year 4 Objectives

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares
- estimate, compare and calculate different measures, including money in pounds and pence
- read, write and convert time between analogue and digital 12- and 24-hour clocks
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

### Key Vocabulary

| | | |
|---|---|---|
| amount | estimate | pound |
| analogue | greater | rectilinear |
| area | hour | round |
| combination | less | second |
| compare | minute | space |
| convert | order | surface |
| digital | pence | |
| equal | | |

### Modelled Examples / Concrete Pictorial Abstract

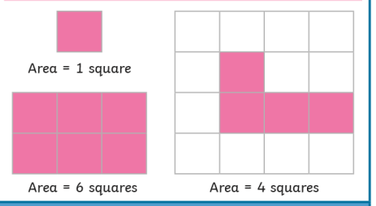
#### Area and Perimeter

**Area** is the amount of space inside a 2D shape.

**Perimeter** is the total **distance** around the outside of a 2D shape.

#### Measuring Area

We can count **squares** to find the **area** of a **rectilinear** shape.

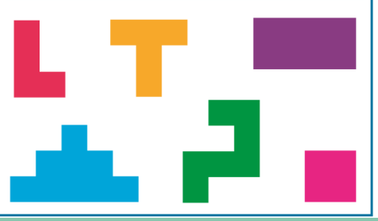



#### Units of Measure for Perimeter

| | |
|---|---|
| km | 1 **kilometre** = 1000 **metres** |
| m | 1 **metre** = 100 **centimetres** |
| cm | 1 **centimetre** = 10 **millimetres** |
| mm | |

#### Rectilinear Figures

A **rectilinear** figure is a 2D shape whose sides all meet at **right angles** (90°).



#### UK Coins

| £0.01 | £0.02 | £0.05 | £0.10 | £0.20 | £0.50 | £1.00 | £2.00 |
|---|---|---|---|---|---|---|---|
| one penny coin | two pence coin | five pence coin | ten pence coin | twenty pence coin | fifty pence coin | one pound coin | two pound coin |

#### UK Notes



| £5 | £10 | £20 | £50 |
|---|---|---|---|
| five pound note | ten pound note | twenty pound note | fifty pound note |

#### Pounds and Pence

£3 and 25 pence £3.25

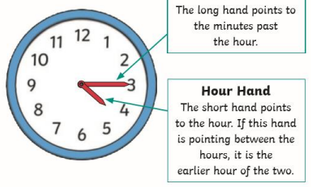
£52 and 13 pence £52.13

463 = £4.63

705p = £7.05

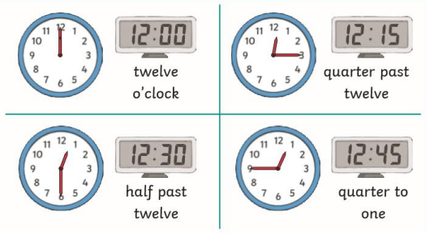
92p = £0.92

#### Analogue and Digital Clocks

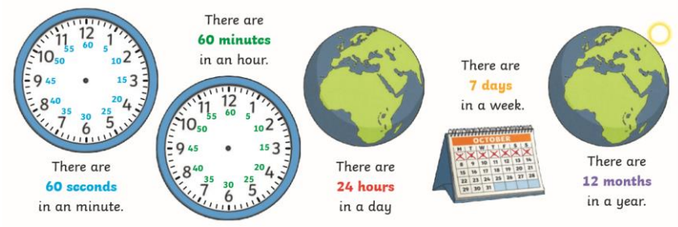


**Minute Hand**
The long hand points to the minutes past the hour.

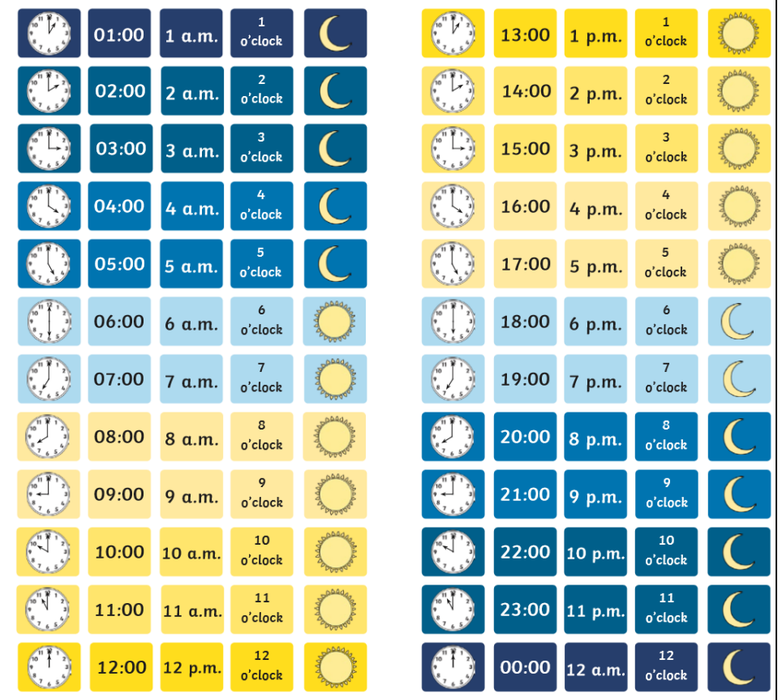
**Hour Hand**
The short hand points to the hour. If this hand is pointing between the hours, it is the earlier hour of the two.




#### Durations of Time




#### 24-Hour Time



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 01:00 | 1 a.m. | 1 o'clock | | 13:00 | 1 p.m. | 1 o'clock | |
| 02:00 | 2 a.m. | 2 o'clock | | 14:00 | 2 p.m. | 2 o'clock | |
| 03:00 | 3 a.m. | 3 o'clock | | 15:00 | 3 p.m. | 3 o'clock | |
| 04:00 | 4 a.m. | 4 o'clock | | 16:00 | 4 p.m. | 4 o'clock | |
| 05:00 | 5 a.m. | 5 o'clock | | 17:00 | 5 p.m. | 5 o'clock | |
| 06:00 | 6 a.m. | 6 o'clock | | 18:00 | 6 p.m. | 6 o'clock | |
| 07:00 | 7 a.m. | 7 o'clock | | 19:00 | 7 p.m. | 7 o'clock | |
| 08:00 | 8 a.m. | 8 o'clock | | 20:00 | 8 p.m. | 8 o'clock | |
| 09:00 | 9 a.m. | 9 o'clock | | 21:00 | 9 p.m. | 9 o'clock | |
| 10:00 | 10 a.m. | 10 o'clock | | 22:00 | 10 p.m. | 10 o'clock | |
| 11:00 | 11 a.m. | 11 o'clock | | 23:00 | 11 p.m. | 11 o'clock | |
| 12:00 | 12 p.m. | 12 o'clock | | 00:00 | 12 a.m. | 12 o'clock | |

#### Quick Quiz

1. What is twenty past 2 in the afternoon on digital clock?
2. If a rectangle has the perimeter of 30cm, what could the length and width be of the shape?
3. Order the following amounts from least to most: 420p, £2.80 and 168p
4. A shape is 3 squares long and 4 squares wide, what is its area?
5. How many hours are in 3 days?

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## Year 4 Maths Knowledge Organiser - Statistics

## Statistics

### Year 4 Objectives

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

### Key Vocabulary

| | | |
|---|---|---|
| Bar chart | Discreet | Pictogram |
| Comparison | Frequency | Sum |
| Continuous | Interpret | Tally |
| Difference | | Time |

## Modelled Examples / Concrete Pictorial Abstract

### Discrete and Continuous Data

Data that is counted in whole numbers is discrete. In **discrete data**, values between whole numbers cannot be counted.

Data that is measured and therefore can take on infinite values is continuous. In **continuous data**, values between whole numbers can be counted.

### Frequency Tables

Tally marks are used to help count things. Each vertical line represents one unit. The fifth tally mark goes down across the first four to make it easier to count.

The frequency column is completed after all the data has been collected.

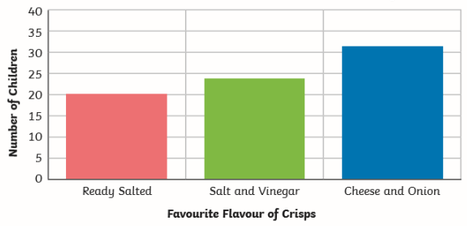
| Eye Colour | Tally | Frequency |
|---|---|---|
| brown | 𝍸 \| | 6 |
| blue | 𝍸 \|\|\| | 8 |
| green | \|\|\| | 3 |
| grey | \|\|\| | 4 |
| hazel | 𝍸 | 5 |

### Bar Charts

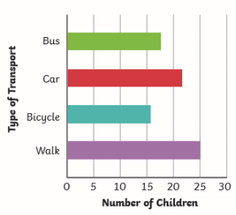
A bar chart has a horizontal axis and a vertical axis. Bars are used to show the data of each category. There must be a gap between each bar.

The scale of the bar chart is based on the range of data.

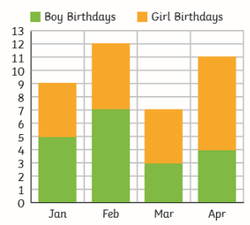
**The scale on this bar chart counts in fives.**




**The bars are horizontal on this bar chart.**



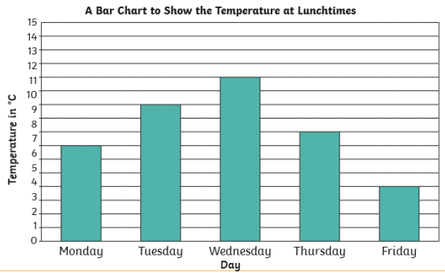

**Two sets of data are shown on this stacked bar chart.**



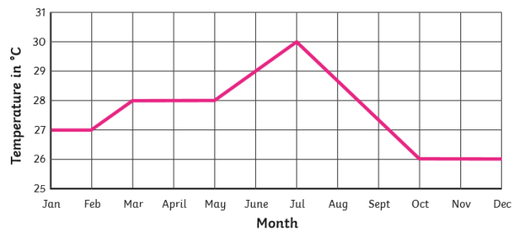

### Time Graphs

Time graphs show how data changes over time.

**A Bar Chart to Show the Temperature at Lunchtimes**




**A Line Graph to Show the Average Monthly Temperature in the Borneo Rainforest**

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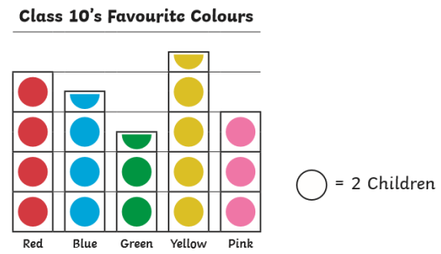
### Pictograms

Pictograms use symbols or pictures to represent data.

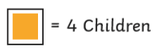
This pictogram uses one symbol to represent two children.

Using this key, we can see that seven children prefer the colour blue.

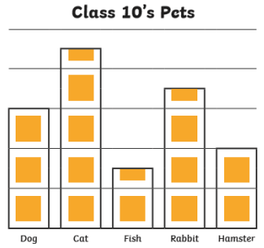
**Class 10's Favourite Colours**




This pictogram uses one picture to represent four children. Using this key, we can see that six children have a pet fish.




**Class 10's Pets**




### Quick Quiz

1. Can you make a tally chart of pets in your class?
2. Explain how you could use a pictogram to represent supported football teams in your class
3. On a line graph, when the line is straight horizontally, what does this mean?
4. Compare and explain discreet and continuous dat
5. What is the definition of the word frequency?