Year 1 Mathematics Knowledge Organiser

Addition and Subtraction

Key Concepts

- Read and write calculations using + - and =
- Use number bonds and related subtraction facts within 20
- Add and subtract one and two digit numbers to 20.
- Solve missing number problems

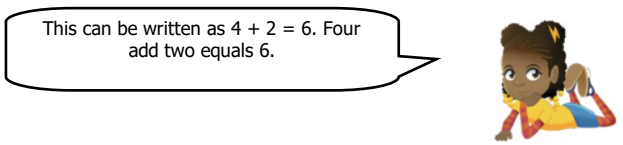
Key Vocabulary

- symbol
- add
- more
- plus
- Make
- altogether
- subtract
- take away
- less
- equals
- number bonds
- number line
-

Addition

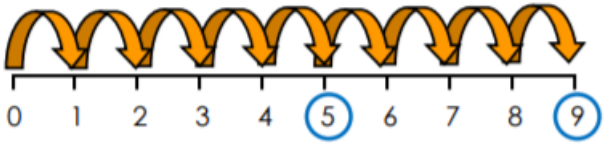
When carrying out addition the mathematical symbols + and = should be recognised and applied.

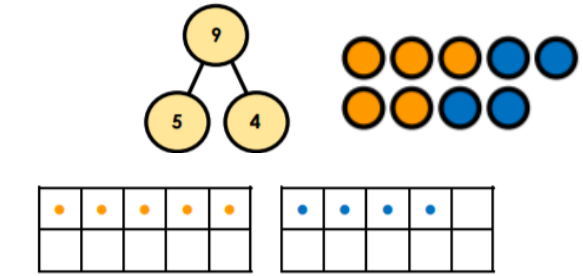
For example, if there are 4 orange and 2 blue counters, there are 6 counters in total.



Adding Numbers by Counting All

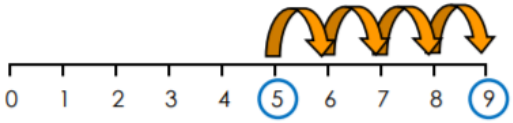
One strategy used when adding is counting all of the objects to find the answer. For 5 + 4 = 9, you count to 5 before counting another 4 to reach 9.

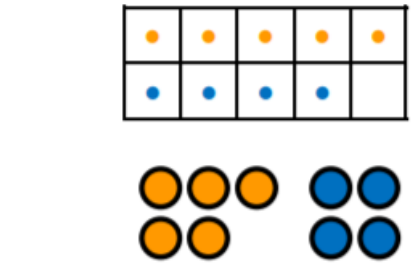




Adding Numbers by Counting On

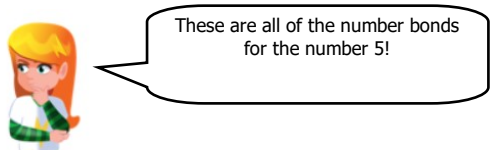
Another strategy to use is counting on from the first number to reach the answer. For 5 + 4 = 9, you start at 5 and count on 4 more





Number Bonds with Numbers to 10

It is important to understand all of the ways that each number to 10 can be partitioned. This is called a number bond.

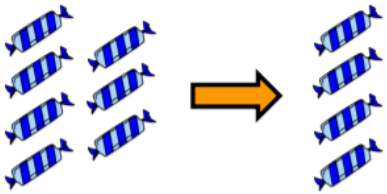


0 + 5 = 5	3 + 2 = 5
1 + 4 = 5	4 + 1 = 5
2 + 3 = 5	5 + 0 = 5

Early Subtraction

First experiences of subtraction should be practical in a real life context before using the - symbol.

For example. If there were 7 sweets and 3 of them were eaten, how many would be left?



First, there were 7. Now, there are 4.

"Taking Away"

Before moving on to a more formal method, continue using practical examples. Use the - symbol, teaching the concept of 'taking away'. For example, there were 5 balloons. 2 blew away. How many are there now?

5 - 2 = 3

Five take away 2 equals 3.

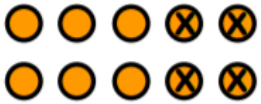
Year 1 Mathematics Knowledge Organiser

Addition and Subtraction

Subtracting Pictorially

Drawing and crossing out is an effective way of starting to formalise subtraction

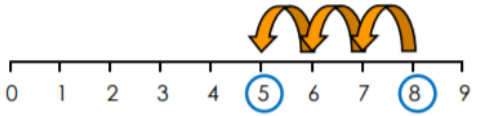
For 10 - 4, you need to draw ten circles and cross out 4.



Sub- tracting on a Number Line

In Year 1, fluency in carrying out subtraction using a number line should be mastered.

For 8 - 3, you should start on the number 8 and count back 3. The answer is 5. The number sentence is 8 - 3 = 5.



Misconception Alert!

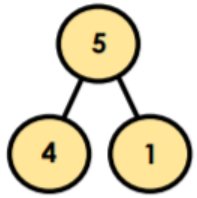
Remember not to include the starting number in your steps backwards!

Fact Families

As more confidence is built with both addition and subtraction, links and patterns will start to seen between them.

With 3 numbers, you can write 8 different number sentences.

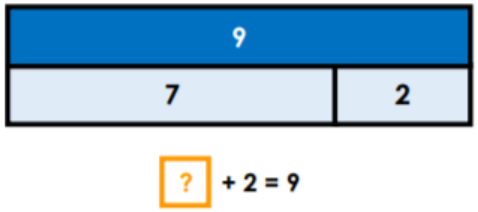
4 + 1 = 5
1 + 4 = 5
5 - 4 = 1
5 - 1 = 4



5 = 4 + 1
5 = 1 + 4
4 = 5 - 1
1 = 5 + 4

Missing Numbers

You can use your knowledge of number bonds and fact families to help find missing numbers.



If something add 2 equals 9, then 9 take away 2 equals the missing number. I know it is 7.

Multiplication and Division

Key Concepts

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with support.

In Year 1 it is important for children to work practically to solve problems like this using concrete objects.

Children in Year 1 are not expected to recognise or use the symbols for multiplication or division.

Key Vocabulary

- Equal groups
- Equal rows
- Grouping
- Sharing
- Doubles
- Halves
- Count in (2s, 5s, 10s)
- Lots of
- Groups of
- Array

Making Equal Groups

Before starting multiplication and division it is necessary to understand what it means to have equal groups.

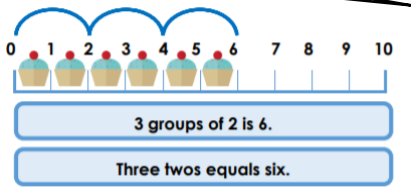
For example: Each plate has 2 cakes. They are equal groups.

Adding Equal Groups

This idea can then be combined with knowledge of counting in 2s,5s and 10s.

There are 3 plates. Each plate has 2.

2,4,6



Year 1 Mathematics Knowledge Organiser

Multiplication and Division

Arrays

The ideas then develops into making equal rows to organise objects clearly:

5 cakes in 1 row

10 cakes in 2 rows

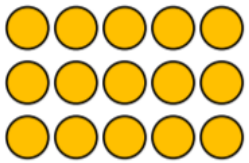
15 cakes in 3 rows

20 cakes in 4 rows

This group of rows is called an array.

I can count the rows, by counting by the number in each row.

As well as using real objects, arrays can be made using representations, like counters or drawings



3 rows.

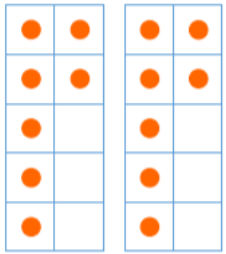
5 in one row

3 fives = 15

There are 15 altogether

Double

An important part of multi-plication in understanding that doubling a number makes 2 equal groups of that amount.

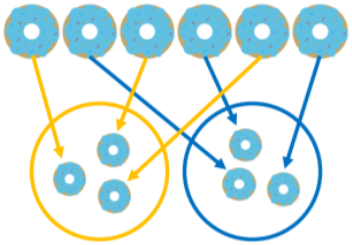


Double 7 = 14

2 sevens

Half

The inverse of this is half. This can be worked out practically by sharing between 2 groups.



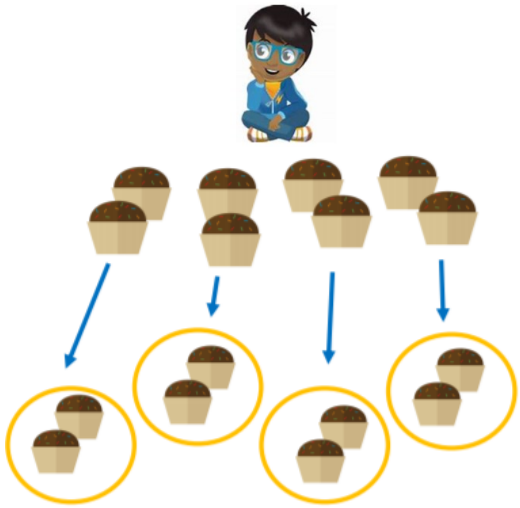
Half of 6 is 3

6 shared between 2 is 3.

Grouping Equally

When the total is known, finding the number of groups may be necessary. This is called division by grouping.

For example, if Alfie puts 2 cakes on each plate, how many plates are needed?



There are 8 cakes altogether.

There are 2 cakes on each plate.

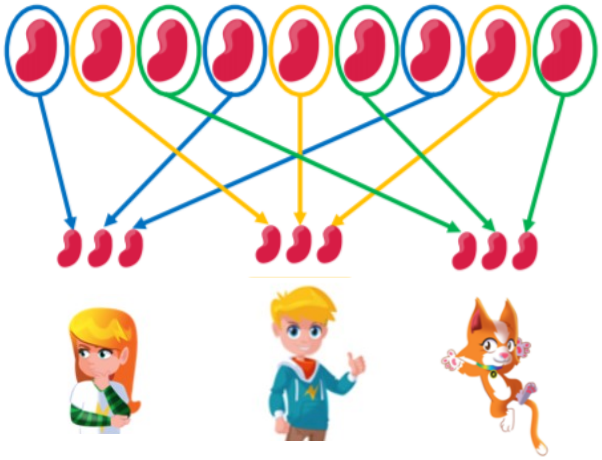
4 plates are needed.

Sharing by Grouping

Another type of division is by sharing equally. This involves knowing the number of groups you have, but not the number in each group.

For example, 3 children share 9 sweets equally, how many sweets does each child get?

Each child takes it in turns to take one, then again until there are none left.



There are 9 sweets altogether.

There are 3 children.

Each child gets 3 sweets.

Year 1 Mathematics Knowledge Organiser

Place Value

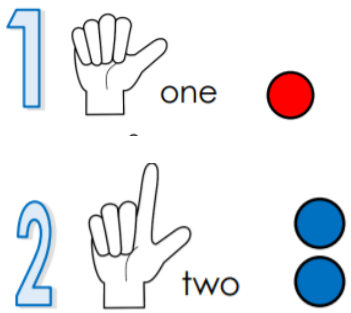
Key Concepts

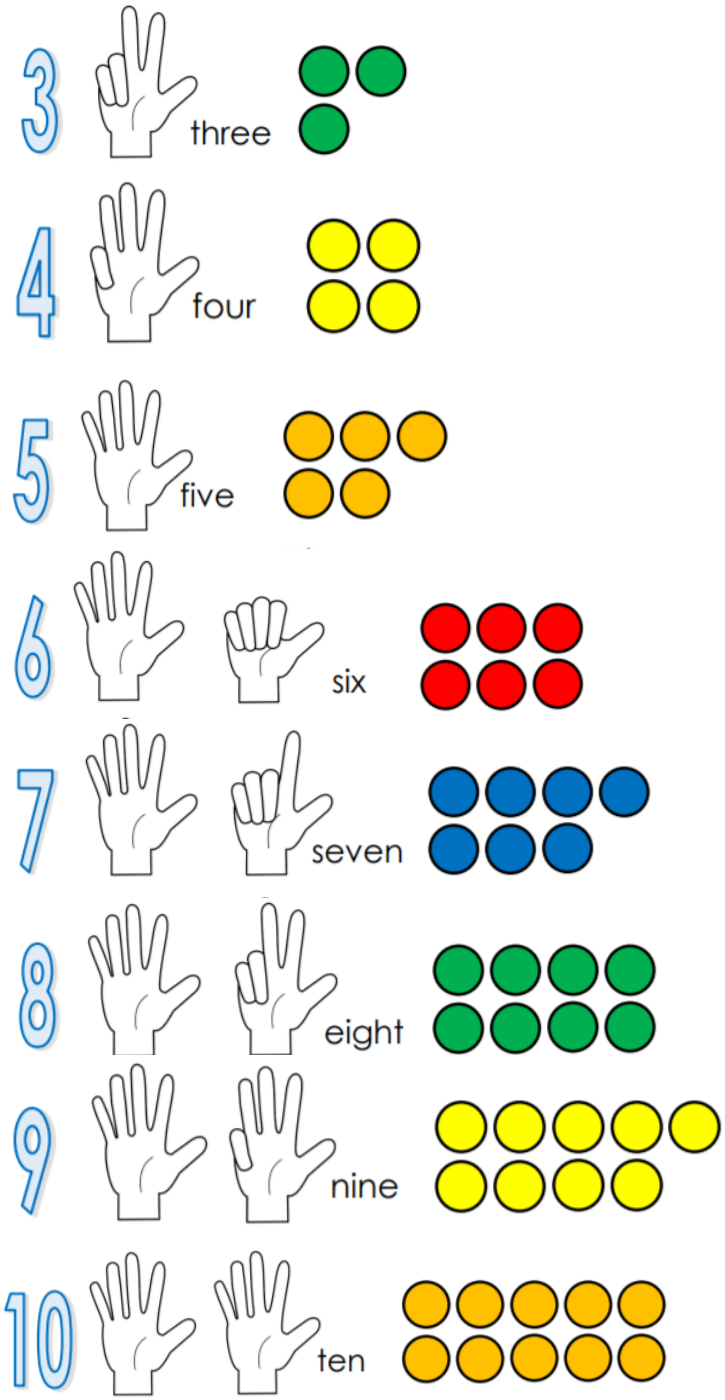
- Sort objects
- Count objects
- Read and write numbers up to 10 in numerals and in words
- Find one more and one less
- Represent numbers using objects and pictures
- Compare objects

Key Vocabulary

- One more
- One less
- Equal to
- More than
- Less than
- Most
- Least
- Total
- Count
-

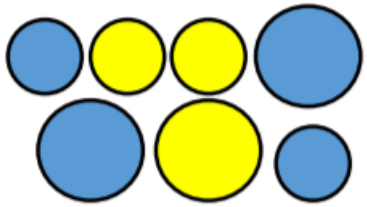
Numbers to 10



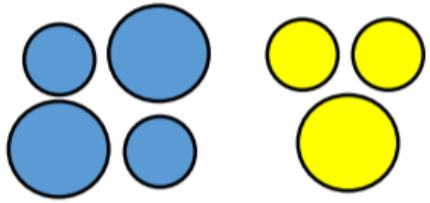


Sorting Objects

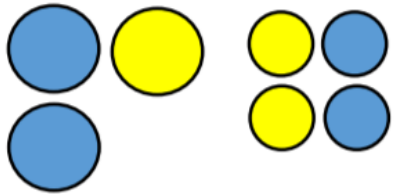
Look at these counters. We can sort them in different ways



We can sort them by colour, like this…

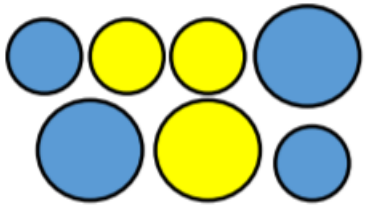


Or we could sort them by size, like this...



Counting Objects

When we count objects, we must start counting from the number 1.

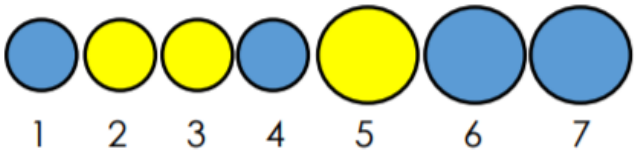


Count the objects one at a time. The last number you say is the total amount.

Year 1 Mathematics Knowledge Organiser

Place Value

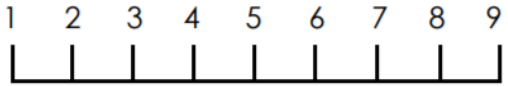
To help you count, you can put the objects in a line.



We can now see there are 7 counters in total.

Finding One More and One Less

When we count, 'one more' is the number after the number we are saying.



One more than 4 is 5.

'One less' is the number **before** the number we are saying.

One less than 4 is 3.

Comparing Objects and Numbers

We can compare objects using words like 'more' and 'fewer'.

There are **more** red triangles than green.

There are **fewer** green triangles than red.

Fractions

Key Concepts

- recognise, find and name a half as one of two equal parts of an object, shape or quantity.
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

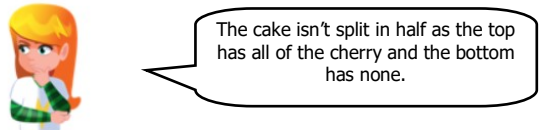
It is not necessary for Year 1 children to use fraction notation of ½ or ¼.

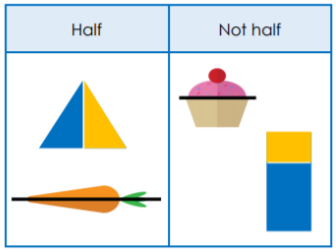
Key Vocabulary

- Equal
- Whole
- Parts
- Half/ halve
- Quarter
- Share

Recognising Half

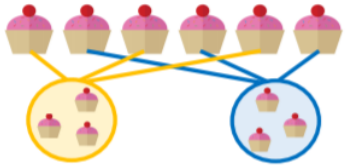
Shapes and objects make a simple introduction to the concept of half. Understanding that half is made by splitting the whole into two equal parts is crucial. Explaining why a shape hasn't been split in half is as important as identifying those that have.





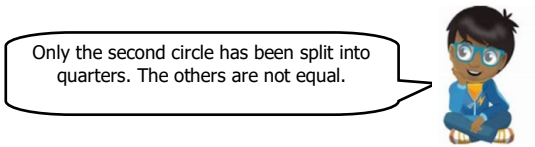
Find Half

When finding half of a quantity is it necessary to know the total number and begin by sharing objects into 2 equal groups. For example, half of 6….



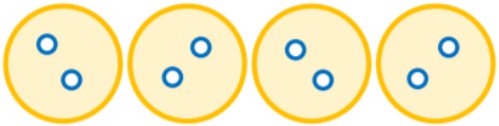
Recognising a Quarter

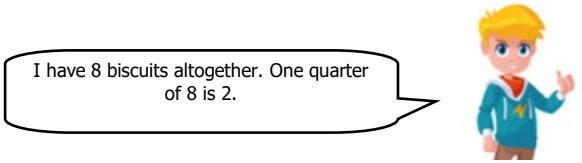
Similar to recognising half, shapes and objects are used to find quarters, knowing that they must be split into 4 equal parts.



Finding a Quarter

Sharing practically between 4 is the first step to finding a quarter of objects. The objects can then be drawn around once confidence





Year 1 Mathematics Knowledge Organiser

Fractions

Finding a Quarter in Capacity

The word quarter is also used in capacity to describe when a container is a quarter full.

Money

Key Concepts

- recognise and know the value of different denominations of coins and notes

Key Vocabulary

- Pence
- Pound
- Coin
- Note
- Value
- Worth
- Greater than
- Less than
- The same as

Children will be able to reason about the value of coins and notes

0 is greater than 5 so 10p is worth more than 5p.

Coins

Recognising coins is the first stage of understanding money.

It is crucial to understand that these are pence:

and that these are called pounds:

Once the coins can be named, an understanding of their value is necessary by looking at how many pennies each coin is worth, for example:

Misconceptions about 1p and £1 being worth the same need to be addressed and children should understand that £1 is worth 100 pennies.

One pound is worth more than one pence.

Notes

As well as coins, children need to recognise notes. It is important for children to know that all notes are worth pounds, not pence and a single note is always worth more than a single coin.

As with coins, it is important to understand the value of notes.

I know 5 + 5 = 10 so

£5 + £5 = £10

Time

Key Concepts

- compare, describe and solve practical problems for time
- measure and begin to record the time
- sequence events in chronological order using language
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

Year 1 Mathematics Knowledge Organiser

Time

Key Vocabulary

- Key Vocabulary
- Hour
- Minutes
- Seconds
- Before/ After
- First/ Next
- Earlier/ Later
- Quicker/ Slower
- Yesterday/ Today/ Tomorrow
- Morning/ Afternoon/ Evening
- Days of the week/ Months of the year.
- O'clock
- Half past

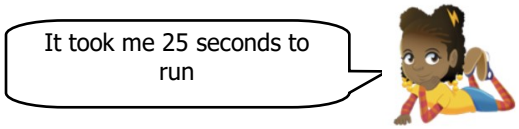
Practical Problems

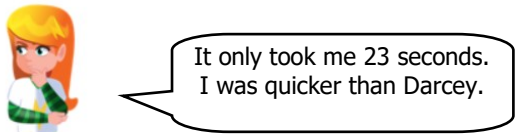
Time is an abstract concept so it is important to see it in real life concepts.

Children can combine measuring and beginning to record the time with comparing and describing practical problems, for example, how long does it take to run across the playground and back again?

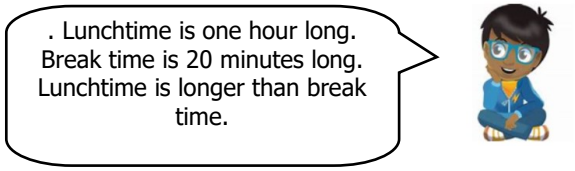
There is an opportunity for different times to be recorded and comparisons to be made.

Name	Time to run
Darcey	25 seconds
Anita	23 seconds



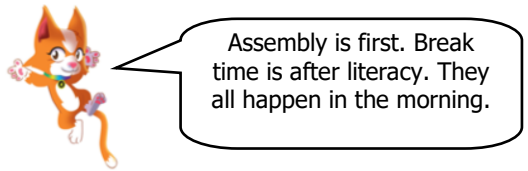


Comparisons can also be made between different activities, for example:



Chronological order

Visual timetables are an excellent way of supporting understanding of chronological order, and supporting the development of time vocabulary



Days of the Week

Ordering vocabulary continues to be used in relation to the days of the week. There should be an understanding that the week is a cycle and even when written in a linear fashion, Sunday is before Monday. Stem sentences support the children's language development:

_____ is after _____.

Today is _____.

Yesterday was _____.

Tomorrow is _____.

Months of the year.

Similarly to the days of the week, months of the year can also incorporate the time language from earlier work. Again, there needs to be an understanding that the end of one year leads to the beginning of a new year.

_____ comes after December.

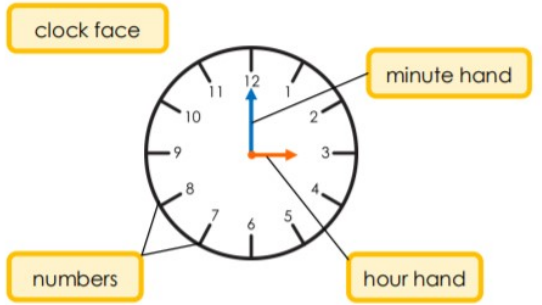
July is after _____ and before _____.

There is an opportunity for cross curricular links to be made to science and the seasons here.

The summer months are _____, _____ and _____.

Clocks

This is the first time children will have been formally introduced to clocks so an understanding of the different parts are necessary.



The children should notice different things about the clock.

Year 1 Mathematics Knowledge Organiser

Time

The numbers go in order around the clock.

The hands move around the clock in the same direction as the numbers.

The minute hand moves quicker than the hour hand.

O'clock

Clocks with moveable hands are needed to be able to manipulate the hands to make o'clock times and understand that the minute hand always points to the 12 when the time is o'clock. The hour hand informs us what number o'clock it is.

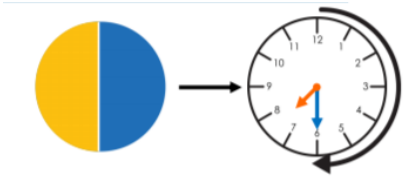
Misconceptions occur when there is uncertainty of which hand is which, for example making quarter past 12 instead of 3 o'clock.

As well as making the time, opportunities should be found to read clocks of a given o'clock time.

It is 7 o'clock!

Half past

When secure on o'clock, half past can be introduced. Links should be made to fraction work and the understanding of half.



It is essential that as well as knowing that the minute hand points to the 6, the hour hand must always be past the hour (half way to the next number) rather than pointing to the number at o'clock. This should also be expected when making the times on clocks.

Position and Direction

Key Concepts

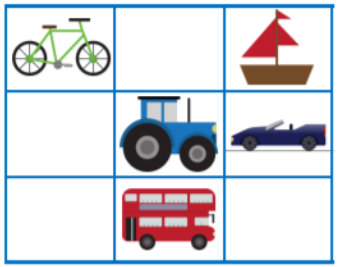
- describe position, direction and movement, including whole, half, quarter and three quarter turns.

Key Vocabulary

- Left/ Right
- Top/ Middle/ Bottom
- Above/ Below/ Under
- On top
- In front of
- Between
- Around
- Near
- Close
- Up/ Down
- Forwards/ Backwards
- Inside/ Outside
- Whole, half, quarter, three quarter turns
- Clockwise/ Anti-clockwise
- Position
- Direction
- Motion

Position

Children need to use language to answer questions and describe positions of objects relative to other things. For example:



The tractor is in the middle. The car is on the right of the tractor

Direction

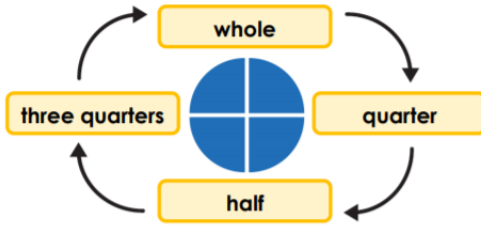
From this language the children can describe how an object will need to move to get to another place. It is important to take note of the direction the object is facing.

The bus needs to move forwards 1 and up 2 to get to there boat.

Movement

Movement describes turns and uses knowledge of time and fractions to support language development and understanding

This can then be used to help describe how something has turned.



Year 1 Mathematics Knowledge Organiser

Shape

Key Concepts

- recognise and name common 2-D and 3-D shapes, including:
- 2-D shapes [for example, rectangles (including squares), circles and triangles]
- 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

Key Vocabulary

- Circle
- Square
- Rectangle
- Triangle
- Cube
- Cuboid
- Pyramid
- Sphere
- Cylinder
- Cone
- 2D shape
- 3D shape

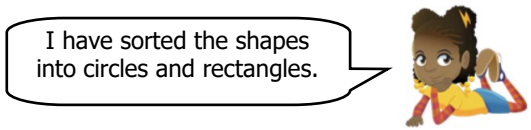
2D Shapes

Recognising 2D shapes is a key part of year 1 shape learning. Exposure to different sizes and orientations is crucial to ensure no misconceptions develop.

For example: Children need to know that each of these are triangles:

And that these shapes are not triangles:

It is not necessary for Year 1 children to describe their properties. However, they should use their knowledge of shapes to sort them in different ways, for example by size or type.

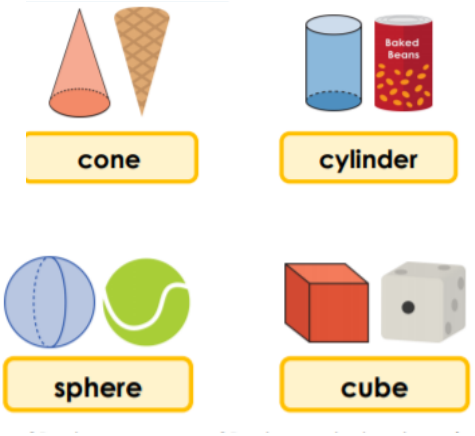


3D Shapes

Again, year 1 shape understanding is based on recognition of 3D shapes. Knowing that a 3D shape can be held, whereas a 2D shape is flat and cannot be picked up will help differentiate between the two types of shapes.

It is important that shapes are held and explored to see how they look in different orientations.

Seeing real life shapes and matching to the shapes seen in a maths lesson is also helpful to reinforce recognition. For example:



Seeing 2D shapes on a 3D shape helps to reinforce the shape names of both types