Maths Calculation Policy
January 2024
Bushmead Primary School

Contents

1. Aims

This policy explains the different calculation methods taught at Bushmead Primary School. In each section of this policy the calculation methods are presented in the order in which they are introduced. It is our expectation that by the end of primary school, each child will be familiar with a range of calculation strategies which they can confidently choose and apply efficiently and accurately.

There is a strong focus on developing the children's mathematical *understanding* through the use of practical resources and pictorial representations. You will also find the common written procedures are developed over time, so as to ensure that the children can not only understand the methods they are using but they can apply them when solving problems and challenges.

Concrete, pictorial, abstract (CPA) concepts should not be confused as adaptive teaching for lower, middle, higher attaining children. CPA is an approach to be used with the whole class and teachers should promote each area as equally valid. Manipulatives in particular must not be presented as a resource to support the less confident or lower attaining pupils.

The abstract should run alongside the concrete and pictorial stage as this enables pupils to better understand mathematical statements and concepts.

2. Legislation and guidance

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The 2014 National Curriculum programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

3. Roles and responsibilities

3.1 The Governors

The governors will:

- Work with the head teacher and Maths Lead to determine the strategic development of the calculation policy and provision in the school.

The Governing Body will review this policy in line with the Policy review schedule at the C&S committee meetings.

3.2 The head teacher

The head teacher will:

- Work with staff, parents and governors to determine the strategic development of the calculation policy and provision in the school.
- Have overall responsibility for the provision and progress of learners with SEND and/or a disability.

3.3 Class teachers and teaching assistants

They will:

- Implement the calculation policy within maths lessons in order to progress learners in their class.
- Work with MSL and SLT to assist with the development of the calculation policy.

4. Maths at Home Activities

Although there is no homework expectation, any support with practical mathematics at home is a valuable way of showcasing mathematics in everyday situations.

4.1 Addition

- Counting with objects at home, such as toys and books
- Counting in twos with pairs of socks, shoes or gloves
- Adding common coins to make different totals
- Adding items to shopping baskets, including counting fruit and vegetables
- Adding measurements of length, volume and mass of objects
- Weighing and measuring for practical applications, such as cooking, planning parties and building construction models

4.2 Subtracting

- Counting backwards when taking away or using objects at home
- Finding the difference between two amounts
- Calculating the change when shopping
- Finding the difference between two measurements, such as heights on a height chart
- Subtracting amounts for practical applications such as cooking or when playing board games

4.3 Multiplication

- Counting in groups, such as counting in 2s with shoes, or counting in 5s with gloves
- Scaling up recipes when cooking or baking for lots of people
- Multiplying for solving real life problems or when playing games, building construction or creating things.

4.4 Division

- Sharing equally with food, games, toys, books etc.
- Scaling down recipes when cooking or baking to make smaller quantities
- Dividing for solving real life problems or when playing games

5. Monitoring arrangements

This policy and information report will be reviewed by the Head teacher **every 3 years**. It will also be updated if any changes to the information are made during the year.
It will be approved by the governing board.

6. Links with other policies and documents

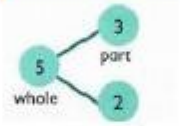
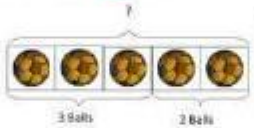
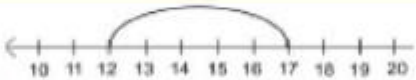
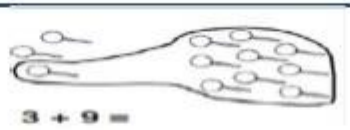
This policy links to our policies on:

- Teaching and Learning and Maths.

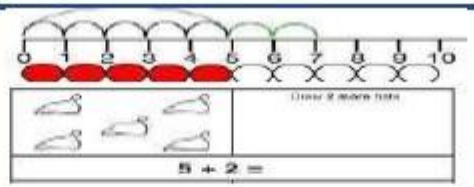
Version:	2	
Written by:	Mark Leonard	**Date:** 24.01.24
Last reviewed by governors:	Spring 2 2024	
Next review due by:	Spring 2 2027	

Appendix 1 -

YEAR 1 Addition

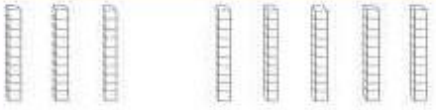
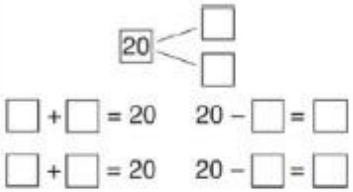
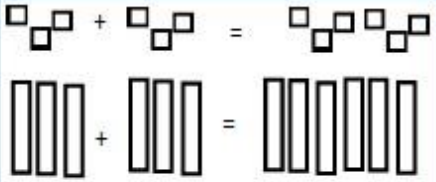
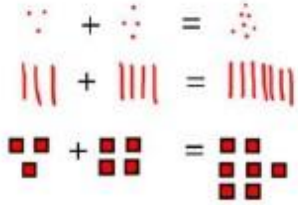
Objective / Strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part- whole model	  Use part, part whole model. Use cubes to add two numbers together as a group or in a bar.  	Use pictures to add two numbers together as a group or in a bar.    	8 = 5 + 3 5 + 3 = 8  Use the part part whole diagram as shown above to move into the abstract. Include missing number questions to support varied fluency: 8 = ? + 3 5 + ? = 8
Starting at the bigger number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	 12 + 5 = 17 Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.
Regrouping to make 10. *This is an essential skill for column addition later.*	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10. Use ten frames.	 Use pictures or a number line. Regroup or partition the smaller number using the part, part whole model to make 10. 	7 + 4= 11 If I am at seven, how many more do I need to make 10? How many more do I add on now?

Appendix 1 -

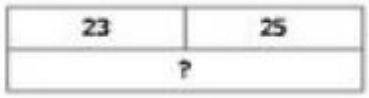
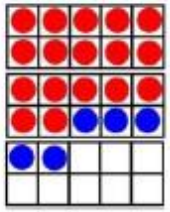
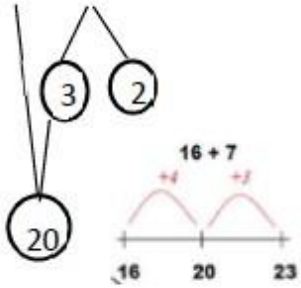
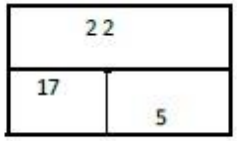
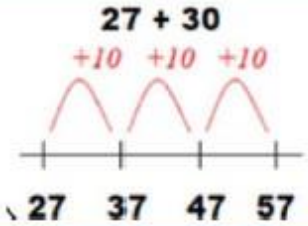
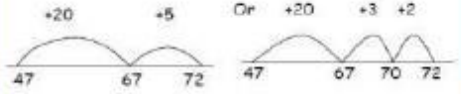
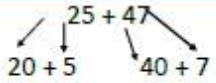
Represent & use number bonds and related subtraction facts within 20	 2 more than 5.		Include missing number questions: 8 = ? + 3 5 + ? = 8 Emphasis should be on the language *'1 more than 5 is equal to 6.'* *'2 more than 5 is 7.'* *'8 is 3 more than 5.'*

Appendix 1 -

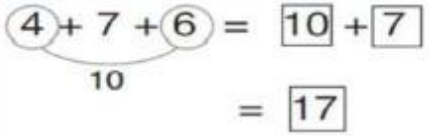
YEAR 2 Addition

Objective /Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten	50= 30 = 20  Model using dienes and bead strings	 3 tens + 5 tens = _____ tens 30 + 50 = _____ Use representations for base ten.	20 + 30 = 50 70 = 50 + 20 40 + □ = 60
Use known number facts Part, part whole	 Children explore ways of making numbers within 20	 20 □ + □ = 20 20 − □ = □ □ + □ = 20 20 − □ = □	Explore commutativity of addition by swapping the addends to build a fact family. Explore the concept of the inverse relationship of addition and subtractions and use this to check calculations. □ + 1 = 16 16 − 1 = □ 1 + □ = 16 16 − □ = 1
Using known facts		 Children draw representations of H,T and O	3 + 4 = 7 *leads to* 30 + 40 = 70 *leads to* 300 + 400 = 700

Appendix 1 -

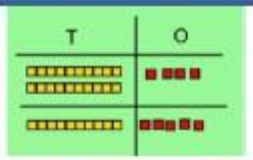
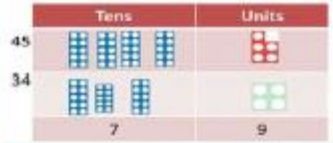
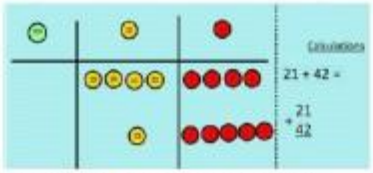
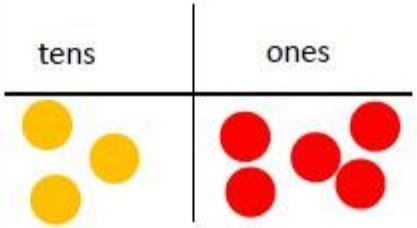
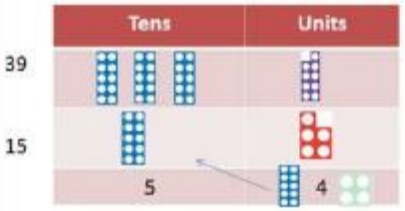
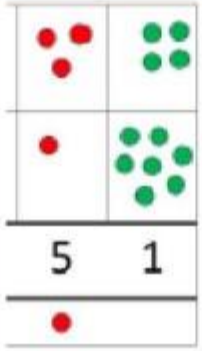
Bar model	 3 + 4 = 7	 7 + 3 = 10	 23 + 25 = 48
Add a two digit number and ones	 17 + 5 = 22 Use ten frame to make 'magic ten Children explore the pattern. 17 + 5 = 22 27 + 5 = 32	17 + 5 = 22 Use part part whole and number line to model.  	17 + 5 = 22 Explore related facts 17 + 5 = 22 5 + 17 = 22 22—17 = 5 22—5 = 17  Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.
Add a 2 digit number and tens	 25 + 10 = 35 Explore that the ones digit does not change	 	27 + 10 = 37 27 + 20 = 47 27 + □ = 57
Add two 2-digit numbers	 Model using dienes , place value counters and numicon	 Use number line and bridge ten using part whole if necessary.	 20 + 40 = 60 5+ 7 =12 60 + 12 = 72

Appendix 1 -

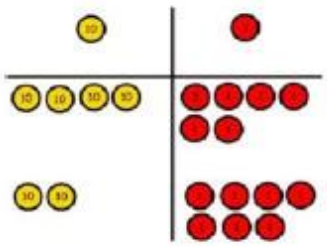
			Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.
Add three 1-digit numbers	 Combine to make 10 first if possible, or bridge 1o then add third digit	 Regroup and draw representation  = 15	 Combine the two numbers that make/ bridge ten then add on the third.

Appendix 1 -

YEAR 3 Addition

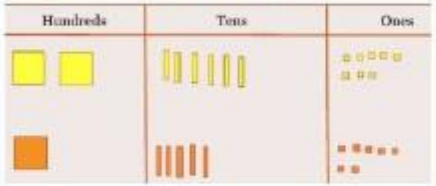
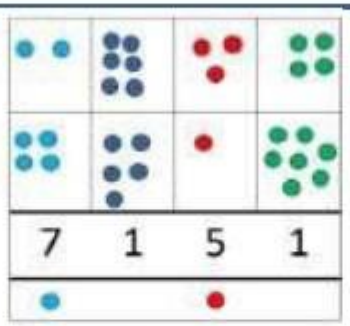
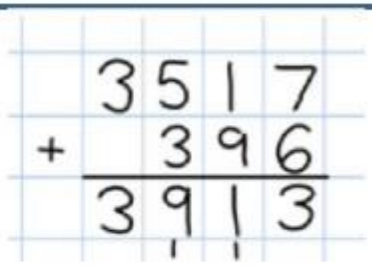
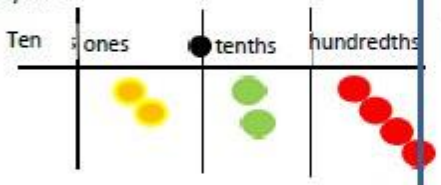
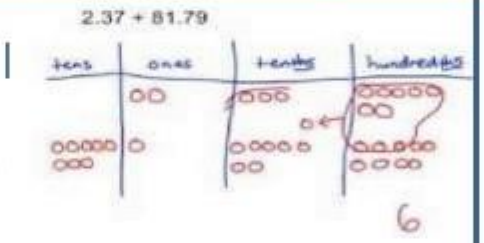
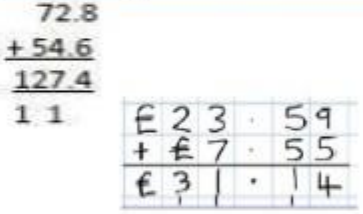
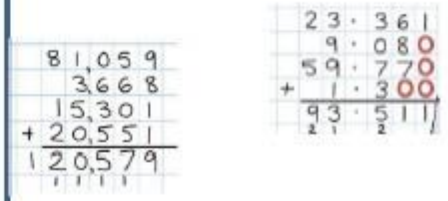
Objective /Strategy	Concrete	Pictorial	Abstract
Column Addition—no regrouping (friendly numbers) Add two or three 2 or 3digit numbers.	 Dienes or numicon Add together the ones first, then the tens.   Move to using place value counters	Children move to drawing the counters using a tens and one frame. 	2 2 3 + 1 1 4 3 3 7 Add the ones first, then the tens, then the hundreds.
Column Addition with regrouping.	 Exchange ten ones for a ten. Model using numicon and place value counters.	 3 4 +1 7 Children can draw a representation of the grid to further support their understanding, carrying the ten underneath the line	20 + 5 40 + 8 60 + 13 = 73 Start by partitioning the numbers before formal column to show the exchange. 536 + 85 621 1 1

Appendix 1 -

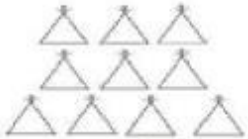
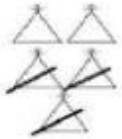
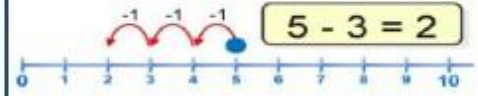
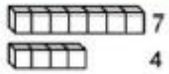
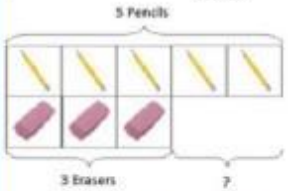
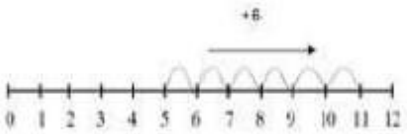
	 46 + 27 = 73		
Estimate the answers to questions and use inverse operations to check answers	 Estimating 98 + 17 = ? 100 + 20 = 120	Use number lines to illustrate estimation. 	Building up known facts and using them to illustrate the inverse and to check answers: 98 + 18 = 116 116 – 18 = 98 18 + 98 = 116 116 – 98 = 18

Appendix 1 -

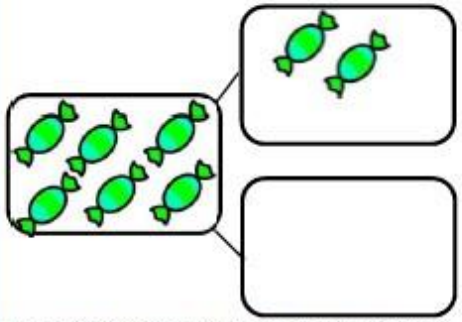
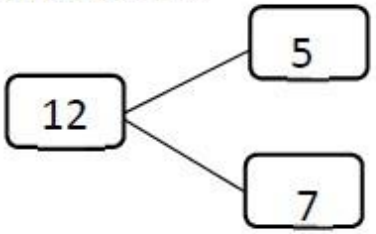
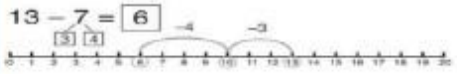
YEARS 4 – 6 Addition

Objective /Strategy	Concrete	Pictorial	Abstract
Years 4 – 6 Estimate and use inverse operations to check answers to a calculation	**AS per Year 3**		
Y4—add numbers with up to 4 digits	Children continue to use dienes or place value counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand. 	 Draw representations using place value grid.	 Continue from previous work to carry hundreds as well as tens. Relate to money and measures.
Y5—add numbers with more than 4 digits. Add decimals with 2 decimal places, including money.	As year 4  Introduce decimal place value counters and model exchange for addition.		
Y6—add several numbers of increasing complexity, including adding money, measure and decimals with different numbers of decimal points.	As Y5	As Y5	Insert zeros for place holders. 	

Appendix 2 -

YEAR 1 SUBTRACTION			
Objective /Strategy	**Concrete**	**Pictorial**	**Abstract**
Taking away ones.	Use physical objects, counters, cubes etc to show how objects can be taken away. 4—2 = 2   6—4 = 2	Cross out drawn objects to show what has been taken away.   15 – 3 = 12	7—4 = 3 16—9 = 7
Counting back	  Move objects away from the group, counting backwards.  Move the beads along the bead string as you count backwards.	 Count back in ones using a number line.	Put 13 in your head, count back 4. What number are you at?
Find the Difference	Compare objects and amounts  'Seven is 3 more than four' 'I am 2 years older than my sister'  Lay objects to represent bar model.	Count on using a number line to find the difference.  	Hannah has12 sweets and her sister has 5. How many more does Hannah have than her sister.?

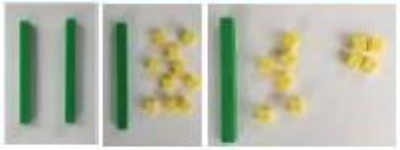
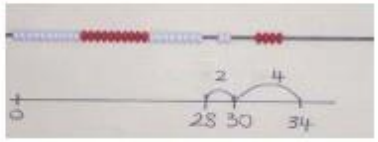
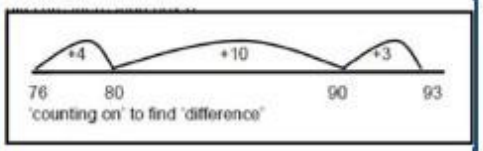
Appendix 2 -

Objective/Strategy	Concrete	Pictorial	Abstract
Represent and use number bonds and related subtraction facts within 20 **Include subtracting zero** Part Part Whole model	 Link to addition. Use PPW model to model the inverse. If 10 is the whole and 6 is one of the arts, what s the other part? 10—6 = 4	 Use pictorial representations to show the part.	Move to using numbers within the part whole model.  Include missing number problems: 12 - ? = 5 7 = 12 - ?
Make 10	14—9  Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.	 13—7 Jump back 3 first, then another 4. Use ten as the stopping point.	16—8 How many do we take off first to get to 10? How many left to take off?

Appendix 2 -

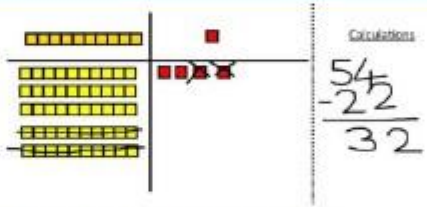
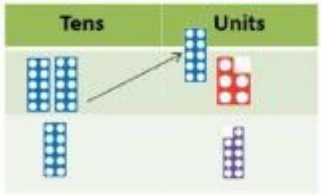
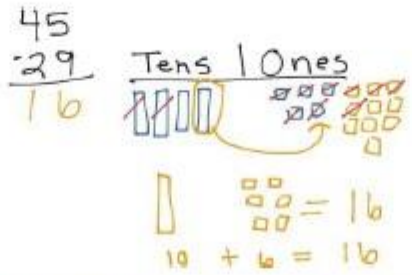
Bar model Including the inverse operations.	 5—2 = 3		 10 = 8 + 2 10 = 2 + 8 10—2 = 8 10—8 = 2

Appendix 2 -

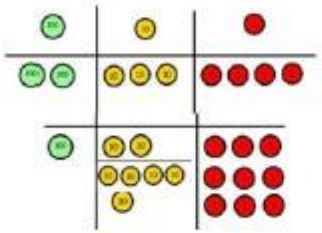
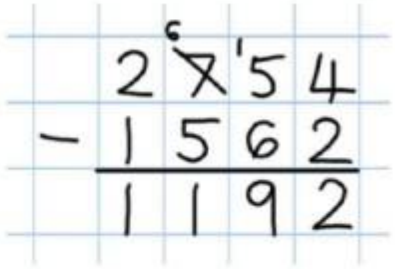
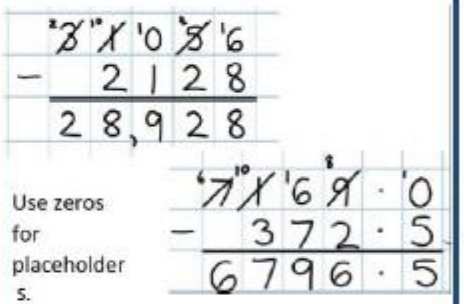
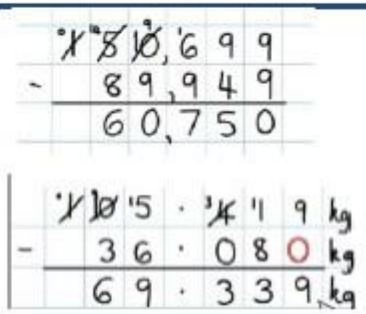
YEAR 2 - SUBTRACTION			
Objective & Strategy	**Concrete**	**Pictorial**	**Abstract**
Regroup a ten into ten ones	 Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'	 20 — 4 =	20—4 = 16
Partitioning to subtract without regrouping. *'Friendly numbers'*	34—13 = 21  Use Dienes to show how to partition the number when subtracting without regrouping.	Children draw representations of Dienes and cross off.  43—21 = 22	43—21 = 22
Make ten strategy *Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.*	 34—28 Use a bead bar or bead strings to model counting to next ten and the rest.	 Use a number line to count on to next ten and then the rest.	93—76 = 17

Appendix 2 -

YEAR 3 - SUBTRACTION

Objective/ Strategy	Concrete	Pictorial	Abstract
Subtract numbers mentally, including: three digit number + ones three digit number + tens three digit number + hundreds			Vary the position of the answer and question. Expose children to missing number questions and vary the missing part of the calculation. 678 = ? - 1 688 – 10 = ? 678 = ? – 100
Column subtraction without regrouping (friendly numbers)	  Use base 10 or Numicon to model	 Draw representations to support understanding	47 – 24 = 23 40 + 7 – 20 + 4 20 + 3 Intermediate step may be needed to lead to clear subtraction understanding. 
Column subtraction with regrouping	 Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.	 Children may draw base ten or PV counters and cross off.	 Begin by partitioning into pv columns  Then move to formal method.

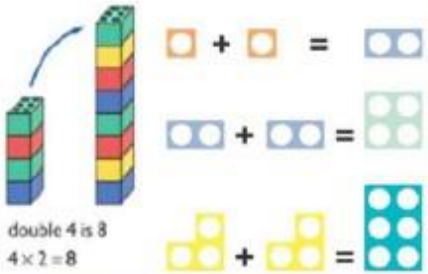
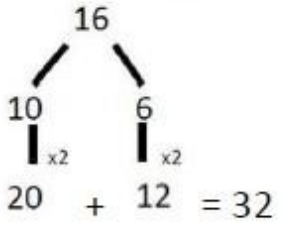
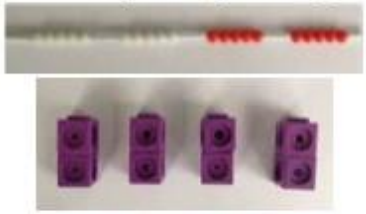
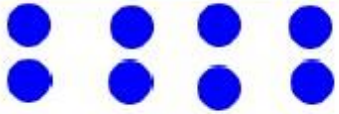
Appendix 2 -

YEARS 4 – 6 SUBTRACTION			
Objective /Strategy	**Concrete**	**Pictorial**	**Abstract**
Subtracting tens and ones Year 4 subtract with up to 4 digits. *Introduce decimal subtraction through context of money*	234 - 179  Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw pv counters and show their exchange—see Y3	 Use the phrase 'take and make' for exchange
Year 5- Subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal Up to 3 decimal places*	As Year 4	Children to draw pv counters and show their exchange—see Y3	 Use zeros for placeholders.
Year 6—Subtract with increasingly large and more complex numbers and decimal values (up to 3 decimal place).	As Year 4	Children to draw pv counters and show their exchange—see Y3	

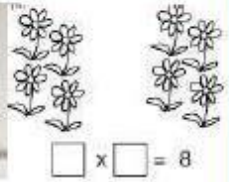
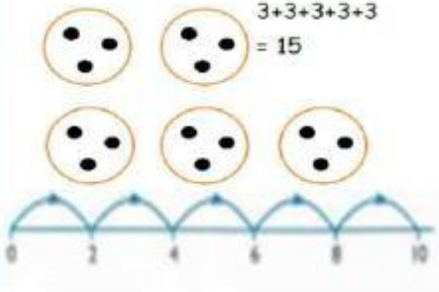
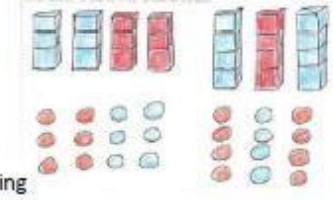
Appendix 3 -

YEAR 1 MULTIPLICATION

Programme of Study specifies the following objectives, however it does not require the explicit teaching of the mathematical symbol of multiplication

Objective / Strategy	Concrete	Pictorial	Abstract
Doubling	Use practical activities using manipultives including cubes and Numicon to demonstrate doubling 	Draw pictures to show how to double numbers 	Partition a number and then double each part before recombining it back together. 
Counting in multiples (2s, 5s, 10s)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. 	 Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

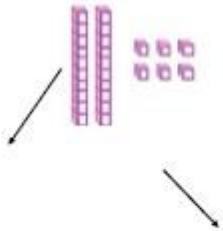
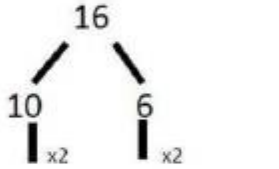
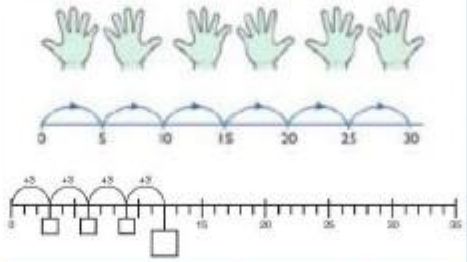
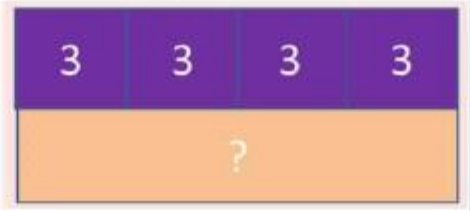
Appendix 3 -

Making equal groups and counting the total	  Use manipulatives to create equal groups.	Draw  to show 2 x 3 = 6 Draw and make representations	2 x 4 = 8
Repeated addition	   Use different objects to add equal groups	Use pictorial including number lines to solve prob There are 3 sweets in one bag. How many sweets are in 5 bags altogether? 	Write addition sentences to describe objects and pictures. 
Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show understanding 	3 x 2 = 6 2 x 5 = 10

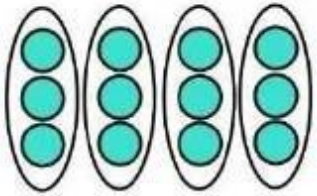
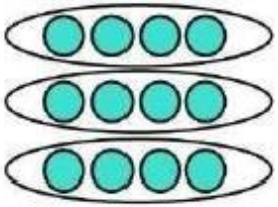
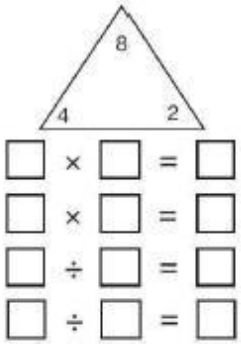
Appendix 3 -

YEAR 2 MULTIPLICATION

Children should be able to recall and use multiplication and division facts for the 2, 5 and 10 times times tables.

Objective / Strategy	Concrete	Pictorial	Abstract
Doubling	Model doubling using dienes and PV counters.  40 + 12 = 52	Draw pictures and representations to show how to double numbers	Partition a number and then double each part before recombining it back together. 
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.  5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40  	Number lines, counting sticks and bar models should be used to show representation of counting in multiples.   	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25 , 30 $4 \times 3 = \square$

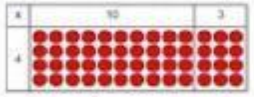
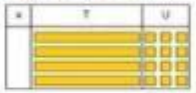
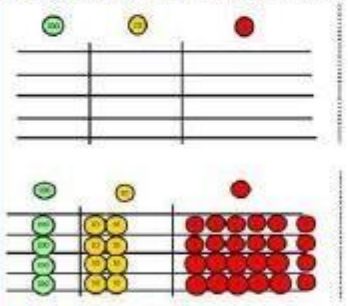
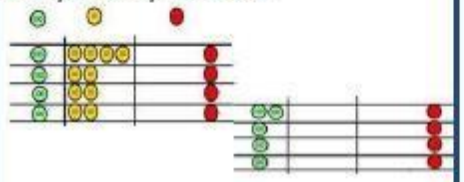
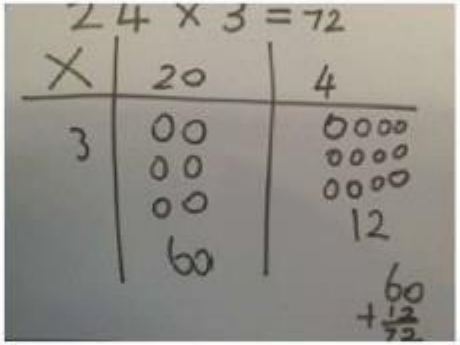
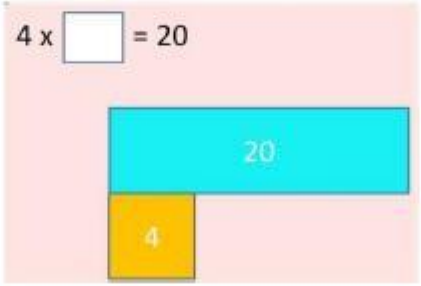
Appendix 3 -

Objective / Strategy	Concrete	Pictorial	Abstract
Multiplication is commutative	Create arrays using counters and cubes and Numicon.    Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. 	Use representations of arrays to show different calculations and explore commutativity.  	12 = 3 × 4 12 = 4 × 3 Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15
Using the Inverse *This should be taught alongside division, so pupils learn how they work alongside each other.*			2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2 Show all 8 related fact family sentences.

Appendix 3 -

YEAR 3 MULTIPLICATION

Children should be able to recall and use multiplication facts for the 3,4, and 8 times tables

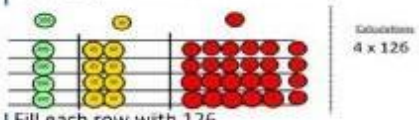
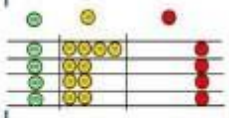
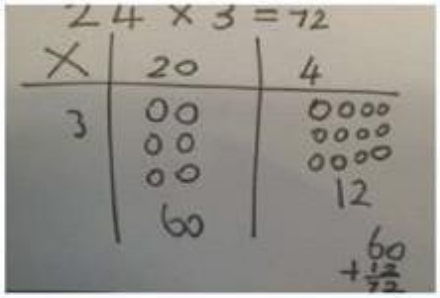
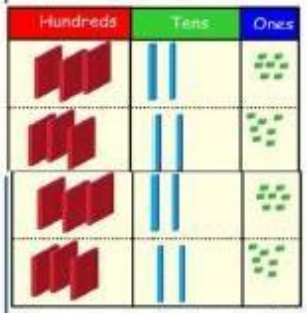
Objective /Strategy	Concrete	Pictorial	Abstract
Grid method, progressing to the formal method Multiply 2 digit numbers by 1 digit numbers	Show the links with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move onto base ten to move towards a more compact method.  4 rows of 13 Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows  Fill each row with 126. Add up each column, starting with the ones making any exchanges needed Then you have your answer. 	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.  Bar model are used to explore missing numbers  4 x ☐ = 20 20 4	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | × | 30 | 5 | | 7 | 210 | 35 | 210 + 35 = 245 Move forward to the formal written method: 35 X 7 245 3

Appendix 3 -

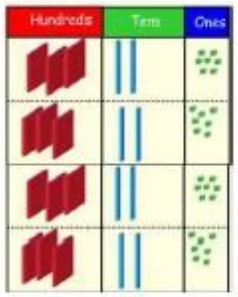
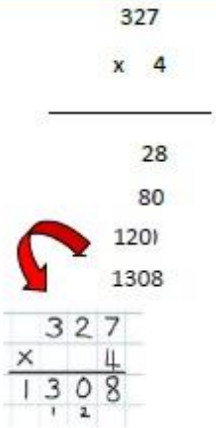
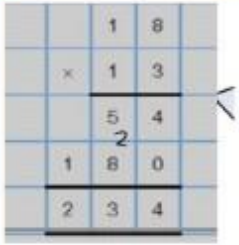
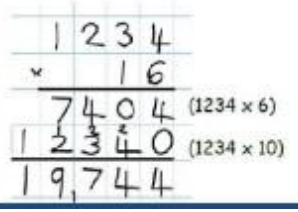
Solve problems, including missing number problems, integer scaling problems,			Three times as high, eight times as long ? x 5 = 20 20 ÷ ? = 5 3 hats and 4 coats, how many different outfits?

Appendix 3 -

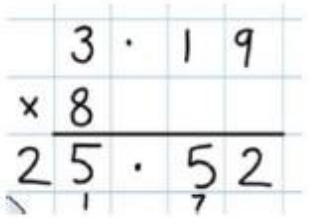
YEARS 4 – 6 Multiplication

Objective /Strategy	Concrete	Pictorial	Abstract
Grid method recap from year 3 for 2 digits x 1 digit Move to multiplying 3 digit numbers by 1 digit. (year 4 expectation)	Use place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows  Calculation: 4 x 126 Fill each row with 126   Add up each column making any exchanges needed	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | x | 30 | 5 | | 7 | 210 | 35 | 210 + 35 = 245
Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642  It is important at this stage that they always multiply the ones first. The corresponding long multiplication is modelled alongside	| x | 300 | 20 | 7 | | 4 | 1200 | 80 | 28 | The grid method my be used to show how this relates to a formal written method.  Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	327 x 4 28 80 1200 1308 3 2 7 x 4 1 3 0 8 1 2 This may lead to a compact method.

Appendix 3 -

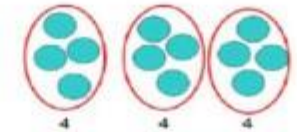
Objective /Strategy	Concrete	Pictorial	Abstract
Column Multiplication for 3 and 4 digits x 1 digit.	 It is important at this stage that they always Multiply the ones first. Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642		
Column multiplication	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	 Continue to use bar modelling to support problem solving	 18 x 3 on the first row (8 x 3 =24, carrying the 2 for 20, then 1 x 3) 18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first 

Appendix 3 -

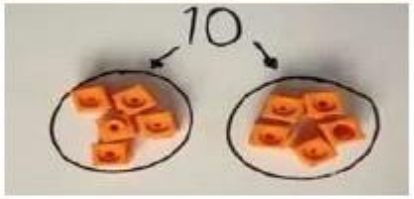
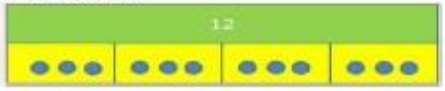
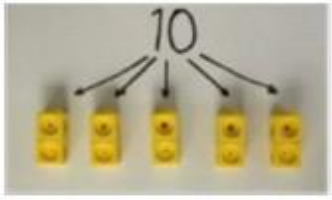
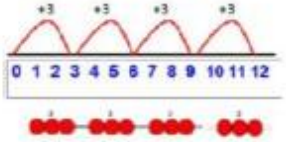
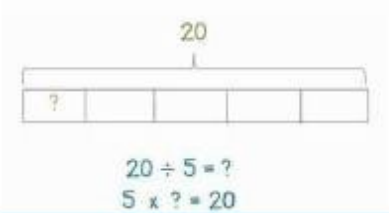
Objective/Strategy	Concrete	Pictorial	Abstract
Multiplying decimals up to 2 decimal places by a single digit.			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 

Appendix 4 -

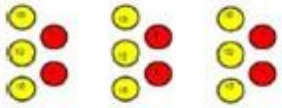
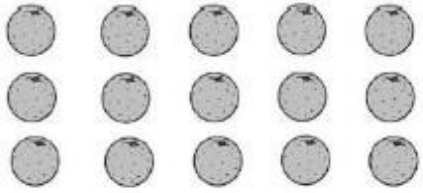
YEAR 1			
Objective /Strategy	**Concrete**	**Pictorial**	**Abstract**

Objective/ Strategy	Concrete	Pictorial	Abstract
Division as sharing *Use Gordon ITPs for modelling*	I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 shared between 2 is4 Sharing:  4 4 4 12 shared between 3 is 4	12: hared between 3 is 4

Appendix 4 -

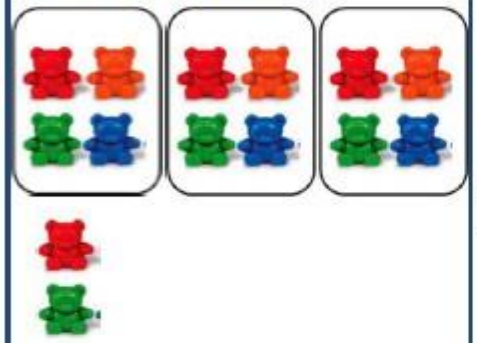
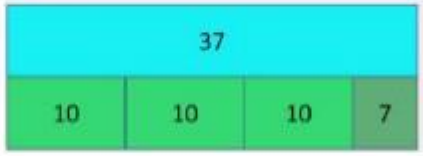
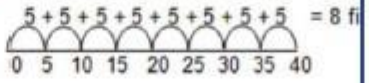
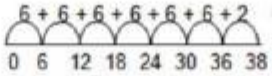
Objective/Strategy	Concrete	Pictorial	Abstract
Division as sharing	 I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  Children use bar modelling to show and support understanding.  12 ÷ 4 = 3	12 ÷ 3 = 4
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  	Use number lines for grouping  12 ÷ 3 = 4 Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. 	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

Appendix 4 -

YEAR 2			
Objective/Strategy	**Concrete**	**Pictorial**	**Abstract**
Division as grouping	Use cubes, counters, objects or place value counters to aid understanding.  24 divided into groups of 6 = 4 96 ÷ 3 = 32 	Continue to use bar modelling to aid solving division problems.  20 ÷ 5 = ? 5 x ? = 20	How many groups of 6 in 24? 24 ÷ 6 = 4
Division with arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Draw an array and use lines to split the array into groups to make multiplication and division sentences 	Find the inverse of multiplication and division sentences by creating eight linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4

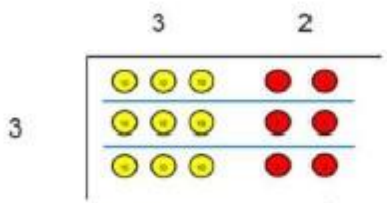
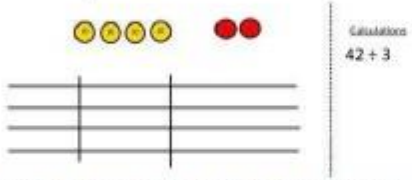
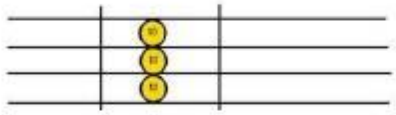
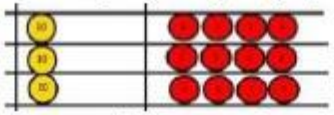
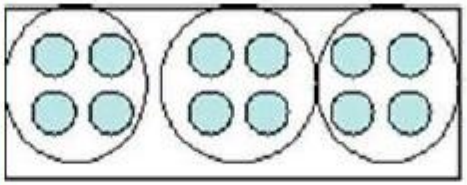
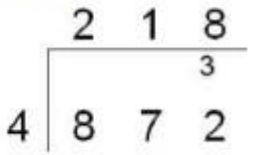
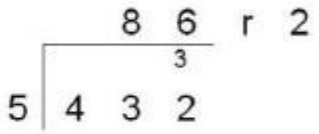
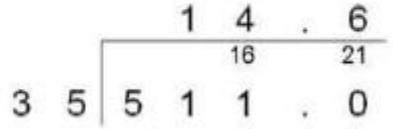
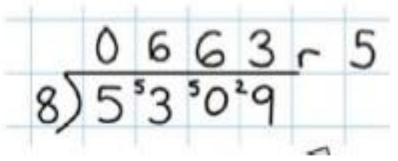
Appendix 4 -

YEAR 3 (Greater Depth Y2)

Objective/Strategy	Concrete	Pictorial	Abstract
Division with remainders.	14 ÷ 3 = Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder.  Use bar models to show division with remainders.  remainder: 5s in 40?"  = 8 fi mainder:  = 6 sixes with rs, when it becomes inefficient to count in single mu orded using known facts.	Complete written divisions and show the remainder using r. 29 ÷ 8 = 3 REMAINDER 5 ↑ dividend ↑ divisor ↑ quotient ↑ remainder

Appendix 4 -

Year 4-6

Objective/Strategy	Concrete	Pictorial	Abstract
Divide at least 3 digit numbers by 1 digit. Short Division	96 ÷ 3 Tens Units 3 2 3   Use place value counters to divide using the bus stop method alongside 42 ÷ 3= Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.   We exchange this ten for ten ones and then share the ones equally among the groups.  We look how much in 1 group so the answer is 14.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.  Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder.  Move onto divisions with a remainder.  Finally move into decimal places to divide the total accurately.  

Appendix 4 -

Long Division

Step 1—a remainder in the ones

```
    h t o
    0 4 1 R1
  ---------
4 ) 1 6 5
```

4 does not go into 1 (hundred). So combine the 1 hundred with the 6 tens (160).

4 goes into 16 four times.

4 goes into 5 once, leaving a remainder of 1.

```
      th h t o
      0 4 0 0 R7
    -----------
8 ) 3 2 0 7
```

8 does not go into 3 of the thousands. So combine the 3 thousands with the 2 hundreds (3,200).

8 goes into 32 four times (3,200 ÷ 8 = 400)
8 goes into 0 zero times (tens).
8 goes into 7 zero times, and leaves a remainder of 7.

Appendix 4 -

Long Division

Step 1 continued...

```
    h t o
    0 6 1
  ---------
4 ) 2 4 7
    - 4
    -----
      3
```

When dividing the ones, 4 goes into 7 one time. Multiply 1 × 4 = 4, write that four under the 7, and subract. This finds us the remainder of 3.

Check: 4 × 61 + 3 = 247

```
    th h t o
     0 4 0 2
  -----------
4 ) 1 6 0 9
      - 8
      -----
        1
```

When dividing the ones, 4 goes into 9 two times. Multiply 2 × 4 = 8, write that eight under the 9, and subract. This finds us the remainder of 1.

Check: 4 × 402 + 1 = 1,609

Appendix 4 - Division

Long Division

Step 2—a remainder in the tens

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
t o 2 2)5 8	t o 2 2)5 8 -4 1	t o 2 9 2)5 8 -4 ↓ 1 8
Two goes into 5 two times, or 5 tens ÷ 2 = 2 whole tens -- but there is a remainder!	To find it, multiply 2 × 2 = 4, write that 4 under the five, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the leftover 1 ten. You combine the remainder ten with 8 ones, and get 18.

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
t o 2 9 2)5 8 -4 1 8	t o 2 9 2)5 8 -4 1 8 -1 8 0	t o 2 9 2)5 8 -4 1 8 -1 8 0
Divide 2 into 18. Place 9 into the quotient.	Multiply 9 × 2 = 18, write that 18 under the 18, and subtract.	The division is over since there are no more digits in the dividend. The quotient is 29.

Appendix 4 - Division

Long Division

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o 1 2)2 7 8	h t o 1 2)2 7 8 -2 0	h t o 1 8 2)2 7 8 -2 ↓ 0 7
Two goes into 2 one time, or 2 hundreds ÷ 2 = 1 hundred.	Multiply 1 × 2 = 2, write that 2 under the two, and subtract to find the remainder of zero.	Next, drop down the 7 of the tens next to the zero.
Divide.	**Multiply & subtract.**	**Drop down the next digit.**
h t o 1 3 2)2 7 8 -2 0 7	h t o 1 3 2)2 7 8 -2 0 7 - 6 1	h t o 1 3 2)2 7 8 -2 0 7 - 6 1 8
Divide 2 into 7. Place 3 into the quotient.	Multiply 3 × 2 = 6, write that 6 under the 7, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the 1 leftover ten.
1. Divide.	**2. Multiply & subtract.**	**3. Drop down the next digit.**
h t o 1 3 9 2)2 7 8 -2 0 7 - 6 1 8	h t o 1 3 9 2)2 7 8 -2 0 7 - 6 1 8 -1 8 0	h t o 1 3 9 2)2 7 8 -2 0 7 - 6 1 8 -1 8 0
Divide 2 into 18. Place 9 into the quotient.	Multiply 9 × 2 = 18, write that 18 under the 18, and subtract to find the remainder of zero.	There are no more digits to drop down. The quotient is 139.

Step 2—a remainder in any of the place values

Primary Maths Dictionary

Why is this resource important?

As a parent, you will know that getting involved with your children's education can be really beneficial to their learning, but sometimes this is easier said than done.

It can be particularly hard as parents to know how to help support your children with maths, especially when you don't even know what some of the words they now use at school mean.

Questions like "what is tessellation?" "how do I draw a bar model" or "where do I find the radius of a shape?" can stump any of us. Googling the answer is one option, but as maths teachers, we know the importance of using correct terminology and definitions in maths that are specifically aimed at Primary School children.

That's why we have created this Primary Maths Dictionary For Children and Parents. So that you no longer have to sift through the various definitions of maths terms that Google delivers, and instead be reassured that you are getting terminology and definitions that are aligned to the UK National Curriculum.

< and >

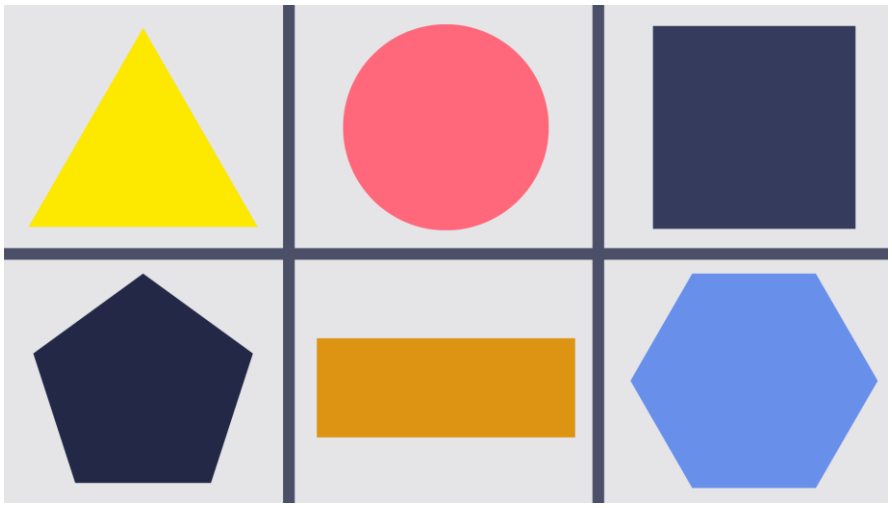
< and > are symbols representing one number being 'greater than' or 'less than' another.
For example 16 > 8 or 8 < 16 says that 16 is greater than 8 and 8 is less than 16.

12-hour and 24-hour clock

The 12-hour clock goes from 1 am in the morning to 12 noon and from 1 pm in the afternoon to 12 midnight. This is known as 'analogue' time.
The 24-hour clock goes from 00:00 (midnight) to 23:59 (one minute to midnight). This is known as 'digital' time.

2D shapes

A 2D shape is any flat or 'two-dimensional' shape, such as a square, circle or triangle.

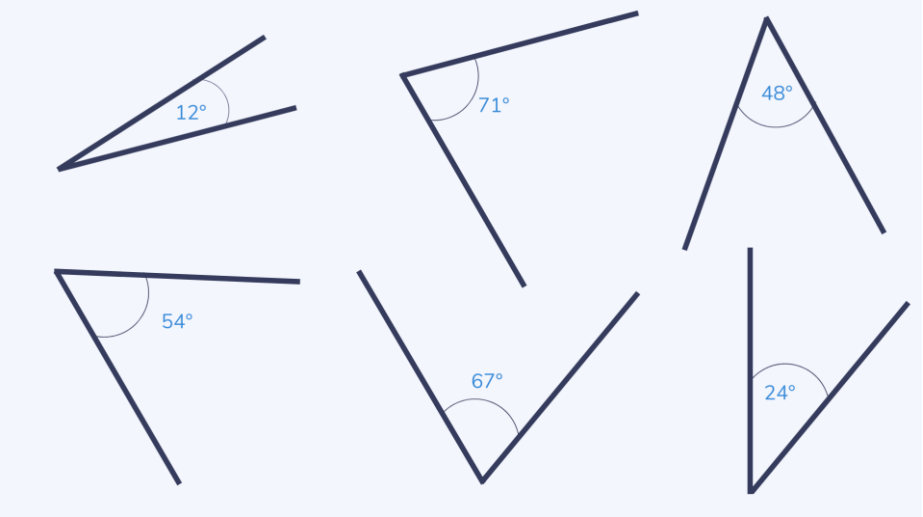


3D shapes

A 3D shape is 'three-dimensional' and has volume, for an example a cube (cardboard box), pyramid or cylinder (tube).

acute angle

An acute angle is any angle less than 90°.



algebra

In algebra, letters and symbols are used to represent numbers in equations or formulae. For example, if w = 3, what is 6w + 7?

analogue and digital clocks

An analogue clock is a clock with the numbers 1 to 12 around the outside and two hands, one short hand that represents hours and one long hand that represents minutes.
A digital clock uses 24-hour time and always has four digits.
For example, 15:30 is half-past three in the afternoon on a digital clock.

area

The area of a shape, surface, piece of land etc. means the amount of space it takes up. For example, a rectangular football field has an area of 64m² or 64 squared metres.

array

An array is a pictorial representation of a calculation, using rows of dots, to help children understand multiplication and times tables.

arrow cards

Arrow cards are a maths tool useful for explaining place value and how to partition numbers (separate them into ones, tens, hundreds etc).

ascending order

To ascend means to go up, so numbers given in ascending order are going from smallest to largest.
For example, 1, 2, 3, 4, 5, 6 are numbers in ascending order.

associative property

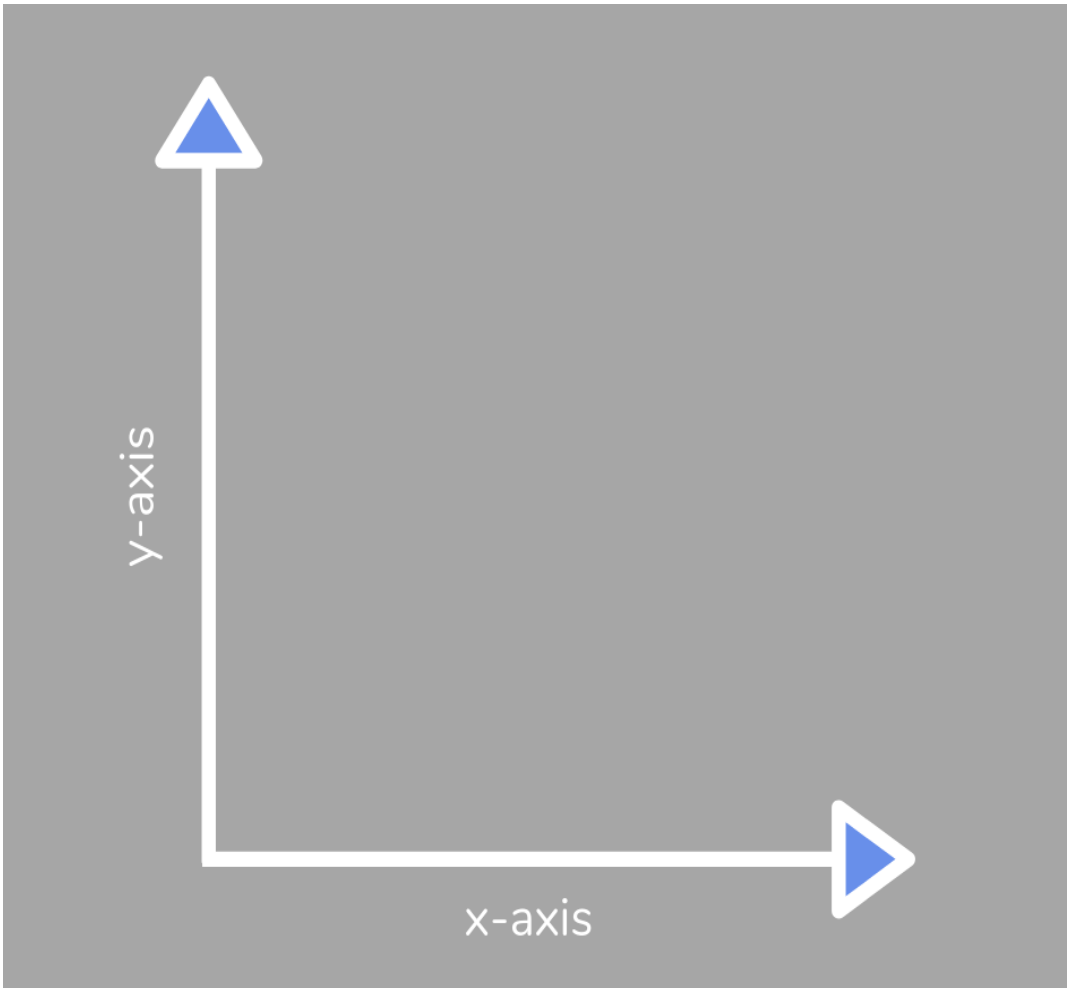
The associative property says that when we add or multiply numbers, it doesn't matter how we group them (which we calculate first).
For example, (7 + 5) + 3 = 7 + (5 + 3) or (4 x 5) x 2 = 4 x (5 x 2)

average

The average of a set of numbers is found by adding all the numbers together and dividing by how many numbers there are.
For example, the average of 12, 10, 8 and 6 is 9 because (12 + 10 + 8 + 6 = 36 ÷ 4).

axes

The axes of a graph or chart are the horizontal and vertical lines that create it, often known as the x-axis and y-axis.


y-axis
x-axis

bar chart

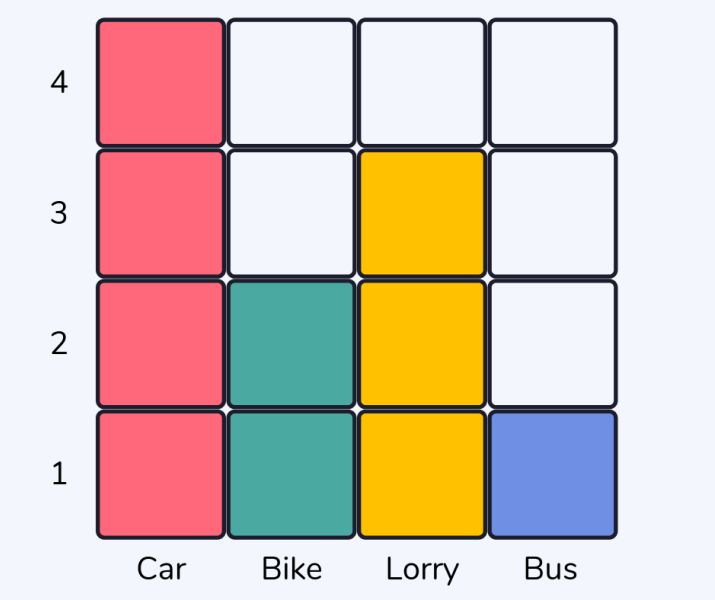
A bar chart is a form of graph that displays information using rectangular bars of different heights, according to their numerical value.

bar model

A bar model is a method that uses diagrams of rectangular bars to represent maths problems in a visual way, making them easier for children to see which operation to use to work out a calculation. Younger children may use cubes to physically represent this.

block graph

A block graph is a simpler version of a bar chart, but using blocks to represent the data, with each block worth 1 unit.



BIDMAS

BIDMAS is a rule for the order to work out calculations with mixed operations. It stands for Brackets, Indices, Division, Multiplication, Addition, Subtraction and is sometimes seen as BODMAS (Brackets, Orders, Division, Multiplication, Addition, Subtraction).

bridging through 10

Bridging through 10 is a way of adding numbers greater than 10 in your head.
For example, to add 8 + 7, you add 2 (from the 7) to get 10, then add the remaining 5 to get 15.

bus stop method

The 'bus stop' method or short division is a way of dividing numbers with two or more digits by one or two digit numbers.

capacity

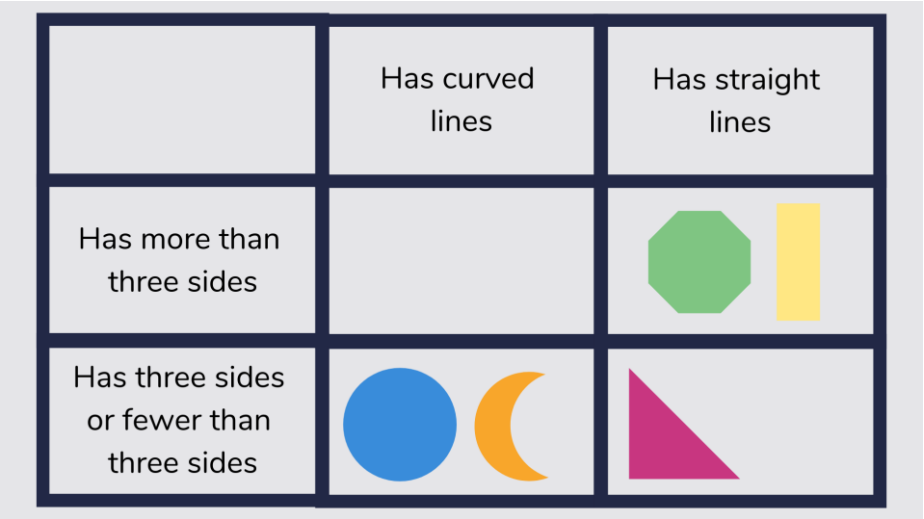
The capacity of a container is how much that container can hold, measured using units such as litres, millilitres, pints etc.

cardinal numbers

A cardinal number tells you how many of something there are; they refer to a set of objects. For example, there are three marbles in my hand. This is in contrast to an ordinal number which tells you the position of something in a list, for example first, second, third.

carroll diagram

A Carroll diagram is a way of organising information and grouping according to what criteria it fits into.



circle

A circle is a simple curved 2D shape, with 1 edge, no corners and infinite lines of symmetry.

circumference

The circumference is the length around the edge of a circle.

clockwise and anti-clockwise

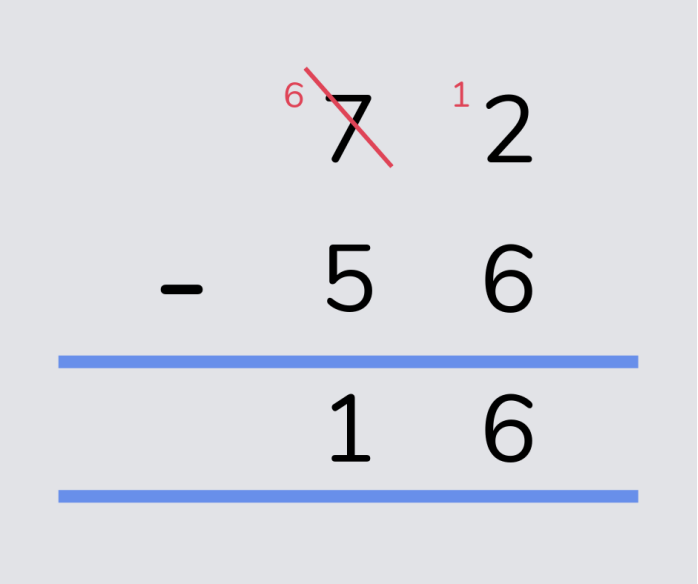
To move in a clockwise direction means moving in the same direction as the hands on a clock. If something moves in the opposite direction to the hands of a clock, it is moving in an anticlockwise direction.

coordinates

The coordinates of a shape or object refer to where on a map or graph they are, by looking at the two axes and recording the numbers they are at. These can be taught with the phrase "along the corridor and up/ down the stairs" to refer to looking at the x-axis first then looking at the y-axis.

column method

The column method is way to solve addition and subtraction calculations, that sometimes involve 'exchanging' amounts from one column to the next (which in the past has been called 'carrying' and 'borrowing'). The numbers are written on top of each other, with the correct digits in each column (e.g. hundreds, tens, ones).

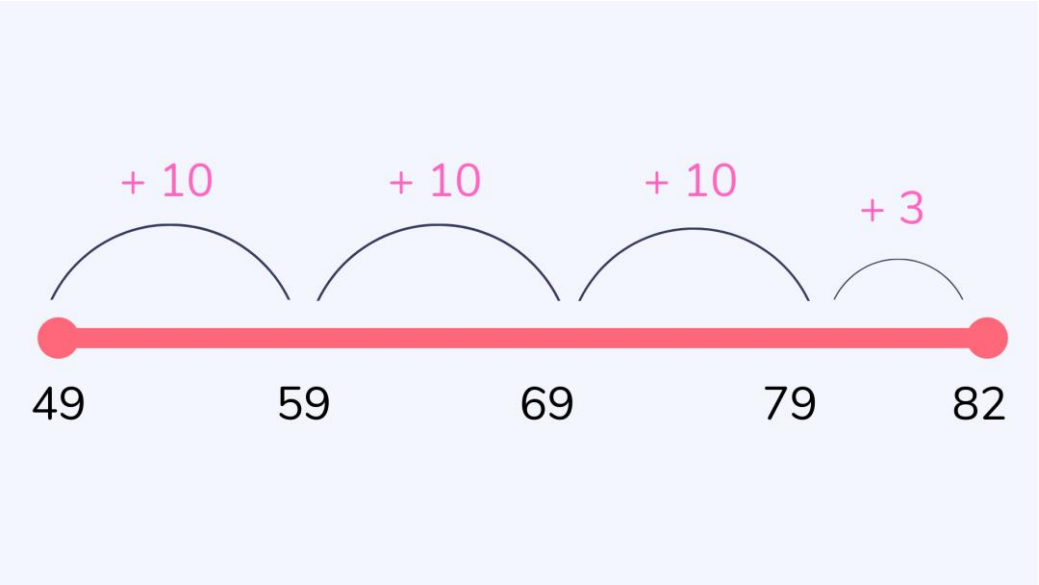


commutative property

The commutative property states that addition and multiplication calculations can be carried out with the numbers in any order, whereas for subtraction and division, the numbers must be in a particular order.
For example, 8 x 9 = 72 or 9 x 8 = 72

complementary addition

Complementary addition is a method for subtraction that involves using a number line to jump from the smaller number to the bigger number and counting the number of jumps. This method is useful in KS1 for teaching children to 'find the difference' between two numbers.



concrete, Pictorial, Abstract approach (CPA)

The concrete, pictorial, abstract approach is a way of teaching mathematical concepts and theories in vari- ous stages, in order to help children fully understand and master what they are learning.
The concrete stage involves using items, models and objects, giving children a chance to be 'hands-on'. For example, children may solve a problem adding groups of toys together using real toys.
The pictorial stage uses visual representations of concrete objects to model problems, encouraging children to make connections between the physical object and the picture that represents the object.
For example, children may use drawing of toys to solve a problem adding toys.

converting into same units

When you convert measurements into the same units, you understand that the same length, weight or

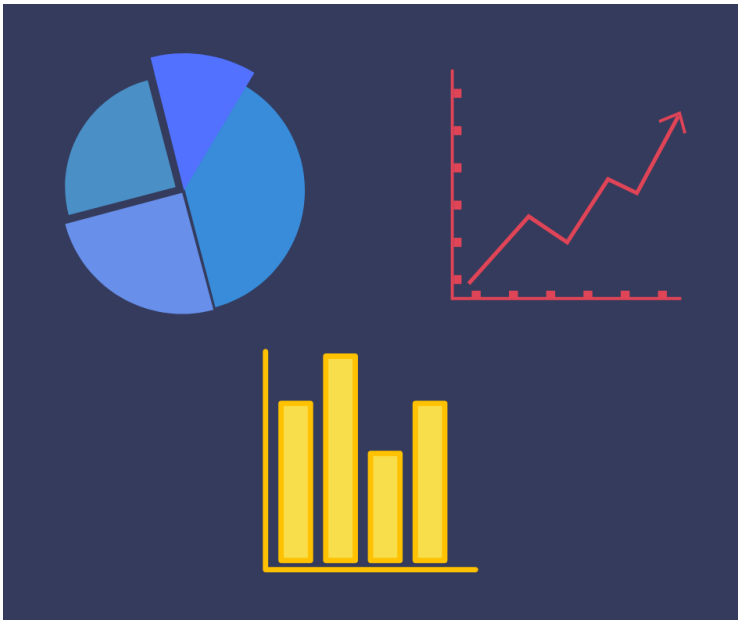
capacity can be shown in different units of measurement.
For example, a bottle of water can be measured in litres or millilitres and there are 1000ml in 1L.

cube numbers

A cube number is the result of when a number is multiplied by itself three times. When writing cube numbers, we write a small three above the number, e.g. 3 x 3 x 3 or $3^3 = 27$

data handling

Data handling is another term for statistics, meaning how we collect, display and interpret data or information, such as the most popular flavour of ice cream in a class, using tables, tally charts, pictograms, block diagrams, bar charts, line graphs and pie charts.



decimal

A decimal is a number that contains tenths, hundredths, thousandths etc, with a decimal point between the ones and tenths. Money is often used to teach decimals.
For example, 3.4, 2.18, £56.99

degrees

We use degrees as the unit of measurement for measuring angles, usually symbolised with a small circle above the number. For example, a right angle is 90° (90 degrees).

denominator

A denominator is the name for the bottom number in a fraction. For example, in the fraction 4/10, 10 is the denominator.

descending order

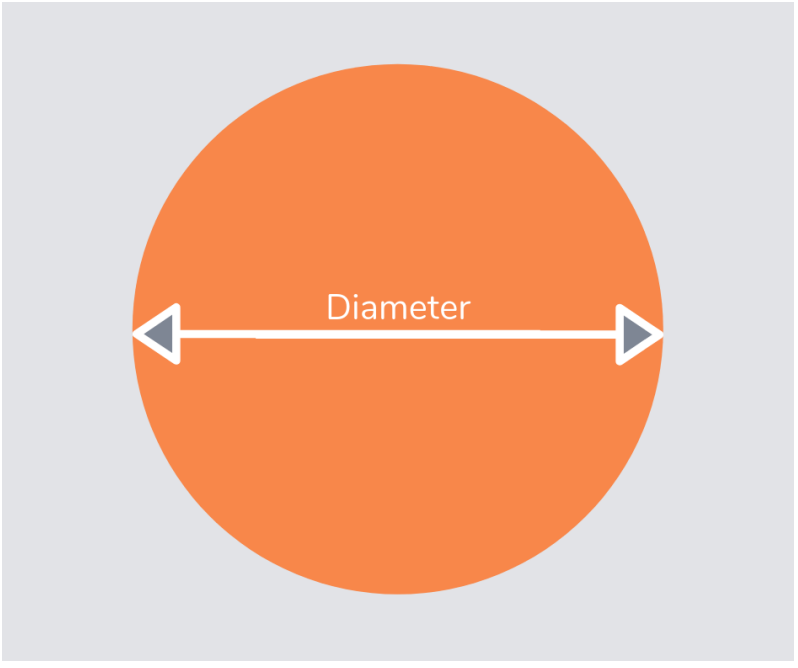
Descending order means to go from the largest number to the smallest and is the opposite of ascending order.
For example, 90, 80, 70, 60, 50 are numbers in descending order.

diagonal

A diagonal is a line joining two opposite corners of a square, rectangle or other shape.

diameter

The diameter is a straight line going from one side of a circle to another, through the centre.



distributive property

The distributive property states that multiplying a number by a group of numbers added together is the same as doing each multiplication separately.

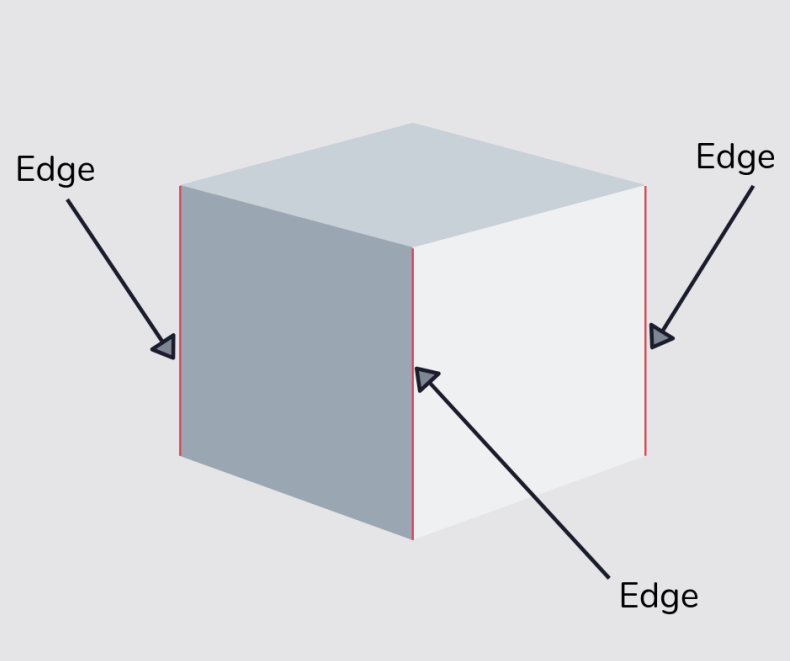
For example, 5 x (2 x 6) = 5 x 2 + 5 x 6

division Facts

Division facts are the division calculations related to times tables.
For example, 50 ÷ 5 = 10 and 25 ÷ 5 = 5 are division facts related to the 5 times table.

edge

An edge is the name for lines created when two faces in a 3D shape meet.

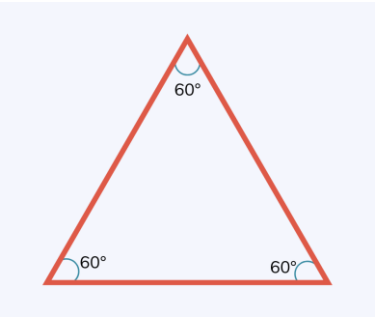


equation

An equation is another name for a number sentence where both sides equal the other. For example, 12 – 5 = 3 + 4

equilateral Triangle

An equilateral triangle is a triangle with three equal sides and three equal angles.


60°
60°
60°

equivalent fractions

An equivalent fraction is one that is equal in terms of size to another, but written using different numbers. For example, $\frac{1}{2}$ is equivalent to 4/8 and 7/14.

estimate

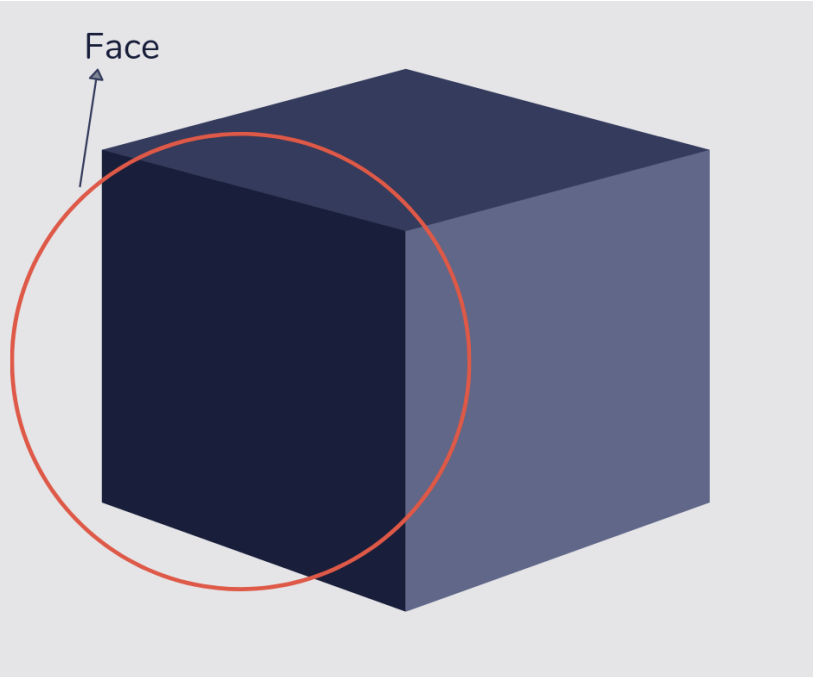
To estimate is to make a clever guess to the answer of a question, by roughly calculating the value. For example, children estimated the length of the playground to be 100 metres.

expanded notation

Expanded notation means to write a number showing the value of each digit, with each digit being multiplied by its matching place value (ones, tens, hundreds etc).
For example, 352 = 3 x 100 + 5 x 10 + 2 x 1.

face

A face is the flat part of a 3D shape.



factor

A factor is a number that can divide exactly into another number.
For example, 2, 3, 4 and 6 are all factors of 12, as 12 can be divided into them exactly.

finding the difference between two numbers

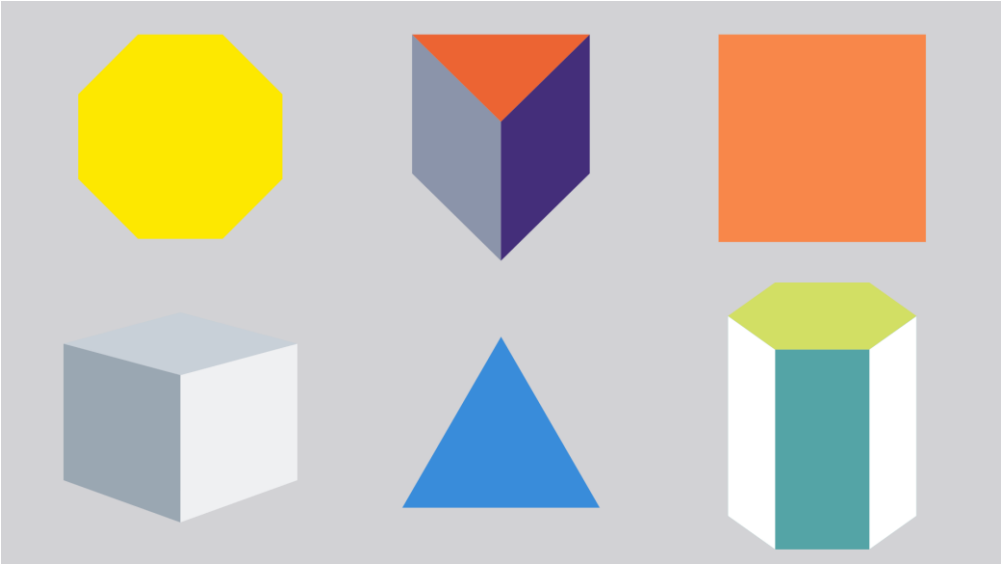
Finding the difference between two numbers is the same as subtracting a smaller number from a larger number. This method is usually taught using a number line, counting the jumps from one number to another.

formula

A formula is a group of numbers and maths symbols that show how to work something out. At primary school, children will encounter formulae for finding the area and perimeter of 2D shapes and for finding the volume of 3D shapes.

geometry

Geometry is the branch of maths where children learn about the properties, measurements, position and relationships of points, lines, angles and shapes.



grid method

The grid method is a way for working out multiplication calculations, especially with larger numbers, involving partitioning the numbers, multiplying each part and adding the totals.

x	30	5
7	210	35

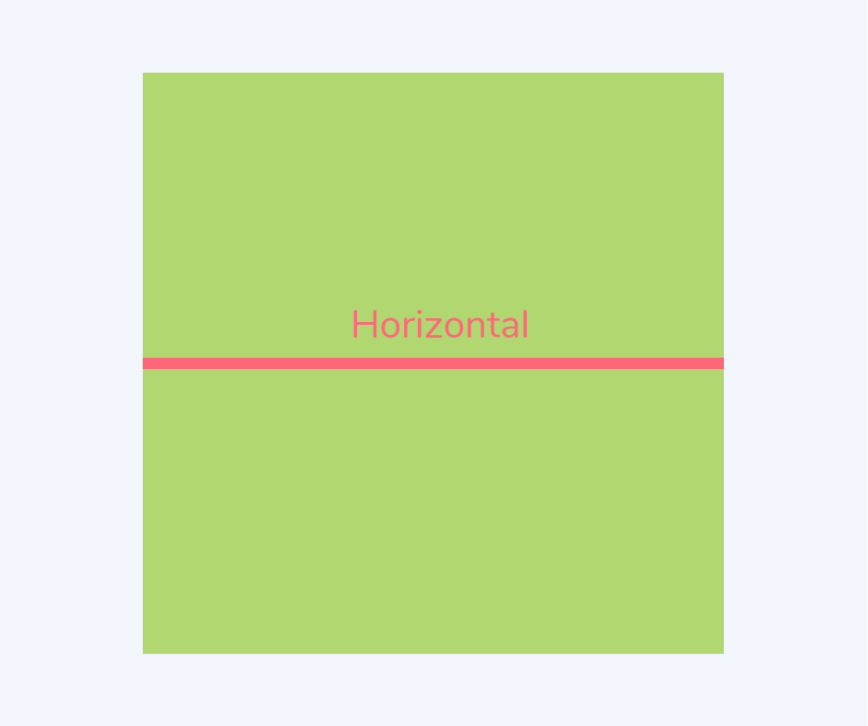
$$210 + 35 = \mathbf{245}$$

highest common factor

The highest common factor is the largest whole number which is a factor of two or more numbers. For example, 6 is the highest common factor of 12 and 18.

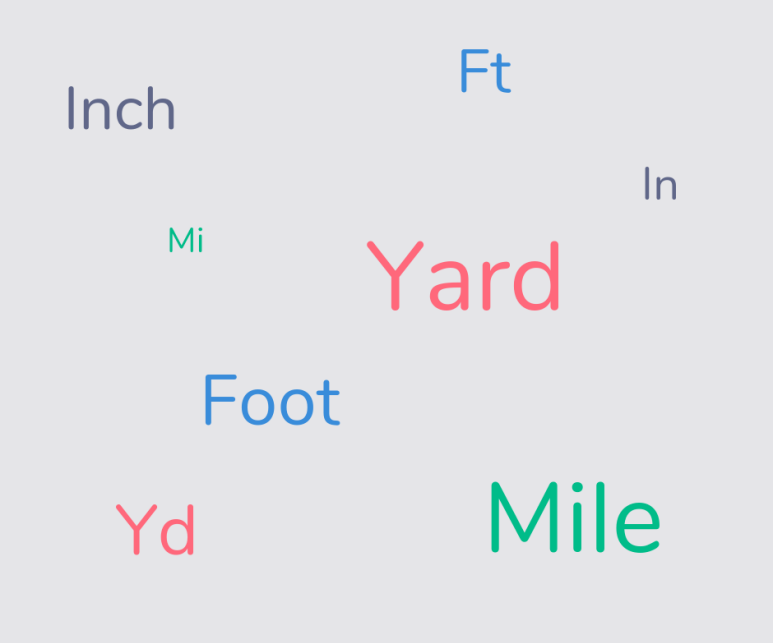
horizontal

A horizontal line is one that goes from left to right and vice versa.



imperial units

Imperial units are units of measurement that were used in the UK before the metric system was introduced. Children, especially from Year 5 on, will be taught how to convert from, for example, miles to kilometres.



improper fraction

An improper fraction is one where the numerator is larger than the denominator and is also known as a 'top-heavy' fraction. For example, 11/4, 6/2 and 21/5 are all improper fractions.

investigation

A mathematical investigation allows children to apply the skills and knowledge they've learnt to solve problems, which may have more than one way to work them out and more than one answer.

integer

An integer is simply a whole number, either positive or negative. For example, 8, -23, 502 and -1000 are all integers.

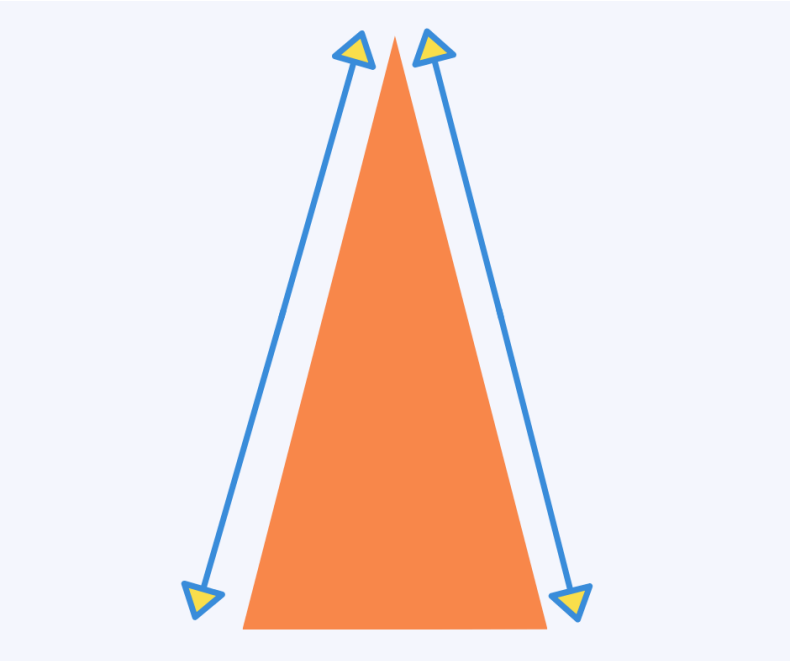
inverse operation

An inverse operation is another way of saying an opposite operation, which can often be used to

check calculations are correct. For example, addition and subtraction are inverse operations, as are multiplication and division.

isosceles triangle

An isosceles triangle is one with two equal sides and two equal angles.



jump

A move made when practising addition or subtraction – forwards or backwards respectively – on a number line.

kite

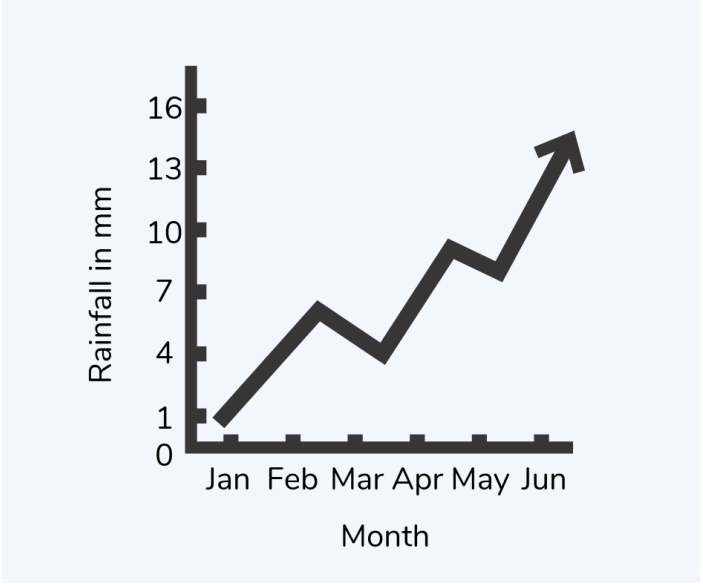
A quadrilateral (four-sided shape) with two pairs of adjacent (next-door) sides that are congruent (equal in length). The diagonals of a kite are perpendicular (meet at a right angle).

length

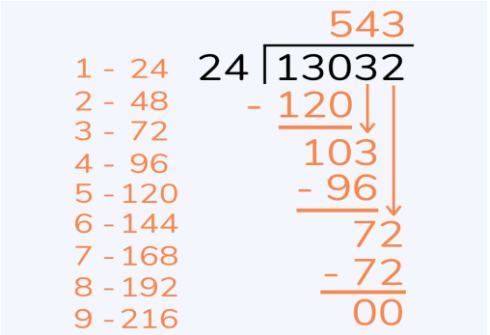
The length of an object is how long or short something is, and is usually measured in metric units such as centimetres, metres and kilometres.

line graph

A line graph is one where a line connects points, showing how values change over time.
For example, a line graph might show the amount of rainfall over six months.



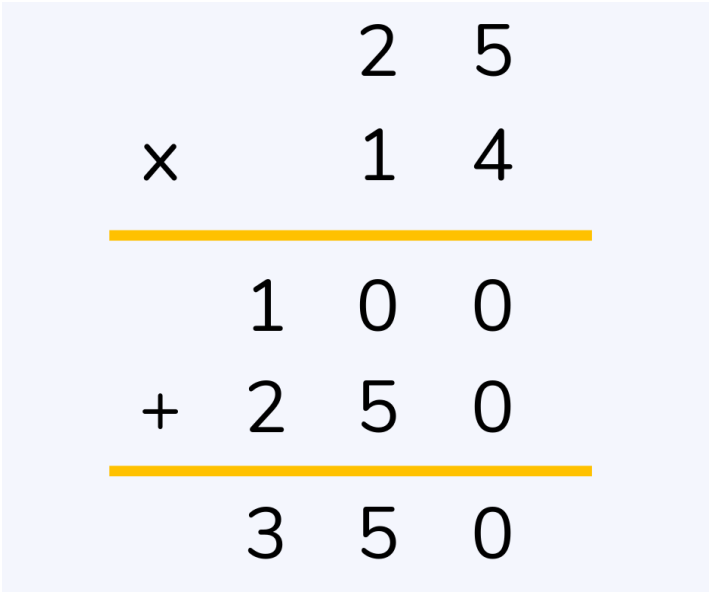
long division



Long division is a written method showing how to divide larger numbers (such as three or four-digit numbers) by other large numbers. Children will move onto long division in KS2, once they've mastered short division.

long multiplication

Long multiplication, which is sometimes known as column multiplication, is a way of multiplying larger numbers together. Just like column addition and subtraction, the numbers are put in columns according to their place value.



lowest common denominator

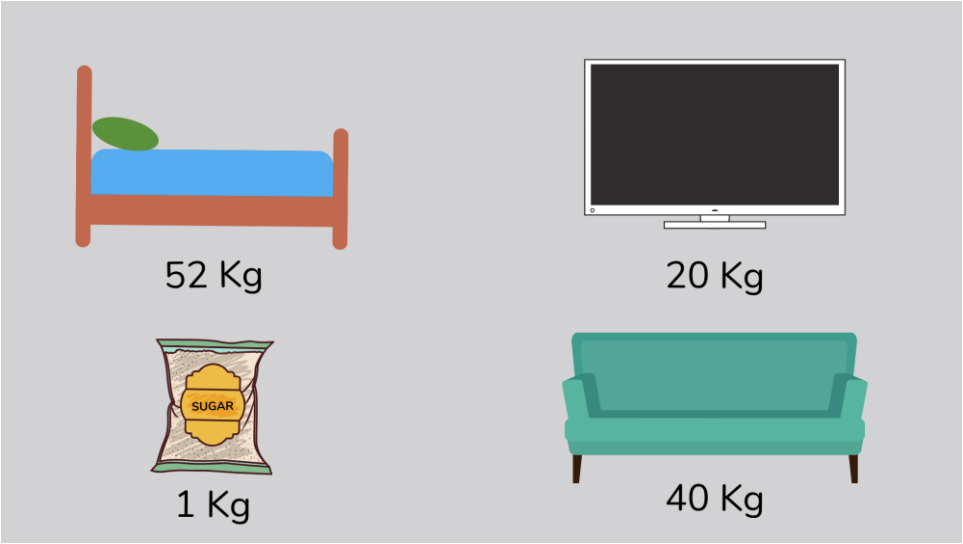
The lowest common denominator of two or more fractions is the smallest number that can be exactly divided by each denominator.
For example, 12 is the lowest common denominator of $\frac{1}{2}$, 1/3 and $\frac{1}{4}$.

lowest common multiple

The lowest common multiple is the smallest number which is a multiple of two or more numbers. For example, the lowest common multiple of 4 and 5 is 20.

mass

The mass of an object is how much it weighs and is usually measured in grams and kilograms.
For example, the mass of a bag of sugar is 1 kilogram.



mastery

Having mastery in a maths topic means that children not only understand how to work out problems, but can also explain how they worked it out and apply their knowledge to more complicated word problems and investigations.

mean

Mean is another word for average, and is found by adding a set of values and dividing the total by the number of values in the set.
For example, the mean of 2, 4, 5, 7 and 12 is 6 because (2 + 4 + 5 + 7 + 12 = 30 ÷ 5 = 6)

median

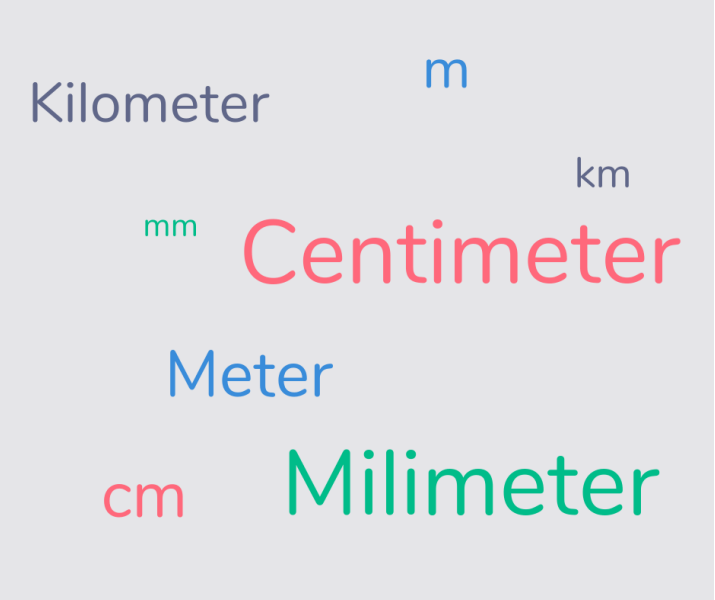
The median of a set of numbers is the middle number in that list. The numbers in the list must first be sorted into ascending order, then children can find the median number.
For example, the median of 1, 2, 3, 4, 5, 6, 7 is 4.

metacognition

Metacognition means to be aware of and analyse your thoughts and learning processes in order to make necessary changes to your learning behaviour. Techniques such as modelling problems and getting children to ask questions about their work are ways of improving their metacognition.

metric units

Metric units are units of measurement that are common around the world and are based on the metric system. For example, grams, centimetres, litres and seconds are all examples of metric units.



mirror line

A mirror line is a line that can be drawn through the centre of a shape or picture to show that both sides are exactly the same.

mixed number

A mixed number is one with both a whole number and a fraction. For example, 8 ⅔ and 5 10/12 are mixed numbers.

mode

The mode of a set of numbers is the one that appears most often. For example, the mode of 2, 3, 4, 5, 5, 6, 7 is 5.

multiple

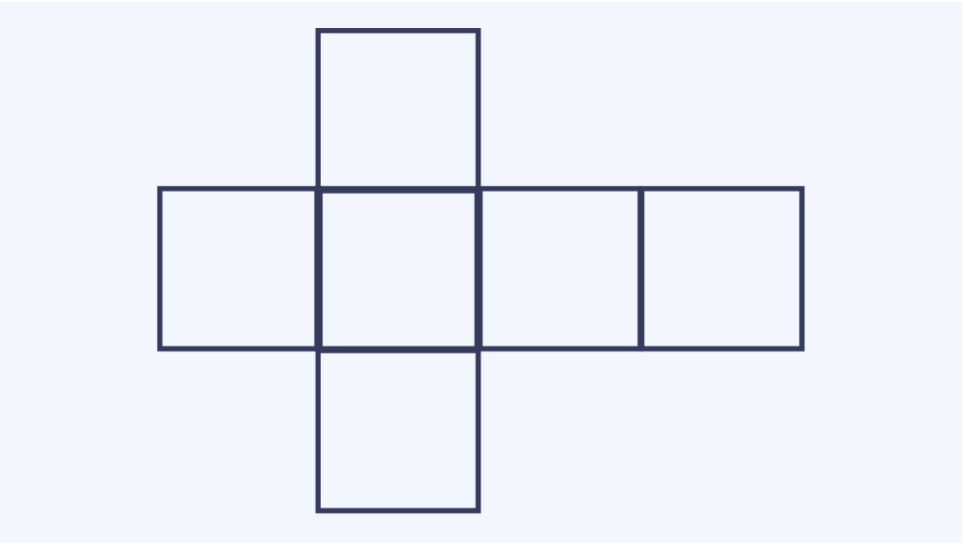
A multiple is the result of multiplying one integer by another. Multiples of a number are those in that numbers times table. For example, multiples of 7 include 14, 35, 49 and 84.

negative numbers

A negative number is any number lower than 0 and is commonly taught using temperatures. For example, -2, -14, -67.

net

A net is the flat outline of a 3D shape, before it is folded together.



number bonds

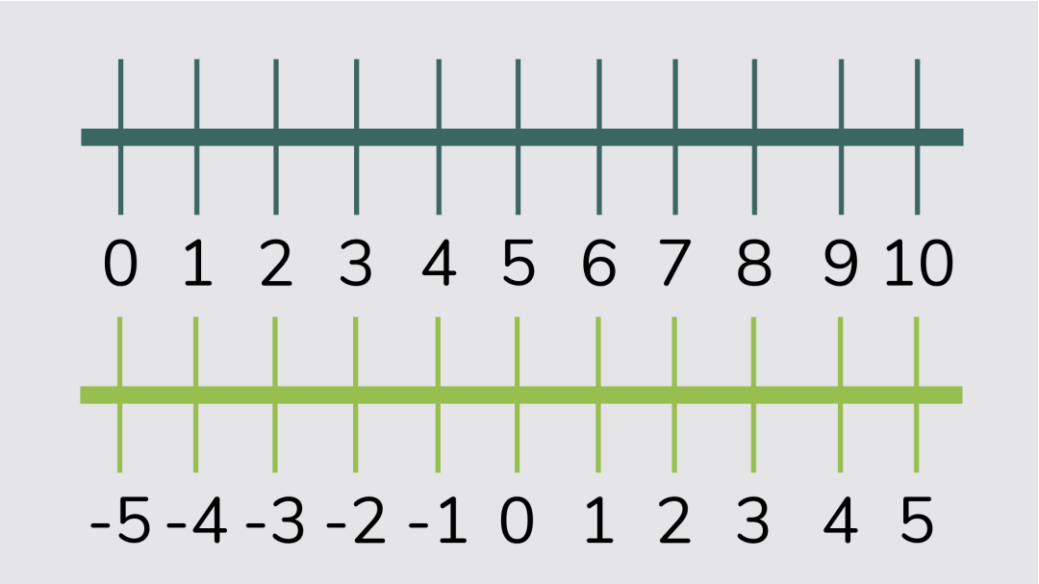
Number bonds are pairs of numbers that add together to make a given number. For example, 2 + 8 and 4 + 6 are number bonds to 10, whereas 43 + 57 and 81 + 19 are number bonds to 100.

number facts

Number facts are simple addition, subtraction, multiplication and division calculations that children should be able to mentally recall easily. For example, 50 + 50 = 100 or 2 x 2 = 4 are number facts.

number line and number ladder

A number line is a horizontal line, with numbers going up the bottom of the line. The numbers will typically increase in size and the space between the numbers doesn't usually matter. Number lines are especially used in Key Stage 1 to teach number bonds and adding using jumping.
A number ladder is a number line drawn vertically.



number sentence

A number sentence is how a calculation is written, using numbers and symbols. For example, 5 + 7 = 12 is an addition number sentence.

number square

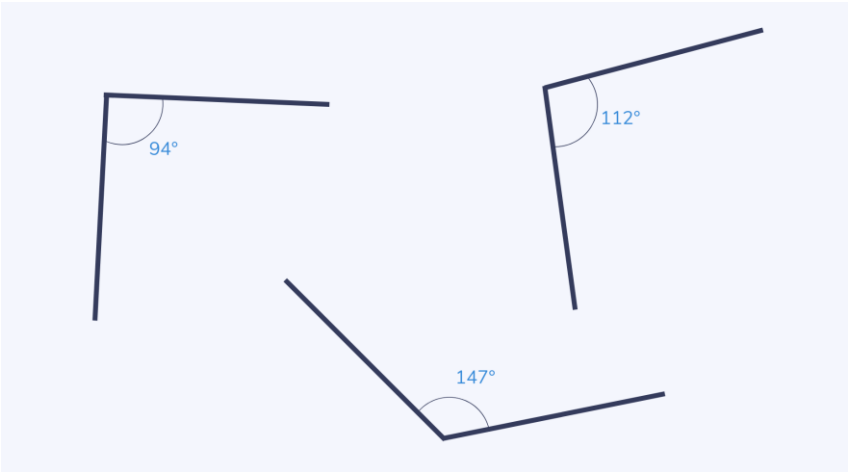
A number square is a maths aid used in primary schools, showing numbers in order from 0 up to, for example, 20 or 100. Number squares are useful for helping with counting and seeing patterns in number sequences.

numerator

A numerator is the name for the top number in a fraction. For example, in the fraction 5/15, 5 is the numerator.

obtuse angle

An obtuse angle is any angle that measures between 90° and 180°.



odd and even numbers

An even number is any number that can be divided into two equal groups and always end in 0, 2, 4, 6 and 8.
An odd number is any number that can't be divided into two equal groups and always end in 1, 3, 5, 7 and 9.

operation

In maths, the four types of operation are addition, subtraction, multiplication and division.

ordinal numbers

An ordinal number tells us what position something is in a list, often taught using dates or the results of races. For example, Ben finished in 1st place, Chris in 2nd and Alex in 3rd. The contrast of this is a cardinal number.

parallel

A parallel line is a straight line that always stays the same distance from another line and never meets. Shapes are often used to teach parallel lines. For example, a square has two pairs of parallel lines.

partitioning

To partition a number means to separate a number into separate parts (ones, tens, hundreds, thousands etc). Partitioning makes understanding place value easier and is also used when using column methods or grid methods.
For example, 5246 can be partitioned into 5 thousands, 2 hundreds, 4 tens and 6 ones or 5000 + 200 + 40 + 6.

percentage

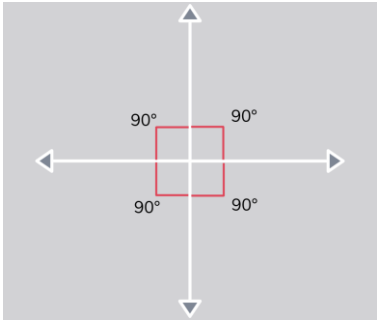
Percentage means 'out of 100' and is used to show a number or ratio expressed as a fraction of 100. Children often use percentages when talking about sales in shops. For example, this £80 jacket had 20% off in the Christmas sale.

perimeter

The perimeter is the distance around a 2D shape and is often taught using the example of fences around a field or garden.

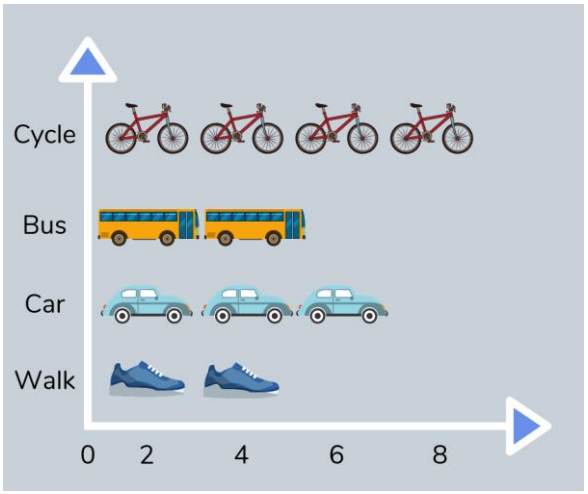
perpendicular

Perpendicular lines are two lines that meet to create a right angle, often seen in shapes.



pictogram

A pictogram is a type of graph that uses pictures to represent information. These are often taught in Key Stage 1 before moving onto block charts and bar charts.



pie chart

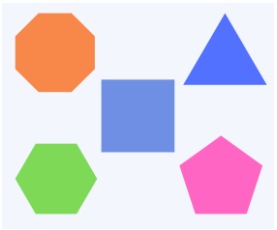
A pie chart is a circular chart divided into sections, representing different values, which can be fractions, decimals, percentages or angles.

place value

The place value of a number is how much each digit in the number represents.
For example, the place value of 157 is 1 hundred, 5 tens and 7 ones.

polygon

A polygon is any 2D shape with straight, closed sides. Any shapes with open or curved sides are not polygons. For example, triangles, squares and parallelograms are polygons, but circles and ovals are not.

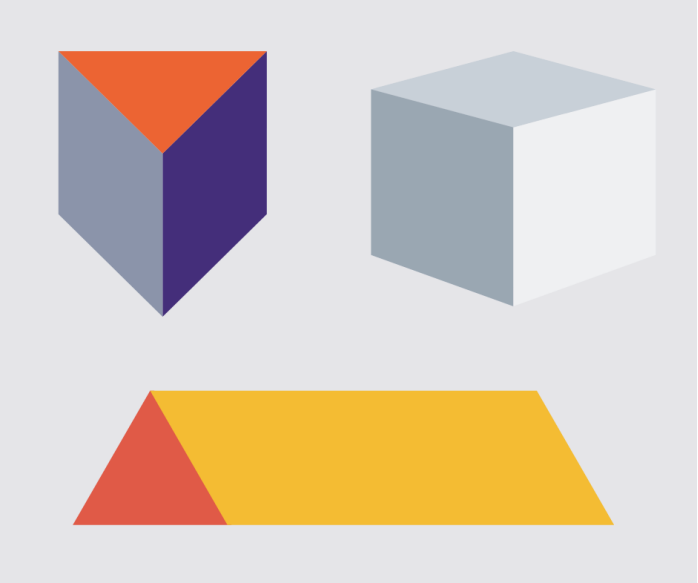


prime number

A prime number is any number greater than 1 that can only be divided equally by itself and 1. For example, 5, 7, 11 and 13 are prime numbers.

prism

A prism is a 3D shape with two identical flat sides and ends. Cubes and cuboids are examples of prisms.



probability, chance and likelihood

Probability is the study of how likely or how big a chance there is that something will happen. It can be described in words, fractions, percentages or ratios. For example, there is a 20% chance of rain tomorrow.

product

A product of two numbers is the name for the answer to a multiplication calculation. For example, 35 is the product of 5 x 7.

proportion

A proportion is a portion or part of a whole, and is often taught alongside ratio.

protractor

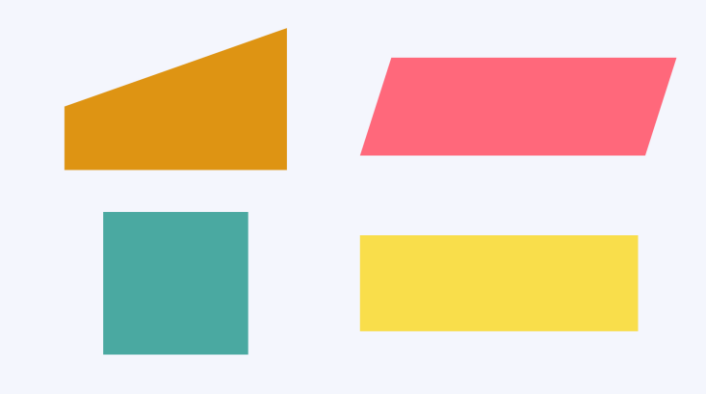
A protractor is an instrument used to measure angles.

pyramid

A pyramid is a 3D shape with triangular sides that join at a point, with a polygon base.

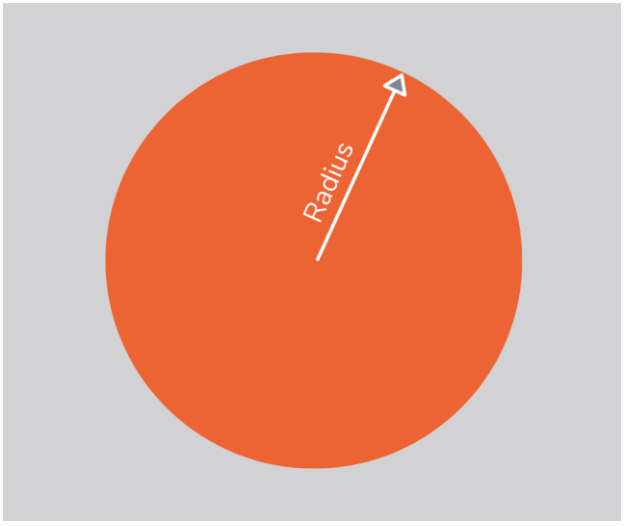
quadrilateral

A quadrilateral is any 2D shape with four sides, including a square, rhombus, kite and trapezium.



radius

The radius is the distance from the centre of a circle to its circumference and is half the diameter.



range

The range of a set of numbers is the difference between the smallest and largest numbers in the set. For example, in the set of numbers 50 to 60, the range is 10.

ratio

A ratio is used to compare values, showing the relative value of one to another. It is taught using real-life examples, such as comparing the number of boys to girls in class. For example, the ratio of boys to girls was 2:1, meaning there are two boys for every one girl.

reflection of shapes

A reflection of a shape is a drawing of a shape reflected in a mirror line, with the reflection on the other side of the line but facing in the opposite direction.

reflective symmetry

Reflective symmetry is a type of transformation, looking at when a shape or pattern is reflected in a mirror or line of symmetry. The reflected shape should be exactly the same size and distance from the mirror line as the original.

reflex angle

A reflex angle is any angle between 180° and 360°.

regular and irregular shapes

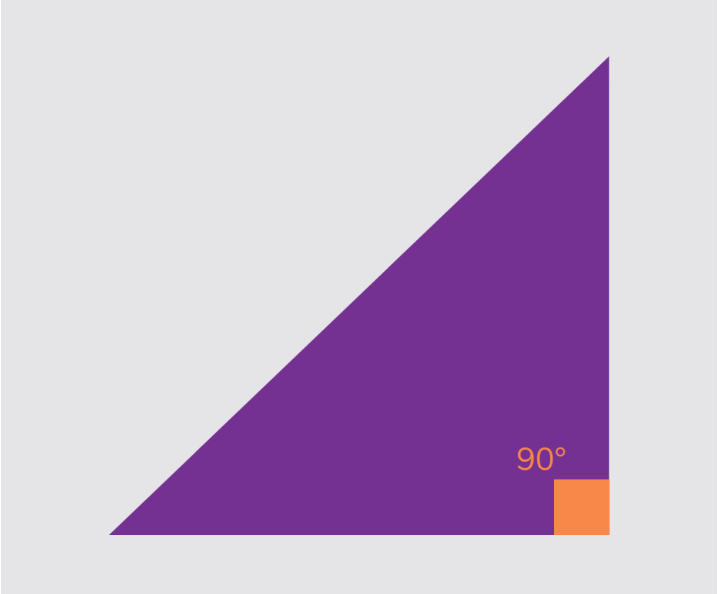
A regular shape is one where all the sides and interior angles are equal, whereas an irregular shape has sides and angles of different lengths and sizes.

right angle

A right angle is an angle that measures 90°. It is also known as a quarter turn, as it is $\frac{1}{4}$ of a full turn, which measures 360°.

right-angled triangle

A right-angled triangle is a 2D shape with three sides and one angle that measures 90°.



roman numerals

Roman numerals are the numbers used in ancient Rome, with letters from the Latin alphabet representing certain numbers. They are commonly taught using years. For example, V = 5, X = 10, C = 100, M = 1000, so 1066 is MLXVI.

rotation of shapes

A rotation of a shape is when a shape is moved around a fixed point, either clockwise or anticlockwise and by a certain number of degrees. However, the shape doesn't change size.

rotational symmetry

Rotational symmetry is a type of transformation, where a shape is turned around a central point, without changing its size.

rounding numbers

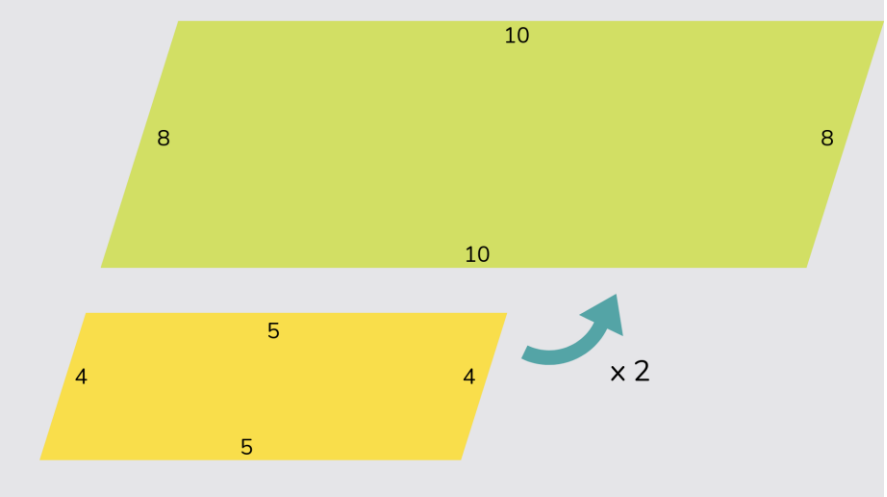
To round a number means to adjust it up or down to a number that makes calculating with it easier. Numbers are usually rounded up to the nearest 10, 100 or 1000, with decimals being rounded to the nearest whole number, tenth or hundredth. There is a rule that if a digit is 4 or less it rounds down and if it is 5 or more it rounds up.
For example, 426 rounds to 430 to the nearest 10, but 400 to the nearest 100.

repeated addition

Repeated addition is a technique used to teach multiplication in Key Stage 1, where children add 'lots' of numbers together.
For example, 3 'lots' of 5 is 5 + 5 + 5 as well as 3 x 5.

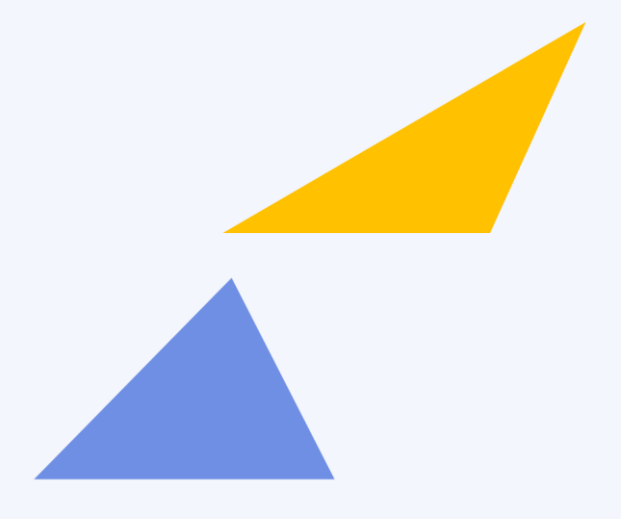
scale factor

A scale factor is used when we increase or decrease a 2D shape in size, so we make the shape larger or smaller depending on the scale factor. For example, this shape has been increased by a scale factor of 2.



scalene triangle

A scalene triangle is a 2D three-sided shape where all the sides and angles are unequal.



shared between

'Shared between' is a phrase used when introducing division, to show how a set of objects can be 'shared' into equal sized groups.

simplifying fractions

To simplify a fraction means to reduce it to its lowest form, by dividing the numerator and denominator by the same number. For example 8/10 can be simplified to ⅔ by dividing both the numerator and denominator by 2.

square numbers

A square number is the result of multiplying a number by itself. When writing this, we write a small two next to and above the number. For example, $7^2 = 7 \times 7 = 49$.

standard and non-standard units

Standard units are the units of measurement we normally use to indicate the length, mass or capacity of an object. For example, centimetres, metres, grams, kilograms, millilitres and litres.

Non-standard units are used by when introducing measurement in KS1, for example the length of a pencil or hand spans.

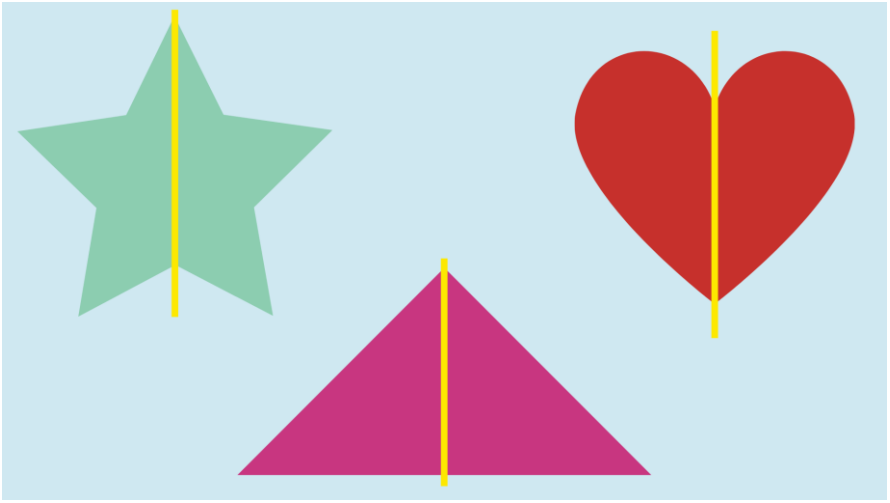
sum

A sum of two numbers is another name for the result of an addition calculation. For example, the sum

of 15 and 23 is 38.

symmetry

When a picture or shape is the same on both sides, we call it 'symmetrical', and this can be shown by drawing a line of symmetry through the centre and seeing if both sides are the same.



tally chart

A tally chart uses marks instead of numbers to represent information. One vertical mark is used to represent each one unit, with five being shown as a fifth line crossed through the first four lines.

Chocolate	Tally	Frequency
Milk	𝍸	16
Dark	𝍷	7
White	𝍸	13

tessellation

When shapes fit together exactly with no gaps, we call this Tessellation. An example of this in real life are floor tiles.

time intervals

A time interval is the length of time between two times. For example, the time interval between 1:15 and 1:45 is 30 minutes.

translation of shapes

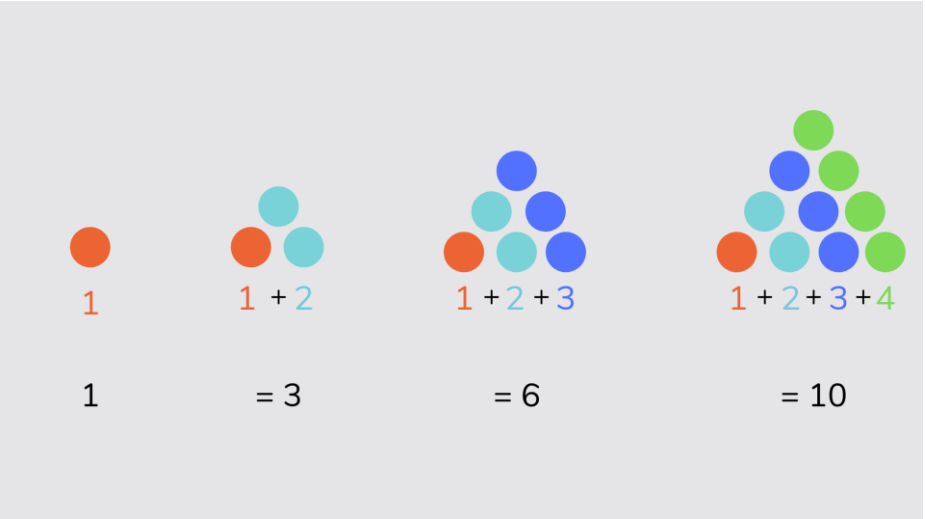
Translation is a type of transformation, where a shape is moved into a new position, without being changed in any way.

triangle

A triangle is a 2D shape with three sides, angles and corners.

triangular number

A triangular number is a number that can make a triangular dot pattern.For example, 1 + 2 = 3, 2 + 3 = 5, 3 + 5 = 8, 5 + 8 = 13 etc.



turns

Turns are a movement in a circle, with a quarter turn being the same as 90°, a half turn as 180° and a full turn as 360°, either clockwise or anticlockwise.

two-step and multi-step problems

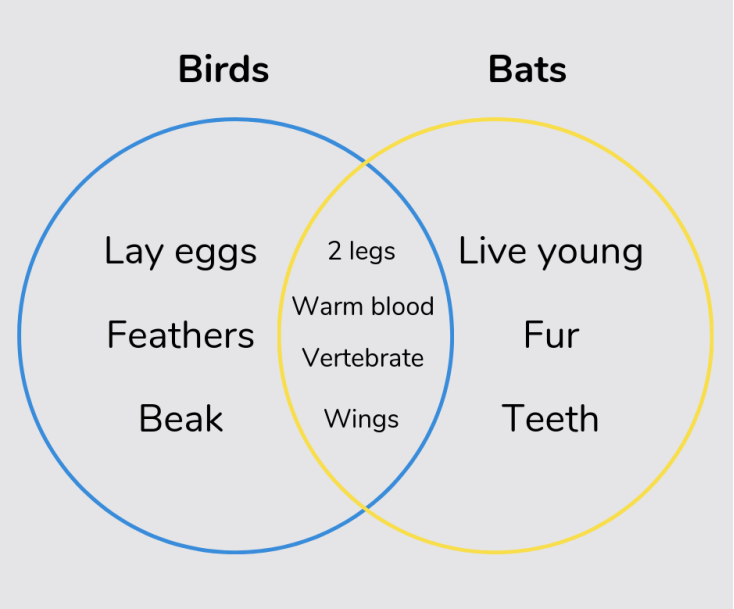
A two-step problem is a word problem which needs two calculations to solve it. A multi-step problem requires more than two calculations to solve it.

unit and non-unit fractions

A unit fraction is any fraction with 1 as the numerator, whereas a non-unit fraction is any fraction with a number greater than 1 as the numerator. For example, ⅔ is a unit fraction, whereas 2/6 is a non-unit fraction.

venn diagram

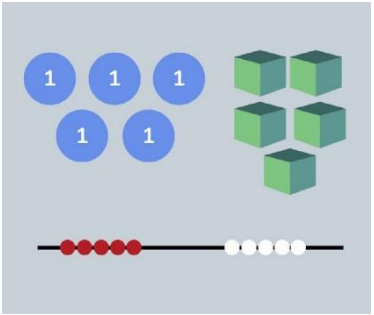
A Venn diagram is a visual way of sorting different objects or numbers into overlapping circles with different rules, with anything in the overlapping part sharing both rules.



variation

In primary maths, there are two types of variation, conceptual and procedural variation.

Conceptual variation means looking at a maths idea in various representations. For example, showing a number using multilink, diennes block, 100 square or partitioned, to explain place value.



Procedural variation is used to support a child's deeper understanding of a maths process by extending a problem by varying the number, varying the processes to solve a problem or varying the problems by applying the same method to a group of similar problems.

vertex/vertices

Vertex is another name for a corner of a 2D shape or the points where edges in a 3D shape meet.

vertical

A vertical line runs up and down, from top to bottom.

volume

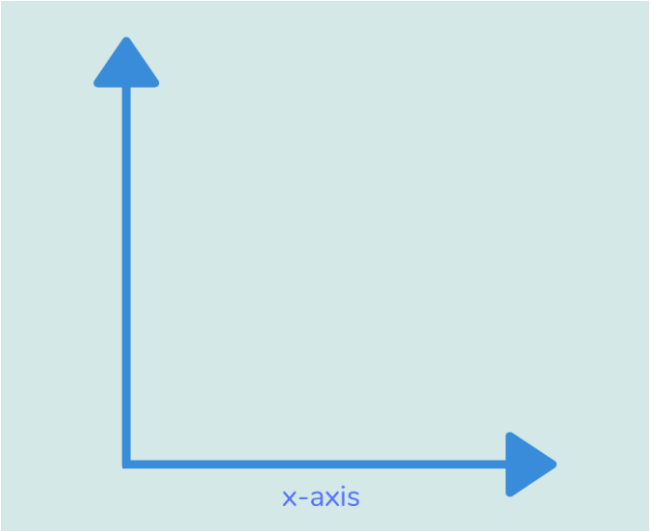
The volume is the amount of space an object occupies, especially 3D shapes. Children will learn the formula for finding the volume of a shape, which is the length x width x height, with the answer having units with a cube number, for example cm^3.

word problem or story problem

A word problem or a story problem is a real-life situation where a maths calculation is needed to solve a problem. For example, 'If half a class of children have pets and there are 36 children in the class, how many have pets?'

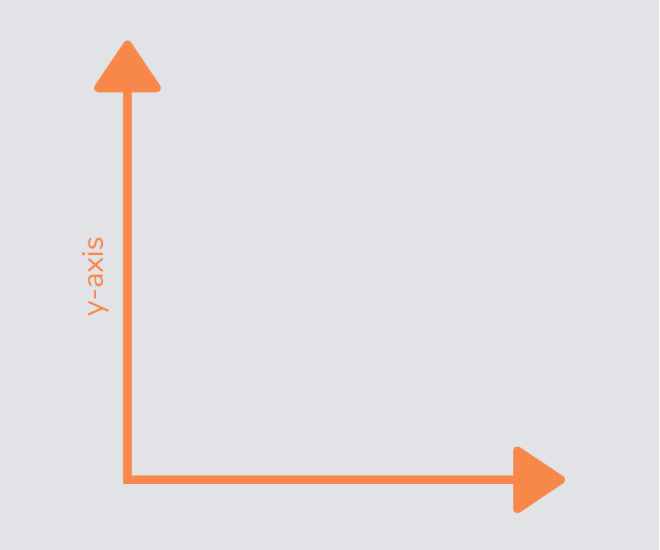
x-axis

The x-axis is the horizontal axis on a graph, along which we find the x-coordinate (by going 'along the corridor').



y-axis

The y-axis is the vertical axis on a graph, along which we find the y-coordinate (by going 'up the stairs').



zero

Zero is a placeholder between +1 and -1, it has no value but changes the value of other numbers. For example, in the number 703 it changes the number 73 to the much larger 703.