

Holy Cross Catholic Primary School



# Parent Handbook

# Maths

*An overview and guide to help parents support their  
child's learning in Maths*

**NEW NATIONAL CURRICULUM EXPECTATIONS**



# Contents

	<b>Page</b>
Introduction.....	4
Reception.....	5
Year 1.....	7
Year 2.....	9
Year 3.....	11
Year 4.....	13
Year 5.....	15
Year 6.....	17
Glossary.....	19
Further help.....	32

# Introduction

This booklet is designed to introduce and inform you of the age related expectations of the new National Curriculum so that you can guide and support your children with home learning.

The key objectives for each year group are listed, along with ideas and activities to help your children further develop their maths skills at home. The role of a parent or carer is essential in the development of maths. There are a number of skills that can be learned and perfected at home that will allow your child to become masters of their own learning, allowing them to develop a greater depth and understanding. If your child masters the skills for their year group, rather than moving on to the following year group's work your child will develop more in-depth and investigative work to allow for a greater understanding of concepts and ideas.

The Department for Education states that the national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Alongside this guide is our Calculation Policy which sets out examples of how to approach calculations for the four operations.

We hope that this booklet serves well as a guide and a help tool to fully support the partnership between home and school for the benefit of all children.

Many thanks,

Miss Mather

Maths Leader

# Supporting your child's learning in Mathematics - Year R

To achieve the Early Learning Goals, by the end of Reception your child should be able to:

- Count reliably with numbers from one to twenty, and recognise and order them.
- Use quantities and objects to add two single digit numbers.
- Use quantities and objects to subtract two single digit numbers.
- Count on or back to find the answer.
- Say which number is one more or one less than a given number.
- Solve problems, including doubling, halving and sharing.
- Use mathematical language to describe objects and shapes.
- Explore characteristics of everyday objects and shapes.
- Recognise, create and describe patterns.
- Use everyday language to talk about size, weight, capacity, position, distance, time and money.
- Use everyday language to compare quantities and objects, and to solve problems.

Ideas for helping your child develop their mathematical understanding:

Encourage counting to higher numbers:

- Playing hide and seek.
- Counting out objects.
- Counting catches/throws/bounces of a ball.

Encourage reading numbers:

- Finding the house number when visiting a new place.
- Games that involve numbers such as Snakes and Ladders.
- Look for maths in storybooks, songs and rhymes.
- Reading car number plates.

Encourage calculations in real-life situations:

- How many more ... do we need? e.g. How many more eggs will we need to buy to make the recipe?
- Gardening and DIY have lots of opportunities for maths.
- Will we have enough? Have we got enough cakes for everyone?
- If we share these among the family, how many are we going to get each?
- How many plates, forks etc. do we need today?

Talk about the measures we use every day:

- Talk to your child about time. Do they know what time they go to bed, get up, go to school etc.?
- Have we got enough time to...? e.g. It's bedtime in half an hour, have we got time to watch Toy Story/read this book/have a bath/make a cake etc. This develops the understanding of the way we mentally plan what we are going to do for the time we have.
- Does your child confidently talk about the days of the week and months of the year?
- Does your child know their date of birth?
- Talk about things that will happen in the future using dates (particularly months)
- Talk about things that happened in the past using months
- Use a calendar to count down how many days/months to a special event
- Can your child say how much each coin is worth?
- What does your child understand about age? Talk about the ages of the different generations of people in your family. Talk about important ages e.g. at 11 we go to Secondary School; at 18 we become an adult etc.
- Can your child order things by size, capacity, length or height?
- Talk about the shapes of everyday objects e.g. cereal box: cuboid, door: rectangle etc.

If you would like any more advice on how to support your child at home please speak to your child's teacher.



# Supporting your child's learning in Mathematics - Year 1

By the end of Year 1 your child should be able to:

- Count to and across 100, forwards and backwards, beginning with zero or one, or from any given number.
- Count, read and write numbers to 100 in numerals.
- Count in multiples of twos, fives and tens.
- Given a number, identify one more and one less.
- Represent and use number bonds and related subtraction facts within 20.
- Recognise, find and name a half as one of two equal parts of an object, shape or quantity.
- Compare, describe, and solve practical problems for:
  1. Lengths and heights e.g. long/short, longer/shorter, tall/short, double/half.
  2. Mass/weight e.g. heavy/light, heavier than, lighter than.
  3. Capacity and volume e.g. full/empty, more than, less than, half, half full, quarter.
  4. Time e.g. quicker, slower, earlier, later.
- Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.
- Recognise and name common 2-D and 3-D shapes, including:
  1. 2-D shapes e.g. rectangles (including squares), circles and triangles.
  2. 3-D shapes e.g. cuboids (including cubes), pyramids and spheres.

Ideas for helping your child develop their mathematical understanding:

Encourage counting to higher numbers:

- Playing hide and seek.
- Counting out objects.
- Counting catches/throws/bounces of a ball.
- Using counting to 'time' activities e.g. how far can you run before I count to 100.

Encourage reading numbers (children can find it tricky to know whether 56 is fifty-six or sixty-five):

- Finding the house number when visiting a new place.
- Games that involve numbers such as Snakes and Ladders.
- How many minutes have we watched of this programme?

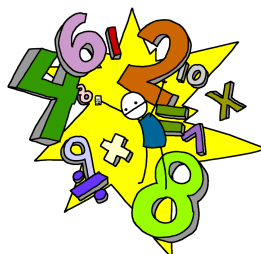
Encourage calculations in real-life situations:

- How many more ... do we need? e.g. How many more eggs will we need to buy to make the recipe?
- How many will be left? e.g. We have a packet of 12 rolls. How many will be left when we have made 8 sandwiches?
- If we share these among the family, how many are we going to get each?

Talk about the measures we use every day:

- Can your child read the time on the hour and half hour?
- Have we got enough time to...? e.g. It's bedtime in half an hour, have we got time to watch Toy Story/read this book/have a bath/make a cake etc. This develops the understanding of the way we mentally plan what we are going to do for the time we have.
- How long do you think it will take us to....? Predict how long it will take to wash the car/change the beds/read the book etc. See how close your prediction is.
- Talk about what time things happen.
- Talk about things that will happen in the future using dates (particularly months).
- Talk about things that happened in the past using months.
- Talk about how you use the calendar/your diary/your phone to record appointments and events.
- Use a calendar to count down how many days/months to a special event.
- Look at the measures on food – ml, l, g, kg.
- Use measures in cooking.
- Talk about measurements when you make them, e.g. length for new curtains; measuring up to see if new furniture will fit.
- Use £ and p to talk about money.
- Can your child say how much each coin is worth?
- Have we got enough money to buy...? Start simply... e.g. the car park will cost £2 I've got three pound coins in my purse, have we got enough?

If you would like any more advice on how to support your child at home please speak to your child's teacher.





# Supporting your child's learning in Mathematics - Year 2

By the end of Year 2 your child should be able to:

- Count in steps of two, three, and five from zero, and in tens from any number, forward and backward.
- Compare and order numbers from 0 up to 100.
- Use < > and = signs correctly.
- Use place value and number facts to solve problems.
- Solve problems with addition and subtraction by:
  1. Using concrete objects and pictorial representations, including those involving numbers, quantities and measures.
  2. Applying an increasing knowledge of mental and written methods.
- Recall and use addition and subtraction facts to 20 and 100; fluently up to 20.
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
- Recognise, find, name and write fractions  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$ , and  $\frac{3}{4}$  of a length, shape, set of objects or quantity.
- Solve simple problems in a practical context involving addition and subtraction of money of the same unit including giving change.
- Compare and sort common 2-D and 3-D shapes and everyday objects.
- Use mathematical vocabulary to describe position, direction and movement including movement in a straight line, and distinguishes between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).
- Ask and answer questions about totalling and comparing categorical data.

Ideas for helping your child develop their mathematical understanding:

Encourage and practise times tables:

- Write out the tables you are learning, first in order then mixed.
- Practise verbally and written.

- Use any practise method available to you – verbal, computer, iPad, DS, songs (see YouTube) etc.
- Practise division facts as well as multiplication.
- Even when your child knows them, continue to practise regularly – the speed of recall is lost very soon when they don't practise.
- Children should aim not to have to think about the answer, just to say it when they hear or see the calculation needed.

Encourage calculations in real-life situations:

- How many more ... do we need? e.g. How many more eggs will we need to buy to make the recipe?
- How many will be left e.g. We have a packet of 12 rolls. How many will be left when we have made 8 sandwiches?
- If we share these among the family, how many are we going to get each?

Talk about the measures we use every day:

- Can your child read the time to five minutes? This can be a very difficult skill to develop and the more your child understands the value in being able to read the time the more chance that they will persevere.
- Have we got enough time to...? e.g. It's bedtime in half an hour, have we got time to watch Toy Story/read this book/have a bath/make a cake etc. This develops the understanding of the way we mentally plan what we are going to do for the time we have.
- How long do you think it will take us to....? Predict how long it will take to wash the car/change the beds/read the book etc. See how close your prediction is.
- Talk about what time things happen.
- Talk about things that will happen in the future using dates (particularly months).
- Talk about things that happened in the past using months.
- Talk about how you use the calendar/your diary/your phone to record appointments and events.
- Use a calendar to count down how many days/months to a special event.
- Look at the measures on food – ml, l, g, kg – how much is in each container?
- Use measures in cooking, DIY and gardening.
- Use £ and p to talk about money.
- Does your child understand what happens when you pay with a card at the shop? Do they understand where the money comes from at the cash point?

If you would like any more advice on how to support your child at home please speak to your child's teacher.



# Supporting your child's learning in Mathematics - Year 3

By the end of Year 3 your child should be able to:

- Count from 0 in multiples of 4, 8, 50 and 100.
- Can work out if a given number is greater or less than 10 or 100.
- Recognise the place value of each digit in a three digit number (hundreds, tens and ones).
- Solve number problems and practical problems involving these ideas.
- Add and subtract numbers mentally including:
  1. A three digit number and ones.
  2. A three digit number and tens.
  3. A three digit number and hundreds.
- Recall and use multiplication and division facts for the multiplication tables 3, 4, and 8.
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that are known including for two digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.
- Recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fractions with small denominators.
- Recognise and show, using diagrams, equivalent fractions with small denominators.
- Measure, compare, add and subtract lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).
- Add and subtract amounts of money to give change, using both £ and p in practical contexts.
- Tell and write the time from an analogue clock and 12 hour and 24 hour clocks.
- Identify right angles, recognises that two right angles make a half turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.
- Interpret and present data using bar charts, pictograms and tables.

### Ideas for helping your child develop their mathematical understanding:

Encourage counting to higher numbers – up to and beyond 100:

- Look for ways to practise ordering numbers three digit numbers.
- Practise counting in multiples of 2, 3, 4, 5, 8, 10, 50, and 100.
- Count coins e.g. sets of 10ps, 2ps, 5ps, 50ps etc.

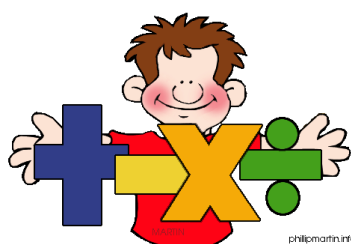
Encourage calculations in real-life situations:

- How much will our shopping cost? Start with 2 items and build from there.
- I need 500g butter – is there enough in these two packets?
- Practise, practise, practise times tables and their division facts. Is there one that is hard to remember e.g.  $8 \times 7 = 56$ . Ask at all times of the day and night!
- Think of silly/special ways to remember tricky tables facts (I ate and ate 'til I was sick on the floor  $8 \times 8 = 64$ ).
- Use all means possible to know times table facts and their division facts, to recall at speed (chanting, singing, games, computer, iPad, DS etc.).

Talk about the measures we use every day:

- Get your child to help you measure up for furniture/curtains etc. Discuss why it's important to measure.
- Give time durations in different units e.g. It's 5 minutes until bed time/it's 300 seconds until bedtime/we're going to Granny's in 48 hours etc.
- What types of clock are around your house – some homes have very few analogue clocks. Does your child have the chance to practise using these?
- Has your child got a watch? Make them your timekeeper!
- Does your child see you using cash? Or do you always had over a card? Talk to your child about how debit cards work.
- Encourage your child to save up for something they want, and get them to record how they are getting on. Give them unusual amounts to add to the pot to make it more challenging e.g. Here's 22p towards your scooter/dinosaur/book/new shoes. Let's add it to your total.
- Think about how many days there are until the end of the month; the end of next month; the end of the year; Christmas; birthdays etc.

If you would like any more advice on how to support your child at home please speak to your child's teacher.



# Supporting your child's learning in Mathematics - Year 4

By the end of Year 4 your child should be able to:

- Count in multiples of 6, 7, 9, 25 and 1,000.
- Count backwards through zero to include negative numbers.
- Order and compare numbers beyond 1,000.
- Round any number to the nearest 10, 100 or 1,000.
- Solve addition and subtraction two-step problems in context, deciding which operations and methods to use and why.
- Recall multiplication and division facts for multiplication tables up to 12 x 12.
- Recognise and show, using diagrams, families of common equivalent fractions.
- Count up and down in hundredths; recognises that hundredths arise when dividing an object by 100 and dividing tenths by 10.
- Round decimals with one decimal place to the nearest whole number.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.
- Convert between different units of measure e.g. kilometre to metre; hour to minute.
- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.
- Identify lines of symmetry in two dimensional shapes presented in different orientations.
- Plot specified points and draws sides to complete a given polygon.
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Ideas for helping your child develop their mathematical understanding:

Encourage counting to higher numbers – up to and beyond 10000:

- Look for ways to practise ordering numbers with four and five digit numbers.
- Practise counting in multiples of 2, 3, 4, 5, 6, 7, 8, 9, 10, 25, 50, 100, and 1000.
- Count coins e.g. sets of 10ps, 2ps, 5ps, 50ps etc.
- Playing Monopoly, Game of Life, and other games needing money.

Encourage calculations in real-life situations:

- How much will our shopping cost? Start with 2 items and build from there. Can you total as we go round the supermarket? How close are you to the real total at the end?
- I need 500g butter – is there enough in these two packets?
- How do you work out the cost of your holiday?
- How much milk do we drink in a week?
- Practise, practise, practise times tables and their division facts. Is there one that is hard to remember e.g.  $8 \times 7 = 56$ ? Ask at all times of the day and night!
- Think of silly/special ways to remember tricky tables facts (I ate and ate 'til I was sick on the floor  $8 \times 8 = 64$ ). Children should know all their tables to  $12 \times 12$  at speed by the end of Year 4.
- Football tables/cricket leagues etc. involve lots of maths!

Talk about the measures we use every day:

- Give time durations in different units e.g. It's 5 minutes until bed time/it's 300 seconds until bedtime etc. We're going to Granny's in 48 hours.
- Begin to look at imperial measures in everyday life – how do they compare to metric? When do we use miles, when do we use km?
- What types of clock are around your house – some homes have very few analogue clocks. Does your child have the chance to practise using these? Can they say a time in 12 and 24hr clock?
- Has your child got a watch? Make them your timekeeper!
- Does your child see you using cash? Or do you always had over a card? Talk to your child about how debit cards work. Many financial transactions are 'invisible' to children. Help them see how the world of money works.
- Encourage your child to save up for something they want, and get them to record how they are getting on. Give them unusual amounts to add to the pot to make it more challenging i.e. Here's 22p towards your scooter/dinosaur/book/new shoes. Let's add it to your total.
- Think about how many days there are until the end of the month; the end of next month; the end of the year; Christmas; birthdays etc.

If you would like any more advice on how to support your child at home please speak to your child's teacher.



# Supporting your child's learning in Mathematics - Year 5

By the end of Year 5 your child should be able to:

- Read, write, order and compare numbers to at least 1,000,000 and determines the value of each digit.
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero.
- Add and subtract whole numbers with more than four digits, including using formal written methods (columnar addition and subtraction).
- Add and subtract numbers mentally with increasingly large numbers (e.g.  $12,462 - 2,300 = 10,162$ ).
- Identify multiples and factors including finding all factor pairs of a number and common factors of two numbers.
- Solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes.
- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
- Compare and order fractions whose denominators are all multiples of the same number.
- Read and write decimal numbers as fractions e.g.  $0.71 = 71/100$ .
- Read, write, order and compare numbers with up to three decimal places.
- Solve problems which require knowing percentage and decimal equivalents of  $1/2$ ,  $1/4$ ,  $1/5$ ,  $2/5$ ,  $4/5$  and those fractions with a denominator of a multiple of 10 or 25.
- Convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre).
- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.
- Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ).
- Draw given angles and measures them in degrees ( $^\circ$ ).
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
- Complete, read and interpret information in tables, including timetables.

Ideas for helping your child develop their mathematical understanding:

Make sure your child is **absolutely confident** with the recall facts they need to know:

- All times tables to 12 x 12.
- Division facts for all tables.
- Children should be able to recall these **without having to think about them.** Continued daily practice is valuable because it helps maintain speed. This is a skill that is lost over time without practice.

Encourage calculations in real-life situations:

- How much will our shopping cost? Going around the supermarket can they mentally add up the cost (use rounding to the nearest pound). How close are they at the checkout?
- How do you work out the cost of your holiday? How much will a day out cost? Get them to investigate for you e.g. train tickets, entrance to attractions, budget for lunch etc.
- Can they work out which purchase represents the best value e.g. cans of coke, washing powder, 2 for 3 etc. These often have special offers meaning they are difficult to compare. In this case they might use a calculator on a phone to work out.
- Can they work out the new price on offers where there is 25% off etc.?
- How much more do you actually get if you get 50% extra?
- Football tables/cricket leagues etc. contain lots of maths.
- Talk about what the language of statistics actually means – the same information is often presented in different ways. It's not always clear as to what the truth is.

Talk about the way we use maths every day:

- Does your child see you using cash? Or do you always hand over a card? Talk to your child about how debit cards work. Many financial transactions are 'invisible' to children. Help them see how the world of money works.
- Does your child understand the difference between credit cards and debit cards? Do they know what interest is?

If you would like any more advice on how to support your child at home please speak to your child's teacher.





# Supporting your child's learning in Mathematics - Year 6

By the end of Year 6 your child should be able to:

- Round any whole number to a required degree of accuracy.
- Use negative numbers in context, and calculates intervals across zero.
- Multiply multi-digit numbers up to four digits by a two-digit whole number using the formal written method of long multiplication.
- Divide numbers up to four digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- Use estimation to check answers to calculations and determines, in the context of a problem, an appropriate degree of accuracy.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- Solve problems involving the calculation of percentages e.g. of measures and calculations such as 15 per cent of 360, and the use of percentages for comparison.
- Use simple formulae.
- Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places.
- Compare and classify geometric shapes based on their properties and sizes and finds unknown angles in any triangles, quadrilaterals and regular polygons.
- Draw and translate simple shapes on the coordinate plane and reflects them in the axes.
- Interpret pie charts and line graphs and uses these to solve problems.
- Calculate and interpret the mean as an average.

### Ideas for helping your child develop their mathematical understanding:

Make sure your child is **absolutely confident** with the recall facts they need to know at speed:

- All times tables to 12 x 12.
- Division facts for all tables.

**To make the most of knowing these facts they need to be able to recall the answers without any hesitation or thought.**

Encourage calculations in real-life situations – in particular where more than one calculation is needed to work out the answer:

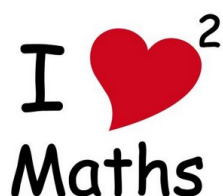
- How much will our shopping cost? Going around the supermarket can they mentally add up the cost (use rounding to the nearest pound). How close are they at the checkout?
- How do you work out the cost of your holiday? How much will a day out cost? Get them to investigate for you e.g. train tickets, entrance to attraction, budget for lunch etc.
- Can they work out which purchase represents the best value e.g. cans of coke, washing powder, 2 for 3 etc. These often have special offers meaning they are difficult to compare. In this case they might use a calculator on a phone to work out.
- Can they work out the new price on offers where there is 25% off etc.
- How much more do you actually get if you get 50% extra?
- Football tables/cricket leagues etc.
- Talk about what the language of statistics actually means – the same information is often presented in different ways. It's not always clear as to what the truth is.

Talk about the way we use maths every day:

- Does your child see you using cash? Or do you always had over a card? Do they understand how you use your bank? Talk to your child about how debit cards work. Many financial transactions are 'invisible' to children. Help them see how the world of money works.
- Does your child understand the difference between credit cards and debit cards? Do they know what interest is? (link to percentages)

Talk about what aspects of maths that they find tricky – there may be aspects that you can help them with. Alternatively encourage them to talk to their class teacher about it. This is a good skill to have in preparation for secondary school.

If you would like any more advice on how to support your child at home please speak to your child's teacher.



# Glossary of Terms

Hyperlinks can be followed when accessed on the school website. Alternatively, this glossary is available on The School Run website.

## < and >

These symbols are referred to as the '[greater than](#)' (>) and '[less than](#)' (<) symbols. Children learn that they are used to show whether a number is bigger or smaller than another number (for example,  $56 > 34$  or  $34 < 56$ ).

## = (equals)

The equal sign shows that what is on the left of the sign is equal in value or amount to what is on the right of the sign. For examples  $3 + 4 = 7$  means that  $3 + 4$  is equal to 7,  $60 \text{ seconds} = 1 \text{ minute}$  means that 60 seconds is equal to 1 minute.

## 12-hour and 24-hour clock

The [12-hour clock](#) runs from 1am to 12 noon and then from 1pm to 12 midnight. The [24-hour clock](#) uses the numbers 00:00 to 23:59 (midnight is 00:00).

## 2D shapes

[2D shapes](#) are two-dimensional, or 'flat'. Examples of 2D shapes are squares, triangles, circles and rectangles.

## 3D shapes

[3D shapes](#) are three-dimensional, and have a volume. Examples of 3D shapes are cubes, cuboids, spheres, cylinders and prisms.

## Acute angle

An [acute angle](#) is one that measures less than  $90^\circ$ .

## Analogue and digital clocks / time

An [analogue clock](#) is a circular-faced clock with the numbers one to twelve around the outside and two hands, a shorter one to measure hours and a longer one to measure minutes. A [digital clock](#) is a clock which simply shows numbers to denote the time.

## Area

[Area](#) is the term used to define the amount of space taken up by a 2D shape or surface. We measure area in square units:  $\text{cm}^2$  or  $\text{m}^2$ .

## **Array**

An [array](#) is a pictorial representation, a picture of rows of dots, to help children understand multiplication and times tables.

## **Arrow cards**

[Arrow cards](#) are a maths aid used to help children partition numbers (divide them into units, tens, hundreds, etc.) and understand place value.

## **Ascending order**

When a group of numbers are given in [ascending order](#), this means they are given in order from smallest to largest (ascending means 'going up'). The opposite is descending order.

## **Average**

In maths, the [average](#) value in a set of numbers is the middle value, calculated by dividing the total of all the values by the number of values.

## **Axes**

[Axes](#) are the horizontal and vertical lines used to frame a graph or chart.

## **Bar chart**

A [bar chart](#) is a chart that displays information (data) by using rectangular bars of different heights, arranged on a vertical axis and a horizontal axis.

## **Block graph**

A [block graph](#) (or block diagram) is a simple chart which shows numbers on the vertical axis and labels on the horizontal axis. Each unit is represented by one block.

## **BODMAS**

[BODMAS](#) is an acronym used to help pupils remember the correct order to complete mathematical calculations in: Brackets, Orders, Division, Multiplication, Addition, Subtraction.

## **Bus stop method**

The ['bus stop' method](#) (also known as short-hand division or short division) is a division technique children are taught in primary school. Children are usually taught the bus stop method once they are confident with chunking (another division technique).

## **Capacity**

[Capacity](#) is the total amount of fluid that can be contained in a container. It is the word we use when we are measuring liquids (in litres or millilitres).

## **Cardinal numbers**

[Cardinal numbers](#) allow us to count a set of objects and tell us about quantity (one, two, three, four, etc.).

## **Carroll diagram**

A [Carroll diagram](#) is used to organise data and group it according to whether it fits certain criteria. The information is presented in rows and columns.

## **Chunking**

[Chunking](#) is a method used for dividing large numbers. It involves using rough estimates of how many times a number will go into another number and then adjusting until the right answer is found (repeated subtraction of the divisor and multiples of the divisor – in other words, working out how many groups of a number fit into another number).

## **Circle**

A [circle](#) is a 2D curved shape, every point of which is the same distance from a fixed point in the centre.

## **Circumference**

The [circumference](#) is the measurement all the way around the outside edge of a circle.

## **Clockwise and anti-clockwise**

When something moves in a [clockwise direction](#), it is moving in the same direction as the hands on the clock. When something moves in an [anti-clockwise direction](#), it is moving in the opposite direction. Children are taught about the language of direction from KS1 onwards.

## **Coordinates**

[Coordinates](#) are numbers which determine the position of a point or a shape in a particular space (a map or a graph). Points are marked by how far along they are on the x axis (the horizontal axis) and how far up they are on the y axis (the vertical axis).

## **Column method**

The [column method](#) of addition and subtraction is the method where numbers are 'carried' and 'borrowed'. The numbers to be added and subtracted are set up in columns of units, tens, hundreds, etc.

## **Complementary addition (subtraction on a number line or the jump strategy)**

'[Complementary addition](#)' is a subtraction method that involves putting the smaller number at the start of a number line and then jumping up to the bigger number (it's also known as the 'jump strategy'). This makes the concept of subtraction being about finding the difference between two numbers very clear.

## **Converting into same units**

[Converting into the same units of measurement](#) means understanding that the same length, capacity or weight can be expressed in different units of measurement. For example, weight can be shown in kilograms (kg) but also grams (g); there are 1000g in 1kg.

## **Cube numbers**

A [cube number](#) is a number that is the product of three numbers which are the same. In other words, if you multiply a number by itself and then by itself again, the result is a cube number. To write the mathematical formula for cube numbers we add a small 3 next to and above the number, for example:  $2^3$ .

## **Data handling**

[Data handling](#) is the term used to refer to primary-school statistics. Children learn about how to collect, interpret and display data in [pictograms](#), [tally charts](#), [block diagrams](#), [bar charts](#), [line graphs](#) and [pie charts](#).

## **Decimal**

A [decimal](#) is a number expressed in the scale of tens. Commonly speaking we talk about decimals when numbers include a decimal point to represent a whole number plus a fraction of a whole number (tenths, hundredths, etc.).

## **Degrees**

[Degrees](#) are the unit of measurement used to measure angles. A right angle is  $90^\circ$ , a straight line angle is  $180^\circ$  and a full turn is  $360^\circ$ . We use a protractor (an angle measurer) to measure degrees.

## **Denominator**

The [denominator](#) is the bottom number of a fraction. So in the fraction  $\frac{3}{8}$  the denominator is 8. In the fraction  $\frac{5}{6}$  the denominator is 6.

## **Descending order**

When numbers are put in [descending order](#), they are ordered from largest to smallest. The opposite is ascending order (from smallest to largest).

## **Diagonal**

A [diagonal](#) is a straight line joining two nonadjacent vertices of a shape, that is, two corners of a shape that are not next to each other.

## **Diameter**

The [diameter](#) is the straight line going through the centre of a circle, connecting two points on the [circumference](#).

## **Division facts**

[Division facts](#) are the division number sentences related to times tables. For example,  $30 \div 3 = 10$ ,  $27 \div 3 = 9$  and  $24 \div 3 = 8$  are all division facts for the 3x table.

## **Edge**

In 3D shapes, the [edges](#) are the lines where two [faces](#) meet.

## **Equation**

An [equation](#) is a number sentence where one side equals the other, for example  $4 + 4 = 10 - 2$ .

## **Equilateral triangle**

An [equilateral triangle](#) has three equal sides and three equal angles.

## **Equivalent fractions and simplifying fractions**

When two fractions are [equivalent](#), this means they are the same in terms of shape and size, but are expressed using different numbers (for example,  $\frac{1}{3}$  is equivalent to  $\frac{2}{6}$  or  $\frac{3}{9}$ ). [Simplifying a fraction](#) means finding an equivalent fraction where the numbers are reduced as much as possible.

## **Estimate**

An [estimate](#) is sometimes called a 'clever guess'. Estimating means roughly calculating or judging a number or value.

## **Expanded notation**

[Expanded notation](#) is writing numbers or number sentences in which the numbers are partitioned (so  $67 + 43$  could be written as  $60 + 7 + 40 + 3$ ).

## **Face**

In 3D shapes, the [faces](#) are the flat parts of the shape.

## **Factor**

A [factor](#) is one of two or more numbers that divides a given number without a remainder. In the number sentence  $4 \times 5 = 20$ , both 5 and 4 are factors of 20.

## **Finding the difference between two numbers**

[Finding the difference between two numbers](#) means subtracting the smaller number from the larger number. This concept is usually taught with complementary addition (subtraction on a number line).

## **Formula**

A [formula](#) is a group of mathematical symbols and numbers that show how to work something out. Formulae children will learn in primary school include the formula for calculating the [perimeter](#) and [area](#) of 2D shapes and the formula for the volume for 3D shapes.

## **Grid method**

The [grid method](#) is a written technique used to teach children multiplication. It involves partitioning numbers into tens and units before they are multiplied, and placing them in a grid. The numbers are then multiplied two by two and the results are added together to give a total answer.

## **Highest common factor**

The [highest common factor](#) of two numbers is the largest whole number which is a factor of both. A factor is one of two or more numbers that divides a given number without a remainder.

## **Horizontal**

A [horizontal](#) line is a line that runs from right to left, like the horizon.

## **Improper fraction**

An [improper fraction](#) is one that is 'top-heavy' so the numerator is bigger than the denominator, for example  $7/3$ .

## **Investigation**

Carrying out a [mathematical investigation](#) means applying skills and knowledge to solving problems. Investigations differ from word problems because there isn't always just one way of one way of working them out and the solution might have to be found through trial and error. Often, there is not just one answer; there could be several.

## **Integer**

An [integer](#) is a whole number. This can be a negative or positive number; 0 is also an integer.

## **Inverse operation**

[Inverse operations](#) are opposite operations; one reverses the effect of the other. Subtraction is the inverse of addition and division is the inverse of multiplication.

## **Isosceles triangle**

An [isosceles triangle](#) has two equal sides and two equal angles.

## **Line graph**

A [line graph](#) is used to display information which changes over time. It is plotted on a graph as a series of points joined with straight lines.



### **Long division**

[Long division](#) is a written method of dividing numbers (usually a three- or four-digit number by another large number).

### **Long multiplication**

[Long multiplication](#) (or column multiplication) is a written method of multiplying numbers (usually a two- or three-digit number by another large number). As in column addition and column subtraction, the numbers are positioned in columns according to their place value.

### **Lowest common denominator**

The [lowest common denominator](#) (or least common denominator) is the smallest number that is exactly divisible by each denominator of a set of fractions.

### **Lowest common multiple**

The [lowest common multiple](#) of two numbers is the smallest whole number which is a multiple of both. A multiple is a number that can be divided by another number a certain number of times without a remainder.

### **Mass**

[Mass](#) refers to the weight of an object. It is usually measured in grams and kilograms.

### **Mean**

The [mean](#) is the total of all the values in a set of data, divided by the number of values.

### **Median**

The [median](#) is the middle number in a list of numbers, ordered from smallest to largest.

### **Mirror line**

A [mirror line](#) is the central line which can be drawn on a symmetrical shape to show that both sides of the shape are exactly the same.

### **Mixed number**

A [mixed number](#) is made up of a whole number and a fraction, for example  $9 \frac{3}{4}$ .

### **Mode**

The [mode](#) is the value that appears most often in a set of data. In this case, the mode is 9 seconds.

### **Multiple**

A [multiple](#) is a number that can be divided by another number a certain number of times without a remainder. In the number sentence  $4 \times 5 = 20$ , 20 is a multiple of 4 and a multiple of 5.

## **Negative numbers**

A [negative number](#) is a number smaller than 0 (for example, -1, -3, -36).

## **Net**

A [net](#) is what a 3D (three-dimensional) shape would look like if it were opened out flat.

## **Number bonds**

[Number bonds](#) are the pairs of numbers that make up a given number (number bonds to 10 are 1 + 9, 2 + 8, 3 + 7, 4 + 6, 5 + 5; number bonds to 20 are 1 + 19, 2 + 18, 3 + 17, 4 + 16, 5 + 15).

## **Number facts**

[Number facts](#) are basic addition, subtraction, multiplication and division calculations that children should learn to recall instantly.

## **Number line and number ladder**

A [number line](#) is a straight, horizontal line with numbers placed at even increments along the length. It's not a ruler, so the space between each number doesn't matter, but the numbers included on the line determine how it's meant to be used. A number ladder is the vertical version of a number line.

## **Number sentence**

A [number sentence](#) is an arrangement of numbers and symbols, such as the following:  $6 + 7 = 13$  (addition number sentence),  $45 - 6 = 39$  (subtraction number sentence),  $8 \times 9 = 72$  (multiplication number sentence),  $48 \div 8 = 6$  (division number sentence).

## **Number square**

A [number square](#) is a primary-school maths aid, a square filled with numbers (ordered sequentially). Younger children will often use a number square with numbers from one to 20. You'll also commonly see number squares from one to 100.

## **Numerator**

The [numerator](#) is the top number of a fraction. So in the fraction  $\frac{3}{8}$  the numerator is 3. In the fraction  $\frac{1}{9}$  the numerator is 1. If a fraction has 1 as its numerator, it is called a unit fraction.

## **Obtuse angle**

An [obtuse angle](#) is one that measures between  $90^\circ$  and  $180^\circ$ .

## **Odd and even numbers**

An [even number](#) is a number that can be divided into two equal groups. Even numbers always end in 2, 4, 6, 8 and 0. An [odd number](#) is a number that cannot be divided into two equal groups. Odd numbers end in 1, 3, 5, 7, 9.

## **Operation**

The four mathematical [operations](#) are addition, subtraction, multiplication and division.

## **Ordinal numbers**

[Ordinal numbers](#) (first, second, third, etc.) tell us the position of an item in a list. Dates are ordinal numbers.

## **Parallel**

[Parallel](#) lines are straight lines that always stay the same distance from each other and never meet.

## **Partitioning**

[Partitioning](#) means separating numbers into the tens, units, hundreds, thousands, etc. that make them up (so 2967 is  $2000 + 900 + 60 + 7$ ). Partitioning helps children understand place value.

## **Percentage**

A [percentage](#) is a number or ratio expressed as a fraction of 100. When we talk about percentages, we imagine that 'a whole' has been divided into 100 equal parts.

## **Perimeter**

The [perimeter](#) is the distance around the edge of a 2D shape.

## **Perpendicular**

When two lines are [perpendicular](#), they are at right angles to each other.

## **Pictogram**

A [pictogram](#) is a chart that uses pictures to represent data. Pictograms are set out in the same way as bar charts, but instead of bars they use columns of pictures to show the numbers involved.

## **Pie chart**

[Pie charts](#) are circular charts divided up into sections (or 'slices') to represent values of different sizes.

## **Place value**

[Place value](#) is the value of each digit in a number. It means understanding that 582 is made up of 500, 80 and 2, rather than 5, 8 and 2.

## **Polygon**

[Polygons](#) are 2D shapes with straight, fully closed sides. Polygons can have any number of sides. Common polygons are triangles, squares, pentagons, hexagons.

### **Prime number**

A [prime number](#) is a number greater than 1 that cannot be divided evenly by any number other than itself or 1. For example: 13 is a prime number because you cannot divide it (without a remainder) by any number except 13 or 1.

### **Prism**

A [prism](#) is a 3D shape with flat sides and two identical ends. Prisms have the same cross-section all along the shape, from end to end.

### **Probability, chance and likelihood**

[Probability](#) (or chance, or likelihood) tells us how likely something is to happen. It can be described in words, or more accurately in terms of fractions and percentages.

### **Product**

The [product](#) of two numbers is the result you get when you multiply them together (for example, 12 is the product of 3 and 4 and 20 is the product of 4 and 5).

### **Proportion**

[Proportion](#) tells us about a portion or part in relation to a whole.

### **Pyramid**

A [pyramid](#) is a 3D shape with a polygon base and flat (triangular) sides that join at a common point (the apex).

### **Radius**

The [radius](#) is the distance from the centre of a circle to the edge of the circle.

### **Range**

The [range](#) is the difference between the lowest value and the highest value in a data set.

### **Ratio**

A [ratio](#) compares values, telling us how much of one thing there is compared to another thing.

### **Reflection of shapes**

[Reflecting a shape](#) in a mirror line means drawing a symmetrical copy of the shape, flipped over the line (exactly the same size but facing in the opposite direction).

### **Reflective symmetry**

[Reflective symmetry](#) is when a shape or pattern is reflected in a line of symmetry or a mirror line. The reflected shape will be exactly the same as the original, the same distance from the mirror line and the same size.

### **Reflex angle**

A [reflex angle](#) is an angle that measures between  $180^\circ$  and  $360^\circ$ .

### **Regular and irregular shapes**

[Regular shapes](#) have sides that are all equal and interior (inside) angles that are all equal. [Irregular shapes](#) have sides and angles of any length and size.

### **Right angle**

A [right angle](#) is an angle that measures  $90^\circ$ . It is also known as a 'quarter turn' because it is a quarter of a full turn, which measures  $360^\circ$ .

### **Right-angled triangle**

A [right-angled triangle](#) is a 2D shape with three sides and an angle that measures  $90^\circ$ .

### **Roman numerals**

[Roman numerals](#) are the numbers that were used in ancient Rome, combinations of letters from the Latin alphabet (I, V, X, L, C, D and M).

### **Rotation of shapes**

[Rotating shapes](#) means moving them around a fixed point (clockwise or anticlockwise, and by a certain number of degrees). The shape stays the same, but its position in the space will change.

### **Rotational symmetry**

[Rotational symmetry](#) is when a shape or pattern can be rotated or turned around a central point and remains the same.

### **Rounding numbers**

[Rounding numbers](#) means adjusting the digits (up or down) to make rough calculations easier. We usually round numbers to the nearest 10, 100 and 1000.

### **Repeated addition**

[Repeated addition](#) is a method of helping children understand multiplication. Children are asked to work out, for example, what 3 'lots of' 5 are. They will be shown that this can be written as  $5 + 5 + 5$  (repeated addition number sentence) as well as  $3 \times 5$  (multiplication number sentence).

### **Scalene triangle**

A [scalene triangle](#) is a three-sided 2D shape in which the sides are all unequal.

### **Shared between**

'[Shared between](#)' is a term used in word problems to indicate division. Children learn that by sharing equally into groups they are dividing.

## **Square numbers**

When you multiply a number by itself, the result is a [square number](#). To write the mathematical formula for square numbers we add a small 2 next to and above the number, for example:  $3^2$ .

## **Standard and non-standard units**

[Standard units](#) are the units we usually use to measure the weight, length or capacity of objects (grams and kilograms, centimetres, metres and kilometres, millilitres and litres). [Non-standard units](#) are used by younger children to introduce them to the concept of measuring (for example: hand spans, the length of a pencil).

## **Sum**

The [sum](#) of two numbers is the answer you get when you add them both together (for example, the sum of 5 and 4 is 9).

## **Symmetry**

Something is symmetrical when it is the same on both sides. A shape has [symmetry](#) if a central dividing line (the mirror line) can be drawn on it, to show that both sides of the shape are exactly the same.

## **Tally chart**

A [tally chart](#) uses marks representing numbers to collect data quickly and efficiently. One vertical mark is used to represent each unit; when five objects are counted the fifth line is crossed through the first four.

## **Tessellation**

[Tessellation](#) is when shapes fit together exactly with no gaps. Common examples of [tessellating shapes](#) are floor tiles.

## **Time intervals**

A [time interval](#) is the length of time in between two given times.

## **Translation of shapes**

In geometry [translation](#) means moving a shape into a different position, without changing it in any way.

## **Triangle**

A [triangle](#) is a [polygon](#) with three sides and three angles. It is a 2D shape.

## **Triangular numbers**

[Triangular numbers](#) are a sequence of numbers generated by arranging a pattern of dots into equilateral triangles.

## **Turns**

A quarter turn is a  $90^\circ$  movement, [clockwise or anti-clockwise](#). A half turn is  $180^\circ$  and a full turn is  $360^\circ$ .

## **Two-step and multi-step problems**

A [two-step problem](#) is a word problem that requires two operations to solve it; a [multi-step problem](#) requires more than two operations before the solution can be found.

## **Unit fractions**

A [unit fraction](#) is a fraction where the numerator (top number) is 1 and the denominator (bottom number) is a whole number.

## **Venn diagram**

A [Venn diagram](#) shows the relationship between a group of different things (a set) in a visual way, by sorting data into two or three circles which overlap in the middle. Each circle follows a certain rule, so any numbers or objects placed in the overlapping part (the intersection) follow both rules.

## **Vertex / vertices**

In 3D shapes, the [vertices](#) are the points where two or more [edges](#) meet. The angles of a 2D shape are also sometimes referred to as 'vertices' (singular: vertex).

## **Vertical**

A [vertical](#) line runs up and down the page, from top to bottom.

## **Volume**

[Volume](#) is the amount of 3D space an object occupies or takes up.

## **Word problem or story problem**

A [word problem](#) (also known as a story problem) is a 'real-life' scenario where a problem needs to be solved by way of a mathematical calculation.

# Further Support

## List of Maths Websites for Parents and Carers

- National Numeracy Family Maths Toolkit has a wealth of tips and advice for parents. <https://www.familymathstoolkit.org.uk/>
- Oxford Owl includes a range of activities, top tips and eBooks to help your child with their maths at home. <http://www.oxfordowl.co.uk/maths-owl/maths>
- Maths 4 Mums and Dads explains some of the milestones children make between the ages of 3-and-11-years-old. <http://www.maths4mumsanddads.co.uk/index.php>
- Nrich. A range of maths games, problems and articles on all areas of maths. <http://nrich.maths.org/frontpage>
- Apps for primary schools. A list of educational apps for all subjects. <https://www.educationalappstore.com/app-by-age/primary-school-apps>
- NCETM progression maps for Key Stages 1 and 2. These documents indicate where key concepts are taught and how the skills build up over primary school. <https://www.ncetm.org.uk/classroom-resources/progression-maps-for-key-stages-1-and-2/>

## List of Maths Websites for Children

<http://amathsdictionaryforkids.com/>

<http://www.bbc.co.uk/bitesize/ks1/maths/>

<http://www.bbc.co.uk/bitesize/ks2/maths/>

<https://classroom.thenational.academy/subjects-by-key-stage/early-years-foundation-stage/subjects/maths>

<https://classroom.thenational.academy/subjects-by-key-stage/key-stage-1/subjects/maths>

<https://classroom.thenational.academy/subjects-by-key-stage/key-stage-2/subjects/maths>

<http://www.ilovemathsgames.com/>

<http://www.mathsisfun.com/index.htm>

<http://www.mathszone.co.uk/>

<http://www.multiplication.com/>

<https://trockstars.com/login>

<http://www.topmarks.co.uk>