



MATHS

AT NORTH CADBURY C OF E PRIMARY SCHOOL

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Maths at North Cadbury C of E Primary School

So, why is Maths important?

Here at North Cadbury, we are passionate about maths!

We aim to develop our children as mathematicians who enjoy engaging with the processes of problem solving over and above the completion of the actual calculations involved.

We embed the core skills of addition, subtraction, multiplication and division, realising the importance and application of number in an everyday real life context.

We promote the importance of learning the multiplication tables and their related division facts through fun, effective, relevant lessons, celebrating individual achievements along the way.

We develop an understanding of shape, data and measures through practical creative lessons which are often cross-curricular and encourage pupil led investigations.

Our teaching of maths aims to equip our children with the necessary numeracy skills to allow them to use different methods and strategies in everyday life as they continue on their learning journey.

How is Maths taught across Key Stages?

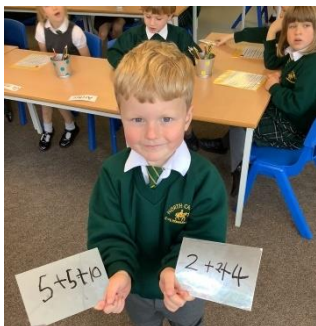
EYFS

Children have regular daily whole class mathematics inputs, where the focus is on the development of mental maths skills - concentrating on numbers 1 to 20.

The initial part of the EYFS is centered around counting and ordering numbers, matching amounts to quantities and ensuring children are accurate in their counting and are using strategies to help them.

Regular small group adult-led sessions are taught in maths. In addition to the more formal taught sessions, children are encouraged to explore number and shape and space through continuous provision activities, which are planned to develop children's understanding of key mathematical concepts.

By the end of the year, children are expected to be able to count and order numbers to 20, to be able to say what is one more and one less than a given number, to be able to add or subtract single digit numbers and to solve problems, including doubling, halving and sharing.



Key Stage 1

The principal focus of maths teaching in Key Stage 1 is to ensure that children develop confidence and mental fluency with whole numbers, counting and place value.

This involves working with numerals, words and the four operations, including the use of practical resources (e.g. concrete objects and measuring tools).

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use related vocabulary.

Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, our pupils know the number bonds to 20 and are precise in using and understanding place value.

An emphasis on practice at this early stage aids fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at Key Stage 1.

Lower Key Stage 2

The principal focus of mathematics teaching in lower Key Stage 2 is to ensure that children become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value.

This should ensure that children develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including simple fractions and decimal place value.

Teaching also ensures that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 times table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Upper Key Stage 2

The principal focus of mathematics teaching in upper Key Stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers.

This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation.

With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number.

Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should

read, spell and pronounce mathematical vocabulary correctly.

At North Cadbury, we believe that maths is a fundamental part of human thought and logic, and is integral to how we understand the world and ourselves. Maths provides an effective way of building mental discipline and encourages logical reasoning and mental rigor.

In addition, mathematical knowledge plays a crucial role in understanding the contents of other school subjects such as science, music and art.

**Without mathematics,
there's nothing you can do.**

**Everything around you
is mathematics.**

**Everything around you
is numbers.**

-Shakuntala Devi

ADDITION

Initially children will be practising number formation, and taking part in practical activities where they will learn to count objects, matching to the written numerals.

Children will start to add, or combine groups of objects from a very young age. They learn that combining two sets will give more, and they are shown how they could represent this on paper using pictures and simple number sentences.



‘You have five apples and I have three apples. How many apples altogether?’

$$5 + 3 = 8$$

Before formal written methods are introduced, children are first taught methods that allow them to work out an answer in their heads. They use equipment to help them, such as cubes or counters.

Number lines are used to help children record what has gone on in their head.



‘Put your finger on number five. Count on (count forwards) four.’

$$5 + 4 = 9$$

When ready, children in Year 2 will start to work more formally in columns, with practical equipment. They will use dienes, straws and other mathematical equipment to carry out a formal written method practically.

Use place value to add numbers.

Pick the correct way to break apart 37 into tens and ones.

Tens	Ones	Tens	Ones	Tens	Ones	Tens	Ones
7	3	7	0	3	7	3	0
							

→ Add 40 to 37 by adding 4 tens.

T	O
7	7



Tens	Ones
3	7
4	0
7	7

$$37 + 40 = \underline{\quad}$$

$$= \boxed{77}$$

Once understanding is secure, children will add larger numbers, working with numbers of more than 4 digits by the time they reach Year 5.

They will also add decimal numbers in different contexts such as money, or measures.

Column method addition for adding money

$$\begin{array}{r}
 \text{£}12.18 + \text{£}25.25 \\
 \hline
 \text{£}25.25 \\
 + \text{£}12.18 \\
 \hline
 \text{£} \quad .
 \end{array}$$

SUBTRACTION

As with addition, children will be doing a daily mixture of practical, mental and oral work including lots of counting, talking about numbers and using numbers in real life activities. They will begin to record what they have done with pictures and numbers. This will help them to understand what is happening and how they have worked something out.

$$6 - 2 = 4$$


‘Take two apples away. How many are left?’

Children are shown two methods to subtract mentally, ‘counting back’ (take away) and ‘counting up’ (finding the difference). Depending upon the numbers involved one method can be more appropriate than the other. As with addition, the ‘empty number line’ can be used to help record their mental methods for subtraction.

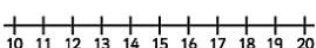
Addition and Subtraction to 20 with a Number Line

Can you work out the answer and draw a picture or write a sentence about it?
The first one is done for you.

Example:

$11 - 5 = 6$	
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$18 - 6 =$

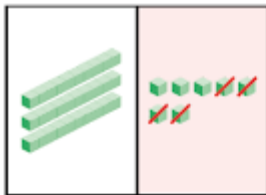


My Dad buys 18 eggs but breaks 6 of them. How many eggs does he have left?

When ready, children in Year 2 will start to work more formally in columns, with practical equipment, as they have for addition. As with addition, they will use dienes, straws and other mathematical equipment to carry out a formal written method, practically.

Subtract the ones.

$$7 \text{ ones} - 4 \text{ ones} = 3 \text{ ones}$$



tens	ones
3	7
- 2	4
	3

Once children are secure with simple subtraction, they will be taught how to use the equipment for more difficult calculations. These will often require the children to 'exchange' a 'ten rod' for ten 'ones'.

This will lead into the formal written method:

78

-23

55

Using the language of place value to ensure understanding:
'Eight subtract three, seventy subtract twenty.'

Introduce the formal written method, involving decomposition/exchange:

$$73 - 27 = 46$$

$$\begin{array}{r} 6 \\ 7 \overline{) 13} \end{array}$$

$$- \underline{27}$$

$$\underline{46}$$

Using the language of place value to ensure understanding:
 'We can't subtract seven from three, so we need to
 exchange a ten for ten ones to give us 60 + 13.'

MULTIPLICATION

Children will first experience multiplication as the repeated addition of different groups of objects. E.g. counting pairs of socks on a line, or finding out the number of bread slices required when making sandwiches.

**In practical activities and through discussion they will
 begin to solve problems involving doubling.**



'Three apples for you and three apples for me. How many
 apples altogether?'

**They will solve practical problems that involve combining
 groups of 2, 5 or 10.**

e.g. socks, fingers and cubes.



'Six pairs of socks.

How many socks altogether? 2, 4, 6, 8, 10, 12'



'Three pots of ten crayons. How many crayons altogether?
10, 20, 30'

'Arrays' are used throughout the school to support children in being able to 'see' the multiplication. An array is an arrangement of rows and columns.

Using arrays to support early multiplication



'Five groups of two faces. How many faces altogether? 2, 4, 6, 8, 10' Two groups of five faces. How many faces altogether? 5, 10'

'2 groups of 5'

Using arrays to support multiplication:



$$6 \times 5 = 30$$



' $5 + 5 + 5 + 5 + 5 + 5 = 30$ '

'6 rows of 5'

'6 groups of 5'

'5 groups of 6'

Using an empty number line:

$$6 \times 5 = 30$$

1x5

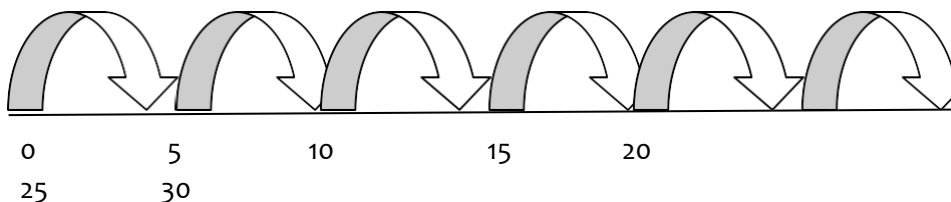
2x5

3x5

4x5

5x5

6x5



Make the link to repeated addition.

Children will be encouraged to learn their multiplication (times) tables, and given strategies to help them succeed. It is important that children learn the multiplication tables in a way that suits them. It is important that our children know their times tables up to and including 12 times.

Multiplication tables will not be learnt in strict numerical order. Children will learn that multiplication is counting on

in repeated steps, and may use the number track or number line to support them.

Grid Method (teen number multiplied by a one- digit number):

$$13 \times 8 = 104$$

x	10	3
8	80	24

$$80 + 24 = 104$$

‘Partition 13 into 10 + 3 then multiply each number by 8. Add the partial products (80 and 24) together.’

This will lead into expanded short multiplication:

$$13 \times 8 = 104$$

$$10 + 3$$

$$\begin{array}{r} \text{X} \quad \underline{\quad} 8 \end{array}$$

$$\begin{array}{r} 24 \end{array} \quad (3 \times 8)$$

$$\begin{array}{r} + \quad \underline{\quad} 80 \end{array} \quad (10 \times 8)$$

$$104$$

Include an addition symbol when adding partial products.

Refine the recording in preparation for formal short multiplication:

$$13 \times 8 = 104$$

$$\begin{array}{r} 13 \\ \times \underline{8} \\ 24 \quad (3 \times 8) \\ + \underline{80} \quad (10 \times 8) \\ \hline 104 \end{array}$$

Use the language of place value to ensure understanding.

Include an addition symbol when adding partial products.

Formal short multiplication:

$$\begin{array}{r} 13 \\ \times \underline{8} \\ \hline 104 \\ 2 \end{array}$$

Ensure that the digit 'carried over' is written under the line in the correct column.

Use the language of place value to ensure understanding.

Further develop the grid method for two-digit numbers multiplied by a one-digit number:

$$36 \times 4 = 144$$

x	30	6
4	120	24

$120 + 24 = 144$ (add the partial products)

Expanded short multiplication (two-digit number by a one-digit number):

$$36 \times 4 = 144$$

$$30 + 6$$

$$\begin{array}{r} \text{X} \quad \underline{\quad} 4 \\ \end{array}$$

$$\begin{array}{r} 24 \end{array} \quad (4 \times 6 = 24)$$

$$+ \underline{120} \quad (4 \times 30 = 120)$$

$$144$$

Include an addition symbol when adding partial products.

Refine the recording in preparation for formal short multiplication:

$$36 \times 4 = 144$$

$$36$$

$$\begin{array}{r} \text{X} \quad \underline{\quad} 4 \\ \end{array}$$

$$\begin{array}{r} 24 \end{array} (4 \times 6)$$

$$+ \underline{120} \quad (4 \times 30)$$

$$\underline{144}$$

This leads to short multiplication (formal method) of a two-digit number multiplied by a one- digit number:

$$36 \times 4 = 144$$

3 6

X 4

1 4 4

2

Use the language of place value to ensure understanding.
Ensure that the digit carried over is written under the line in the correct column.

DIVISION

Children are taught to understand division as both 'Sharing' and 'Grouping'

In practical activities and through discussion they will begin to solve problems involving halving and sharing.



Share the apples between two people.

'Half of the apples for you and half of the apples for me.'

From a young age our children are encouraged to draw pictures or make marks on the page to support their thinking.

They will begin to use the vocabulary associated with division in practical contexts:



'Share these eight apples equally between two children.
How many apples will each child have?'



'Share 20 crayons between 2 pots.'

'How many crayons are in each pot?'

Children will move from sharing to grouping in a practical way:

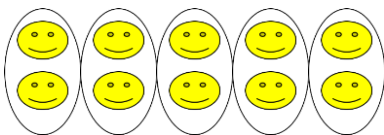


‘Put 20 crayons into groups of 10. How many pots do we need?’

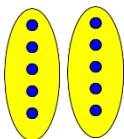
Use arrays to support early division:



‘How many faces altogether? How many groups of two?’



‘Five groups of two’



‘How many groups of 5?’

‘10 shared equally between 2 people’ ‘Half of ten is five’

Using arrays to support division:



How many groups of 3? How many groups of 5? 15 shared between 3 people is...? 15 shared between 5 people is...?

15 divided by 5 = 3

15 divided by 3 = 5

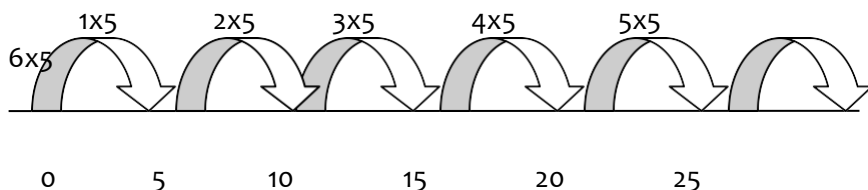
$15 \div 5 = 3$

$15 \div 3 = 5$

Use an empty number line to count forwards:

$30 \div 5 = 6$

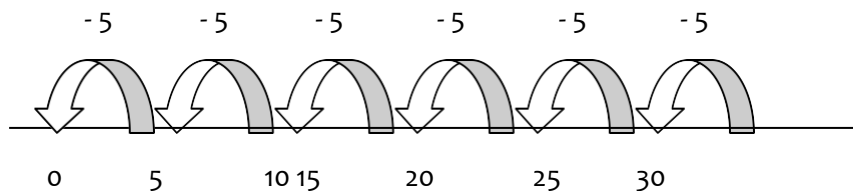
‘How many jumps of five make thirty?’



Also jump back to make the link with repeated subtraction:

$30 \div 5 = 6$

‘How many groups of five?’



The number line is used to model division and help children when counting in repeated steps, either forwards or backwards.

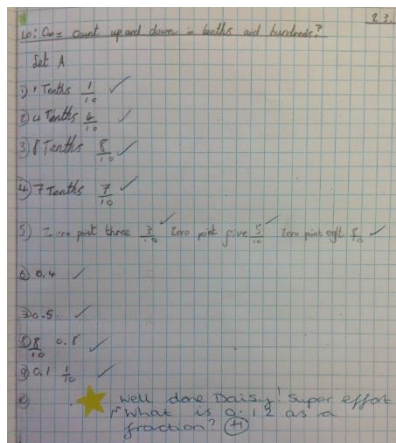
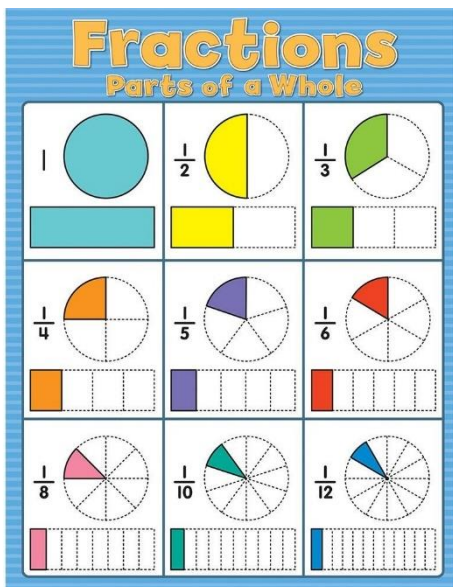
Introduce the formal layout using multiplication/division facts that the children know:

$$24 \div 3 = 8$$

$$\begin{array}{r} 8 \\ 3 \overline{) 24} \end{array}$$

‘Twenty four divided by three equals eight.’ ‘How many threes are there in twenty four?’

This ‘short division’ method is used for all division calculations when dividing by a single digit number. In Year 6 the children will be expected to divide by 2-digit numbers. For this they will use the ‘long division’ method using their knowledge of multiplication tables.



FRACTIONS, GEOMETRY(SHAPE), MEASURES & STATISTICS (HANDLING DATA)

Fractions

As soon as children start at North Cadbury C of E Primary School, they will begin to explore fractions in everyday life.

Initially they will be recognising, finding and naming half and quarter of objects, shapes or quantities. This will be extended to other fractions and children will explore the concept of equivalence.

Once children reach Key Stage 2, they will begin to order, compare, add and subtract fractions with the support of practical equipment.

Decimal numbers will be introduced in contexts such as money and measures once the children are ready.

At the end of Key Stage 2, your child will explore multiplying and dividing fractions in preparation for Key Stage 3.

Geometry (shape)

Many children are familiar with a variety of shapes when they first enter school, and this will be built upon in the classroom setting.

Children will quickly learn to recognise and name common 2D and 3D shapes and relate these to everyday objects.

In Key Stage 2, children will explore different lines and angles using mathematical language. They will also begin to describe positions on a coordinate grid.

Measures

When measuring length, mass, capacity or time our children will begin by using non-standard units e.g. measuring the length of the classroom in steps.

They will soon begin to measure and record using standard, everyday measures e.g. cm/m, g/kg, ml/l, seconds/minutes.

Children learn to tell the time to the hour and half past the hour before moving onto 5 minute intervals.

Once children reach Key Stage 2, children will begin to explore and calculate perimeter, area and volume.

Young children naturally enjoy sorting everyday objects according to colour, size and shape and answering simple questions.

By the end of Key Stage 1, they will learn to record their findings using simple pictograms, tally charts and block diagrams.

These representations are further extended in Key Stage 2, to include bar charts, time graphs, line graphs and pie charts.

Timetables and other charts will allow children to develop their skills in interpreting information.

ADDITIONAL MATHEMATICS FOR YEAR 6

The concepts of ratio and proportion are introduced at the very end of Key Stage 2.

Children will solve problems and link back to previous work involving percentages. Formal algebra will be taught in Year

6 when children will use simple formulae to generate and describe number sequences and solve problems.

