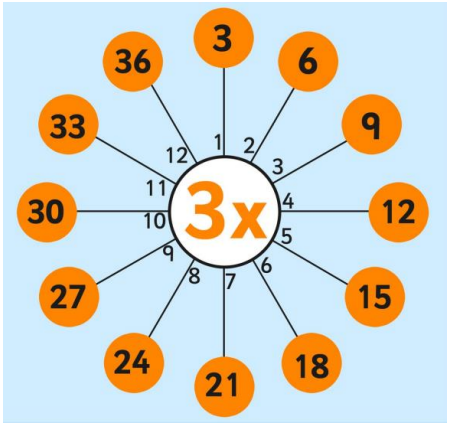
Maths Workshop
Thursday 5th October



ST ANTHONY'S CATHOLIC PRIMARY SCHOOL

Multiplication and Division

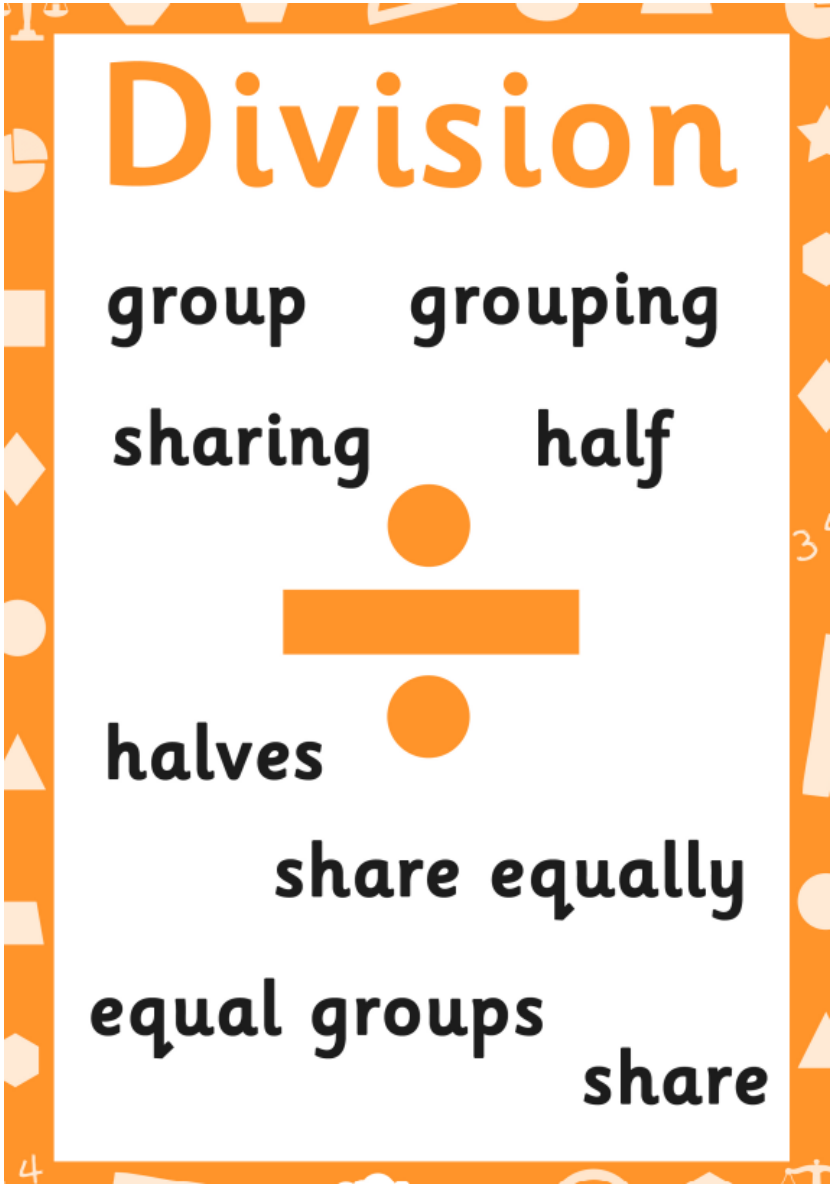
How does this make you feel?

1x1=	11x12=	10x12=	3x5=	1x9=	7x1=
1x5=	1x2=	2x5=	4x1=	2x9=	4x5=
3x1=	3x3=	9x12=	3x7=	6x1=	3x11=
1x4=	4x3=	1x3=	11x7=	4x9=	3x9=
5x1=	8x9=	5x5=	8x12=	2x7=	5x11=
10x3=	6x3=	1x11=	2x11=	11x11=	1x7=
5x3=	9x7=	7x5=	7x7=	7x9=	10x5=
8x1=	10x1=	5x7=	6x5=	3x8=	8x11=
9x1=	9x3=	3x10=	9x9=	4x7=	8x7=
11x9=	6x8=	6x11=	10x7=	10x9=	10x11=
11x1=	11x3=	11x5=	2x3=	4x11=	8x5=
12x5=	12x12=	5x4=	12x7=	12x9=	12x11=
2x1=	8x3=	6x7=	1x12=	1x10=	7x3=
2x2=	9x11=	2x6=	2x8=	2x12=	7x6=
11x4=	3x4=	5x9=	12x2=	2x4=	1x6=
4x2=	4x4=	4x6=	6x9=	4x10=	9x5=
5x2=	10x2=	12x1=	5x8=	3x6=	7x11=
7x4=	6x4=	6x6=	12x3=	6x2=	8x4=
7x2=	9x2=	2x10=	5x10=	1x8=	5x6=
7x8=	6x10=	12x10=	12x4=	8x10=	8x2=
10x4=	9x4=	3x12=	9x8=	12x8=	8x6=
11x6=	9x6=	10x6=	3x2=	4x12=	9x10=
11x2=	6x12=	5x12=	11x8=	11x10=	8x8=
7x12=	10x10=	12x6=	7x10=	4x8=	10x8=

22÷11=	33÷11=	40÷5=	27÷3=	99÷11=	25÷5=
28÷7=	16÷8=	121÷11=	48÷4=	63÷7=	8÷2=
18÷6=	12÷6=	72÷8=	99÷9=	60÷12=	18÷2=
56÷8=	8÷1=	77÷11=	28÷4=	54÷6=	24÷6=
3÷1=	55÷5=	60÷10=	45÷5=	25÷5=	18÷6=
32÷8=	36÷4=	70÷7=	40÷5=	9÷9=	18÷9=
60÷5=	24÷8=	18÷2=	22÷2=	88÷8=	40÷5=
8÷8=	96÷8=	20÷2=	132÷12=	40÷8=	12÷4=
2÷2=	48÷8=	72÷8=	110÷11=	84÷7=	20÷5=
24÷3=	77÷7=	8÷4=	48÷12=	30÷5=	84÷12=
21÷7=	9÷1=	33÷3=	27÷3=	60÷5=	48÷8=
84÷12=	35÷5=	12÷12=	25÷5=	49÷7=	12÷1=
35÷7=	120÷12=	81÷9=	80÷10=	32÷8=	10÷2=
48÷4=	66÷11=	88÷8=	8÷4=	54÷9=	35÷5=
24÷8=	72÷12=	10÷1=	88÷8=	60÷5=	54÷6=
40÷10=	16÷2=	45÷9=	7÷1=	48÷6=	21÷7=
56÷8=	88÷11=	108÷9=	32÷8=	10÷2=	54÷9=
36÷12=	11÷11=	56÷8=	20÷5=	88÷11=	5÷1=
5÷5=	88÷8=	88÷11=	5÷1=	16÷2=	48÷12=
3÷3=	81÷9=	12÷2=	120÷12=	77÷7=	110÷10=
18÷9=	8÷8=	70÷7=	4÷2=	24÷2=	28÷7=
24÷3=	45÷5=	30÷10=	5÷5=	8÷2=	12÷6=
10÷2=	42÷7=	8÷4=	18÷6=	72÷6=	24÷8=
66÷11=	56÷7=	24÷4=	12÷1=	9÷3=	45÷9=

How could we make it easier?


Multiplication
Multiply
Times
Groups of
Lots of
Repeated Addition
Product
Multiplied by
Array
twinkl


Division
group
grouping
sharing
half
halves
share equally
equal groups
share

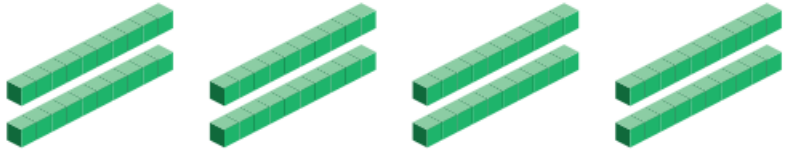
Resources can be powerful tools to support mathematical thinking and reasoning skills.

They help our children to be able to engage practically with new learning and to support their ability to visualise new concepts and knowledge.

At St Anthony's, we apply a CPA approach to maths learning which embeds the importance of using physical, concrete resources to support learning opportunities.

The use of visual images and concrete resources are crucial to the conceptual understanding of mathematics.

Multiply 2 tens by 4.



4×2 tens $= 8$ tens

$4 \times 20 = 80$

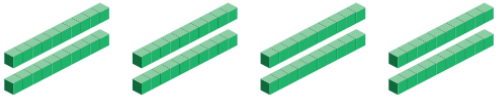
The Concrete, Pictorial, Abstract approach (CPA) is a highly effective approach that develops a deep and sustainable understanding of maths.

It is an essential technique within the teaching of maths for mastery.

Children (and adults!) can find maths difficult because it is abstract. The CPA approach builds on children's existing knowledge by introducing abstract concepts in a concrete and tangible way. It involves moving from concrete materials,

to pictorial representations.

Multiply 2 tens by 4.



to abstract symbols and problems.

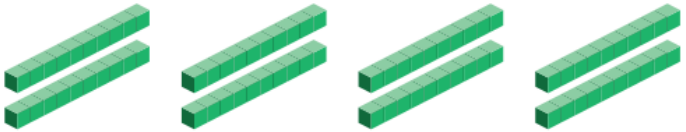
4×2 tens $= 8$ tens

$4 \times 20 = 80$

Concrete step of CPA

Concrete is the "doing" stage.
During this stage, students use concrete objects to model problems.
It allows children to experience and handle physical (concrete) objects.
With the CPA framework, every abstract concept is first introduced using physical, interactive and concrete materials/resources.

Multiply 2 tens by 4.



Pictorial step of CPA

Pictorial is the "seeing" stage.
Here, visual representations of concrete objects are used to model problems.
This stage encourages children to make a mental connection between the physical, concrete object and the abstract pictures, diagrams or models.
This makes it easier for children to visualise and grasp difficult abstract concepts (for example, fractions).

4×2 tens $= 8$ tens

$4 \times 20 = 80$

Abstract step of CPA

Abstract is the "symbolic" stage, where children use abstract symbols to model problems.
Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, +, −, x, /) to indicate addition, subtraction, multiplication or division.

National Curriculum aims for children

To 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.

To reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.

To 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.

At St Anthony's, we want all our children

- to be active participants in their own learning
- to be confident and numerate
- to be ***fluent*** in their maths
- to be able to ***reason*** about their learning using the correct mathematical vocabulary
- to be able to ***apply*** their skills and knowledge as they progress, through ***sustainable*** learning
- *to develop an appreciation that maths is a key skill that equips them for life*
- to not feel anxious and ***enjoy*** maths!

Multiplication and Division in EYFS

Mathematics

Number

- Have a deep understanding of number to 10, including the composition of each number.
- Subitise (recognise quantities without counting) up to 5.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Multiplication in Year 1

Year 1 Multiplication
Multiplication in Year 1 includes: • solving one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Problems include making and adding equal groups. Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. They make connections between arrays, number patterns, and counting in twos, fives and tens.
Key language: double, times, groups of, lots of, equal groups.

Multiplication in Year 2

Year 2 Multiplication

Multiplication in Year 2 includes:

- recalling and using multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculating mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×), and equals (=) signs
- showing that multiplication of two numbers can be done in any order (commutative)
- solving problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Pupils use a variety of language to describe multiplication and division.

Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.

Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

Key language

double, times, multiplied by, the product of, groups of, lots of, equal groups, array.

Multiplication in Year 3

Year 3 Multiplication

Multiplication in Year 3 includes:

- recalling and using multiplication facts for the 3, 4 and 8 multiplication tables
- writing and calculating mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.

Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example,$30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).

Pupils develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written expanded method of multiplication.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Key language

double, times, multiplied by, the product of, groups of, lots of, equal groups.

Multiplication in Year 4

Year 4 Multiplication

Multiplication in Year 4 includes:

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

Pupils continue to practise recalling and using multiplication tables and related facts to aid fluency.

Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).

Pupils practise to become fluent in the formal written method of expanded and compact multiplication, renaming and regrouping where necessary.

Pupils write statements about the equality of expressions (for example, use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, 2 x 6 x 5 = 10 x 6 = 60.

Pupils solve two-step problems in context, such as correspondence questions, choosing the appropriate operation, working with increasingly harder numbers.

Key language:

double, times, multiplied by, the product of, groups of, lots of, equal groups, rename.

Multiplication in Year 5

Year 5 Multiplication

Multiplication in Year 5 includes:

- identifying multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- knowing and using the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establishing whether a number up to 100 is prime and recall prime numbers up to 19
- multiplying whole numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication, for two-digit numbers
- multiplying numbers mentally, drawing upon known facts
- multiplying whole numbers, and those involving decimals, by 10, 100 and 1,000
- recognising and using square numbers and cube numbers, and the notation for squared (²) and cubed (³)
- solving problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solving problems involving all operations, including understanding the meaning of the equals sign
- solving problems involving multiplication and division, including scaling by simple fractions and problems

Pupils practise and extend their use of the formal written methods of multiplication. They apply all the multiplication tables and related facts frequently, commit them to memory and use them confidently to make larger calculations.

They use and understand the terms factor, multiple and prime, square and cube numbers.

Pupils use multiplication and division as inverses to support the introduction of ratio in Year 6, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1,000 in converting between units such as kilometres and metres.

They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, $4 \times 35 = 2 \times 2 \times 35$; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$).

Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example $13 + 24 = 12 + 25$; $33 = 5 \times ?$).

Key language:

double, times, multiplied by, the product of, groups of, lots of, equal groups, rename, regroup.

Multiplication in Year 6

Year 6 Multiplication

Multiplication in Year 6 includes:

- multiplying multi-digit whole and decimal numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- performing mental calculations, including with mixed operations and large numbers
- identifying common factors, common multiples and prime numbers
- using their knowledge of the order of operations to carry out calculations involving the four operations
- solving multi-step problems in context, deciding which operations and methods to use and why
- estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Pupils practise multiplication for larger numbers, using the formal written methods of short and long multiplication.

They undertake mental calculations with increasingly large numbers and more complex calculations.

Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.

Distributivity can be expressed as $a(b + c) = ab + ac$.

Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$.

Common factors can be related to finding equivalent fractions.

Key language:

double, times, multiplied by, the product of, groups of, lots of, equal groups, rename, regroup.

Division in Year 1

Year 1 Division
Division in Year 1 includes: • solving one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Problems include grouping and sharing equally. Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. They make connections between arrays, number patterns, and counting in twos, fives and tens.
Key language: share, group, divide, equal groups, half.

Division in Year 2

Year 2 Division

Division in Year 2 includes:

- recalling and using multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculating mathematical statements for division within the multiplication tables and write them using the division (÷), and equals (=) signs
- showing that, unlike multiplication, division of two numbers cannot be done in any order
- solving problems involving division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Pupils use a variety of language to describe multiplication and division.

Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.

Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).

Key language

share, group, divide, divided by, half

Division in Year 3

Year 3 Division

Division in Year 3 includes:

- recalling and using multiplication and division facts for the 3, 4 and 8 multiplication tables
- writing and calculating mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods
- solving division problems, including missing number problems.

Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.

Pupils develop efficient mental methods and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).

Pupils develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of division. They learn that division is a process of repeated subtraction. When calculating, they subtract groups of the multiple they are dividing by.

Pupils are taught to use number bonds and partitioning to split the dividend into manageable parts. They use their knowledge of multiplication, number bonds and repeated subtraction to support the division process of grouping and sharing. In Year 3, they are introduced to long division, which displays repeated subtraction of multiples to solve division problems.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Key language

share, group, divide, divided by, half

quotient
divisor | dividend

Division in Year 4

Year 4 Division

Division in Year 4 includes:

- recalling multiplication and related division facts for multiplication tables up to 12 × 12
- using place value, known and derived facts to divide mentally, including dividing by 1
- dividing two-digit and three-digit numbers by a one-digit number using formal written layout.

Pupils continue to practise recalling and using multiplication tables and related facts to aid fluency.

Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).

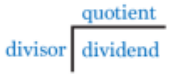
Pupils practise to become fluent in the formal written method of division. They learn that division is a process of repeated subtraction. When calculating, they subtract groups of the multiple they are dividing by.

Pupils continue to use number bonds and partitioning to split the dividend into manageable parts. They use their knowledge of multiplication, number bonds and repeated subtraction to support the division process of grouping and sharing. They are introduced to long division (which displays repeated subtraction of multiples to solve division problems) in Year 3 and build on this learning in Year 4.

Pupils solve two-step problems in context, such as correspondence questions, choosing the appropriate operation, working with increasingly harder numbers.

Key language:

share, group, divide, divided by, half, dividend, divisor, quotient, remainder



Division in Year 5

Year 5 Division

Division in Year 5 includes:

- identifying multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- dividing whole numbers up to 4 digits by a one- or two-digit number using a formal written long division method
- dividing numbers mentally, drawing upon known facts
- dividing whole numbers and those involving decimals by 10, 100 and 1,000
- solving problems involving all operations, including using their knowledge of factors and multiples, squares and cubes, and understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions

Pupils practise and extend their use of the formal written methods of division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. They use their knowledge and understanding that division is a process of repeated subtraction, and when calculating, they efficiently subtract groups of the multiple they are dividing by.

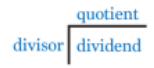
Pupils continue to use number bonds and partitioning to split the dividend into manageable parts. They use their knowledge of multiplication, number bonds and repeated subtraction to support the division process of grouping and sharing. They are introduced to long division (which displays repeated subtraction of multiples to solve division problems) in Year 3 and build on this learning into Years 5 and 6.

Pupils use multiplication and division as inverses to support the introduction of ratio by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1,000 in converting between units such as kilometres and metres.

Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example 13 + 24 = 12 + 25; 33 = 5 x ?).

Key language:

share, group, divide, divided by, half, dividend, divisor, quotient, remainder, rename, regroup



Division in Year 6

Year 6 Division

Division in Year 6 includes:

- dividing whole and decimal numbers, up to 4 digits, by a two-digit whole number using the formal written method of long and short division, and interpreting remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- performing mental calculations, including with mixed operations and large numbers
- using their knowledge of the order of operations to carry out calculations involving the four operations
- solving multi-step problems involving all operations in context, deciding which operations and methods to use and why
- estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Pupils practise all operations for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division.

They undertake mental calculations with increasingly large numbers and more complex calculations.

Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

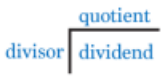
Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.

Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.

Common factors can be related to finding equivalent fractions.

Key language:

share, group, divide, divided by, half, dividend, divisor, quotient, remainder, rename, regroup



Activities

How can you help your child with Maths at home?

- Take away their fear. Maths is fun!
- Reassure and praise whenever possible.

2 Times Table Song (Cover of Can't Stop The Feeling! By...

Laugh Along and Learn

1M views • 5 years ago

Thank you for coming

Any questions?

Maths No Problem for parents