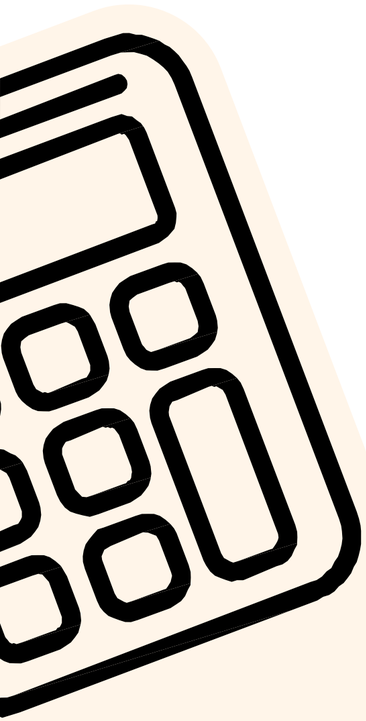
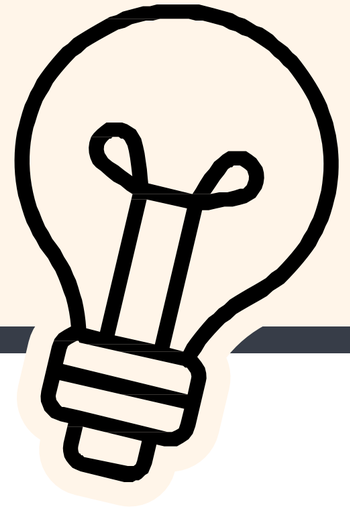
20.1.26

MATHEMATICAL FLUENCY

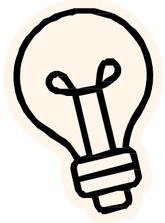


NATIONAL CURRICULUM



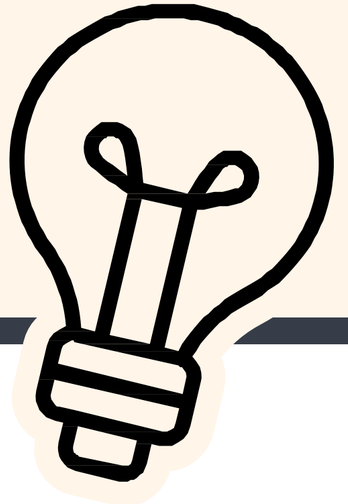
AIMS

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

NATIONAL CURRICULUM

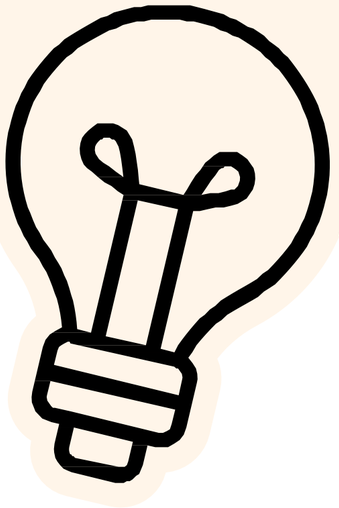


AIMS

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

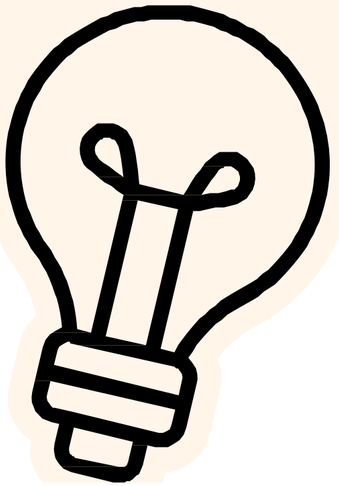
can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

NATIONAL CURRICULUM



Mathematics is an interconnected subject in which pupils need to be able to move **fluently** between representations of mathematical ideas.

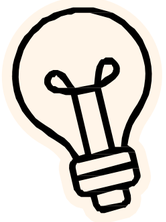
NATIONAL CURRICULUM



Lower Key Stage 2 (Years 3 & 4)

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

EXPECTATIONS - YEAR 3

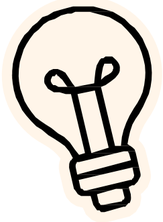


Number - number and place value

Pupils should be taught to:

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a 3-digit number (100s, 10s, 1s)
- compare and order numbers up to 1,000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1,000 in numerals and in words
- solve number problems and practical problems involving these ideas

EXPECTATIONS - YEAR 3

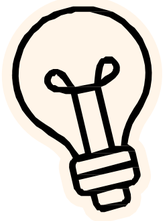


Number - addition and subtraction

Pupils should be taught to:

- add and subtract numbers mentally, including:
  - a three-digit number and 1s
  - a three-digit number and 10s
  - a three-digit number and 100s
- add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

EXPECTATIONS - YEAR 3



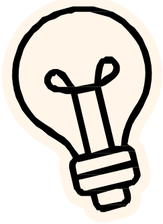
Number - multiplication and division

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division 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

EXPECTATIONS - YEAR 3

Number - fractions

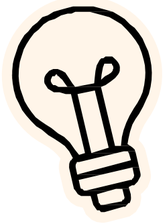


Pupils should be taught to:

- 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 use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example, [Fraction:5/7]+[Fraction:1/7] = [Fraction:6/7]]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above

EXPECTATIONS - YEAR 4

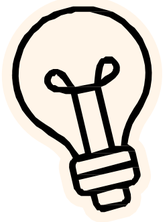
Number - number and place value



Pupils should be taught to:

- count in multiples of 6, 7, 9, 25 and 1,000
- find 1,000 more or less than a given number
- count backwards through 0 to include negative numbers
- recognise the place value of each digit in a four-digit number (1,000s, 100s, 10s, and 1s)
- order and compare numbers beyond 1,000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1,000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value

EXPECTATIONS - YEAR 4

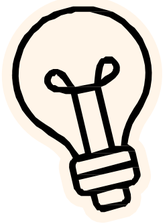


Number - addition and subtraction

Pupils should be taught to:

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

EXPECTATIONS - YEAR 4

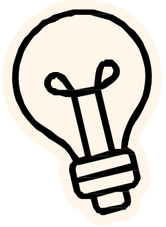


Number - multiplication and division

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

EXPECTATIONS - YEAR 4

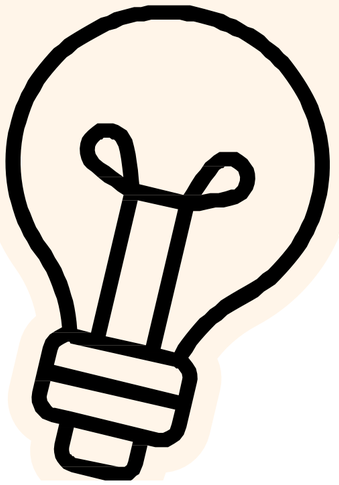


Number - fractions (including decimals)

Pupils should be taught to:

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundreds
- recognise and write decimal equivalents to [Fraction:1/4], [Fraction:1/2], [Fraction:3/4]
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with 1 decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to 2 decimal places
- solve simple measure and money problems involving fractions and decimals to 2 decimal places

NATIONAL CURRICULUM

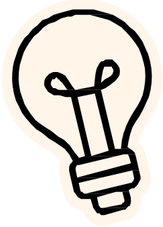


Upper Key Stage 2 (Years 5 & 6)

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.

An **integer is a whole number, including positive numbers, negative numbers, and zero, without fractions or decimals.

EXPECTATIONS - YEAR 5



Number - number and place value

Pupils should be taught to:

- read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0
- round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1,000 (M) and recognise years written in Roman numerals

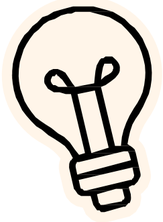
EXPECTATIONS - YEAR 5

Number - addition and subtraction

Pupils should be taught to:

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

EXPECTATIONS - YEAR 5



Number - multiplication and division

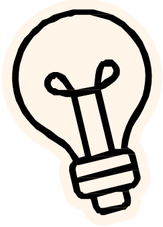
Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

EXPECTATIONS - YEAR 5

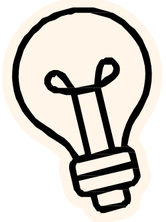
Number - fractions (including decimals and percentages)

Pupils should be taught to:



- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, [Fraction:2/5]+[Fraction:4/5] = [Fraction:6/5] = 1 [Fraction:1/5]]
- add and subtract fractions with the same denominator, and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, 0.71 = [Fraction:71/100]]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of [Fraction:1/2], [Fraction:1/4], [Fraction:1/5], [Fraction:2/5], [Fraction:4/5] and those fractions with a denominator of a multiple of 10 or 25

EXPECTATIONS - YEAR 6



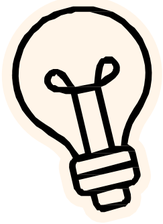
Number - number and place value

Pupils should be taught to:

- read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across 0
- solve number and practical problems that involve all of the above

EXPECTATIONS - YEAR 6

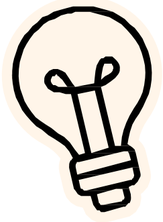
Number - addition, subtraction, multiplication and division



Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

EXPECTATIONS - YEAR 6



Number - Fractions (including decimals and percentages)

Pupils should be taught to:

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions >1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, [Fraction:1/4] × [Fraction:1/2] = [Fraction:1/8]]
- divide proper fractions by whole numbers [for example, [Fraction:1/3] ÷ 2 = [Fraction:1/6]]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, [Fraction:3/8]]
- identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- use written division methods in cases where the answer has up to 2 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

CHANGES TO TEACHING MATHS

Children learn best through activities that are hands-on, practical and visual. There is greater emphasis on understanding rather than rote learning of simple processes. Learning is not a race, everyone learns at different paces and in different ways. It is important that children are secure with the core number concepts with smaller numbers before rushing on to higher numbers.

KIRFS (Key Instant Recall Facts)

"KIRFs" stands for "Key Instant Recall Facts" and refer to essential mathematical facts and number knowledge that students are expected to recall quickly and accurately. These facts form the foundation for more advanced mathematical concepts and problem-solving skills.

KIRFs typically include fundamental arithmetic operations, such as addition, subtraction, multiplication, and division, as well as key number facts, times tables, and other mathematical facts relevant to the year group curriculum.

KIRFS (Key Instant Recall Facts)

The primary objectives of introducing KIRFs to our school are:

- Develop fluency in mathematical operations: KIRFs help students become fluent in performing basic mathematical calculations, enabling them to solve more complex problems with ease.
- Enhance mental maths skills: KIRFs encourage students to develop strong mental maths skills, allowing them to perform calculations in their heads quickly and accurately.
- Build a solid mathematical foundation: By mastering KIRFs, students establish a strong foundation in mathematics, which is essential for their ongoing mathematical education.
- Improve problem-solving abilities: Proficiency in KIRFs enables students to focus on problem-solving strategies and concepts in mathematics, rather than getting bogged down by basic calculation
- Promote confidence: As students achieve mastery of KIRFs, they gain confidence in their mathematical abilities, which can positively impact their overall attitude towards maths
- Prepare for assessments

KIRFs

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3	I know number bonds for all numbers to 20	I know the multiplication and division facts for the 3 times table	I can recall facts about duration of time	I know the multiplication and division facts for the 4 times table.	I can tell the time to the nearest five minutes	I know the multiplication and division facts for the 8 times table
Year 4	I know number bonds to 100	I know the multiplication and division facts for the 6 times table	I know the multiplication and division facts for the 7 times table	I know the multiplication and division facts for the 9 and 11 times tables	I can multiply and divide single-digit numbers by 10 and 100	I can recall decimal equivalents of fractions
Year 5	I know decimal number bonds to 1 and 10	I know the multiplication and division facts for all times tables up to 12 x 12	I can recall metric conversions	I can double and halve any number up to 100	I can recall square numbers up to 12^2 and their square roots	I can find factor pairs of a number
Year 6	I know the multiplication and division facts for all times tables up to 12 x 12	I can identify common factors of a pair of numbers	I know common decimals, fractions and percentage equivalences	I can identify prime numbers up to 50	I know the formulae for finding the area of different shapes	I know the first 5 cube numbers

MTC - Year 4

What is the MTC?

The Multiplication Tables Check (MTC) is a statutory national check taken by all Year 4 pupils in England. It assesses how well children can recall multiplication facts.

The MTC checks:

Instant recall of multiplication facts
Speed and accuracy
Automatic knowledge of tables rather than written methods

Why is the MTC important?

Knowing multiplication facts fluently helps children:
Work more confidently with division, fractions, decimals and percentages
Perform better in mental arithmetic
Reduce cognitive load in more complex maths problems

End of KS2 Assessments – arithmetic

Good fluency and instant recall of number facts help pupils succeed in the **SATs mental arithmetic paper** because they:

- **Reduce cognitive load** – pupils don't have to stop and work out basic facts, freeing their brain to focus on the question.
- **Increase speed** – quick recall of facts (e.g. number bonds, times tables) allows answers within the short time limits.
- **Improve accuracy** – fewer steps mean fewer mistakes.
- **Support multi-step questions** – known facts help pupils hold information in their head and complete several operations mentally.
- **Build confidence** – fluent pupils are less likely to panic and more likely to attempt every question.

End of KS2 Assessments – reasoning

Good fluency and instant recall of number facts play a **key role in success in KS2 SATs reasoning papers** because they allow pupils to focus on **thinking and problem-solving**, rather than basic calculation.

Here's how fluency helps:

Reduces cognitive load

When number facts (e.g. times tables, number bonds, related division facts) are automatic, pupils can devote their mental energy to understanding the problem and choosing the correct strategy.

Supports multi-step reasoning

Many reasoning questions require several calculations. Fluent recall helps pupils keep track of steps and avoid losing their place.

End of KS2 Assessments – reasoning (continued)

Improves accuracy
Confident recall reduces counting and working out errors, which are common under time pressure.

Saves time
Faster calculation leaves more time to read questions carefully, check answers, and complete the paper.

Strengthens proportional and fraction reasoning
Secure knowledge of multiplication and division facts helps pupils reason about fractions, decimals, percentages, ratio and scaling.

Builds confidence and resilience
Pupils who are fluent are less likely to feel overwhelmed and more likely to attempt all questions.

KEY VOCABULARY – KS2

Maths

Please find below attached, information on Maths in Year 4.

- Maths workshop presentation - KS2 January 2025 PDF
- Year 4 Maths Vocabulary List PDF
- Calculation Policy 2024 PDF

In this section

- Homework
- English
- Maths
- Recommended Reading
- Useful Websites

Year 4

Numbers and the number system

Place value, ordering and rounding

units, ones
tens, hundreds, thousands
ten thousand, hundred thousand, million
digit, one-, two-, three- or four-digit number
numeral
'teens' number
place, place value
stands for, represents
exchange
the same number as, as many as
equal to
Of **two** objects/amounts:
>, greater than, bigger than, more than, larger than
<, less than, fewer than, smaller than
Of **three** or more objects/amounts:
greatest, most, largest, biggest
least, fewest, smallest,
one… ten… one hundred… one thousand more/less
compare, order, size
first… tenth… twentieth
last, last but one
before, after
next
between, half-way between
guess how many, estimate
nearly, roughly, close to, about the same as
approximate, approximately
just over, just under
exact, exactly
too many, too few, enough, not enough
round (up or down), nearest
round to the nearest ten
round to the nearest hundred
integer, positive, negative
above/below zero, minus

Properties of numbers and number sequences

HOW YOU CAN HELP AT HOME

- Focussing on mental calculations.
- Reinforcing the importance of estimation .
- Using maths in a real life context (eg time & money)
- Asking children to explain how they have calculated something using a method that suits them.
- Practising taught written methods.

HOW YOU CAN HELP AT HOME

Positive mindset is very important!

You may find yourself from time to time saying ‘I was never good at Maths.’ Children will pick up and mirror this energy. We would advise parents to use positive language such as ‘It’s fine to make mistakes, we all do’ or ‘It’s ok that you find this tricky, let’s look through it together.’

Positivity can go a long way to improving their attitude towards Maths

USEFUL WEBSITES

Hit the Button –https://www.topmarks.co.uk/maths-games/hit-the-button

www.timestables.me.uk Play online or print out written sheets

Maths Frame
(MTC) https://mathsframe.co.uk/en/resources/resource/477/Multiplication-Tables- Check
Games https://mathsframe.co.uk/en/resources/category/22/most-popular

BBC Bitesize
https://www.bbc.co.uk/bitesize/subjects/z826n39

UR Brainy (worksheets)
URBrainy - Maths and English Learning Resources

THANK YOU

Any questions?