



All content today will refer only to <u>calculation only (addition,</u> <u>subtraction, multiplication and division)</u>

Our aims:

- To provide an insight into expectations in maths across the school
- To model and use written strategies
- To suggest strategies to help at home

The DfE stated:

### The Importance of Teaching White Paper

- benchmarking expectations for our children against the expectations of the most successful nations
- ensure that our qualifications match the best in the world, providing a good basis for further study and employment
- stronger leadership, more intelligent accountability and, above all, improvements in teaching quality are essential
- extending school freedoms, reforming performance tables and reforming inspection
- attracting even more outstanding people into an already great profession....

... and help raise **attainment for all children** and support **poorest children most** of all



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### Primary mathematics – what has changed?

- higher expectation overall benchmarked against agerelated expectations in other nations
- progression shown year-by-year but for teachers to set out their year-by-year approach in their school curriculum
- conceptual development of number addressed in detail, especially in relation to arithmetic and proportionality
- fewer things in more depth in primary so data has less prominent and probability not introduced till Key Stage 3
- all pupils expected to build firm foundations and not be accelerated to content expected in secondary school



Department for Education







#### 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.
  - Reasoning is: Following a line of enquiry, conjecturing relationships and justifying.
- 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 nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.



#### How do children develop conceptual understanding?



### Place Value

To confidently calculate children need a secure understanding of place value. This means they understand the value of all the digits.



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Have a go at making these numbers using the resources on your table:



Numbers up to 20 using resources to support.



Year 1 is an opportunity for children to develop firm foundations of addition. Their conceptual understanding is heavily developed through the use of resources. They gain confidence in mental calculation in preparation for using more formal written methods efficiently in year 2.



Addition of two digit numbers using resources moving towards column addition by the end of the year if secure. Children will use resources and jottings to gain an understanding of the process used for column addition followed by using the formal method if appropriate. Children will practically re-group (more than 10) using resources and may begin to express this as a written method.







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Addition of three digit numbers using resources to support column methods. Children will show regrouping (more than 10) in their formal methods.

challenge eto/ore and achieve Addition Addition with re-grouping Year 3 (more than 10) From Year 3. = 221+ 20 =10 10 10 10 3 = 143 100 + + 9 (6+3) 3.123 (see rod abacus) U + = = 258 + 50 

Addition of four digit numbers using column addition including re-grouping.





### Addition-Year 5 and 6

Addition of number with more than 5 digits and decimals using formal column methods. When adding decimal numbers, the decimal place must be moved down to the same position for the answer.





Year 6 children are expected to solve multi-step problems involved all four operations  $( + - X \div )$ 





Numbers up to 20 using resources to support.

Similarly to addition, subtraction in year 1 is an opportunity for children to develop firm foundations. Their conceptual understanding is heavily developed through the use of resources. They gain confidence mentally calculating in preparation for using more formal written methods efficiently in year 2.

The image shows different ways to subtract in order to consolidate their understanding of the concept of subtraction.



Subtraction of 2 digit numbers using resources and progressing to written methods where appropriate.

*Children are not expected to regroup for subtraction until year 3.* 







Subtraction of 3 digit numbers, including regrouping, using resources and progressing to written methods where appropriate.

#### Subtraction-Year 4 and 5

Subtraction - Year 4 4 digits (Th H T U) -6568 = and decimals 28425= 41

Year 4-Subtraction of 4 digit numbers including regrouping using both practical methods and formal column subtraction.

#### Year 5-

Subtraction of numbers larger than 4 digits and decimals, including regrouping, using both practical methods and formal column subtraction.







#### Year 6-

Subtraction of numbers larger than 4 digits and decimals with different decimal places, including regrouping, using both practical methods and formal column subtraction.

Year 6 children are expected to solve multi-step problems involved all four operations ( + -X ÷ )





Doubling and counting in multiples of 2,5,10. Children will use practical resources to solve multiplication problems.





Children will use repeated addition, arrays and other practical resources to solve multiplication problems. Children are expected to learn their 2, 5 and 10 times tables and division facts for rapid recall which they are tested on weekly.





Multiplication of 2 digit numbers by 1 digit numbers using arrays and progressing to the use of grid method along with other practical resources. Children are expected to learn their 3, 4 and 8 times tables and division facts for rapid recall which they are tested on weekly.



Multiplication of 2 and 3 digit numbers by 1 digit numbers using grid method, practical resources and introducing column multiplication.

Children are expected to learn their 6, 7 and 9 times tables and division facts for rapid recall which they are tested on weekly.



#### Multiplication - Year 5 TKHTUXU: 4628×5 =

### Multiplication-Year 5



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Multiplication of 4 digit numbers by 1 and 2 digit numbers using grid method, practical resources and column multiplication.

*Children are expected to recall times* tables and division facts for rapid recall up to 12X12 which they are tested on weekly.

## This provides a breakdown as a guide!



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Multiplication of multi-digit numbers up to 4 digit by 2 digit numbers using column multiplication.

Children are expected to recall times tables and division facts for rapid recall up to 12X12 which they are tested on weekly.







Solve division problems using practical resources to share (sharing objects into the correct number of groups) and group (divide objects into groups of...).





Children continue using strategies from year 1 to solve problems as well as using arrays. Arrays support the children to see the link between multiplication and division therefore children should be beginning to use their recall facts (2,5,10) to solve multiplication and division problems.



Divide two digit numbers by one digit numbers using practical resources to support the introduction of short division (bus stop method).







3.	91 = 5 = 18 c 1 18 c 1 5 941
4.	$ \begin{array}{c} 1 & 0 & 1 & = 4 \\  & 0 & 2 & 5 \\  & 0 & 2 & 5 \\  & 4 & 1 & 0^{2}1 \end{array} $
5.	94 = 5 = 18 - 4 18 - 18 5944
6.	$8 + = 6 = 1 + \sqrt{2}$ $1 + \frac{1}{6}$ $6 + \frac{8}{2} + \frac{1}{6}$
7.	362=4=90r2/ 090r2/ $43^{3}62$
8	289 = 7 = 41r2v 041r2 72289



Divide three digit numbers by one digit numbers using practical resources to support short division (bus stop method).

Division-Year 5 4 digits by 1 digit with remainders

Decimals.

1305r256527

> $156.1^{\circ}$  $62^{\circ}4.5^{\circ}$





Divide four digit numbers by one or two digit numbers and some decimals, using practical resources to support short division (bus stop method).

## <u>Division- Year 6</u>



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Divide 4 digit numbers by 2 digit numbers interpreting remainders as whole numbers, fractions or round, where appropriate.

Long division is a method that is taught in school. Recent changes to our teaching of division enforces the use of short division which generally children can use more efficiently if taught using resources to support the concept. Where children struggle with long division, it is advisable to let your child's class teacher know so we can support your child/ren at school.



Children will become fluent mathematicians if we embed recall facts.

These are facts they should be fluent in by the end of each year group.

Games, Mathletics, little and often, praise!

#### Facts to Learn and Recall in Years 1 - 6

#### Year 1

- > Addition and Subtraction facts for all numbers to 10 and 20
- > Names of numbers up to and including 100
- > One more/less than any number up to and including 100
- > Double and half of any number to 10

#### Year 2

- > Fluent recall of addition and subtraction facts for all numbers to 20
- > One and ten more/less than any number up to and including 100
- > Double and half of any number to 20
- Multiplication facts for the 2, 5 and 10 times tables

#### Year 3

- > 1, 10 and 100 more/less than any number up to and including 1,000
- > Double and half of any two-digit number
- Double and half of any multiple of 10 and 100
- > Multiplication facts for the 3, 4 and 8 times tables

#### Year 4

- > Number bonds for any number to 100
- > Equivalent fractions and decimals and 'bonds' to one whole
- Recall multiplication and division facts for the 6, 7 and 9 times tables
- Recall square numbers to 10 x 10

#### Year 5 and 6

Fluent recall of all of the above, and

- > Recall multiplication and division facts up to and including 12 x 12
- Recall square numbers to 12 x 12
- Can read, sort and compare numbers with six digits and decimal numbers with up to three decimal places.







- Learn number bonds and times tables
- Practice telling the time, knowing days of week, months of the year, ordering days and months
- Familiarisation with coins, simple shopping bills, value for money offers in shops
- Playing board games such as Yahtzee, Monopoly, snakes and ladders.
- Play cards, darts, dominoes, snap, pick up sticks
- Puzzles from the newspaper
- Reading maths stories

# Final thought...



<u>http://whiterosemathshub.co.uk/maths-everyone-can/</u>