



# **Mental Maths**

# **Calculations Policy**

**(Updated November 2023)**

*Next Review: November 2026 (or earlier if amendments required)*

## Introduction

The Mental Maths Calculation Policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics, and is also designed to give pupils a consistent and smooth progression of learning in mental calculations across the school. Early learning in number and calculation in Reception follows the 'Birth to 5 Matters' and this policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

This policy has been created to highlight the progression in mental calculation strategies for each of the four operations. It sets out:

- Essential understanding of the principles underpinning each operation;
- Example models and images to support children's understanding of the operation and the related mental strategies;
- Core mental skills and strategies that all children should learn, including examples and the requisite prior knowledge in order to learn the new strategies;
- Enhanced mental skills and strategies that should be reserved for teaching to specific groups of children who understand the special cases that lend themselves to these strategies.

## Mental Methods of Calculation

Oral and mental work in mathematics is essential, particularly so in calculation. Early practical, oral and mental work must lay the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts. Later work must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied. Ongoing oral and mental work provides practice and consolidation of these ideas. It must give children the opportunity to apply what they have learned to particular cases, exemplifying how the rules and laws work, and to general cases where children make decisions and choices for themselves. The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. A good knowledge of numbers is the product of structured practice and repetition. It requires an understanding of number patterns and relationships developed through directed enquiry, use of models and images and the application of acquired number knowledge and skills. Secure mental calculation requires the ability to:

- recall key number facts instantly;
- use taught strategies to work out the calculation;
- understand how the rules and laws of arithmetic are used and applied.

## Mental Maths Activities

Weekly Timetables Olympics are carried out from Year 2 (with children who are achieving Greater Depth in Year 1 also accessing it in the Summer Term). Children progress through the different levels, with recognition and rewards given for achieving each level.

Times Tables Rock Stars is used in school and at home, to enhance the learning, fluency and consolidation of Times Tables. Children from Year 2 - Year 6 have a number of Times Tables Rock Stars Session allocated to them each week, to complete as part of their home learning.

All children from Year 1 to Year 6 have a mental maths activity recorded in books at least 3 times each week.

Mathstastic is carried out weekly and children progress through their Year Group Maths Curriculum. Those children with special educational needs will progress through previous Year Groups' Maths Curriculum and will move onto the next level as soon as they are ready.

## Core understanding for each operation

For addition, children understand that:

- Addition is the combining of two or more quantities resulting in a larger total.
- Addition is the inverse of subtraction.
- Addition is commutative i.e. that  $3 + 5 = 8$  and  $5 + 3 = 8$ .

For subtraction, children understand that:

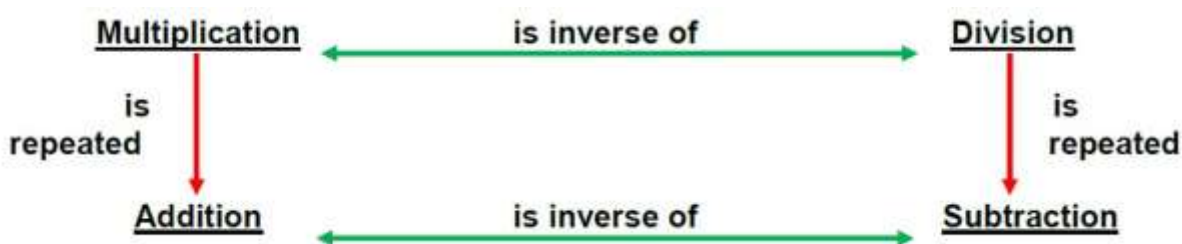
- Subtraction is the removing or taking away a quantity from another.
- Subtraction is the inverse of addition.
- Subtraction is **not** commutative i.e.  $3 + 5 = 5 + 3$  but  $5 - 3 \neq 3 - 5$ .

For multiplication, children understand that:

- Multiplication is repeated addition.
- Multiplication is the inverse of division.
- Multiplication is commutative i.e. that  $3 \times 5 = 15$  and  $5 \times 3 = 15$ .

For division, children understand that:

- Division is sharing or grouping (repeated subtraction). □ Division is the inverse of multiplication.
- Division is **not** commutative i.e.  $3 \times 5 = 5 \times 3$  but  $15 \div 3 \neq 3 \div 15$ .



## Age stage expectations

The mental calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014. **However, it is vital that pupils are taught according to the stage that they are currently working at**, being moved onto the next level as soon as they are ready, or working at a lower stage until they are secure enough to move on.

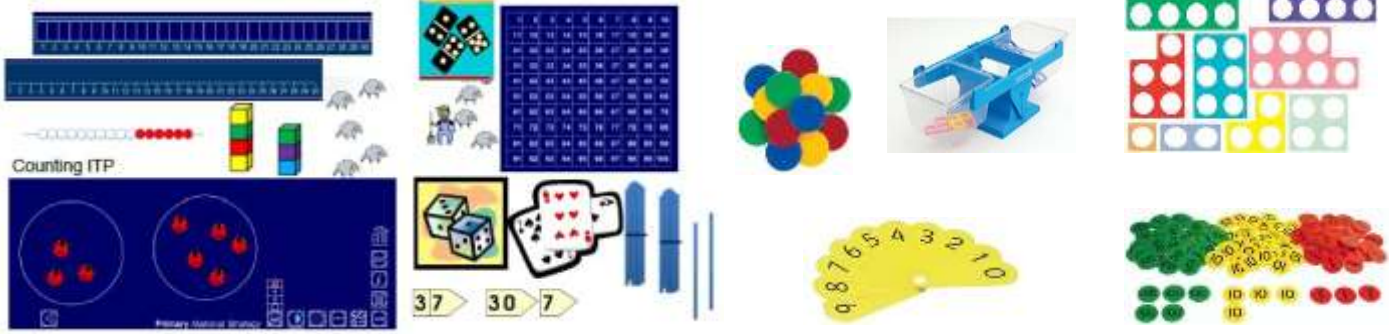
## Providing a context for calculation

It is important that any type of calculation is given a real-life context or problem-solving approach to help build children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems. This must be a priority within calculation lessons.



# Addition - Year 1

Practical equipment, models and images to support children with mental addition:



Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Add a pair of single digit numbers</b></p>	<ul style="list-style-type: none"> <li>• 3 + 5</li> <li>• Represent this calculation using cubes, cars, small world people, a number track / line.</li> <li>• If 3 + 5 = 8, what else do you know?</li> </ul>	<ul style="list-style-type: none"> <li>• Know the number names up to 20 in order, in symbols (using numerals) and words (spoken).</li> <li>• Know number bonds to 20.</li> <li>• Understand the amounts the symbols and words represent.</li> <li>• Count on from any given single digit number.</li> <li>• Know that the last number said is the total (cardinality).</li> <li>• Place value - identify the largest number in order to count on from this.</li> <li>• Reorder the numbers to start from the largest number making the count more efficient.</li> <li>• Subsidise small amounts to make the count more efficient.</li> </ul>
<p><b>Add a single digit number to a teens number</b></p>	<ul style="list-style-type: none"> <li>• 13 + 5</li> <li>• Represent this calculation using cubes, cars, small world people, a number track / line.</li> <li>• If 13 + 5 = 18, what else do you know?</li> </ul>	<p>As above plus:</p> <ul style="list-style-type: none"> <li>• Count on from any given teens number.</li> <li>• Know and use related addition facts e.g. 3 + 5 = 8 so 13 + 5 = 18.</li> <li>• Place value - understand what each digit represents in a teens number.</li> </ul>
<p><b>Add a single digit number to 10 or a multiple of 10</b></p>	<ul style="list-style-type: none"> <li>• 10 + 7</li> <li>• 7 + 30</li> <li>• 7 + ? = 73</li> <li>• Represent these calculations using cubes, base 10 equipment, bundles of straws, a number track/line, a 100 square.</li> </ul>	<p>As above plus:</p> <ul style="list-style-type: none"> <li>• Know the decade number names up to 100 in order, in symbols (using numerals) and words (spoken).</li> <li>• Understand the amounts the symbols and words represent. Place value – understand what each digit represents in a two-digit number.</li> <li>• Use knowledge of place value to recognise that combining 60 and 5 equals 65.</li> </ul>
<p><b>Add near doubles</b></p>	<ul style="list-style-type: none"> <li>• 6 + 7</li> </ul>	<ul style="list-style-type: none"> <li>• Place value - recognise when numbers are close to each other.</li> <li>• Double any single digit number.</li> <li>• Add or subtract 1 to or from any number.</li> </ul>

# Addition – Year 2

Practical equipment, models and images to support children with mental addition:

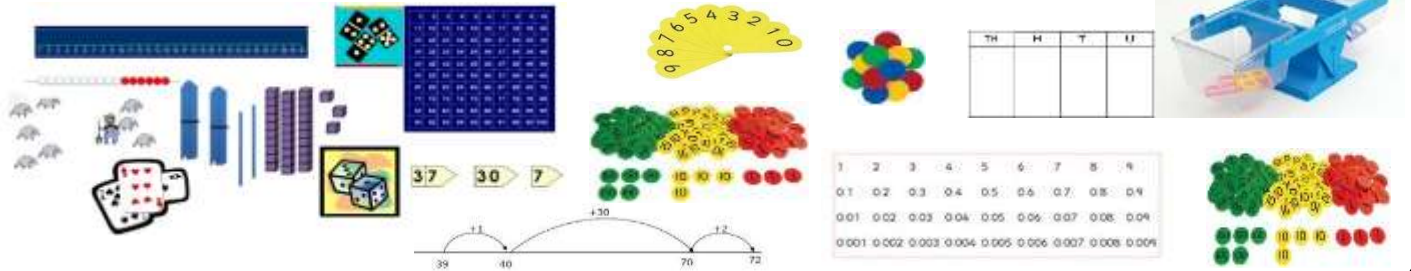


Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Add two or three single-digit numbers, including crossing 10</b></p>	<ul style="list-style-type: none"> <li>• <math>5 + 8</math></li> <li>• <math>2 + 4 + 3</math> Represent this calculation using cubes, cars, small world people, a number track/line, straws, multilink, bead bars.</li> </ul>	<ul style="list-style-type: none"> <li>• Know the number names up to 10 in order, in symbols (using numerals) and words (spoken).</li> <li>• Understand the amounts the symbols and words represent.</li> <li>• Count on from any given single digit number.</li> <li>• Place value – identify the largest number in order to count on from this.</li> <li>• Reorder the numbers to start from the largest number making the count more efficient.</li> <li>• Understand Place Value eg. The value of tens and ones.</li> <li>• Addition can be done in any order.</li> <li>• Know and use number bonds to 10.</li> <li>• Subsidise small amounts to make the count more efficient.</li> </ul>
<p><b>Add a single digit number to a two-digit number, including crossing a tens boundary</b></p>	<ul style="list-style-type: none"> <li>• <math>23 + 5</math></li> <li>• <math>28 + 5</math></li> </ul>	<ul style="list-style-type: none"> <li>• Count on from any two-digit number in 1s.</li> <li>• Use number bonds to efficiently add numbers to bridge 10.</li> </ul>
<p><b>Add a multiple of 10 to any single or two digit number</b></p>	<ul style="list-style-type: none"> <li>• <math>27 + 60</math></li> <li>• Show how to work this out on a 100 square /number line/base 10/a bead string.</li> <li>• If there is 36p in the piggy bank and I drop in four 10p coins, how much does the piggy bank have in it now?</li> </ul>	<ul style="list-style-type: none"> <li>• Know what is 10 more than any given two-digit number.</li> <li>• Count on in 10s from any two-digit number</li> </ul>
<p><b>Add 9, 19, 29,... or 11, 21, 31,...</b></p>	<ul style="list-style-type: none"> <li>• <math>23 + 9</math> <math>34 + 11</math></li> <li>• Show what these calculations would look like on a number line.</li> </ul>	<ul style="list-style-type: none"> <li>• Add 10 to any number.</li> <li>• Add a multiple of 10 to any number.</li> <li>• Be able to round to the nearest 10.</li> </ul>
<p><b>Add near doubles</b></p>	<ul style="list-style-type: none"> <li>• <math>13 + 14</math></li> </ul>	<ul style="list-style-type: none"> <li>• Double any two-digit number.</li> </ul>



# Addition - Year 4

Practical equipment, models and images to support children with mental addition:

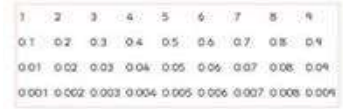
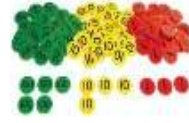
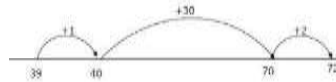
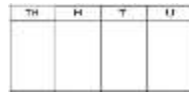
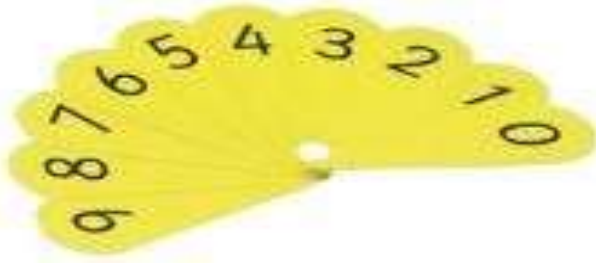


Mental calculation skills	Examples	Requisite prior knowledge
<b>Add two-digit or three-digit multiples of 10</b>	<ul style="list-style-type: none"> <li>• <math>140 + 150</math></li> <li>• <math>140 + 70</math></li> </ul>	<ul style="list-style-type: none"> <li>• Use knowledge of place value to relate e.g. <math>14 + 15 = 29</math> so <math>140 + 150 = 290</math>.</li> <li>• Count on in 10s from any multiple of 10.</li> <li>• Use knowledge of number bonds to efficiently add numbers to bridge 100.</li> </ul>
<b>Add a near multiple of 10, 100 or 1000 and adjust</b>	<ul style="list-style-type: none"> <li>• <math>56 + 29</math></li> <li>• <math>42 + 199</math></li> <li>• Show what this would look like on a number line or 100 square.</li> </ul>	<ul style="list-style-type: none"> <li>• Add 10/100/1000 to any number.</li> <li>• Add a multiple of 10 to any number.</li> <li>• Round to the nearest 10/100/1000.</li> </ul>
<b>Add near doubles of two-digit numbers</b>	<ul style="list-style-type: none"> <li>• <math>38 + 37</math></li> </ul>	<ul style="list-style-type: none"> <li>• Double any two-digit number.</li> </ul>
<b>Add two 2-digit numbers by partitioning and counting on</b>	<ul style="list-style-type: none"> <li>• <math>29 + 43 = 43 + 20 + 9</math></li> </ul>	<ul style="list-style-type: none"> <li>• Understand that addition can be done in any order.</li> <li>• Use knowledge of place value to partition 2-digit numbers.</li> <li>• Count on in 10s from any number.</li> <li>• Use knowledge of number bonds to efficiently add numbers to bridge 10 or 100.</li> </ul>
<b>Add a decimal number to a single-digit number</b>	<ul style="list-style-type: none"> <li>• <math>7 + 3.2</math></li> <li>• <math>9 + ? = 10.7</math></li> </ul>	<ul style="list-style-type: none"> <li>• Count on in tenths.</li> <li>• Use knowledge of place value to partition decimal numbers.</li> <li>• Use knowledge of number bonds to efficiently add numbers to bridge 1.</li> </ul>



# Addition - Year 5

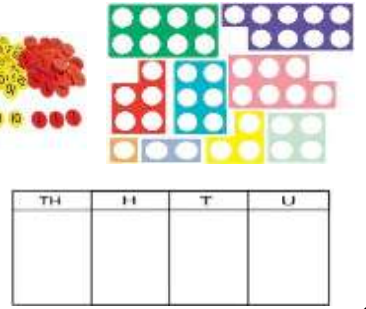
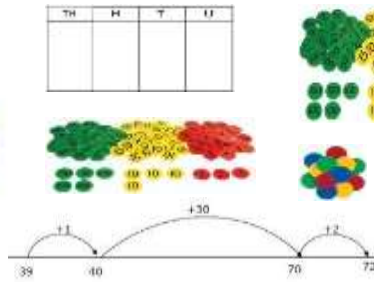
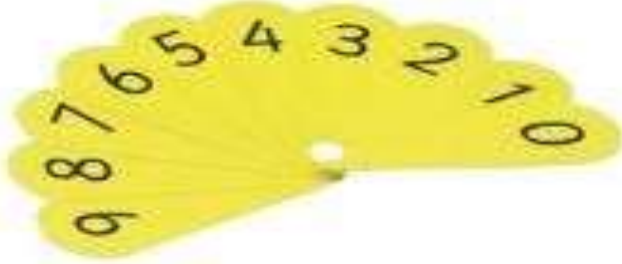
Practical equipment, models and images to support children with mental addition:



Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Add a pair of three-digit numbers or four-digit multiples of 10</b></p>	<ul style="list-style-type: none"> <li>• <math>38 + 86</math></li> <li>• <math>350 + 360</math></li> </ul>	<ul style="list-style-type: none"> <li>• Partition two-digit numbers into tens and ones.</li> <li>• Understand place value in three-digit numbers.</li> <li>• Use knowledge of place value to relate e.g. <math>35 + 36 = 71</math> to <math>350 + 360 = 710</math>.</li> </ul>
<p><b>Add a near multiple of 10 or 100 to any two-digit or three digit number</b></p>	<ul style="list-style-type: none"> <li>• <math>235 + 198</math></li> </ul>	<ul style="list-style-type: none"> <li>• Add 100 to any number.</li> <li>• Add a multiple of 100 to any number.</li> <li>• Round to the nearest 100.</li> </ul>
<p><b>Add any pair of decimal fractions each with ones and tenths</b></p>	<ul style="list-style-type: none"> <li>• <math>5.7 + 2.5</math></li> </ul>	<ul style="list-style-type: none"> <li>• Partition ones and tenths.</li> <li>• Count on in tenths, including bridging through 1.</li> <li>• Use knowledge of place value to relate e.g. <math>57 + 25 = 82</math> to <math>5.7 + 2.5 = 8.2</math>.</li> </ul>
<p><b>Add simple fractions with the same denominator</b></p>	<ul style="list-style-type: none"> <li>• <math>1/5 + 3/5</math></li> </ul>	<ul style="list-style-type: none"> <li>• Understand what fractions represent.</li> <li>• Know that a number is whole if the numerator and denominator are the same.</li> </ul>
<p><b>Find doubles of decimals each with ones and tenths</b></p>	<ul style="list-style-type: none"> <li>• <math>1.6 + 1.6</math></li> </ul>	<ul style="list-style-type: none"> <li>• Double any two-digit number.</li> <li>• Understand place value.</li> </ul>

# Addition - Year 6

Practical equipment, models and images to support children with mental addition:



Mental calculation skills	Examples	Requisite prior knowledge
<b>Add pairs of decimals with ones, tenths or hundredths</b>	<ul style="list-style-type: none"> <li>• <math>0.7 + 3.38</math></li> <li>• <math>4.52 + 2.78</math></li> </ul>	<ul style="list-style-type: none"> <li>• Partition ones, tenths and hundredths.</li> <li>• Understand place value of tenths and hundredths.</li> <li>• Recombine ones, tenths and hundredths.</li> </ul>
<b>Add a decimal with ones and tenths, that is nearly a whole number</b>	<ul style="list-style-type: none"> <li>• <math>4.3 + 2.9</math></li> </ul>	<ul style="list-style-type: none"> <li>• Round a decimal to the nearest whole number.</li> <li>• Add a whole number to any decimal number.</li> </ul>
<b>Add near doubles of decimals</b>	<ul style="list-style-type: none"> <li>• <math>2.5 + 2.6</math></li> </ul>	<ul style="list-style-type: none"> <li>• Double any two-digit number.</li> <li>• Use knowledge of place value and related facts.</li> </ul>
<b>Add fractions with denominators that are multiples of the same number</b>	<ul style="list-style-type: none"> <li>• <math>3/5 + 4/10</math></li> </ul>	<ul style="list-style-type: none"> <li>• Understand what fractions represent.</li> <li>• Know that a number is whole if the numerator and denominator are the same.</li> <li>• Recognise equivalent fractions.</li> <li>• Simplify fractions by cancelling.</li> </ul>

# Subtraction - Year 1

Practical equipment, models and images to support children with mental subtraction:

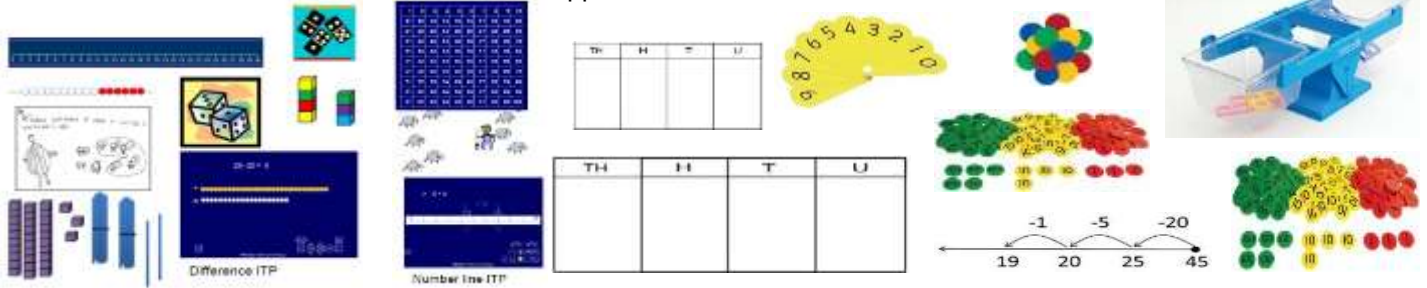


Mental calculation skills	Examples	Requisite prior knowledge
<b>Subtract a pair of single-digit numbers</b>	<ul style="list-style-type: none"> <li>• 8 - 3</li> <li>• Model this calculation using cubes, small world people, a number line/track.</li> <li>• If <math>8 - 3 = 5</math>, what else do you know?</li> </ul>	<ul style="list-style-type: none"> <li>• Know number names up to 10 in order in symbols and words and understand the amounts they represent.</li> <li>• Understand the amounts the symbols and words represent.</li> <li>• Count back from any given single digit number.</li> <li>• Know that the last number said is the amount left.</li> <li>• Place value – identify the largest number in order to count back from this.</li> </ul>
<b>Subtract a single-digit number from a teens number</b>	<ul style="list-style-type: none"> <li>• 15 - 3</li> <li>• Model this calculation using cubes, small world people, a number line/track.</li> <li>• If <math>15 - 3 = 12</math>, what else do you know?</li> </ul>	<p>As above plus:</p> <ul style="list-style-type: none"> <li>• Know number names up to 20 in order in symbols (using numerals) and words (spoken).</li> <li>• Count back from any given teens number.</li> <li>• Count back in ones.</li> <li>• Know and use related subtraction facts e.g. <math>5 - 3 = 2</math> so <math>15 - 3 = 12</math>.</li> <li>• Place value- understand what each digit represents in a teens number.</li> </ul>
<b>Subtract a single-digit number from 10</b>	<ul style="list-style-type: none"> <li>• 10 - 7</li> <li>• 10 - ? =</li> <li>• 6 10 -</li> <li>• ? = ?</li> </ul>	<p>As above plus:</p> <ul style="list-style-type: none"> <li>• Count back in ones.</li> <li>• Know number bonds to 10.</li> <li>• Understand and use subtraction as the inverse of addition.</li> </ul>



# Subtraction - Year 3

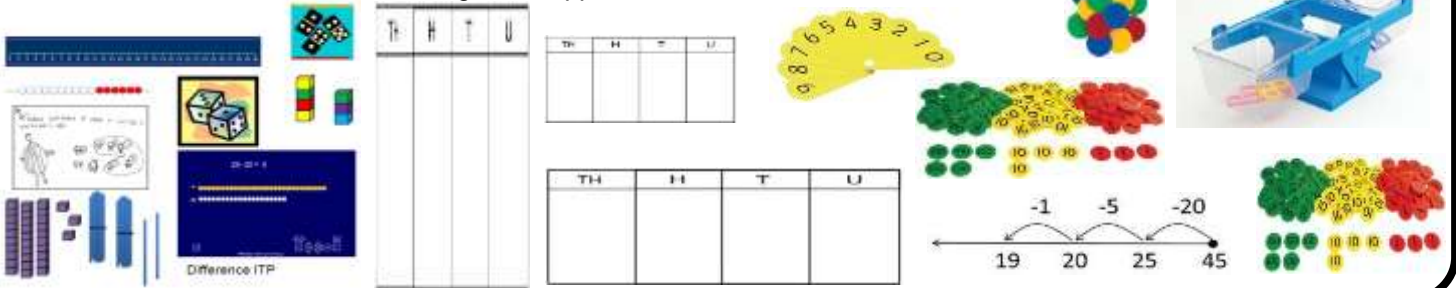
Practical equipment, models and images to support children with mental subtraction:



Mental calculation skills	Examples	Requisite prior knowledge
<b>Subtract groups of small numbers</b>	<ul style="list-style-type: none"> <li>• <math>7 - 3 - 2</math> in context e.g. There were 7 children on the bus, 3 got off in Preston, 2 got off in Chipping. How many were left on the bus?</li> </ul>	<ul style="list-style-type: none"> <li>• Count on and back in ones from any given number.</li> <li>• Know number bonds to 10.</li> </ul>
<b>Subtract pairs of two-digit numbers including crossing the tens boundary</b>	<ul style="list-style-type: none"> <li>• <math>65 - 38</math></li> <li>• <math>91 - 35</math></li> </ul>	<ul style="list-style-type: none"> <li>• Count on and back in ones from any two-digit number.</li> <li>• Count on and back in tens from any two-digit number.</li> <li>• Partition two-digit numbers to tens and ones.</li> <li>• Recombine tens and ones.</li> <li>• Understand place value in two digit numbers.</li> </ul>
<b>Subtract single-digit numbers and multiples of 10 or 100 from three-digit numbers</b>	<ul style="list-style-type: none"> <li>• <math>348 - 7</math></li> <li>• <math>283 - 20</math></li> <li>• <math>364 - 100</math></li> </ul>	<ul style="list-style-type: none"> <li>• Count on and back in ones from any three-digit number.</li> <li>• Count on and back in tens from any three-digit number.</li> <li>• Count on and back in hundreds from any three-digit number.</li> </ul>
<b>Reorder and recombine numbers to enable more efficient calculations</b>	<ul style="list-style-type: none"> <li>• <math>7 - 3 - 2 = 7 - (3+2)</math></li> <li>• <math>14 - 5 - 4 = 14 - 4 - 5</math></li> </ul>	<ul style="list-style-type: none"> <li>• Understand that subtraction is not commutative.</li> <li>• Know and use knowledge of number bonds to 10.</li> <li>• Count on and back in tens and ones.</li> </ul>

# Subtraction - Year 4

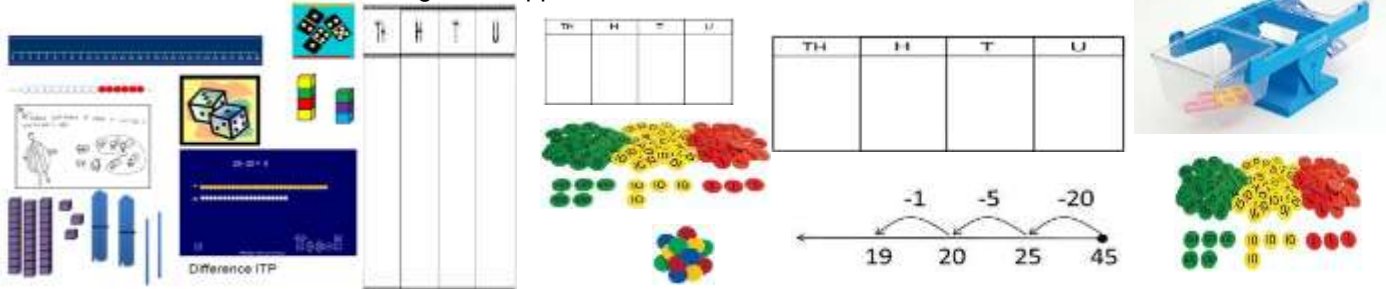
Practical equipment, models and images to support children with mental subtraction:



Mental calculation skills	Examples	Requisite prior knowledge
Subtract two digit or three-digit multiples of 10	<ul style="list-style-type: none"> <li>• <math>120 - 40</math></li> <li>• <math>370 - 180</math></li> </ul>	<ul style="list-style-type: none"> <li>• Use knowledge of place value to relate <math>12 - 4</math> to <math>120 - 40</math>.</li> <li>• Count on and back in tens.</li> <li>• Use knowledge of number bonds to efficiently subtract numbers.</li> </ul>
Subtract a near multiple of 10	<ul style="list-style-type: none"> <li>• <math>63 - 19</math></li> <li>• Model using practical equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Round to the nearest 10.</li> <li>• Add a multiple of 10 to any number.</li> <li>• Count on and back in tens and ones.</li> </ul>
Subtract single-digit numbers and multiples of 10, 100 or 1000 from four-digit numbers	<ul style="list-style-type: none"> <li>• <math>2739 - 7</math></li> <li>• <math>1876 - 50</math></li> <li>• <math>2718 - 300</math></li> <li>• <math>3827 - 1000</math></li> </ul>	<ul style="list-style-type: none"> <li>• Count on and back in ones from any four-digit number.</li> <li>• Count on and back in tens from any four-digit number.</li> <li>• Count on and back in hundreds from any four-digit number.</li> <li>• Count on and back in thousands from any four-digit number.</li> </ul>
Use known facts and knowledge of place value to work out new facts	<ul style="list-style-type: none"> <li>• <math>32 - 6 = 26</math></li> <li>• <math>3200 - 600 = 2600</math></li> </ul>	<ul style="list-style-type: none"> <li>• Count on and back in ones from any two-digit number.</li> <li>• Count on and back in tens from any two-digit number.</li> <li>• Partition two-digit numbers to tens and ones.</li> <li>• Recombine tens and ones.</li> <li>• Understand place value in two digit numbers.</li> <li>• Understand the effect of multiplying by 10/100/1000.</li> </ul>

# Subtraction - Year 5

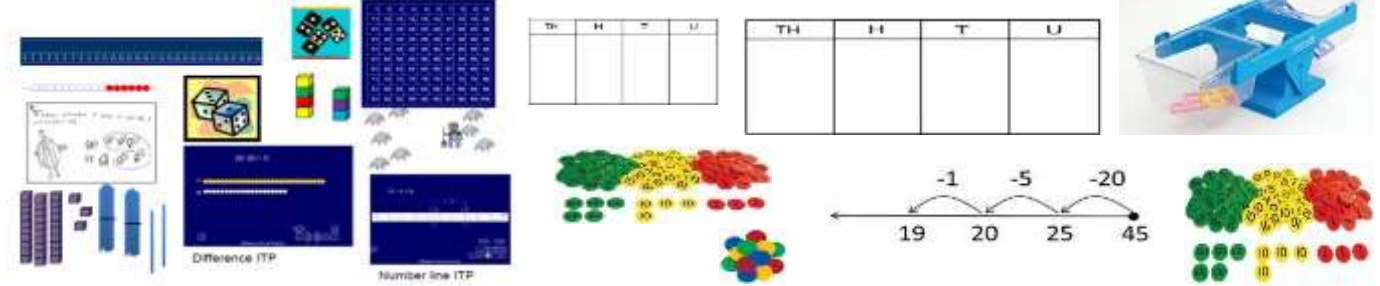
Practical equipment, models and images to support children with mental subtraction:



Mental calculation skills	Examples	Requisite prior knowledge
Subtract a pair of two-digit numbers or three-digit multiples of 10	<ul style="list-style-type: none"> <li>• 620 - 380</li> </ul>	<ul style="list-style-type: none"> <li>• Partition three-digit numbers into hundreds, tens and ones.</li> <li>• Understand place value in two- and three-digit numbers.</li> <li>• Use knowledge of place value to relate 62 - 38 to 620 - 380.</li> </ul>
Subtract a near multiple of 10 or 100 from any two digit or three-digit number	<ul style="list-style-type: none"> <li>• 326 - 99</li> <li>• £5.00 - £1.99</li> </ul>	<ul style="list-style-type: none"> <li>• Subtract a multiple of 10 from any number.</li> <li>• Subtract a multiple of 100 from any number.</li> <li>• Round numbers to the nearest 10 and 100.</li> </ul>
Subtract any pair of decimal fractions each with ones and tenths	<ul style="list-style-type: none"> <li>• 6.3 - 4.8</li> </ul>	<ul style="list-style-type: none"> <li>• Partition ones and tenths.</li> <li>• Count on and back in tenths including bridging through 1.</li> <li>• Understand and use the link between decimals and whole numbers e.g. multiply by 10 to give whole numbers then divide the answer by 10.</li> </ul>
Find the difference between near multiples of 100 or of 1000	<ul style="list-style-type: none"> <li>• 607 - 588</li> <li>• 6070 - 3992</li> </ul>	<ul style="list-style-type: none"> <li>• Know number bonds to 100 and related facts (to 1000).</li> <li>• Count on and back in tens, hundreds and thousands.</li> </ul>

# Subtraction - Year 6

Practical equipment, models and images to support children with mental subtraction:

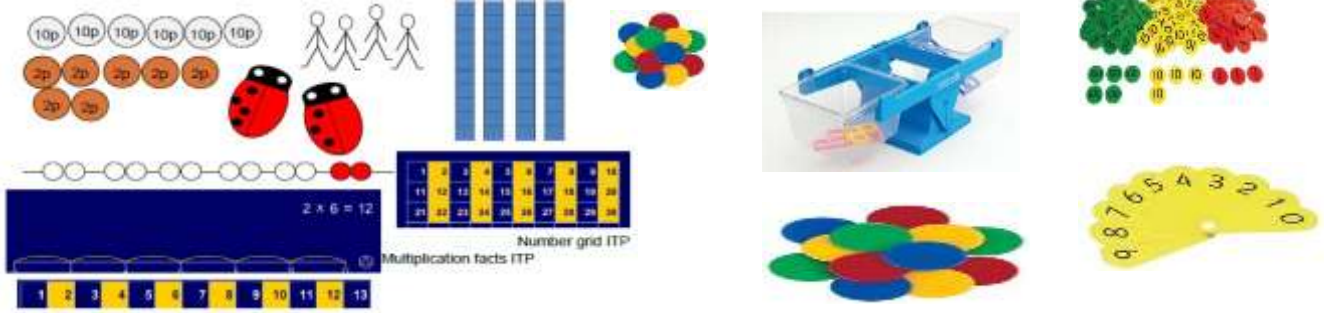


Mental calculation skills	Examples	Requisite prior knowledge
<b>Subtract pairs of decimals with ones, tenths or hundredths</b>	<ul style="list-style-type: none"> <li>• <math>5.6 - 3.38</math></li> </ul>	<ul style="list-style-type: none"> <li>• Partition units, tenths and hundredths.</li> <li>• Understand place value of tenths and hundredths.</li> <li>• Recombine ones, tenths and hundredths.</li> </ul>
<b>Subtract a decimal with ones and tenths, that is nearly a whole number</b>	<ul style="list-style-type: none"> <li>• <math>6.5 - 3.8</math></li> </ul>	<ul style="list-style-type: none"> <li>• Understand place value of tenths and hundredths.</li> <li>• Be able to round to the nearest whole number.</li> <li>• Subtract a whole number from any decimal number.</li> </ul>



# Multiplication - Year 1

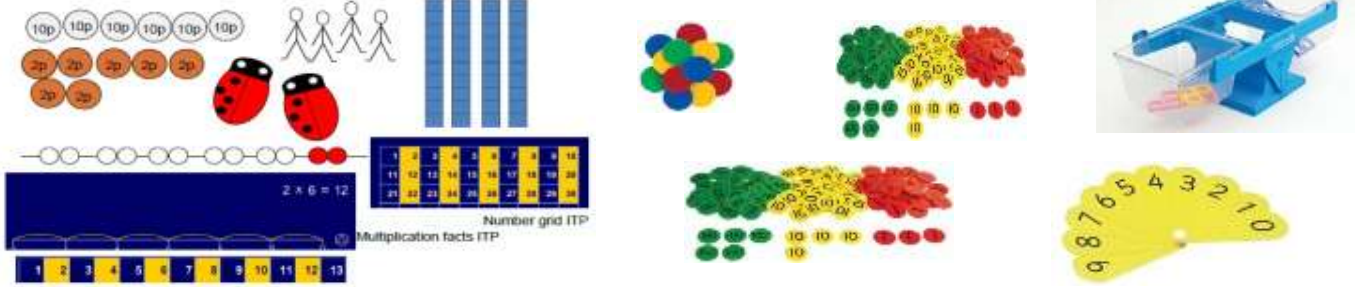
Practical equipment, models and images to support children with mental multiplication:



Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Count on from zero in ones, twos, fives or tens</b></p>	<ul style="list-style-type: none"> <li>Count on in ones from any number to 100. If you count in twos from 0, what will be the first six numbers?</li> <li>I'm putting 10p coins into this piggy bank. Count in tens to check how much money is going in.</li> <li>Count the number of eyes in this class.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to understand the link between multiplication and repeated addition.</li> <li>Know the number names up to 100 in order, in symbols (using numerals) and words (spoken).</li> <li>Recognise number patterns, in numeric symbols and spoken words. Cross tens boundaries when counting in ones and twos by understanding the base 10 number system.</li> <li>Learn and apply 2x table and 10x table.</li> <li>Understand and use commutativity (multiplication can be done in any order).</li> </ul>

# Multiplication - Year 2

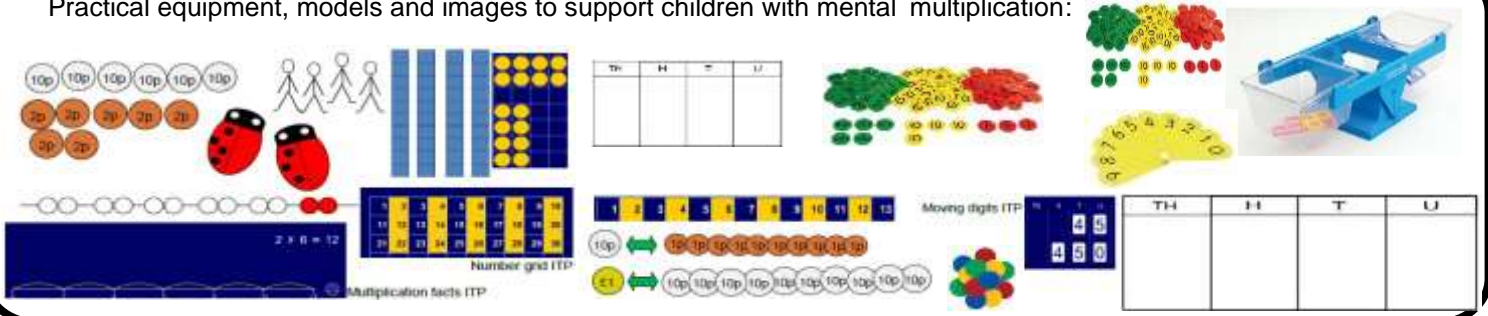
Practical equipment, models and images to support children with mental multiplication:



Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Double any multiple of 10 up to 100</b></p>	<ul style="list-style-type: none"> <li>• Double 15</li> <li>• <math>30 + 30 =</math></li> <li>• Explain how you could work out double 45.</li> <li>• Twice 25 is... 40 multiplied by 2 equals...</li> </ul>	<ul style="list-style-type: none"> <li>• Double single digit numbers.</li> <li>• Double multiples of 10.</li> <li>• Partition two-digit numbers into T and O and recombine T and O (by adding components).</li> <li>• Understand that doubling is adding the same number to itself.</li> <li>• Understand that doubling is multiplying by 2.</li> </ul>
<p><b>Find the total number of objects when they are organised in groups of 2, 5 or 10</b></p>	<ul style="list-style-type: none"> <li>• What is the total of six groups of 5?</li> <li>• How many fingers do these 4 children have? How did you work it out?</li> <li>• What is the total of this tally? <math>\text{    } \text{—} \text{    } \text{     } \text{     }</math></li> <li>• How else could you write <math>10 + 10 + 10 + 10</math>?</li> </ul>	<ul style="list-style-type: none"> <li>• Count on from zero in twos, fives and tens.</li> <li>• Relate 'groups of' to repeated addition.</li> <li>• Understand that the last number said in the count is the total of the group.</li> <li>• Learn and apply 2x table, 10x table and 5x table.</li> <li>• Understand and use commutativity (multiplication can be done in any order).</li> <li>• Use estimation to predict and check answers.</li> </ul>

# Multiplication - Year 3

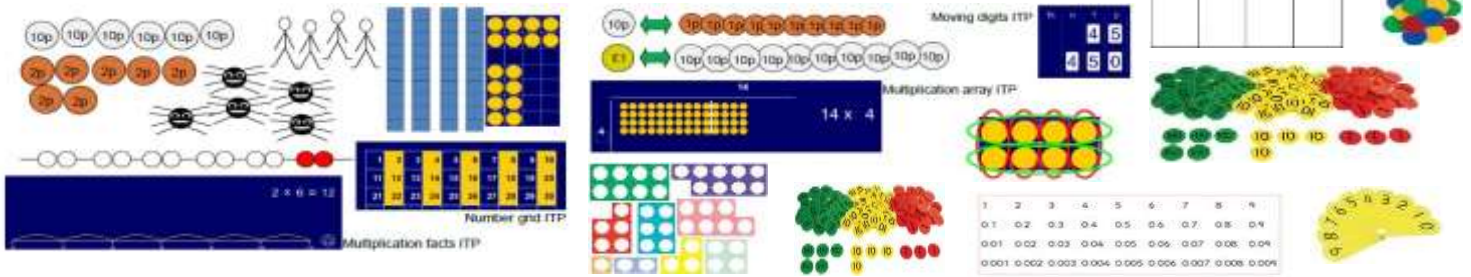
Practical equipment, models and images to support children with mental multiplication:



Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Double any multiple of 5 up to 100</b></p>	<ul style="list-style-type: none"> <li>• Double 55</li> <li>• <math>30 + 30 =</math></li> <li>• Explain how you could work out double 65.</li> <li>• Twice 70 is...</li> <li>• 40 multiplied by 2 equals...</li> </ul>	<ul style="list-style-type: none"> <li>• Double single digit numbers.</li> <li>• Double multiples of 10.</li> <li>• Partition two-digit numbers into T and O and recombine T and O (by adding components).</li> <li>• Understand that doubling is adding the same number to itself.</li> <li>• Understand that doubling is multiplying by 2.</li> </ul>
<p><b>Multiply one digit and two-digit numbers by 10 or 100</b></p>	<ul style="list-style-type: none"> <li>• <math>13 \times 10 =</math></li> <li>• <math>7 \times 100 =</math></li> <li>• Balloons are sold in packs of 10. How many balloons are in 24 packs?</li> </ul>	<ul style="list-style-type: none"> <li>• Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa. Understand that zero can be used as a place holder.</li> <li>• Learn and apply 2x table, 10x table, 5x table, 3x table, 4x table and 8x table.</li> <li>• Use estimation to predict and check answers.</li> </ul>

# Multiplication - Year 4

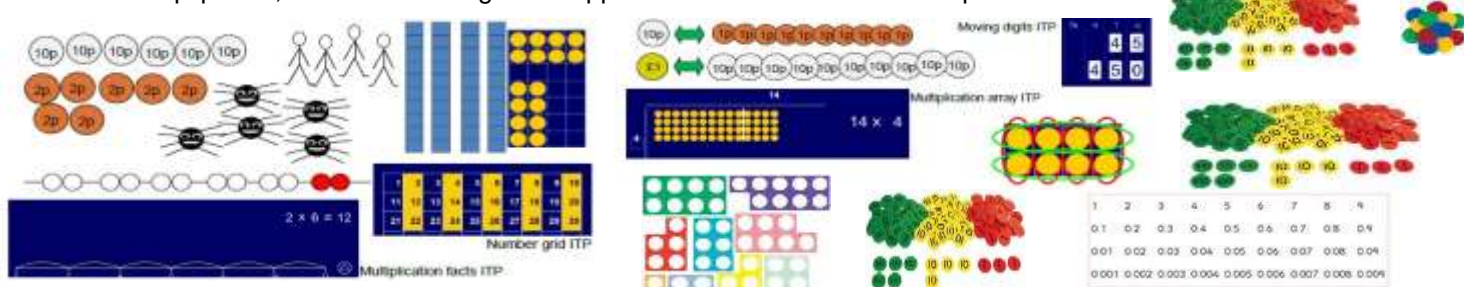
Practical equipment, models and images to support children with mental multiplication:



Mental calculation skills	Examples	Requisite prior knowledge
Double any multiple of 10 or 100	<ul style="list-style-type: none"> <li>• Double 80</li> </ul>	<ul style="list-style-type: none"> <li>• Double single digit numbers.</li> <li>• Understand and use knowledge of base 10 number system to relate 4 x 2 to 40 x 2.</li> </ul>
Double any two-digit number	<ul style="list-style-type: none"> <li>• Double 78</li> <li>• Double ?? and double ? is the same as doubling 36</li> </ul>	<ul style="list-style-type: none"> <li>• As above plus:</li> <li>• Partition two-digit numbers into T and O and recombine (by adding components).</li> </ul>
Multiply numbers to 1000 by 10 and then 100	<ul style="list-style-type: none"> <li>• 268 x 10</li> <li>• 407 x 100</li> </ul>	<ul style="list-style-type: none"> <li>• Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa.</li> <li>• Understand that zero can be used as a place holder.</li> </ul>
Multiply a multiple of 10 up to 100 by a single-digit number	<ul style="list-style-type: none"> <li>• 30 x 6</li> <li>• How would you work out 60 x 8?</li> </ul>	<ul style="list-style-type: none"> <li>• Know multiplication facts to 12 x 12.</li> <li>• Understand and use knowledge of base 10 number system to relate 3 x 4 to 30 x 40.</li> </ul>
Multiply numbers to 20 by a single digit	<ul style="list-style-type: none"> <li>• 14 x 8</li> <li>• 16 x 3 = (10 x 3) + (? x 3)</li> </ul>	<ul style="list-style-type: none"> <li>• Know multiplication facts to 12 x 12.</li> <li>• Partition two-digit numbers into T and O and recombine (by adding components).</li> </ul>
Give the factor pair associated with a multiplication fact	<ul style="list-style-type: none"> <li>• The factor pairs of 24 are 24 and 1, 12 and 2, ? and 3, ? and ?</li> <li>• If 14 x 3 = 42, give a factor pair for 42.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that some numbers can be represented as an array.</li> <li>• Know multiplication facts to 12 x 12.</li> <li>• Know that prime numbers only have two factors.</li> </ul>

# Multiplication - Year 5

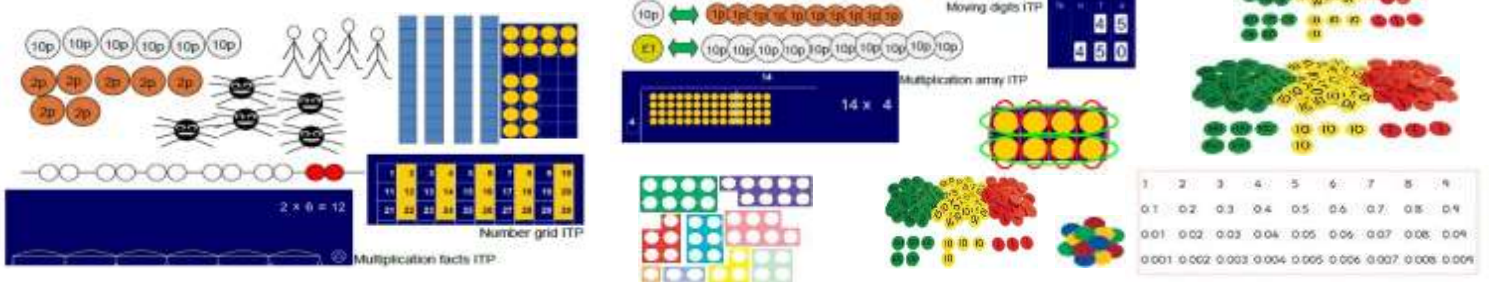
Practical equipment, models and images to support children with mental multiplication:



Mental calculation skills	Examples	Requisite prior knowledge
Double three-digit multiples of 10 to 500	<ul style="list-style-type: none"> <li>Double 460</li> </ul>	<ul style="list-style-type: none"> <li>Double single digit numbers.</li> <li>Understand and use knowledge of base 10 number system to relate <math>4 \times 2</math> to <math>40 \times 2</math> to <math>400 \times 2</math>.</li> <li>Partition three-digit numbers into H, T and O and recombine (by adding components).</li> </ul>
Multiply whole numbers and decimals by 10, 100 or 1000	<ul style="list-style-type: none"> <li><math>1.7 \times 100</math></li> </ul>	<ul style="list-style-type: none"> <li>Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa and 10 tenths = 1 whole and vice versa.</li> <li>Understand that zero can be used as a place holder</li> </ul>
Multiply pairs of multiples of 10	<ul style="list-style-type: none"> <li><math>20 \times 30</math></li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to <math>12 \times 12</math>.</li> <li>Understand and use knowledge of base 10 number system to relate <math>3 \times 4 = 12</math> to <math>3 \times 40 = 120</math> to <math>30 \times 40 = 1200</math>.</li> </ul>
Multiply two-digit numbers by 5 or 20	<ul style="list-style-type: none"> <li><math>17 \times 5</math></li> <li><math>38 \times 5</math></li> <li><math>74 \times 20</math></li> </ul>	<ul style="list-style-type: none"> <li>Multiply two-digit numbers by 10.</li> <li>Double two-digit and three-digit numbers.</li> <li>Halve two-digit and three digit numbers.</li> <li>Understand that <math>(x 10 \times 2)</math> is the same as <math>x 20</math> and that <math>(x 10 \div 2)</math> is the same as <math>x 5</math>.</li> </ul>
Multiply numbers by 4 or 8	<ul style="list-style-type: none"> <li><math>16 \times 4</math></li> </ul>	<ul style="list-style-type: none"> <li>Double two-digit and three-digit numbers.</li> <li>Understand the relationship between <math>x 2</math>, <math>x 4</math> and <math>x 8</math>.</li> </ul>
Multiply by 25 or 50	<ul style="list-style-type: none"> <li><math>14 \times 25</math></li> </ul>	<ul style="list-style-type: none"> <li>Multiply two-digit and three-digit numbers by 100.</li> <li>Halve numbers.</li> <li>Understand why halving and halving again is the same as finding a quarter.</li> </ul>
Find factor pairs for numbers to 100	<ul style="list-style-type: none"> <li>Factors of 42</li> </ul>	<ul style="list-style-type: none"> <li>Understand that some numbers can be represented as an array</li> <li>Know multiplication facts to <math>12 \times 12</math>.</li> <li>Recall prime numbers to 100.</li> <li>Know that square numbers have an odd number of factors.</li> </ul>

# Multiplication - Year 6

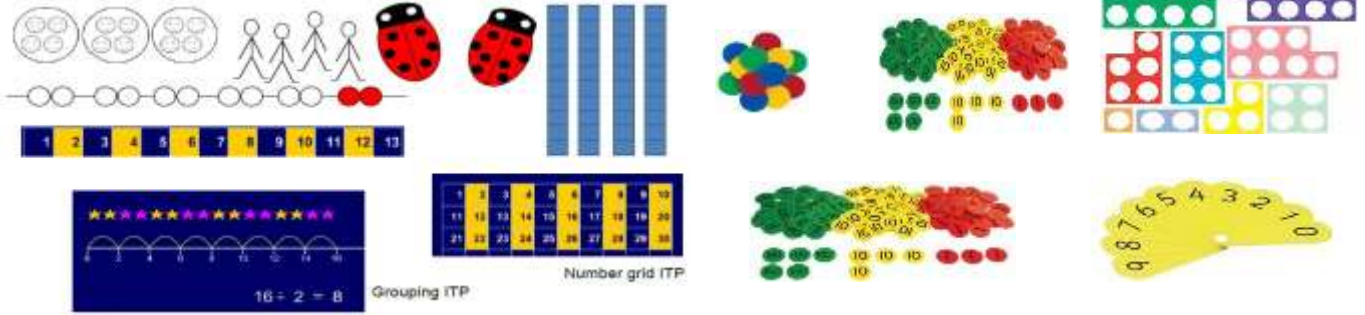
Practical equipment, models and images to support children with mental multiplication:



Mental calculation skills	Examples	Requisite prior knowledge
Multiply pairs of two-digit and single digit numbers	<ul style="list-style-type: none"> <li>• <math>28 \times 3</math></li> </ul>	<ul style="list-style-type: none"> <li>• Know multiplication facts to <math>12 \times 12</math>.</li> <li>• Partition two-digit numbers into T and O and recombine (by adding components).</li> <li>• Understand and use knowledge of base 10 number system to relate <math>3 \times 4 = 12</math> to <math>3 \times 40 = 120</math>.</li> </ul>
Double decimals with ones and tenths	<ul style="list-style-type: none"> <li>• Double 7.6</li> </ul>	<ul style="list-style-type: none"> <li>• Double single digit numbers.</li> <li>• Partition decimal numbers into ones and tenths and recombine (by adding components).</li> <li>• Understand and use knowledge of base 10 number system to relate double 4 to double 0.4.</li> </ul>
Multiply pairs of multiples of 10 and 100	<ul style="list-style-type: none"> <li>• <math>50 \times 30</math></li> <li>• <math>600 \times 20</math></li> </ul>	<ul style="list-style-type: none"> <li>• Know multiplication facts to <math>12 \times 12</math>.</li> <li>• Understand and use knowledge of base 10 number system to relate <math>3 \times 4 = 12</math> to <math>3 \times 40 = 120</math> to <math>30 \times 40 = 1200</math>.</li> </ul>
Multiply two-digit decimals	<ul style="list-style-type: none"> <li>• <math>0.8 \times 7</math></li> <li>• <math>5.6 \times 9</math></li> </ul>	<ul style="list-style-type: none"> <li>• Know multiplication facts to <math>12 \times 12</math>.</li> <li>• Understand and use knowledge of base 10 number system to relate <math>8 \times 7 = 56</math> to <math>0.8 \times 7 = 5.6</math>.</li> </ul>
Scale up or down using known facts	<ul style="list-style-type: none"> <li>• Given that three oranges cost 24p, find the cost of four oranges.</li> </ul>	<ul style="list-style-type: none"> <li>• Know multiplication facts to <math>12 \times 12</math>, including related division facts.</li> </ul>
Identify numbers with an odd number of factors and no factor pairs other than one and themselves	<ul style="list-style-type: none"> <li>• What are the factors of 25?</li> <li>• Is it always true, sometimes true or never true that square numbers have an odd number of factors? How many different sized rectangular arrays can you make using 12 counters? 17 counters? 13 counters?</li> <li>• 16 counters?</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that some numbers can be represented as an array.</li> <li>• Understand that some numbers can be represented as a square array which is why they are called square numbers.</li> <li>• Understand that some numbers have only two factors, one and themselves, and that they are called prime numbers.</li> <li>• Understand that every number greater than one is either a prime number or a composite number.</li> <li>• Know multiplication facts to <math>12 \times 12</math>.</li> </ul>

# Division - Year 1

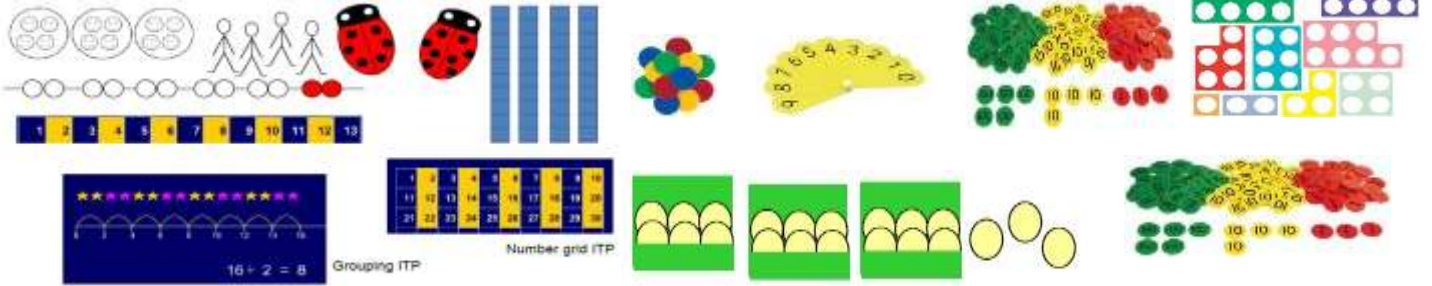
Practical equipment, models and images to support children with mental division:



Mental calculation skills	Examples	Requisite prior knowledge
<p><b>Count back to zero in ones, twos, fives or tens</b></p>	<ul style="list-style-type: none"> <li>Count back in ones from 14 to 0.</li> <li>Now try counting back in twos from 14 to 0.</li> <li>How many numbers did you say?</li> <li>Count back in tens from 90 to 0.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to understand the link between division and repeated subtraction</li> <li>Count on from 0 in ones, twos, fives and tens.</li> <li>Cross tens boundaries when counting in ones and twos by understanding the base 10 number system.</li> <li>Know the number names up to 100 in order, in symbols (using numerals) and words (spoken).</li> <li>Understand the amounts the symbols and words represent.</li> <li>Place value – understand what each digit represents in a two-digit number.</li> <li>Recognise number patterns, in numeric symbols and spoken words.</li> </ul>

# Division - Year 2

Practical equipment, models and images to support children with mental division:



Mental calculation skills	Examples	Requisite prior knowledge
<p>Halve any multiple of 10 up to 100 where the answer is even</p>	<ul style="list-style-type: none"> <li>• <math>40 \div 2</math></li> <li>• Use these bundles of straws to help you halve 90.</li> </ul>	<ul style="list-style-type: none"> <li>• Know multiples of 10.</li> <li>• Halve even numbers to 20.</li> <li>• Understand that halving is dividing by 2 and half as one of two equal parts.</li> <li>• Understand and use knowledge of base 10 number system to relate <math>8 \div 2</math> to <math>80 \div 2</math>.</li> </ul>
<p>Find half of even numbers to 40</p>	<ul style="list-style-type: none"> <li>• Halve 24</li> <li>• <math>32 \div 2</math></li> <li>• <math>?? \times 2 = 20</math></li> <li>• <math>28 = ?? \times 2</math></li> </ul>	<p>As above plus:</p> <ul style="list-style-type: none"> <li>• Know even numbers.</li> <li>• Partition numbers in different ways e.g. when finding half of 36 partitioning 36 into 20 + 16.</li> </ul>
<p>Use times tables facts to divide two-digit numbers by 2, 5 or 10</p>	<ul style="list-style-type: none"> <li>• <math>18 \div 2</math></li> <li>• <math>45 \div 5</math></li> <li>• <math>60 \div 10</math></li> </ul>	<ul style="list-style-type: none"> <li>• Know and use division facts related to the 2x table, 5x table and 10x table.</li> </ul>

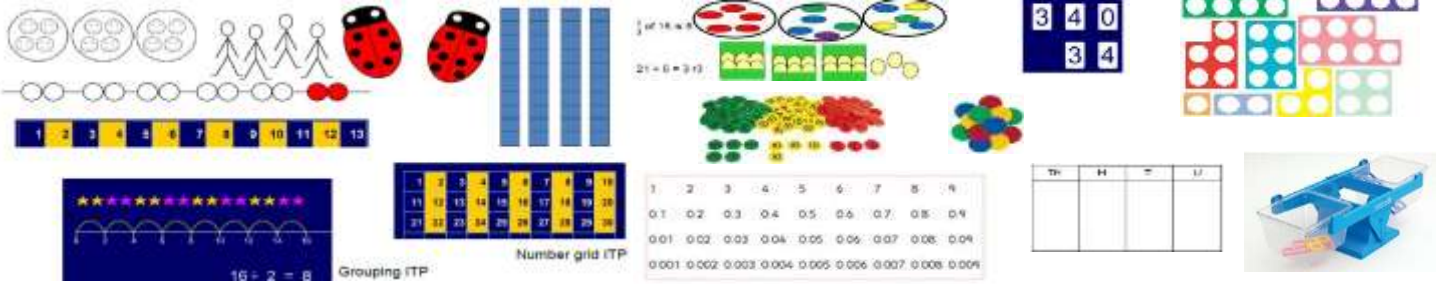






# Division - Year 5

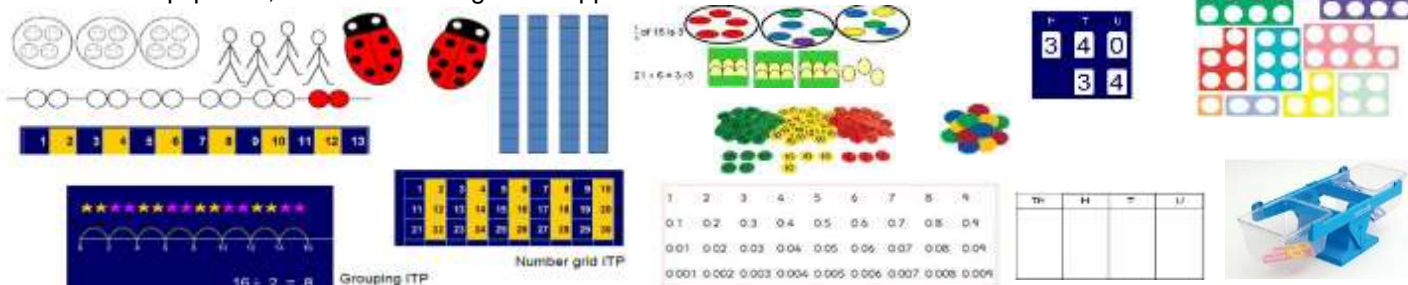
Practical equipment, models and images to support children with mental division:



Mental calculation skills	Examples	Requisite prior knowledge
Halve three-digit multiples of 10 to 1000	<ul style="list-style-type: none"> <li><math>760 \div 2</math></li> <li>Halve 770</li> <li>Find <math>\frac{1}{2}</math> of 440</li> <li><math>? \times 2 = 290</math></li> </ul>	<ul style="list-style-type: none"> <li>Know multiples of 10 up to 1000.</li> <li>Partition multiples of 10 into pairs of multiples of 10 e.g. <math>170 = 160 + 10</math>.</li> <li>Partition multiples of 100 into pairs of multiples of 100 e.g. <math>700 = 600 + 100</math>.</li> <li>Halve even numbers to 100.</li> <li>Understand that halving is dividing by 2 and half as one of two equal parts.</li> <li>Understand and use knowledge of base 10 number system to relate <math>8 \div 2</math> to <math>80 \div 2</math> to <math>800 \div 2</math>.</li> </ul>
Find the remainder after dividing a two-digit number by a one-digit number	<ul style="list-style-type: none"> <li><math>27 \div 4</math></li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to <math>10 \times 10</math> and related division facts.</li> <li>Count in equal steps of 2, 3, 4, 5, 6, 7, 8, 9 and 10 from non-multiples of those numbers e.g. count back in sixes from 43.</li> </ul>
Divide whole numbers by 10, 100 or 1000 (decimal answers)	<ul style="list-style-type: none"> <li><math>25 \div 10</math></li> <li><math>673 \div 100</math></li> <li><math>74 \div 100</math></li> <li>How many metres are there in 456cm?</li> </ul>	<ul style="list-style-type: none"> <li>Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa.</li> <li>Understand base 10 decimal number system i.e. 1 whole = 10 tenths, 1 tenth = 10 hundredths.</li> <li>Understand that zero can be used as a place holder.</li> </ul>
Divide a multiple of 10 by a single-digit number (whole number answers)	<ul style="list-style-type: none"> <li><math>80 \div 4</math></li> <li><math>270 \div 3</math></li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to <math>12 \times 12</math> and related division facts.</li> <li>Understand and use knowledge of base 10 number system to relate <math>8 \div 4</math> to <math>80 \div 4</math> to <math>800 \div 4</math>.</li> </ul>
Find fractions of whole numbers or quantities	<ul style="list-style-type: none"> <li><math>\frac{2}{3}</math> of 27</li> <li><math>\frac{4}{5}</math> of 70 kg</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to <math>12 \times 12</math> and related division facts.</li> <li>Understand fractions of shapes.</li> <li>Understand fractions as equal parts of a whole.</li> <li>Understand what the numerator and denominator represent in a fraction.</li> <li>Count in equal steps (groups).</li> <li>Understand that finding a fraction of an amount is related to sharing equally (division).</li> <li>Find simple unit fractions of numbers.</li> </ul>
Find 50%, 25% or 10% of integers or quantities	<ul style="list-style-type: none"> <li>25% of 20kg</li> <li>10% of £80</li> </ul>	<ul style="list-style-type: none"> <li>As above plus:</li> <li>Know percentage equivalences for <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math> and <math>\frac{1}{10}</math> and vice versa.</li> </ul>
Divide two-digit numbers by 4 or 8	<ul style="list-style-type: none"> <li><math>72 \div 4</math></li> <li><math>96 \div 8</math></li> </ul>	<ul style="list-style-type: none"> <li>Understand the relationship between <math>\div 2</math>, <math>\div 4</math> and <math>\div 8</math>.</li> <li>Halve two-digit numbers.</li> </ul>

# Division - Year 6

Practical equipment, models and images to support children with mental division:



Mental calculation skills	Examples	Requisite prior knowledge
Divide a two-digit number by a single digit number	<ul style="list-style-type: none"> <li>88 ÷ 3</li> <li>68 ÷ 4</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to 12 x 12 and related division facts.</li> <li>Partition numbers in different ways e.g. when finding 84 ÷ 7, recognising 84 as 70 + 14.</li> </ul>
Halve decimals with tens, ones and tenths	<ul style="list-style-type: none"> <li>Halve 72.7</li> <li>Find ½ of 15.2.</li> <li>13.1kg ÷ 2</li> </ul>	<ul style="list-style-type: none"> <li>Halve whole numbers to 100.</li> <li>Understand that halving is dividing by 2 and half as one of two equal parts.</li> <li>Understand base 10 decimal number system i.e. 1 whole = 10 tenths, 1 tenth = 10 hundredths.</li> <li>Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2 and 0.8 ÷ 2.</li> </ul>
Divide multiples of 100 by a multiple of 10 or 100 (whole number answers)	<ul style="list-style-type: none"> <li>400 ÷ 20</li> <li>4000 ÷ 200</li> <li>How many 20p coins in £20?</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to 12 x 12 and related division facts.</li> <li>Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa.</li> <li>Understand and use knowledge of base 10 number system to relate 8 ÷ 4 to 80 ÷ 40 to 800 ÷ 40 to 800 ÷ 400.</li> </ul>
Divide two-digit decimals	<ul style="list-style-type: none"> <li>4.8 ÷ 6</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to 12 x 12 and related division facts.</li> <li>Understand and use knowledge of base 10 number system to relate 18 ÷ 6 to 180 ÷ 6 and 1.8 ÷ 6.</li> </ul>
Find 10% or multiples of 10% of whole numbers or quantities	<ul style="list-style-type: none"> <li>Find 30% of 50ml</li> <li>What is 70% of 200g? How much would you pay for an item worth £30 with 40% off?</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to 12 x 12 and related division facts.</li> <li>Know equivalence between 1/10 and 10% and related fractions e.g. 3/10 = 30%, 9/10 = 90%.</li> <li>Divide whole numbers or quantities by 10.</li> </ul>
Simplify fractions by cancelling	<ul style="list-style-type: none"> <li>What is 14/35 in its simplest form?</li> <li>Reduce 56/100 to its simplest form.</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to 12 x 12 and related division facts. Identify all factors of numbers to 100.</li> </ul>
Scale up or down using known facts	<ul style="list-style-type: none"> <li>Given that 3 oranges cost 24p, find the cost of 4 oranges.</li> </ul>	<ul style="list-style-type: none"> <li>Know multiplication facts to 12 x 12, including related division facts.</li> </ul>
Divide by 25 or 50	<ul style="list-style-type: none"> <li>480 ÷ 25</li> <li>3200 ÷ 50</li> </ul>	<ul style="list-style-type: none"> <li>Divide numbers by 100.</li> <li>Double numbers.</li> </ul>