
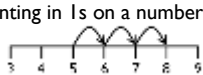



Progression in Teaching and Learning Addition – Draft

Year Group and Notes	Written Calculations	Models & Images / Manipulatives	Mental Calculations for fluency	Known Facts for fluency	Reasoning and Problem Solving
<p><b>Foundation Stage Development Matters/ELGs</b></p>	<p>-Find one more than a number to 10 -In practical activities &amp; discussion, begin to use the vocabulary involved in addition</p>	<p>Select two groups of objects to make a given total of objects</p>	<p>-Find the total number of objects in two groups by counting them all -In practical activities &amp; discussion, begin to use the vocab of addition</p>	<p>-Recognise some numerals of personal significance -Use a range of strategies for +, incl some recall of number bonds</p>	<p>-Use of concrete, familiar objects e.g. farm animals, -Range of manipulatives to demonstrate e.g. Numicon, compare bears, mini cuddly toys -Incorporate problem solving word problems as part of everyday maths. <b>NRICH:</b> <a href="http://nrich.maths.org/early-years">http://nrich.maths.org/early-years</a> <a href="#">Number Book</a> <a href="#">Number Rhymes</a> <a href="#">Maths Story Time</a> <a href="#">Shopping</a></p>
<p><b>Year 1</b> - Essential to develop cardinal and ordinal representations of number in parallel - Understand + as finding the total of two or more sets of objects - Understand = as equals and meaning a balance - Introduce 'How many more?' Vocabulary: add, plus, total, altogether, put together, more than</p>	<p>Record their work, e.g. - record their work with objects, pictures or diagrams to solve one step problems - Use the symbols '+' and '=' to record additions e.g. <math>10 + 5 = 15</math>; <math>3 + ? = 7</math>; <math>10 = 8 + 2</math> - Solve missing number problems such as <math>7 = ?? - 9</math> - Uses numbers up to 20 (including 0) - Combine and increase numbers</p>	<p><b>Cardinal</b>  the 'eightness' of eight <b>Ordinal</b> Counting in 1s on a number line  <b>Addition - Foundations of understanding (Year 1)</b>  <b>Mental methods</b> <math>8 + 6 = 14</math> <math>8 + 2 = 10 + 4 = 14</math></p>	<p>Add numbers of objects to 20 - Begin to add by counting on from the number of objects in the first set - Know number bonds to 10 and 20 in several forms</p>	<p><b>Instant recall</b></p> <ul style="list-style-type: none"> <li>Doubles of numbers to 10</li> <li>Number bonds to 20</li> </ul> <p><b>Derived</b></p> <ul style="list-style-type: none"> <li><math>10 + U</math></li> </ul> <p><b>(Using combining rather than counting in 1s)</b></p>	<p><b>Rising Stars:</b> Missing Numbers The Story of 10 Mr Penny's Fruit Shop If this equals 2... What's the problem? Tell me about... Three Card Trick <b>NRICH:</b> <a href="#">I'm eight</a> <a href="#">2,4,6,8</a> <a href="#">Ladybirds in the garden</a> <a href="#">Find the difference</a> <a href="#">Sort them out</a> <a href="#">How do you see it?</a> <b>NCETM:</b> Continue the pattern Missing numbers Working Backwards What do you notice? What else do you know? Missing symbols Convince me Making an estimate</p>

Is it true that...?

**Year 2**

- Check that children are not getting stuck in a counting in 1s strategy. A good sense check is that they don't add 10 (e.g.  $25 + 10$ ) by counting on on their fingers but instead think '2 tens and 5 units plus 1 ten = 3 tens and 5 units'
- Understand that addition can be done in any order (commutative)
- Look at adding strings of single digit numbers, e.g.  $6 + 3 + 4 + 9 =$  by finding number bonds to 10 first
- recognise inverse and use this to check calculations and solve missing number problems.

Vocabulary: add, plus, total, altogether, put together, more than, sum

- Add TU+U, TU+T, TU+TU, U+U+U
- Solve problems using concrete objects and pictorial representations, including those involving numbers, quantities and measures.
- Record in columns to support place value

Add two digit numbers using a written method, e.g. – use written methods that involve bridging

$$\begin{array}{r} 36 + 45 \\ \hline 70 + 11 = 81 \end{array}$$

**Partitioning** (Dienes/ PV Counters)

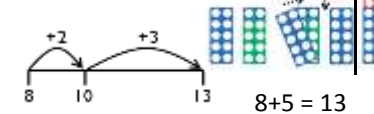
**Addition – Year 2**

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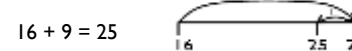
Add TO+O, TO+T, TO+TO, O+O+O  
Begin to add multiples of 10 to a 2 digit number, e.g. calculate  $26 + 30$

**(By counting on in 10s or partitioning)**  
Record their work in writing, e.g. – record their mental calculations as number sentences

**Bridging** - Teach mental calculation represented on number line



**Compensating**



**Instant recall**

- Doubles of numbers to 20 and corresponding halves
- Number bonds to 20
- Multiples of 10 which total 100

**Derived**

- All addition facts for totals to 20
- Addition facts to 100 derived from number bonds e.g.  $2+8=10$ ,  $20+80=100$
- Add 10 to any number to 90
- Use knowledge of doubles to derive near doubles

**Rising Stars:**

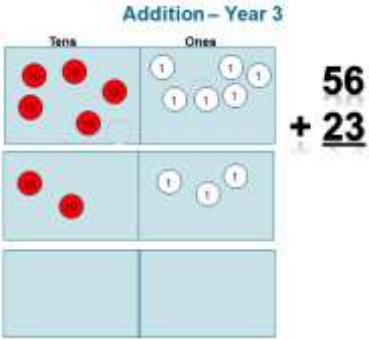
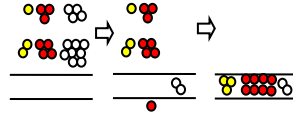

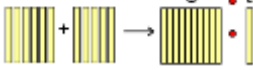
The story of 20  
Calculation families  
A difference of 5  
Total patterns

**NRICH:**

- [Secret number](#)
- [Number Lines](#)
- [Getting the balance](#)
- [Strike it Out](#)
- [The add and take-away path](#)
- [What was in the box?](#)
- [Doing and Undoing](#)
- [Unit Differences](#)
- [Big Dog, Little Dog](#)

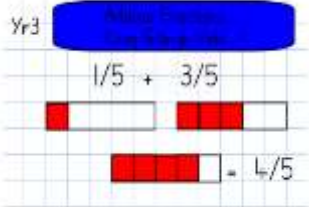
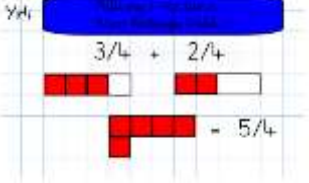
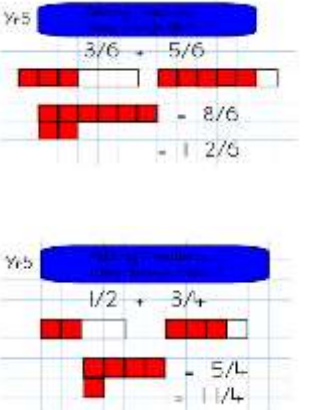
**NCETM:**

- Continue the pattern
- Missing numbers
- True or False?
- Hard and easy questions
- Other possibilities
- Fact families
- What else do you know?
- Missing symbols
- Convince me
- Making an estimate
- Always, sometimes, never

<p><b>Year 3</b></p> <ul style="list-style-type: none"> <li>- Don't forget to show you can add more than 2 numbers in column addition</li> <li>-Add decimals in the context of money where bridging is not required</li> <li>-Solve problems including missing number problems, using number facts, place value and more complex addition</li> <li>-Estimate and use inverse operations to check answers to calculations</li> </ul> <p>Vocabulary: increase</p>	<p><b>Expanded Column addition</b></p> <p>Add three digit numbers involving bridging 10 or 100</p> $\begin{array}{r} 239 \\ + 154 \\ \hline 13 \\ 80 \\ \hline 300 \\ 393 \end{array}$ <p><b>Column Addition</b></p> $\begin{array}{r} 239 \\ 154 \\ \hline 393 \\ 1 \end{array}$	<p><b>Addition – Year 3</b></p>  <p><b>Column addition</b></p> <p>Model using Dienes/ PV counters to show the carrying into the next column</p>  <p>Use place value counters to develop understanding of addition with decimals</p>	<p>Add 2 digit numbers and strings of 3 numbers mentally, e.g. -Calculate <math>36 + 19</math> (could exceed 100)</p> <p>Add mentally: HTO+O, HTO+T, HTO+H</p> <p><b>Teach mental methods:</b> <b>Partitioning, compensating, bridging or near doubles</b></p> <p><b>(Counting on strategy)</b></p>	<p><b>Instant recall!</b></p> <ul style="list-style-type: none"> <li>• Double 15, 25, 35, 45 and corresponding halves</li> <li>• All addition facts for multiples of 10 to 100</li> <li>• All addition facts to 100 (complements to 100)</li> </ul> <p><b>Derived</b></p> <ul style="list-style-type: none"> <li>• Multiples of 5 which total 100</li> </ul>	<p><b>Rising Stars:</b> Missing Problems Fabulous 28</p> <p><b>NRICH:</b> <a href="#">Strike it out</a> <a href="#">Make 100</a> <a href="#">Sums and Differences 1</a> <a href="#">Sums and Differences 2</a> <a href="#">Which symbol?</a> <a href="#">Carrying Cards</a></p> <p><b>NCETM:</b> True or False Hard and easy questions Convince me Making an estimate Always, sometimes, never</p>
<p><b>Year 4</b></p> <ul style="list-style-type: none"> <li>- When working with money, teach that e.g. <math>£2.99 + £5.99</math> can quickly be added mentally using compensating (<math>£3 + £6 - 2p</math>)</li> <li>- Chn should 'see' decimals so that they are not saying <math>0.5+0.6 = 0.11</math></li> <li>- Add numbers with up to 4 digits using formal written method</li> <li>- Solve addition two-step problems in contexts, deciding on which method to use and why.</li> <li>- Estimate and use inverse operations to check answers to a calculation</li> </ul>	<p><b>Column addition</b></p> <p>Use efficient written methods of addition, e.g.</p> <ul style="list-style-type: none"> <li>- calculate <math>1202 + 45 + 367</math></li> <li>- add decimals to 2 places</li> <li>- add 3 numbers eg <math>348+276+368</math> – notice unit total 24</li> </ul> 	<p><b>Addition facts for decimals</b></p> <p>Introduce using Dienes: <math>0.6+0.5=1.1</math></p>  <p>Use place value counters to develop understanding of addition with decimals</p>	<p>Calculation complements to 1000 for multiples of 10, e.g. <math>340 + \underline{\quad} = 1000</math> <math>100 = \underline{\quad} + \underline{\quad}</math></p> <p>Practise mental methods with increasingly large numbers to aid fluency</p>	<p><b>Derived</b></p> <ul style="list-style-type: none"> <li>• Doubles of all numbers to 100</li> <li>• Doubles of tenths to 0.9 and corresponding halves</li> <li>• Addition facts for tenths up to 0.9, e.g. <math>0.7 + 0.9 = 1.6</math></li> </ul>	<p><b>Rising Stars:</b> Finding the difference Disco drinks Terrific thirty-six</p> <p><b>NRICH:</b> <a href="#">Roll these dice</a> <a href="#">Super Shapes</a> <a href="#">Subtraction Squares</a> <a href="#">Down to Nothing</a> <a href="#">The Deca Tree</a> <a href="#">Carrying Cards</a> <a href="#">The Money Maze</a> <a href="#">A Dotty Problem</a></p> <p><b>NCETM:</b> True or False Hard and easy questions Convince me Making an estimate Always, sometimes, never</p>
<p><b>Year 5/6</b></p> <ul style="list-style-type: none"> <li>-Solve problems including decimals up to 3 decimal places</li> <li>-Add numbers with more than 4 digits</li> <li>-Use rounding to check</li> <li>-Solve multi-step problems</li> <li>-Use estimation to check answers</li> </ul>	<p><b>Column addition</b></p> <p>Add numbers that do not have the same number of decimals places</p>		<p>Calculate decimal complements to 10 or 100</p> <p>Practise mental methods with increasingly large numbers to aid fluency</p> <p>Mental calculations with mixed operations and large numbers</p>	<p><b>Derived</b></p> <ul style="list-style-type: none"> <li>• Doubles of hundredths to 0.09 and corresponding halves</li> <li>• Addition facts for hundredths up to 0.09 e.g. <math>0.07 + 0.09 = 0.16</math></li> </ul>	<p><b>Rising Stars:</b> Missing Numbers Magic Squares</p> <p><b>NRICH:</b> <a href="#">Dicey Operations</a> <a href="#">Wild Jack</a> <a href="#">Criss Cross Quiz</a></p>

to calculations					<a href="#">Down to Nothing</a> <a href="#">First Connect Three</a> <a href="#">Amy's Dominoes</a> <a href="#">One Million to Seven</a> <a href="#">The Money Maze</a> <a href="#">Difference</a> <a href="#">The 24 Game</a> <b>NCETM:</b> True or False Hard and easy questions Convince me Making an estimate Always, sometimes, never Missing symbols What else do you know?
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**Fractions**

<p><b>Year 3</b> Add fractions with the same denominator within one whole. e.g. <math>5/7 + 1/7 = 6/7</math></p>	<p><b>Rectangle Model</b> Use the rectangle model to visualise the given fractions. Add numerators that don't exceed 1 whole.  Development into adding numerators without using rectangle model.</p>		Add single digit numbers.	<p><b>Instant recall</b></p> <ul style="list-style-type: none"> <li>Addition of single digits numbers</li> </ul>	Build a wall – Problem Solving (Finding equivalents – showing which fractions can add together to make another).
<p><b>Year 4</b> Add fractions with the same denominator (With improper fractions). <math>3/5 + 4/5 = 7/5</math></p>	<p><b>Rectangle Model</b> Use the rectangle model to visualise the given fractions. Add numerators that exceed 1 whole.  Development into adding numerators without using rectangle model.</p>		Add single digit numbers.	<p><b>Instant recall</b></p> <ul style="list-style-type: none"> <li>Addition of single digits numbers</li> </ul>	
<p><b>Year 5</b> Add fractions with the same denominator and denominators that are multiples of the same number. (Improper and mixed number facts) <math>2/5 + 4/5 = 6/5 = 1 \frac{1}{5}</math> <math>1/2 + 3/4 = 5/4 = 1 \frac{1}{4}</math></p>	<p><b>Rectangle Model</b> Use the rectangle model to visualise the given fractions. Add numerators that exceed 1 whole and convert fractions to common denominators. Use visual rectangle to calculate mixed number fraction. Development into adding numerators without using rectangle model.</p>		Adding single digit numbers Calculating multiples of numbers Subtracting single digit numbers	<p><b>Instant recall</b></p> <ul style="list-style-type: none"> <li>Addition of single digits numbers</li> <li>Multiples of numbers</li> </ul>	Fraction Pairs – Rising Stars Maths

**Year 6**

Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

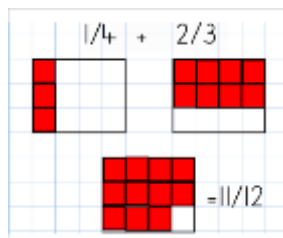
$$3/5 + 7/10 = 13/10 = 1 \frac{3}{10}$$

$$1 \frac{3}{4} + 1 \frac{3}{8} = 3 \frac{1}{8}$$

**Rectangle Model**

Use the rectangle model to visualise the given fractions. Add numerators that exceed 1 whole and convert fractions to common denominators. Use visual rectangle to calculate mixed number fraction.

Development into adding numerators without using rectangle model.



Adding single digit numbers

Calculating multiples of numbers

Subtracting single digit numbers

**Instant recall**

- Addition of single digits numbers
- Multiples of numbers

Monsters – Rising Stars Maths