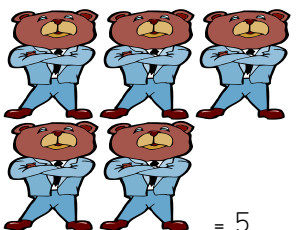




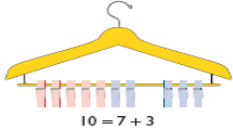
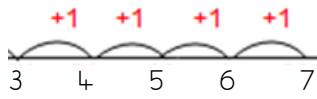
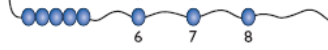
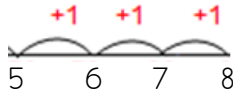
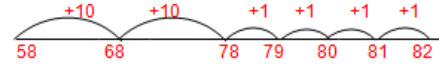
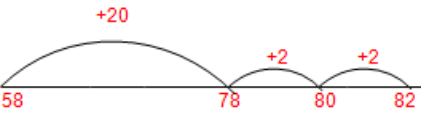
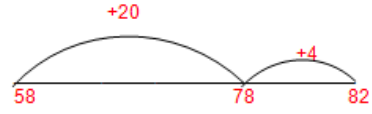



Newdale Primary Maths Calculation Policy – Addition

Reception/Year 1	Year 1	Year 2 Adding:
<p>Key skills: Count sets of objects splitting them into different sized groups using practical apparatus; begin to recognise pairs of numbers which make 10.</p> <p>Begin to understand that they can be split in any way and the total number remains the same.</p> <p>Children use number rhymes and stories in a meaningful context.</p> <p>Pictorial recording of practical experiences.</p> <p>Understand that when we add the number gets bigger.</p> <p>Know that addition can be done in any order (commutative)</p> <p><i>Jane had 3 bears. She was given 2 more. How many does she have now?</i></p> <div style="text-align: center;">  <p>= 5</p> </div> <p>Show calculation as pictures or a number sentence</p> <p>Teacher modelling of number sentences and addition as commutative.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  $1 + 1 = 2$ double 1 is 2 </div> <div style="text-align: center;">  $2 - 1 = 1$ half of 2 is 1 </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;">  $2 + 2 = 4$ double 2 is 4 </div> <div style="text-align: center;">  $4 - 2 = 2$ half of 4 is 2 </div> </div>	<p>Key skills: Know and recall all number bonds to 20; add one and two digit numbers to 20, including 0; solve 1 step problems involving addition e.g. $7 = \square + 5$</p> <div style="text-align: center;">  <p>$10 = 7 + 3$</p> </div> <p>To have experience of using equal sign = in calculation.</p> <p>Record addition by counting forwards on a number line in steps of 1.</p> <p>$3 + 4 =$</p> <div style="text-align: center;">  </div> <p>Know that addition can be done in any order (commutative)</p> <p>Reorder the calculation so that the largest number is first.</p> <p>$3 + 5 =$</p> <div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 10px;">  </div> <p>Begin to understand that addition is the inverse or opposite of subtraction.</p> <div style="text-align: center;"> $2 + 3 = 5$ $3 + 2 = 5$ $5 - 3 = 2$ $5 - 2 = 3$ </div>	<p>Key skills: Recall addition facts to 20 and 100; add two-digit number and units, two-digit number and tens, two two-digit numbers; adding 3 one digit numbers; show that addition can be done in any order 'Commutative';</p> <p>$TU + TU = TU$ and when secure moving on to $TU + TU = HTU$</p> <p>Informal methods</p> <p>$24 + 58$</p> <div style="text-align: center;">  </div> <p>adding in 10s and 1s</p> <div style="text-align: center;">  </div> <p>add 20, bridge the 10</p> <div style="text-align: center;">  </div> <p>add 20 and then 4</p> <p>Compensation strategy</p> <p>$5 + 9 =$ $5 + 10 - 1$</p> <div style="text-align: center;">  </div> <p style="color: red; font-style: italic;">Children to show notation</p>



Newdale Primary Maths Calculation Policy – Addition

Use shapes to represent missing numbers.

$$\square + \square = \triangle$$

$$6 + 6 = 12$$

Add more than 2 single digit numbers mentally.

$$5+3+1=9$$

Reorder a calculation to find number bonds to 20 and then combine

$$6+3+2+7+4=$$

$$6+4+7+3+2=22$$

Mastery check:

Use the pattern to complete the number sentences.

- 0 + 5 = 5
- 1 + \square = 5
- 2 + \square = 5
- 3 + \square = 5
- 4 + \square = 5
- 5 + \square = 5

Now do the same for rows of 6 counters, 7 counters, 8 counters, 9 counters and 10 counters.

Children should be able to recall all number bonds to and within 10. Exposing the structure of the mathematics supports this process. They should then apply this to number bonds to 20, so if 5+3=8, 15+3=18

I'm thinking of a number. I've subtracted 5 and the answer is 7. What number was I thinking of? Explain how you know.

I'm thinking of a number. I've added 8 and the answer is 19. What number was I thinking of? Explain how you know.

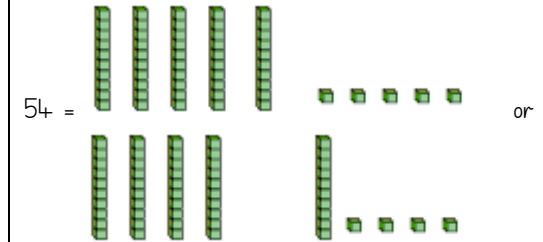
I know that 7 and 3 is 10. How can I find 8 + 3? How could you work it out?

Show children a price list with items costing up to 20p. I have 20p to spend. If I spend 20p exactly, which two items could I buy? And another two, and another two.

If I bought one of the items how much change would I have? And another one, and another one.

See NCETM for more examples.

Introduced to rearranging with Diennes TU numbers so that 54 is seen as 5 tens and 4 units and also a 40 and 14.



Formal methods

Vertical notation for non-crossing of boundaries calculations to start with.

Introduce column addition without crossing the boundary

$$\begin{array}{r} 24 \\ +53 \\ \hline 7 \quad (4 + 3) \\ +70 \quad (50 + 20) \\ \hline 77 \end{array}$$

Start with least significant digit

$$\begin{array}{r} 67 \\ + 24 \\ \hline 11 \quad (7+4) \\ + 80 \quad (60+20) \\ \hline 91 \end{array}$$

Mastery check:

Captain Conjecture says.
"An odd number + an odd number = an even number".
Is this sometimes, always or never true?

Explain your reasoning.

Concrete resources might help pupils to explain their reasoning.



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Newdale Primary Maths Calculation Policy – Addition

Year 3	Year 4	Year 5/Year 6
<p>Key skills: add mentally a three digit number and units, a three digit number and tens, a three digit number and hundreds; add numbers with up to three digits using column addition; use addition as the inverse to check subtraction calculations.</p> <p><u>Formal methods</u></p> <p>Adding: HTU + HTU = HTU and when secure moving on to HTU + HTU = ThHTU</p> $ \begin{array}{r} 625 \\ + 48 \\ \hline 13 \text{ (5+8)} \\ 60 \text{ (20 + 40)} \\ + 600 \text{ (600 + 0)} \\ \hline 673 \end{array} $ <p>All language in the context of the place value and the mental addition of the totals to be done in any order.</p> <p><u>Compact addition – carrying</u></p> <p>Carry numbers below the line under the appropriate column and refer to the carried digit as a ten or hundred 'Carry one ten, carry one hundred'</p> $ \begin{array}{r} 47 \\ + 76 \\ \hline 123 \\ 11 \end{array} $ <p><u>Mastery check:</u></p>	<p>Key skills: add numbers with up to 4 digits using the formal, written method of compact column addition; use addition as the inverse to check subtraction calculations.</p> <p>Check if a calculation can be solved with a mental approach first before using a written method.</p> <p><u>Column addition – carrying</u> Carry numbers below the line under the appropriate column and refer to the carried digit as a ten, hundred or thousand.</p> <p>Begin with 3digit numbers:</p> <p>789 + 642 becomes</p> $ \begin{array}{r} 789 \\ + 642 \\ \hline 1431 \end{array} $ <p>Answer: 1431</p> <p>"7 add 5 equals 12. That's 2 units and 1 ten to carry over. 80 add 70 equals 150 and the one ten to carry makes 160. That's 6 tens and 100 to carry over. 500 add 400 equals 900 and the one hundred to carry makes 1000"</p> <p><u>Progress to 4 digit numbers:</u></p> $ \begin{array}{r} 7648 \\ + 1486 \\ \hline 14 \\ 120 \\ 1000 \\ +8000 \\ \hline 9134 \end{array} $ $ \begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array} $	<p>Key skills: Add whole numbers with more than 4 digits using formal compact method; extend methods to include decimals to two decimal places.</p> <p>Compact method used as standard for all written calculations</p> <p>Undertake mental calculations with increasingly large numbers and more complex calculations</p> <p>Calculators should therefore be introduced near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems</p> <p><u>Mastery check Year 5:</u></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><small>Captain Conjecture says, 'When working with whole numbers, if you add two 2-digit numbers together the answer cannot be a 4-digit number.'</small></p> <p>Do you agree? Explain your reasoning.</p> </div> <div style="width: 10%; text-align: center;"> </div> <div style="width: 45%;"> <p><small>Captain Conjecture says, 'If you keep subtracting 3 from 397 you will eventually reach 0.'</small></p> <p>Do you agree? Explain your reasoning.</p> </div> <div style="width: 10%; text-align: center;"> </div> </div> <p><u>Mastery check Year 6:</u></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><small>Calculate 362 + 198</small></p> <ul style="list-style-type: none"> <input type="checkbox"/> with a formal written column method <input type="checkbox"/> with a mental method, explaining your reasoning. </div> <div style="width: 10%; text-align: center;"> </div> <div style="width: 45%;"> <p><small>Jasmine and Kamal have been asked to work out 5748 + 893 and 5748 - 893.</small></p> <p><small>Jasmine says, '893 is 7 less than 900, and 900 is 100 less than 1000, so I can work out the addition by adding on 1000 and then taking away 100 and then taking away 7.'</small></p> <p><small>What answer does Jasmine get, and is she correct?</small></p> <p><small>Kamal says, '893 is 7 less than 900, and 900 is 100 less than 1000, so I can work out the subtraction by taking away 1000 and then taking away 100 and then taking away 7.'</small></p> <p><small>What answer does Kamal get, and is he correct?</small></p> <p><small>If you disagree with either Jasmine or Kamal, can you correct their reasoning?</small></p> </div> </div> <p>See NCETM assessment materials for more examples.</p>



Newdale Primary Maths Calculation Policy – Addition

Solve calculations using a place value grid and equipment alongside a column method to demonstrate understanding.

Hundreds place	Tens place	Ones place
100 100	100 100	10 10 10 10
100 100	100 100	10 10 10 10

325
+ 247

Sam has completed these calculations, but he is incorrect. Explain the errors he has made.

325	355
+ 247	- 247
-----	-----
581	112

There are six 3-digit addition calculations shown below.

a) $\begin{array}{r} 124 \\ + 233 \\ \hline \end{array}$ b) $\begin{array}{r} 644 \\ + 172 \\ \hline \end{array}$ c) $\begin{array}{r} 366 \\ + 277 \\ \hline \end{array}$

d) $\begin{array}{r} 579 \\ + 221 \\ \hline \end{array}$ e) $\begin{array}{r} 791 \\ + 163 \\ \hline \end{array}$ f) $\begin{array}{r} 567 \\ + 233 \\ \hline \end{array}$

Which calculations have no carry digits?
 Which calculations have a carrying digit only once?
 Which calculations have a carrying digit twice?
 Which calculation has the largest answer?
 Which calculation has the smallest answer?

Check that children are looking at the numbers involved, rather than doing the calculation.

Mastery check:

What do you notice about the calculations below?
 Can you find easy ways to calculate?

$5000 + 4000 =$	$5230 + 400 =$	$5023 + 28 =$
$4000 + 5000 =$	$4230 + 500 =$	$4023 + 28 =$
$3000 + 6000 =$	$3230 + 600 =$	$3023 + 28 =$
$2000 + 7000 =$	$2230 + 700 =$	$2023 + 28 =$
$1000 + 8000 =$	$1230 + 800 =$	$1023 + 48 =$

Find the missing numbers.
 What do you notice?

Make 9999	Make 9998	Make 9990
$5000 + \square = 9999$	$5230 + \square = 9998$	$5023 + \square = 9990$
$4000 + \square = 9999$	$4230 + \square = 9998$	$4023 + \square = 9990$
$3000 + \square = 9999$	$3230 + \square = 9998$	$3023 + \square = 9990$
$2000 + \square = 9999$	$2230 + \square = 9998$	$2023 + \square = 9990$
$1000 + \square = 9999$	$1230 + \square = 9998$	$1023 + \square = 9990$

See NCETM assessment materials for more examples

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