Mental Maths Policy
&
Guidance for Teachers

GEOFFREY FIELD JUNIOR SCHOOL

At GFJS we believe that these are the key principles which should underpin all of our Maths:

1. Exploration
2. Collaboration
3. Conceptual not just procedural
4. Concrete – Pictorial – abstract
5. Struggle is good but drowning bad
6. Balance of fluency, problem solving and reasoning
7. Fluency is recall and mental strategies
8. Small steps - big gains
9. Varied practice
10. Making links
11. Enjoyment

Our Maths lessons are split into different sections and the main parts to our maths lesson include:

- Power Up
- Discovery task
- Share
- Let's learn together
- Guided Practice
- Independent practice
- Challenge or further practice
- Reflect
- Core competency

What is the purpose of this guide?

This guidance will support you with the **Power Up** and **Core Competency** sections of our maths lessons where children will be taught and able to practise recall and mental strategy skills.

Power Up – This is time to tune children in. It could be an arrival task to practise core skills, time for counting, recalling number facts or fluent in five, where children select and explain whether they use mental or written strategies. It may also be a chance to review a mental strategy. Sometimes it will be an opportunity to do a power up task, which is a small but essential core skill required for or to support the main task within the lesson.
Maths principles addressed during this part of the lesson include fluency and making links

Core competency (rapid recall and mental strategies) - This a time for pupils to practise and learn their rapid recall as well as time to teach pupils mental maths strategies. It is time to allow pupils to develop, compare and explain their own mental maths strategies and to give time to practise mental calculations. Many of the mental strategies will require knowledge of the key aspects of number sense - number bonds, making 10, regrouping, doubling and halving and using known facts. This is why it is also important to teach and rehearse rapid recall (progressions shown in the document)
Maths principles addressed during this part of the lesson include fluency, exploration, CPA, small steps, varied practice and making links (e.g. known facts).

What are our aims?

At GFJS, our aim is that children will become confident mathematicians. They will achieve this by having a balance of fluency, problem solving and reasoning skills. To become fluent, we aim for our children to be able to rapidly recall number facts, derive other facts and have a range of mental strategies to draw upon. We want them to be able to select an efficient method of their choice (whether this be mental or written) and for it is appropriate for a given task. Children will be able to use a range of mental methods (including with the use of jottings/informal recording, when appropriate). However, for calculations that they cannot do mentally, they will be able to use an efficient written method accurately and with confidence.
They will do this by always asking themselves:

- ‘Do I know this?’
- ‘Can I do this in my head?’
- ‘Can I do this in my head using drawings or jottings?’
- ‘Which method would be good to use here?’
- ‘Do I need to use a written method?’

How can we teach children to be fluent in maths?

To be fluent in maths children need to be secure in mental calculations, and in order for pupils to be secure in mental calculations pupils need to be 'taught':

1. **Key facts** that they can rapidly recall (including counting).

2. How to use or apply those facts to solve other questions. They need to **derive known facts**. E.g.

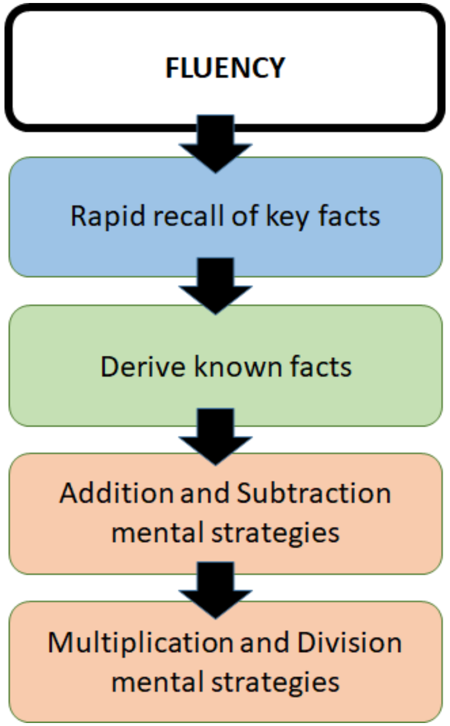
   a) '3 for free-use the fact family triangles' – if I know 3 + 4 = 7, then I also know: 4 + 3 = 7 7 – 3 = 4 7 – 4 = 3
   And if I know 3 x 4 = 12, then I also know: 4 x 3 = 12 12 ÷ 4 = 3 12 ÷ 3 = 4

   b) Place value rules. 'Use what you know.' E.g.
   If I know 4 + 3 = 7, then I also know 40 + 30 = 70, 400 + 300 = 700, 0.4 + 0.3 = 0.7 etc.

3. The **6 key addition and subtraction mental strategies**, which are:
   I. counting forwards and backwards
   II. re-ordering
   III. partitioning
   IV. bridging
   V. compensating
   VI. using near doubles

4. The **6 key multiplication and division strategies**, which are:

   TBC



What are the key principles of teaching mental calculation strategies?

- Ensure the underpinning skills and knowledge needed to calculate mentally are secure:
    - The ability to count in a variety of ways, both forwards and backwards
    - A secure sense of the number system
    - An understanding of place value
    - Recall of number bonds
    - Recall of multiplication and division facts
    - An understanding of mathematical vocabulary and signs associated with calculation
- Select mental strategies to teach based on where the children are in the progression
- Commit regular time to teaching mental calculation strategies
- Select and use appropriate resources, models and images for mental strategies – encourage pupils to do this too
- Encourage the use of jottings/ informal recording
- Teach a range of mental strategies - raise pupil's awareness that there are a range of strategies
- Develop quick and efficient strategies, by choosing and encouraging pupils to select and justify the most appropriate method for the calculation
- Give children the opportunity to explain, share and reason about methods
- Allow children time to practise mental strategies which have been taught

What might a core competency session on mental strategies look like?

- Start with something to tune the children in - recall of number bonds, quick doubles, counting etc.
- Show a calculation/s you would like the children to have a go at (provide children with whiteboard or paper to make jottings.informal recordings)
- Gather feedback on how the sum was calculated - encourage children to explain their method and show their thinking using their notes and jottings
- Take several different methods from the children - discuss the various ways that pupils reached the answer, compare these, point out the range of possible strategies and highlight the most efficient and appropriate strategies
- Focus on one method to teach the children
- Model the method using CPA where you can - demonstrate jottings/ informal recording
- Allow pupils to have a go at the method taught - vary the numbers used of necessary to support and challenge pupils
- Reflect on the method used at the end - How well did you do? When is this method best used? Which type of calculations/numbers is it good for?
- REMEMBER: you will need to reinforce the methods in other core competency and power up sessions.

MENTAL RECALL PROGRESSION – counting, rapid recall and deriving/using known facts

	Counting	**Rapid recall** **Number bonds/ Making 10/** **Addition and subtraction facts**	**Rapid recall** **Doubling and halving**	**Rapid recall** **Multiplication and division facts**	**Rapid recall** **Deriving and using known facts**
Y1	Count to and across 100, forwards and backwards from 0 or any given number Count in multiples of two from 0 to 24 Count in multiples of 5 from 0 to 60 Count in multiples of 10 from 0 to 120	Given a number, identify one more/one less Recall addition/ subtraction facts to 10 and within 10. Recall all pairs of numbers with a total of 10 Say 10 more/less of multiples of 10	Recall the doubles of all numbers to at least 10 and corresponding halves.	Count in multiples of twos, fives and tens	Derive related facts from pairs to and within 10 e.g. 4 + 5 = 9 so 5 + 4 = 9, 9 – 4 = 5 and 9 – 5 = 4
Y2	Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward Count in odd numbers from 1 to 20 Count forwards in halves up to 10 Count forwards in quarters up to 10 Count forwards in thirds up to 10	Recall and use addition and subtraction facts to 20 fluently Add and subtract numbers across 10 e.g. 8 + 6 (R to P criteria) Recall what must be added to any two-digit number to make the next multiple of 10, e.g. 52 + ♦= 60 using number bonds to 10. Given a number under 100, say 10 more/10 less	Recall doubles of all numbers to 20, and the corresponding halves	Recall multiplication and division facts 2, 5 and 10 x tables	Derive and use related facts up to 100 e.g. from 4 + 6 know that 40 + 60 or 60 + ? = 100 Derive doubles of multiples of multiples of 10 to 100 (e.g. double 40 is 80) and derive the related halves (e.g. half of 80 is 40)
Y3	Count forwards and backwards in multiples of 2, 3, 4, 5, 8 (to the 12th multiple) Count on and back in multiples of 50 and 100 from 0 to 1000 Count on and back in multiples of 100 from any number up to 1000 Count forwards and backwards in tenths (as fraction and decimal) from any number within 50 Count forwards and backwards in halves, quarters and thirds from 10	Recall addition and subtraction facts for all numbers to 20, e.g. 9 + 8, 17 – 9, drawing on knowledge of inverse operations Recall sums and differences of multiples of 10 to 200, e.g. 50 + 80, 120 – 90 Recall pairs of two-digit numbers with a total of 100, e.g. 32 + 68, or 32 + ♦= 100 • addition Given a number under 1000, identify 10 or 100 more/less	Recall doubles for multiples of 10 to 100, e.g. 90 + 90, 60 + 60 and corresponding halves e.g. half of 180.	Recall multiplication and division facts for the 3, 4, and 8 times-tables	Derive other multiplication and division facts from facts in the 2, 3, 4, 5, 8 and 10 times tables. E.g. If I know 3 x 4 = 12, I also know 4 x 3 = 12, 12 ÷ 3 = 4 Derive doubles of all two-digit numbers (e.g. double 42 is 84) and the corresponding halves (half of 84 is 42) Derive addition and subtraction facts for multiples of 100 to 1000 e.g. if I know 30 + 40 = 70, 300 + 400 = 700 Derive addition and subtraction facts for multiples of five to 100

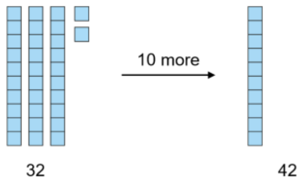
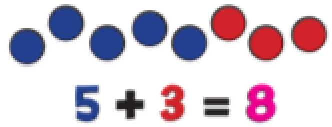
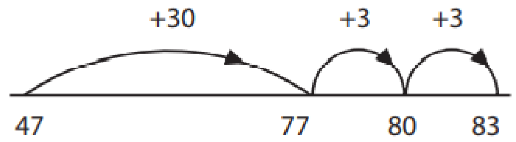
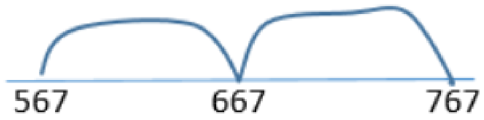
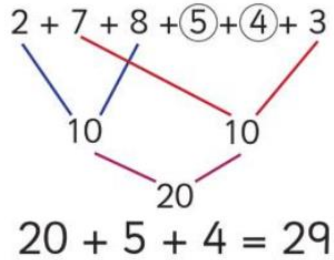
	Counting	Rapid recall Number bonds/ Making 10/ Addition and subtraction facts	Rapid recall Doubling and halving	Rapid recall Multiplication and division facts	Rapid recall Deriving and using known facts
Y4	Count forwards and backwards in multiples of 6, 7, 9, 11, 12 (to the 12th multiple) Count forwards and backwards in multiples of 1000 from 0 to 10 000 from any number Count forwards and backwards in steps of 25 to 1000 Count backwards through zero to include negative numbers Count forwards and backwards in hundredths Count forwards and backwards in steps of any fraction with the same denominator e.g. sixths	Know addition/ subtraction facts for multiples of 100 that total 1,000 Say what must be added to any three-digit number to make the next multiple of 100, e.g. 521 + ⧫ = 600 Recall pairs of fractions that total 1 Given a number, identify 10, 100 or 1000 more/less	Recall doubles of 2 digit numbers 1 to 100, e.g. 38 + 38, and the corresponding halves	*Recall multiplication and division facts* for the 6, 7, 9, 11 and 12 times tables (and the other previous tables) Divide and multiply by 10 and 100	Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 e.g. 130 + 210 use 13 + 21, 400 + 800 use 4 + 8 Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves Find pairs of decimal numbers that total one (e.g.0.4 and 0.6)
Y5	Count forwards and backwards in powers of 10 from any given number up to one million (whole numbers) Count forwards and backwards through zero Count forwards in steps of known multiples as decimals e.g. 0.2, 0.9, 1.1 , 2.5 Count forwards and backwards in square numbers from 0 to 100 Count forwards and backwards in prime numbers to 19 Count forwards and backwards in steps of simple fractions including bridging 0	Recall complements of hundredths that make 1 e.g. 0.83 and 0.17 = 1 Say what must be added to any four-digit number to make the next multiple of 1000, e.g. 4087 + ⧫ = 5000 • Say what must be added to a decimal with units and tenths to make the next whole number, e.g. 7.2 + ⧫ = 8 Given a number identify 10/ 100/ 1,000/ 10,000 more or less	doubles and halves of decimals, e.g. half of 5.6, double 3.4	Recall quickly multiplication facts up to 12 x 12 and corresponding division facts Use multiplication and division facts to multiply pairs of multiples of 10 and 100 e.g. 50 x 70 use 5 x 7; 400 x 600 use 4 x 6 Recall all square numbers to 12^2 (12 x 12 = 144) Quickly multiply and divide whole numbers by 10, 100 and 1000 (can include decimals but not essential for mental recall)	Derive sums and differences of decimals with tenths (using knowledge of addition and subtraction of two-digit numbers) e.g. 6.5 + 2.7, 7.8 – 1.3 Use knowledge of place value and to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7,) Derive doubles of three-digit and four-digit numbers (and decimal numbers with up to two decimal places) and find the corresponding halves half of 5.64, double 0.34
Y6	Consolidate all counting from previous year groups including bridging 0 e.g. -25s forwards and backwards	Consolidate all counting from previous year groups Recall addition and subtraction facts for multiples of 10 to 1000 and decimal numbers with one decimal place, e.g. 650 + ⧫ = 930, ⧫ – 1.4 = 2.5 • Say what must be added to a decimal with units, tenths and hundredths to make the next whole number, e.g. 7.26 + ⧫ = 8	doubles and halves of decimals, e.g. half of 8.74, double 3.54	Use knowledge of place value and multiplication facts to 12 x 12 to derive and recall related multiplication and division facts involving decimals (e.g. 0.8 x 7, 4.8 ÷ 6) Recall squares of numbers to 12 x 12 and the corresponding squares of multiples of 10 Quickly multiply and divide whole numbers and decimals by 10, 100 and 1000	

MENTAL CALCULATION STRATEGIES PROGRESSIONS – ADDITION AND SUBTRACTION

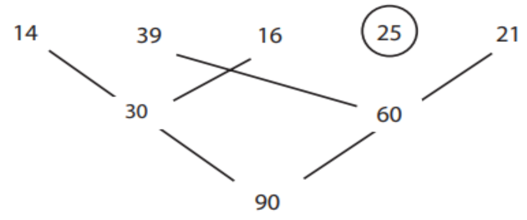
National curriculum core objectives for mental addition and subtraction	
Y1	Add and subtract 1 and 2 digit numbers to 20 including 0
Y2	Add and subtract mentally including 2 digit number and one 2 digit number and tens Two 2 digit numbers Adding three 1 digit numbers
Y3	Add and subtract mentally including 3 digit number and ones 3 digit number and tens 3 digit number and hundreds Two 2 digit numbers exceeding 100
Y4	Practise mental methods for addition and subtraction for increasingly large numbers to aid fluency
Y5	Add and subtract numbers mentally with increasingly large numbers e.g. 12462-2300
Y6	Perform mental calculations including with mixed operations and large numbers Undertake mental calculations with increasingly large numbers

MENTAL CALCULATION STRATEGIES PROGRESSIONS – ADDITION AND SUBTRACTION

Reordering (including finding complements)	Counting on and back (including find the difference)	Partitioning	Bridging (including making 1/10/multiples of 10/100/1000)	Compensating and adjusting	Using near doubles

REORDERING – requires finding complements/number bonds and occasionally doubling			
	Example calculations	**Conceptual teaching resources**	**Visual models and examples (the numbers can change using example calculations)**
Y1	**Largest number first** 2 + 7 becomes 7 + 2 5 + 13 becomes 13 + 5 **Adding tens then ones (10 + ?)** 4 + 10 becomes 4 + 10 10 + 2 + 10 becomes 10 + 10 + 2	Numicom Dienes	• **Counters/Dienes drawings**  
Y2	**Largest number first** 5 + 34 becomes 34 + 5 **Adding tens then ones** 7 + 60 becomes 60 + 7 **10ness pairs (using pairs to 20)** 5 + 7 + 15 becomes 15 + 5 + 7	Numicon Dienes	• **Number lines** **36 + 47** 
Y3	**Largest number first** 23 + 54 becomes 54 + 23 12 – 7 – 2 becomes 12 – 2 – 7 **10ness pairs (using pairs of multiples of 10 up to 100)** 3 + 8 + 7 + 6 + 2 = 3 + 7 + 8 + 2 + 6 6 + 13 + 4 + 3 becomes 6 + 4 + 13 + 3 36 + 18 + 14 becomes 36 + 14 + 18 **Double/near double pairs** 13 + 21 + 13 becomes 13 + 13 + 21 (using double 13)	Numicon Dienes	200 + 567 becomes 567 + 200 
Y4	**Largest number first** 47 + 189 becomes 189 + 47 **10ness pairs (making any multiples of 10 and multiples of 100)** 9 + 17 + 41 becomes 41 + 9 + 17 17 + 46 + 24 + 13 becomes 46 + 24 + 13 + 17 37 + 9 – 17 = 37 – 17 + 9 **Double/near double pairs** 52 + 40 + 52 becomes 52 + 52 + 40 (using double 52)	Place value charts Place value counters	• **Tree model** 
Y5	**Largest number first** 200 + 2567 = 2567 + 200 3.5 + 8.9 = 8.9 + 3.5	Place value charts	

<table>
<tr>
<td></td>
<td>10ness pairs (multiples of 10/100/1000 and whole numbers)
25 + 36 + 75 = 25 + 75 + 36
58 + 47 – 38 = 58 – 38 + 47
1.7 + 2.8 + 0.3 = 1.7 + 0.3 + 2.8
180 + 90 + 320 becomes 320 + 180 + 90
4.7 + 5.6 – 0.7 becomes 4.7 – 0.7 + 5.6 = 4 + 5.6

Double/near double pairs
4.3 + 2.6 + 4.3 becomes 4.3 + 4.3 + 2.6 (using double 4.3)</td>
<td>Place value counters</td>
<td rowspan="2">14 + 39 + 16 + 25 + 21
it is sensible to pair numbers:


90 + 25 =115

• Number jottings

7 + 359
becomes 359 + 7

1.7 + 2.8 + 0.3
becomes
1.7 + 0.3 + 2.8

3 + 8 + 7 + 6 + 2 = 3 + 7 + 8 + 2 + 6

1.7 + 2.8 + 0.3
2.0 + 2.8</td>
</tr>
<tr>
<td>Y6</td>
<td>Largest number first
450 + 1620 = 1620 + 450
2.9 + 11.9 = 11.9 + 2.9

10ness pairs (multiples of 10/100/1000 and whole numbers)
260 + 360 + 740 = 260 + 740 + 360
450 + 470 – 250 = 450 – 250 + 470 or 450 + 450 -250 + 20
3.45 + 3.79 + 1.55 = 3.45 + 1.55 + 3.79

Double/near double pairs
3.9 + 1.2 + 3.8 becomes 3.8 + 3.8 + 0.1 + 1.2 (using near double 3.8)</td>
<td>Place value charts

Place value counters</td>
</tr>
</table>

<table>
<tr><th colspan="4">COUNTING ON AND BACK (including finding the difference) – requires being able to count in sequences</th></tr>
<tr><th></th><th>Example calculations</th><th>Conceptual teaching resources</th><th>Visual models and examples (the numbers can change using example calculations)</th></tr>
<tr><td>Y1</td><td>Count on and back in ones from a single digit number
4 + 8 count on in ones from 4 or count on in ones from 8
7 – 3 count back in ones from 7

Count on and back in ones from a 2-digit number
13 + 4 count on from 13
15 – 3 count back in ones from 15
18 – 6 count back in two

Find a small difference
by counting up from the smaller to larger number</td><td rowspan="4">Counting stick

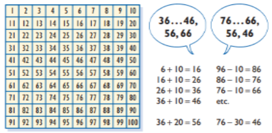
Number beads

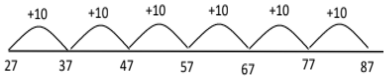
Dienes/ Place value counters

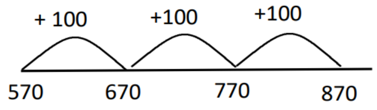
Number line

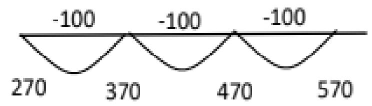
Counters

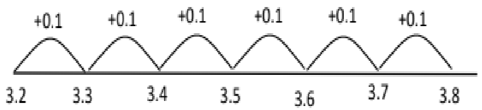
Dienes

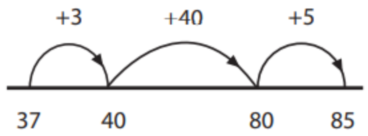
Hundred square

</td><td rowspan="4">• Number lines

27+60


570 + 300


570 - 300


3.2 + 0.6


• Number lines (for finding the difference)
85 - 37

</td></tr>
<tr><td>Y2</td><td>Count on and back in ones from a 2-digit number
14 + 3 count on in ones from 14
27 – 4 count on or back in ones from any two-digit number

Count on and back in twos from a 2-digit number under 50
18 – 4 count back in twos from 18

Count on and back in tens from a 2-digit number

Finding the difference</td></tr>
<tr><td>Y3</td><td>Count on and back in tens from a 2-digit number
40 + 30 count on in tens from 40
90 – 40 count back in tens from 90 or count on in tens from 40

Count on and back in 2s, 5s and 10s from a 2-digit number
35 – 15 count on in steps of 5

Finding the difference</td></tr>
<tr><td>Y4</td><td>Count on in 2s from an even to an even number
74 – 68 count on 2s to 70 then 3 to 73
86 – 30 count back in tens from 86 or count on in tens from 30
570 + 300 count on in hundreds from 300
960 – 500 count back in hundreds from 960
or count on in hundreds from 500

Finding the difference</td></tr>
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<table>
<tr>
<td>Y5</td>
<td>Count on and back in 1/2 , ¼ and 1/10
11/2 + 3/4 count on in quarters

Finding the difference</td>
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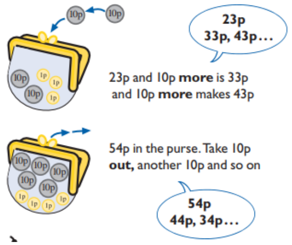
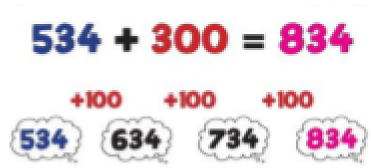
- **Counters**





</td>
</tr>
<tr>
<td>Y6</td>
<td>Count on and back 0.1s and 0.01s
1.7 + 0.5 count on in tenths

Finding the difference</td>
</tr>
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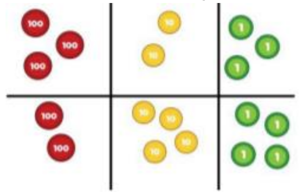
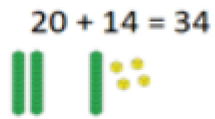
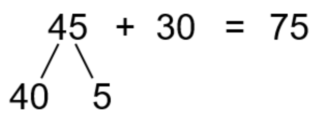
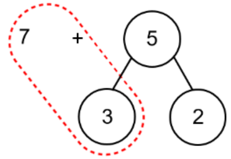
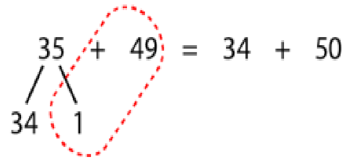
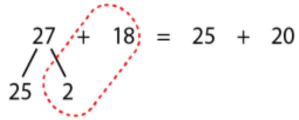
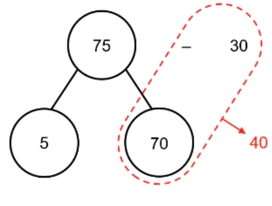
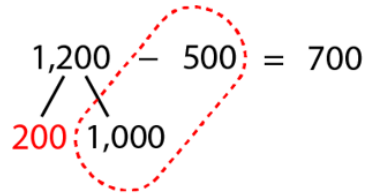
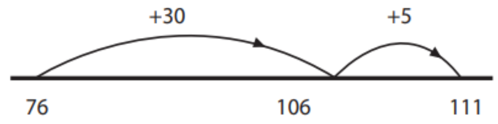
PARTITIONING – requires secure knowledge of partitioning, recall of complements/number bonds and ability to make 10			
	Example calculations	**Conceptual teaching resources**	**Visual models and examples (the numbers can change using example calculations)**
Y1	**Partitioning one of the numbers/partitioning to count on or back** *Add and subtract 1 and 2 digit numbers to 20* 12 + 6 is 10 + 2 + 6 17 – 11 is 17 – 10 -1 **Partitioning one number in different ways to make complements** Adding numbers under 10 6 + 8 is 6 + 4 + 4 Subtracting 1 digit from numbers to 20 16 – 9 is 16 – 6 - 3	Numicon Place value cards Dienes	• **Counters/dienes**  
Y2	**Partitioning both numbers to add/subtract each part** (TO) *add and subtract two-digit numbers* 34 + 65 is 30 + 60 and 4 + 5 68 – 35 is 60 – 30 and 8 - 5 17 + 14 is 10 + 7 + 10 + 4 = 10 + 10 + 7 + 4 **Partitioning one of the numbers/partitioning to count on or back** *add and subtract two-digit numbers* 46 + 35 is 46 + 30 + 5 65 – 32 is 65 - 30 - 2 *add or subtract a two-digit number to or from a multiple of 10,* 50 + 38 is 50 + 30 + 8 90 – 27 is 90 – 20 - 7 **Partitioning one number in different ways to make complements (links to bridging)** *Add and subtract 2 digit number and ones* 16 + 7 is 16 + 4 + 3 24 – 9 is 24 – 4 – 5	Numicon Place value grid Place value cards Dienes	• **Tree models**   7 + 3 = 10 10 + 2 = 12  
Y3	**Partitioning both numbers to add/subtract each part** (HTO) *add and subtract two-digit numbers (including exceeding 100* 54 + 65 is 50 + 60 and 4 + 5 97 – 46 is 90 – 40 and 7 - 6 17 + 14 is 10 + 7 + 10 + 4 = 10 + 10 + 7 + 4 **Partitioning one of the numbers/partitioning to count on or back** *add and subtract two-digit numbers (*including crossing the tens and 100 boundary*)* 78 + 43 is 78 + 40 + 3 85 – 46 is 85 - 40 - 6 *Add or subtract a two-digit number to or from a multiple of 10 (including crossing 100)* 90 + 64 is 90 + 60 + 4	Numicon Place value grid Place value cards Dienes	 75 – 30 = 45 

<table>
<tr>
<td></td>
<td>90 – 57 is 90 – 50 - 7

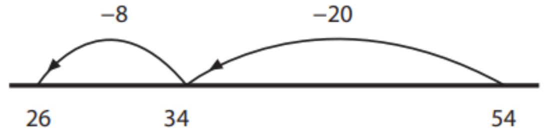
Partitioning one number in different ways to make complements (links to bridging)
Add and subtract 3 digit number and ones
126 + 7 is 126 + 4 + 3
174 – 9 is 174 – 4 – 5</td>
<td></td>
<td rowspan="3">

• **Number line**

76 + 35:



54 – 28:



• **Number jottings**

37+28 = ...

30 + 20 = 50
7 + 8 = 15
50 + 15 = 65

35 + 49 = 30 + 40 + 5 + 9
= 70 + 14
= 84

5.6 + 3.2 =
5 + 3 = 8
0.6 + 0.2 = 0.8
8 + 0.8 = 8.8

</td>
</tr>
<tr>
<td>Y4</td>
<td>Partitioning both numbers to add/subtract each part (ThHTO)
Add and subtract 3 and 4 digit multiples of 10
350 + 360 = 300 + 300 50 + 60 = 600 + 110
2370 – 1260 = 2000 – 1000, 300 – 200, 70 – 60 = 1000 + 100 + 10 = 110
Add and subtract three-digit numbers (including crossing 10s and 100s barriers)
364 + 565 is 300 + 500 + 60 + 60 + 4 + 5
357 – 234 = 300 – 200, 50 – 30, 7 – 4 = 123

Partitioning one of the numbers/partitioning to count on or back
add and subtract three-digit numbers and 2 digit numbers (including crossing the tens and 100 boundary)
378 + 43 is 378 + 40 + 3
567 + 154 = 567 + 100 + 50 + 4
368 – 49 is 368 – 40 – 9
365 – 72 = 365 – 70 – 2
Add or subtract a two-digit number to or from a 3 digit multiple of 10 (including crossing 100)
270 + 64 is 270 + 60 + 4
460 – 57 is 460 – 50 - 7

Partitioning one number in different ways to make complements (links to bridging)
Add and subtract 3 and 4 digit number and ones
2356 + 7 is 2356 + 4 + 3
174 – 9 is 174 – 4 – 5
Add and subtract 3 and 4 digit numbers and tens (multiples of 10)
370 + 90 = 370 + 30 + 60
3470 + 80 = 3470 + 30 + 50
540 – 70 = 540 – 40 - 30</td>
<td>Place value grid

Dienes

Place value counters</td>
</tr>
<tr>
<td>Y5</td>
<td>Partitioning both numbers to add/subtract each part (TthThHTO and O.t)
Add and subtract 4 and 5 digit multiples of 10
2670 + 1240 = 2000 + 1000 + 600 + 200 _ 70 + 40
2370 – 1260 = 2000 – 1000, 300 – 200, 70 – 60 = 1000 + 100 + 10 = 110
Add and subtract 4 digit numbers (including crossing 10s and 100s barriers)
3364 + 5615 is 3000 + 5000 + 300 + 600 + 60 + 10 + 4 + 5
7 – 234 = 300 – 200, 50 – 30, 7 – 4 = 123
Add or subtract any pairs of decimal fractions each with units and tenths
5.7 + 2.5 = 5 + 2 + 0.7 + 0.5
6.3 – 4.1 = 6 – 4, 0.3 – 0.1 = 2.2

Partitioning one of the numbers/partitioning to count on or back</td>
<td>Place value grid

Place value counters</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>Add and subtract 4 digit numbers and 2 or 3 digit numbers (including crossing the 10s and 100s boundary)
4378 + 43 is 4378 + 40 + 3
5675 + 154 = 5675 + 100 + 50 + 4
3168 – 49 is 3168 – 40 – 9
3265 – 172 = 3265 – 100 - 70 - 2
Add or subtract three and two-digit numbers to or from a larger multiple of 10 (including crossing 10s and 100s)
2590 + 164 is 2590 + 100 + 60 + 4
3740 – 57 is 3740 – 50 - 7
Add or subtract any pairs of decimal fractions with ones and tenths
5.6 + 3.7 is 5.6 + 3 + 0.7 = 8.6 + 0.7
4.7 – 3.5 is 4.7 – 3 – 0.5

Partitioning one number in different ways to make complements (links to bridging)
Add and subtract 4 digit number and ones
2356 + 7 is 2356 + 4 + 3
174 – 9 is 174 – 4 – 5
Add and subtract 4 digit numbers and multiple of 10
3470 + 190 = 3470 + 30 + 160
2740 – 70 =2740 – 40 – 30
3487 + 60 = 3487 + 13 + 47</td>
<td></td>
<td rowspan="2">double 136
d 100 = 200
d 30 = 60
d 6 = 12
200 + 60 + 12 = 272

Bar model
36 + 42
<table><tr><td colspan="2">36</td><td colspan="2">42</td></tr><tr><td>30</td><td>6</td><td>40</td><td>2</td></tr></table></td>
</tr>
<tr>
<td>Y6</td>
<td>Consolidate year 5 partitioning and move onto larger numbers (HthTthThHTO) and TO.th

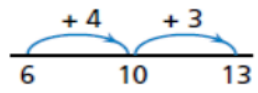
Partitioning both numbers to add/subtract each part (HthTthThHTO and O.th)
Consolidate Year 5 objectives
Add or subtract pairs of decimals with units, tenths or hundredths
0.72 + 3.38 = 0 + 3 + 0.7 + 0.3 + 0.02 + 0.08

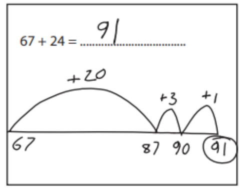
Partitioning one of the numbers/partitioning to count on or back
Consolidate Year 5 objectives
Add or subtract pairs of decimals with units, tenths or hundredths
4.34 + 3.38 = 4.34 + 3 + 0.3 + 0.04
5.96 – 3.46 = 5.96 – 3 – 0.4 – 0.06</td>
<td>Place value grid

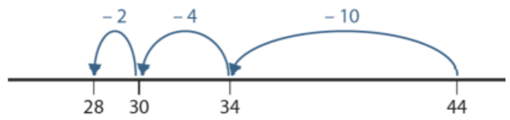
Place value counters</td>
</tr>
</table>

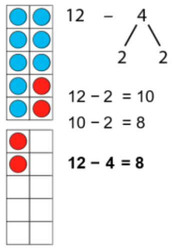
<table>
<tr><th colspan="4">BRIDGING (including making 1/10/multiples of 10/100/1000) – requires ability to make 10 and recall of complements/number bonds</th></tr>
<tr><th></th><th>Example calculations</th><th>Conceptual teaching resources</th><th>Visual models and examples (the numbers can change using example calculations)</th></tr>
<tr><td>Y1</td><td>Begin to bridge through 10, and later 20, when adding a single-digit number
6 + 7 = 6 + 4 + 3
8 + 5 = 8 + 2 + 3</td><td rowspan="6">Number line

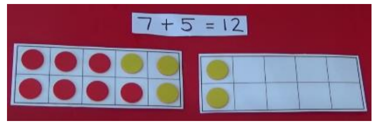
Hundred square

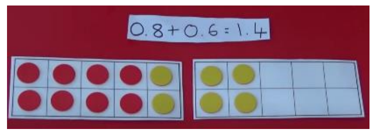
Trios</td><td rowspan="6">
Number line




44 – 16


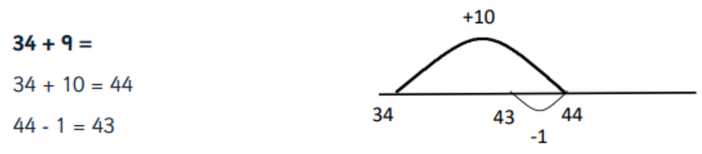
Counters


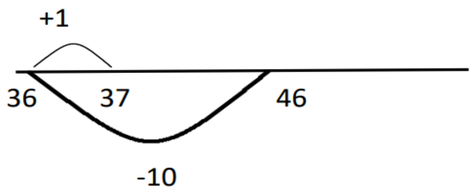


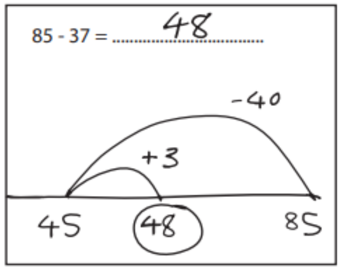


Number jotting
6 + 7 = 6 + 4 + 3

57 + 14 =
57 + 3 = 60
60 + 11 = 70
</td></tr>
<tr><td>Y2</td><td>Bridge through 10 or 20
23 – 9 = 23 – 3 – 6
15 + 7 = 15 + 5 + 2</td></tr>
<tr><td>Y3</td><td>Bridge through a multiple of 10, then adjust
49 + 32 = 49 + 1 + 31
62 - 46 = 62 - 2 - 40 -6</td></tr>
<tr><td>Y4</td><td>Bridge through 100
97 + 14 = 97 + 3 + 11 or 97 + 13 + 1</td></tr>
<tr><td>Y5</td><td>Add or subtract pairs of three-digit multiples of 10 and two digit numbers with one decimal place
3.8 + 2.6 = 3.8 + 0.2 + 2.4
5.6 + 3.5 = 5.6 + 0.4 + 3.1</td></tr>
<tr><td>Y6</td><td>296 + 134 = 296 + 4 + 130
584 – 176 = 584 – 184 = 400 then add 8
0.8 + 0.35 = 0.8 + 0.2 + 0.15</td></tr>
</table>

<table>
<tr><th colspan="4">COMPENSATING AND ADJUSTING – requires understanding of making 10</th></tr>
<tr><th></th><th>Example calculations</th><th>Conceptual teaching resources</th><th>Visual models and examples (the numbers can change using example calculations)</th></tr>
<tr><td>Y1</td><td>Add a near multiple of 10
Add 9 to one digit numbers by adding 10 and subtracting 1
3 + 9 becomes 3 + 10 – 1</td><td>Counting stick
Counters/cubes
Bead string
Weighing scales
Numicon
Hundred square</td><td rowspan="3">• Number line


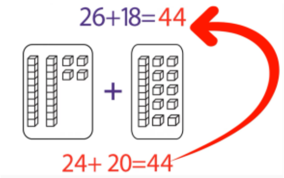
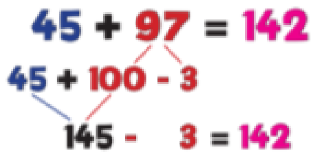
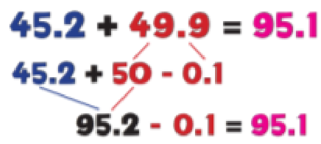



</td></tr>
<tr><td>Y2</td><td>Adding/subtracting a near multiple of 10
Add 9, 19, 29, … or 11, 21, 31, …
27 + 9 becomes 27 + 10 – 1
34 + 21 becomes 34 + 20 + 1
Subtract 9, 19, 29, … or 11, 21, 31, …
45 – 9 becomes 45 – 10 + 1
67 – 31 becomes 67 – 30 - 1

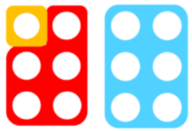
Adjusting addition/subtraction sums both sides
Change an addition sum on both sides by making one number go up and one go down to aid calculation (numbers to 20)
7 + 8 becomes 5 + 10
6 + 11 becomes 7 + 10
Change a subtraction sum by making both sides go down or both sides go up to aid calculation (numbers under 20)
14 – 8 becomes 16 – 10 (adjusted 2 up each side)
16 – 13 becomes 13 – 10 (adjusted 3 down each side)</td><td>Counting stick
Counters/cubes
Bead string
Weighing scales
Numicon
Hundred square
Dienes</td></tr>
<tr><td>Y3</td><td>Adding/subtracting a near multiple of 10
Add or subtract two 2 digit numbers where one is a near multiple of 10 (includes numbers exceeding 100)
45 + 12 becomes 45 + 10 + 2
57 + 18 becomes 57 + 20 – 2
98 – 42 becomes 98 – 40 – 2
86 – 39 becomes 86 – 40 + 1

Adjusting addition/subtraction sums both sides</td><td>Counting stick
Bead string
Weighing scales
Numicon
Hundred square
Dienes</td></tr>
</table>

	Change an addition sum on both sides by making one number go up and one go down to aid calculation (2 digit including crossing 100) 67 + 18 becomes 65 + 20 47 + 31 becomes 48 + 30 *Change a subtraction sum by making both sides go down or both sides go up to aid calculation (2 digit numbers)* 64 – 18 becomes 66 – 20 (adjusted 2 up each side) 76 – 23 becomes 73 – 20 (adjusted 3 down each side)		• **Number jotting** **46 - 9 =** 46 - 10 = 36 36 + 1 = 37 **138 + 69 =** 138 + 70 = 208 208 - 1 = 207 **16.4 + 4.8 =** 16.4 + 5 = 21.4 21.4 - 0.2 = 21.2 **27 + 18 =** $\boxed{45}$ – 2 + 2 25 + 20 = $\boxed{45}$ **5.3 + 3.98 =** $\boxed{9.28}$ – 0.02 + 0.02 5.28 + 4.0 = $\boxed{9.28}$ + 10 30 + 25 = $\boxed{40}$ + 15 – 10 199,999 + 345,222 = 200,000 + 345,221 = 545,221 1 345,221
Y4	**Adding/subtracting a near multiple of 10/100** *Add or subtract a 3 digit and 2 digit number where one is a near multiple of 10 or 100* 345 + 89 becomes 345 + 90 – 1 487 – 49 becomes 487 – 50 + 1 235 + 198 becomes 235 + 200 - 2 467 – 203 become 467 – 200 – 3 **Adjusting addition/subtraction sums both sides** *Change an addition sum on both sides by making one number go up and one go down to aid calculation (3 add 2 digit including crossing 100)* 237 + 78 becomes 235 + 80 247 + 62 becomes 249 + 60 *Change a subtraction sum by making both sides go down or both sides go up to aid calculation (3 and 2 digit numbers)* 294 – 68 becomes 296 – 70 (adjusted 2 up each side) 776 – 63 becomes 773 – 60 (adjusted 3 down each side)	Counting stick Hundred square Dienes Place value counters	
Y5	**Adding/subtracting a near multiple of 10/100** Add or subtract 3 digit and 4 digit numbers where one is a near multiple of 10 or 100 467 + 398 becomes 467 + 400 – 2 3457 + 402 becomes 3457 + 400 – 2 1569 – 303 becomes 1569 – 300 – 3 **Adding/subtracting a near whole number** add or subtract a decimal with units and tenths, that is nearly a whole number 4.3 + 2.9 becomes 4.3 + 3 – 0.1 6.5 – 3.8 becomes 6.5 – 4 + 0.2 **Adjusting addition/subtraction sums both sides** *Change an addition sum on both sides by making one number go up and one go down to aid calculation (3 and 4 digit numbers and decimals with ones and tenths)* 1337 + 128 becomes 1335 + 130 2347 + 452 becomes 2349 + 450 5.6 + 4.2 becomes 5.8 + 4 *Change a subtraction sum by making both sides go down or both sides go up to aid calculation (3 and 4 digit numbers and decimals with ones and tenths)* 494 – 368 becomes 496 – 370 (adjusted 2 up each side)	Counting stick Hundred square Place value counters	

	2320 – 470 becomes 2300 – 450 (adjusted 20 down each side) 7.1 – 4.9 becomes 7.2 – 5		• **Counters/dienes** 
Y6	**Adding/subtracting a near multiple of 10/100/1000** Add or subtract larger numbers where one is a near multiple of 10/100/1000 4563 + 1997 becomes 4563 + 2000 – 3 15435 – 4003 becomes 15435 – 4000 – 3 Practise with increasing numbers **Adding/subtracting a near whole number** add or subtract a decimal with units, tenths and hundredths, that is nearly a whole number 4.37 + 2.95 becomes 4.37 + 3 – 0.05 7.86 – 4.98 becomes 7.86 – 5 + 0.02 **Adjusting addition/subtraction sums both sides** *Change an addition sum on both sides by making one number go up and one go down to aid calculation (4 or 5 digit numbers and decimals with ones, tenths and hundredths)* 3490 + 4530 becomes 3500 + 4520 23997 + 4563 becomes 24000 + 4560 2.37 + 4.98 becomes 2.35 + 5 *Change a subtraction sum by making both sides go down or both sides go up to aid calculation (4 and 5 digit numbers and decimals with ones, tenths, hundredths)* 3697 – 2197 becomes 3700 – 2200 (adjusted 3 up each side) 2840 – 1490 becomes 2800 – 1450 (adjusted 40 down each side) 7.15 – 4.95 becomes 7.2 - 5	Counting stick Hundred square Place value counters	• **Tree model** 

<table>
<tr><th colspan="4">USING NEAR DOUBLES – requires recall of doubles and ability to partition</th></tr>
<tr><th></th><th>Example calculations</th><th>Conceptual teaching resources</th><th>Visual models and examples (the numbers can change using example calculations)</th></tr>
<tr><td>Y1</td><td>Double single digit to 10 and adjust
5 + 6 is double 5 and add 1 or double 6 and subtract 1</td><td rowspan="6">Counters

Numicon
</td><td rowspan="6">• Tree model

15 + 16
15 1
15 + 15 + 1
30 + 1 = 31

30 + 32
30 2
30 + 30 + 2
60 + 2 = 62

4.5 + 4.7 = 9.2
4.5 + 4.5 + 0.2
9 + 0.2 = 9.2

• Number jotting

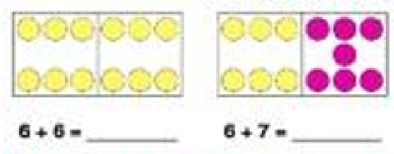
60 + 70 =
Double 60 = 120
120 + 10 = 130

2.5 + 2.6 =
Double 2.5 = 5
5 + 0.1 = 5.1

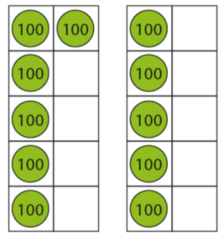
Or Double 2.6 = 5.2
5.2 - 0.1 = 5.1

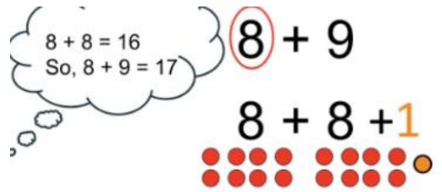
3.3 + 2.9 = 6.2
(2 x 3) + 0.3 - 0.1 =
6 + 0.3 - 0.1 =
6.3 - 0.1 = 6.2</td></tr>
<tr><td>Y2</td><td>Identify near doubles to 20
13 + 14 is double 14 and subtract 1 or double 13 and add 1 16 + 15 is double 15 and add 1 or double 16 and subtract 1</td></tr>
<tr><td>Y3</td><td>Identify near doubles for any number to 50.
Using doubles already known e.g.
2 + 2 = 4 so 20 + 20 = 40
18 + 16 is double 18 and subtract 2 or double 16 and add 2 36 + 35 is double 36 and subtract 1 or double 35 and add 1 60 + 70 is double 60 and add 10 or double 70 and subtract 10</td></tr>
<tr><td>Y4</td><td>Identify near doubles of 2 digit numbers and adjust in a variety of ways.
Use doubles already known to add near double 3 digit multiples of 10 e.g.
12 + 13 = 12 + 12 + 1, 120 + 130 = 120 + 120 + 10
38 + 35 is double 35 and add 3
160 + 170 is double 150 and add 10 then add 20, or double 160 and add 10, or double 170 and subtract 10 380 + 380 is double 400 and subtract 20 twice</td></tr>
<tr><td>Y5</td><td>1.5 + 1.6 is double 1.5 and add 0.1 or double 1.6 and subtract 0.1</td></tr>
<tr><td>Y6</td><td>Identify near doubles of 3 digit numbers and adjust in a variety of ways
421 + 387 is double 400 add 21 and then subtract 13</td></tr>
</table>

- **Counters**



600 + 500= 1,100





- **Bar model**

17 + 18

17	18	
17	17	1