John Fletcher of Madeley Primary School

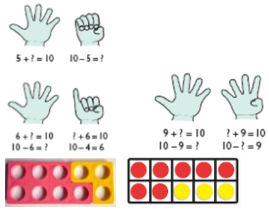
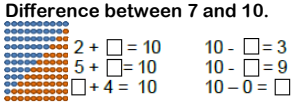
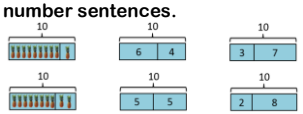
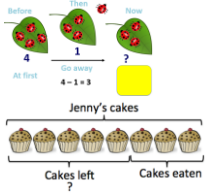
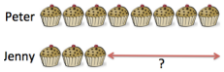
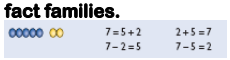
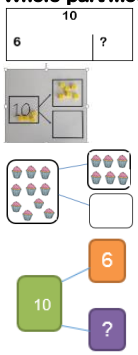
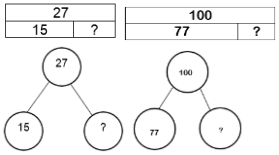
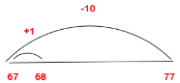
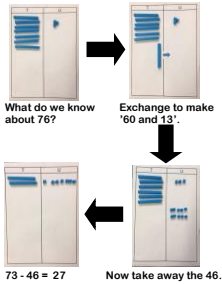
Calculation Policy- SUBTRACTION

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

<table>
<tr><th>Year</th><th colspan="4">1</th><th colspan="4">2</th></tr>
<tr><td>Overview and key vocabulary</td><td colspan="3">Know that the number gets smaller because objects have been removed from the set.
Pictorial recording of practical experiences.
Practical models of subtraction.
Counting back on fingers, orally, number sticks.
Find the difference, counting on.
Use number tracks to develop counting skills, forwards and backwards.
To have experience of '=' sign as last stage in calculation.</td><td>take away, distance between, difference between, less than. How many more? How much greater? How many fewer?</td><td colspan="3">Rearranging of numbers- 36 can be seen as 30 and 6 or as 20 and 16.
Place value- partitioning of numbers into T and U. Know what each digit represents.
Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
To know that '=' means 'the same as' and can appear in a different place within a calculation.</td><td>difference, partition, rearrange, inverse, place value</td></tr>
<tr><td>Written Methods</td><td colspan="4">Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.</td><td colspan="4">Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers.</td></tr>
<tr><td>Developing Conceptual/ Procedural Understanding

Structures: Partitioning- finding what remains.

Reduction- finding the reduced value.

Comparison- comparing two quantities.</td><td colspan="2">Number bonds
 
Numicon Ten Frame
Difference between 7 and 10.
 
2 + ☐ = 10 10 - ☐ = 3
5 + ☐ = 10 10 - ☐ = 9
☐ + 4 = 10 10 – 0 = ☐
Use the pattern to complete the number sentences.
 
6 less than 10 is 4.
Count out, then count how many are left.
7 – 4 = 3
  </td><td colspan="2">Count back on a number track.
15 – 6 = 9
 
Difference between.
13 - 8 =__
8+ __= 13
 
Subtraction-take away
 
8-3=?
Subtraction-finding the difference
 
How many more cakes does Peter have than Jenny? 8-3=?</td><td>Develop knowledge of fact families.
 
Whole-part model
 
Fill in the missing numbers</td><td colspan="2">Whole-part model
 
Fill in the missing numbers
All answers to be recorded in a number sentence following any informal recording.
Adjustment strategy
77 - 9 =
77-10 +1 =67+ 1
=68
 
(Round and adjust)
What is the nearest 10?
55 – 27 =
55 – 30 +3 =25 + 3
= 28
91 – 48 =
91-50 +2=41 +2
=43</td><td colspan="2">Re-arranging
35 - 8 =
Tell me what you know about 8, e.g. 2 + 6, 5 + 3
35 - 8=
Rearrange the 8 into 5 + 3
So 35 - 5 - 3= 30 - 3 =27
55 - 27 =
Partition the 27 into 20 +7 and rearrange the 7 into 5 + 2.
So 55 – 27 = 55 -20 -5 -2
= 35 – 5 - 2
= 28
Taking away and exchanging
73 – 46 =
 
</td><td>Subtract mentally pairs of multiples of 10 using known facts
60 – 20 = 40 because 6 – 2 = 4
Introducing columns without crossing the boundary
47 40 7
- 23 - 20 3
24 20 4
"7 subtract 3 equals 4 and 40 subtract 20 equals 20. 20 and 4 make 24"
Balance in the equation
35 - ☐ = 31
☐ - 12 =34
20 - ☐ = 14 - 3
(Open-ended)
18 - ☐ = 15 - ☐
Decision making
27 - ☐ = 12
Sam works out
27 – 15 = 12.
How could he have done this?</td></tr>
<tr><td>With jottings… or in your head</td><td colspan="4">Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as: 7 = ☐ – 9</td><td colspan="4">Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures. Add and subtract numbers using concrete objects, pictorial representations and mentally, including: a 2 digit number and ones; a 2 digit number and tens; two 2 digit numbers; adding three 1 digit numbers.</td></tr>
<tr><td>Just know it!</td><td colspan="4">Represent & use number bonds and related subtraction facts within 20
Add and subtract 1 digit and 2 digit numbers to 20, including zero</td><td colspan="4">Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</td></tr>
<tr><td rowspan="6">Foundations</td><td colspan="2">1 less</td><td colspan="2">Number bonds: subtraction 5 and 6</td><td colspan="2">10 less</td><td colspan="2">Number bonds: subtraction 20,12 and 13</td></tr>
<tr><td colspan="2">Count back</td><td colspan="2">Number bonds: subtraction 7 and 8</td><td colspan="2">Subtract 1 digit from 2 digit by bridging</td><td colspan="2">Number bonds: subtraction 14 and 15</td></tr>
<tr><td colspan="2">Subtract 10.</td><td colspan="2">Number bonds: subtraction 9 and 10</td><td colspan="2">Partition second number and count back in tens then ones.</td><td colspan="2">Number bonds: subtraction 16 and 17</td></tr>
<tr><td colspan="2">Teens subtract 10</td><td colspan="2">Difference between</td><td colspan="2">Subtract 10 and multiples of 10.</td><td colspan="2">Number bonds: subtraction 18 and 19</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2">Subtract near multiples of 10.</td><td colspan="2">Difference between</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2">Add near multiples of 10.</td><td colspan="2"></td></tr>
</table>

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Calculation Policy- SUBTRACTION

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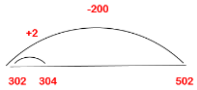
<table>
<tr><th>Year</th><th colspan="3">3</th><th colspan="3">4</th></tr>
<tr><td>Overview and key vocabulary</td><td colspan="2">Estimate the answer to a calculation and use inverse operations to check answers.
Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</td><td>decomposition, exchange</td><td colspan="2">Estimate and use inverse operations to check answers to a calculation.
Approximate using the most significant digit, rounding skills.
Refer to the carried digit as a ten or a hundred.
Extend method to include decimals to 2 decimal places.</td><td></td></tr>
<tr><td>Written Methods</td><td colspan="3">Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction. Least significant digit is always dealt with first to establish if the exchange is needed.</td><td colspan="3">Add and subtract numbers with up to 4 digits using the formal written method of columnar addition and subtraction where appropriate. Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</td></tr>
<tr><td>Developing Conceptual/ Procedural Understanding

Structures:
Partitioning- finding what remains.

Reduction- finding the reduced value.

Comparison- comparing two quantities.</td><td>Subtract mentally pairs of multiples of 100 using known facts
600 – 200 = 400 because 6 – 2 = 4

Adjustment strategy
502 - 198
by - 200 then + 2
(Round and adjust)
 

Re-arranging
Use of apparatus to understand rearrangements, e.g. 55 as 40 and 15(not as part of calculations).

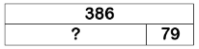
Place value materials to represent calculations
Diennes and then place value counters.</td><td>Start with least significant digit - decomposition
81 = 80 1
- 57 50 7
= 24

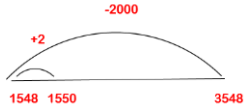
81 = 70 11
- 57 50 7
= 24
“1 subtract 7 is tricky so I will rearrange 81 into 70 and 11. 11 subtract 7 equals 4 and 70 subtract 50 equals 20. 20 and 4 make 24.”

754 700 50 4
- 86 80 6
600 60 8

754 600 140 14
-86 80 6
600 60 8 =668
“It’s tricky to take 6 from 4 and 80 from 50. I need to rearrange the number. I will exchange one ten from 50 which leaves 40 and makes 14 in the units.</td><td>40 to subtract 80 is tricky. I will exchange one hundred from 700 and make 140. 14 subtract 6 equals 8. 140 subtract 80 equals 60 and 600 subtract 0 equals 600.”

Columnar subtraction
754
- 286
468

Emphasis on language of place value, i.e. 14 units subtract 6 units, 14 tens subtract 8 tens, and 6 hundreds subtract 2 hundreds.
Representing problems
There are 386 pupils at John Fletcher of Madeley Primary. If 79 pupils have sandwiches, how many have dinners?
 
</td><td>Subtract mentally pairs of multiples of 1000 using known facts
6000 – 2000= 4000 because 6 – 2 = 4

Adjustment strategy
3548 - 1998
by - 2000 then +2
(Round and adjust)
 

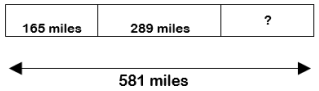
Find the difference strategy
13·6 – 2·8 =
 

13·6 – 2·8 = 10·8

Place value materials to represent calculations
Place value counters.</td><td>Columnar subtraction
2344 -187
2157

6467 – 2684
6467
- 2684
3783

Columnar subtraction (decimals) in contexts such as money and measurement

32.34 – 14.18
32.34
-14.18
18.16</td><td>Representing problems
The Green family went to Scotland for their summer holiday. They drove 165 miles to Grantham on Wednesday and stayed overnight; then they drove 289 miles to a hotel just north of Glasgow where the family stayed on Thursday. On Friday morning, they drove the final leg of their 581 mile-long journey to Aviemore, in Scotland.
How long was the final part of the trip, from Glasgow to Aviemore?
 
</td></tr>
<tr><td>With jottings… or in your head</td><td colspan="3">Add and subtract numbers mentally, including: a 3 digit number and ones; a 3 digit number and tens; a 3 digit number and hundreds.</td><td colspan="3">Add and subtract numbers mentally, including: a 4 digit number and ones; a 4 digit number and tens; a 4 digit number and hundreds.</td></tr>
<tr><td>Just know it!</td><td colspan="3">Derive and use addition and subtraction facts to 100, e.g. 33+ 67 =100.</td><td colspan="3">Derive and use addition and subtraction facts (for multiples of 10) to 1000, e.g. 330+ 670=1000.</td></tr>
<tr><td rowspan="4">Foundations</td><td>Subtract single digit bridging through boundaries</td><td>Subtract multiples of 10,100</td><td>Fluency of 2 digit - 2 digit</td><td colspan="2">Subtract multiples of 10, 100 and 1000</td></tr>
<tr><td>Partition second number to subtract</td><td>Pairs of 100 (complements of 100)</td><td>Partition second number to subtract</td><td colspan="2">Decimal subtraction from 10 or 1</td></tr>
<tr><td>Difference between</td><td>Subtract near multiples of 10 and 100 by rounding and adjusting</td><td>Difference between</td><td colspan="2">Subtract near multiples by rounding and adjusting</td></tr>
<tr><td>Partition and recombine</td><td></td><td></td><td colspan="2"></td></tr>
</table>

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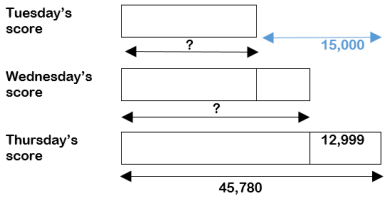
<table>
<tr><th>Year</th><th colspan="3">5</th><th colspan="3">6</th></tr>
<tr><td>Overview and key vocabulary</td><td colspan="3">Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
Subtract with increasingly large numbers.
Promote decision making so that pupils choose an appropriate method/strategy.
Decimals, fill ‘empty columns’ with zeros as place holders.</td><td colspan="3">Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</td></tr>
<tr><td>Written Methods</td><td colspan="3">Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</td><td colspan="3">Solve problems involving addition, subtraction, multiplication and division.</td></tr>
<tr><td>Developing Conceptual/ Procedural Understanding

Structures: Partitioning- finding what remains.

Reduction- finding the reduced value.

Comparison- comparing two quantities.</td><td>Columnar subtraction

Include calculations with ‘empty columns’.
324.9 - 7.25
  </td><td colspan="2">Representing problems
Molly is always trying to beat her score on her favourite computer game. Today, Thursday, her best score is 45,780. This is an increase of 12,999 on Wednesday’s score and an increase of 15,000 on Tuesday’s score. What did she score on Tuesday and Wednesday?
 
</td><td>Columnar subtraction
Include calculations with up to 3 ‘empty columns’.
128.7 - 3.014
  </td><td colspan="2"></td></tr>
<tr><td>With jottings… or in your head</td><td colspan="3">Add and subtract numbers mentally with increasingly large numbers.</td><td colspan="3">Undertake mental calculations with increasingly large numbers and more complex calculations.</td></tr>
<tr><td>Just know it!</td><td colspan="3">Derive and use addition and subtraction facts to 10 and 1, e.g. 3.3+ 6.7 =10 leads to 10 – 3.3 = 6.7 and 0.33 + 0.67 = 1 so 1 – 0.67 = 0.33</td><td colspan="3"></td></tr>
<tr><td rowspan="3">Foundations</td><td>Fluency of 2 digit - 2 digit including with decimals</td><td>Subtract multiples of 10, 100, 1000 and tenths</td><td colspan="2">Fluency of 2 digit - 2 digit including with decimals</td><td>Subtract multiples of 10, 100, 1000, tenths and hundredths</td></tr>
<tr><td>Partition second number to subtract</td><td>Use number facts, bridging and place value</td><td colspan="2">Partition second number to subtract</td><td>Use number facts, bridging and place value</td></tr>
<tr><td>Adjust numbers to subtract</td><td>Difference between</td><td colspan="2">Adjust numbers to subtract</td><td>Difference between</td></tr>
</table>