

ADDITION AND SUBTRACTION GUIDELINES

Overview

1. The aim of these guidelines, in line with the new National Curriculum, is not to race to the end but to secure understanding at each stage.
2. Children need to be able to explain the methods in terms of how and why not just what to do.
3. The written method is the way to record what we do with equipment. Children need to manipulate objects, draw images or use concrete representation before moving to abstract concepts. The imagery will stay in the pupils' heads, it's not just something to do during the first stages of learning a method.
4. Each time a new stage is introduced children should compare it to the stage before and identify similarities, rather than just ignore or move on from what has preceded it.

**Can I do it in my head? • Can I use jottings? • Can I use some equipment?
• Can I use a written method?**

Common language / MMMS (All language is to be used interchangeably)

- maths story, number sentence, calculation as opposed to the real life story
- get ready to get some more, addition, add (with physical action)
- get ready to take some away, subtraction, take away (with physical action)
- same value, different appearance, equals (with physical action)
- I love what you are doing, do it lots of times, multiply (with physical action)
- think about piles/groups, division, sharing, grouping (with physical action)
- that's one of those things we call... eg. add one of those things we call a quarter to two of those things we call a quarter is three quarters

Teaching subtractions

Step	Model and image
<p>Step 6 – subtraction with differing numbers of digits</p> <p>Column subtraction.</p>	

Prerequisites: as below, understanding that if there is nothing there, you can write a 0 for nothing

<p>Stage 5 - Subtraction of decimals with money</p> <p>Column subtraction. Decimal point must be in alignment.</p> <p>Initial use of coins to model exchanging.</p> <p>MMS jottings to be shown when first introduced to reinforce understanding of place value.</p>	<p>U t $\frac{1}{10}$ h $\frac{1}{100}$</p>	<table border="1" style="margin-bottom: 10px;"> <tr><td>£</td><td>2</td><td>4</td><td>7</td></tr> <tr><td>-</td><td>£</td><td>1</td><td>2</td><td>4</td></tr> <tr><td>£</td><td>1</td><td>2</td><td>3</td></tr> </table> <p>Jottings</p> <table border="1"> <tr><td>7</td><td>-</td><td>4</td><td>=</td><td>3</td><td></td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>-</td><td>2</td><td>=</td><td>2</td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>-</td><td>1</td><td>=</td><td>1</td><td></td><td></td><td></td><td></td></tr> </table>	£	2	4	7	-	£	1	2	4	£	1	2	3	7	-	4	=	3		1	0	0	1	0	0	1	0	0	4	-	2	=	2					1	0	1	0	1	0				2	-	1	=	1				
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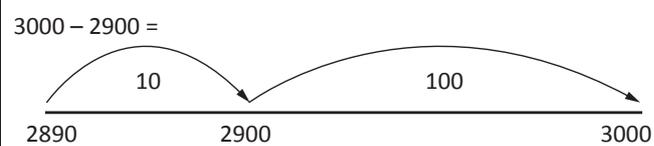
Prerequisites: as below, use of base 10, exchanging, counting on a number line

Stage 4b - Find the difference using a number line

The idea of finding the difference using a number line should be continued to stress that subtraction can be taken away or find the difference, both giving the same answer. It becomes impracticable as numbers get larger and more complex.

Example calculation to be done with decomposition: $456 - 289 =$

Calculation to be done by by finding the difference:



Prerequisites: as below, use of base 10, exchanging, counting on a number line

Stage 4a - Subtraction by decomposition

This can be referred to as 'stealing', exchanging or MMS terms funny counting for tricky columns (decomposition is not borrowing).

Jottings

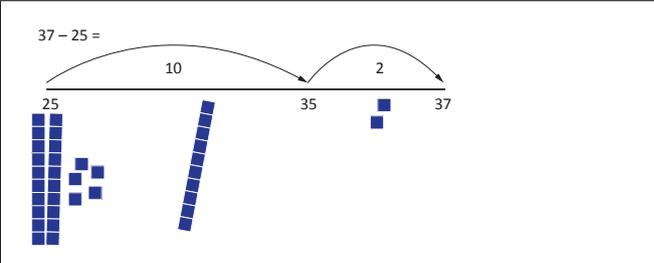
7	2	=	7	0	+	2	=	6	0	+	1	2
1	2	-	4	7	=	5						
6	0	-	4	0	=	2	0					

Prerequisites: as below, use of base 10, exchanging, counting on a number line

Progression in subtraction (not just bigger numbers)

- a) TU - TU no stealing/ funny counting $42 - 31 =$
- b) Steal/exchange from the tens $47 - 28 =$
- c) Steal/exchange from the hundreds $471 - 182 =$
- d) Steal/ exchange from hundreds to enable stealing/ exchanging from tens $306 - 239 =$
- e) Different numbers of digits $375 - 48 =$

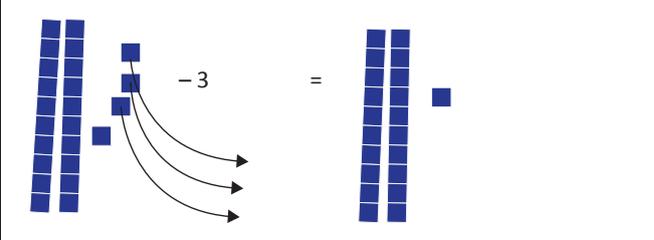
Step 3b – Find the difference using a number line and base 10



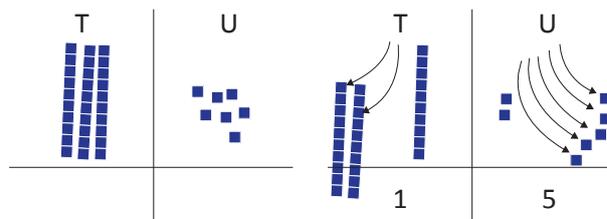
Prerequisites: as below, use of base 10, exchanging, counting on a number line

Step 3a – Take away using base 10 and expanded jottings

Show me $24 - 3$ (children physically move 3 away)



Leading to showing on a TU or HTU board and presenting in an expanded way



Jottings

7	-	5	=	2		
3	0	-	2	0	=	1 0

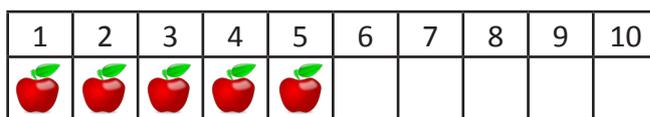
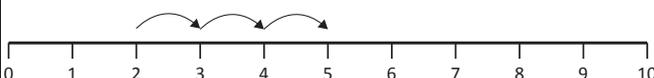
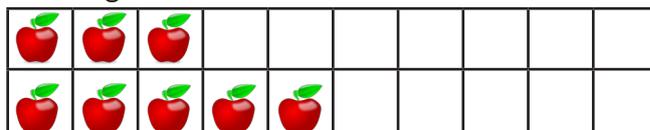
Prerequisites: as below, use of base 10, exchanging, counting on a number line

Step 2b - finding the difference using number lines

Note subtraction needs to be taught as both take away and as find the difference. Clear modelling needs to be used.

Take away on a number tracker leading to counting back on a number line.

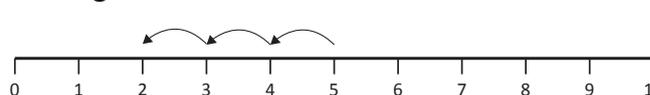
Find the difference by 2 methods counting on or counting back



Take away 3



Leading to...



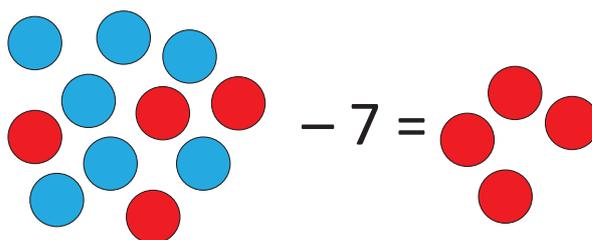
Step 2a – take away using number lines

Prerequisites: as below, counting on a number line

Step 1b– take away objects

Prerequisites: counting, organising objects

Children count out objects and take some away. This develops to 11 take away 7 is 4 and the learning of number bonds.



Prerequisites: counting, organising objects

Step 1a - Take one away

Prerequisites: counting, organising objects.

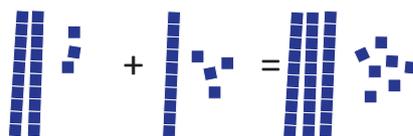


Prerequisites: counting, organising objects

Teaching addition																																																																													
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<p>Step 4 – column addition with carrying “5 cups/units/ones add 7 cups/units/ones is 12 cups/units/ones which is 1 ~ty/ten 2 cups/units/ones. So the ~ty must go in the ~ty column.” Use of arrow cards to demonstrate.</p>	<div style="text-align: center;"> <table style="margin: 0 auto;"> <tr> <td style="padding: 0 10px;">T</td> <td style="padding: 0 10px;">U</td> <td style="padding: 0 10px;">T</td> <td style="padding: 0 10px;">U</td> </tr> <tr> <td style="text-align: center;">  </td> <td style="text-align: center;">  </td> <td style="text-align: center;">  </td> <td style="text-align: center;">  </td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">5</td> <td style="text-align: center;">2</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">+</td> <td style="text-align: center;">  </td> <td style="text-align: center;">+</td> <td style="text-align: center;">  </td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">7</td> <td style="text-align: center;">4</td> <td style="text-align: center;">7</td> </tr> <tr> <td style="text-align: center; border-top: 1px solid black;">1</td> <td style="text-align: center; border-top: 1px solid black;">2</td> <td style="text-align: center; border-top: 1px solid black;">7</td> <td style="text-align: center; border-top: 1px solid black;">2</td> </tr> </table> </div> <p>Jottings</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>5</td><td>+</td><td>7</td><td>=</td><td>1</td><td>2</td><td>=</td><td>1</td><td>0</td><td>+</td><td>2</td><td></td> </tr> <tr> <td>2</td><td>0</td><td>+</td><td>4</td><td>0</td><td>+</td><td>1</td><td>0</td><td>=</td><td>7</td><td>0</td><td></td> </tr> </table> <div style="margin-top: 10px;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>T</td><td>U</td></tr> <tr><td></td><td>2</td><td>5</td></tr> <tr><td>+</td><td>4</td><td>7</td></tr> <tr><td></td><td>7</td><td>2</td></tr> <tr><td></td><td>1</td><td></td></tr> </table> </div>	T	U	T	U					2	5	2	5	+		+		4	7	4	7	1	2	7	2	5	+	7	=	1	2	=	1	0	+	2		2	0	+	4	0	+	1	0	=	7	0			T	U		2	5	+	4	7		7	2		1														
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Step 3 – column addition

Use of place value specific language is a must. Use MMS language and jottings. As stated on the front of the guidelines It is important to reinforce and highlight the use of metal skills at this stage. (eg. 1digit to 2 digit is best done in your head)



Jottings

3	+	4	=	7		
20	+	10	=	30		

	T	U
	2	3
+	1	4
	3	7

Get ready to get some more (hands hanging to the left)
 "3 cups/units/ones add 4 cups/units/ones is 7 cups/units/ones".
 "2 ~ty/ten add 1 ~ty/ten is 3 ~ty/ten."
 "The zero slides and hides" (arrow cards are useful to demonstrate.)

Prerequisites: as below, use of base ten, partitioning

Step 2 – number trackers and number lines

First numbers of objects combined on a number tracker (object with number line). This leads to using a number line (number lines are still a fairly abstract concept) (number lines do not extend beyond 30).

5 + 2 =

1	2	3	4	5	6	7	8	9	10

Add 2



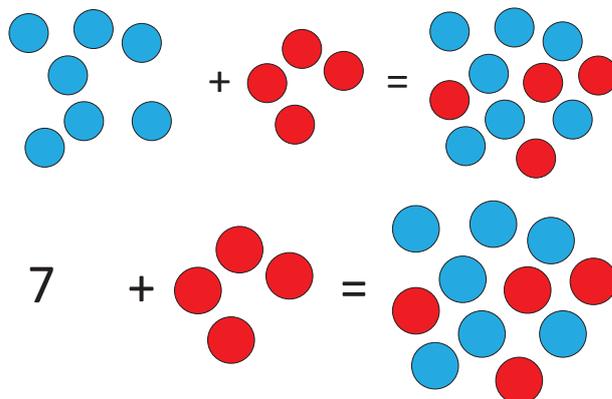
Leading to...



Prerequisites: as below, counting on a number line

Step 1b – combining sets

Two sets of objects are counted. At this stage children start again at 1 when counting them 'altogether'. This develops to 7 add 4 is 11 and the learning of number bonds (ie number held in head).



Prerequisites: as below, counting on a number line

Step 1a – finding one more

Prerequisites: counting, organising objects.



Prerequisites: as below, counting on a number line