

# Calculation Journey

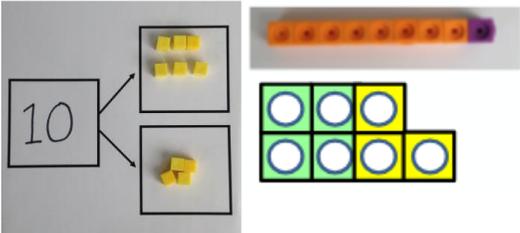
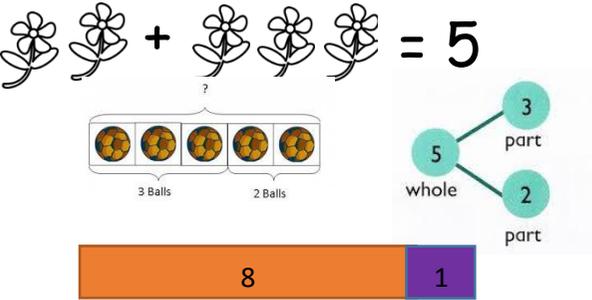
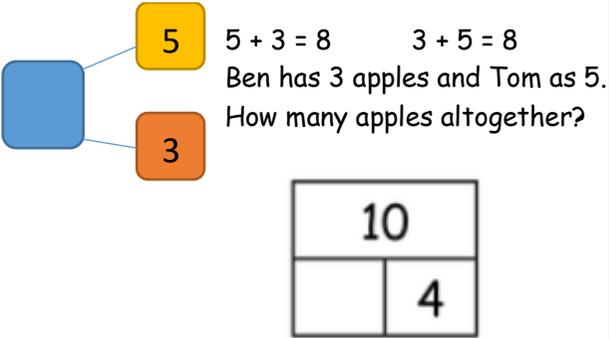
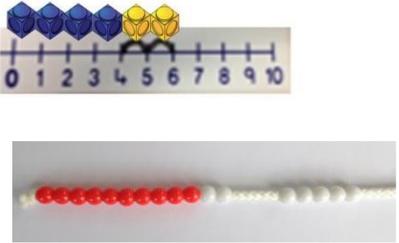
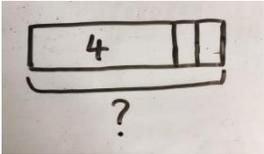
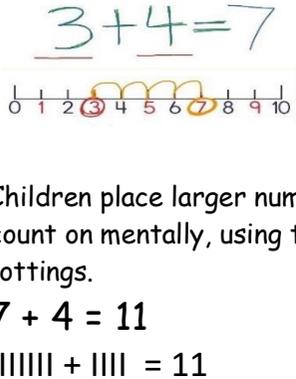
## Addition

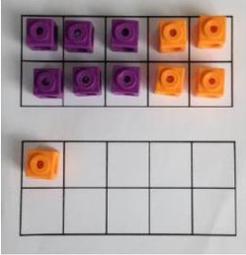
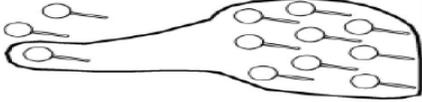
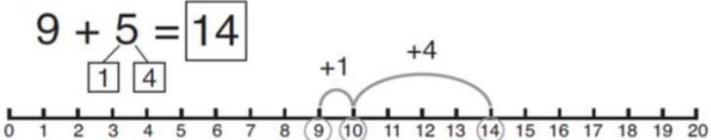
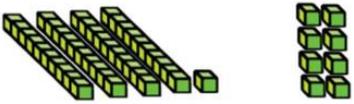
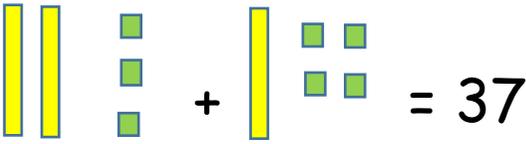
September 2021



<b>Concrete</b>	<b>Pictorial</b>	<b>Abstract</b>
<p>We begin every new skill with the use of concrete apparatus. This can include counter, cubes, beads, numicon, base 10 etc. This helps children to visualise the numbers and understand the process clearly.</p>	<p>Next, we use drawings and models to show a pictorial version of the concrete apparatus used.</p>	<p>Finally, the children are confident enough to apply their knowledge to an abstract written method including numbers and symbols. They can then apply this to problem solving.</p>
<p><b>Reasoning at every level</b></p>		

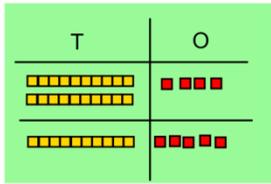
Addition key language: add, sum, total, plus, altogether, 'is equal to', 'is the same as'.

	Concrete	Pictorial	Abstract																																																																																																				
Combining two parts to make a whole	<p>Combining two parts to make a whole (part-whole model).</p> 	<p>Use pictures to add together in a group or a bar.</p> 	<p>Apply the part-whole model to problem solving.</p> 																																																																																																				
Count on from the biggest number	<p>Counting on using number lines using cubes, beads or Numicon.</p> 	<p>Use a bar model to encourage counting on.</p>  <p>Counting on using a number line or a hundred square.</p> $24 + 5 =$ <table border="1" data-bbox="792 1225 1106 1458"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td></tr> <tr><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td></tr> <tr><td>71</td><td>72</td><td>73</td><td>74</td><td>75</td><td>76</td><td>77</td><td>78</td><td>79</td><td>80</td></tr> <tr><td>81</td><td>82</td><td>83</td><td>84</td><td>85</td><td>86</td><td>87</td><td>88</td><td>89</td><td>90</td></tr> <tr><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>100</td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	<p>Abstract number line: What is 4 more than 7?</p>  <p>Children place larger number in their head and count on mentally, using their fingers or using jottings.</p> $7 + 4 = 11$ 
1	2	3	4	5	6	7	8	9	10																																																																																														
11	12	13	14	15	16	17	18	19	20																																																																																														
21	22	23	24	25	26	27	28	29	30																																																																																														
31	32	33	34	35	36	37	38	39	40																																																																																														
41	42	43	44	45	46	47	48	49	50																																																																																														
51	52	53	54	55	56	57	58	59	60																																																																																														
61	62	63	64	65	66	67	68	69	70																																																																																														
71	72	73	74	75	76	77	78	79	80																																																																																														
81	82	83	84	85	86	87	88	89	90																																																																																														
91	92	93	94	95	96	97	98	99	100																																																																																														

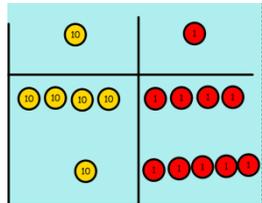
Regrouping to make 10	<p>Start with the biggest number and use the smallest number to make 10.</p> <p><math>6 + 5 = 11</math></p>  	<p>Use pictures or a number line. Regroup or partition the smaller number to make 10.</p>  <p><math>3 + 9 =</math></p> <p><math>9 + 5 = 14</math></p> 	<p><math>7 + 4 = 11</math></p> <p>If I am at seven, how many more do I need to make 10? How many more do I add on now?</p>																																				
Partitioning	<p>Use base 10 and place value cards to support understanding of partitioning to add together.</p> <p><math>41 + 8 = 49</math></p>  <p>TU + TU</p> <p>HTU + HTU</p>	<p>Use drawings to support partitioning and understanding of place value.</p>  <p>23 → 20 → 3</p> <p>14 → 10 → 4</p>	<p><math>23 + 14 =</math></p> <p><math>20 + 10 = 30</math></p> <p><math>3 + 4 = 7</math>                      <math>30 + 7 = 37</math></p> <p>Expanded column method (up to 3 digits)</p> <table border="1" data-bbox="1585 1007 1765 1342"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>364</td> <td>3</td> <td>6</td> <td>4</td> </tr> <tr> <td>+ 278</td> <td>2</td> <td>7</td> <td>8</td> </tr> <tr> <td colspan="4"><hr/></td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>2</td> </tr> <tr> <td>130</td> <td>1</td> <td>3</td> <td>0</td> </tr> <tr> <td>+ 500</td> <td>5</td> <td>0</td> <td>0</td> </tr> <tr> <td colspan="4"><hr/></td> </tr> <tr> <td>642</td> <td>6</td> <td>4</td> <td>2</td> </tr> </tbody> </table> <p>Start with the ones in preparation for the column method.</p>		H	T	O	364	3	6	4	+ 278	2	7	8	<hr/>						1	2	130	1	3	0	+ 500	5	0	0	<hr/>				642	6	4	2
	H	T	O																																				
364	3	6	4																																				
+ 278	2	7	8																																				
<hr/>																																							
		1	2																																				
130	1	3	0																																				
+ 500	5	0	0																																				
<hr/>																																							
642	6	4	2																																				

Column method (no grouping)

Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.

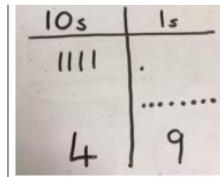


Add the ones first!

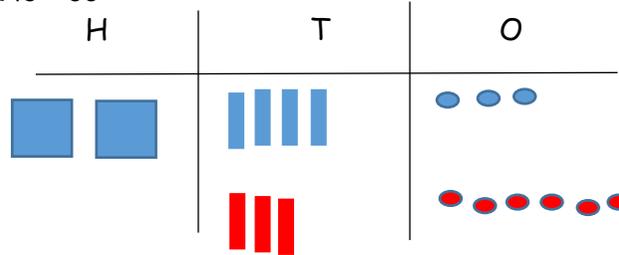


Draw the Base 10 or the counters.

41 + 8 =



243 + 36 =



Calculations

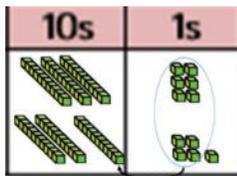
21 + 42 =

$$\begin{array}{r} 21 \\ + 42 \\ \hline \end{array}$$

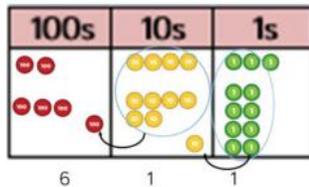
Column method (with grouping)

Using Base 10 or place value counters, make both numbers on the place value grid. Add up the ones and exchange 10 ones for 1 ten. Carry it over to the tens column.

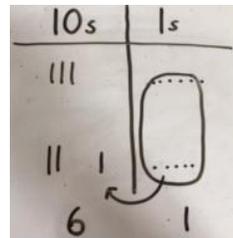
36 + 25 =



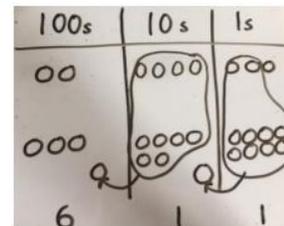
243 + 368 =



Draw pictorial versions of Base 10 or place value counters to re-group and carry.



Reinforce place value understanding by explaining that they are adding 3 tens and 2 tens and not 3 add 2.



Apply understanding to written column method.

$$\begin{array}{r} 243 \\ + 368 \\ \hline 611 \\ \hline 1 \quad 1 \end{array}$$

Apply to numbers with different place value (1739 + 278 =) and decimals.

$$\begin{array}{r} £ 23.59 \\ + £ 7.55 \\ \hline £ 31.14 \\ \hline 1 \quad 1 \quad 1 \end{array}$$