
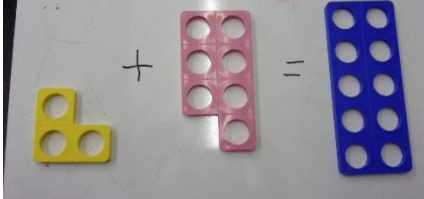
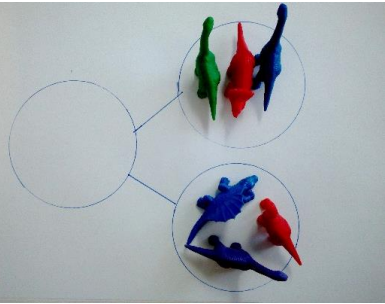
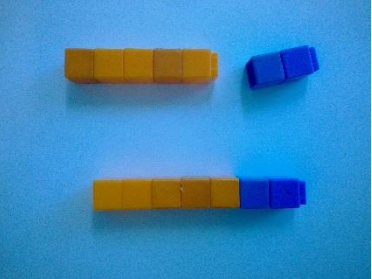
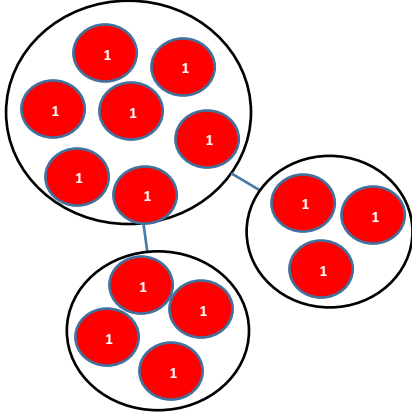
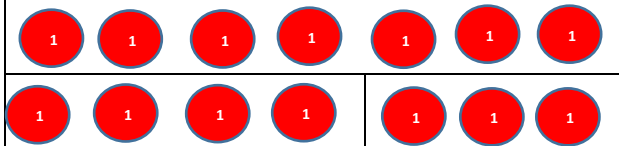
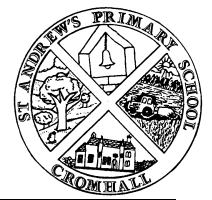
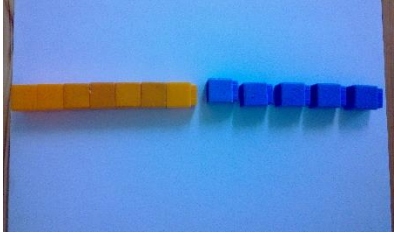
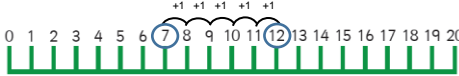
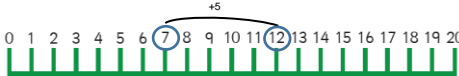

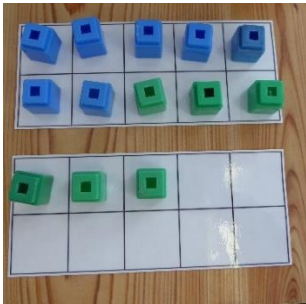
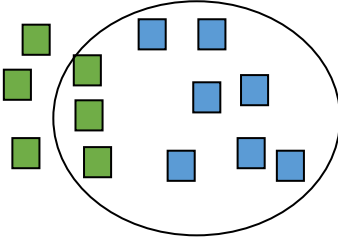
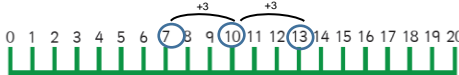


CALCULATION POLICY

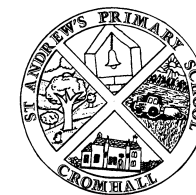
Addition	Strategy	Concrete	Pictorial	Abstract
	Vocabulary: Count, number bonds, number line, make, inverse, digit, numeral, compare (in) order/a different order, size, equals, is the same as, ones, group, add, more, more than, altogether, total, part, whole, the same as, equal, and make, one more, ten more, plus, near double, addition, tens boundary, hundreds boundary, increase, units boundary, tenths boundary, column addition, numbers to one thousand, numbers to one million, numbers to ten million			
	Number bonds to 10			$1 + 9 = 10$
	Add two parts to make a whole	Combining groups:  	Part Part Whole with place value counters:  Bar model with place value counters: 	Writing number sentences in different orders: $4 + 3 = 7$ $3 + 4 = 7$ $7 = 4 + 3$ $7 = 3 + 4$

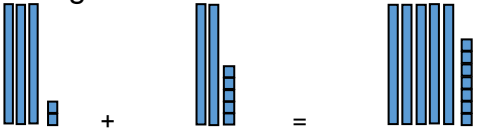
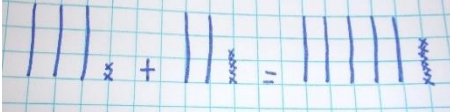



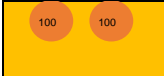

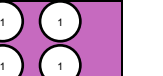






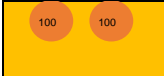

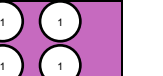






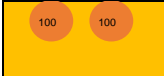

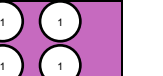



St Andrews CE VC Primary School



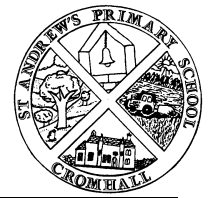
<p>Counting on</p>	<p>Start with the larger number and add on one at a time.</p> 	<p>Start at the larger number and count on in ones.</p>  <p>Start at the larger number and count on in groups.</p>  <p>Note: count on above the line</p>	<p>$7 + 5 = 12$</p> <p>Use “First, Then, Now”</p> <p>i.e. first I had 7, then I add 5, now I have 12</p> <p>Put larger number in your head, then count on.</p>																																																																																																				
<p>Regroup to make 10</p>	<p>$7 + 6 = 13$</p>  <p>Start with the bigger number, then make ten with the smaller number. Add on what is left.</p> 	<p>Regroup to make 10</p>   <table border="1" data-bbox="1167 1129 1473 1437"> <tbody> <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> </tbody> </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>$7 + 6 = 13$</p> <p>If I am at 7, how many do I need to make 10?</p> <p>$7 + 3 + 3 = 13$</p>
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																																																																																														

St Andrews CE VC Primary School



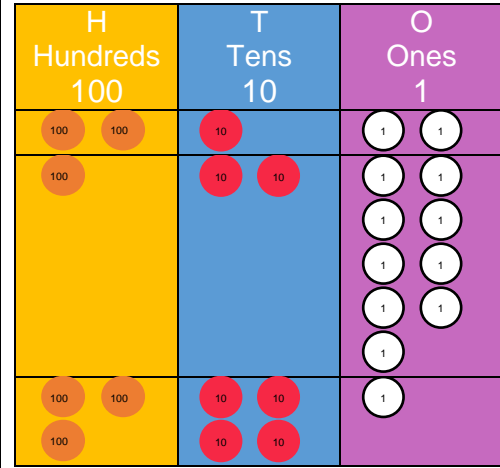
<p>Column method (no regrouping)</p>	<p>Using dienes</p>  <p style="text-align: center;">①</p>	<p>Represent Dienes using squares, lines and dots.</p>  <p>$32 + 25 = 57$</p> <p>Using place value counters Make numbers on a place value grid</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <thead> <tr> <th style="background-color: yellow;">H Hundreds 100</th> <th style="background-color: blue;">T Tens 10</th> <th style="background-color: purple;">O Ones 1</th> </tr> </thead> <tbody> <tr> <td>  </td> <td>  </td> <td>  </td> </tr> <tr> <td>  </td> <td>  </td> <td>  </td> </tr> <tr> <td>  </td> <td>  </td> <td>  </td> </tr> </tbody> </table> <p>Start by adding the ones, then add tens and hundreds etc.</p>	H Hundreds 100	T Tens 10	O Ones 1										<p>Bar Model</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td colspan="2" style="border: none;">57</td> </tr> <tr> <td style="width: 50%;">32</td> <td style="width: 50%;">25</td> </tr> </table> <p>Standard written addition</p> $\begin{array}{r} 25 \\ +32 \\ \hline 57 \end{array}$ <p>It is important to line up the numbers in the correct place value columns.</p> $\begin{array}{r} 342 \\ +215 \\ \hline 557 \end{array}$	57		32	25
H Hundreds 100	T Tens 10	O Ones 1																	
																			
																			
																			
57																			
32	25																		

St Andrews CE VC Primary School



<p>Column Method (with regrouping)</p>		<p>Make numbers on a place value grid Start by adding the ones, and exchange 10 ones for 1 ten. Then add tens and hundreds etc.</p>	<p>Standard written addition with bar model alongside</p> <table border="1" style="margin: 0 auto; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;">341</td></tr> <tr><td style="text-align: center;">212</td><td style="text-align: center;">129</td></tr> </table> $\begin{array}{r} 212 \\ + 129 \\ \hline 341 \\ 1 \end{array}$ $\begin{array}{r} 17.32 \\ + 21.81 \\ \hline 39.13 \\ 1 \end{array}$ <p>When adding decimals it is important to line up the decimal places and use zeros as place value holders</p> <p>For example:</p> $\begin{array}{r} 79.30 \\ + 43.19 \\ \hline 122.49 \\ 1 \end{array}$	341		212	129
341							
212	129						

Make numbers on a place value grid
Start by adding the ones, and exchange 10 ones for 1 ten. Then add tens and hundreds etc.



Standard written addition with bar model alongside

341	
212	129

$$\begin{array}{r} 212 \\ + 129 \\ \hline 341 \\ 1 \end{array}$$

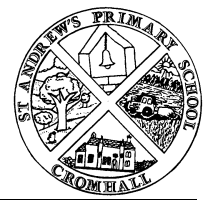
$$\begin{array}{r} 17.32 \\ + 21.81 \\ \hline 39.13 \\ 1 \end{array}$$

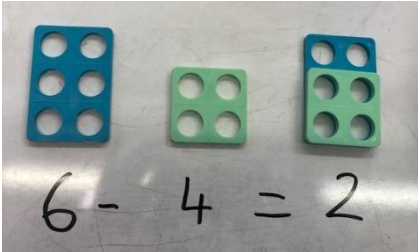
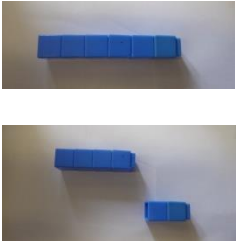
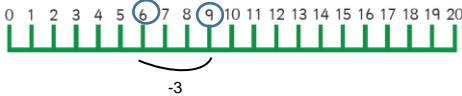
When adding decimals it is important to line up the decimal places and use zeros as place value holders

For example:

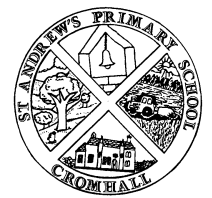
$$\begin{array}{r} 79.30 \\ + 43.19 \\ \hline 122.49 \\ 1 \end{array}$$


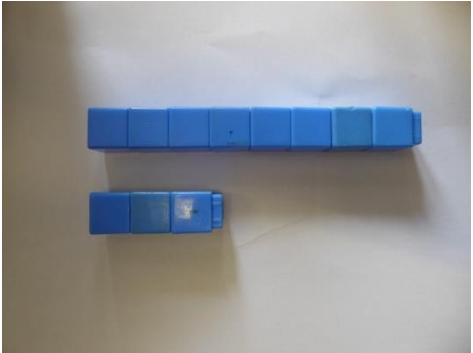
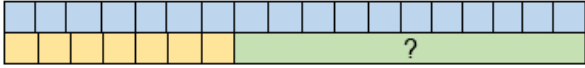
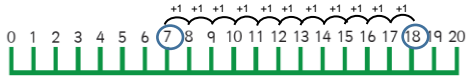
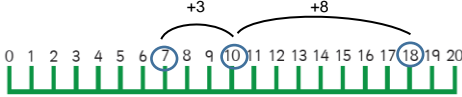

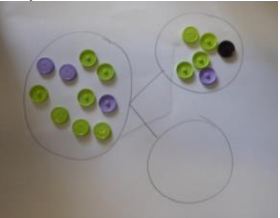
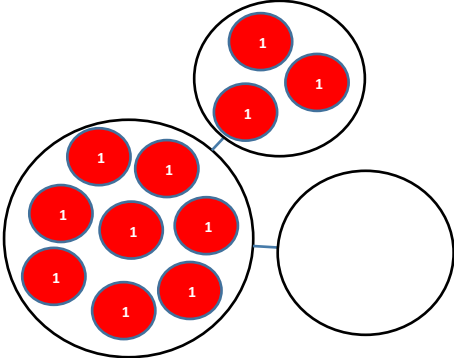
St Andrews CE VC Primary School



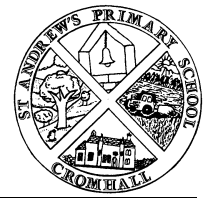
	Strategy	Concrete	Pictorial	Abstract
Subtraction	<p>Vocabulary: Number bonds, number line, make, inverse, ten less, digit, numeral, figure(s), compare (in) order/a different order, size, equals, is the same as (including equals sign), difference between, How many more to make..?, how many more is...than..?, how much more is..?, subtract, take away, minus, How many fewer is...than..?, how much less is..?, numbers to one hundred, hundreds, partition, recombine, hundred less, column subtraction, numbers to one thousand, order of operations, numbers to one million</p>			
	<p>Taking away ones</p>	<p>Numicon:</p>  <p>Use physical objects, counters, cubes etc. to show how objects can be taken away</p> <p>i.e. $6 - 2 = 4$</p> 	<p>Cross out drawn objects to show what has been taken away.</p> <pre> X X X X X X X X X X X X X X X </pre> <p>$15 - 3 = 12$</p>	<p>Use concrete or pictorial representation to write the number sentences</p>  <p>$9 - 3 = 6$</p> <p>$12 - 2 = 10$</p> <p>$13 - 0 = 13$</p> <p>$6 = 12 - 6$</p>

St Andrews CE VC Primary School



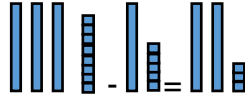
<p>Find the difference</p>	<p>Use Numicon or cubes to make bars to show the difference</p>  	<p>Tom has 18 sandwiches, Sam has 7 sandwiches. How many more sandwiches does Tom have?</p>  <p>Start at the smaller number and count on to find the difference.</p>  <p>Note: count on above the line</p>	<p>Tom has 18 sandwiches, Sam has 7 sandwiches. How many more sandwiches does Tom have?</p> <table border="1" data-bbox="1659 357 2119 435"> <tr> <td colspan="2">Tom 18</td> </tr> <tr> <td>Sam 7</td> <td>?</td> </tr> </table> 	Tom 18		Sam 7	?
Tom 18							
Sam 7	?						
<p>Part Part Whole Model</p>	<p>Numicon: Two parts on top of the whole</p>  <p>If 10 is the whole and 6 is one of the parts. What is the other part? (Link to addition / inverse operations)</p> 	<p>Use numbers and drawings in the part part whole model</p> 	<p>Use the part part whole model to write the number sentences.</p> <p> $8 - 3 = 5$ $8 - 5 = 3$ $5 = 8 - 3$ $3 = 8 - 5$ </p> <p>Link to addition : $3 + 5 = 8$</p> <p>Note: show that order is important i.e. $5 - 8 \neq 3$</p> <table border="1" data-bbox="1659 1294 2119 1366"> <tr> <td colspan="2">8</td> </tr> <tr> <td>5</td> <td>3</td> </tr> </table>	8		5	3
8							
5	3						

St Andrews CE VC Primary School



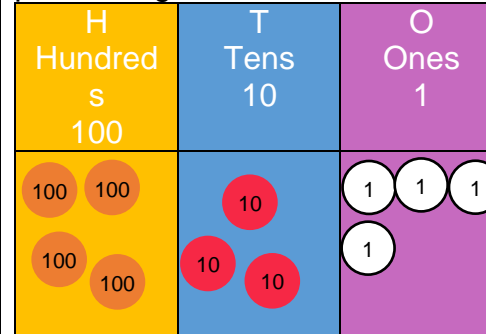
Column Method without exchanging

Use dienes to make the larger number, then take the smaller number away.

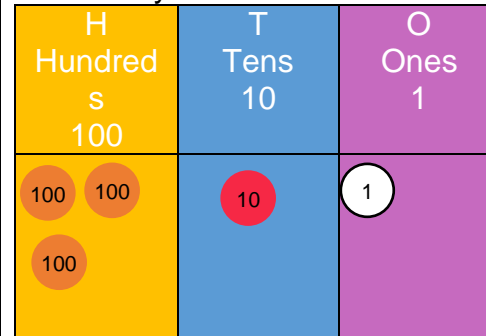


$$38 - 15 = 23$$

Using place value counters
Make number on a place value grid using partitioning



Take away the counters



$$434 - 123 = 311$$

Represent dienes using squares, lines and crosses. Draw a line to cross out to subtract.

Hundred square:
Count back in ones then tens
 $38 - 15 = 23$

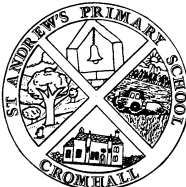
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

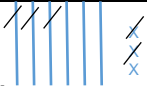
Written column subtraction

$$\begin{array}{r} 38 \\ - 15 \\ \hline 23 \end{array}$$

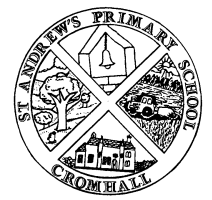
38	
15	?

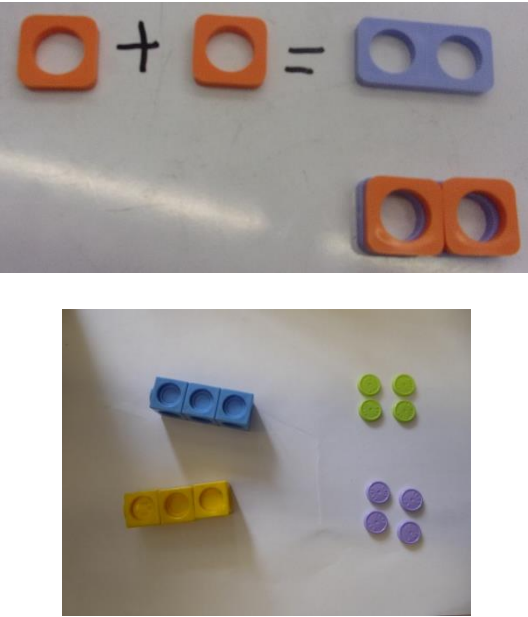
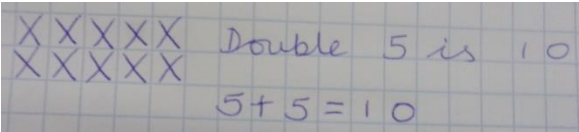
St Andrews CE VC Primary School



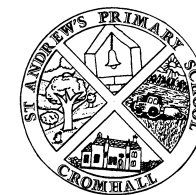
			<p>e.g. </p> <p>$63 - 32 = 31$</p>	
--	--	--	--	--

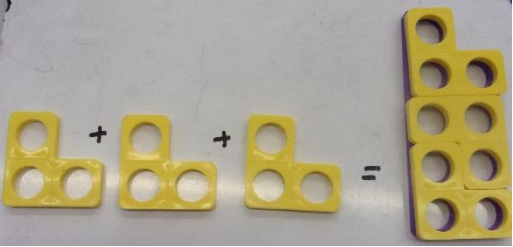

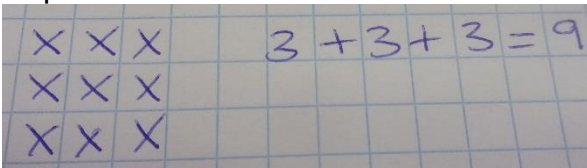
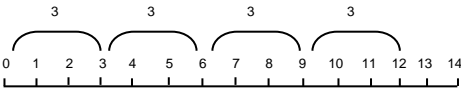
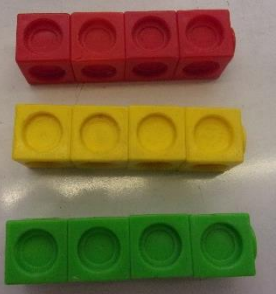
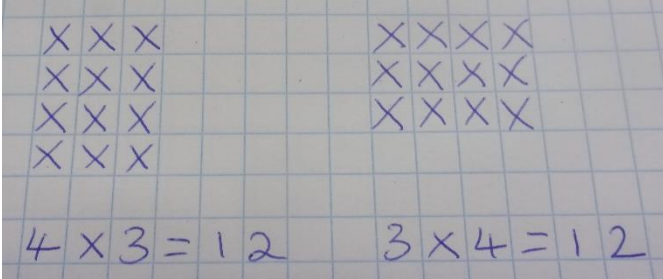
St Andrews CE VC Primary School



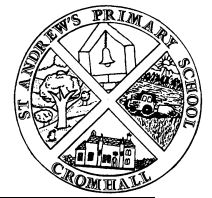
Multiplication	Strategy	Concrete	Pictorial	Abstract
	<p>Vocabulary: lots of, groups of, times, multiply, multiplied by multiple of, once, twice, three times..., ten times..., times as (big, long, wide... and so on), repeated addition, array, row, column, product, inverse, odd, even, count in twos, threes, fives, count in tens (forwards from/backwards from), How many times?, scale up, multiplication facts (up to 12x12), derive, factor pairs, composite numbers, prime number, prime factors, square number, cubed number, formal written method, order of operations, common factors, common multiples</p>			
<p>Doubling</p>	<p>Use blocks, objects, counters etc to practically show how to double a number.</p> 	<p>Draw pictures to show how to double a number.</p> 	<p>Partition</p> $\begin{array}{c} 16 \\ \swarrow \quad \searrow \\ 10 + 6 \end{array}$ <p>Double</p> $\begin{array}{c} 20 + 12 \\ \swarrow \quad \searrow \\ 32 \end{array}$ <p>Add</p> $16 = 10 + 6$ $\text{Double } 10 = 20$ $\text{Double } 6 = 12$ $20 + 12 = 32$	


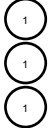



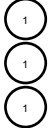



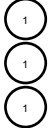


St Andrews CE VC Primary School



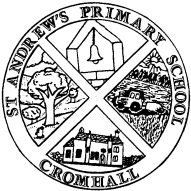
<p>Counting in multiples</p>	<p>Use concrete groups to support counting in multiples</p>  	<p>Repeated addition</p>  <p>Use a number line to count on in groups</p> 	<p>Count out loud in multiples</p> <p>What number comes next?</p> <p>3 6 9 12</p> <p> ?</p>
<p>Arrays- showing commutative multiplication</p>	<p>Create arrays using counters/ cubes to show multiplication sentences.</p> 	<p>Draw arrays in different rotations to find commutative multiplication sentences</p> 	<p>$2 \times 4 = 8$ $4 \times 2 = 8$ $8 = 4 \times 2$ $8 = 2 \times 4$</p>

St Andrews CE VC Primary School



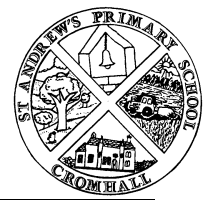
	<p>Formal Methods</p>	<p>Link with arrays to first introduce the grid method.</p> <table border="1" data-bbox="526 323 869 496"> <tr> <td>x</td> <td>10</td> <td>3</td> </tr> <tr> <td>4</td> <td></td> <td></td> </tr> </table> <p>Use Base 10</p> <table border="1" data-bbox="526 608 869 759"> <tr> <td>x</td> <td>10</td> <td>3</td> </tr> <tr> <td>4</td> <td></td> <td></td> </tr> </table> <p> $4 \times 10 = 40$ $4 \times 3 = 12$ $40 + 12 = 52$ </p>	x	10	3	4			x	10	3	4				<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table border="1" data-bbox="1579 355 1921 507"> <tr> <td>x</td> <td>30</td> <td>5</td> <td>210</td> </tr> <tr> <td>7</td> <td>210</td> <td>35</td> <td><u>+35</u> 245</td> </tr> </table> <p>For calculations greater than 2-digit x 1-digit, use the compact method.</p>	x	30	5	210	7	210	35	<u>+35</u> 245																				
x	10	3																																										
4																																												
x	10	3																																										
4																																												
x	30	5	210																																									
7	210	35	<u>+35</u> 245																																									
	<p>Column Multiplication</p>	<p>Children can still use counters to support calculations if needed.</p>	<p>Bar model</p> <table border="1" data-bbox="1032 1058 1547 1134"> <tr> <td colspan="8">456</td> </tr> <tr> <td>57</td><td>57</td><td>57</td><td>57</td><td>57</td><td>57</td><td>57</td><td>57</td> </tr> </table> <p>$57 \times 8 = 456$</p>	456								57	57	57	57	57	57	57	57	<p>Remind children to line up calculations correctly. Always start with ones column.</p> <p>1.</p> <table data-bbox="1601 1169 1892 1390"> <tr> <td>3</td><td>7</td><td>8</td> </tr> <tr> <td>x</td><td>5</td><td></td> </tr> <tr> <td colspan="3"><hr/></td> </tr> <tr> <td>4</td><td>0</td><td>(5 x 8)</td> </tr> <tr> <td>3</td><td>5</td><td>0 (5 x 70)</td> </tr> <tr> <td>1</td><td>5</td><td>0 0 (5 x 300)</td> </tr> <tr> <td colspan="3"><hr/></td> </tr> <tr> <td>1</td><td>8</td><td>9 0</td> </tr> </table>	3	7	8	x	5		<hr/>			4	0	(5 x 8)	3	5	0 (5 x 70)	1	5	0 0 (5 x 300)	<hr/>			1	8	9 0
456																																												
57	57	57	57	57	57	57	57																																					
3	7	8																																										
x	5																																											
<hr/>																																												
4	0	(5 x 8)																																										
3	5	0 (5 x 70)																																										
1	5	0 0 (5 x 300)																																										
<hr/>																																												
1	8	9 0																																										


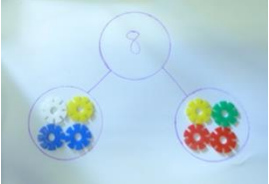
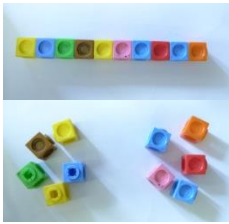
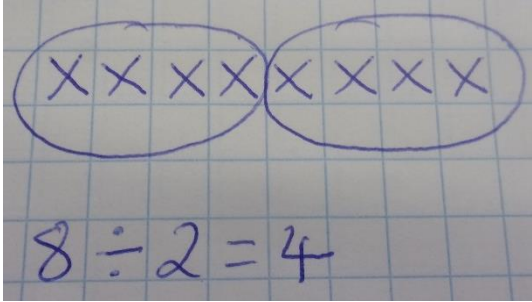
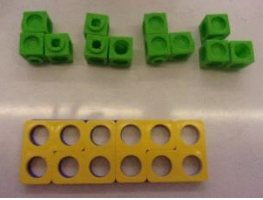
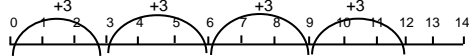
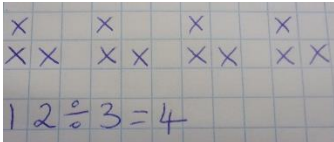
St Andrews CE VC Primary School



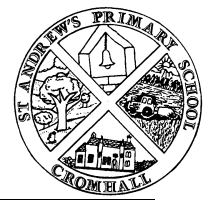
				<p>Compact method including exchanging</p> <p>2.</p> $\begin{array}{r} 378 \\ \times \quad 5 \\ \hline 1890 \\ 34 \end{array}$ <p>3.</p> $\begin{array}{r} 2458 \\ \times \quad 23 \\ \hline 7374 \\ 112 \\ \hline 49160 \\ 11 \\ \hline 56534 \\ 1 1 \end{array}$ <p>Use 0 to fill place when moving into the tens column</p>
--	--	--	--	---

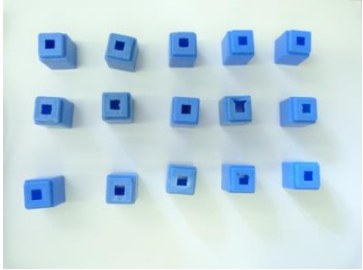
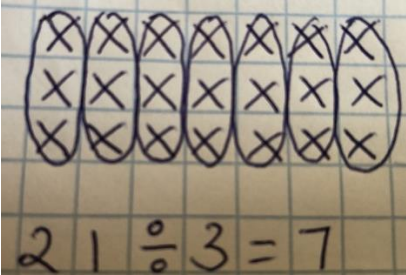
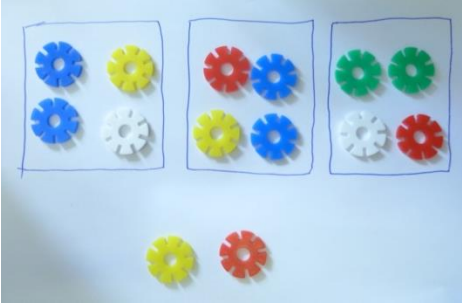
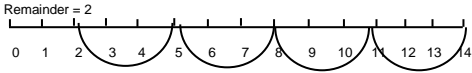
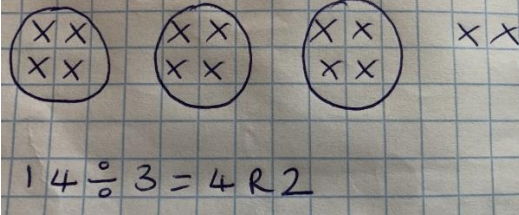
St Andrews CE VC Primary School



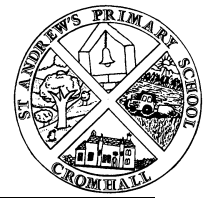
Division	Strategy	Concrete	Pictorial	Abstract
	Vocabulary: As multiplication plus - halve, share, share equally, one each, two each, three each..., group in pairs, threes... tens, equal groups of, \div , divide, divided by, divided into, left, left over remainder, factor, quotient, divisible by, inverse, division facts			
	Sharing objects into groups	$8 \div 2 = 4$   $10 \div 2 = 5$ 	Use pictures or shapes to share into groups $8 \div 2 = 4$ 	$8 \div 2 = 4$
	Division as grouping	Divide quantities into equal groups $12 \div 3 = 4$ 	Use a number line to show jumps in groups. The number of jumps is the number of groups.  	$12 \div 3 = 4$

St Andrews CE VC Primary School



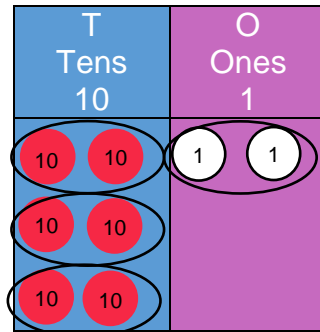
<p>Division within arrays</p>	 <p>Make an array using objects Write the number sentences. i.e. $15 \div 5 = 3$ $15 \div 3 = 5$ Link to multiplication</p>	 <p>Draw an array Use lines to split into groups Write number sentences i.e. $21 \div 3 = 7$ Link to multiplication</p>	<p>Find the inverse of multiplication and division sentences by creating four linking number sentences.</p> <p>$7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$</p>
<p>Division with remainders</p>	<p>$14 \div 3 = 4$ remainder 2</p>  <p>Divide objects between groups and see how much is left over</p>	<p>Use a number line to jump backwards in equal jumps, and then see how many more you need to jump to find a remainder.</p>  <p>Draw crosses and group them to divide an amount and clearly show a remainder.</p> 	<p>Complete written divisions and show the remainder using r.</p> <p>$14 \div 3 = 4 \text{ r } 2$</p>

St Andrews CE VC Primary School



Short Division

Make the number on a place value grid using place value counters
i.e. 62

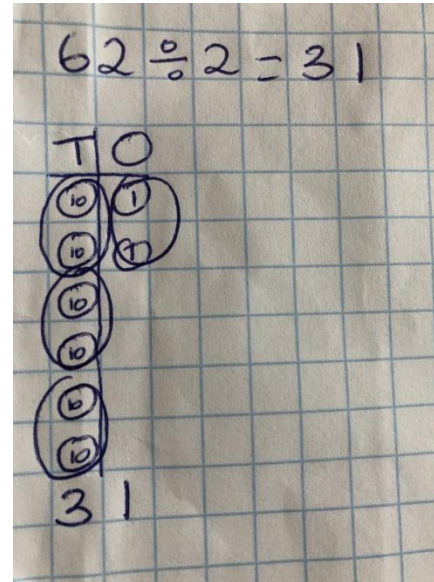


Group the tens into groups of two. (three groups of 20)
Group the ones into groups of two. (one group of 2)

$$62 \div 2 = 31$$

Children to draw place value counters in their books.

Without remainders:



With remainders:

Short division with no remainder

$$\begin{array}{r} 31 \\ 2 \overline{) 62} \end{array}$$

Move to division with remainders within the calculation

$$\begin{array}{r} 36 \\ 2 \overline{) 72} \end{array}$$

Then division with remainders

$$\begin{array}{r} 14 \\ 5 \overline{) 72} \text{ R } 2 \end{array}$$

Expressing remainders as fractions

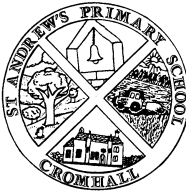
$$\begin{array}{r} 14 \\ 5 \overline{) 72} \text{ R } 2/5 \end{array}$$

Numerator is remainder
Denominator is divisor

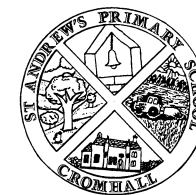
Expressing remainders as decimals

$$\begin{array}{r} 14.4 \\ 5 \overline{) 72.0} \end{array}$$

St Andrews CE VC Primary School



			<p>$72 \div 2 = 36$</p>	
--	--	--	------------------------------------	--



	<p>Long Division</p>			$ \begin{array}{r} 114 \\ 23 \overline{) 2622} \\ \underline{- 23} \\ 32 \\ \underline{- 23} \\ 92 \\ \underline{- 92} \\ 5 \end{array} $ <p> 23 (x1) 46 (x2) 69 (x3) 92 (x4) </p> <p>Children can write out the multiples of the divisor to aid calculation.</p>