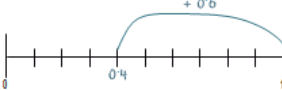

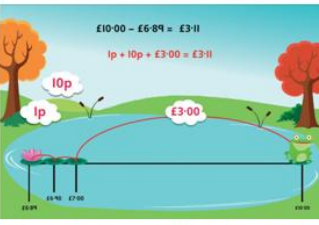





## Year 5 Mental Methods

<b>+</b>	<p><b>Using place value</b> Count in 0.1s, 0.01s e.g. Know what 0.1 more than 0.51 is</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">10s</td> <td style="padding: 2px;">1s</td> <td style="padding: 2px;">0.1s</td> <td style="padding: 2px;">0.01s</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px; text-align: center;">0</td> <td style="padding: 2px; text-align: center;">5</td> <td style="padding: 2px; text-align: center;">1</td> </tr> </table> <p>Partitioning e.g. <math>2.4 + 5.8</math> as <math>2 + 5</math> and <math>0.4 + 0.8</math> and combine the totals: <math>7 + 1.2 = 8.2</math></p> <table border="1" style="margin: 10px auto; border-collapse: collapse; font-size: 8px;"> <tr><td>01</td><td>02</td><td>03</td><td>04</td><td>05</td><td>06</td><td>07</td><td>08</td><td>09</td><td>1</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>2</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>3</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>4</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>5</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>6</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>7</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>8</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>9</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>10</td></tr> </table> <p><b>Counting on</b> Add two decimal numbers by adding the 1s, then the 0.1s/0.01s e.g. <math>5.72 + 3.05</math> as <math>5.72 + 3 (8.72) + 0.05 = 8.77</math> Add near multiples of 1 e.g. <math>6.34 + 0.99</math> e.g. <math>5.63 + 0.9</math> Count on from large numbers e.g. <math>6834 + 3005</math> as <math>9834 + 5</math></p> <p><b>Using number facts</b> Number bonds to 1 and to the next whole number e.g. <math>5.7 + 0.3</math> e.g. <math>0.4 + 0.6</math></p>  <p>Add to the next 10 from a decimal number e.g. <math>7.8 + 2.2 = 10</math></p>	10s	1s	0.1s	0.01s		0	5	1	01	02	03	04	05	06	07	08	09	1	11	12	13	14	15	16	17	18	19	2	21	22	23	24	25	26	27	28	29	3	31	32	33	34	35	36	37	38	39	4	41	42	43	44	45	46	47	48	49	5	51	52	53	54	55	56	57	58	59	6	61	62	63	64	65	66	67	68	69	7	71	72	73	74	75	76	77	78	79	8	81	82	83	84	85	86	87	88	89	9	91	92	93	94	95	96	97	98	99	10	<ul style="list-style-type: none"> <li>• Know number bonds to 1 and to the next whole number</li> <li>• Add to the next 10 from a decimal number e.g. <math>13.6 + 6.4 = 20</math></li> <li>• Add numbers with 2 significant digits only, using mental strategies e.g. <math>3.4 + 4.8</math> e.g. <math>23\ 000 + 47\ 000</math></li> <li>• Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. <math>8000 + 7000</math></li> <li>• Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers e.g. <math>82\ 472 + 30\ 004</math></li> <li>• Add decimal numbers which are near multiples of 1 or 10, including money e.g. <math>6.34 + 1.99</math> e.g. <math>£34.59 + £19.95</math></li> <li>• Use place value and number facts to add two or more 'friendly' numbers, including money and decimals e.g. <math>0.6 + 0.7 + 0.4</math> e.g. <math>2056 + 44</math></li> </ul>
10s	1s	0.1s	0.01s																																																																																																											
	0	5	1																																																																																																											
01	02	03	04	05	06	07	08	09	1																																																																																																					
11	12	13	14	15	16	17	18	19	2																																																																																																					
21	22	23	24	25	26	27	28	29	3																																																																																																					
31	32	33	34	35	36	37	38	39	4																																																																																																					
41	42	43	44	45	46	47	48	49	5																																																																																																					
51	52	53	54	55	56	57	58	59	6																																																																																																					
61	62	63	64	65	66	67	68	69	7																																																																																																					
71	72	73	74	75	76	77	78	79	8																																																																																																					
81	82	83	84	85	86	87	88	89	9																																																																																																					
91	92	93	94	95	96	97	98	99	10																																																																																																					
<b>-</b>	<p><b>Taking away</b> Use place value to subtract decimals e.g. <math>4.58 - 0.08</math> Take away multiples of powers of 10 e.g. <math>15\ 672 - 300</math> e.g. <math>4.82 - 2</math> e.g. <math>2.71 - 0.5</math> Partitioning or counting back e.g. <math>3964 - 1051</math> e.g. <math>5.72 - 2.01</math> Subtract near multiples of 1, 10, 100, 1000, 10 000 or £1 e.g. <math>86\ 456 - 9999</math> e.g. <math>3.58 - 1.99</math></p> <p><b>Counting up</b> Find a difference between two numbers by counting up from the smaller to the larger e.g. <math>£12.05 - £9.59</math> e.g. <math>2009 - 869</math></p>  <p>Find change using shopkeepers' addition e.g. Buy a toy for £6.89 using £10.00</p>  <p>Find a difference between two amounts of money by counting up</p> <p><b>Using number facts</b> Derived facts from number bonds to 10 and 100 e.g. <math>2 - 0.45</math> using <math>45 + 55 = 100</math> e.g. <math>3 - 0.86</math> using <math>86 + 14 = 100</math></p> <p>Number bonds to £1, £10 and £100 e.g. <math>£4.00 - £3.86</math> e.g. <math>£100 - £66</math> using <math>66 + 34 = 100</math></p>	<ul style="list-style-type: none"> <li>• Subtract numbers with 2 significant digits only, using mental strategies e.g. <math>6.2 - 4.5</math> e.g. <math>72\ 000 - 47\ 000</math></li> <li>• Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. <math>8000 - 3000</math> e.g. <math>60\ 000 - 200\ 000</math></li> <li>• Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers e.g. <math>82\ 472 - 30\ 004</math></li> <li>• Subtract decimal numbers which are near multiples of 1 or 10, including money e.g. <math>6.34 - 1.99</math> e.g. <math>£34.59 - £19.95</math></li> <li>• Use counting up subtraction, with knowledge of number bonds to 10, 100 or £1, as a strategy to perform mental subtraction e.g. <math>£10 - £3.45</math> e.g. <math>1000 - 782</math></li> <li>• Recognise fraction complements to 1 and to the next whole number e.g. <math>1\frac{2}{5} + \frac{3}{5} = 2</math></li> </ul>																																																																																																												
<b>X</b>	<p><b>Doubling and halving</b> Double amounts of money using partitioning e.g. double £6.73</p>  <p>Use doubling and halving as a strategy in multiplying by 2, 4, 8, 5 and 20 e.g. <math>58 \times 5</math> is half of <math>58 \times 10 (580) = 290</math></p> <p><b>Grouping</b> Multiply whole numbers and decimals by 10, 100, 1000 e.g. <math>3.4 \times 100 = 340</math> Use partitioning to multiply 'friendly' 2- and 3-digit numbers by 1-digit numbers e.g. <math>402 \times 6</math> as <math>400 \times 6 (2400)</math> and <math>2 \times 6 (12) = 2412</math></p>  <p>Use partitioning to multiply decimal numbers by 1-digit numbers e.g. <math>4.5 \times 3</math> as <math>4 \times 3 (12)</math> and <math>0.5 \times 3 (1.5) = 13.5</math> Multiply near multiples by rounding e.g. <math>32 \times 29</math> as <math>(32 \times 30) - 32 = 928</math></p> <p><b>Using number facts</b> Use times-tables facts up to <math>12 \times 12</math> to multiply multiples of 10/100 of the multiplier e.g. <math>4 \times 6 = 24</math> so <math>40 \times 6 = 240</math> and <math>400 \times 6 = 2400</math> Use knowledge of factors and multiples in multiplication e.g. <math>43 \times 6</math> is double <math>43 \times 3</math> e.g. <math>28 \times 50</math> is half of <math>28 \times 100 (2800) = 1400</math> Know square numbers and cube numbers</p> 	<ul style="list-style-type: none"> <li>• Know by heart all the multiplication facts up to <math>12 \times 12</math></li> <li>• Multiply whole numbers and 1- and 2-place decimals by 10, 100, 1000, 10 000</li> <li>• Use knowledge of factors and multiples in multiplication e.g. <math>43 \times 6</math> is double <math>43 \times 3</math> e.g. <math>28 \times 50</math> is <math>\frac{1}{2}</math> of <math>28 \times 100 = 1400</math></li> <li>• Use knowledge of place value and rounding in mental multiplication e.g. <math>67 \times 199</math> as <math>67 \times 200 - 67</math></li> <li>• Use doubling and halving as a strategy in mental multiplication e.g. <math>58 \times 5</math> is half of <math>58 \times 10</math></li> <li>• Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally e.g. <math>6 \times 27</math> as <math>6 \times 20 (120)</math> plus <math>6 \times 7 (42)</math></li> <li>• Double amounts of money by partitioning e.g. <math>£37.45</math> doubled is <math>£37</math> doubled (<math>£74</math>) plus <math>45p</math> doubled (<math>90p</math>) giving a total of <math>£74.90</math></li> </ul>																																																																																																												

**Doubling and halving**

Halve amounts of money using partitioning  
e.g. half of £14.84 is half of £14 (£7) plus half of 84p (42p)



Use doubling and halving as a strategy in dividing by 2, 4, 8, 5 and 20  
e.g.  $115 \div 5$  as double 115 (230)  $\div 10 = 23$

**Grouping**

Divide numbers by 10, 100, 1000 to obtain decimal answers with up to 3 decimal places  
e.g.  $340 \div 100 = 3.4$

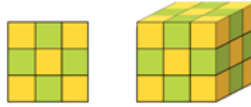
Use the 10th, 20th, 30th ... multiple of the divisor to divide 'friendly' 2- and 3-digit numbers by 1-digit numbers  
e.g.  $186 \div 6$  as  $30 \times 6$  (180) and  $1 \times 6$  (6)

$$\begin{array}{r}
 186 \div 6 = \square \\
 \square \times 6 = 186 \quad 186 \div 6 = 31 \\
 30 \times 6 = 180 \\
 \quad \quad \quad 6 \\
 \hline
 1 \times 6 = 6 \\
 \quad \quad \quad 0 \\
 \hline
 31
 \end{array}$$

**Using number facts**

Use division facts from the times-tables up to  $12 \times 12$  to divide multiples of powers of 10 of the divisor  
e.g.  $3600 \div 9$  using  $36 \div 9$

Know square numbers and cube numbers



- Know by heart all the division facts up to  $144 \div 12$
- Divide whole numbers by 10, 100, 1000, 10 000 to give whole number answers or answers with 1, 2 or 3 decimal places
- Use doubling and halving as mental division strategies  
e.g.  $34 \div 5$  is  $(34 \div 10) \times 2$
- Use knowledge of multiples and factors, as well as tests for divisibility, in mental division  
e.g.  $246 \div 6$  is  $123 \div 3$   
e.g. *We know that 525 divides by 25 and by 3*
- Halve amounts of money by partitioning  
e.g.  $\frac{1}{2}$  of £75.40 =  $\frac{1}{2}$  of £75 (£37.50) plus half of 40p (20p) which is £37.70
- Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate  
e.g.  $96 \div 6$  is  $10 + 6$ , as  $10 \times 6 = 60$  and  $6 \times 6 = 36$   
e.g.  $312 \div 3$  is  $100 + 4$  as  $100 \times 3 = 300$  and  $4 \times 3 = 12$
- Know tests for divisibility by 2, 3, 4, 5, 6, 9 and 25
- Know square numbers and cube numbers  
Reduce fractions to their simplest form