

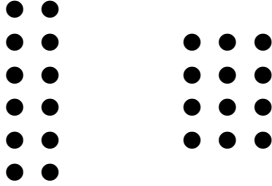



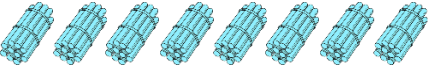
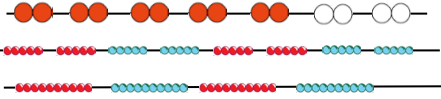




# CALCULATION PROGRESSION: MULTIPLICATION

## Pre-learning 1

### Grouping objects and counting

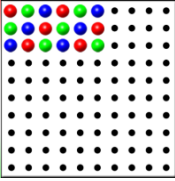

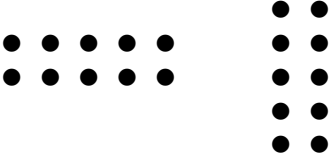
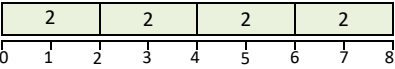
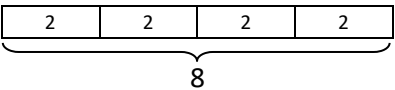
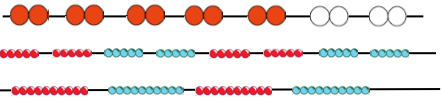








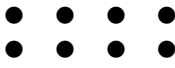

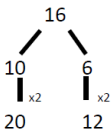


| concrete   | pictorial   | abstract   |
|--|---|--|
| <p><u>Repeated Addition</u></p> <p>Arrays:<br/>Use real objects to demonstrate arrays and count in groups:</p>  <p>Place objects into equal groups:</p>                      | <p><u>Repeated Addition</u></p> <p>Arrays:</p>  <p>Equal groups:</p>  | <p><u>Repeated Addition</u></p> <p><math>2 + 2 + 2 + 2 + 2 + 2 = 12</math><br/> <math>2 \times 6 = 12</math><br/> <i>2 multiplied 6 times is equal to 12</i></p> <p><math>3 + 3 + 3 + 3 = 12</math><br/> <math>3 \times 4 = 12</math><br/> <i>3 multiplied 4 times is equal to 12</i></p> <p><math>2 + 2 + 2 = 6</math><br/> <math>2 \times 3 = 6</math><br/> <i>2 multiplied 3 times is equal to 12</i></p> |
| <p><u>Multiplication tables</u></p> <p><i>Count in 2s, 5s and 10s using objects.</i></p>    | <p><u>Multiplication tables</u></p> <p>Bead string:</p>    | <p><u>Multiplication tables</u></p> <p><i>Count in 2s, 5s and 10s.</i></p>   |



# CALCULATION PROGRESSION: MULTIPLICATION

## Pre-learning 2

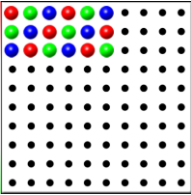
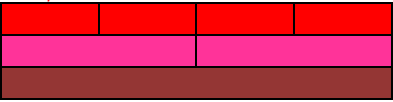
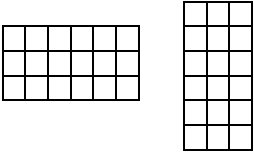
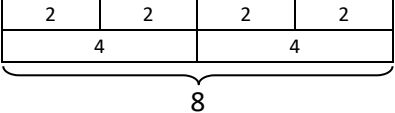


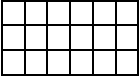
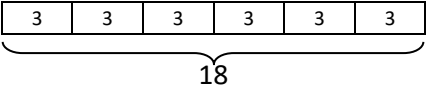



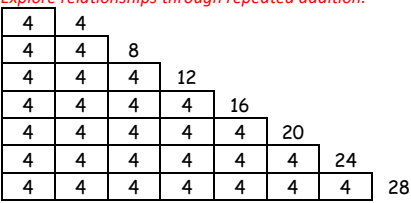
OxO 2x, 5x & 10x tables

| concrete  | pictorial   | abstract   |   |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
|---|---|--|---|---|--|---|----|----|-----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---|---|---|---|----|---|---|---|----|---|---|---|---|----|---|---|---|---|---|----|---|---|---|---|---|---|----|---|---|---|---|---|---|---|----|--|
| <p><u>Understanding Multiplication</u></p> <p>Peg boards:<br/><i>Make arrays.</i></p>  <p>Cuisenaire rods:<br/><i>Repeated addition using the same rod.</i></p>   | <p><u>Understanding Multiplication</u></p> <p>Arrays:</p>  <p>Bar model:<br/><i>Next to a number line.</i></p>  <p><i>Without a number line.</i></p>   | <p><u>Understanding Multiplication</u></p> <p><math>2 \times 5 = 10</math><br/><i>2 multiplied by 5 is equal to 10</i></p> <p><math>5 \times 2 = 10</math><br/><i>5 groups of 2 is equal to 10</i></p> <p><math>5 \times 2 = 2 \times 5</math></p> <p><math>2 + 2 + 2 + 2 = 2 \times 4</math><br/><math>2 \times 4 = 8</math><br/><i>2 multiplied by 4 is equal to 8</i></p> <p><math>4 \times 2 = 8</math><br/><i>4 groups of 2 is equal to 8</i></p> |   |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| <p><u>Multiplication tables</u></p> <p>2, 5 and 10 multiplication tables modelled as above and practised using rhythm, songs and games.</p> <p>Bead string:</p>  <p>Counting stick:<br/><i>Start with multiples labelled, then gradually remove them.</i></p>  <p>Clock face:<br/><i>Count round a clock face in 5s.</i></p>    | <p><u>Multiplication tables</u></p> <p>2, 5 and 10 multiplication tables modelled as above and practised using rhythm, songs and games.</p> <p>100 square:<br/><i>Colour in the multiples and look for patterns.</i></p> <table border="1" data-bbox="563 981 826 1227"> <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> <p>Bar Model:<br/><i>Explore relationships through repeated addition.</i></p> <table border="1" data-bbox="563 1301 975 1496"> <tr><td>5</td><td>5</td></tr> <tr><td>5</td><td>5</td><td>10</td></tr> <tr><td>5</td><td>5</td><td>5</td><td>15</td></tr> <tr><td>5</td><td>5</td><td>5</td><td>5</td><td>20</td></tr> <tr><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>25</td></tr> <tr><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>30</td></tr> <tr><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>35</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 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 15 | 5 | 5 | 5 | 5 | 20 | 5 | 5 | 5 | 5 | 5 | 25 | 5 | 5 | 5 | 5 | 5 | 5 | 30 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 | <p><u>Multiplication tables</u></p> <p>2, 5 and 10 multiplication tables modelled as above and practised using rhythm, songs and games.</p> <p><i>Make connections between facts:</i><br/>5x is half of 10x<br/>4x is double 2x<br/>6x is double 3x<br/>9x is 10x subtract 1x etc.</p> <p><i>Make connections between tables:</i><br/>10x table related to place value;<br/>5x table related to 10x table by halving and to the divisions on a clock face;<br/>2x table related to doubling.</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 |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   |  |   |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   | 10   |   |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   | 5  | 15  |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   | 5  | 5   | 20  |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   | 5  | 5   | 5   | 25   |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   | 5  | 5   | 5   | 5  | 30  |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| 5   | 5   | 5  | 5   | 5   | 5  | 5   | 35 |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| <p><u>Doubling</u></p> <p>Using objects:<br/><i>Scaling to double the size.</i></p>  <p><i>Double the number of objects in the group.</i></p>  <p>Base ten blocks:</p> <table border="1" data-bbox="97 1955 515 2092"> <thead> <tr> <th>tens</th> <th>ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> | tens  | ones   |  |  | <p><u>Doubling</u></p> <p>Arrays:</p>  <p>Drawing base ten:</p>  | <p><u>Doubling</u></p> <p>Double 4 is 8</p> <p><math>4 \times 2 = 8</math></p> <p>Partition the number then double each part before recombining:</p>  <p><math>16 \times 2 = 32</math></p> |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
| tens  | ones  |  |   |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |
|    |    |  |   |   |  |   |    |    |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |   |   |   |   |    |   |   |   |    |   |   |   |   |    |   |   |   |   |   |    |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |  |



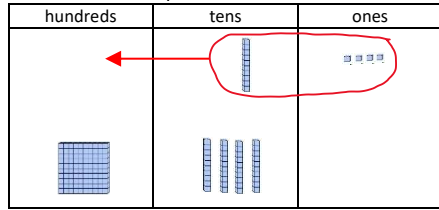
# CALCULATION PROGRESSION: MULTIPLICATION

## Y3 0x0 & TOxO 3x, 4x & 8x tables

| concrete  | pictorial   | abstract  |    |    |    |    |    |    |     |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
|---|---|---|----|----|----|----|----|----|-----|---|----|---|---|---|---|----|----|----|----|----|----|---|---|---|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|--|
| <p><u>Understanding Multiplication</u></p> <p>Peg boards:<br/><i>Explore different arrays made with the same number of pegs.</i></p>  <p>Cuisenaire rods:<br/><i>Use repeated addition to make the same total.</i></p>    | <p><u>Understanding Multiplication</u></p> <p>Arrays:<br/><i>Draw arrays to show that multiplication is commutative.</i></p>  <p>Bar model:</p>   | <p><u>Understanding Multiplication</u></p> <p><i>Understand that multiplication is commutative.</i></p> <p><math>6 \times 3 = 18</math><br/><i>6 multiplied by 3 is equal to 18</i></p> <p><math>3 \times 6 = 18</math><br/><i>3 groups of 6 is equal to 18</i></p> <p><math>6 \times 3 = 3 \times 6</math></p> <p><i>Family of four</i></p> <p><math>2 \times 4 = 8</math><br/><math>4 \times 2 = 8</math><br/><math>8 \div 2 = 4</math><br/><math>8 \div 4 = 2</math></p> |    |    |    |    |    |    |     |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| <p><u>One-digit x one-digit</u></p> <p>Base ten blocks (arranged as an array):</p>  <p>Cuisenaire rods:</p>    | <p><u>One-digit x one-digit</u></p> <p>Array:</p>  <p>Bar model:</p>   | <p><u>One-digit x one-digit</u></p> <p><math>6 \times 3 = 18</math></p>   |    |    |    |    |    |    |     |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| <p><u>Multiplication tables</u></p> <p>3, 4 and 8 multiplication tables modelled as above and practised using rhythm, songs and games.</p> <p>Counting stick:<br/><i>Start with multiples labelled, then gradually remove them.</i></p>  <p>Arrays:<br/><i>Show how facts can be 'built'.</i></p>  <p><math>3 \times 6</math> is the same as <math>2 \times 6</math> and <math>1 \times 6</math> put together.</p>  <p><math>4 \times 5</math> is the same as double <math>2 \times 5</math>.</p> | <p><u>Multiplication tables</u></p> <p>3, 4 and 8 multiplication tables modelled as above and practised using rhythm, songs and games.</p> <p>100 square:<br/><i>Colour in the multiples and look for patterns.</i></p> <table border="1" data-bbox="563 1256 810 1503"> <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>2</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td><td>14</td><td>16</td><td>18</td><td>20</td></tr> <tr><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td><td>21</td><td>24</td><td>27</td><td>30</td></tr> <tr><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td><td>24</td><td>28</td><td>32</td><td>36</td><td>40</td></tr> <tr><td>5</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td><td>35</td><td>40</td><td>45</td><td>50</td></tr> <tr><td>6</td><td>12</td><td>18</td><td>24</td><td>30</td><td>36</td><td>42</td><td>48</td><td>54</td><td>60</td></tr> <tr><td>7</td><td>14</td><td>21</td><td>28</td><td>35</td><td>42</td><td>49</td><td>56</td><td>63</td><td>70</td></tr> <tr><td>8</td><td>16</td><td>24</td><td>32</td><td>40</td><td>48</td><td>56</td><td>64</td><td>72</td><td>80</td></tr> <tr><td>9</td><td>18</td><td>27</td><td>36</td><td>45</td><td>54</td><td>63</td><td>72</td><td>81</td><td>90</td></tr> <tr><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td></tr> </table> <p>Bar model:<br/><i>Explore relationships through repeated addition.</i></p>  | 1   | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9 | 10 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | <p><u>Multiplication tables</u></p> <p>3, 4 and 8 multiplication tables modelled as above and practised using rhythm, songs and games.</p> <p><i>Make connections between facts:</i></p> <p><math>5x</math> is half of <math>10x</math><br/><math>4x</math> is double <math>2x</math><br/><math>6x</math> is double <math>3x</math><br/><math>9x</math> is <math>10x</math> subtract <math>1x</math> etc.</p> <p><i>Make connections between tables:</i></p> <p><i>Commutativity means that key facts (2x, 5x, 10x) are already known;</i></p> <p><math>4x</math> and <math>8x</math> tables related to <math>2x</math> table by doubling;<br/><math>3x</math> table is <math>2x</math> table add <math>1x</math>.</p> <p><i>Relate to division facts.</i></p> |
| 1   | 2   | 3   | 4  | 5  | 6  | 7  | 8  | 9  | 10  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 2   | 4   | 6   | 8  | 10 | 12 | 14 | 16 | 18 | 20  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 3   | 6   | 9   | 12 | 15 | 18 | 21 | 24 | 27 | 30  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 4   | 8   | 12  | 16 | 20 | 24 | 28 | 32 | 36 | 40  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 5   | 10  | 15  | 20 | 25 | 30 | 35 | 40 | 45 | 50  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 6   | 12  | 18  | 24 | 30 | 36 | 42 | 48 | 54 | 60  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 7   | 14  | 21  | 28 | 35 | 42 | 49 | 56 | 63 | 70  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 8   | 16  | 24  | 32 | 40 | 48 | 56 | 64 | 72 | 80  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 9   | 18  | 27  | 36 | 45 | 54 | 63 | 72 | 81 | 90  |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |
| 10  | 20  | 30  | 40 | 50 | 60 | 70 | 80 | 90 | 100 |   |    |   |   |   |   |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |  |

Multiplying by 10

Base ten blocks & place value chart:



Multiplying by 10

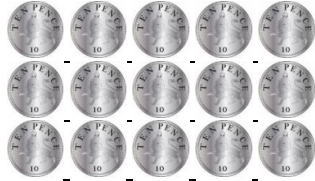
| H | T | O |
|---|---|---|
|   | 1 | 4 |
| 1 | 4 | 0 |

Multiplying by 10

$$14 \times 10 = 140$$

One-digit x multiple of ten

Coins:



Place value counters:



One-digit x multiple of ten

Array:

|    |    |    |    |    |
|----|----|----|----|----|
| 10 | 10 | 10 | 10 | 10 |
| 10 | 10 | 10 | 10 | 10 |
| 10 | 10 | 10 | 10 | 10 |

One-digit x multiple of ten

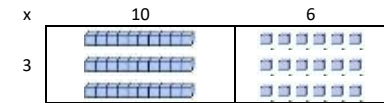
$$50 \times 3 = 5 \times 3 \times 10$$

$$= 15 \times 10$$

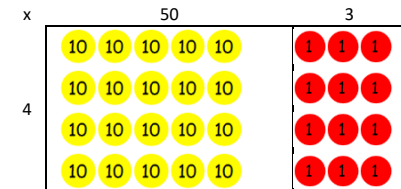
$$= 150$$

Two-digit x one-digit

Base ten blocks:

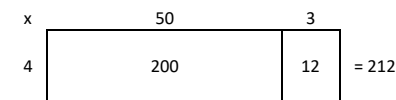
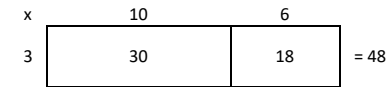


Place value counters:



Two-digit x one-digit

Area method:



Two-digit x one-digit

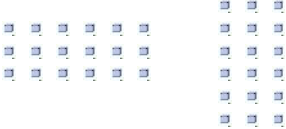
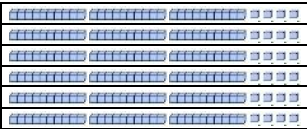
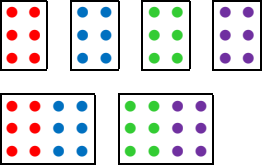
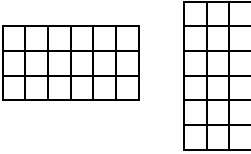
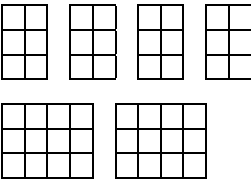



$$16 \times 3 = 48$$

$$53 \times 4 = 212$$



# CALCULATION PROGRESSION: MULTIPLICATION

## Y4 HTOxO 6x, 7x, 9x, 11x & 12x tables

| concrete   | pictorial  | abstract   |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
|--|--|--|----|-------|---|----|---|----|--|----|-----|----|---|--|---|-----|-----|----|-------|--|
| <p><u>Rules of Multiplication</u></p> <p>Arrays:<br/><i>Commutative law</i></p>  <p><i>Distributive law</i></p>  <p><i>Associative law</i></p>    | <p><u>Rules of Multiplication</u></p> <p>Arrays:<br/><i>Commutative law</i></p>  <p><i>Distributive law</i></p> <table border="1" data-bbox="563 524 873 651"> <tr><td>30</td><td>4</td></tr> <tr><td>30</td><td>4</td></tr> <tr><td>30</td><td>4</td></tr> <tr><td>30</td><td>4</td></tr> <tr><td>30</td><td>4</td></tr> <tr><td>30</td><td>4</td></tr> </table> <p><i>Associative law</i></p>  | 30   | 4  | 30    | 4 | 30 | 4 | 30 | 4  | 30 | 4   | 30 | 4 | <p><u>Rules of Multiplication</u></p> <p><math>6 \times 3 = 3 \times 6</math></p> <p><math>34 \times 6 = (30 \times 6) + (4 \times 6)</math></p> <p><math>(2 \times 3) \times 4 = 2 \times (3 \times 4)</math></p> |   |     |     |    |       |  |
| 30   | 4  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 30   | 4  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 30   | 4  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 30   | 4  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 30   | 4  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 30   | 4  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| <p><u>Multiplication tables</u></p> <p>6, 7, 9, 11 and 12 multiplication tables modelled as above and practised using rhythm, songs and games (including Times Tables Rock Stars).</p> <p>Counting stick:<br/><i>Start with multiples labelled, then gradually remove them.</i></p>  <p>Arrays:<br/><i>Show how facts can be 'built'.</i></p>  <p><math>6 \times 4</math> is the same as <math>5 \times 4</math> and <math>1 \times 4</math> put together.</p>  <p><math>6 \times 5</math> is the same as double <math>3 \times 5</math>.</p> | <p><u>Multiplication tables</u></p> <p>6, 7, 9, 11 and 12 multiplication tables modelled as above and practised using rhythm, songs and games (including Times Tables Rock Stars).</p> <p>100 square:<br/><i>Colour in the multiples and look for patterns.</i></p> <p>Bar model:<br/><i>Explore relationships through repeated addition.</i></p> <p>Digit patterns:<br/><i>Look for patterns in the digits of different multiples.</i></p>  | <p><u>Multiplication tables</u></p> <p>6, 7, 9, 11 and 12 multiplication tables modelled as above and practised using rhythm, songs and games (including Times Tables Rock Stars).</p> <p><i>Make connections between facts:</i><br/> <math>5x</math> is half of <math>10x</math><br/> <math>4x</math> is double <math>2x</math><br/> <math>6x</math> is double <math>3x</math><br/> <math>9x</math> is <math>10x</math> subtract <math>1x</math> etc.</p> <p><i>Make connections between tables:</i><br/>     Commutativity means that several facts (<math>2x</math>, <math>3x</math>, <math>4x</math>, <math>5x</math>, <math>8x</math>, <math>10x</math>) are already known;<br/>     Use doubling and halving to find new tables.</p> <p><i>Relate to division facts.</i></p> |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| <p><u>Three-digit x one-digit</u></p> <p>Place value counters:</p> <table border="1" data-bbox="108 1630 496 1778"> <tr> <td>x</td> <td>200</td> <td>40</td> <td>3</td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> </tr> </table>   | x  | 200  | 40 | 3     | 4 |    |   |    | <p><u>Three-digit x one-digit</u></p> <p>Area method:</p> <table border="1" data-bbox="563 1630 991 1711"> <tr> <td>x</td> <td>200</td> <td>40</td> <td>3</td> <td></td> </tr> <tr> <td>4</td> <td>800</td> <td>160</td> <td>12</td> <td>= 972</td> </tr> </table> | x  | 200 | 40 | 3 |  | 4 | 800 | 160 | 12 | = 972 | <p><u>Three-digit x one-digit</u></p> <p><math>243 \times 4 = 972</math></p> |
| x  | 200  | 40   | 3  |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 4  |  |  |    |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| x  | 200  | 40   | 3  |       |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |
| 4  | 800  | 160  | 12 | = 972 |   |    |   |    |  |    |     |    |   |  |   |     |     |    |       |  |

Column Method

Place value counters:

*Carry out the area method first, then place the counters onto the grid. This will help to see where carrying is needed.*



Column Method

Area method:

|   |     |     |    |
|---|-----|-----|----|
| x | 100 | 40  | 6  |
| 7 | 700 | 280 | 42 |

Column Method

*Using squared paper to aid layout:*

|           |   |   |   |   |  |
|-----------|---|---|---|---|--|
| 146 x 7 = |   |   |   |   |  |
|           |   |   |   |   |  |
|           |   | 1 | 4 | 6 |  |
|           | x |   |   | 7 |  |
|           | 1 | 0 | 2 | 2 |  |
|           |   | 3 | 4 |   |  |



# CALCULATION PROGRESSION: MULTIPLICATION

## Y5 ThHTOxO, TOxTO & HTOxTO

| concrete   | pictorial  | abstract   |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|--|--|--|-------------|--------|---|---------|-----------------|---------|---|---------|-----------------|---------|------|---------|-----------------|---------|--|------|-----|----|---|---|--|--|--|---|--|---|------|-----|---|--------|---|------------|---|---|---|--|--|--|--|--|--|--|--|--|--|---|---|---|--|--|---|--|--|---|--|--|---|---|---|---|--|--|--|---|--|--|--|
| <p><u>Multiplication tables</u></p> <p>Continue to practise all multiplication facts up to 12 x 12 using counting, rhythm, songs, patterns and games (including Times Tables Rock Stars).</p>  | <p><u>Multiplication tables</u></p> <p>Continue to practise all multiplication facts up to 12 x 12 using counting, rhythm, songs, patterns and games (including Times Tables Rock Stars).</p>  | <p><u>Multiplication tables</u></p> <p>Continue to practise all multiplication facts up to 12 x 12 using counting, rhythm, songs, patterns and games (including Times Tables Rock Stars).</p>  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| <p><u>Short Multiplication Column Method</u></p>   | <p><u>Short Multiplication Column Method</u></p>   | <p><u>Short Multiplication Column Method</u></p> <p style="color: red; font-size: small;">Using squared paper to aid layout:</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr><td colspan="6" style="text-align: center;">4,346 x 8 =</td></tr> <tr><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td></tr> <tr><td> </td><td> </td><td style="text-align: center;">4</td><td style="text-align: center;">3</td><td style="text-align: center;">4</td><td style="text-align: center;">6</td></tr> <tr><td> </td><td style="text-align: center;">x</td><td> </td><td> </td><td> </td><td style="text-align: center;">8</td></tr> <tr><td> </td><td style="text-align: center;">3</td><td style="text-align: center;">4</td><td style="text-align: center;">7</td><td style="text-align: center;">6</td><td style="text-align: center;">8</td></tr> <tr><td> </td><td> </td><td style="text-align: center;">2</td><td style="text-align: center;">3</td><td style="text-align: center;">4</td><td> </td></tr> </table> | 4,346 x 8 = |        |   |         |                 |         |   |         |                 |         |      |         |                 |         | 4  | 3    | 4   | 6  |   | x   |  |  |  | 8 |  | 3 | 4    | 7   | 6 | 8      |   |            | 2 | 3 | 4 |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| 4,346 x 8 =  |  |  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  |  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  | 4  | 3           | 4      | 6 |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  | x  |  |             |        | 8 |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  | 3  | 4  | 7           | 6      | 8 |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  | 2  | 3           | 4      |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| <p><u>Column Method (Decimals)</u></p> <p>Place value counters:</p> <table style="margin-left: 20px;"> <tr> <td style="text-align: right; padding-right: 10px;">x</td> <td style="text-align: center; padding-right: 20px;">4</td> <td style="text-align: center; padding-right: 20px;">0.9</td> <td style="text-align: center;">0.02</td> </tr> <tr> <td> </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: right; padding-right: 10px;">3</td> <td style="text-align: center;">● ● ● ●</td> <td style="text-align: center;">● ● ● ● ● ● ● ●</td> <td style="text-align: center;">● ● ● ●</td> </tr> <tr> <td> </td> <td style="text-align: center;">● ● ● ●</td> <td style="text-align: center;">● ● ● ● ● ● ● ●</td> <td style="text-align: center;">● ● ● ●</td> </tr> </table> | x  | 4  | 0.9         | 0.02   |   | ● ● ● ● | ● ● ● ● ● ● ● ● | ● ● ● ● | 3 | ● ● ● ● | ● ● ● ● ● ● ● ● | ● ● ● ● |      | ● ● ● ● | ● ● ● ● ● ● ● ● | ● ● ● ● | <p><u>Column Method (Decimals)</u></p> <p>Area method:</p> <p style="color: red; font-size: small;">Establish that the calculation can be carried out with whole numbers by multiplying the question by a multiple of 10 then adjusting the answer by dividing.</p> <p>4.92 x 3    <i>Multiply the question by 100 to give a whole number</i></p> <p>492 x 3 =</p> <table style="margin-left: 20px;"> <tr> <td style="text-align: right; padding-right: 5px;">x</td> <td style="text-align: center; padding-right: 20px;">400</td> <td style="text-align: center; padding-right: 20px;">90</td> <td style="text-align: center;">2</td> <td> </td> </tr> <tr> <td> </td> <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: right; padding-right: 5px;">3</td> <td style="text-align: center;">1200</td> <td style="text-align: center;">270</td> <td style="text-align: center;">6</td> <td style="text-align: center;">= 1476</td> </tr> </table> <p style="font-size: small;">Adjust the answer by dividing by 100<br/>1476 ÷ 100 = 14.76</p> | x    | 400 | 90 | 2 |   |  |  |  |   |  | 3 | 1200 | 270 | 6 | = 1476 | <p><u>Column Method (Decimals)</u></p> <p style="color: red; font-size: small;">Using squared paper to aid layout:</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr><td colspan="6" style="text-align: center;">4.92 x 3 =</td></tr> <tr><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td></tr> <tr><td> </td><td> </td><td style="text-align: center;">4</td><td style="text-align: center;">9</td><td style="text-align: center;">2</td><td> </td></tr> <tr><td> </td><td style="text-align: center;">x</td><td> </td><td> </td><td style="text-align: center;">3</td><td> </td></tr> <tr><td> </td><td style="text-align: center;">1</td><td style="text-align: center;">4</td><td style="text-align: center;">7</td><td style="text-align: center;">6</td><td> </td></tr> <tr><td> </td><td> </td><td style="text-align: center;">2</td><td> </td><td> </td><td> </td></tr> </table> <p>1476 ÷ 100 = 14.76</p> | 4.92 x 3 = |   |   |   |  |  |  |  |  |  |  |  |  |  | 4 | 9 | 2 |  |  | x |  |  | 3 |  |  | 1 | 4 | 7 | 6 |  |  |  | 2 |  |  |  |
| x  | 4  | 0.9  | 0.02        |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  | ● ● ● ●  | ● ● ● ● ● ● ● ●  | ● ● ● ●     |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| 3  | ● ● ● ●  | ● ● ● ● ● ● ● ●  | ● ● ● ●     |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  | ● ● ● ●  | ● ● ● ● ● ● ● ●  | ● ● ● ●     |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| x  | 400  | 90   | 2           |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  |  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| 3  | 1200   | 270  | 6           | = 1476 |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| 4.92 x 3 =   |  |  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  |  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  | 4  | 9           | 2      |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  | x  |  |             | 3      |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  | 1  | 4  | 7           | 6      |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  | 2  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| <p><u>Long Multiplication</u></p>  | <p><u>Long Multiplication</u></p> <p>Area method:</p> <table style="margin-left: 20px;"> <tr> <td style="text-align: right; padding-right: 5px;">x</td> <td style="text-align: center; padding-right: 20px;">300</td> <td style="text-align: center; padding-right: 20px;">50</td> <td style="text-align: center;">2</td> <td> </td> </tr> <tr> <td> </td> <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: right; padding-right: 5px;">20</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">40</td> <td> </td> </tr> <tr> <td style="text-align: right; padding-right: 5px;">4</td> <td style="text-align: center;">1200</td> <td style="text-align: center;">200</td> <td style="text-align: center;">8</td> <td> </td> </tr> </table> <p style="text-align: right; margin-right: 20px;">7,040 + 1,408 = 8,448</p> | x  | 300         | 50     | 2 |         |                 |         |   |         |                 | 20      | 6000 | 1000    | 40              |         | 4  | 1200 | 200 | 8  |   | <p><u>Long Multiplication</u></p> <p>352 x 24 = 8,448</p> |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| x  | 300  | 50   | 2           |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
|  |  |  |             |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| 20   | 6000   | 1000   | 40          |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |
| 4  | 1200   | 200  | 8           |        |   |         |                 |         |   |         |                 |         |      |         |                 |         |  |      |     |    |   |   |  |  |  |   |  |   |      |     |   |        |   |            |   |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |   |  |  |   |  |  |   |   |   |   |  |  |  |   |  |  |  |



## CALCULATION PROGRESSION: MULTIPLICATION

**Y6** THTOxTO & ThHTOxTO

| concrete  | pictorial   | abstract  |
|---|---|---|
| <p><u>Multiplication tables</u></p> <p>Continue to practise all multiplication facts up to 12 x 12 using counting, rhythm, songs, patterns and games (including Times Tables Rock Stars).</p> | <p><u>Multiplication tables</u></p> <p>Continue to practise all multiplication facts up to 12 x 12 using counting, rhythm, songs, patterns and games (including Times Tables Rock Stars).</p> | <p><u>Multiplication tables</u></p> <p>Continue to practise all multiplication facts up to 12 x 12 using counting, rhythm, songs, patterns and games (including Times Tables Rock Stars).</p>   |
| <p><u>Long Multiplication Column Method</u></p>   | <p><u>Long Multiplication Column Method</u></p> <p>Area method:<br/> <i>Revision of the grid method used in Y5.</i><br/> <i>Compare this method to the formal column method.</i></p>          | <p><u>Long Multiplication Column Method</u></p> <p>24 x 32 =</p> $\begin{array}{r} 24 \\ \times 32 \\ \hline 48 \quad (24 \times 2) \\ 720 \quad (24 \times 30) \\ \hline 768 \end{array}$ <p>352 x 24 =</p> $\begin{array}{r} 352 \\ \times 24 \\ \hline 1408 \quad (352 \times 4) \\ 7040 \quad (352 \times 20) \\ \hline 8448 \end{array}$ <p>2418 x 36 =</p> $\begin{array}{r} 2418 \\ \times 36 \\ \hline 14508 \quad (2418 \times 6) \\ 72540 \quad (2418 \times 30) \\ \hline 87048 \end{array}$ |