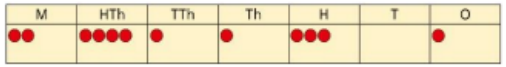
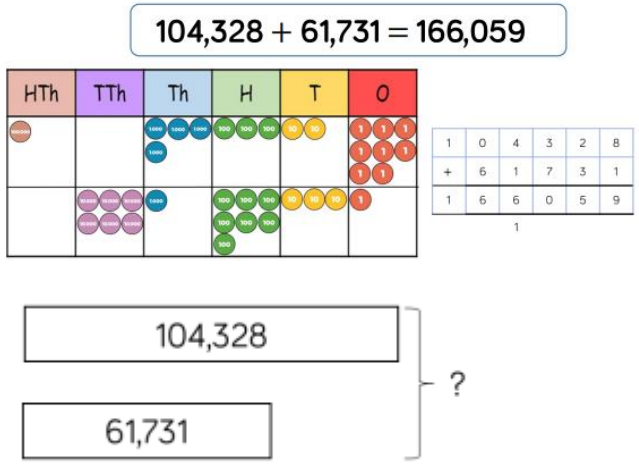
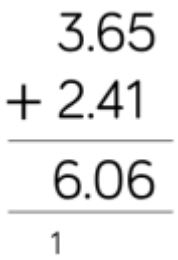
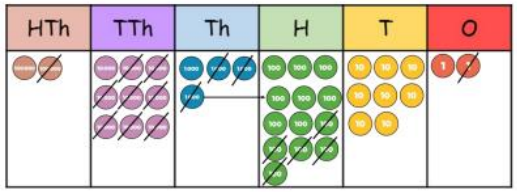
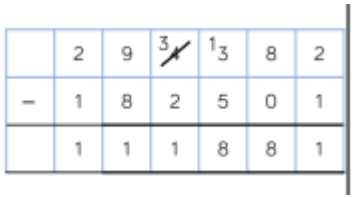
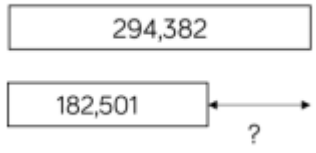
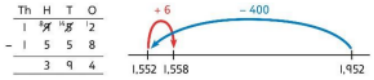
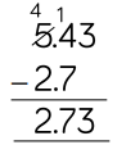
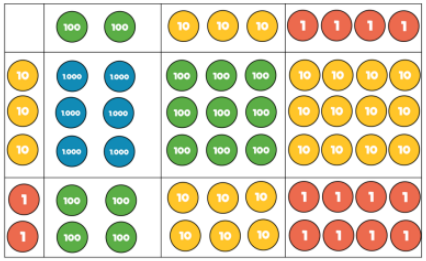
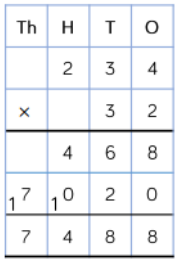
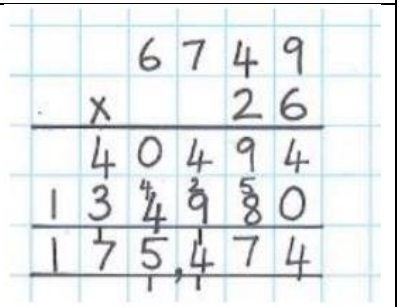
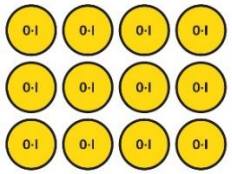
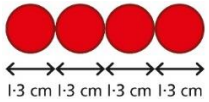
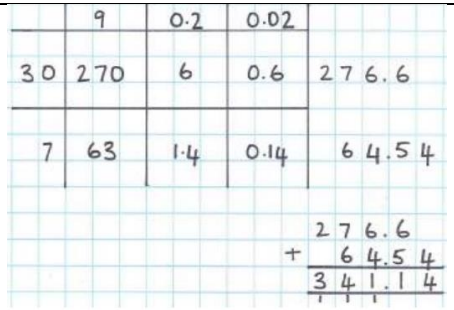
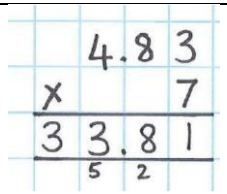
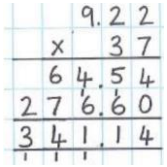
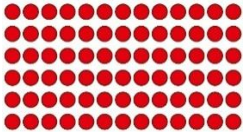
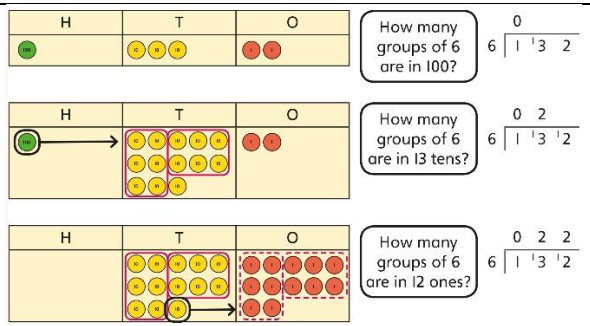
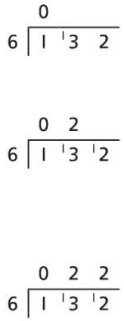
Year 6			
	Concrete	Pictorial	Abstract
Year 6 addition			
solve addition multi-step problems in contexts, deciding which operations and methods to use.	Represent 7-digit numbers on a place value grid and use this to support thinking and mental methods.  2,411,301 + 500,000 = ? This would be 5 more counters in the HTh place. So, the total is 2,911,301. 2,411,301 + 500,000 = 2,911,301	Discuss similarities and differences between methods, and choose efficient methods based on the specific calculation. Compare written and mental methods alongside place value representations.  Use bar model and number line representations to model addition in problem-solving and measure contexts.	Use column addition where mental methods are not efficient. Ensure children have experience of adding decimals with a variety of decimal places. This includes money and measures. 
Year 6 Subtraction			

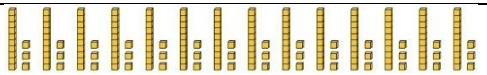
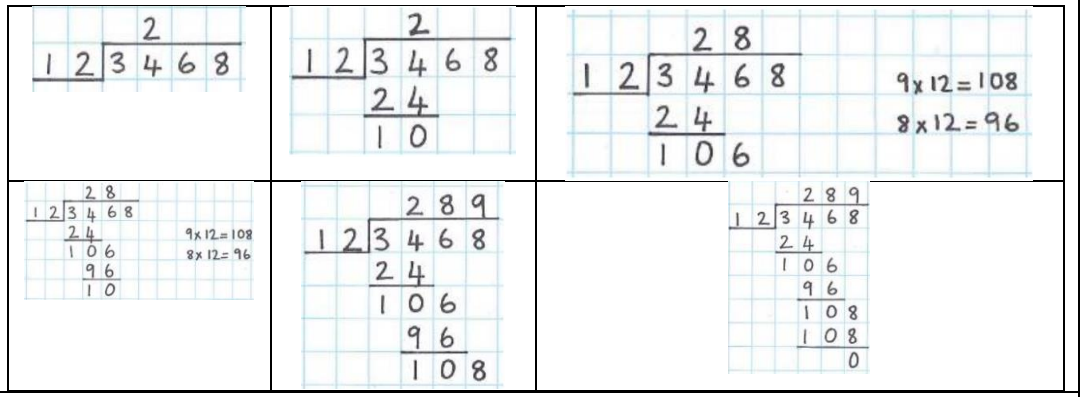
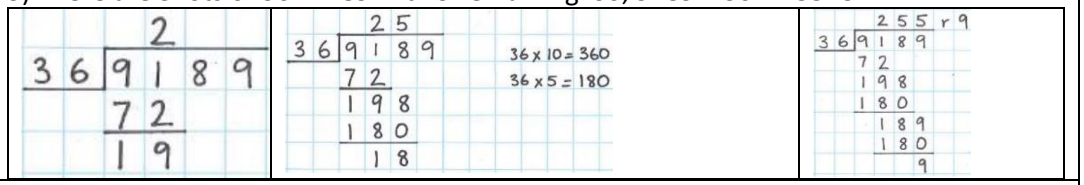
<table>
<tr>
<td>solve subtraction multi-step problems in contexts, deciding which operations and methods to use.</td>
<td>Use counters on a place value grid to represent subtractions of larger numbers.
 
</td>
<td>Compare subtraction methods alongside place value representations.
 

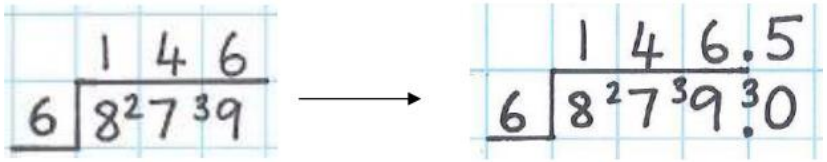
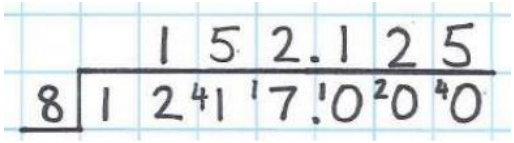
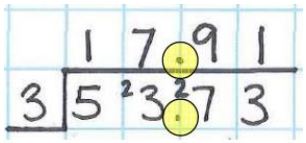
Use a bar model to represent calculations, including ‘find the difference’ with two bars as comparison.
 
</td>
<td>Compare and select methods. Use column subtraction when mental methods are not efficient. Use two different methods for one calculation as a checking strategy.
 

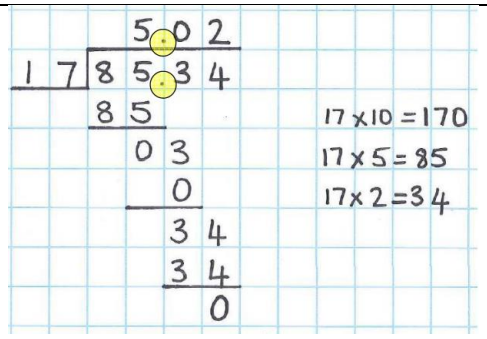
Ensure children have experience of adding decimals with a variety of decimal places. This includes money and measures.
 
</td>
</tr>
<tr>
<td>Year 6 addition and subtraction vocabulary</td>
<td colspan="3">addition add, more, and make, sum, total altogether double near double half, halve one more, two more … ten more … one hundred more how many more to make …? how many more is … than …? how much more is …? subtract take away how many are left/left over? how many have gone? one less, two less, ten less … one hundred less how many fewer is … than …? how much less is …? difference between equals is the same as number bonds/pairs/facts missing number tens boundary, hundreds boundary, ones boundary, tenths boundary inverse</td>
</tr>
<tr>
<td>Year 6 multiplication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform mental calculations, including those with mixed operations and large numbers</td>
<td></td>
<td colspan="2">Children should be able to draw upon several different mental strategies to help them solve some calculations in their head.
<table>
<tr>
<td>To multiply by 4: Double and then double again.</td>
<td>To multiply by 5: Multiply by 10 and then halve.</td>
<td>To multiply by 20: Multiply by 10 and then double.</td>
<td>To multiply by 9: Multiply by 10 and then adjust.</td>
<td>To multiply by 6: Multiply by 3 and then double.</td>
</tr>
</table>
As well as knowing the square numbers up to 12 x 12, children are also expected to derive the corresponding squares of multiples of 10: e.g. 8 x 8 = 64 so... 80 x 80 = 6400</td>
</tr>
</table>

		The strategy of rounding should also be used to help make sensible approximations when multiplying or dividing decimal numbers: 3.6 x 18.2 becomes 4 x 18 = 72	
Identify common factors, common multiples and prime numbers.	As per the Year 4 and 5 calculation policy.		
Use their knowledge of the order of operations to carry out calculations involving the four operations.		Children are encouraged to use the acronym BODMAS to help them remember. **B** brackets **O** orders - squared, cubed, square root **DM** division and multiplication **AS** addition and subtraction	6 x 9 + 4 = ? 54 + 4 = 58
multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	Use equipment to explore multiplications.  $234 \times 32 = 7{,}488$	Use an area model alongside written multiplication.  × | 200 | 30 | 4 30 | 6,000 | 900 | 120 2 | 400 | 60 | 8	
Multiply one-digit numbers with up to two decimal places by whole numbers	Explore decimal multiplications using place value equipment and in the context of measures. 	The grid method can be used to build confidence first if necessary.	When multiplying a decimal number, it is important to place the decimal point on the answer line before doing anything else. Short multiplication should then be used to complete the rest.

	3 groups of 4 tenths is 12 tenths. *4 groups of 3 tenths is 12 tenths.*  *4 × 1 cm = 4 cm* *4 × 0·3 cm = 1.2 cm* *4 × 1·3 = 4 + 1·2 = 5·2 cm*	 	 Long multiplication can used to multiply a decimal number by a two-digit whole number. Again, the decimal point should be placed on the answer line first. 
Year 6 division			
Dividing by a single digit.	Use equipment to make groups from a total.  *There are 78 in total.* *There are 6 groups of 13.* *There are 13 groups of 6.*	 	Use short division to divide by a single digit. 
Divide numbers with up to four digits by a two-digit whole	Use equipment to build numbers from groups.	1) How many 12s are there in 3? Since 3 is smaller than 12, there are no 12s in 3. 2) So how many 12s are there in 34? We can work out that there are 2 lots of 12 in 34. We write this number above the 4.	

number using the formal written method of long division.	 *182 divided into groups of 13.* *There are 14 groups.*	3) We then need to write down the exact amount that 2 x 12 comes to underneath the 34, so that we can see how many are left. 34 - 24 = 10. 4) Bringing down the next digit, we now need to find out how many 12s there are in 106. Separate jottings on the side may be helpful. The answer of 8 is written above the 6. 5) Having established that there are 8 lots of 12 in 106, we need to work out how many we have left over. 8 x 12 = 96, leaving a remainder of 10. 6) Again, we bring down the next digit in the question (8). Now we have to calculate how many 12s there are in 108. The answer of 9 is written above the 8. 7) 12 x 9 = 108 which leaves us with no remainders. So, 3468 ÷ 12 = 289 
With a remainder		9189 ÷ 36 = ? 1) There are 2 lots of 36 in 91, with 19 left over. 2) There are 5 lots of 36 in 198, with 18 left over 3) There are 5 lots of 36 in 189 with 9 remaining. So, 9189 ÷ 36 = 255 r9 
Interpret remainders as whole number remainders, fractions or by rounding, as		Children should understand how to turn a remainder into a fraction or decimal. In this example... 19 ÷ 6 = 3 r1 ...the remainder can be turned into a fraction by continuing to divide it by 6. 19 ÷ 6 = 3 1/6

appropriate for the context.		For some examples, the fraction can be simplified.: 26 ÷ 4 = 6 r2 26 ÷ 4 = 6 2/4 26 ÷ 4 = 6 1/2 Children can also express a remainder as a decimal. When using either short or long multiplication, by adding a decimal point and a zero to the number being divided, we are able to carry on the calculation.  They must also remember to add a decimal point to the answer line, in the same position as the one in the question. It might be that the children will be presented with an example where they need to add more than one zero on to the number being divided.  Examples where the numbers after the decimal point carry on indefinitely should not be given to the children at this stage.
Decimal numbers		Short and long division can be used to divide decimal numbers as well; children simply need to remember to put the decimal point in the same position on the answer line as it is in the question.  53.73 ÷ 3 = 17.91

		85.34 ÷ 17 = 5.02 
Year 6 multiplication and division vocabulary	multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times … ten times repeated addition division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each … ten each group in pairs, threes … tens equal groups of doubling halving array row, column number patterns multiplication table multiplication fact, division fact inverse square, squared cube, cubed	