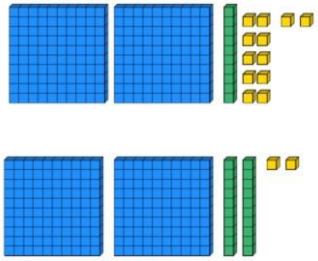
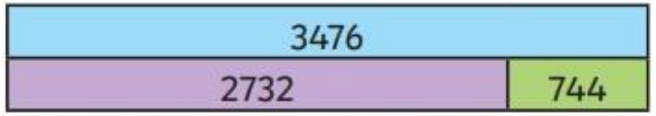
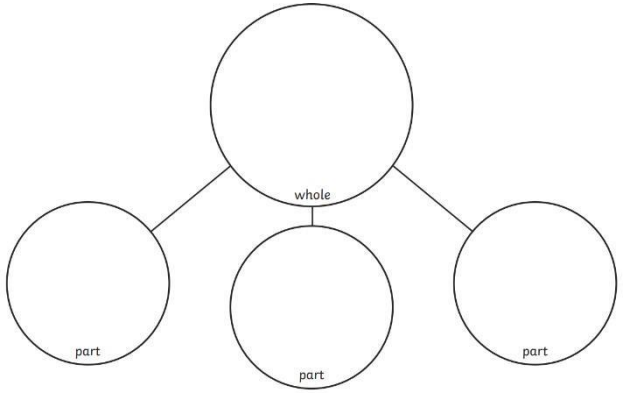
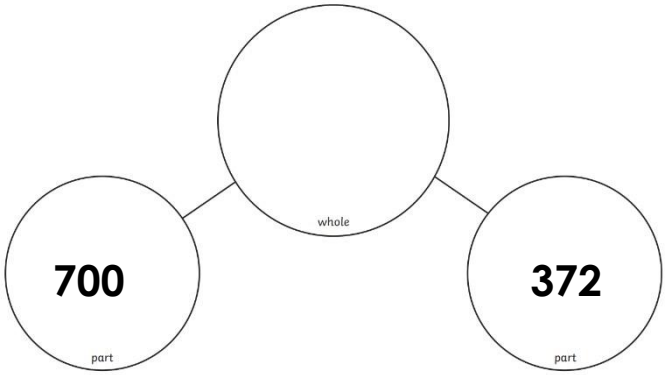
Year 4: Addition

Vocabulary: add, make, altogether, sum, and, plus, total, more than, greater than, combined, **increased**

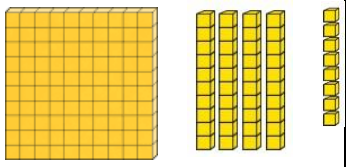
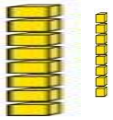
Strategy	Concrete	Pictorial	Abstract
Column addition (compact) with and without regrouping /exchanging (**four digit + four digit).**	**Without regrouping:** Use dienes apparatus to physically add thousands, hundreds, tens and ones. **With regrouping: 119 + 103 = 222** Physically exchange ten ones for a ten, ten tens for a hundred and ten hundreds for a thousand. 	**Without regrouping:** Draw dienes apparatus and add ones first, then add tens, then add hundreds and finally add thousands. **With regrouping:** Draw dienes apparatus and **to add from the right to the left, beginning with the ones as with compact column addition.** When exchanging, cross out and regroup e.g. Cross out ten ones and add the extra ten into the tens column.	**Without regrouping/exchanging:** 5162 +3427 8589 **With one regroup/** 5162 +3497 8659 1 **With multiple exchange:** 5864 +3497 9361 11 1 **regroup/exchanges:** Work from the right to the left, beginning with the ones. When exchanges take place, they should be recorded beneath the calculation.

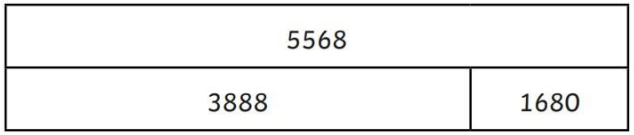
Using the inverse to check calculations.	Use practical apparatus such as counters, dienes apparatus, cubes etc. to form addition number sentences and then the related addition sentence using the commutative law and the related subtraction number sentences.	Use pictorial models including bar models and part, whole models to show the inverse operation and the related number sentences. **3476 – 744 = 2732**  3476 – 744 = 2732 can be checked using 2732 + 744 = 3476	Use formal methods for column addition and subtraction to demonstrate the inverse operation (including checking answers and calculating missing numbers). **5162 + 3497 = 8659 3497 + 5162 = 8659** **8659 – 3497 = 5162 8659 – 5162 = 3497** 
Changing the order of numbers through identifying number bonds to check calculations.	Practical apparatus such as counters, dienes apparatus, cubes etc. can be used to form addition number sentences and physically manipulated to demonstrate known number facts e.g. 60 + 40 = 100 and the commutative law (numbers can be added in any order to get the total sum).	Use pictoral models including bar models and part, whole models to demonstrate known number bonds. **420 + 372 + 280 =** 	Identify useful number bonds in order to rewrite a number sentence and recalculate to check answer. **420 + 372 + 280 =** **Change to 420 + 280 + 372 as 420 + 280 = 700** **(because 42 + 28 = 70 (number bond))**

		420 **280** **372**  	**420 + 280 + 372 = 700 + 372 = 1072**

Year 4: Subtraction

Vocabulary: minus, take away, difference, less than, less, leave, left, left over, fewer, subtract, minus, difference between, distance between, subtraction **decreased**

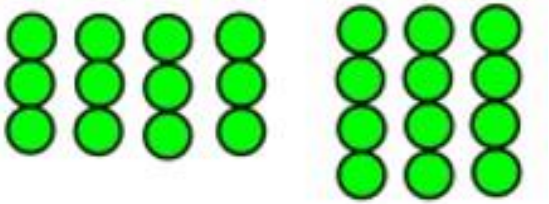
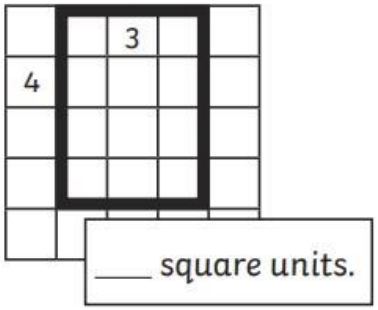
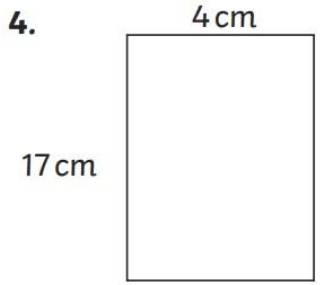
Strategy	Concrete	Pictorial	Abstract
Compact column subtraction with and without exchanging (**up to four digits).**	**Without exchanging:** **148 – 17 =** Physically take away the ones, then the tens and then the hundreds.  **With exchanging:** **32 – 7 =** Make the largest number using dienes apparatus. Physically take away the ones, then the tens and finally the hundreds. If there are not enough ones, exchange one ten for ten units. If there are not enough tens, exchange one hundred for ten tens.	**Without exchanging:** Draw the largest numbers. Cross out the ones being taken away, followed by the tens and then the hundreds. **With exchanging:** **47 – 19 =** Draw the largest numbers.  If there are not enough ones, exchange one ten for ten units. If there are not enough tens, exchange one hundred for ten tens. Cross out the ones being taken away followed by the tens and the units. 	**Without exchanging:** 5789 - 3421 2368 **With one exchange:** 6 1 5749 - 3471 2278 **With multiple exchange:** 6 13 1 5742 - 3476 2266

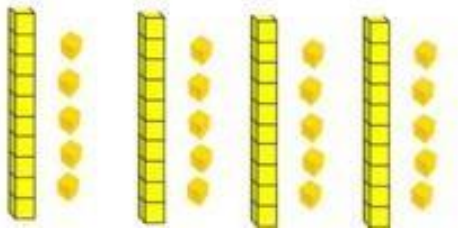
Finding the difference.	Use practical apparatus to show the difference between two numbers. Equipment such as multilink, which is equal in size and can be lined up exactly, demonstrates this concept.	Use bar models to show finding the difference between two numbers. What is the difference between 5568 and 3888? 	**Number Sentence:** What is the difference between 1216 and 504? **1216 – 504 =**

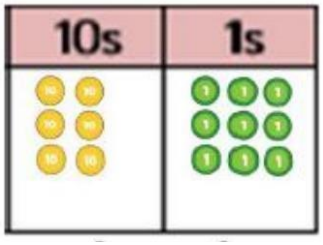
Year 4: Multiplication

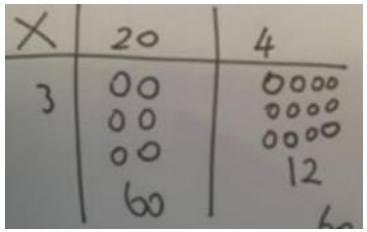
Vocabulary: double, groups, lot, grouping, array, twos, tens, fives, times, multiply, multiplied by, two times table, ten times table, five times table, multiple of, once, twice, three times, five times, ten times, time as, repeated addition, row, column, sets, product, **six times table, seven times tables, nine times table, eleven times table, twelve times table, short multiplication**

Timetables Progression: 2s to 12s

Strategy	Concrete	Pictorial	Abstract
Use of arrays to show commutativity)	Create arrays using counters/cubes to show multiplication. **4 x 10 =** 	Draw arrays to show multiplication. Arrays should be created in different rotations to demonstrate the commutative law.  **Calculating area:** Use squares to create arrays when calculating the area of rectangles. 	**Number Sentence:** **4 x 3 = 12** **3 x 4 = 12** **Calculating area:** Calculate the area of this rectangle. **4 x 17 =** 

<table>
<tr>
<td>Expanded method of short multiplication (three digit by one digit)</td>
<td>Use dienes apparatus to make groups.
Combine units and tens.
Add together to find the total.
 
4 x 15 =
4 x 10 = 40
4 x 5 = 20
40 + 20 = 60

Use counters to represent value of digits to multiply in a place value grid.
Recombine tens and ones.
 

23 x 3 =
20 x 3 = 60
3 x 3 = 9
60 + 9 = 69</td>
<td rowspan="2">Draw dienes apparatus or counters to represent place value of digits in columns.
24 x 3 =
60 + 12 = 72
 
</td>
<td>Expanded Method of Short Multiplication:
<table>
<tr><th>Th</th><th>H</th><th>T</th><th>O</th><th></th></tr>
<tr><td></td><td>5</td><td>4</td><td>3</td><td></td></tr>
<tr><td>×</td><td></td><td></td><td>4</td><td></td></tr>
<tr><td></td><td></td><td>1</td><td>2</td><td>(4 × 3)</td></tr>
<tr><td></td><td>1</td><td>6</td><td>0</td><td>(4 × 40)</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>0</td><td>(4 × 500)</td></tr>
<tr><td>2</td><td>1</td><td>7</td><td>2</td><td></td></tr>
</table>
Multiply from the right to the left (ones, tens and then hundreds). When exchanges take place, they should be recorded beneath the calculation.</td>
</tr>
<tr>
<td>Short multiplication (three digit by one digit).</td>
<td>Short Multiplication:
<table>
<tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>5</td><td>4</td><td>3</td></tr>
<tr><td>×</td><td></td><td></td><td>4</td></tr>
<tr><td>2</td><td>1</td><td>7</td><td>2</td></tr>
<tr><td></td><td>1</td><td>1</td><td></td></tr>
</table>
Multiply from the right to the left (ones, tens and then hundreds). When exchanges take place, they should be recorded beneath the calculation.</td>
</tr>
</table>

Year 4: Division

Vocabulary: half, halve, pair, share equally, equal groups, grouping, sharing, repeated subtraction, arrays, column, row, one each, two each, three each, group in pairs, group in tens, group in fives, equal groups of, divide, divided, divided by, divided into, **remainder, divide by 10**

Timetables Progression: 2s – 12s

Strategy	Concrete	Pictorial	Abstract

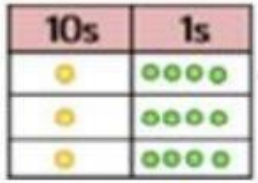
Short Division

Y3: Use short division to divide two digit numbers by one digit numbers.

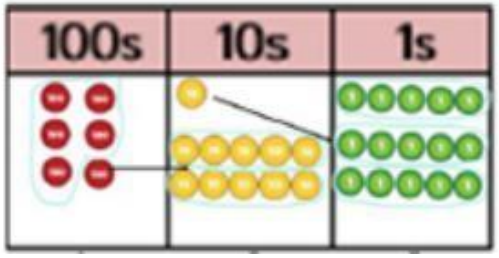
Y4: Use short division to divide three digit numbers by one digit numbers

Place value grids can also be used to support sharing larger quantities. One ten may need to be exchanged for ten ones.

42 ÷ 3 = 14



615 ÷ 5 = 123

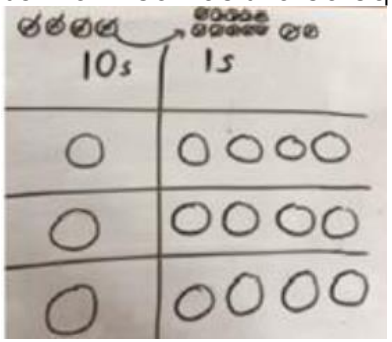


Make 615 with place value counters. How many groups of 5 hundreds can you make with 6 hundred counters?
Exchange 1 hundred for 10 tens.
How many groups of 5 tens can you make with 11 counters?
Exchange 1 ten for 10 ones.
How many groups of 5 ones can you make with 15 ones?

Place Value Grid:

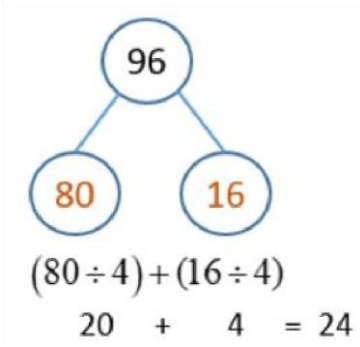
42 ÷ 3 = 14

Draw total amount (4 tens and 2 ones).
Divide into 3 equal groups.
Cross out counters as they are shared.
Where a ten cannot be shared equally, exchange for ten ones so that it can be shared equally.



Part-Whole Model:

96 ÷ 4 = 24



Number Sentence:

	2	1
4	8	4

Without carrying:

How many 4's in 8 (tens)?
How many 4's in 4 (ones)?

With carrying:

	1	5
3	4	$^{1}5$

How many 3's in 4(tens)?
Exchange the remaining ten.
How many 3's in 15?