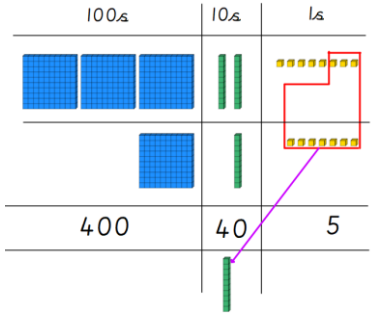
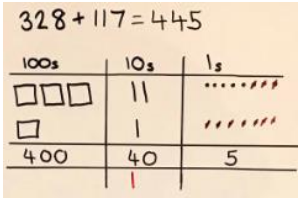
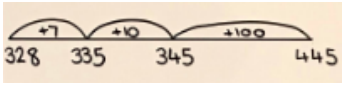
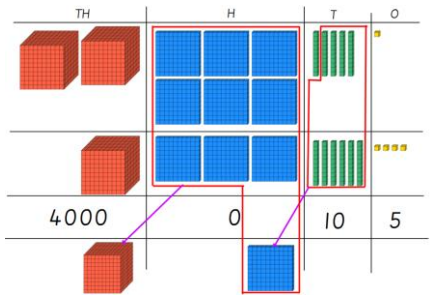
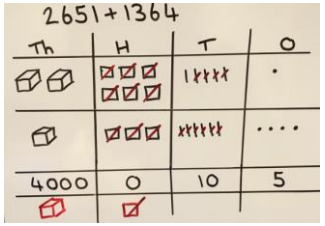
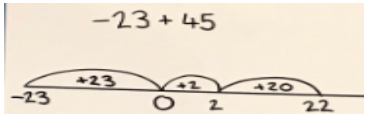
Taverham Junior School Calculation Policy

Calculation Policy Aims

- To ensure consistency in layout and teaching across Taverham Junior School and allow children to build on previous learning.
- Each of the 4 operations must build on a solid understanding of place value, number sense and the connections between the four operations.
- Children must use the correct mathematical language and terminology and be able to talk through their calculations verbally.
- Children should also be taught to use the most appropriate and efficient method for a particular calculation, always considering mental methods and using known facts before attempting any formal calculation.
- The Calculation policy is centred on teaching using a CPA (concrete, pictorial, abstract) approach. Children should always start by using concrete resources as the use of manipulatives helps them understand number and how the operations work. The CPA approach needs to be available to all children throughout the school and should only be taught formal methods once they have mastered each stage.
- Previous stages may need to be revisited for some children to consolidate their understanding when introducing a new strategy. As new methods are taught, children should have the chance to make connections between methods and establish their similarities and differences.
- Use of bar models and numbers lines are recommended to be taught alongside all methods at every stage.

This policy includes sections on Addition, Subtraction, Multiplication, Division and Fractions. It outlines the progression in teaching and the concrete, pictorial and abstract models that must be covered in each year group.

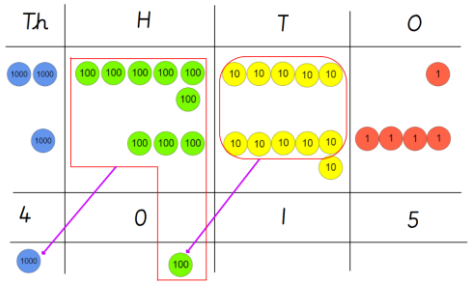
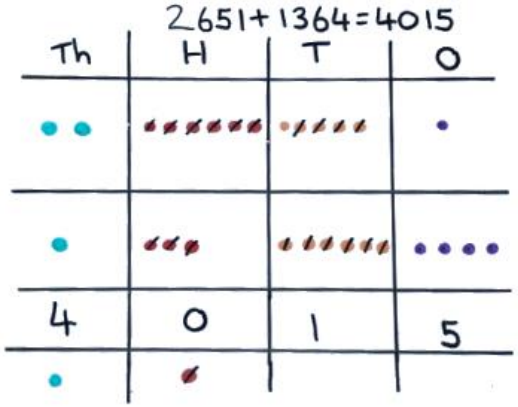
Addition

Year	Concrete	Pictorial	Abstract
3	328 + 117 = 445 	 	300 + 20 + 8 + 100 + 10 + 7 400 + 40 + 5 = 445 10
4	2651 + 1364 = 4015 	 Number lines should still be taught when appropriate 	2000 + 600 + 50 + 1 + 1000 + 300 + 60 + 4 4000 + 0 + 10 + 5 = 4015 1000 100 Th H T O 2 6 5 1 + 1 3 6 4 4 0 1 5 1 1

- One-digit addition to be done mentally or if necessary using bead string or cubes/counters.
- Pupils must have an understanding of place value (HTO) before moving on to 2 and 3-digit addition.
- Always start with ones first and regroup underneath the total.
- CPA approach to be used as often as possible.
- Also, to be taught- mental strategies, number bonds, inverse, and missing numbers.

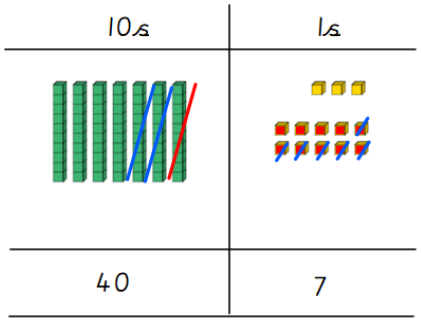
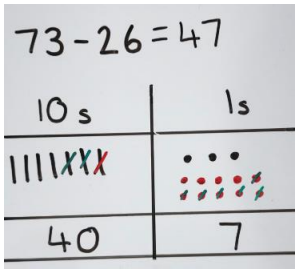
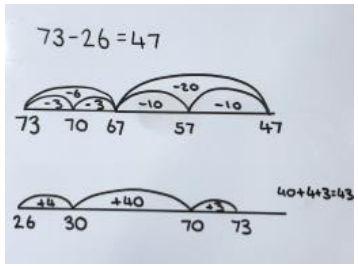
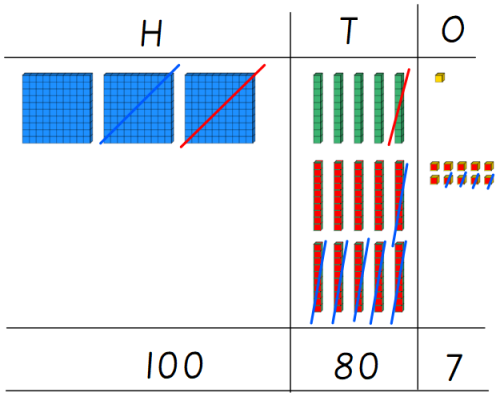
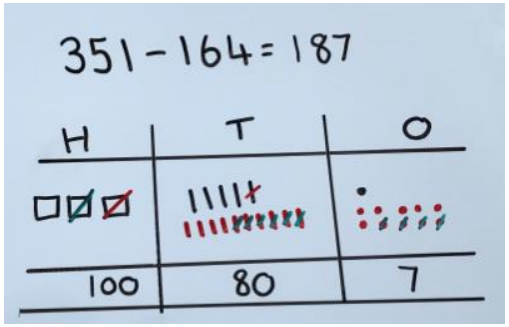
Bar models are to be incorporated into the teaching of calculations when possible so children can begin to understand the relationships between addition and subtraction.

?	
117	328

5			2 6 5 1 + 1 3 6 4 4 0 1 5 1 1
6	Continue work using previously taught methods.		

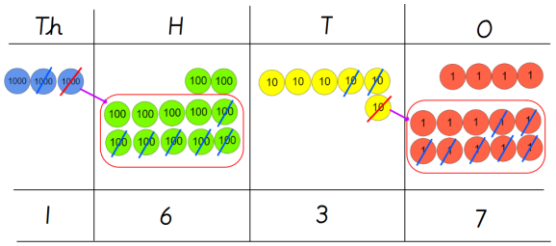
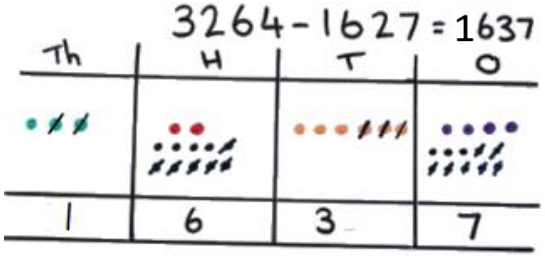
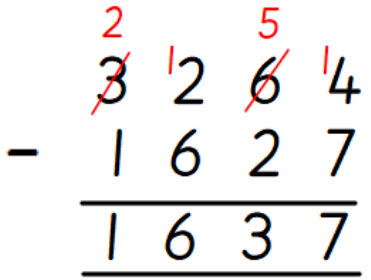
- Concrete and pictorial to move from base 10 to place value counters.
- Abstract to move from expanded column to compact column.
- Children to have the option of using different colours for pictorial.
- Always start with the lowest place value and regroup underneath the total.
- CPA approach to be used as often as possible.
- Also, to be taught- rounding to check answers, multi-step problems, and deciding which operations and methods to use and why.
- Continue to use bar models alongside formal calculations.

Subtraction

Year	Concrete	Pictorial	Abstract
3	73 - 26 = 47 	 	60 70 + 13 - 20 + 6 40 + 7
4	351 - 164 = 187 		200 140 300 + 50 + 11 - 100 + 60 + 4 100 + 80 + 7 H T O 2 14 11 3 5 1 - 1 6 4 1 8 7

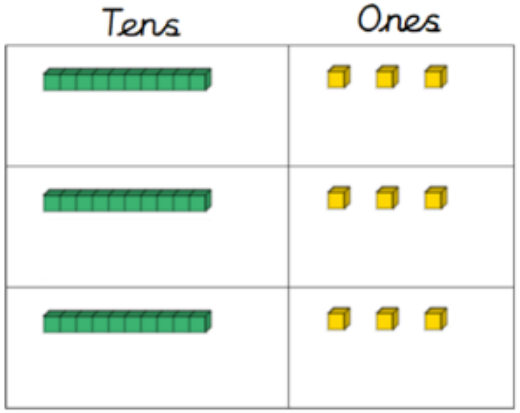
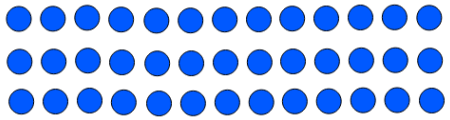
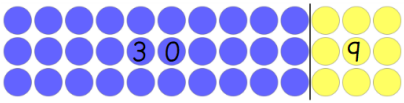
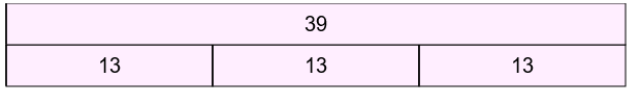
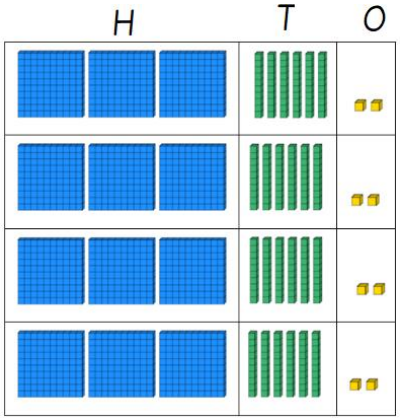
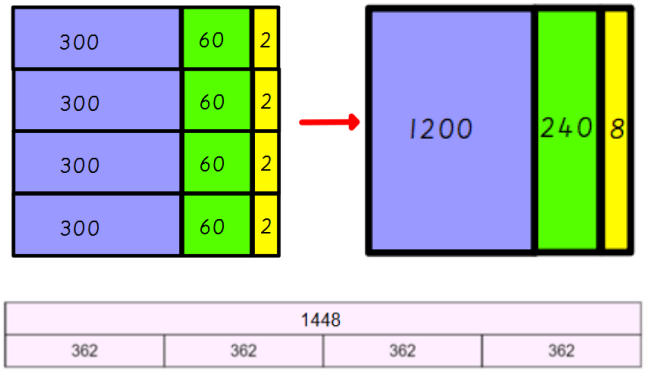
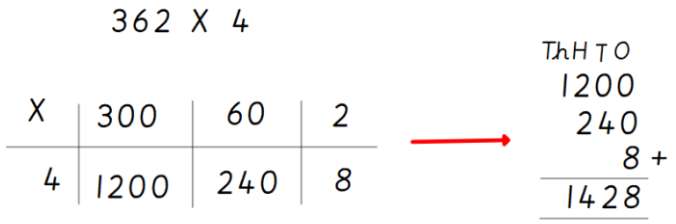
- Children to use the term regrouping when using subtraction.
- Bar models to be incorporated into the teaching of calculations when possible so children can begin to understand the relationships between addition and subtraction.

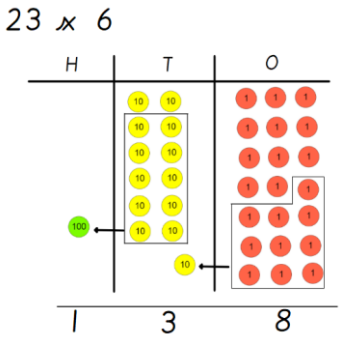
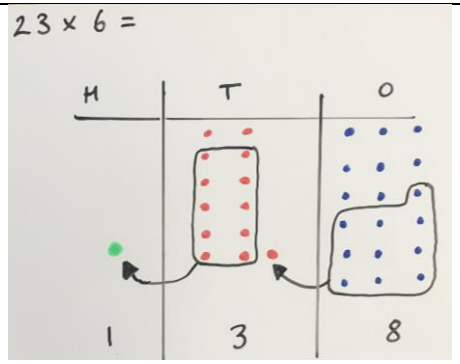
73	
26	?

5			
6	Continue work using a formal addition method.		

- Concrete and pictorial to move from base 10 to place value counters.
- Abstract to move from expanded column to compact column.
- Children to have the option of using different colours for pictorial.
- Always start with the lowest place value and regroup as shown above.
- CPA approach to be used as often as possible.
- Also to be taught- rounding to check answers, multi-step problems, and deciding which operations and methods to use and why.
- Continue to use bar models alongside formal calculations.

Multiplication

Year	Concrete	Pictorial	Abstract
3	13 x 3 = 39 	13 x 3 = 39  If I know 10 x 3 = 30 then… 	13 x 3 = 10 X 3 + 3 X 3 X | **10** | **3** **3** | 30 | 9 
4	362 x 4 	362 x 4 =1448 	362 x 4 = 1448  *(Children should start with ones as this will help them progress to year 5 and 6 methods)*

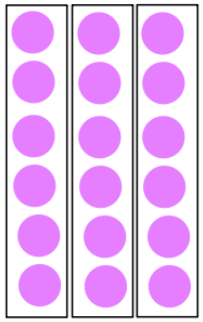
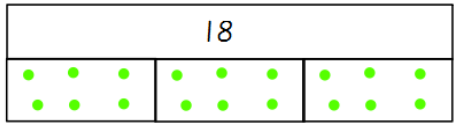
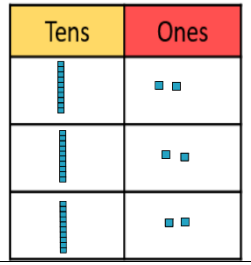
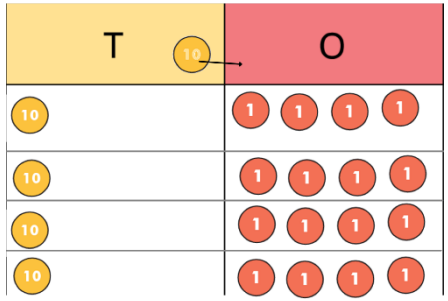
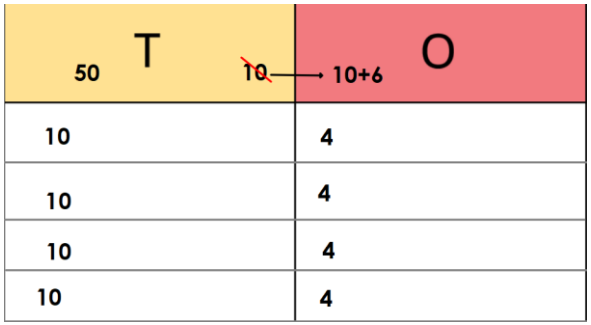
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<td>
</td>
<td>
</td>
<td>3 6 2 5
x 6
3 0 (6 x 5)
1 2 0 (6 x 20)
3 6 0 0 (6 x 600)
+ 1 8 0 0 0 (6 x 3000)
2 1 7 5 0

(Children should start with ones as this will help them progress to year 6 methods)</td>
</tr>
<tr>
<td>6</td>
<td colspan="2">Children must be confident with the abstract method from year 5 before moving on to a compact method or attempting multiplications such as 4-digit x 2-digit or 3-digit x 3-digit.</td>
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x 2 6
2 1 7 5 0
7 2 5 0 0
9 4 2 5 0</td>
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<td colspan="4">

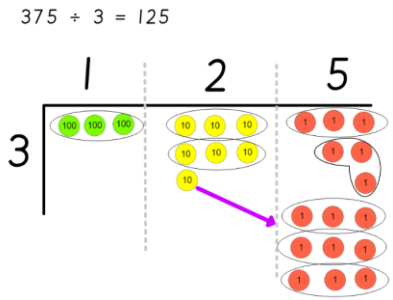
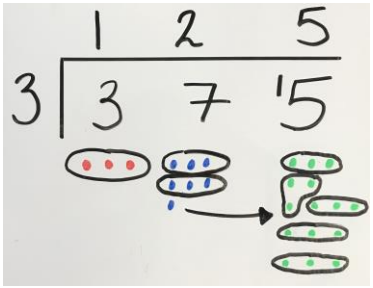
When using arrays, children should also illustrate commutativity.
For example, 6 x 3 = 18 and 3 x 6 = 18
In years 4 and 5 children should use known facts to help. If I know that 4 x 6 = 24 then 4 x 60 is ten times bigger so… 4 x 60 =240
When using a grid method, the distributive law that 36 x 6 can be partitioned down into 30 x 6 + 6 x 6 should also be taught.
Always begin with the lowest place value
All regrouping to be done underneath the number.

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Division

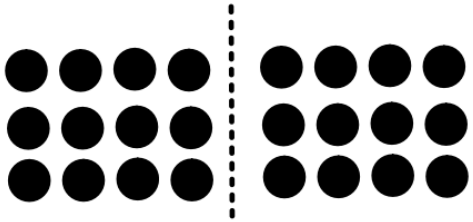
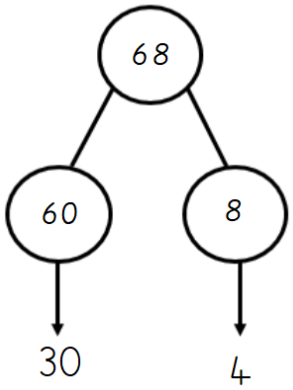
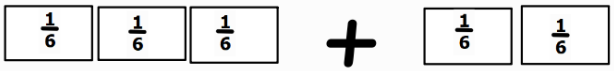
Year	Concrete	Pictorial	Abstract
3	18 ÷ 3 = 6 	18 ÷ 3 = 6  36 ÷ 3 = 12  	18 ÷ 3 = 6 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
4	56 ÷ 4 = 14 Children to use place value counters to start sharing/grouping divisions using a place value grid by drawing on their knowledge of times tables and division facts. 40 ÷ 4 = 10 16 ÷ 4 = 4	 	56 ÷ 4 = 14 

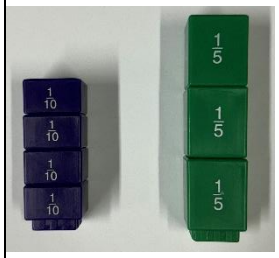
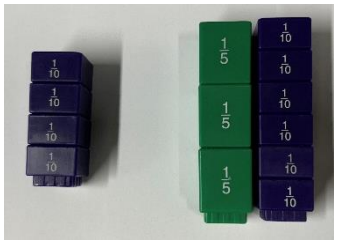
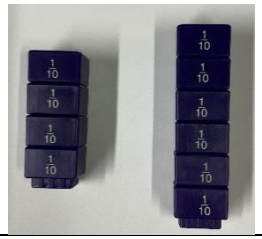
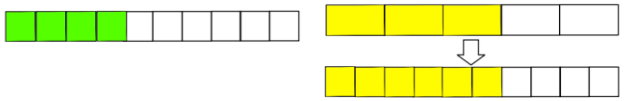
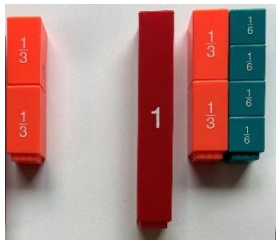
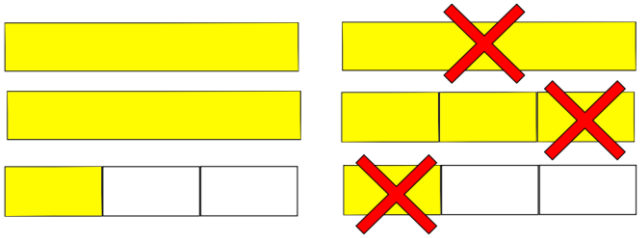
- In year 3 children must learn to share before moving on to the idea of grouping.
- Year 4 children should use known multiplication and division facts to use a method of grouping and partitioning numbers and only move on to a formal method when they are confident with these processes. For example, if I know 32 ÷ 4 = 8 children should use apply this knowledge to solve 320 ÷ 4.

5			1 2 0 6 6 7 1 2 3 3 6
6	As above	2 9 24 6 9 6 - 4 8 2 1 6	20 X table + 4 X table = 24 X table 20 + 4 = 24 40 + 8 = 48 60 + 12 = 72 80 + 16 = 96 100 + 20 = 120 120 + 24 = 144 140 + 28 = 148 160 + 32 = 192 180 + 36 = 216 200 + 40 = 240

- Multiplication and division facts should be written and practised in all year groups.
- When moving to a formal method, children will start to use grouping and must be secure with the understanding of commutativity.
- Division and multiplication should be taught alongside each other with children using inverse methods to check their answers.

Fractions

Year	Concrete	Pictorial	Abstract
3	$\frac{1}{2}$ of 24 	$\frac{1}{2}$ of 68 	$\frac{1}{7} + \frac{2}{7} = \frac{3}{7}$ 
4	$\frac{3}{6} + \frac{2}{6}$ 	$\frac{3}{6} + \frac{2}{6}$ 	$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$ Add the numerator Denominator stays the same

5	$\frac{4}{10}+\frac{3}{5}$   	$\frac{4}{10}+\frac{3}{5}=\frac{10}{10}=1$ 	$\frac{4}{10}+\frac{3}{5}$ $\times 2$ $\frac{4}{10}+\frac{6}{10}$ $\times 2$ $=\frac{10}{10}=1$
6	$2\frac{1}{3}-1\frac{4}{6}$   	$2\frac{1}{3}-1\frac{4}{6}$ 	$2\frac{1}{3}-1$ $\div 2$ $\frac{4}{6}$ $\div 2$ $2\frac{1}{3}-1\frac{2}{3}$ $1\,\cancel{2}\,\frac{4}{3}-1\frac{2}{3}=\frac{2}{3}$