Calculation Policy

January 2019

Approved by GB: January 2019

Next review due: January 2022

Purpose and Aims

The key aim of this policy is to develop calculation across KS2, basing all learning on understanding, never on processes. Children are supported to record what they understand. It has been written to ensure consistency and progression throughout the school. It is not intended as a straightjacket, nor is it a scheme of work. It recognises that children will develop their mathematical skills at different rates and have their own individual learning styles. They will develop calculation skills through a combination of practical, oral and mental activities. Although the focus of this policy is on pencil and paper procedures, it is important to recognise that in every written method there is an element of mental processing. Written calculation strategies will therefore be taught alongside mental calculation strategies and should be seen as complementary to and not as separate from them.

It should also be noted that:

- Children will be given strategies and methods which ensure that they have the correct knowledge of the steps which need to be taken to ensure calculation is accurate.
- Children should be given appropriate opportunities to practice these strategies using both pen and paper procedure on a weekly basis
- They should be encouraged to use 'Times Table Rockstars' (an online resource to learn times table facts) as part of their home study to strengthen these strategies

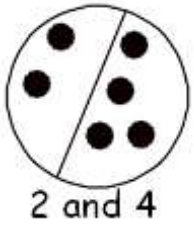
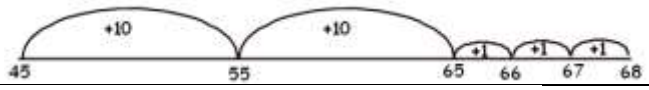
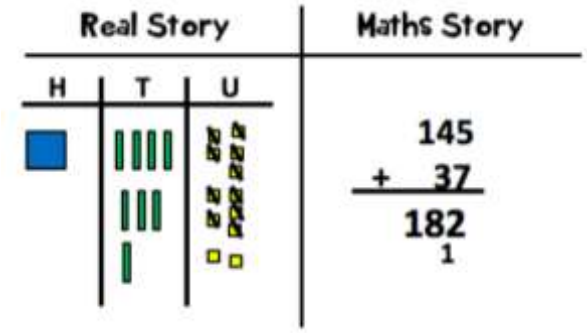
Informal written recording will take place regularly and is an important part of learning and understanding. More formal written methods follow only when the child is able to use a wide range of mental calculation strategies. The emphasis of our teaching will always be to facilitate understanding and not simply to arrive at a correct answer. It should also be noted that the intention is not for the child to reach the last step as quickly as possible, but to progress through the steps at their own pace, focusing on understanding and becoming fully comfortable with the method.

Our aim is for children to be able to select an efficient method of their choice (whether this be mental or written) that is appropriate for a given task and will help them to become increasingly **fluent**. They will do this by always asking themselves:

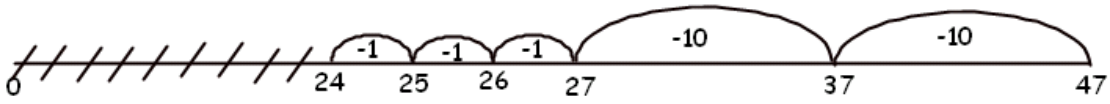
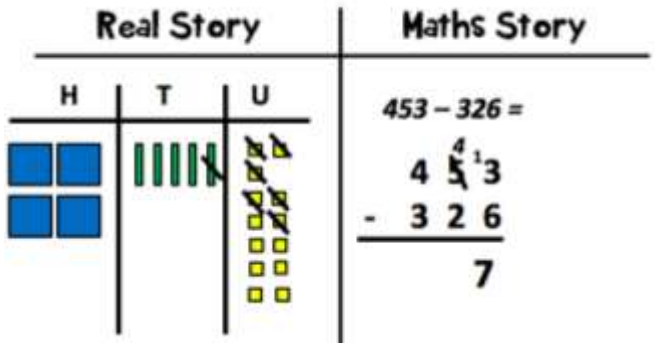
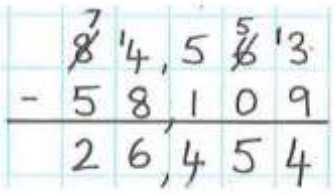
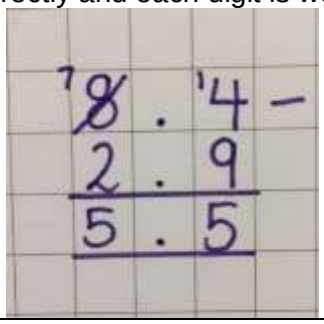
• 'Can I do this in my head?'
• 'Can I do this in my head using drawings or jottings?'
• 'Do I need to use a pencil and paper procedure?'

The policy reflects the views of all the staff of the school. It has been drawn up following consultation with staff and has full agreement of the Governing Body and staff. All staff are fully aware of their role in its implementation. Staff have access to the Policy on the Teacher's Drive. Parents are also able to access a copy of the policy on the school website.

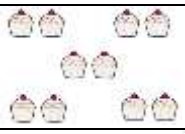
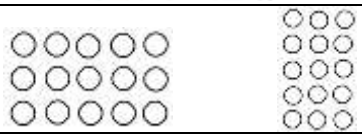
Addition

Step	Method	Example
Step 1	**Pre KS2:** Using pictures and counting totals.	2 + 4 = 6 
Step 2	**Pre KS2:** Using number lines and making jumps of tens and ones (progressing to unmarked number lines).	45 + 23 = 68 
Step 4	**Exp. year 3:** Using dienes to exchange and regroup ones, tens and hundreds	 **Refer to: http://www.churchfieldsjunior.com/addition-1/**
Step 5	**Exp. year 3:** Using partitioning.	45 + 23 = 5+3 = 8 40+20 = 60 60 + 8 = 68
Step 6	**Exp. year 4:** Using a vertical method of expanded notation.	45 + 23 = 45 +23 8 60 68
Step 7	**Exp. year 5 & 6** Using a traditional vertical method involving 'carrying' (progressing on to numbers including decimals). 'Ones' 'tens' or 'hundreds' should be always be recorded 'below' the appropriate column when 'carrying'	123 + 48 = 123 + 48 171 1

Subtraction

Step	Method	Example
Step 1	**Pre KS2:** Using pictures	8 – 2 = 6 
Step 2	**Pre KS2:** Using number lines and making jumps back in tens and units (progressing to unmarked number lines)	47 – 23 = 24 
Step 4	**Exp. year 3:** Using dienes to exchange and regroup ones, tens and hundreds	 Refer to : http://churchfieldsjunior.com/subtraction-2/
Step 5	**Exp. year 4:** Using a traditional column method and exchanging 'ones' 'tens' and 'hundreds' should be carried at the 'top' of the appropriate column as shown	
Step 6	**Exp. year 5:** Using a traditional column method and exchanging (including decimals) 'ones' 'tens' and 'hundreds' should be carried at the 'top' of the appropriate column as shown	Children should ensure that place value is adhered to carefully to ensure that the decimal points are lined up correctly and each digit is worth the correct value. 
Step 7	**Exp. year 6:**	Children in Year 6 should continue to develop their mental and written calculation methods for addition and subtraction. They should progress to larger numbers and continue calculating with decimals, including those with different numbers of decimal places.

Multiplication

<table>
<tr><th>Step</th><th>Method</th><th>Example</th></tr>
<tr><td>Step 1</td><td>Pre KS2:
Using pictures to make groups of objects.</td><td>2 x 5 = 10
  </td></tr>
<tr><td>Step 2</td><td>Pre KS2:
Using arrays</td><td>3 x 5 = 15
  </td></tr>
<tr><td>Step 3</td><td>Exp. year 3:
Using the grid method for short and long multiplication</td><td>346 x 9
<table><tr><th>x</th><th>300</th><th>40</th><th>6</th></tr><tr><td>9</td><td>2700</td><td>360</td><td>54</td></tr></table>2700
360
54
+
3114
11

372 x 24
<table><tr><th>x</th><th>300</th><th>70</th><th>2</th></tr><tr><td>20</td><td>6000</td><td>1400</td><td>40</td></tr><tr><td>4</td><td>1200</td><td>280</td><td>8</td></tr></table>6000
1400
1200
280
40
8
+
8928
1</td></tr>
<tr><td>Step 4</td><td>Exp. year 4:
Using a vertical method of expanded notation for long multiplication

‘ones’ ‘tens’ and ‘hundreds’ should be carried at the bottom of the appropriate column as shown.

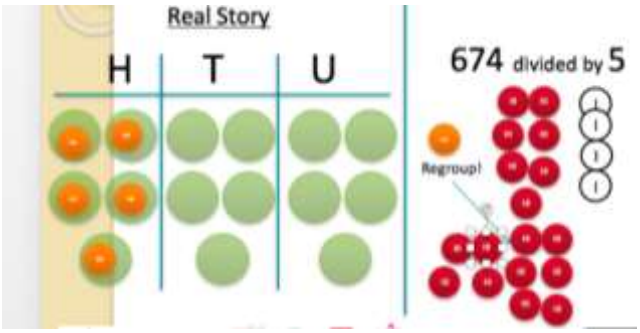
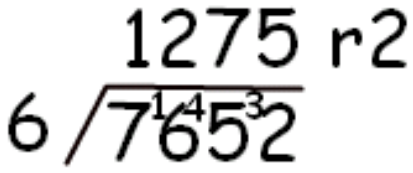
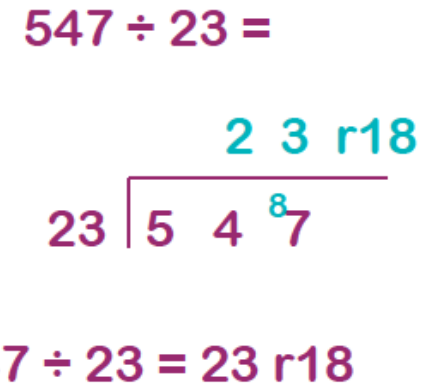
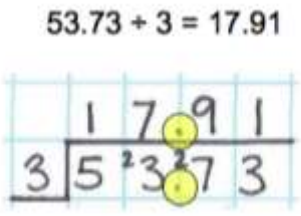
This is applicable across steps 4-6 of multiplication</td><td>378 x 4
378
x 4
32 (4 x 8)
280 (4 x 70)
1200 (4 x 300)
1512
1

429 x 57
429
x 57
63 (9 x 7)
140 (7 x 20)
2800 (7 x 400)
450 (50 x 9)
1000 (50 x 20)
20000 (50 x 400)
24453
11</td></tr>
<tr><td>Step 5</td><td>Exp. year 5:
Using a traditional vertical method for short multiplication</td><td>378 x 4
378
x 4
1512
33

429 x 57
429
x 57
3003
26
21450
14
24453</td></tr>
<tr><td>Step 6</td><td>Exp. year 6:
Adjusting place value to multiply decimal numbers</td><td>429 x 5.7 – multiply by 10 – 429 x 57
429
x 57
3003
26
21450
14
24453

24453 – divided by 10 = 2445.3</td></tr>
</table>

Division

Step	Method	Example
Step 1	**Pre KS2:** Using pictures to group objects.	12 ÷ 3 = 4 
Step 2	**Exp. year 3:** Using dienes to exchange and regroup ones, tens and hundreds with regrouping	 **Refer to: http://churchfieldsjunior.com/division-1/**
Step 3	**Exp. year 4** Compact 'bus stop' method.	7652 ÷6 = 1275 r2 
Step 4	**Exp. year 5** Compact 'bus stop' method two digit by up to 4 digit	
Step 5	**Exp. year 6** Division involving decimals.	Short division can be used to divide decimal numbers as well; children simply need to remember to put the decimal point in exactly the same position on the answer line as it is in the question.  Children should also recognise them in terms of proportion. 36 ÷ 1.2 is the same as 360 ÷ 12 = 30

Review

This policy is monitored by the Maths Subject Leader and the Senior Leadership Team through:

- Regular scrutiny of pupil's books;
- Regular monitoring of teaching plans;
- Lesson observations to monitor the quality of teaching and implementation of teaching plans;
- Discussion and feedback from staff;
- Pupil interviews.

This policy is reviewed by staff and governors at least once every two years and whenever Government policy changes. The next review is due by January 2022. Parents are most welcome to request copies of this document and comments are invited from anyone involved in the life of the school.