



Mathematics Calculation

Policy



| 1 | Summary | Calculation Policy | | | |
|----|--|--|----------|--|-------------------------|
| 2 | Responsible person | Stephanie Crawford/ Emily Mortimer | | | |
| 3 | Accountable SLT member | Stephanie Crawford/ Tracey Johnson | | | |
| 4 | Applies to | ☑ All staff □ Support staff □ Teaching staff | | | |
| 5 | Who has overseen development of this policy | Stephanie Crawford/ Emily Mortimer | | | |
| 6 | Who has been consulted and recommended policy for approval | Governors | | | |
| 7 | Approved by and date | Head of School September 2022 | | | |
| 8 | Version number | 2 | | | |
| 9 | Available on | Every | □Y □N | Trust website Academy website SharePoint | □Y □N □Y □N □Y □N |
| 10 | Related documents (if applicable) | | | | |
| 11 | Disseminated to | □Trustees/governors ⊠All staff □Support staff □Teaching staff | | | |
| 12 | Date of implementation (when shared) | September 2022 | | | |
| 13 | Consulted with recognised trade unions | | | | |



1. Introduction

1.1. This policy exemplifies a recommended progression through the four operations, beginning in Foundation Stage and carrying on to Year 6, including the appropriate steps from the White Rose curriculum.

2. Scope of the policy

2.1. Children should begin by using mental calculations and then will build up towards written calculations.

This policy outlines which methods should be used in which year group and runs directly in line with the sequence and planning progression laid out in the White Rose Maths curriculum documents,

Children are ready to take on written calculations in addition and subtraction when:

- Children know addition and subtraction facts to 20.
- They understand place value and can partition numbers into hundreds, tens and units.
- They use and apply commutative and associative laws of addition.
- They can add at least three 1-digit numbers mentally.
- They can add and subtract any pair of 2 digit numbers mentally.
- They can explain their mental strategies orally and can record those using informal jottings.
- Children are ready to take on written calculations in multiplication and division when:
- They know 2,3,4,5 and 10 times tables.
- They know the result of multiplying by 0 and 1
- They understand place value.
- They understand 0 as a place holder.
- Children can use their knowledge of tables to approximate.
- They can explain their mental strategies orally and record them using informal jottings.

By the end of year 6, children will have a range of calculation methods, mental and written.

3. Implementation of the policy

3.1. This policy will be used and followed within each Maths unit each term. The White Rose lesson structures, planning documents and work books out line which strategies will be used within each lesson and continue to progress throughout each year group. The new 3.0 scheme also addresses key teaching points from the previous year group to ensure any learning gaps are filled before moving onto a new skill.

4. Addition





















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Year 2/3

Children can also use a blank number line to count back to find the difference. Encourage them to jump to multiples of 10 to become more efficient.

From Year 3, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters.

As numbers become larger, straws become less efficient.

Year 3

Base 10 and place value counters are the most effective manipulative when subtracting numbers with up to 3 digits.

Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

Year 4

Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits.

Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

Year 5/6

Place value counters or plain counters on a place value grid are the most effective concrete resource



Subtract numbers with more than 4 digits





6. Timestables









using number shapes to support

9X- Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square. Look for patterns in the nine times table, using concrete manipulatives to support. Notice the pattern in the tens and ones using the hundred square to support as well as noting the odd, even pattern within the multiples

7X- Encourage daily counting in multiples both forwards and backwards, supported by a number line or a hundred square. The seven times table can be trickier to learn due to the lack of obvious pattern in the numbers, however they already know several facts due to commutativity. Children can still see the odd, even pattern in the multiples using number shapes to support.



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7. Multiplication

| Year 1/2 | 1 step problems using multiplication |
|------------------------|--------------------------------------|
| Children represent | |
| multiplication as | |
| repeated addition in | |
| many different ways. | |
| In Year 1, children | |
| use | |
| concrete and pictorial | |
| representations to | |







from resources when multiplying larger numbers. Year 5 When multiplying 4-digit numbers, place value counters are the best manipulative to use to

support children in their understanding of the formal written method. If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so children can focus on the use of the written method.

When multiplying a multi-digit number by 2-digits, use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the Base 10. The grid method matches the area model as an initial written method before moving on to the formal written multiplication method

Year 5/6

method.

Consider where

exchanged digits are placed and make sure this is consistent.

When multiplying 4-

digits by 2-digits, children should be



2,739 × 28 = 76,692

8. Division







the concrete representation.

Year 3/4

Exchanges- When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange one ten for ten ones. Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows. Flexible partitioning in a part-whole model supports this method.

Sharing- When dividing numbers with remainders, children can use Base 10 and place value counters to exchange one ten for ten ones. Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made. Flexible partitioning in a part-whole model supports this method.

Year 5

When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor.

Language is important here.

Children should consider 'How many groups of 4 tens can we make?' and 'How many groups of 4 ones can we make?'

Remainders can also be seen as they are left ungrouped.



Divide 2d by 1d- grouping





Year 4

Children can continue to use place value counters to share 3digit numbers into equal groups. Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. This method can also help to highlight remainders. Flexible partitioning in a part-whole model supports this method.

Year 5

3d by 1d-Children can continue to use grouping to support their understanding of short division when dividing a 3digit number by a 1-digit number. Place value counters or plain counters can be used on a place value grid to support this understanding. Children can also draw their own counters and group them through a more pictorial method.

4d by 1d- Place value counters or plain counters can be used on a place value grid to support children to divide 4-digits by 1-digit. Children can also draw their own counters and group them through a more pictorial method.

Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.

Divide 3d by 1d-sharing



Divide 3d by 1d- grouping



Divide 4d by 1d- grouping



8,532 ÷ 2 = 4,266



2d long division- When a remainder

is left at the end of a calculation,

Year 6

Short division- When children begin to divide up to 4- digits by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective. Children can write out multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be rounded as appropriate.

Multi digits- long

division- Children can also divide by 2-digit numbers using long division. Children can write out multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be rounded as appropriate.



Divide multi -digits by 2d- long division

