

Teaching and Learning Handbook Maths



September 2023

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Overview

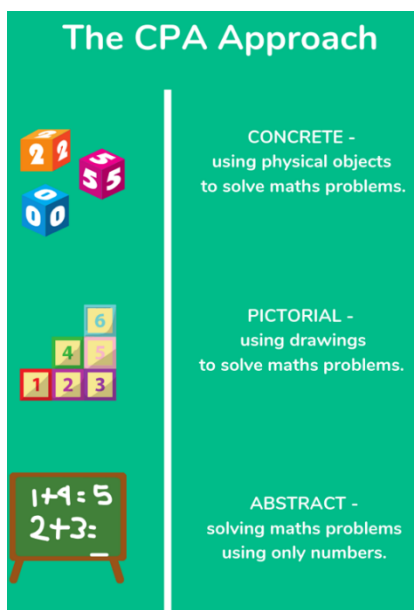
The national curriculum for mathematics aims to ensure that all pupils:

- ✓ become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- ✓ reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- ✓ can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

We believe:

All children can succeed in mathematics. We want every child to be ready to access the secondary curriculum by the time they leave Year 6. This means that they will be fluent in mathematics (have automaticity in key number facts); have good problem-solving and reasoning skills. They will achieve age-related expectations or greater depth where they are capable of achieving this.

The school's curriculum overview is based on the national curriculum and follows a mastery approach. This means that pupils should acquire a deep, long-term understanding of the maths that enables them to move onto more complex maths. Each learning journey encompasses previously learnt knowledge to highlight the relational nature of mathematics. We use White Rose Maths as our core learning resource- using their teaching slides and questions to ensure consistency across the school. White Rose Maths is structured into small steps that children need to master in order to progress onto more challenging lessons. Alongside this, we use Maths No Problem and NCETM resources to provide high-quality questions and materials to enable all children to access mathematical learning. Ready to Progress materials (RTP) materials are used with small groups to review, practise and consolidate learning.



Pupils are introduced to a new mathematical concept through the use of **concrete** resources (e.g. fruit, Dienes blocks, place value counters etc). When they are comfortable solving problems with physical aids, they are given problems with pictures – usually **pictorial representations** of the concrete objects they were using.

Then they are asked to solve problems where they only have the **abstract** i.e. numbers or other symbols.

Building these steps across lessons helps pupils better understand the relationship between numbers and the real world, and therefore helps secure their understanding of the mathematical concept they are learning.

Individual learning approaches are respected.

- ✓ Children will be provided with the necessary means to fully access appropriate learning as independently as possible.
- ✓ Students often develop efficient strategies of their own and will be encouraged to use these alongside the methods taught in school.

In developing key mathematical skills alongside fluency.

- ✓ Manipulating materials and drawing diagrams are essential mathematical skills and represent stages of learning which must be acquired before moving towards abstract written notation.
- ✓ Estimation is described by top mathematicians as the most important mathematical skill. Number flexibility and mental calculation strategies are essential for effective estimation and calculation (See Guided Maths Guidance).
- ✓ Other key skills are looking for patterns, making models, drawing pictures or diagrams, working with others, guessing, checking and improving, acting out the problem, producing lists and tables, working systematically, reasoning logically, trying simpler cases, working backwards...

PLANNING

LONG TERM PLANS – UPDATE TO V3

Long-term plans indicate when each topic is taught throughout the year, with core knowledge (Place Value and Number, Addition and Subtraction, Multiplication and Division, Fractions) given priority and revisited each year. The order of units is based on the White Rose Maths yearly overviews.

YEAR 3 OVERVIEW

AUTUMN	Number: Place Value 3 weeks	Number: Addition and subtraction 5 weeks		Number: Multiplication and division 4 weeks
SPRING	Number: Multiplication and division 3 weeks	Measurement: Money 1 week	Statistics 2 weeks	Measurement: Length and perimeter 3 weeks
SUMMER	Number: Fractions 3 weeks	Measurement: Time 3 weeks	Geometry: Properties of shape 2 weeks	Measurement: Mass and capacity 3 weeks

YEAR 4 OVERVIEW

AUTUMN	Number: Place Value 4 weeks	Number: Addition and subtraction 3 weeks	Measurement: Length and perimeter 2 weeks	Number: Multiplication and division 3 weeks		
SPRING	Number: Multiplication and division 3 weeks	Measurement: Area 1 week	Number: Fractions 4 weeks	Number: Decimals 3 weeks		
SUMMER	Number: Decimals 2 weeks	Measurement: Money 2 weeks	Measurement: Time 2 weeks	Statistics 1 week	Geometry: Properties of shape 2 weeks	Geometry: Position and direction 2 weeks

YEAR 5 OVERVIEW

AUTUMN	Number: Place Value 3 weeks	Number: Addition and subtraction 2 weeks	Statistics 2 weeks	Number: Multiplication and division 3 weeks	Measurement: Perimeter and area 2 weeks
SPRING	Number: Multiplication and division 3 weeks	Number: Fractions 6 weeks		Number: Decimals and percentages 2 weeks	
SUMMER	Number: Decimals 3 weeks	Geometry: Properties of shape 3 weeks	Geometry: Position and direction 2 weeks	Measurement: Converting units 2 weeks	Measurement: Volume 1 week

YEAR 6 OVERVIEW

AUTUMN	Number: Place value 2 weeks	Number: Addition and subtraction Multiplication and division 5 weeks		Number: Fractions 4 weeks	Geometry: Position and direction 1 week	
SPRING	Number: Decimals 2 weeks	Number: Percentages 2 weeks	Number: Algebra 2 weeks	Measurement: Converting units 1 week	Measurement: Perimeter, area and volume 2 weeks	Number: Ratio 2 weeks
SUMMER	Statistics 2 weeks	Geometry: Properties of shape 3 weeks	SATs week	STEM projects Getting ready for secondary maths Transition units (topics to be confirmed)		

PLANNING

The majority of maths planning will be stored on StaffShare/2021-2022/Year Group/Maths. Each year group should also have a 'working' folder to hold any paper documents related to maths.

Each StaffShare year group folder should contain:

- ✓ The yearly overview (from White Rose)

YEAR 5 OVERVIEW

AUTUMN	Number: Place Value 3 weeks	Number: Addition and subtraction 2 weeks	Statistics 2 weeks	Number: Multiplication and division 3 weeks	Measurement: Perimeter and area 2 weeks
SPRING	Number: Multiplication and division 3 weeks	Number: Fractions 6 weeks		Number: Decimals and percentages 2 weeks	
SUMMER	Number: Decimals 3 weeks	Geometry: Properties of shape 3 weeks	Geometry: Position and direction 2 weeks	Measurement: Converting units 2 weeks	Measurement: Volume 1 week

Planning Folder

There should be a separate folder for each unit taught which is subdivided so that there is also a separate folder for each lesson.

For each unit taught:

- ✓ The unit overview (this can be snipped from White Rose)

Year 5 - Autumn Block 2 - Addition & Subtraction

Recap Add two 4-digit numbers - one exchange
Recap Add two 4-digit numbers - more than one exchange
Add whole numbers with more than 4 digits (column method)
Recap Subtract two 4-digit numbers - one exchange
Recap Subtract two 4-digit numbers - more than one exchange
Subtract whole numbers with more than 4 digits (column method)
Round to estimate and approximate
Inverse operations (addition and subtraction)
Multi-step addition and subtraction problems

- ✓ The Scheme of learning should also be saved in the unit planning folder.

This is a really useful document, as it contains notes and guidance for each lesson and examples of questions to develop mathematical talk during class input. See example below.

Notes and Guidance

Building on their experiences in Year 3, children use their knowledge of subtracting using the formal column method to subtract two 4-digit numbers.

Children explore subtractions where there is one exchange. They use place value counters to model the exchange and match this with the written column method.

Mathematical Talk

When do we need to exchange in a subtraction?
How do we indicate the exchange on the written method?

How many bars are you going to use in your bar model?
Can you find out how many tokens Mo has?
Can you find out how many tokens they have altogether?

Can you create your own scenario for a friend to represent?

- ✓ Teaching slides are the planning for each lesson. These PowerPoints should be saved for each lesson in the planning folder for that unit and annotated where necessary.

TA GUIDANCE SHEET

- ✓ TAs should have a copy of the lesson plan in advance, as well as the following guidance sheet that will indicate their role and focus children for that lesson. A copy can be found on StaffShare in Maths 22 folder.

Children are learning to							Focus children
Most effective working strategies as applicable.							
Resource	Model	Method		Problem-solving strategy			
Cubes	Number line	Informal		Act out the problem			
Counters	Bar model			Draw or build the problem			
Base 10	Whole-part model			Look for patterns and relationships			
Numicon	Proportion squares	Formal		Work backwards			
Cuisenaire rods	Percentages model			Draw pictures, graphs, tables			
Estimation and check							
Try an easier example							
Eliminate unneeded information							
Redirect child to red task if							
Prioritise feedback on							
Resources used	Model used	Choice of method	Problem-solving strategy suggestion	Planning	Checking	Evaluating	

Working Planning folder

Included in your 'paper' folder should be:

- Yearly overview
- The unit overview
- The scheme of learning which should be annotated as necessary, with key points to remember (such as anything that was done differently or if more time was needed, reasons why slides/calculations were done in a particular order etc.), focus children identified for pre-teaching or support in a lesson
- TA guidance sheets for each lesson

INDEPENDENT WORK

The White Rose Maths worksheet for each lesson will form the BLUE task questions that are aimed at those working at age-related expectations.

YELLOW task questions will come from the 'reasoning and problem-solving' document for that unit, and from the reasoning and problem-solving section of the Scheme of Learning.

Questions should be snipped from the appropriate documents and included in the planning folder for that unit of work.

LEARNING OBJECTIVES

These should be provided for each small step (lesson) and provide any information or models that pupils need to be successful with the new learning in the lesson.

They should include (as below):

- ✓ learning objective in child friendly language
- ✓ date
- ✓ unit that is being taught
- ✓ information needed for the lesson; which can take the form of:
 - prior knowledge that should have been remembered, REMEMBER
 - top tips for new learning (also things to remember, such as lining up digits)
 - vocabulary definitions where appropriate
 - CHOOSE FROM.... different strategies/models for calculations
 - WAGOLL – example of how to solve a particular type of problem

The LO may contain one or more of these.

See the example below.

FRACTION 3a

18/01/21

LO: convert improper fractions to mixed numbers

REMEMBER that there are 3 types fractions.

$\frac{5}{3}$ is an **improper fraction** because the fraction is greater than 1 and the numerator is greater than or equal to the denominator.

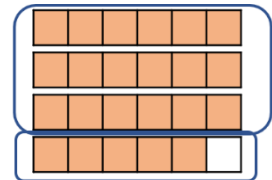
$\frac{5}{3}$ can also be written as $1\frac{2}{3}$ which is a **mixed number** – it is made up from a whole number and a fraction.

WAGOLL: Convert the improper fraction to a mixed number.

$\frac{23}{6}$ is the same as $23 \div 6$

$23 \div 6 = 3 \text{ r } 5$ We can make 3 wholes and there are 5 parts left over and each part is equal to $\frac{1}{6}$.

So $\frac{23}{6} = 3\frac{5}{6}$



$$\frac{23}{6} = 3\frac{5}{6}$$

STRUCTURE OF LEARNING

Questioning

Questioning throughout the lessons is used to challenge and deepen the understanding of the mathematics being taught.




Key questions used are:

- ✓ What is the same? What is different?
- ✓ Give me an example of ... and another ... and another.
- ✓ Give me an example of ... which is also an example of ...
- ✓ What if I change ...?
- ✓ If I know ... what else do I know?
- ✓ If I know ... what else can I work out?

Variable grouping

Lesson inputs are structured using the small step PowerPoints from the White Rose resources and adapted to suit the needs of the learners.

Each teacher sets adaptive tasks suited to children working within the age-related standards (blue task) and at greater depth (yellow task). The learning is further broken down for those children who need more structure and scaffolding to move onto the expected level (red for blue task).

Red for blue	Blue	Yellow
<p>Children who require support or scaffolding to answer the question and work towards working independently on the blue questions.</p> <p style="text-align: center;"></p> <p>This is a teacher-led session that starts at the point the learning is secure and uses scaffolding and concrete resources to be able to independently start the blue questions.</p> <p><i>The pre-assessment should help identify those children and the gaps and where necessary, pre-teaching to address this happens before the start of the unit; and sometimes consolidated with some adult support during the lesson. This can include clear explanation of the learning using a carefully selected range of concrete and pictorial models and links to previous learning in the unit made explicit.</i></p>	<p>Children who can solve the problem, but who need to become more efficient or explore the conceptual structure further.</p> <p style="text-align: center;"></p> <p>These children will be part of the lesson input and will start on question 1 of the blue questions which will include opportunities for fluency, problem-solving and reasoning.</p> <p><i>The expectation is that children will complete all the blue questions in a lesson.</i></p>	<p>Children who have shown that they understand the concept being taught and so do not need to be part of the whole class input.</p> <p style="text-align: center;"></p> <p>These children will start immediately after the warm-up on the blue questions, moving onto the yellow questions when completed and corrected if necessary.</p> <p><i>Answers are provided to allow self-marking and no disruption of the input. Answers should not show all working, it is good practice for the children to find and correct their own errors.</i></p>

Role of the teacher

During the lesson, the teacher provides feedback at the point of learning.

Student's work is used to draw out key ideas, misconceptions and discussion is used to build links in their understanding.

Discussions should:

- provide opportunity for children to discuss the key ideas and links they need to correct their work and move on.
- support to model problems clearly, understand the vocabulary and use more efficient calculation methods, reasoning and start to draw out generalisations by looking for patterns.
- challenge children to make clear links between the expected learning and their task using generalisations (where appropriate), justifying their ideas mathematically using models and symbol notations as well as the correct mathematical vocabulary.

Vocabulary

At the start of each unit, children are provided with a sheet (see example below) which details key vocabulary for the unit. This includes a definition and visual representation. Children will be referred to this when a new word is being used and encouraged to use it themselves when vocabulary unfamiliar to them is used.

YEAR 6 – MULTIPLICATION AND DIVISION

<p style="text-align: center; font-weight: bold;">common factors</p> <p>When you find the factors of two or more numbers, you will see that some are the same. These numbers are called common factors.</p> <p>Factors of 20: 1, 2, 4, 5, 10, 20 Factors of 28: 1, 2, 4, 7, 14, 28</p> <p>1, 2 and 4 are common factors of 20 and 28 because they are factors of 20 and 24.</p>	<p style="text-align: center; font-weight: bold;">factors</p> <p>Numbers that are multiplied to make another number.</p> <p style="text-align: center;"> </p> <p>3 and 4 are factors of 12 because $3 \times 4 = 12$</p>	<p style="text-align: center; font-weight: bold;">prime number</p> <p>A number greater than 1 that has only 2 different factors – it is only divisible by itself and 1.</p> <p style="text-align: right;"> </p>
<p style="text-align: center; font-weight: bold;">common multiples</p> <p>When you find the multiples of two or more numbers, you will see that some are the same. These numbers are called common multiples.</p> <p>Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24 Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32</p>	<p style="text-align: center; font-weight: bold;">inverse</p> <p>This can mean the opposite/ reversing. The inverse of multiplication is division. The inverse of division is multiplication.</p> <p>$147 \times 3 = 441$ $441 \div 3 = 147$</p> <p>The inverse can be used to check calculations and to solve missing number problems.</p>	<p style="text-align: center; font-weight: bold;">prime factors</p> <p>A factor which is also a prime number is a prime factor. To find the prime factors of a number we can use a factor tree.</p> <p>Find the prime factors of 70: $7 \times 5 \times 2 = 70$</p> <p style="text-align: center;"> </p>
<p style="text-align: center; font-weight: bold;">commutative law</p> <p>When you multiply numbers, you will get the same answer when you swap the numbers around.</p> <p>$3 \times 4 = 12$ $4 \times 3 = 12$</p>	<p style="text-align: center; font-weight: bold;">long division</p> <p style="text-align: center;"> </p> <p>A step by step method of dividing by a two-digit number.</p>	<p style="text-align: center; font-weight: bold;">product</p> <p style="text-align: center;"> </p> <p>The answer when two or more numbers are multiplied.</p>
<p style="text-align: center; font-weight: bold;">composite numbers</p> <p style="text-align: center;"> </p> <p>Numbers that are not prime numbers.</p>	<p style="text-align: center; font-weight: bold;">long multiplication</p> <p>Long multiplication is a way to multiply large numbers. We have multiplied 26 by 3 (first of all). You can use 0 as a place holder and now multiply 26 by 30. We then add the 2 to find the total.</p> <p style="text-align: center;"> </p>	<p style="text-align: center; font-weight: bold;">quotient</p> <p>The answer after you divide one number by another.</p> <p style="text-align: center;"> </p>
<p style="text-align: center; font-weight: bold;">cube numbers</p> <p>When you multiply a number by itself, and then multiply it by itself again, you get a cube number.</p> <p>$1 \times 1 \times 1 = 1$ $2 \times 2 \times 2 = 8$ $3 \times 3 \times 3 = 27$</p>	<p style="text-align: center; font-weight: bold;">multiples</p> <p>Multiples are the numbers that appear in the number's multiplication table.</p> <p>Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24</p> <p>We get multiples after multiplying the number by a whole number.</p> <p>$3 \times 1 = 3$ $3 \times 2 = 6$ $3 \times 3 = 9$</p> <p>These are multiples of 3. Can you think of any more?</p>	<p style="text-align: center; font-weight: bold;">remainder</p> <p>An amount left over after dividing</p> <p style="text-align: center;"> </p> <p>$4800 \div 4 =$</p>
<p style="text-align: center; font-weight: bold;">distributive law</p> <p>If you don't know 7×8, you could do 5×8 and add the answer to 2×8. You would get the correct answer!</p> <p>$5 \times 8 = 40$ $2 \times 8 = 16$ $7 \times 8 = 56$</p> <p>I have 'distributed' (spread out) the 7 into a 5 and a 2 and multiplied them both by 8. I then add the products.</p>	<p style="text-align: center; font-weight: bold;">multiplication</p> <p>Numbers combined to give a product. A product is the answer when two or more numbers are multiplied.</p> <p style="text-align: center;"> </p>	<p style="text-align: center; font-weight: bold;">short multiplication</p> <p>This is a strategy for multiplying 2, 3 or 4-digit numbers by a 1-digit number. Starting with the ones, multiply each of the digits by the 1-digit number. In this example, remembering to exchange where it is needed.</p> <p style="text-align: center;"> </p>
<p style="text-align: center; font-weight: bold;">divide</p> <p>To split a number into equal groups or parts. Example: Find $96 \div 4$</p> <p style="text-align: center;"> </p> <p>$96 \div 4 = 24$</p>	<p style="text-align: center; font-weight: bold;">order of operations</p> <p>Brackets Indices Division Multiplication Addition Subtraction</p> <p style="text-align: center;"> </p> <p>Operations are addition, subtraction, division and multiplication.</p> <p>You have to know which operations to complete before another.</p>	<p style="text-align: center; font-weight: bold;">short division</p> <p>A calculation where you divide the single digit into the other number, one digit at a time.</p> <p style="text-align: center;"> </p>
<p style="text-align: center; font-weight: bold;">square numbers</p> <p>When you multiply a number by itself, the result is a square number.</p> <p style="text-align: center;"> </p>		

FEEDBACK

Point of learning feedback is the most effective method of improving outcomes for children.

Effective on-the-spot marking comments:

- Explain why you think this
- Find and fix error(s)
- Add more detail
- Prove that you are correct

Children need time to act upon feedback. Allow students to discuss feedback with others; ask the teacher / a peer for clarification or write notes on what they need to do next.

REPRESENTATIONS AND MODELS

Representations are examples or images of mathematics in real contexts; for example, measurements and money represent decimal numbers. Children should work with concrete and pictorial representations before using visual models.

Models are visual representations of mathematical structure. It can be built using practical materials or drawn. Students should be able to implement this in their independent work. A good model represents key mathematical concepts in multiple contexts. ALL children should be encouraged to use and draw models as part of their reasoning and explanations.

Key drawn models are:

- ✓ Number line – Blank to use with post-its and numbered
- ✓ Whole-part bar model - additive and multiplicative relationships
- ✓ Ratio / comparison bar model
- ✓ Multiplicative relationship 4-squares (including proportion and fractions)
- ✓ Percentage model (Years 5 & 6)
- ✓ Gattegno place value chart (Year 5 & 6)
- ✓ Place value grid
- ✓ Arrays then rectangles for multiplicative relationships
- ✓ Fraction wall

Useful modelling materials, which should be readily available in the classroom, are:

- Numicon
- Cuisenaire rods
- Cubes
- Counters
- Dienes
- Bead strings
- Unstructured (blank) number lines

Other materials that can be made available according to the learning journey include:

- Dice
- Money
- Shapes
- Measuring equipment for length, mass and volume

- Clocks
- Digit cards
- Place value cards
- Sorting circles

WORKING WALLS

The working wall always shows:

- ✓ the unit theme and learning journey
- ✓ relevant vocabulary and definitions for the learning journey
- ✓ representations and models relevant to the lesson / unit
- ✓ a place value grid which are always displayed, and in year 3, a hundred square as well
- ✓ WAGOLL – an example of the sort of question they should be able to answer by the end of the unit.
- ✓ WAGOLL – an example of excellent student work both mathematically and in terms of the quality of presentation from the unit

ASSESSMENT

Pre-unit assessments

Pre-unit assessments are used to diagnose individual and class areas for development before a unit begins.

- Printed on green paper.
- They should be completed at least a week before the start of the unit so that pre-teaching can take place to ensure that foundational knowledge is secure.
- There should be a maximum of 5 questions for the assessment.

Questions could be found from:

- ✓ White Rose- the end of block assessment from the previous year for that unit.
- ✓ RTP document
- ✓ Baseline assessment for that unit on Twinkl
- Pupils are given 20 minutes to complete the assessment. The assessment is stuck into pupils' books on a new page to indicate the start of the unit.
- Pre-assessments should be discussed with the Maths lead before giving to children.

Post-unit assessments

These are set in the form of 'Nuggets' on the online programme, Century. This self-marks pupils' answers and provides specific areas for development and stretching based on the child's performance.

Formative Assessment

Good formative assessment takes place at the point of learning and during a lesson; it is evident in the path each learner takes, neither too easy nor too hard, and the progression of learning within and from step to step.

- Start from where the learner is, allowing time to incorporate new ideas into existing understanding, taking all student questions and responses seriously, talking through inconsistencies and challenges.
- Students must be actively learning; make sure you have time to observe.
- Students need to talk about their ideas as a whole class and in peer groups, so they can construct their understanding of the language of mathematics.
- Students must understand the learning objective (what they are learning and how it links to the previous lesson and prior knowledge). A WAGOLL models the expected quality of work and thinking

but will not ensure progress alone. Students need to actively discuss and judge the quality of their own and their peers' work. Together this will enable students to take responsibility for their own learning.

- Feedback should tell pupils how to improve: comment on the work, not the student. Highlight strengths and weaknesses in a piece of work and show how to improve it. This way students will learn from their mistakes.

Recording AfL

At the end of each lesson, the learning objective is highlighted in pink if it has been achieved and in green if it has not. Sometimes it is necessary to only highlight part of the objective as achieved.

This should be used to inform the starting points for learners at the start of the next lesson.

Summative Assessment

The tests are marked and scores submitted as percentages across all 3 papers. This test score is then compared with the teacher assessment.

Summative assessment data takes two forms, both of which are recorded on OTrack:

- Percentage score from summative test.
- Progress arrows and teacher assessment of attainment.

An evidence-based assessment is then used to indicate each child's position in relation to the end of year expectations.

Rising Stars arithmetic tests are taken fortnightly by each year group as part of low-stakes testing opportunities. From this, the children edit their Target 30 target sheet. Their score identifies how many more marks the child needs in the following test when working towards their overall score (this is around 75% of the total number of marks for the paper).

Target 30

Target 30 is an arithmetic-based target aimed at ensuring children are proficient with their number fluency. Our aim is for all children achieving a score of at least 30/40 in the SATs arithmetic paper. After completing a Rising Stars arithmetic test, children identify an area for improvement and write this onto their Target 30 sheet. Children will then be given opportunities during Guided Maths or morning work sessions to improve on this area. This may be via computer-based tools, paper learning opportunities, videos, and one-to-one interventions or tutoring. Children are encouraged to identify to an adult when they feel they have achieved this target or they will have an opportunity to review these on a fortnightly basis after their arithmetic test. If this target is highlighted, it means children have achieved that aspect of learning.

STUDENTS WITH ADDITIONAL NEEDS

Beyond the adaptations put in place for individual needs, there are several keys to success for students with additional needs.

- ✓ Clear, consistent use of practical and visual models.
- ✓ Precise vocabulary used consistently.

- ✓ Making explicit when mathematical and general definitions of the same word do not align. The word 'difference' is the most common source of problems.
- ✓ Opportunities to talk with their peers and share ideas.

Targets for maths are written so that they fit with the learning and are taken from the KPIs in the relevant Programme of Study that the child is currently working at.

CHILDREN WORKING BELOW ARE IN MATHS

This path will support SEND pupils by highlighting the most important concepts (RTP criteria) within the National Curriculum and targeting the teaching towards these concepts

- This is a different curriculum path for those working BELOW in maths who have significant gaps in their fundamental knowledge. It is not a quick fix, but will enable the ready to progress criteria to be met and pupils to access other parts of the curriculum more easily.
- These will be referred to as WHITE group (which fits with the colours used for variable grouping).
- Any child following this path to enable 'catch-up' will need to be discussed and signed off by Angela Larby.

RESOURCES

- ✓ Mathematics Guidance – key stages 1 and 2 (Ready to Progress Criteria)
(Copy in Staffshare/2021-2022/Subject Resources/Maths 21)
- ✓ White Rose planning overview for unit that includes current year and 2 preceding years.
- ✓ WR resources for the lesson that matches the RTP criteria.

EXAMPLE

This example is for a Year 4 child working below ARE for Multiplication and Division.

1. The child is in Year 4, so go back 2 years to Year 2 and identify the criteria required to progress in multiplication and division ([page 13](#) in the Mathematics Guidance document).

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
MD		2MD-1 Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.	3MD-1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division.	4MD-1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. →	5MD-1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.	For year 6, MD ready-to-progress criteria are combined with AS ready-to-progress criteria (please see above).
		2MD-2 Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division).		4MD-2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.	5MD-2 Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.	
				4MD-3 Understand and apply the distributive property of multiplication. →	5MD-3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.	
					5MD-4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.	

2. Use Maths Guidance to identify exactly what learning is required to achieve the RTP criteria for Year 2 and so be ready to progress to Year 3 criteria.

The learning for this criteria can be found on [page 69 - 71](#) of the Guidance Document:

- ✓ It is imperative that the teaching guidance provided is read carefully by the teacher and the TA if they are delivering the WR lesson, as it makes explicit what prior knowledge the learning is based on and what the pupils will learn. It provides core mathematical representations, language structures and discussion of connections to other criteria, as shown below.

2MD–1 Multiplication as repeated addition

Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.

2MD–1 Teaching guidance

Pupils must first be able to recognise equal groups. To better understand and identify equal groups, pupils should initially explore both equal and unequal groups. Pupils should then learn to describe equal groups with words.



Figure 52: recognising equal groups – 3 groups of 5 eggs

Language focus

“There are 3 equal groups of eggs.”

“There are 5 eggs in each group.”

“There are 3 groups of 5.”

Based on their existing additive knowledge, pupils should be able to represent equal-group contexts with repeated addition expressions, for example $5+5+5$. They should then learn to write multiplication expressions to represent the same contexts, for example 3×5 . Pupils must be able to explain how each term in a multiplication expression links to the context it represents.

Pupils must also be able to understand equivalence between a repeated addition expression and a multiplication expression: $5+5+5=3\times 5$.

Pupils should then learn to calculate the total number of items (the product), for contexts based on the 2, 5 and 10 multiplication tables, initially by skip counting. They should be able to write complete multiplication equations, for example $3\times 5=15$, and explain how each term links to the context.

Language focus

“The 3 represents the number of groups.”

“The 5 represents the number of eggs in each group.”

“The 15 represents the total number of eggs.”

Pupils should be able to relate multiplication to situations where the total number of items cannot be seen, for example by representing 3×5 with three 5-value counters.



Figure 53: three 5-value counters

You can find out more about fluency and recording for the 2, 5 and 10 multiplication tables here in the calculation and fluency section: [2MD-1](#).

Making connections

Pupils must be able to write and solve addition problems with 3 or more addends before they can connect repeated addition to multiplication.

2MD-1 Example assessment questions

1. Write these addition expressions as multiplication expressions. The first one has been completed for you.

$$5+5+5+5+5=5 \times 5$$

$$2+2+2+2+2= \underline{\hspace{2cm}}$$

$$2+2+2= \underline{\hspace{2cm}}$$

$$10+10+10= \underline{\hspace{2cm}}$$

2. There are 7 year-groups in Winterdale School. Each year-group has 2 classes. How many classes are in the school?
3. Sally buys 3 cinema tickets. Each ticket costs £5. How much does Sally spend? Write the multiplication expression and calculate the cost.

- There are 10 children sitting at each table in a dining hall. There are 8 tables. How many children are there?
- The pictogram shows how many socks each child has. How many socks does Asif have?



represents 2 socks



- Write a story to go with this equation.
 $6 \times 10 = 60$

- Complete the calculations.

$7 \times 5 = \square$






































































































































$10 \times 4 = \square$

$9 \times 2 = \square$

3. Identify which lessons in White Rose Year 2 match the RTP learning.

It is not necessary to complete all of the multiplication and division lessons in White Rose for Year 2 multiplication and division (Spring Block for multiplication and division).

Year 2 - Spring Block 1 - Multiplication & Division

Recognise equal groups	      
Make equal groups	      
Add equal groups	      
Multiplication sentences using the x symbol	      
Multiplication sentences from pictures	      
Use arrays	      
Recap Make doubles	      
2 times-table	      
5 times-table	      
10 times-table	      
Recap Make equal groups - sharing	      
Make equal groups - sharing	      
Recap Make equal groups - grouping	      
Make equal groups - grouping	      
Activity Sharing and grouping activity	      
Divide by 2	      
Odd and even numbers	      
Divide by 5	      
Divide by 10	      
Download the whole block	