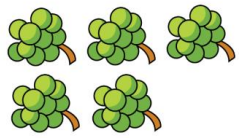
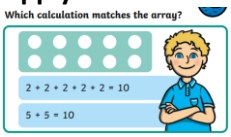
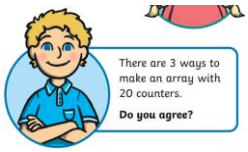
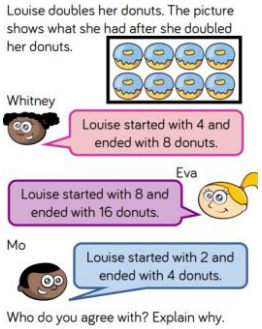
Y1 Personalised Learning Journey Date: WB:		
NC Objective: Multiplication and division		
Resources/documents: Ready to Progress Guidance, White Rose Small steps, White Rose Calculation Policies (Use of concrete), NCETM mastery assessment docs. Base 10, multilink, counters, numicon, compare bears, bead strings		
Pre- assessment	Assessment tasks	Language Focus
Teaching sequence	Learning tasks	Language Focus
1. WALT: Count in 2s	**WILF:** I can count in 2s from 0 to 50. Use bead string to model – 2 beads at a time counting from 0 to 50. Numicon to model and count **Evidence**: Real life: How many socks / gloves in total? 50 grid, colour in multiples of 2 Missing number tracks – fill in missing numbers **Apply**: So many bags of sweets, some with 2 in a pack and some with 1 in a pack. Person 1 – 15 bags of 1 Person 2 – 9 bags of 2 "Person 1 says they have more sweets because they have more bags. Are they right? Explain answer" **Apply 2:** X is counting in 2s. She says: 22, 24, 26, 28… Will she say the number 33? Prove your answer	Count Count on Higher Forwards Twos Multiples Pattern Tens Ones Even Odd
2. WALT: count in 5s	**WILF:** I can count in 5s from 0 to 60. Bead strings / numicon to model **EVIDENCE:** Groups of 5 things – how many in total? 60 grid, colour in multiples of 5 and find the pattern. Ordering numbers Missing number tracks- fill in missing numbers Lowers: concrete + pictures **Apply** Piggy banks with 5ps inside (20p, 40p, 45p, 50p) – which is the odd one out? – explain answer **GD**: I'm thinking of a number: You count it in 2s and 5s. It has less than 4 tens. What could it be?	Count Count on Higher Value Forwards Multiples Pattern Fives Tens Ones Even Odd
3.	**WILF**: I can count in 10s from 0 to 100	Value Tens

WALT: Count in 10s	Tens counters and bead strings to model. **EVIDENCE:** Groups of 10 things – how many in total? 100 square, colour in multiples of 10 and find the pattern. Ordering numbers Missing number tracks- fill in missing numbers **Apply** In a shop, grapes come in bunches of 10  Max wants to buy forty grapes. Are there enough grapes? **Apply 2** Always, sometimes, never? When I count in 10s from 0, the ones change.	Ones Count Count on Value Multiples Odd Even
4. WALT: Make equal groups	**1. Concrete** **WILF**: I use objects to make groups with equal amounts. Share objects (pencils etc.) between groups of chn – explore equal groups and unequal groups. Chn to work in mixed ability pairs (talk partners) – give amounts of objects and ask to put into given equal groups. Challenge: give amount, can they find an amount equal groups to put the amount into? Oracy: ___ altogether. ____ equal groups of _____. **EVIDENCE**: photos **Apply** True or false: "2 children can equally share 13 sweets." **GD** How many children could share 30 sweets? Multiple possible answers – share objects (30 (1 each), 15 (2 each), 6 (5 each), 10 (3 each)) **2. Pictorial** **WILF**: I can use pictures and drawings to make equal groups. Draw groups and share by drawing into each one – count as you share. **EVIDENCE**: challenge cards – given amount and groups to draw into. Complete the equal groups by adding drawings **Apply 1**	Share Equal Unequal Altogether Groups Full sentence Amount

	 **Apply 2** Roll a dice – can you make that number of equal groups with 18? **GD** Circle the box of chocolates that 2 people could share equally (more than one possible answer) Circle the box of chocolates that either 2 or 5 people could share equally (more than one possible answer)	
5. WALT: Add equal groups	1. **Pictorial** **WILF**: I can find the total within an amount of groups by adding each one together. Count in the multiple to find the total. e.g. 4 bikes and find the total amount of wheels. 2 + 2 + 2 + 2 Count in 2s 4 times to find the answer = 8 **EVIDENCE**: challenge cards – pics of groups, number sentences beneath. Draw the groups to correspond to the number sentence. **Apply** Spot the mistake – pic of groups, number sentence with more than the correct amount of groups and incorrect answer. **GD** George and Tilly have both made different equal groups of sweets. They both have 20 sweets altogether. What groups could they each have made?	Groups Total Amount Multiple Altogether Each group Add Equal
6. WALT: make arrays	**1. Concrete** **WILF**: I can use objects to make and understand arrays Pictures to embed column / boat. – Columns hold UP the building. Row ACROSS the lake. Cones on the playground in 3 / 4 groups depending on adults – draw around rows / columns to find groups of rows / columns. Counters to make different arrays, write number sentences. **EVIDENCE**: photos, 2. **Pictorial** Pic of arrays – ____ rows of ____ ____ columns of ____ Draw arrays to match the sentences and matching number sentences.	Column Row Amount Altogether Add Groups Across Up Array

	Apply  **GD**  	
7. WALT: Make doubles.	**1. Concrete** **WILF**: I can use concrete objects to double amounts up to 20 Carousel of activities: Twenties frames – 2 colours Paper chains Numicon Finger painting Number and word sentences in each (___ + ____ = ____, double ___ is ___) **EVIDENCE**: photos / finger paintings 2. **Pictorial** **WILF**: I can use pictures and drawings to double amounts up to 20. **EVIDENCE**: Drawings doubles – 1 colour + another colour drawn straight into books. No sentences and word sentence. CHALLENGE: 'x' symbol (3x2 example) **Apply**  3. **Abstract** **WILF**: I can double amounts by counting in 2s **EVIDENCE**: 0-9 dice, roll and double straight into books. Addition no. sentence, word no. sentence + 'x' no. sentence for challenge. **Apply**	Double Equal Multiple Even Two Amount Altogether Two times

	Finish the doubles.  What is the pattern?	1 → 2 2 → ☐ 3 → ☐ 4 → ☐ 5 → ☐	

Y2 Maths Personalised Learning Journey	**Number: Multiplication and division**	
NC Objective: • Count in multiples of twos, fives and tens. • Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.		
Resources/documents: Ready to Progress Guidance, White Rose Small steps, White Rose Calculation Policies (Use of concrete), NCETM mastery assessment docs, Primary Stars Maths Tens frames, counters, base 10, whole-part model, bar model, number cards		
Real life discussion before teaching: Where do we use calculations in real life? Why do we need it? Why is it important? Collect examples for WW.		
Pre- assessment	Assessment tasks	Language Focus
Revision from previous year (Y1)	Counting in steps of 2,5,10	Numbers 1- 50, multiplication, count, steps, 2s, 5s, 10s
Teaching sequence	Learning tasks	Language Focus
1: WALT: Make equal groups	Children will use stories, pictures and concrete manipulatives to explore making equal groups and write statements. Tt is important that children know which groups are equal and which are unequal. *Ask questions such as:* *How do I know if the groups are equal / unequal?* *Complete the sentences to describe the equal groups.* *Are the groups equal / unequal?* *How can we make these groups equal?*	Numbers 1- 50, multiplication, multiply, multiplied by, multiple, division, dividing, grouping, sharing, array, number patterns, groups, lots of, groups of, total, rows, columns, repeated addition.
2. WALT: Add equal groups	Children use their knowledge of equal groups to find totals. They focus on counting equal groups of 2, 5 and 10 and explore this within 50. Children begin by linking this to real life contexts and use the pictorial representations to help them. They begin by identifying the repeated addition sum that matches the pictorial representation. *Ask questions such as:* *How many groups?* *How many in each group?* *How many in total?*	Numbers 1- 50, multiplication, multiply, multiplied by, multiple, division, dividing, grouping, sharing, array, number patterns, groups, lots of, groups of, total, rows, columns, repeated addition.
3. WALT: Add equal groups	As children are now familiar with adding equal groups, children will progress to representing equal groups in various ways such as pictorially, repeated addition, sentences, and bar models. Children will be encouraged to use number lines to check their answers. *Ask questions such as:* *How many groups? How many in each group?* *How many in total?* *Can you represent this using a bar model?* *Can you use a number line to check your answer?*	Numbers 1- 50, multiplication, multiply, multiplied by, multiple, division, dividing, grouping, sharing, array, number patterns, groups, lots of, groups of, total, rows, columns, repeated addition.

4 WALT: Make arrays	Children will be introduced to arrays. They will use their knowledge from equal groups to build arrays from the equal groups presented. It is important that children understand the difference between columns and rows. For example, an array with 2 rows and 3 columns will look different to an array that has 3 rows and 2 columns but will both give a total of 6. children will use concrete apparatus to work practically building arrays using pictorial representations of equal groups then use repeated addition to help them find the total. *Ask questions such as:* *What do we mean by row / column?* *Can you build an array using the equal groups shown?* *How many rows / columns? Can you write a number sentence to represent the array?*	Numbers 1- 50, multiplication, multiply, multiplied by, multiple, division, dividing, grouping, sharing, array, number patterns, groups, lots of, groups of, total, rows, columns, repeated addition.
5. WALT: Make arrays	Children should now be able to confidently build arrays and describe them commenting on the number of rows and how many in each row. In this lesson, children will use pictorial representations to describe arrays. They will also be able to build and draw an array based on its description. *Ask questions such as:* *Can you build an array using the equal groups shown?* *How many rows / columns?* *Can you write a number sentence to represent the array?* *What is different between the two arrays?* *Can you draw an array from the description shown?*	Numbers 1- 50, multiplication, multiply, multiplied by, multiple, division, dividing, grouping, sharing, array, number patterns, groups, lots of, groups of, total, rows, columns, repeated addition.
6. WALT: Recognise equal groups	Children will describe equal groups using stem sentences to support them. It is important that children know what groups are equal and which are unequal. The addition or multiplication symbol is not used within this small step but the language will support them in understanding repeated addition and multiplication. In Year 2, children will work with 2x, 3x, 5x and 10x multiplication tables. *Ask questions such as:* *What does the 2 represent? What does the 3 represent? What does the 5 represent? What does the 2 represent? I have X equal groups, with Y in each group. Which image am I describing?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
7. WALT: Make equal groups	Children should be able to make equal groups to demonstrate their understanding of the new language. It is important that children are exposed to numerals and words, as well as multiple representations. Children should be able to verbally explain and write what particular groups show. *Ask questions such as:* *How else could you represent these in equal*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication

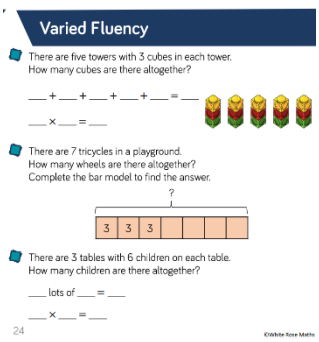
	groups? How many ways can you represent this? How have you grouped your items?	table, multiplication fact, division fact
8. WALT: Add equal groups	Children will start relating equal groups to repeated addition. At this point children would have added 3 single digits together, therefore they should be able to add any 3 numbers together. However, if there are more than 3 equal groups, they must be limited to 2s, 5s, 10s and 3s. *Ask questions such as:* *What do the two 3s represent? Why are we using the addition symbol? How else can we show the equal groups? What is the total?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
9. WALT: write multiplication sentences using the X symbol	Children are introduced to the multiplication symbol for the first time. They should link the stem sentences, repeated addition and multiplication together. Children should also be able to interpret mathematical stories and create their own. The use of concrete resources and pictorial representations is still vital for understanding. *Ask questions such as:* *What does the 3 represent? What does the 6 represent? What does lots of mean? Does 18 = 3 ×6 mean the same? How is 7 +7 +7 the same as 3 ×7?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
10. WALT: write multiplication sentences from pictures	Children will use the multiplication symbol and work out the total from given pictures. They should also be able to interpret a word problem by drawing images to help them solve it. Coins could also be used within this small step. *Ask questions such as:* *What does the 4 represent? What does the 3 represent? What does the 12 represent? Can you think of your own story for _ x _ ?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
11. WALT: Use arrays	Children will explore arrays to see the commutativity between multiplication facts e.g. 5 ×2 =2 ×5. The use of the arrays will help children calculate multiplication statements. The symbol and language of 'lots of' should be used interchangeably. *Ask questions such as:* *Where are the 2 lots of 3?* *Where are the 3 lots of 2?* *What do you notice?* *What can we use to represent the ___?* *Can you draw an image to show this?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
12. WALT: Make doubles	Children will recap double numbers up to 20. They will understand that doubling is 2 groups of the same amount / number. Children will work practically and use pictorial representations to represent doubling then progress to describing doubles using stem sentences and represent this in the abstract	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array,

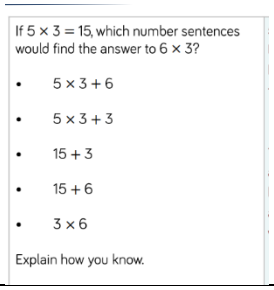
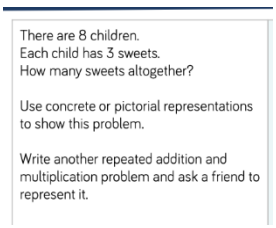
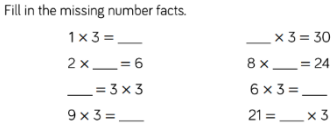
	using repeated addition. *Ask questions such as:* *Does this picture represent doubles?* *Double __ is __.* *__ + __ = __* *How can we represent this double?*	row, column, number patterns, multiplication table, multiplication fact, division fact
13. WALT: Use pictorial strategies to count in twos	Images will be used to encourage children to count in twos. In addition to this, number tracks will be used. Manipulatives such as cubes and Numicon are important for children to explore equal groups within the 2 times table. *Ask questions such as:* *If 12p is made using 2p coins, how many coins would there be?* *How many 2s go into 12?* *How can the images of _____ help you to solve the problems?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
14. WALT: count in 5s	Children should see the =sign at both ends of the calculation to understand what it means. *Ask questions such as:* *If there are 5 pens in each pot and 30 pens, how many pots? Can you count in 5s to ___?* *How many 5s go into ____? What does each symbol mean? Do we need to calculate?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
15 WALT: count in 10s	Children will count in 10s from any given number. This small step is focused on the 10 times table and it is important to include the use of zero. Children should see the = sign at both ends of the calculation to understand what it means. Hundred number squares can be used allowing children to see a pattern. *Ask questions such as:* *If there were ___ altogether, how many ___?* *How do you know? How many tens go into ___? Can you count in 10s to ___? What does greater than mean? What does less than mean?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
16. WALT: Make equal groups – sharing	Children will divide by sharing to make equal groups using one to one correspondence. They will start by doing this in practical contexts. *Ask questions such as:* *How many do you have to begin with?* *How many equal groups are you sharing between?* *How many are in each group?* *How do you know that you have shared the objects equally?* *___ has been shared equally in to ___ equal groups.* *___ groups of ___ make*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact

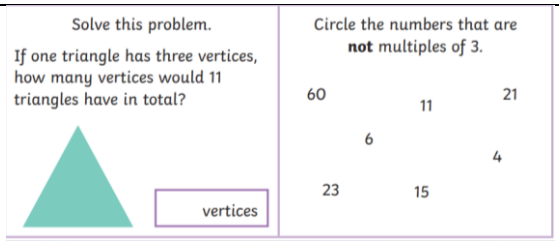
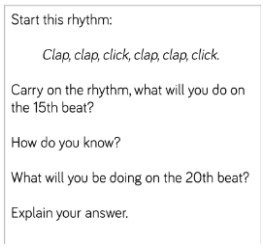
17. WALT: Make equal groups – sharing	Children will be introduced to the ÷ symbol. They will begin to see the link between division and multiplication. *Ask questions such as:* *How many in each group?* *How many groups?* *How do you know that you have shared the objects equally?* *What division calculation can we write to show this?* *What multiplication can we write to show this?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
18. WALT: Make equal groups - grouping	Children divide by grouping objects into a given amount. They then count on to find the total number of groups. They will start by doing this in practical contexts. *Ask questions such as:* *How many do you have to begin with?* *How many are in each group?* *How many groups do you have?* *There are _____ groups of _____ which make _____*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
19. WALT: Make equal groups - grouping	As children will now be confident dividing by sharing practically, they will move onto doing this pictorially including the use of number lines. They will recognise the link between division, multiplication and repeated addition when representing their groups. *Ask questions such as:* *How many do you have to begin with?* *How many are in each group?* *How many groups do you have?* *How long should your number line be?* *What will you count up in?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
20. WALT: Divide by 2	As children will now be secure with sharing and grouping they will use this knowledge to help them divide by 2. They will be secure with representing division as an abstract number sentence using the division and equals symbol. Children should be able to count in 2s and know their 2x table. *Ask questions such as:* *What do you notice when you group these objects into twos? Is there a link between dividing by 2 and halving? What is different about sharing into two groups and grouping in twos?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
21. WALT: recognise odd and even numbers	Building on from Year 1, children should at this stage be able to recognise odd and even numbers. They will use concrete manipulatives to understand odd and even numbers and the structure of these. *Ask questions such as:*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array,

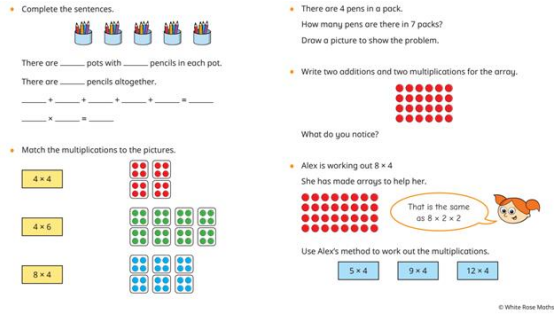
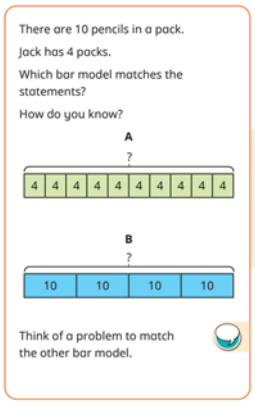
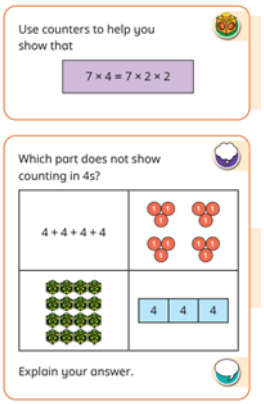
	Can you sort these objects (number pieces, ten frames, cubes, pictures etc) into odd and even? *What makes these odd/even?* *Which of these numbers can you share equally between 2?* *How do you find out if X is an odd or even number?*	row, column, number patterns, multiplication table, multiplication fact, division fact
22. WALT: Divide by 5	Children focus on efficient strategies. They use their knowledge of the five times table to help them divide by 5. They will start by using practical methods involving cubes to help divide by 5. *Ask questions such as:* *How can we show the problem using objects/images?* *How does knowing your 5 times table help when dividing by 5?* *How many towers of 5 could you make from ___* *___ towers of 5 is the same as ____.* *___ is the same as ___ towers of 5.* *___ towers of cubes make ____.*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
23. WALT: Divide by 5	Building on from the previous step, children will have greater confidence dividing by 5 and will use calculations to represent this including using the '=' sign at both ends of the calculation. *Ask questions such as:* *How can we show the problem using objects/images?* *How does knowing your 5 times table help when dividing by 5? Circle all the multiples of 5 on a 100 square. What do you notice about the numbers? Can you explain the pattern?* *How does this help you to divide these numbers?* *When would we count in 5s?*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
24. WALT: Divide by 10	Children will need to be able to multiply by 10 and recognise multiples of 10. They will need to use both grouping and sharing to divide by 10. Children start to see that grouping and counting in 10s is more efficient than sharing into 10 equal groups. They will start by using practical methods to help divide by 10. Ask questions such as: What can we use to represent __? How does knowing your 10 times table help you to divide by 10? How many 10s in ____?	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
25. WALT: Divide by 10	Building on from the previous step, children will have greater confidence dividing by 10 and will use calculations to represent this including using the '=' sign at both ends of the calculation. *Ask questions such as:* *How many groups of 10 are there in ___ tens?* *What bar model would represent this*	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number

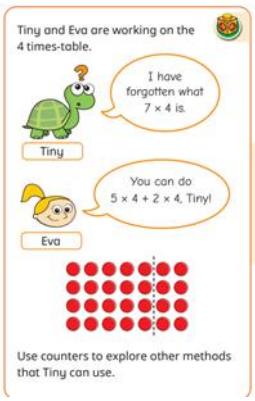
	problem? *How many 10s make ___?* *___ make ___ tens.*	patterns, multiplication table, multiplication fact, division fact
26. WALT: Solve problems	Worded problems of increasing difficulty related to topic of plants/flowers/The Secret Garden Teach how to solve worded problems by modelling using pictures to work out answers. Talk to children about the key information and underline it on the question. Model in different ways – using base 10, place value counters, part whole model, bar model… Encourage children to take responsibility for their own learning by using the resources they need and drawing pictures, models to help them.	2s, 5s, 10s, 3s, numeral, how many, multiplication, multiply, multiplied by, multiple, groups of, lots of, times, repeated addition, equals, altogether, sum, total, array, row, column, number patterns, multiplication table, multiplication fact, division fact
Assessment	Ideas: Quiz Mini test Challenge lesson Children independently use resources if they need to. These should be available for children to access independently. Any misconceptions and gaps must be picked up at this point and intervention given.	

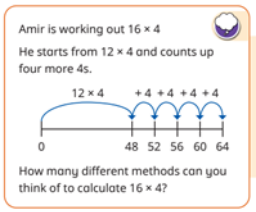
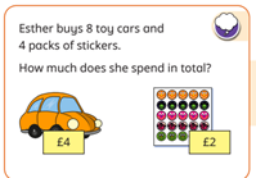
Y3 Personalised Learning Journey Multiplication and Division		
• **NC Objective:** • recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods • solve problems, including missing number problems, involving multiplication and division		
Resources/documents: White Rose Small steps, White Rose Calculation Policies (Use of concrete), NCETM mastery assessment docs, Garry Hall.org.uk		
Real life discussion before teaching: Set in context of real life – calculating amounts, arrays etc		
Pre- assessment	Assessment tasks	Language Focus
	White Rose assessment block	
Teaching sequence	Learning tasks	
WALT: Count in groups of 3 Day 1: WILF: I can use concrete resources to make groups of 3. Day 2: WILF: I can make arrays and write a calculation to match it.	Day 1: Use a variety of resources (EG: counters, bead strings) to make groups of three. Practise counting these in threes verbally. Use these to ask questions and use the language of multiplication: EG lots of, times by, multiply by, groups of) Day 2: Demonstrate making an array by starting with 1 x 3 Show that when we change to 3 x1 (draw itas an array) it is the same answer. Ask children to draw arrays on their whiteboards to represent 2 x 3 and 3 x 2. Ask children to draw the rest of the 3 x table using arrays and then consolidate learning using mathematical language and counting the groups of arrays in threes. Ensure they know how to write the calculation to match each array Have some arrays ready on IWB. Show them and quickly they write they answer on their whiteboards. Practise in books: Give some arrays and they write the calculation to match it and then give the calculation and they write the array. Apply: Odd one out/spot the mistake: give some arrays that are in the three times table and some with unequal groups. GD: Worded harder problems- use of NCETM assessment doc.	Times Multiply Lots of Groups of Equal groups of
WALT: Count in multiples of three WILF: I can solve calculations and problems using pictorial representations.	Show some pictorial representaions of objects counting in threes EG: Give similar questions for practise questions(independent)  	Times Multiply Lots of Groups of Equal groups of

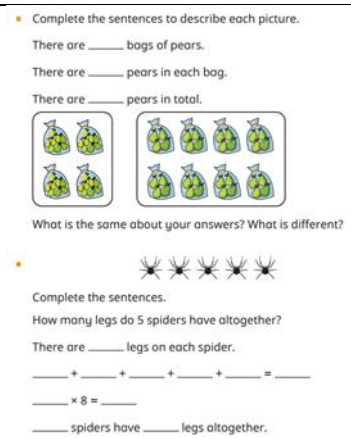
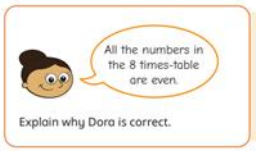
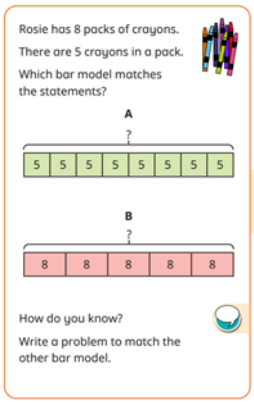
	Show a worded problem and ask children to draw images to work out the problem: Give similar problems for apply task (independent) EG GD - 	
WALT: Multiply by three WILF: I can solve calculations by counting in threes.	Use a number sqaure (100) and ask children to count in threes -colour in every third number. Write down the three times table EG 1 x 3 =, 2 x 3 = Introduce the vocabulary – multiple-the answer to a times table question is called a multiple Ask children to complete the rest of the table calculting the answers (multiples of 3). Show some missing numbers calculations using the 3 x table: 3 x ? = 30 Ensure they understand that the multiplication can be written either way and it is still the same answer (link back/model using arrays if needed). Independent tasks: Practise Solve calculations in any order: EG: 2 x3 = 3 x 5 = 7 x3 = 1 x3 = Further practise:  Apply: Various worded problems EG:	Times Multiply Lots of Groups of Equal groups of Multiply

	 GD 	
WALT: Count in groups of 4 Day 1: WILF: I can use concrete resources to make groups of 4. Day 2: WILF: I can make arrays and write a calculation to match it.	Day 1: Use a variety of resources (EG: counters, bead strings) to make groups of four. Practise counting these in threes verbally. Use these to ask questions and use the language of multiplication: EG lots of, times by, multiply by, groups of) Day 2: Demonstrate making an array by starting with 1 x 4 Show that when we change to 4 x1 (draw itas an array) it is the same answer. Ask children to draw arrays on their whiteboards to represent 2 x 4 and 4 x 2. Ask children to draw the rest of the 4 x table using arrays and then consolidate learning using mathematical language and counting the groups of arrays in fours. Ensure they know how to write the calculation to match each array Have some arrays ready on IWB. Show them and quickly they write they answer on their whiteboards. Practise in books: Give some arrays and they write the calculation to match it and then give the calculation and they write the array. Apply: Odd one out/spot the mistake: give some arrays that are in the three times table and some with unequal groups. GD: Worded harder problems- use of NCETM assessment doc.	Times Multiply Lots of Groups of Equal groups of

WALT: Count in multiples of four WILF: I can solve calculations and problems using pictorial representations.	Show some pictorial representations of counting in fours on whiteboardMake sure children are counting in groups of four. Practise (EG)  Apply:  GD  	Times Multiply Lots of Groups of Equal groups of
WALT: Multiply by four WILF: I can solve calculations by counting in fours.	Use a number sqaure (100) and ask children to count in fours -colour in every fourth number. Write down the three times table EG 1 x 4 =, 2 x 4 = Introduce the vocabulary – multiple-the answer to a times table question is called a multiple	Times Multiply Lots of Groups of Equal groups of Multiply

	Ask children to complete the rest of the table calculting the answers (multiples of 4). Show some missing numbers calculations using the 4 x table: 4 x ? = 40 Ensure they understand that the multiplication can be written either way and it is still the same answer (link back/model using arrays if needed). Independent tasks: Practise Solve calculations in any order: EG: 2 x4 = 4 x 5 = 7 x4 = 1 x4 = Further practise: • Complete the number sentences. ▸ 1 × 4 = _____ ▸ 9 × 4 = _____ ▸ 2 × _____ = 8 ▸ 32 = _____ × 4 ▸ _____ = 5 × 4 ▸ _____ × 4 = 48 • 8 children go to the cinema. One ticket costs £4 How much does it cost altogether? Apply: Various worded problems EG:  GD	

	 	
WALT: Count in groups of 8 Day 1: WILF: I can use concrete resources to make groups of 8. Day 2: WILF: I can make arrays and write a calculation to match it.	Day 1: Use a variety of resources (EG: counters, bead strings) to make groups of eight. Practise counting these in eights verbally. Use these to ask questions and use the language of multiplication: EG lots of, times by, multiply by, groups of) Day 2: Demonstrate making an array by starting with 1 x 8 Show that when we change to 8 x1 (draw itas an array) it is the same answer. Ask children to draw arrays on their whiteboards to represent 2 x 8 and 8 x 2. Ask children to draw the rest of the 3 x table using arrays and then consolidate learning using mathematical language and counting the groups of arrays in eights . Ensure they know how to write the calculation to match each array Have some arrays ready on IWB. Show them and quickly they write they answer on their whiteboards. Practise in books: Give some arrays and they write the calculation to match it and then give the calculation and they write the array. Apply: Odd one out/spot the mistake: give some arrays that are in the three times table and some with unequal groups. GD: Worded harder problems- use of NCETM assessment doc.	Times Multiply Lots of Groups of Equal groups of
WALT: Count in multiples of eight WILF: I can solve calculations and problems using pictorial representations.	Show some pictorial representations of counting in eights on whiteboardMake sure children are counting in groups of eight. Practise (EG)	Times Multiply Lots of Groups of Equal groups of

	 Apply:   GD 	
WALT: Multiply by eight WILF: I can solve calculations by counting in eights.	Use a number sqaure (100) and ask children to count in eights -colour in every eighth number. Write down the three times table EG 1 x 8 =, 2 x 8 = Introduce the vocabulary – multiple-the answer to a times table question is called a multiple Ask children to complete the rest of the table calculting the answers (multiples of 8). Show some missing numbers calculations using the 8 x table: 8 x ? = 40 Ensure they understand that the multiplication can be written either way and it is still the same answer (link back/model using arrays if needed).	Times Multiply Lots of Groups of Equal groups of Multiply

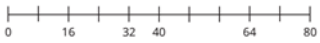
Independent tasks:

Practise

Solve calculations in any order:
EG: 2 x8 =
8 x 5 =
7 x8 =
1 x8 =

Further practise:

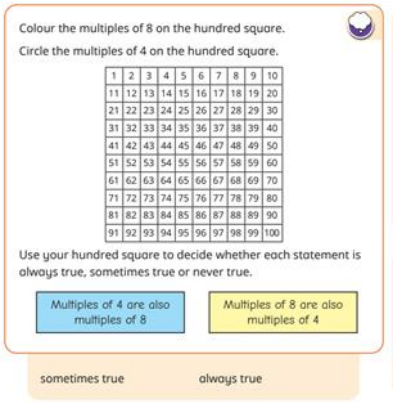
- Complete the calculations.
  - 1 × 8 = _____
  - 2 × _____ = 16
  - _____ ÷ 8 = 11
  - 72 ÷ 8 = _____
  - 64 = _____ × 8
  - _____ × 8 = 48
- Complete the number line.



Apply: Various worded problems EG:

- 9 children go swimming.
  It costs £8 for one child to go swimming.
  How much does it cost altogether?

- 56 children are going on a school trip.
  Each minibus can take 8 children.
  How many minibuses are needed?



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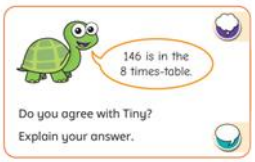
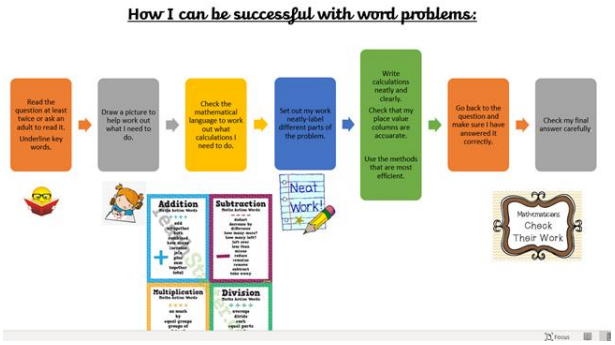
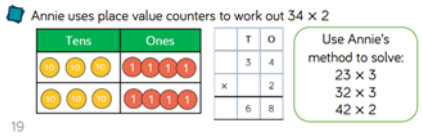
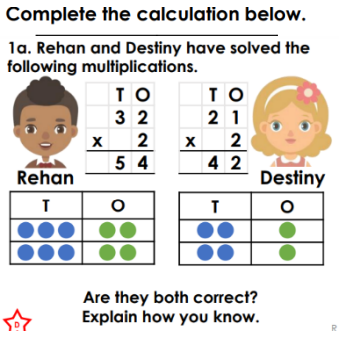
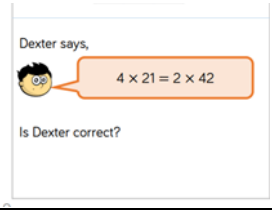
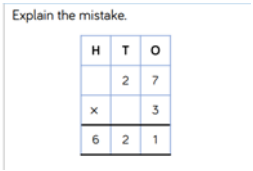
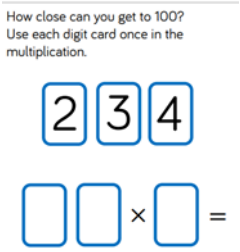
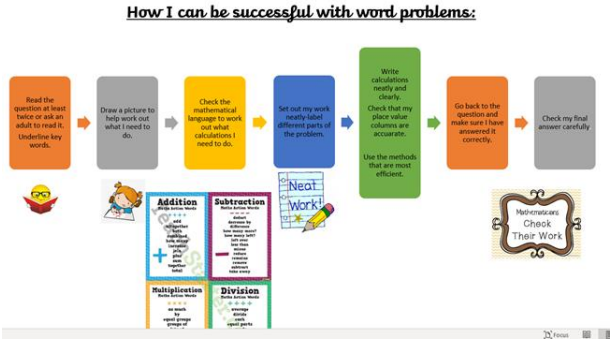
	 	
WALT: Solve word problems involving the 3, 4 and 8 x tables WILF: I can use my times tables to solve problems.	Write a range of mixed calculations on the board for the 3, 4 and 8 x table. Put a topic/real life related word problem on the board EG: On 3 days, the Iron Man walked 8 miles per day. Show the graphic organiser:  Tell children that we can use these steps to be successful when solving problems: Go through the steps using the word problem as a model-draw on large paper to show how you would solve it by following each step carefully. Now put another word problem on the board. Ask children to follow the steps and work in pairs on big paper with colured pens. Go through the answer and children self check. Give other word problems for children's independent tasks: Work up from easy to harder questions by putting in more or less steps or more complex vocabulary.	
Assessment of knowledge at this point.	Intervention where needed.	
WALT: Multiply 2 digits by 1 digit WILF: I can use base 10 to multiply 2 x 1 digit numbers.	Write the multiplication 21 x 3 on the board as a number sentence. Ask children to say what it means using various vocabulary. Now write it in a column. Tell them that it means the same thing 21 x3 =	Groups of Lots of 2 digit 1 digit Multiply Multiplied by

	Model how to use base 10 to solve the question by partitioning the tens and ones into groups of 3 (see image) alongside the column multiplication.  Model how to add the ones and write it in the column correctly then the tens. Give some more and children use base 10 to solve in pairs.	
WALT: Multiply 2 digits by 1 digit WILF: I can solve calculations using pictorial images	Repeat last step to consolidate prior learning. Move onto using pictorial images to calculate but still have Base 10/place value counters if children need them. Practise  Apply:  GD  	multiply, group, sets of, digits
WALT: Multiply 2 digits by 1 digit	Practical into formal written method Show a calculation EG 23 x 4 Using base 10 as in previous lessons, model again how to use the base 10 alongside the column method and verbally talk through the process in small steps making sure children know to calculate the ones first then the tens and writing in the correct place in the	multiply, group, sets of, digits, formal method

	column. Ensure that the children are using their multiples and not just counting each one. Give some more to do in pairs on whiteboards just by writing the column calculation on the board-can they solve independently or by using the base 10 independently and writing in the column correctly? Ask children if they can calculate without using base 10 and model how to do this. Practise: 2 x 1 digit column calculations to solve. Apply:  Explain the mistake. H T O 2 7 × 3 6 2 1 And/or worded problems GD  How close can you get to 100? Use each digit card once in the multiplication. 2 3 4 □□ × □ =	
WALT: Solve word problems involving 2 x 1 digit numbers WILF: I can use column multiplication to solve problems.	Put a topic/real life related word problem on the board EG: On 23 children all ate 3 sweets each. How many did they eat in total Show the graphic organiser:  How I can be successful with word problems: Read the question at least twice or ask an adult to read it. Underline key words. Draw a picture to help work out what I need to do. Check the mathematical language to work out what calculations I need to do. Set out my work neatly label different parts of the problem. Write calculations neatly and clearly. Check that my place value columns are accurate. Use the methods that are most efficient. Go back to the question and make sure I have answered it correctly. Check my final answer carefully Addition Subtraction Multiplication Division Neat Work! Mathematicians Check Their Work Tell children that we can use these steps to be successful when solving problems:	Column method Multiplied by Groups of Lots of Word problems

	Go through the steps using the word problem as a model- draw on large paper to show how you would solve it by following each step carefully and showing that they need to calculate using column multiplication. Now put another word problem on the board. Ask children to follow the steps and work in pairs on big paper with colured pens. Go through the answer and children self check. Give other word problems for children's independent tasks: Work up from easy to harder questions by putting in more or less steps or more complex vocabulary.	
Assessment and intervention		

Y4 Personalised Learning Journey Start date: WB: 15.11.2

NC Objectives:

Year 3

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Year 4

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

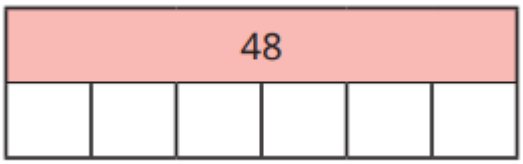
Resources/documents: Ready to Progress Guidance, White Rose Small steps, White Rose Calculation, deepening understanding resources Policies (Use of concrete), NCETM mastery assessment docs, past SATs questions. Deepening Understanding TTRS Prodigy Maths Classroom secrets

Numicon, Hundred squares, Multiplication cards, timetable fact cards, multiplication games, Base 10. Place value counters. Unifex (SEN),, beads and other objects, counters to create arrays.

Real life discussion before/during teaching : Where do we use Place Value in real life:

EG: pizza cakes

Pre- assessment	Assessment tasks	Language Focus
Revision from previous years: Puma assessments	White Rose assessments	
Teaching sequence	**Learning tasks**	**Language Focus**
Multiples of 3	This small step revisits learning from Year 3 around multiplying by 3 and the 3 times-table. Children explore the link between counting in 3s and the 3 times-table to understand multiples of 3 in a range of contexts. They use familiar representations such as number tracks and hundred squares to represent multiples of 3. They explore how to recognise if a number is a multiple of 3 by finding its digit sum: if the sum of the digits of a number is a multiple of 3, then the number itself is also a multiple of 3 This small step includes multiples of 3 up to 3 × 12 and will be useful support for learning multiples of 6 and 9 in future steps. 3 | 6 | | 12 | | 18 | 21 | 24 | | | 33 | 36 **Misconceptions:**	• Multiple • Lots of… • Arrays

	• Children may think that any number with 3 ones is a multiple of 3 • An early mistake when counting in 3s will affect all subsequent multiples. • Children may always begin counting from 3 to find a larger multiple of 3, when they could use the multiples they already know to find the new information	
Multiply and divide by 6.	In this small step, children build on their knowledge of the 3 times-table to explore the 6 times-table. The step aims to embed the children's fluency skills with the 6 times-table, while also providing them with strategies to use the multiplication facts they know to find unknown facts. Children explore the fact that the 6 times-table is double the 3 times-table. Children who are confident in their times-tables can also explore the link between the 5 and 6 times-tables. They use the fact that multiplication is commutative to derive values for the 6 times-tables. This is developed further with division facts, where children explore fact families to embed their understanding of division as the inverse of multiplication. **Numicon**  **Bar models**  **Misconceptions:** • Children may always start at 1 × 6 = 6 and recite the times-table, rather than use the number facts they know to find the facts they are not as secure with. • When writing fact families, children may follow the pattern from multiplication and see division as commutative, for example writing 42 ÷ 6 = 7 so 6 ÷ 42 = 7 • Children may not recognise that when they are dividing by a greater number they get a smaller answer.	
Multiply and divide by 9.	In this small step, children are introduced to the 9 times-table. They use a range of strategies to support their fluency, such as looking for number patterns and finding unknown number facts from known facts, for example subtracting from the 10 times-table or tripling the 3 times-table, and these will be built upon later in the block. Children explore the structure of the 9 times-table using a range of models and pictorial representations, and by exploring multiples	

	of 9 in context. They also use commutativity with the facts they already know from other times-tables. Children find division facts and explore fact families to embed their understanding of division as the inverse of multiplication. **Misconceptions:** • When finding multiplication facts, children may always start at 1 × 9 = 9 and recite the times-table rather than using the number facts they know to find the facts they are not as secure with. • When writing fact families, children may follow the pattern from multiplication and see division as commutative, writing examples such as 54 ÷ 9 = 6 so 9 ÷ 54 = 6	
9 times table and division facts	Building on the previous step, children become more fluent using the 9 times-table and apply the multiplication and division facts in a wide variety of contexts. To establish the facts, children use strategies such as using the 10 times-table to derive the 9 times-table, and understanding that each multiple of 9 is triple the equivalent multiple of 3 They investigate finding the digit sum and look for patterns that will support them in identifying multiples of 9: if the sum of the digits of a number is a multiple of 9, then the number itself is also a multiple of 9. This, and the corresponding rule for the 3 times-table, will support their learning in the next step, where they compare the 3, 6 and 9 times-tables. **Misconceptions:** • Children may confuse different terminology to describe multiplication and division, such as “equal groups”, “lots of”, “times”, “multiple” and so on. • An early mistake when counting in 9s will affect all subsequent multiples. • Children may use tricks to find multiplication facts in the 9 times-table but not be able to use these to find the related division facts.	
The 3,6- and 9-times tables.	In this small step, children make links between the 3, 6 and 9 times-tables to deepen their understanding and embed fluency with these times-tables. This is done by exploring the structure of the times-tables using resources such as arrays and hundred squares, as well as via tasks that require children to reason and explore number facts to look for structural patterns. On completion of this step, children should be confident with their 2, 3, 4, 5, 6, 8, 9 and 10 times-tables before moving on to look at the remaining times-tables later in the block. **Misconceptions:**	

	• Children may see the pattern of doubling 3 times-table facts to find 6 times-table facts, then make the mistake of assuming that they can double the 6 times-table facts to find 9 times-table facts. • Children may rely on reciting the times-tables, rather than using known facts at other points in the times-tables to help them. • Even when children are secure in multiplication facts, they may not be confident with the corresponding divisions.	
Multiply and divide by 7.	In this small step, children use their knowledge of multiples and count in 7s to make the link between repeated addition and multiplication. Children apply their knowledge of equal groups and use a range of concrete and pictorial representations to deepen their understanding of multiplying by 7. They also draw on ideas from previous steps to explore flexible partitioning to show, for example, 8 × 7 = 5 × 7 + 3 × 7 or 8 × 7 = 8 × 5 + 8 × 2 Children also explore dividing by 7 through sharing into 7 equal groups and grouping into 7s. **Misconceptions:** • Children may need support to use the multiplication facts that they are confident in to find the ones they do not know as well. • Children may not be able to identify which number in a number sentence corresponds with which number in a context. • Children may find all multiplication facts by starting from 1 × 7 and then reciting their times-table facts, rather than using facts they know to find the facts they do not know.	
7 times table and division facts.	In this small step, children use their knowledge of multiples and count in 7s to make the link between repeated addition and multiplication. Children apply their knowledge of equal groups and use a range of concrete and pictorial representations to deepen their understanding of multiplying by 7. They also draw on ideas from previous steps to explore flexible partitioning to show, for example, 8 × 7 = 5 × 7 + 3 × 7 or 8 × 7 = 8 × 5 + 8 × 2 Children also explore dividing by 7 through sharing into 7 equal groups and grouping into 7s **Misconceptions:** • Children may need support to use the multiplication facts that they are confident in to find the ones they do not know as well. • Children may not be able to identify which number in a number sentence corresponds with which number in a context. • Children may find all multiplication facts by starting from 1 × 7 and then reciting their	

	times-table facts, rather than using facts they know to find the facts they do not know.	
7 times table and division facts.	In this small step, children bring together their knowledge of multiplying and dividing by 7 in order to become more fluent in the 7 times-table. Children construct fact families and use concrete and pictorial representations to make links between multiplication and division. It is important that children understand the structure of the multiplication table and can derive unknown facts from known facts. Children explore links between multiplication tables, investigating how this can help with mental strategies for calculation, such as $9 \times 7 = 9 \times 5 + 9 \times 2$. This step could also be an opportunity to use the 6 and 8 times-tables to derive the 7 times-table, for example $9 \times 7 = 9 \times 8 - 9$ or $9 \times 7 = 9 \times 6 + 9$. Drawing arrays is a useful way of helping children to see these links. **Misconceptions:** • Children may need support to use the multiplication facts that they are confident in to find the ones that they do not know as well. • Children may find all multiplication facts by starting from 1×7 and then reciting their times-table facts, rather than using facts they know to find the facts they do not know	
11 times table and division facts.	In this small step, children build on their knowledge of the 1 and 10 times-tables to explore the 11 times-table. They recognise that they can partition 11 into 10 and 1 and use known facts to support their understanding, for example $7 \times 11 = 7 \times 10 + 7 \times 1 = 77$ They use a range of concrete and pictorial representations to deepen their understanding of multiplying by 11 and to make links between multiplying and dividing by 11. They explore dividing by 11 through sharing into 11 equal groups and grouping into 11s. At this stage, children should already know the majority of facts from other times-tables, so highlighting the importance of commutativity is key in this step **Misconceptions:** • Children may need support to use the multiplication facts that they are confident in to find the ones that they do not know as well. • Children may not realise that 110, 121, 132 and so on are multiples of 11, as the previous multiples of 11 all have repeated digits, for example 66, 77, 88	
12 times table and division facts.	In this small step, children build on their knowledge of the 2 and 10 times-tables to explore the 12 times-table. They recognise that they can partition 12 into 10 and 2 and use known facts to support their	

	understanding, for example 7 × 12 = 7 × 10 + 7 × 2 = 84. They also build on their knowledge of the 6 times-table, recognising that multiplying by 12 is the same as multiplying by 6 and then doubling. Children use a range of concrete and pictorial representations to deepen their understanding of multiplying by 12 and to make links between multiplying and dividing by 12. They explore dividing by 12 through sharing into 12 equal groups and grouping into 12s. At this stage, children should already know multiplication facts from other times-tables, so highlighting the importance of commutativity is key in this step. **Misconceptions:** • Children may need support to use known multiplication facts to find new ones. • Children may find all multiplication facts by starting from 1 × 12 and then reciting their times-table facts, rather than using facts that they know.	
Multiply by 1 and 0.	In this small step, children explore the effect of multiplying by 1. They notice that when they multiply a number by 1, the result will always be the number itself. This small step also focuses on multiplying by zero. Children learn that when multiplying any number by zero the result is always zero. A common misconception with this small step is that children confuse the result of multiplying by zero with multiplying by 1. Ensure pictorial representations are used to address this misconception, so that children can see that 4 × 0 is the same as 4 lots of zero, which is equal to zero. **Misconceptions:** • Children may use addition instead of multiplication, for example 1 × 1 = 2 and 8 × 1 = 9 • Children may confuse the result of multiplying by zero with multiplying by 1 • When working out a longer multiplication, for example 3 × 4 × 5 × 0, children may start working from left to right rather than realising that as they are mutiplying by zero the answer must be zero.	
Divide a number by 1 and itself.	In this small step, children apply their knowledge of division and explore what happens to a number when they divide it by 1 or itself. Children can sometimes confuse the result of dividing a number by 1 with dividing a number by itself. Ensure concrete and pictorial representations are used to address this misconception, including examples that involve both structures of division. Stem sentences can be used to encourage children to see this, for example: 5 grouped into 5s is equal to 1 (5 ÷ 5 = 1) and 5 grouped into 1s is equal to 5 (5 ÷ 1 = 5). Following on from the previous small step, children may try to	

	divide a number by zero and it should be highlighted that this is not possible. **Misconceptions:** • Children may assume that division is commutative and think that 12 ÷ 1 = 1 ÷ 12 • Children may confuse the result of dividing a number by 1 with dividing the number by itself. • Children may think a number divided by itself is zero	
Multiply three numbers.	In this small step, children apply their knowledge of multiplication to multiply three numbers together. They are introduced to the idea of the associative law (but do not need to know it by name), which focuses on the fact that it does not matter how they group the numbers when they multiply. For example, 4 × 5 × 2 = (4 × 5) × 2 = 20 × 2 = 40 or 4 × (5 × 2) = 4 × 10 = 40 Encourage children to link this idea to commutativity and change the order of the numbers to group them more efficiently. Counters and cubes are effective concrete resources to use during this step to support children's understanding of the associative law. **Misconceptions:** • Children may need support ordering the numbers to group them more efficiently. • If children are not confident with their times-table facts, they may struggle with multiplying three numbers. • Children may automatically work from left to right without looking at the most efficient way to complete a calculation.	
Factor Pairs	In this small step, children are introduced to factors for the first time. They learn that when they multiply two whole numbers to give a product, both the numbers that they multiplied together are factors of the product. For example, 3 × 5 = 15, so 3 and 5 are factors of 15. 3 and 5 are also referred to as a "factor pair" of 15 They then generalise this further to conclude that a factor of a number is a whole number that divides into it exactly. Children create arrays using counters to develop their understanding of factor pairs. It is important for children to work systematically when finding the factor pairs of a number in order to ensure that they find all the factors. For example, when finding factor pairs of 12, begin with 1 × 12, then 2 × 6, 3 × 4. At this stage, children should recognise that they have already used 4 in the previous calculation, therefore all factor pairs have been identified. **Misconceptions:**	

	• Children may not work systematically, meaning that they could miss some factor pairs. • Children may find it difficult to understand why not all factors come in pairs, for example 4 × 4 = 16, so this only gives 1 factor of 16, not 2	
Use factor pairs	In this small step, children build on their knowledge of factor pairs from the previous step as they use them to write equivalent calculations. For example, as 3 and 4 are a factor pair of 12, this means that 5 × 12 is equivalent to 5 × 3 × 4 or 5 × 4 × 3 Children explore equivalent calculations using different factors pairs, and then practise calculating with them to identify which factor pair produces the easiest calculation to complete mentally. The calculation that is deemed easiest will vary for different children, as they are likely to focus on using the times-tables they are most confident with. **Misconceptions:** • Children may need support finding the appropriate factor pairs that will enable them to solve the calculation mentally. • Children may partition a number rather than finding a factor pair	
Multiply by 10	In this small step, children explore multiplying by 10. They need to be able to visualise making a number 10 times the size and understand that "10 times the size" is the same as "multiply by 10". Children use their understanding that 1 ten is 10 times the size of 1 one and 1 hundred is 10 times the size of 1 ten to support them with this step. A place value chart is useful to show this. They recognise that when multiplying by 10 the digits move one place value column to the left and zero is needed as a placeholder in the now blank column. While children may notice a zero is always used as a placeholder when multiplying a whole number by 10, it is important that they do not develop the misconception that they just add a zero to multiply by 10, as this will cause confusion when multiplying decimals in later learning. **Misconceptions:** • Children may move only one digit and misplace the placeholder, for example 45 × 10 = 405 • Children may not realise that calculations of the form 10 × and × 10 can be carried out in the same way.	
Multiply by 100	Building on the previous step, children learn to multiply whole numbers by 100, understanding that this is the same as multiplying by 10 and then multiplying by 10 again. They need to be able to	

	visualise making a number 100 times the size and understand that “100 times the size” is the same as “multiply by 100”. Children use a place value chart, counters and base 10 to explore what happens to the values of the digits when multiplying by 100. Encourage children to recognise that when multiplying whole numbers by 100, the digits move two place value columns to the left and zeros are needed as placeholders in the now blank columns. As with multiplying by 10 in the previous step, it is important that they do not develop the misconception that they just add two zeros to multiply by 100, as this will cause confusion when multiplying decimals by 100 **Misconceptions:** • Children may move only some of the digits and misplace the placeholder, for example 45 × 100 = 4,005 • Children may need support to recognise that multiplying by 100 is the same as multiplying by 10 and multiplying by 10 again.	
Divide by 10	In this small step, children divide whole numbers by 10, with questions that only have whole number answers. They need to be able to visualise making a number one-tenth the size and understand that “one-tenth the size” is the same as “dividing by 10”. Children use concrete resources and a place value chart to see the link between dividing by 10 and the position of the digits of a number before and after the calculation. They recognise that when dividing by 10, the digits move one place value column to the right. They begin to understand that multiplying by 10 and dividing by 10 are the inverse of each other. Children may notice that in all the examples they see, they need to “remove the zero” to find the answer. Ensure that they do not generalise this too far and use it as their method, as this will cause issues in later learning when looking at decimals. **Misconceptions:** • Children may incorrectly conclude that to divide by 10, they always just remove a zero from the number. • Children may confuse multiplying and dividing by 10, and move the digits in the wrong direction in a place value chart	
Divide by 100	In this small step, children build on their understanding of dividing by 10 and notice the link between dividing by 10 and dividing by 100. They need to be able to visualise making a number one-hundredth the size and understand that “one-hundredth the size” is the same as “dividing by 100”. Children use concrete resources and a place value chart to see the link between dividing by 100 and the position of the digits before and after the calculation. They realise that when dividing by 100, the digits	

	move two place value columns to the right. They begin to understand that multiplying by 100 and dividing by 100 are the inverses of each other. Money is a good real-life context for this small step, as exchanging, for example, pounds for pence can be used for the concrete stage. **Misconceptions:** • Children may need support in recognising that onehundredth the size is the same as dividing by 100 • Children may divide by 10 instead of 100 • Children may confuse multiplying and dividing by 100, and move the digits in the wrong direction	
Related facts – multiplication and division.	In this small step, children bring together the skills learnt so far in this block as they explore calculations related to known facts. Children explore scaling facts by 10 and 100, for example using the fact that 4 × 7 = 28 to derive 4 × 70 = 280 and 4 × 700 = 2,800. They then look at this relationship with division, for example using 12 ÷ 3 = 4 to derive 120 ÷ 3 = 40 and 1,200 ÷ 3 = 400. Care should be taken to ensure that children do not also think that 12 ÷ 30 = 40. This is a good opportunity to remind children that multiplication is commutative, but division is not. A range of representations are used to make the link between multiples of 1, 10 and 100 that will be familiar to children from previous steps in this block and in Year 3 **Misconceptions:** • Children may derive incorrect division facts by using the rules that they have learnt about related multiplication facts. • Children may try to find results by calculation rather than recognising the relationship between one fact and another.	
Informal written methods for multiplication	In this small step, children use a variety of informal written methods to multiply a 2-digit number by a 1-digit number. Children follow a clear progression of methods and representations to support their understanding. They begin by using place value charts to recognise multiples of a number and make the link to repeated addition. The use of base 10 encourages children to partition the tens and ones and unitise the tens, laying the foundations for later work. Part-whole models are used to illustrate the informal method of partitioning. Children use number lines, along with their knowledge of multiplying by 10. For example, to work out 32 × 4 they count along a number line to show 10 × 4 + 10 × 4 + 10 × 4 + 2 × 4. They may also use their knowledge of factor pairs from earlier in the block to multiply **Misconceptions:**	

	• Children may not use the correct place value, multiplying tens as ones, for example 34 × 6 = 3 × 6 + 4 × 6 • Children may conflate the partitioning and factorising methods, for example when calculating 4 × 18, they may do 4 × 9 + 4 × 2	
Multiply by a 2- digit number by a 1-digit number.	In this small step, children progress from multiplying using informal written methods to the formal written method. The short multiplication method is introduced for the first time, initially in an expanded form and then in the formal short single-line form. Children first do calculations where there are no exchanges, then move on to one and two exchanges. Place value counters in place value charts are used to illustrate the structure of the short multiplication by presenting the concrete model alongside the formal written method. Concrete manipulatives alongside abstract calculations are particularly useful to support children's understanding of exchanges. **Misconceptions:** • Children may exchange ones or tens incorrectly, often by missing zeros or including zeros erroneously. • Children may not include digits created through exchanging, either by not writing them down when completing the exchange or neglecting to include them in the calculation afterwards. • When exchanges are performed, if digits are written in the incorrect place, this can lead to errors with the rest of the calculation.	
Multiply a 3-digit number by a 1-digit number	Following on from the previous step, children extend the formal written method to multiplying a 3-digit number by a 1-digit number. They continue to use the short multiplication method, but now with more columns. Children need to be secure with the previous step before moving on to this one. Place value counters in place value charts are again used to model the structure of the formal method, allowing children to gain a greater understanding of the procedure, particularly where exchanges are needed. They continue to use the counters to exchange groups of 10 ones for 1 ten and also exchange 10 tens for 1 hundred and 10 hundreds for 1 thousand. This is mirrored by the positioning of the exchanged digit in the formal written method. The focus here is on the short-written method, but the expanded method could be used to support understanding for children who need it. **Misconceptions:** • The use of a zero in the ones or tens column can sometimes expose misunderstandings, as children can be unsure of multiplying by zero.	

	• Children may omit the exchange or include the exchange in an incorrect place on the formal written method.	
Divide a 2-digit number by a 1-digit number X2	In this small step, children use their division facts from the Autumn term to build on their knowledge of dividing a 2-digit number by a 1-digit number from Year 3 Initially, children carry out divisions where the tens and ones are both divisible by the number being divided by without any remainders, for example 96 ÷ 3 and 84 ÷ 4. They then move on to calculations where they need to exchange between tens and ones, for example 96 ÷ 4. Place value counters are used to explore the sharing structure of division. Children do not need to use the formal short division method at this stage and may use informal jottings or representations such as a part-whole model to record their working instead **Misconceptions:** • Children may partition the 2-digit number correctly, but then divide the tens as if they are ones, for example 96 ÷ 3 = 9 ÷ 3 + 6 ÷ 3 • Instead of using their times-tables knowledge, children may revert to less efficient methods such as drawing circles, then drawing dots to share between the circles. • Children may always partition into tens and ones when other forms of partitioning are more appropriate.	
Divide a 3-digit number by a 1-digit number.	In this small step, children continue to develop their understanding of division by extending from dividing 2-digit numbers in the previous two steps to dividing 3-digit numbers. Place value counters are again used to represent the calculations, so that children can make sense of exchanges that are needed to complete the division. Part-whole models are also used to show how flexible partitioning can support the process of division by looking for multiples of the number being divided by. The step starts with divisions that do not leave a remainder, before progressing to divisions with remainders. By the end of this step, children should have a good understanding of division that will support them when they move on to the formal written method in Year 5 **Misconceptions:** • Children may partition the 3-digit number correctly, but then divide the hundreds and tens as if they are ones, for example 846 ÷ 2 = 8 ÷ 2 + 4 ÷ 2 + 6 ÷ 2 • Children may divide the whole number rather than partitioning into hundreds, tens and ones and then unitising the hundreds and tens.	

Correspondence problems.	In this small step, children consolidate their understanding of correspondence problems from Year 3, using multiplication to work out the number of possible combinations of sets of items. Children use a range of representations and contexts to support them. Using tables helps to encourage children to adopt a systematic approach to finding all of the possible combinations in a given context. Children then generalise to make the link between the number of possibilities for each item and using multiplication to find the total number of combinations. Once confident with finding all possible combinations for two sets of items children may begin to explore finding all possible combinations for three sets of items. **Misconceptions:** • Children may see the same choices in a different order as a different choice. • Children may need support to work systematically when listing all possibilities. • Children may add instead of multiply the number of possibilities for each item.	
Efficient multiplication.	In this small step, children consolidate their knowledge and understanding of multiplication and begin to make decisions regarding the most efficient or appropriate methods to use in a range of contexts. Children look at times-tables facts, building strategies for finding unknown facts that will support them to strengthen their fluency of times-tables. They then examine a range of strategies for multiplying a 2-digit number by a 1-digit number. Finally, they use arrays to explore multiplicative structure, in particular the associative law and distributive law. **Misconceptions:** • Children may conflate different methods, leading to misunderstanding. • Children may partition the numbers correctly, but then multiply the tens as if they are ones, for example $34 \times 6 = 3 \times 6 + 4 \times 6$ • Children may attempt to learn the different methods procedurally. It is vital that children understand how they are manipulating the numbers, rather than try to remember a long series of instructions.	

Y5 Personalised Maths Learning Journey Date: WB: 22.11.21

NC Objectives:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Resources/documents:

Ready to Progress Guidance, White Rose Small steps, White Rose Calculation Policies (Use of concrete), NCETM mastery assessment docs.

Base 10, place value counters, part-whole models, bar models, real-life objects e.g. sweets etc.

Real life discussion before teaching:
Building, constructions, shopping, baking

Pre- assessment	Assessment tasks	Language Focus
Revision from previous years: • recall multiplication and division facts for multiplication tables up to 12 × 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers • recognise and use factor pairs	White Rose Year 4 Multiplication and Division (Autumn Term) Assessment sheets.	Multiple, multiplication, lots of, groups of, divide, share, factors, common, prime, square

and commutativity in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout • solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects		
Teaching sequence	Learning tasks	Language Focus
1. WALT: To identify multiples. WILF: I will use my knowledge of times tables facts to identify a range of multiples.	What is a multiple? Give examples. Look for patterns in multiples. Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary. Problem solving and reasoning questions. GL- use numicon and base 10 to practice 2x and 5x tables. WALT: To recall multiplication facts. WILF: I will use manipulatives to show 2x and 5x multiplication facts.	Multiple, product, pattern, consecutive
2. WALT: To identify Factors. WILF: I will use my knowledge of times tables facts to identify factors and factor pairs.	What is a factor? Explain. Factors come in factor pairs. We can use this to work systematically to find factors- reminder of Alien Hunt task from previous year. Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary.	Multiple, product, pattern, consecutive, factors, factor pairs, systematically

	Problem solving and reasoning questions. GL- as previous lesson but now introduce the word 'Factors'. Can she find the factors of 2x and 5x tables?	
3. WALT: To identify common factors. WILF: I will use my knowledge of times tables facts to identify common factors.	Recap of factors and factor pairs. What are common factors? Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary. Problem solving and reasoning questions. GL- look at 2x, 5x and now 10x. Find the factors and identify common factors.	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors
4. WALT: To identify prime numbers. WILF: I will use my knowledge of factors to identify prime numbers.	What are prime numbers? who can give example? Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary. Problem solving and reasoning questions. GL- practise of 2x, 5x and 10x. some of this time can be TT Rockstars.	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite
5. WALT: To show that a square number is a number that is multiplied by itself WILF: To use arrays to show examples of different squared numbers.	Show a square number on the board as an array. What shape does this make? Explain that this is a squared number. show the square number symbol and where it is positioned. Have children draw some examples in their books using arrays and they write the number next to it e.g. 3 x 3 = 3^2 = 9. Have them do this for 3, 5 and 6 squared in their books. Problem solving and reasoning questions. GL- practise of 2x, 5x and 10x. some of this time can be TT Rockstars.	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays

6. WALT: To show that a cubed numbers is a number that is multiplied by itself and then itself again. WILF: To use knowledge of multiplication facts to calculate cubed numbers.	Show a cube. Discuss the cubes across, down and back. Represent this on the board. E.g. 3 x 3 x 3. Now show 3^3 and discuss. Have the children write and practice this in their books. E.g. 4 x 4 x 4= 4^3 = 64 Problem solving and reasoning questions. GL- practise of 2x, 5x and 10x. some of this time can be TT Rockstars.	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers
7. WALT: To multiply by 10. WILF: To use understanding of place value to multiply by 10.	Model x10- using place value. Focus on apply questions input. Problem solving and reasoning questions. GL- 2-digit x10	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x bigger, place value
8. WALT: To multiply by 100. WILF: To use understanding of place value to multiply by 100.	Model x100- using place value. Focus on apply questions input. Problem solving and reasoning questions. GL- 2-digit x 100	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x/100x bigger, place value
9. WALT: To multiply by 10, 100 and 1000. WILF: To use place value to multiply by 10, 100 and 1000.	Use input to model apply and GD questions Problem solving and reasoning questions. GL- 2-digit x 10 and 100	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x/100x/1000x bigger, place value
10. WALT: To divide by 10. WILF: To use understanding of place value to divide by 10.	Model ÷10- using place value. Focus on apply questions input. Problem solving and reasoning questions. GL- 2-digit ÷10	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x/100x/1000x bigger, place value, 10x smaller, divide
11. WALT: To divide by 100. WILF: To use understanding of	Model ÷100- using place value. Focus on apply questions input. Problem solving and reasoning questions. GL- 3-digit ÷100	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x/100x/1000x bigger, place value, 10x/100x smaller, divide

place value to divide by 100.		
12 WALT: To divide by 10, 100 and 1000. WILF: To use understanding of place value to divide by 1000.	Use input to model apply and GD questions Problem solving and reasoning questions. Word problems: 1. There are 100 children in each club at Hayes Park School. There are 31 different after school clubs. How many children attend clubs in total? 2. The capacity of Sheffield United FC's stadium is 4045 seats. Liverpool's stadium has a capacity for 1000 times more spectators. What is the capacity of Liverpool's stadium? 3. Rotherham United's stadium has a capacity that is 10 times less than that of Liverpool. What is the capacity for Arsenal's stadium? 4. To build an adventure playground it will cost Doncaster council £7549. Ealing council can build it at a price that is hundred times cheaper. How much could they build it for? 5. A Hatchimal toy costs £3.40. How much would 10 Hatchimals cost? 6. Mrs Khan buys a cappuccino from Costa Coffee every morning. It costs £2.45. How much does she spend over 100 days? GL- 3-digit ÷ 10 and 100	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x/100x/1000x bigger, place value, 10x/100x/1000x smaller, divide
13. WALT: To identify multiples of 10, 100 and 1000. WILF: To use knowledge of times/divide by 10, 100 and 1000 to find relating facts.	22 x 7 = 154 model other relating facts e.g. 22 x 70 = ? 220 x 7 = ? etc Give them another and ask them to find relating facts- on whiteboard. Have them show and share with class. Discuss misconceptions. Problem solving and reasoning questions.	Multiple, product, pattern, consecutive, factors, factor pairs, systematically, common factors, prime, composite, square numbers, arrays, cube numbers, 10x/100x/1000x bigger, place value, 10x/100x/1000x smaller, divide

Y5 Personalised Maths Learning Journey Date: WB: 03/01/21

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- multiply and divide numbers mentally, drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Resources/documents:

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Base 10, place value counters, part-whole models, bar models, real-life objects e.g. sweets etc.

Real life discussion before teaching:
Building, constructions, shopping, baking

Pre- assessment	Assessment tasks	Language Focus
Revision from previous years: • recall multiplication and division facts for multiplication tables up to 12 × 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers • recognise and use factor pairs	White Rose Year 4 Multiplication and Division (Spring Term) Assessment sheets.	Multiple, multiplication, lots of, groups of, divide, share,

and commutativity in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout • solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects		
Teaching sequence	Learning tasks	Language Focus
1. WALT: To multiply a 2 or 3-digit number by a single digit. WILF: I will use a formal method (column method) to multiply a 2 or 3-digit number by a single digit.	Model how to use column method with a 2-digit number. Now do one with children explaining each step. Repeat with 3-digit number. Now put a 2 by 1-digit number and 3 by 1-digit number on the board. Those that can complete those can continue to practice while the other children are split for further intervention. Children will roll a dice to create their numbers- LAP children will have 1-6. MAP with have 1-9 dice and HAP will have 1-12 dice to create own 3-digit by 1-digit calculation. GL- use numicon and base 10 to practice 2x and 5x tables. WALT: To recall multiplication facts. WILF: I will use manipulatives to show 2x and 5x multiplication facts.	Multiple, multiply, column, place value
2. WALT: To multiply a 4-digit number by a single digit.	Put a 4 by 1-digit multiplication on the board. Do quick assess. Those that complete correctly can start on fluency task.	Multiple, multiply, column, place value, carry, exchange

WILF: I will use a formal method (column method) to multiply a 4-digit number by a single digit.	Those that struggled the previous day can go straight on to intervention with TA. Those that need some support with 4 by 1-digit based on fist questions. Will stay with CT for further modelling and examples before moving on to fluency. Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary. Problem solving and reasoning questions. GL- use numicon and base 10 to practice 4x tables. Help her to make links with 2x tables. Look for patterns such as all even numbers in ones column. WALT: To recall multiplication facts. WILF: I will use manipulatives to show 4x multiplication facts.	
3. 2 days WALT: To multiply a 2-digit number by a 2-digit. WILF: I will use a formal method (column method) to multiply a 2-digit number by 2-digit.	Day 1- Model how to use column method with a 2 by 2-digit number. Now do one with children explaining each step. Now put a 2 by 2-digit number on the board for children to solve independently. Those that can complete those can continue to practice while the other children are split for further intervention. Children will roll a dice to create their numbers- LAP children will have 1-6. MAP with have 1-9 dice and HAP will have 1-12 dice to create own 3-digit by 1-digit calculation. Day 2- Put a 2 by 2-digit multiplication on the board. Do quick assess. Those that complete correctly can start on fluency task. Those that struggled the previous day can go straight on to intervention with TA. Those that need some support with 2 by 2-digit based on first questions. Will stay with CT for further modelling and examples before moving on to fluency.	Multiple, multiply, column, place value, carry, exchange

	Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary. Problem solving and reasoning questions. GL- use numicon and base 10 to practice 4x tables. Help her to make links with 2x tables. Look for patterns such as all even numbers in ones column. WALT: To recall multiplication facts. WILF: I will use manipulatives to show 4x multiplication facts.	
4. WALT: To multiply a 3-digit number by a 2-digit. WILF: I will use a formal method (column method) to multiply a 3-digit number by 2-digit.	As day 2 above but with 3 by 2-digit number GL- As previous lesson	Multiple, multiply, column, place value, carry, exchange
5. WALT: To multiply a 4-digit number by a 2-digit. WILF: I will use a formal method (column method) to multiply a 4-digit number by 2-digit.	As day 2 above but with 4 by 2-digit number Word Problems 1. There are 35 rows of 24 dominoes. How many dominoes are there altogether? 2. There are 15 biscuits in a packet. A shop orders 156 packets. How many biscuits will be in the 156 packets? 3. It takes 18 minutes to make a toy car. How many minutes will it take to make 205 cars? 4. 614 people are sorted into teams of 18 for a competition. How many teams are there? 5. It is 8521 miles between Alaska and Death Valley. The coach drivers between the 2 12 times over the summer. How many miles will it have travelled? 6. A rugby club has an average attendance of 6962 people to each match. What is the total attendance for the 39 matches played in a season?	Multiple, multiply, column, place value, carry, exchange

	7. A cinema chain has 28 cinemas. The average weekly attendance is 9828 people. What is the total attendance across the whole chain? GL- WALT: To multiply a 2-digit number by a single digit. WILF: I will use a formal method (column method) to multiply a 2-digit number by a single digit. Complete task from lesson 1 from whole class learning- only do this if the last 2 lessons are secure.	
6. WALT: To divide a 2-digit by a 1-digit number. WILF: I will use different representations to divide and share 2-digit by 1-digit number.	Model different ways a representing division number sentences. E.g. bar model, part-whole, groups etc. Problem solving and reasoning questions. GL- using manipulatives to divide by 2 and 5. WALT: To divide by 2 and 5. WILF: I will use grouping to divide by 2 and 5.	Division, divide, share, group
7. division- inverse 2 by 1 WALT: To identify division facts. WILF: I will use inverse operation and knowledge of multiplication facts to identify relating division facts.	Model how multiplication facts can be used to find relating division facts. Explain and model how this can also be used to check answer. Children practice this skill- give some multiplication facts for the children to write as division fact. Then give some division facts for them to check using inverse if they are correct or not and explain what is wrong and why. GL- As previous lesson	Division, divide, share, group, inverse, relating facts, check
8. 2 days WALT: To divide a 3-digit by a 1-digit number. WILF: I will use formal written method (bus stop) to divide 3-digit by 1-digit number.	Day 1- Model bus stop a few times. Show how they can work out each step e.g. write multiplication down the side, dots for counting in groups etc. Now model with the children's input on what to do next and why. Then give one or 2 for them to complete independently. Those that understand can continue to practise using dice. Day 2- Put a division some on the board as quick assessment. Those that complete correctly can start on fluency task.	Division, divide, share, group, inverse, relating facts, check, formal method, bust stop

	Those that struggled the previous day can go straight on to intervention with TA. Those that need some support with 3 by 1-digit based on first questions. Will stay with CT for further modelling and examples before moving on to fluency. Once children have started. Have children that are on apply task to come to board to check understanding and give input on how to answer using correct vocabulary. Problem solving and reasoning questions. GL- using manipulatives to divide by 3 and 4. WALT: To divide by 3 and 4. WILF: I will use grouping to divide by 3 and 4.	
9. WALT: To divide a 4-digit by a 1-digit number. WILF: I will use formal written method (bus stop) to divide 4-digit by 1-digit number.	As day 2 above but with 4 by 2-digit number GL- As previous lesson	Division, divide, share, group, inverse, relating facts, check, formal method, bust stop
10. WALT: To divide using remainders. WILF: I will use formal written method (bus stop) to divide with remainders	Model bust stop with remainders. Use grouping to show how to find remainders Problem solving and reasoning questions. Word Problems GL- As previous lesson	Division, divide, share, group, inverse, relating facts, check, formal method, bust stop, remainders

Y6 Personalised Learning Journey Multiplication and division

NC Objectives:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the
- formal written method of long multiplication
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
  use their knowledge of the order of operations to carry out calculations involving the
- four operations
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- Use written division methods in cases where the answer has up to two decimal places
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- identify the value of each digit in numbers given to three decimal places and multiply
- and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal
- places
- solve problems which require answers to be rounded to specified degrees of
- accuracy
- Solve problems involving addition, subtraction, multiplication and division

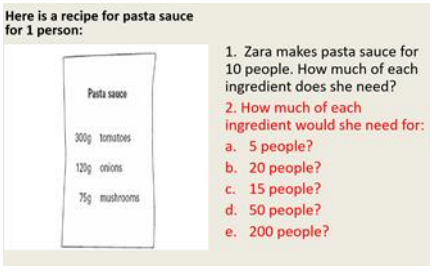
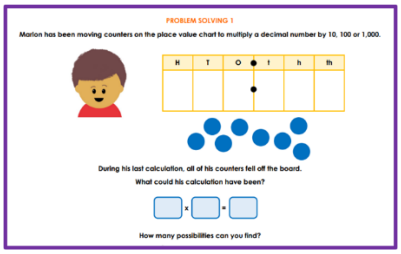
Resources/documents: Ready to Progress Guidance, White Rose Small steps, White Rose Calculation Policies (Use of concrete), NCETM mastery assessment docs, past SATs questions.

Base 10. Place value counters.

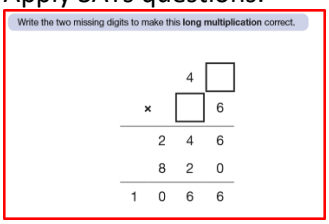
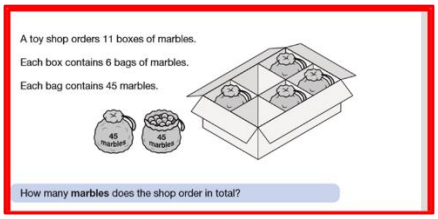
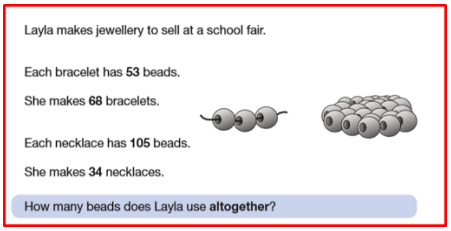
Real life discussion before/during teaching : Where do we use multiplication and division in real life:

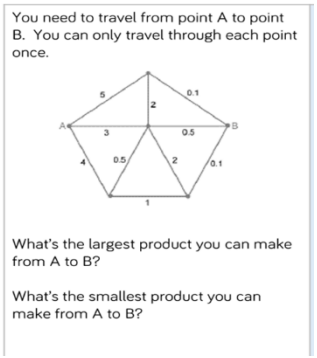
EG: Sharing out sweets,objects, money etc; at a restaurant sharing the bill.

Pre- assessment	Assessment tasks	Language Focus
Revision from previous years: Dividing and multiplying by multiples of 10 Column method multiplication 3 x 1 digit and 3 x 2 digit Short division of 2 and 3 digit numbers with and without regrouping and exchange.	Short assessment task Short assessment task Short division (bus stop method) of 2 and 3 digit numbers using place value counters/base 10.	Multiply Product Divisor Dividend Quotient Share Divide Divided by Inverse of multiplication
Teaching sequence	**Learning tasks**	**Language Focus**
WALT: Multiply by multiples of 10	Check that children know what is meant by a multiple of 10 and that 100s, 1000s, 10,000s, 100, 000s and 1,000,000 are all multiples of 10. Use a place value chart to demonstrate what happens to the digits when we multiply by 10 by	

	allowing the children to see the pattern -start easy such as 32 x 10 so they know the answer. Move to using the same rule for x 100, 1000, etc. ensure they use their place value chart and move the digits correctly. Move onto multiplying by other multiples of 10 EG 34 x 200 = 34 x 2 then x 100 OR 34 x 100 and then x 2. Ask them to complete some others on whiteboards. Then practise: Set A: 5.6 x 100 = 0.54 x = 54 x 1000 = 3570 5.5 x 2000 = 9.25 x 300 = 6.2 x 50 = Set B EG 0.45 x 60 = 5.2 x 500 = 45.1 x 10,000 = 7.65 x 20,000 = 8.75 x 50,000 = 9.2 x 100,000 = 98.5 x 400,000 = Apply  GD  	
WALT: divide by multiples of 10	Input as above but perform the inverse of place value chart.	

	Give the number 2.4 What as happened to it each time: Which multiple of 10 has it been multiplied or divided by? Children work in pairs: 24 240 480 0.24 24,000 0.024 Practise: Division of various integers and decimals by multiples of 10 Apply **Apply** **What has happened to the number 3.2 each time? Which multiple of 10 has it been multiplied or divided by?** • 32 • 320 • 3200 • 64,000 • 64 • 0.032 • 96 • 3.20 • 0.0032 GD 10g of gold costs £452.30. What is the cost of: A. 1g of gold? B. 5g of gold C. 100g of gold? D. 50g of gold? E. half a kilogram of gold. F. 3 kg of gold?  G. Explain clearly how you calculated your answer to question E.	
WALT: Multiply by 2 digit numbers	Give some column multiplications on board EG: a. 76 x 16 = b. 57 x 24 = c. 165 x 14 = d. 523 x 21 = e. 1342 x 25 = assess children – if secure, they can start staright away if not teach column method.	

	Practise similar to input Apply SATs questions:  Write the two missing digits to make this **long multiplication** correct. 4 □ × □ 6 2 4 6 8 2 0 1 0 6 6  A toy shop orders 11 boxes of marbles. Each box contains 6 bags of marbles. Each bag contains 45 marbles. How many **marbles** does the shop order in total?  Layla makes jewellery to sell at a school fair. Each bracelet has **53** beads. She makes **68** bracelets. Each necklace has **105** beads. She makes **34** necklaces. How many beads does Layla use **altogether**? *GD* *GD 1* *A rectangular leisure centre has a length of 42m and a width of 33m. The centre's swimming pool is 25 metres long and 12 metres wide.* *a.How much area of the leisure centre is used for other facilities other than swimming?* *b.Jay swims 234 lengths per week. How many metres does he swim in a week?* *c.It takes him approximately 83 seconds to swim one length. How many seconds does he swim each week?* *GD 2* *Rhona says that when her new baby sister is 3 days old she will have been alive for 240,000 seconds. Is she correct?* *Explain your answer fully using APE.*	
WALT: Multiply decimals using the column method.	Teach how to use the column method to solve multiplication of decimals and 1 and 2 digit numbers EG: 12.8 x 9 = 45.6 x 8 = 16.8 x 21 = 33.64 x 45 = Practise – examples like above Apply:	

	 GD 	
Concrete, pictoral and abstract. WALT: Use the short division method accurately.	Teach division when regrouping is needed using place value counters. When secure, use pictoral representations of place value counters, then abstract. Lots of practical in this session. Daily intervention to gap fill.	Divisor Dividend Quotient Share Divide Divided by Inverse of multiplication Regroup/exchange
2: WALT: Use the short division method to divide decimals by integers.	Teach division of decimals by integers when regrouping is needed using place value counters. And no remainders When secure, use pictoral representations of place value counters, then abstract. Problem-solving and reasoning – SATS questions involving money- various difficulties. Lots of practical in this session. Daily intervention to gap fill.	Divisor Dividend Quotient Share Divide Divided by Inverse of multiplication Decimals integers
3: WALT: Use the short division method to divide integers by	Teach division by integers when regrouping is needed using place value counters and interpret remainders.	Divisor Dividend

integers that leave remainders.	When secure, use pictoral representations of place value counters, then abstract. Problem-solving and reasoning – problem-solving word problems where the answers need to be rounded up or down. Real life scenarios. Lots of practical in this session. Daily intervention to gap fill.	Quotient Share Divide Divided by Inverse of multiplication Integers remainder
4: WALT: Use the short division method to divide integers by integers, interpreting remainders as decimals.	Teach how to create a decimal from an integer remainder by adding the decimal point and place holders. Problem-solving and reasoning – word problems, SATs questions. Differentiation when ready –problem-solving and reasoning.	Divisor Dividend Quotient Share Divide Divided by Inverse of multiplication Integers remainder
5. WALT: Use long division.	Teach long division.	Divisor Dividend Quotient Share Divide Divided by Inverse of multiplication Integers remainder
Assessment	Challenge lesson Give different division questions similar to throughout the learning journey and give points different amount of points for each correct answer. Work in teams to reach a target score. Give prizes. Children independently use resources if they need to. These should be available for children to access independently. Any misconceptions and gaps must be picked up at this point and intervention given.	Sentence stems.
6 Making connections: WALT: Use knowledge of multiplication and division to	Teach missing number calculations knowing when to use or not use inverse operations. Teach matching worded problems to division and multiplication calculations.	Divisor Dividend Quotient Share Divide

solve missing number problems.	Children can still use equipment to solve these. Daily intervention. Differentiation when ready –problem-solving and reasoning.	Divided by Inverse of multiplication Integers Remainder Inverse
7. WALT: Solve missing number worded problems by working backwards and performing the inverse. Working backwards SATs style questions.	SATS style questions	
8. WALT: Solve problems by using a given formula.	SATs style questions	
9: Fluency/ Application: WALT: Solve multi-step problems. Calculations and worded problems linked to topic	Worded problems of increasing difficulty related to topic Teach how to solve worded problems by modelling using pictures to work out answers and use of graphic organiser. These may involve other operations as well as division. Encourage children to take responsibility for their own learning by using the resources they need and drawing pictures, models to help them Daily intervention.	Divisor Dividend Quotient Share Divide Divided by Inverse of multiplication Integers Remainder inverse Modelled APE answers.
WALT: Find common multiples	Recap on what a multiple is. Give two numbers to find the multiples of and then ask children to find the common multiples. What is the LCM (lowest common multiple)? Practise same as in input – Apply – give various sorting diagrams (venn, carroll) children to sort according to multiples. GD – more complex sorting diagrams	
WALT: Find squares and cubes	Recap on square numbers. Teach children to find squares of 2 digit numbers by using the column method. Teach how to calculate cubed numbers by using the column method but ensuring they know that	

	EG 12 cubed = 12 x 12 x 12 so 12 x 12 = 144 x 12 = 1728.	
WALT: Find common factors	Recap on factors then give two numbers and children find the factors then common factors. Teach HCF - highest common factor-children to identify. Give a range of sorting diagrams for children to identify common factors then move to worded problems for GD.	
WALT: Identify prime numbers	Recap on factors Give some factors of numbers to find ensure that some are prime. Ask if there are any that have only 2 factors – 1 and itself. These are prime numbers. Children to identify prime numbers from given list and solve simple problems involving knowledge of prime numbers.	
WALT: Use BODMAS to solve calculations involving mixed operations.	Tach how to solve mixed calculation problems using BODMAS correctly	