Year 4 Maths Spring medium Term plan

Spring	Number: Multiplication and Division	Measurement: Area	Number: Fractions	Number: Decimals

Number: Multiplication and Division
NC Objectives:
•Recall and use 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 three 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 one-digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Week	Small step	Key Questions	Notes and Guidance	Assessment
	11 and 12 times table	Which multiplication and division facts in the 11 and 12 times tables have not appeared before in other times-tables? Can you partition 11 and 12 into tens and ones? What times tables can we add together to help us multiply by 11 and 12? If I know 11 × 10 is equal to 110, how can I use this to calculate 11 × 11?	Building on their knowledge of the 1, 2 and 10 times-tables, children explore the 11 and 12 times-tables through partitioning. They use Base 10 equipment to build representations of the times-tables and use them to explore the inverse of multiplication and division statements. Highlight the importance of commutativity as children should already know the majority of facts from other times-tables.	
	Multiply 3 numbers	Can you use concrete materials to build the calculations? How will you decide which order to do the multiplication in? What's the same and what's different	Children are introduced to the 'Associative Law' to multiply 3 numbers. This law focuses on the idea that it doesn't matter how we group the numbers when we multiply e.g. 4 × 5 × 2 = (4 × 5) × 2 = 20 × 2	

		about the arrays? Which order do you find easier to calculate efficiently?	= 40 or 4 × 5 × 2 = 4 × (5 × 2) = 4 × 10 = 40 They link this idea to commutativity and see that we can change the order of the numbers to group them more efficiently, e.g. 4 × 2 × 5 = (4 × 2) × 5 = 8 × 5 = 40	
	Factor Pairs	Which number is a factor of every whole number? Do factors always come in pairs? Do whole numbers always have an even number of factors? How do arrays support in finding factors of a number? How do arrays support us in seeing when a number is not a factor of another number?	Children learn that a factor is a whole number that divides by another whole number without a remainder. They develop their understanding of factor pairs using concrete resources to work systematically, e.g. factor pairs for 12 – begin with 1 × 12, 2 × 6, 3 × 4. At this stage, children recognise that they have already used 4 in the previous calculation therefore all factor pairs have been identified.	
	Efficient Multiplication	Which method do you find the most efficient? Can you see why another method has worked? Can you explain someone else's method? Can you think of an efficient way to multiply by 99?	Children develop their mental multiplication by exploring different ways to calculate. They partition two-digit numbers into tens and ones or into factor pairs in order to multiply one and two-digit numbers. By sharing mental methods, children can learn to be more flexible and efficient.	
	Written methods	Why are there not 26 jumps of 8 on the number line? Could you find a more efficient method? Can you calculate the multiplication mentally or do you need to write down your method? Can you partition your number into more than two parts?	Children use a variety of informal written methods to multiply a two-digit and a one-digit number. It is important to emphasise when it would be more efficient to use a mental method to multiply and when we need to represent our thinking by showing working.	

	Multiply 2 digits by 1 digit	Which column should we start with, the ones or the tens? How are Ron and Whitney's methods the same? How are they different? Can we write a list of key things to remember when multiplying using the column method?	Children build on their understanding of formal multiplication from Year 3 to move to the formal short multiplication method. Children use their knowledge of exchanging ten ones for one ten in addition and apply this to multiplication, including exchanging multiple groups of tens. They use place value counters to support their understanding.	
	Multiply 3 digits by 1 digit	How is multiplying a three-digit number by one-digit similar to multiplying a two-digit number by one-digit? Would you use counters to represent 84 multiplied by 8? Why?	Children build on previous steps to represent a three-digit number multiplied by a one-digit number with concrete manipulatives. Teachers should be aware of misconceptions arising from 0 in the tens or ones column. Children continue to exchange groups of ten ones for tens and record this in a written method.	
	Divide 2 digits by 1 digit (1)	How can we partition 84? How many rows do we need to share equally between? If I cannot share the tens equally, what do I need to do? How many ones will I have after exchanging the tens? If we know 96 ÷ 4 = 24, what will 96 ÷ 8 be? What will 96 ÷ 2 be? Can you spot a pattern?	Children build on their knowledge of dividing a 2-digit number by a 1-digit number from Year 3 by sharing into equal groups. Children use examples where the tens and the ones are divisible by the divisor, e.g. 96 divided by 3 and 84 divided by 4. They then move on to calculations where they exchange between tens and ones.	
	Divide 2 digits by 1 digit (2)	If we are dividing by 3, what is the highest remainder we can have? If we are dividing by 4, what is the highest remainder we can have? Can we make a general rule comparing	Children explore dividing 2-digit numbers by 1-digit numbers involving remainders. They continue to use the place value counters to divide in order to explore why there are remainders. Teachers should	

		our divisor (the number we are dividing by) to our remainder?	highlight, through questioning, that the remainder can never be greater than the number you are dividing by.	
	Divide 3 digits by 1 digit	What is the same and what's different when we are dividing 3digit number by a 1-digit number and a 2-digit number by a 1digit number? Do we need to partition 609 into three parts or could it just be partitioned into two parts? Can we partition the number in more than one way to support dividing more efficiently?	Children apply their previous knowledge of dividing 2-digit numbers to divide a 3-digit number by a 1-digit number. They use place value counters and part-whole models to support their understanding. Children divide numbers with and without remainders.	
	Correspondence Problems	Can you use a table to support you to find all the combinations? Can you use a code to help you find the combinations? e.g. VS meaning Vanilla and Sauce Can you use coins to support you to make all the possible combinations?	Children solve more complex problems building on their understanding from Year 3 of when n objects relate to m objects. They find all solutions and notice how to use multiplication facts to solve problems.	
Measurement: Area **NC Objectives** **•Find the area of rectilinear shapes by counting squares.**				
	What is area?	How many post it notes cover your piece of paper? Using the post it notes what would have a smaller area or larger area than your piece of paper? Which square is larger/smaller? Which squares will cover a larger/smaller area? If I wanted to find the surface area of…what size square would I use?	Children are introduced to area for the first time. They will understand that area is how much space is taken up by a 2D shape or surface. Children recognise why squares are used to measure area and understand why other things such as circles cannot be used (link to gaps between circles).	

		Why can we not use other shapes to find the area?		
	Counting Squares	What strategy can you use to ensure you don't count a square twice? What is the same and different about the two fields? Are there any shapes that you wouldn't need to count every individual square to calculate the area? If so, which shapes? Can you write some rules for this?	Once children have recognised that area is measured in squares, they use the strategy of counting the number of squares in a shape to measure and compare the areas of rectilinear shapes. Children are introduced to the notation cm2 .They explore the most efficient method of counting squares and link this to their understanding of squares and rectangles.	
	Making Shapes	Could you overlap the squares when counting area? Explain your answer. How many different rectilinear shapes can you make with 8 squares? Will the area always be the same? Why?	Children make rectilinear shapes using a given number of squares. They build on practical experience of constructing rectilinear shapes using squares which they can handle before drawing them.	
	Comparing Area	What is the area of the two rectilinear shapes? Which shape has a larger/smaller area? How much larger/smaller is the area of the shape? How can we order the shapes? Can we draw a shape that would have the same area as _____? Can we draw a shape that would have a larger/smaller area as _____?	Children compare the area of rectilinear shapes where the same size square has been used. Children will be able to use < and > with the value of the area to compare shapes. They will also order shapes based on their area.	

Fractions:

NC Objectives:

•Recognise and show, using diagrams, families of common equivalent fractions.

•Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.

•Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.

•Add and subtract fractions with the same denominator.

	What is a Fraction?	How can we sort the fraction cards? What does each one represent? How can we represent a/b in different ways? Is it a unit or non unit fraction? Explain how you know.	Children explore fractions in different representations, for example, fractions of shapes, quantities and fractions on a number line. They explore and recap on the meaning of numerator and denominator, non unit and unit fractions.	
	Equivalent Fractions (1)	How can you fold a strip of paper into equal parts? What do you notice about the numerators and denominators? Do you see any patterns? Can a fraction have more than one equivalent fraction?	Children use strip diagrams to investigate and record equivalent fractions. They start by comparing two fractions before moving on finding more than one equivalent fraction on a fraction wall.	
	Equivalent Fractions (2)	Do you notice anything about the denominators? Does this apply to the numerators? Would this pattern continue? If I multiply the numerator by a number, what do I have to do to the denominator to keep it equivalent? Is this always true? What relationships can you see between the numerator and denominator?	Children continue to understand equivalences through diagrams. They move onto using proportional reasoning to find equivalent fractions. Attention should be drawn to the method of multiplying the numerators and denominators by the same number to ensure that fractions are equivalent.	
	Fractions greater than 1	How many ____ make a whole? If I have ______ eighths, how many more do I need to make a whole? Can you draw it? Can you build it using cubes? What do you notice about the numerator and denominator when a fraction is equivalent to a whole?	Children use manipulatives and diagrams to show that a fraction can be split into wholes and parts. Children focus on how many equal parts make a whole dependent on the number of equal parts altogether. This learning will lead on to Year 5 where children learn about improper fractions and mixed numbers.	
	Count in Fractions	How many ____ make a whole?	Children explore fractions greater than	

		If I have _____ eighths, how many more do I need to make a whole? Can you write the missing fractions in more than one way?	one on a number line and start to make connections between improper and mixed numbers. They use cubes and bar models to represent fractions greater than a whole. This will support children when adding and subtracting fractions greater than a whole.	
	Add 2 or more fractions	If I have two strips folded into quarters, show me what 4 + 4 = How many quarters do I have in total? How many equal parts is the whole split into? How many equal parts am I adding? Where is on the number line? How can I use the number line to add to my first fraction?	Children use practical equipment and pictorial representations to add two or more fractions. Children record their answers as an improper fraction when the total is more than 1 Children also explore using a number line to add fractions where they can add on from a given fraction. They could also explore adding fractions more efficiently by using known facts or number bonds to help them e.g. 5/ 9 + 7 /9 + 5/ 9 = 10/ 9 + 7/ 9 = 17/9	
	Subtract 2 fractions	If I have two strips folded into eighths, show me what 8 − 8 = Can you use a bar model to show the difference between two fractions? Where is on the number line? How can I use the number line to subtract ? Can I partition my fraction to help subtract? What is staying the same? What is changing?	Children use practical equipment and pictorial representations to subtract fractions. Children explore using a number line to subtract fractions. They could also explore partitioning fractions to help subtract more efficiently by using known facts or number bonds to help them e.g. 12 /9 − 7 /9 = 12/ 9 − 2 /9 – 5/ 9 = 5/ 9	
	Subtract from whole amounts	How can we represent our calculation? What is 9 /9 the same as? Can we record our fraction as a whole number? Why?	Children continue to use practical equipment and pictorial representations to subtract fractions. Children subtract fractions from a whole amount. Children	

		Why not? Where can we see the whole number? How can we use a number line to find the difference between a fraction and a whole number?	need to understand the relationship between the whole number and the denominator. For example, 9 /9 = 1, 18/ 9 = 2 etc.	
	Calculate Fractions of a quantity	What is the whole? What fraction of the whole are we finding? How many equal parts will I split the whole into? If we change the numerator by 1, what do you notice? Can we spot a pattern? How can we represent this fraction of an amount using a bar model? What does this part of the model represent?	Children build on their understanding from Year 3 that the denominator tells us how many equal parts a whole has been split into and the numerator tells us how many equal parts of the whole there are. Children use concrete and pictorial representations to find fractions of a quantity. They link bar modelling to the abstract method in order to understand why the method works.	
	Problem-solving: calculate quantities	If I know one quarter of a number, how can I find three quarters of a number? If I know one of the equal parts, how can I find the whole? How can a bar model support my working?	Children solve more complex problems for fractions of an amount. They continue to use practical equipment and pictorial representations to help them work out what the whole is when a fraction is given. Children continue to only use proper fractions within this step.	
Number: Decimals **NC Objectives:** **•Recognise and write decimal equivalents of any number of tenths or hundredths.** **•Find the effect of dividing a one or two digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths** **•Solve simple measure and money problems involving fractions and decimals to two decimal places.** **•Convert between different units of measure [for example, kilometreto metre]**				
	Recognise tenths and hundredths	If each row is one row out of ten equal rows, what fraction does this represent?	Children recognise tenths and hundredths using a hundred square. When first introducing tenths and hundredths,	

		If each square is one square out of one hundred equal squares, what fraction does this represent? How many squares are in one row? How many squares are in one column? How many hundredths are in one tenth? How else could you partition these numbers?	concrete manipulatives such as Base 10 can be used to support children's understanding. They see that ten hundredths are equivalent to one tenth and can use a part-whole model to partition a fraction into tenths and hundredths.	
	Tenths as decimals	What is a tenth? How many different ways can we write a tenth? When do we use tenths in real life? Which representation do you think is clearest? Why? How else could you represent the decimal/fraction?	Using the hundred square and Base 10, children can recognise the relationship between 1 /10 and 0.1 Children write tenths as decimals and as fractions. They write any number of tenths as a decimal and represent them using concrete and pictorial representations. Children understand that a tenth is a part of a whole split into 10 equal parts. In this small step children stay within one whole.	
	Tenths on a place value grid	How many ones are there? How many tenths are there? What's the same/different between 0.2 , 1.2 and 0.8? How many different ways can you make a whole using the three decimals? Why do we need to use the decimal point?	Children read and represent tenths on a place value grid. They see that the tenths column is to the right of the decimal point. Children use concrete representations to make tenths on a place value grid and write the number they have made as a decimal. In this small step children will be introduced to decimals greater than 1	
	Tenths on a number line	How many equal parts are between 0 and 1? What are the intervals between each number? How many tenths are in one whole? What is 0.1 metres in millimetres?	Children read and represent tenths on a number line. They link the number line to measurement, looking at measuring in centimetres and millimetres. Children use number lines to explore relative scale.	

	Divide 1 digit by 10	What number is represented on the place value chart? What links can you see between the 2 methods? Which method is more efficient? What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?	Children need to understand when dividing by 10 the number is being split into 10 equal parts and is 10 times smaller. Children use counters on a place value chart to see how the digits move when dividing by 10. Children should make links between the understanding of dividing by 10 and this more efficient method. Emphasise the importance of 0 as a place holder.	
	Divide 2 digits by 10	What number is represented on the place value chart? Do I need to use 0 as a place holder when dividing a 2-digit number by 10? What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?	As in the previous step, it is important for children to recognise the similarities and differences between the understanding of dividing by 10 and the more efficient method of moving digits. Children use a place value chart to see how 2 digit-numbers move when dividing by 10 They use counters to represent the digits before using actual digits within the place value chart.	
	Hundredths	One hundredth is one whole split into how many equal parts? How many hundredths can I exchange one tenth for? How many hundredths are equivalent to 5 tenths? How does this help me complete the sequence? How does Base 10 help you represent the difference between tenths and hundredths?	Children recognise that hundredths arise from dividing one whole into one hundred equal parts. Linked to this, they see that one tenth is ten hundredths. Children count in hundredths and represent tenths and hundredths on a place value grid and a number line.	
	Hundredths as decimals	One hundredth is one whole split into ______ equal parts.	Using the hundred square and Base 10, children can recognise the relationship	

		What is the same and what is different about a number written as a fraction and a number written as a decimal? What is the same and different between 0.3 and 4 hundredths?	between 1/ 100 and 0.01 Children write hundredths as decimals and as fractions. They write any number of hundredths as a decimal and represent the decimals using concrete and pictorial representations. Children understand that a hundredth is a part of a whole split into 100 equal parts. In this small step children stay within one whole.	
	Hundredths on a Place Value grid	What is a hundredth? How many hundredths are equivalent to one tenth? Look at the decimals you have represented on the place value grid and in the part whole models. What's the same about the numbers? What's different?	Children read and represent hundredths on a place value grid. They see that the hundredths column is to the right of the decimal point and the tenths column. Children use concrete representations to make numbers with tenths and hundredths on a place value grid and write the number they have made as a decimal.	
	Divide 1 or 2 digits by 100.	What number is represented on the place value chart? Why is 0 important when dividing a one or two-digit number by 100? What is the same and what is different when dividing by 100 on a Gattegno chart compared to a place value chart? What happens to the value of each digit when you divide by 10 and 100?	Children need to understand when dividing by 100 the number is being split into 100 equal parts and is 100 times smaller. Children use counters on a place value chart to see how the digits move when dividing by 100. Children should make links between the understanding of dividing by 100 and this more efficient method. Emphasise the importance of 0 as a place holder.	