Year 5 Spring Maths medium Term plan

Spring	Number: Multiplication and Division	Number: Fractions	Number: Decimals and Percentages

Multiplication and Division:

NC Objectives

•Multiply and divide numbers mentally drawing upon known facts.
•Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for 2-digit numbers.
•Divide numbers up to 4 digits by a 1digit number using the formal written method of short division and interpret remainders appropriately for the context.
•Solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the use of the equals sign.

Week	Small step	Key Questions	Notes and Guidance	Assessment
	Multiply 4 digits by 1 digit	Why is it important to set out multiplication using columns? Explain the value of each digit in your calculation. How do we show there is nothing in a place value column? What do we do if there are ten or more counters in a place value column? Which part of the multiplication is the product?	Children build on previous steps to represent a 4-digit number multiplied by a 1-digit number using concrete manipulatives. Teachers should be aware of misconceptions arising from using 0 as a place holder in the hundreds, tens or ones column. Children then move on to explore multiplication with exchange in one, and then more than one column.	
	Multiply 2 digits (area model)	What are we multiplying? How can we partition these numbers? Where can we see 20 × 20? What does the 40 represent? What's the same and what's different between the three representations (Base 10, place value counters, grid)?	Children use Base 10 to represent the area model of multiplication, which will enable them to see the size and scale linked to multiplying. Children will then move on to representing multiplication more abstractly with place value counters and then numbers.	
	Multiply 2 digits by 2 digits	Why is the zero important? What numbers are being multiplied in the first line and in the second line?	Children will move on from the area model and work towards more formal multiplication methods.	

		When do we need to make an exchange? What can we exchange if the product is 42 ones? If we know what 38 × 12 is equal to, how else could we work out 39 × 12?	They will start by exploring the role of the zero in the column method and understand its importance. Children should understand what is happening within each step of the calculation process.	
	Multiply 3 digits by 2 digits	Why is the zero important? What numbers are being multiplied in the first line and the second line? When do we need to make an exchange? What happens if there is an exchange in the last step of the calculation?	Children will extend their multiplication skills to multiplying 3digit numbers by 2-digit numbers. They will use multiplication to find area and solve multi-step problems. Methods previously explored are still useful e.g. using an area model.	
	Multiply 4 digits by 2 digits	Explain the steps followed when using this multiplication method. Look at the numbers in each question, can they help you estimate which answer will be the largest? Explain why there is a 9 in the thousands column. Why do we write the larger number above the smaller number? What links can you see between these questions? How can you use these to support your answers?	Children will build on their understanding of multiplying a 3-digit number by a 2-digit number and apply this to multiplying 4-digit numbers by 2-digit numbers. It is important that children understand the steps taken when using this multiplication method. Methods previously explored are still useful e.g. grid.	
	Divide 4 digits by 1 digit	How many groups of 4 thousands are there in 4 thousands? How many groups of 4 hundreds are there in 8 hundreds? How many groups of 4 tens are there in 9 tens? What can we do with the remaining ten?	Children use their knowledge from Year 4 of dividing 3-digits numbers by a 1-digit number to divide up to 4-digit numbers by a 1-digit number. They use place value counters to partition their number and then group to develop their understanding of the short division method.	

<table>
<tr><td></td><td></td><td>How many groups of 4 ones are there in 12 ones?
Do I need to solve both calculations to compare the divisions?</td><td></td><td></td></tr>
<tr><td></td><td>Divide with remainders</td><td>If we can’t make a group in this column, what do we do?
What happens if we can’t group the ones equally?
In this number story, what does the remainder mean?
When would we round the remainder up or down?
In which context would we just focus on the remainder?</td><td>Children continue to use place value counters to partition and then group their number to further develop their understanding of the short division method.
They start to focus on remainders and build on their learning from Year 4 to understand remainders in context. They do not represent their remainder as a fraction at this point.</td><td></td></tr>
<tr><td colspan="5">Fractions:
NC Objectives:
•Compare and order fractions whose denominators are multiples of the same number.
•Identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths.
•Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example 2/5 + 4/5 = 6/5 = 1 1/5
•Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</td></tr>
<tr><td></td><td>Equivalent Fractions</td><td>What equivalent fractions can we find by folding the paper?
How can we record these?
What is the same and what is different about the numerators and denominators in the equivalent fractions?
How does multiplication and division help us find equivalent fractions?
Where can we see this in our model?</td><td>Children recap on learning from year 4. They explore equivalent fractions using models and concrete representations. They use models to make the link to multiplication and division. Children will then be able to apply the abstract method to find equivalent fractions. It is important children have the conceptual understanding before moving in to just using an abstract method.</td><td></td></tr>
<tr><td></td><td>Improper fractions to mixed numbers</td><td>Why are we grouping the cubes into 5s?
How many fifths are there in a whole?</td><td>In this step, children convert from improper fractions to mixed numbers for</td><td></td></tr>
</table>

		What do you notice about the improper fraction and the mixed number?	the first time. An improper fraction is a fraction where the numerator is larger than the denominator. A mixed number is a whole number alongside a fraction. It is important for children to see this process represented visually to allow them to make the connections between the concept and what happens in the abstract.	
	Mixed numbers to improper fractions	How many quarters/halves/eighths are there in a whole? What do you notice about the whole number and the denominator? What happens to the whole number and the numerator? Why?	Children now convert from mixed numbers to improper fractions using concrete and pictorial methods to understand the abstract method. Ensure children always write their working alongside the concrete and pictorial representations so they can see the clear links.	
	Number sequences	What other start numbers could we begin with? Will your sequence increase or decrease? How much will it go up or down by each time? If my sequence is decreasing by ___ and the ___ number is worth ____, what numbers will be in my sequence?	Children will count up and down in a given fraction. They will continue to use visual representations to help them explore number sequences. They will also find missing fractions in a sequence and determine whether the sequence is increasing or decreasing and by how much.	
	Compare and order fractions less than 1	How does a bar model help us to visualise the fractions? Should both of our bars be the same size? Why? What does this show us? If the numerators are the same, how can we compare our fractions? If the denominators are the same, how can we compare our fractions?	Children build on their equivalent fraction knowledge to compare and order fractions less than 1 where the denominators are multiples of the same number. It is important that children are able to draw models so that they can directly compare them. Children need to find the common denominator in this step. They may also investigate finding a common numerator.	

		Do we always have to find a common denominator? Can we find a common numerator?		
	Compare and order fractions greater than 1	How can we represent the fractions? How does the bar help us see which fraction is the greatest? Can we use our knowledge of multiples to help us? Can you predict which fractions will be greatest? Explain how you know. When we are comparing mixed numbers what can we do to the bars to help us see each fractions?	Children use their knowledge of ordering fractions less than 1 to help them compare and order fractions greater than 1 They use their knowledge of common denominators to help them. Children will compare both improper fractions and mixed numbers during this step.	
	Add and subtract fractions	How many equal parts do I need to split my bar into? Can you convert the improper fraction into a mixed number? How can a bar model help you balance both sides of the equals sign?	Children recap their year 4 understanding and add and subtract fractions with the same denominator. They use bar models to support understanding of adding and subtracting fractions.	
	Add fractions within 1	How can we convert ___ into ___? How can we convert thirds into fifteenths? What do you think the common denominator might be? Why? Could it be anything else? What do you notice about the denominators? Can you simplify your answer?	Children add fractions with different denominators for the first time. The denominators are multiples of one another. It is important that children see this represented visually so they can make connections with the abstract.	
	Add 3 or more fractions	How can we split our model? What do you notice about the denominators? What is that same and what is different	Children use their knowledge of adding fractions that are multiples of one another to add more than 2 fractions. They will use an area model and bar models to continue	

		about the area model and the bar model? How do the models show the common denominator?	to explore how to add fractions where the denominators are multiples of one another.	
	Add Fractions	Do I need to count all the sections to find the total? Can you see a whole? Can we see common equivalent fractions that we already know without converting them? What is the best way to solve ____ ? Explain why.	Children continue to represent adding fractions using the area model and the bar model to explore adding two or more fractions that are greater than 1 Children can record their totals as an improper fraction but will then convert this to a mixed number using their prior knowledge.	
	Add mixed numbers	How can we partition this mixed number into whole numbers and fractions? What will the wholes total? Can I add the fractions straight away? What will these mixed numbers be as improper fractions? If I have an improper fraction in the question, should I change it to a mixed number first? Why?	Children move on to adding two fractions where one or both are mixed numbers or an improper fraction. They will use a method of adding the wholes and then adding the parts. Children will record their answer in its simplest form. Children can still draw models to represent adding fractions.	
	Subtract Fractions	What could the common denominator be? Can you draw an area model to help you solve the problem? Is it easier to us a take away bar model or a bar model to find the difference?	Children subtract fractions with different denominators for the first time, where one denominator is a multiple of the other. It is important that children see this represented visually so they can make connections with the abstract. It is important that subtraction is explored as take away and finding the difference	
	Subtract mixed numbers	Which fraction is greatest? How do you know? If the denominators are different, what	Children apply their understanding of subtracting fractions where one denominator is a multiple of the other to	

		can we do? Can you simplify your answer?	subtract proper fractions from mixed numbers. They continue to use models and number lines to support their understanding.	
	Subtract- breaking the whole	Is flexible partitioning easier than converting the mixed number to an improper fraction? Do we always have to partition the mixed number? When can we subtract a fraction without partitioning the mixed number in a different way?	Children use their knowledge of fractions to subtract two fractions where one is a mixed number and you need to break one of the wholes up. They use the method of flexible partitioning to create a new mixed number so they can complete the calculation.	
	Subtract 2 mixed numbers	Why is subtracting the wholes and parts separately easier with some fractions than others? Can you show the subtraction as a difference as well as a take away on the bar model? Does making the whole numbers larger make the subtraction any more difficult? Explain why.	Children use different strategies to subtract two mixed numbers. Building on learning in previous steps, they look at partitioning the mixed numbers into wholes and parts and build on their understanding of flexible partitioning to subtract two mixed numbers when an exchange is involved.	
	Multiply unit fractions by an integer	How is multiplying fractions similar to adding fractions? Which bar model do you find the most useful? Which bar model helps us to convert from an improper fraction to a mixed number most effectively?	Children are introduced to multiplying fractions by a whole number for the first time. They link this to repeated addition and see that the denominator remains the same, whilst the numerator is multiplied by the integer. This is shown clearly through the range of models to build the children’s conceptual understanding of multiplying fractions.	
	Multiply non-unit fractions by an integer	Can you show me 3 lots of 3/10 on a bar model? How many tenths do we have	Children apply prior knowledge of multiply a fraction by a while number to multiplying a non-unit fraction by a whole number.	

		altogether? How does repeated addition help us with this multiplication? How does a number line help us see the multiplication?	They use similar models and discuss which method will be the most efficient depending on the questions asked.	
	Multiply mixed numbers by integers	How could you represent this mixed number? What is the denominator? How do you know? How many wholes are there? How many parts are there? What is multiplying fractions similar to? (repeated addition) What representation could you use to convert a mixed number to an improper fraction?	Children use their knowledge of fractions to multiply a mixed number by a whole number. They use the method of multiplying the whole and part separately and also the method of converting to an improper fraction then multiplying. It is important that they see varied representations of fractions.	
	Fraction of an amount	How many equal groups have you shared 49 into? Why? What does each equal part represent as a fraction and an amount? What could you do to 1 metre to make the calculation easier? Could you convert 4/5 to make the calculation any easier?	Children find unit and non-unit fractions of amount, quantities and measures. It is important that the concept is explored pictorially through bar models to support children to make sense of the abstract.	
	Using fractions as operators	Is it easier to multiply a fraction of find a fraction of an amount? Does it depend on the whole number you are multiplying by? Can you see the link between the numbers? Can you use previous calculations to help you calculate missing numbers?	Children link their understanding of fractions of amounts and multiplying fractions to use fractions as operators. They use their knowledge of commutativity to help them understand that you can change the order of multiplication without changing the outcome.	
Decimals and percentages				

NC Objectives:

•Read, write, order and compare numbers with up to three decimal places.
•Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.
•Round decimals with two decimal places to the nearest whole number and to one decimal place.
•Solve problems involving number up to three decimal places.
•Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.
•Solve problems which require knowing percentage and decimal equivalents of ½ ¼ 1/5 2/5 4/5 and those fractions with a denominator of a multiple of 10 or 25.

	Decimals up to 2 d.p	How many ones/tenths/hundredths are in the number? How do we write this as a decimal? Why? What is the value of the ____ in the number ______? When do we need to use zero as a place holder? How can we partition decimal numbers in different ways?	Children use place value counters and a place value grid to make numbers with up to two decimal places. They read and write decimal numbers and understand the value of each digit. They show their understanding of place value by partitioning decimal numbers in different ways.	
	Decimals as fractions (1)	What does the whole grid represent? What can we use to describe the equal parts of the grid (fractions and decimals) How would you convert a fraction to a decimal? What does the decimal point mean? Can the fraction be simplified? How can you prove that the decimal ____ and the fraction ____ are the same?	Children explore the relationship between decimals and fractions. They start with a fraction convert it into a decimal and as they progress, children will see the direct link between fractions and decimals. Children use their previous knowledge of fractions to aid this process	
	Decimals as fractions (2)	In the number 1.34 what does the 1 represent, what does the 3 represent,	Children concentrate on more complex decimals numbers e.g. 1 (0.96, 0.03, 0.27)	

		what does the 4 represent? Can we represent this number in a different way, and another, and another? On the number line, where can we see tenths? Where can we see hundredths? Tell me another that would come in between c and d as a fraction. Tell me a number that would not come in between c and d.	and numbers greater than 1. They represent them as fractions and as decimals. Children record the number in multiple representations, including expanded form and in words.	
	Understanding thousandths	How many tenths are in a whole? How many hundredths are there in 10 tenths? How many thousandths are there in 2 tenths? How many different ways can this number be written? Are seven hundredths equal to seven tenths? Why?	Children build on previous learning of tenths and hundredths 1 and apply this to understanding thousandths. They convert decimals to fractions. Children develop their knowledge of exchange and apply it to the concept of decimals. For example 3 tenths = 30 hundredths = 300 thousandths)	
	Thousandths as decimals	What number is represented? How will we show this on the place value chart? How many ones/ tenths/hundredths/thousandths do I have? What does 0.21 represent? How do we record this as a fraction? How many thousandths do I have? How can I record this number differently? How will it look in expanded form? Do we record 0 in the thousandth	Children build on their understanding of decimals and start to 1 understand the link between tenths, hundredths and thousandths and write a thousandth as a decimal e.g. 0.001 Children use concrete materials to understand the connection between one tenth, one hundredth, one thousandth. They will continue to represent decimals in different ways and will also explore deeper connections such as 100/1000 is the same as 1/10	

		column? Why?		
	Rounding decimals	What number is represented? How many decimal places does it have? When rounding to the nearest one decimal place, how many decimals will the answer have? Where would 3.25 appear on both number lines? What is the same and what is different about the two number lines?	Children are introduced to numbers with two decimal places and 1 develop their understanding of rounding to the nearest whole number and to the nearest tenth. Number lines support children to understand where numbers appear in relation to other numbers and are important to developing conceptual understanding of rounding.	
	Order and compare decimals	What number is represented? _______ is greater/less than _______ because… Explain how you know. Can you build the number using place value counters?	Children order and compare numbers with up to three decimal 1 places. They use place value counters to represent the numbers they are comparing. Number lines support children to understand where numbers appear in relation to other numbers.	
	Understand Percentages	How many parts is the square split in to? How many parts per hundred are shaded/not shaded? Can we represent this percentage differently? Look at the bar model, how many parts is it split into? If the bar is worth 100, what is each part worth? How would we say this as a percentage? In the table, what does the score represent? How many parts per hundred did ___ score?	Children are introduced to 'per cent' for the first time and will 1 understand that 'per cent' relates to 'number of parts per hundred'. They will explore this through different representations which show different parts of a hundred. Children will use 'number of parts per hundred' alongside the % symbol.	

	Percentages as fractions and decimals	What do you notice about the percentage and the decimal? What's the same? What's different about percentages, decimals and fractions? How can we record this proportion as a fraction? How can we turn it into a percentage? Explain your method.	Children represent percentages as fractions using the denominator 1 100 and make the connection to decimals and hundredths. Children will recognise percentages, decimals and fractions are different ways of expressing proportions.	
	Equivalent F.D.P	Show these decimals on the bead string. What are they as a decimal? What are they as a fraction? Can you simplify the fraction? How can we represent the fractions on a number line? What are they equivalent to? Which is closer to 100%, # $ or 70%? How do you know?	Children recognise simple equivalent fractions and represent them 1 as decimals and percentages. Children then solve problems which require knowing percentage and decimal equivalents of ½ ¼ 1/5 2/5 4/5 and those fractions with a denominator of a multiple of 10 or 25	