

Date:	The Bigger Picture Topic	Step	Learning Intention(s)	Support	Interleaving Topics	Hegarty Maths
<p>Rationale: Students coming up from KS2 will have probably missed their algebra unit This unit is spent exploring sequences using diagrams and lists. Calculators should be used throughout so number skills are not a barrier to the spotting of patterns. (note nth term is not covered)</p>						
6/9/2021	Block 1 Sequences	<p>Check in 1. Describe & continue sequences 2. Predict and check next terms</p>	TBAT describe, continue and predict linear and non-linear sequences	Access to counters and other manipulatives. Provide ready- drawn early term of sequences to continue form Following on from above continue to physically make the sequences	Addition Subtraction Multiplication	HM 196
		3. Sequences in a table and graphically	TBAT complete sequences in a table and make graphical representations	Provide tables ready to fill in. Encourage the use of a calculator to find the patterns	Coordinates Plotting graphs	
		4. Linear and non-linear sequences	TBAT understand and recognise linear and non-linear sequences	Encourage the use of a calculator to find differences and if they are constant or changing		
		5. Continue linear sequences 6. Continue non-linear sequences	TBAT continue linear and non-linear sequences	Use a calculator, place emphasis on using given rules rather than finding unknown. Limit to geometric sequences, if necessary		
		7. Explain the term-to-term rule	TBAT explain the term-to-term rule	Use calculator and pictorial and concrete forms if necessary Emphasise vocabulary, term, term to term, linear and geometric		HM 197
		Revision & check out	TBAT revise and complete check out test			

	<p>Rationale: Unit is to develop a deep understanding of the basic algebraic forms. Function machines, bar models and letter notation are introduced. Single functions machines and links to inverse function machines are embedded before moving to two step function machines. The use of concrete resources such as multilink cubes and calculators should be used where possible. This block is revisited in year 8, extending coverage to more complex expressions, hence the importance of securing the introductory knowledge in this block.</p>					
20/9/2021	<p>Block 2 Understand and use algebraic notation</p>	<p>Check in 1. Find output of a single function machine 2. Use inverse operations to find the input</p>	<p>TBAT find the output of a single function machine and use inverse operations to calculate the output</p>	<p>Use a calculator to remove the focus on arithmetic Stick to more obvious inverses e.g. the four operations and squaring</p>	<p>Square numbers Estimation</p>	
		<p>3. Use diagrams and letters to generalise number operations</p>	<p>TBAT use diagrams and letters to generalise number operations</p>	<p>Use concrete materials for bars, multilink cubes and counters. Emphasise equivalence of repeated addition and multiplication Common misconceptions include $b+b = 2b$ not b^2 $2ab$ is the same as $2ba$ it is not the same $ab+2$</p>	<p>Square numbers Estimation</p>	
	<p>4. Use diagrams and letters with single function machines</p> <p>5. Find the function machine given a simple expression</p>	<p>TBAT calculate the input and output of a single function machine</p>	<p>Use concrete materials for bars, multilink cubes, counters Emphasise equivalence of repeated addition and multiplication</p> <p>When using concrete, emphasise the difference between one of a variable and single "one" represented by a place value counter</p>	<p>Function machines</p> <p>Inverse operations</p>		
	<p>6. Substitute values into single operation expressions</p>	<p>TBAT substitute values into single operation expressions</p>	<p>Use a calculator Vary questions with minimum changes e.g. substitute different values of x into the same expression</p>	<p>Inverse operations</p>	<p>HM 151</p>	
	<p>7. Find numerical inputs and outputs for a series of two function machines</p>	<p>TBAT calculate inputs and outputs of two step function machines</p>	<p>Model carefully explicitly showing the number that is the output on the first machine going into the second. Provide ready – drawn pairs of function machine/tables.</p>	<p>Order of operations</p>	<p>HM 780 HM 152</p>	

		8. Use diagrams and letters with a series of two function machines		When using concrete, emphasise the difference between one of a variable and single "one" represented by a place value counter Use letters alongside the concrete, emphasising how the letters and cubes represent an unknown value.		
		9. Find the function machines given a two-step expression	TBAT calculate the function given a two-step expression	Build slowly from one step expressions e.g. $2x$ followed by $2x+1$, $2x+4$, $2x-3$ Provide ready drawn pairs of function machines with spaces in the middle to aid "undoing" the expression one step at a time.		
		10. Substitute values into two-step expressions	TBAT substitute values into two-step expressions	Use a calculator, explicitly teaching the use of the fraction key for expressions like $\frac{x+4}{5}$ Move onto expressions with brackets/powers only if confident teaching the use of calculator buttons	Substitution Brackets Function machines	HM 781
		11. Generate sequences given an algebraic rule	TBAT generate sequences from an algebraic rule	Use a calculator to find the difference between terms Reinforce language of terms and expressions Use rules of non-standard terms e.g. 87 th term to emphasise work on any position number	Sequences	
		Revision & check out	TBAT revise and complete check out test			
Baseline Assessments						
4/10/2021	Baseline Assessments					

<p>Rationale: Students coming up from KS2 will have probably missed their algebra so may need extra time on one step equations. This section introduces forming and solving one-step linear equations, building on inverse operations. Use of a calculator is encouraged to student develop the skills and not just spot the solutions. So careful consideration must be given to the problems posed</p>					
<p>Block 3 Equality and Equivalence</p>	<p>Check in 1. Understand the meaning of equality 2. Understand and use fact families numerically and algebraically</p>	<p>TBAT understand the meaning of equality and fact families numerically and algebraically</p>	<p>Use practical equipment and diagrams to show equality of different numerical expressions e.g. $3+4=2+5$ Emphasise “is equal to” works both ways rather than equals producing an answer. Use a calculator to test whether two calculations are equal e.g. $86+94=30 \times 6$ Practice with number only fact families until secure before introducing algebra</p>	<p>Equations Function machines Fact families</p>	<p>HM 3</p>
	<p>3. Solve one step equations +/- 4. Solve one step equations \times/\div</p>	<p>TBAT solve one step equations using all four operations</p>	<p>Use bar model and function machines till secure. May be needed throughout at this stage. Use calculators to evaluate and for students to perform self-sensibility checks</p>	<p>Equations Function machines Fact families</p>	<p>HM 176 HM 177</p>
	<p>5. Understand the meaning of like and unlike terms 7. Simplify algebraic expressions by collecting like terms</p>	<p>TBAT understand the meaning of like terms and to simplify algebraic expressions by collecting like terms</p>	<p>Use sorting activities to help establish the meaning of like terms. Use concrete or pictorial representations to show why e.g. $3x+2x \equiv 5x$ emphasising x represents an unknown number.</p>	<p>Algebraic notation</p>	<p>Don't use HM 156 as it includes negatives</p>
	<p>6. Understand the meaning of equivalence</p>	<p>TBAT understand the meaning of equivalence in an algebraic context</p>	<p>Emphasise that numerical terms in an expression are like. You don't need to have letters. Emphasise that numerical terms in an expression are like. You don't need to have letters</p>		
	<p>Revision & check out</p>	<p>TBAT revise and complete check out test</p>			

<p>Rationale: This unit follows on and builds on content taught at KS2 but extends to integers of 1 billion and decimals to hundredths. Rounding to 10s and 1 significant figure is taught, not decimal rounding. This unit introduces the range and median because separating them from other averages avoids confusion. Students should have met the range and median at KS2.</p>					
18/10/2021	<p>Block 4 Place Value & Ordering</p>	<p>Check in 1. Recognise the place value of any number in an integer 2. Understand and write integers up to one billion in words and figures</p>	<p>TBAT recognise the place value of any number in an integer and write numbers up to one billion in words and figures</p>	<p>Students have met numbers up to 10 million at KS2. Provide and use place value columns and number lines to aid students' understanding Note decimals are not introduced yet</p>	<p>HM 13</p>
		<p>3. Work out intervals on a number line 4. Position integers on a number line</p>	<p>TBAT work out intervals on a number line and position integers</p>	<p>Prepare tables Focus on common values such as 5 and 10</p>	<p>Scales (number line) Approximation</p>
	<p>6. Compare two numbers using =, ≠, <, >, ≤, ≥ 7. Order a list of integers</p>	<p>TBAT compare numbers and order a list of integers</p>	<p>Provide and use place value columns Provide and use number lines- put a series of integers in order. Introduce the term "leading digit" – emphasis on the difference between a number and a digit</p>	<p>Substitution Sequences</p>	<p>HM 14</p>
	<p>8. Find the range of a set of numbers 9. Find the median of a set of numbers</p>	<p>TBAT calculate the range and median from a set of numbers</p>	<p>Provide students with "values range from.....to....." Regularly revise concept in starters or within other topics. Median of odd and even numbers need to be found. Start with numbers already in order then move to ordering them first.</p>	<p>Substitution to get the list of numbers for the range</p>	<p>HM 410 HM 409 (includes decimals and negatives)</p>
	<p>10. Understand place value for decimals</p>	<p>TBAT understand place value for decimals</p>	<p>Focus on tenths and hundredths only</p>	<p>Frequency trees Converting FDP</p>	<p>HM 45</p>

		11. Position decimals on a number line	TBAT position decimals on a number line	Provide intervals on decimal number lines	Estimation	
25/10/2021		HALF TERM				
1/11/2021		12. Compare and order any numbers	TBAT compare and order any numbers	Focus on numbers only up to 2 decimal places	Sequences Solving equations Addition and subtraction of decimals	HM 46
		5. Round integers to the nearest power of 10 13. Round to one significant figure	TBAT round integers to powers of 10 and one significant figure	Focus on leading digits to identify the significant figures and round accordingly	Substitution Leading digits Place value	HM 17 HM 130 (includes 2 and 3 significant figures)
		Revision & check out	TBAT revise and complete check out			
Rationale: The aim to build on the previous units work and develop a deep understanding of the links between fractions and decimals. This unit also focuses on securing an understanding of common fractions under 1 but can be extend to above one for higher. Pie charts are introduced whilst looking at percentages						
	Block 5 Fraction, decimal and percentage equivalence	Check in 1. Represent tenths and hundredths as diagrams 2. Represent tenths and hundredths on a number line	TBAT represent tenths and hundredths as diagrams and on a number line	Use concrete and pictorial representations (base 10, place value grids) Provide number lines with easier scales Students should understand 0.1 is equivalent to one tenth so number lines can be interchangeable from fractions and decimals	Intervals on number lines and addition of decimals. Converting fractions to decimals (vice versa)	
		3. Interchange between fractional and decimal number lines	TBAT convert between fractions and decimals using number lines	Use diagrams and concrete resources	Sequences Converting fractions to decimals Inequality signs	HM 52

15/11/2021	4. Convert between fractions and decimals- tenths and hundredths	TBAT convert between fractions and decimals- tenths and hundredths	Use diagrams and concrete resources Bar models needed	Sequences Converting fractions to decimals Inequality signs	HM 81
	5. Convert between fractions and decimals- fifths and quarters	TBAT convert between fractions and decimals- fifths and quarters	Use diagrams and concrete resources Bar models needed	Sequences Converting fractions to decimals Inequality signs	
	6. Convert between fractions and decimals- eighths and thousandths (H)	TBAT convert between fractions and decimals- eighths and thousandths	Use diagrams and concrete resources Bar models needed	Sequences Converting fractions to decimals Inequality signs	
	7. Understand the meaning of percentage using a hundred square	TBAT understand the meaning of percentage	Use concrete and pictorial representation (100 square)	Converting fractions to percentages	
	8. Convert fluently between simple fractions, decimals and percentages	TBAT convert simple fractions, decimals and percentages	Percentage grids Use of place value when converting decimals to fractions Use of a calculator		
	10. Represent any fraction as a diagram	TBAT represent fractions as diagrams	Key here is to reinforce the importance of equal parts	Times tables Converting FDP	HM 58
	11. Represent fractions on number lines	TBAT represent fractions on number lines	Place fractions on a number line for students to see the importance of fractions as numbers	Times tables Converting FDP	
	12. Identify and use simple equivalent fractions	TBAT identify and use simple equivalent fractions	Use concrete pictorial representations and emphasise that a fraction is equivalent due to it being multiplied by 1, the value has not changed	Inequality signs	HM 59
	13. Understand fractions as division	TBAT understand fractions as division	Start with a familiar concept of tenths but show in a variety of ways e.g. 0.1, 10%, 1/10, 1÷10 etc) Provide number lines and scales	Division of decimals FDP	HM 57 HM 82

29/11/2021		14. Convert fluently between fractions, decimals and percentages	and convert fluently between FDP			
		15. Explore fractions above one, decimals and percentages (H)	TBAT explore fractions, decimals and percentages above 1	Use concrete and pictorial representations Use a hundred square	Sequences	HM 63 HM 64
		Revision	TBAT revise			
		Check out & check in	TBAT complete check out and check in test			
		Revision block 1				
		Revision block 2				
		Revision block 3				
		Autumn Assessment				
13/12/2021		Reflection				
		Reflection				
		Reflection				
20/12/2021	CHRISTMAS HOLIDAYS					
3/1/2022	Rationale: Students will have seen formal and mental methods for addition and subtraction at KS2. The focus here is building on KS2 skills but drawing on problems involving perimeter, money, bar charts and tables to ensure a deeper conceptual understanding. Frequency trees is likely to be a new concept					
	Block 6 Addition and Subtraction	1. Properties of addition and subtraction 2. Mental strategies	TBAT understand and use properties of addition and subtraction	Use Cuisenaire rods to model commutative and associative properties of addition and subtraction. Use number lines to show adding 9 is the same as adding 10 and subtracting 1. Encourage use of calculators	Inverse operations Addition and subtraction	HM 7 (commutative) HM 8 (associative) HM 140

		<p>3. Use formal methods for addition of integers</p> <p>4. Use formal methods for addition of decimals</p>	<p>TBAT apply formal methods for addition of integers and decimals</p>	<p>Use place value grids, counters and base 10 to model formal methods.</p> <p>Encourage estimation of solutions to discuss place value.</p> <p>Use concrete manipulatives (place value grids, counters, base 10)</p> <p>Encourage students to think about whether their answer is sensible</p>	<p>Evaluate numbers using algebraic substitution</p> <p>Include fractions in the calculations that students need to convert to decimals</p>	<p>HM 18</p>
		<p>5. Use formal methods for subtraction of integers</p> <p>6. Use formal methods for subtraction of decimals</p>	<p>TBAT apply formal methods for subtraction of integers and decimals</p>	<p>Use place value grids, counters and base 10 to model formal methods</p> <p>Demonstrate why exchanges are necessary and how they are performed</p> <p>Encourage estimation of solutions to discuss place value</p>	<p>Solving equations</p> <p>Converting fractions to decimals</p>	<p>HM 19</p> <p>HM 47</p>
		<p>8. Solve problems in the context of perimeter</p>	<p>TBAT solve problems involving perimeter</p>	<p>Students can use calculators to reduce cognitive load</p> <p>Use string to measure outside of a shape so perimeter can be seen as one continuous length</p>	<p>Solving equations</p> <p>Formal written/ mental methods</p> <p>Algebraic notation</p>	<p>HM 549</p>
		<p>9. Solve financial maths problems</p>	<p>TBAT solve problems involving real life finance</p>	<p>Use coins and notes</p> <p>Keep contexts familiar (shop purchases) before moving to complex situations e.g. bank accounts</p> <p>Calculators should be used</p>	<p>Estimation</p> <p>Addition and subtraction</p>	<p>HM 743-751</p> <p>All money-based problem tasks</p>

		10. Solve problems involving tables and timetables	TBAT solve problems involving timetables and two-way tables	Use clocks and number lines to represent journey times Make students aware that column addition/subtraction can't be easily applied to time calculations	Addition and subtraction	
		11. Solve problems with frequency trees	TBAT complete frequency trees and solve problems	Link to part whole models Calculators should be used	Part whole models Mental/written methods of addition and subtraction	HM 368
		12. Solve problems with bar charts and line charts	TBAT interpret bar and line charts and solve problems	Start with simple scales on y-axis Begin with simple interpretations e.g. greatest and least value of the bar then move to differences or addition Calculators used when necessary		HM 425
17/1/2022		Revision & check out	TBAT revise and complete check out test			
<p>Rationale: Revision of work from KS2 but extended. Emphasis is on solving problems particularly on area and the mean. Note the timing of the lessons in this unit will be driven by check in assessment. Choosing the correct operation to solve a problem will also be a focus. There will also be some exploration of the order of operations to ensure an early introduction, which will be reinforced alongside much of this content next term when studying directed number.</p>						
	Block 7 Multiplication and Division	Check in 2. Understand and use factors 3. Understand and use multiples	TBAT understand and use factors and multiples	It is important to emphasise the need for a systematic approach when reordering factors, such as reordering factor pairs in ascending order. Arrays will be helpful here Use bar models to help pupils see what a multiple looks like. Pupils need to understand the term "lowest common multiple"	Multiplication and division Venn diagrams	HM 27 HM 33
		4. Multiply and divide integers and decimals by powers of 10 6. Convert metric units	TBAT multiply and divide integers and decimals by powers of 10 and convert metric units	Pupils have been exposed to multiplying and dividing by powers of 10 in KS2. Important that we check there is a conceptual understanding and not just relying on a rule or a procedure. Using counters and place value grids will help to explain that you don't just "add a zero"	Solving equations Range Median Place value Equivalence	HM 15 HM 16 HM 705

				Students need to understand the relative size of different measures, this will help them to see whether they need to multiply or divide, rather than relying on just remembering		
		7. Use formal methods to multiply integers 8. Use formal methods to multiply decimals	TBAT use formal methods to multiply integers and decimals	Students have been exposed to formal methods throughout KS2 but may have not discussed the conceptual understanding behind each method. Revisiting of estimating using rounding to one significant figure is vital here	Place value Multiplication	HM 48
		9. Use formal methods to divide integers 10. Use formal methods to divide decimals	TBAT use formal methods to divide integers and decimals	Problems should be chosen so that answers with remainders and with decimals are appropriate. Students need to be aware of key words such as quotient, divisor, dividend and remainder.	Place value Division Solving equations	HM 50
		11. Order of operations	TBAT use the order of operations when making calculations	Use visual representations to show incorrect examples Students may have misconceptions about when it is correct to work from left to right e.g. $10-3+5$ should be $7+5=12$ but is often incorrectly performed as $10-8$ "because you have to do addition before subtraction"	Arrays	HM 24
		12. Area of rectangles and parallelograms	TBAT calculate the area of rectangles and parallelograms	Use squared paper to show students why the area of a 6×4 rectangle is $24cm^2$ and it will help them see that the area of a parallelogram is base \times perpendicular height	Multiplication Division	HM 554 HM 556
		13. Area of triangles	TBAT calculate the area of a triangle	Help students to understand why they divide by 2 by showing a square and rectangles divided into two equal sized triangles.	Multiplication Division	HM 557

7/2/2022		14. Solve problems using the mean	TBAT solve problems involving the mean	Use bar models to ensure a deeper conceptual understanding It is important for students to understand visually what happens when you find the mean and the set of numbers “average out”		HM 405-408
		Revision & check out	TBAT revise and complete check out test			
Rationale: This unit builds on the knowledge and understanding that students learned from block 5, FDP equivalence. Students should have met finding fractions of an amount throughout KS2, however this could have been missed due to school closures and lockdown. This unit provides an opportunity for students to consolidate their understanding and attempt increasingly difficult problems. More lessons have been given to this unit to ensure a concrete understanding.						
Block 8 Fractions & Percentages of Amounts	Check in					
	1. Find a fraction of a given amount	TBAT find a fraction of a given amount	In order to aid understanding, students should be able to represent and see the problem with a bar model. They could use comparison bar models to look at e.g. one-third of 90 and two-thirds of 45	Equivalence Fractions Division Multiplication	HM 77	
	2. Use a given fraction to find the whole	TBAT find the whole using given information	Bar models are again a useful tool for working backwards to find the whole given a particular fraction. Once the whole is found, other fractions can easily be found	Fractions Multiplication Algebraic expressions		
	3. Find a percentage of a given amount using mental methods	TBAT find a percentage of a given amount	Use bar models Students may not yet be familiar with finding 5% and 10% due to lockdown, so focus on securing knowledge using those key percentages to begin with. It is also worth exploring alternative methods e.g. 95% is best found by subtraction from the whole	Place value Percentage	HM 84 HM 85	
4. Find a percentage of a given amount using a calculator	TBAT find a percentage of a given amount using a calculator	Unlikely students will have used a calculator to find percentages Explore the percentage button and allow students to consider when a calculator method is preferable to a mental method	Place value Percentage	HM 87		

		Revision & check out	TBAT revise and complete check out test			
21/2/2022	HALF TERM					
28/2/2022	<p>Rationale: Students will only have had limited experience of directed number at primary school, so this unit is designed to extend and deepen their understanding of this. To ensure continuity from primary school settings, multiple representations and contexts will be used to enable students to appreciate the meaning behind operations with negative integers, rather than relying on a set of potentially confusing rules. Students may have missed this at KS2 due to school closures dependent upon the sequencing of different primary schools' topics. This is why the use of multiple representations is important, to ensure continuity for students that were exposed to directed number, and to ensure a deep conceptual understanding for pupils who will be working with directed numbers for the first time.</p>					
	Block 9 Directed Number	Check in 1. Understand and use representations of directed numbers 2. Order directed numbers using lines and appropriate symbols	TBAT use representations of directed numbers and order directed numbers using lines and symbols	Students should be introduced to the reflective nature of positive and negative numbers on the number line. To avoid confusion -4 should be read as negative 4 and NOT minus 4. Use counters to aid understanding. Students should practice ordering negative fractions and decimals on a number line, as well as integers.	Number lines Temperature	HM 37
		3. Perform calculations that cross zero	TBAT perform calculations that cross zero	Use number lines to support adding and subtracting through partitioning: e.g. $-8+12 = -8+8+4=4$ A number line is also useful to illustrate the difference between two numbers e.g. -3 and +4	Addition Subtraction Simplifying algebraic expressions	
		4. Add directed numbers	TBAT add directed numbers	Use double sided counters Electronic version available online on maths bot Introduce the idea of zero pairs to help with the use of partitioning Emphasis should be on understanding the calculation rather than memorising rules	Addition Subtraction Simplifying algebraic expressions	HM 39
		5. Subtract directed numbers	TBAT subtract directed numbers	Use double sided counters	Addition Subtraction	HM 40

				Avoid phrases such as “two negatives make a positive” as this leads to misconceptions such as “-1-2=+3”	Simplifying algebraic expressions	
		7. Multiplication and division of directed numbers	TBAT multiply and divide directed numbers	The result of multiplication of two negative can be justified with continuing patterns within a multiplication grid. Use bar models and fact families	Fact families Multiplication Division Simplifying algebraic expressions	HM 42 HM 43
		9. Evaluate algebraic expressions with directed number	TBAT evaluate algebraic expressions with directed number	Encourage students to take care in organising their recording of work, ensuring they have substituted accurately and maintained the correct order of calculations throughout. Model correct use of brackets around negative numbers	Substitution Order of operations	HM 785
		10. Introduction to two step equations	TBAT revise solving one step equations and move onto solving two step equations	Students have met one step equations but not necessarily with negative solutions. Use concrete manipulatives such as cups and counters, bar models and function machines	Solving one step equations Fact families Function machines	
		11. Solve two-step equations	TBAT solve two-step equations	Opportunities to consider how varying the signs, coefficients and operations in an equation affects its solution. Continue to use bar models, function machines and concrete representations as appropriate	Part whole models Solving equations Negative numbers	HM 179-182
14/3/2022		12. Use order of operations with directed numbers	TBAT use order of operations including negative numbers	Discussion of common misconceptions is useful here. A reminder about commutativity should help students to understand why multiplication and division are of equal priority	Four operations	HM 44
		Revision & check out	TBAT revise and complete check out test			

<p>Rationale: This unit builds on the Autumn term study of “key” fractions, decimals and percentages. It is sequenced after the autumn block and after the directed number block to ensure students are ready to be exposed to more advanced fractions work, including equivalence of fractions with any denominator and introducing the addition and subtraction of fractions. Students may not have had much exposure to this topic due to school closures, which is why the use of bar models and concrete representations is used extensively throughout.</p>					
<p>Block 10 Addition and Subtraction of Fractions</p>	<p>Check in 1. Representations of fractions</p>	<p>TBAT represent fractions as diagrams</p>	<p>Emphasis should be placed on the need for equal parts, which can be explored and made explicit through the exemplar questions. Number lines can help reinforce that a fraction is a number with a position on the number line</p>	<p>Number lines</p>	
	<p>2. Convert between mixed numbers and fractions</p>	<p>TBAT convert between mixed numbers and fractions</p>	<p>A common misconception is that a fraction is part of a whole one, so it is necessary to reinforce that fractions can be greater than 1</p>	<p>Number lines</p>	<p>HM 63 HM 64</p>
	<p>3. Add and subtract unit fractions with the same denominator 4. Add and subtract fractions with the same denominator</p>	<p>TBAT add and subtract fractions with the same denominator</p>	<p>Common misconception of adding both the numerators and the denominators should be addressed here. Use bar models and number lines</p>	<p>Equivalent fraction</p>	<p>HM 65</p>
	<p>5. Add and subtract fractions from integers 7. Add and subtract fractions where denominators share a simple common multiple</p>	<p>TBAT add and subtract fractions from integers and add and subtract fractions</p>	<p>Continue to use bar models and number lines to support their thinking and conceptual understanding An explicit connection should be made in how finding a common denominator aids in addition and subtraction of fractions</p>	<p>Lowest common multiple</p>	<p>HM 66</p>
	<p>6. Understand and use equivalent fractions</p>	<p>TBAT understand and use equivalent fractions</p>	<p>Explore the relationship between the numerators and the denominators of two equivalent fractions Use fraction walls</p>	<p>Multiples</p>	<p>HM 59</p>

		8. Add and subtract fractions with any denominator	TBAT add and subtract fractions with any denominator	Pictorial representations such as fraction walls will help understanding	Equivalence Lowest common multiple	HM 66
28/3/2022		9. Add and subtract improper fraction and mixed numbers	TBAT add and subtract improper fractions and mixed numbers	Explore different ways so students can be flexible when choosing methods	Converting mixed numbers	
		10. Use fractions in algebraic contexts	TBAT use fractions in algebraic contexts	Opportunity to interleave the previous unit of algebraic thinking in the context of fractions	Function machines Substitution Sequences	HM 786
		11. Use equivalence to add and subtract decimals and fractions	TBAT use equivalence to add and subtract decimals and fractions	Students should be encouraged to estimate before they calculate in order to avoid misconceptions	FDP conversions	
		Revision & check out	TBAT revise and complete check out test			
		Revision blocks 6, 7 & 8				
		Revision blocks 9 & 10				
		Spring Assessment				
		Reflection				
11/4/2022	<u>EASTER HOLIDAYS</u>					

25/4/2022	Rationale: This block is designed to build on KS2 skills using rulers, protractors and other measuring equipment. Construction of triangles has been omitted from this block to ensure more time to focus on a concrete understanding of the basic fundamentals behind geometric notation and measuring. Constructing triangles is revisited in year 8. This decision was made because students missed out on the basic fundamental skills of using rulers and protractors due to lockdown and school closures.					
	Block 11 Constructing, measuring & using geometric notation	Check in 1. Understand and use letter and labelling conventions (geometric figures) 3. Understand angles as a measure of turn	TBAT understand angles and 3 letter angle-notation	Opening and closing a door or a book allows students to visualise angles as a turn Capital letter should always be used to define a vertex Two letters required for a line segment Three letters required for an angle		
		4. Classify angles 5. Measures angles up to 180 6. Draw angles up to 180	TBAT classify angles and measure and draw angles up to 180 degrees	Students should be able to classify angles by sight Students should estimate the size of angles before measuring	Four operations	HM 455 HM 461
		8. Identify perpendicular and parallel lines 9. Recognise types of triangle 10. Recognise types of quadrilaterals	TBAT identify perpendicular and parallel lines and classify types of triangles and quadrilaterals	Correct notation following on from step 1 should be used to ensure continuity Examples of parallel and perpendicular lines in the real world should be explored Appropriate terminology should be used to classify types of triangles and quadrilaterals- this was taught in depth at KS2		HM 824
		16. Interpret pie charts using a protractor 17. Draw pie charts	TBAT interpret and draw pie charts using a protractor	Students should be familiar with a full turn being 360 degrees Encourage discussion around considering whether a pie chart is the most appropriate representation for given data	Multiplication Division	HM 429
		Revision & check out	TBAT revise and complete check out test			

Rationale: This block covers basic geometric language and names and properties of types of triangles and quadrilaterals. Angle rules will be introduced and used to form short chains of reasoning, with a focus on students becoming fluent and building resilience in their reasoning skills early on. There is also opportunities for interleaving work such as solving equations to be introduced to allow links between the two topics to be made and to revisit the algebra block.						
9/5/2022	Block 12 Developing geometric reasoning	Check in 1. Understand and use the sum of angles at a point 2. Understand and use the sum of angles on a straight line	TBAT understand and use angles at a point and angles on a straight line	Interactive geometry software should be used to demonstrate and explore these two rules Non-examples should be shared where tow angles on a straight line do not share a common point	Four operations	HM 477 HM 812
		3. Understand and use the equality of vertically opposite angles	TBAT understand and use the equality of vertically opposite angles	Non-examples should be shared from the teacher slides to correct misconceptions		HM 480
		4. Know and apply the sum of angles in a triangle	TBAT apply the sum of angles in a triangle	Students should know that the interior angles in any type of triangle sum to 180 degrees	Adding Subtracting Solving equations	HM 485
		5. Know and apply the sum of angles in a quadrilateral	TBAT apply the sum of angles in a quadrilateral	Derive the angle sum by considering a quadrilateral as two triangles Revisit the properties of quadrilaterals	Adding Subtracting Solving equations	HM 560
		6. Solve angle problems using properties of triangles and quadrilaterals	TBAT solve angle problems	The focus should be on reasoning which angle fact should be applied to each scenario Justifications using correct vocabulary should be used throughout		HM 488
		Revision & check out	TBAT revise and complete check out test			

<p>Rationale: Probability is not covered at KS2 therefore this content will be unfamiliar to the students. Fraction, decimal and percentage equivalence will be revisited in the study of probability, so that there is some familiarity within the probability block for the students. Students will also learn about sets, set notation and systematic listing strategies whilst revisiting topics such as solving equations and adding and subtracting fractions, which interleave quite well. This coverage is also reviewed and extended in year 8.</p>					
<p>Block 14 Sets and Probability</p>	<p>Check in 1. Identify and represent sets</p>	<p>TBAT identify and represent sets</p>	<p>All should find the idea of a set familiar and systematically organising information. However much of the language will be unfamiliar and will need revisiting regularly</p>	<p>Multiples Factors</p>	
	<p>2. Interpret and create Venn diagrams</p>	<p>TBAT interpret and create Venn diagrams</p>	<p>Linking this to probability can help students to understand how Venn diagrams can be used as a strategy in working out answers to other problems</p>	<p>Odd numbers Even numbers Square numbers</p>	
	<p>3. Understand and use the intersection of sets</p>	<p>TBAT understand and use the intersection of sets</p>	<p>Using colour to highlight the intersection is an effective way of teaching this Students need to be explicitly taught to associate the word 'and' with intersecting sets</p>		
	<p>4. Understand and use the union of sets</p>	<p>TBAT understand and use the union of sets</p>	<p>Labelled Venn diagrams and the use of colour are useful representations to develop understanding Students need to be explicitly taught to use the words 'and' and 'or'</p>		<p>HM 374</p>
	<p>6. Know and use the vocabulary of probability</p>	<p>TBAT use the vocabulary of probability</p>	<p>Common misconception is that students assume that there is always an even chance of an event happening Exposing these misconceptions by well chosen examples is crucial e.g. such as scoring a 3 on a die</p>		
	<p>7. Generate sample spaces for single events</p>	<p>TBAT generate sample spaces for single events</p>	<p>This step provides opportunities to link with the concepts of sets and set notation</p>		
<p>23/5/2022</p>	<p>8. Calculate the probability of a single event</p>	<p>TBAT calculate the probability of a single event</p>	<p>Students need to be taught how to calculate a single probability giving their answer as a fraction, decimal or percentage</p>		<p>HM 351</p>

		9. Understand and use the probability scale	TBAT understand and use the probability scale	This step allows students to revisit working out intervals on a number line and FDP conversion Pegging events on a washing line is a good way to encourage class discussion	FDP conversion Number lines	
30/5/2022	HALF TERM					
6/6/2022		10. Know that the sum of all probabilities for all possible outcomes is 1	TBAT know that the sum of all probabilities for all possible outcomes is 1	Using this fact, students should also be able to calculate the probability of an event not happening Finding unknown probabilities can be linked back to forming and solving equations	Forming and solving equations	HM 353
		Revision & check out	TBAT revise and complete check out test			
Rationale: Factors and multiples will be revisited to introduce the concept of prime numbers. Odd, even, prime, square and triangular numbers will be used as the basis of forming and testing conjectures. The use of counter examples will also be addressed. Interleaving work will include generating and describing sequences and factors and multiples.						
	Block 15 Prime numbers & proof	Check in 1. Find and use multiples	TBAT find and use multiples	Important to emphasise that multiples are found by multiplying any number by a positive integer Use skip counting on a number line, arrays and cuisine rods	Multiples Algebraic expressions	HM 33
		2. Identify factors of numbers and expressions	TBAT identify factors of numbers and expressions	Sometimes students don't realise that a number is a factor of itself Represent numbers as arrays Distinguish between factors and multiples	Factors Multiples Algebraic expressions	HM 27
		3. Recognise and identify prime numbers	TBAT recognise and identify prime numbers	Ensure students know that prime numbers are integers greater than 0 that have exactly two factors Emphasise the first prime number is 2 as 1 only has 1 factor	Factors Algebraic expressions	

		4. Recognise square and triangular numbers	TBAT recognise square and triangular numbers	Opportunity for students to spot patterns and follow a line of enquiry Concrete resources and pictorial representations are useful	Sequences Square numbers	HM 99
		5. Find common factors of a set of numbers including HCF	TBAT find the highest common factor of a set of numbers	If knowledge on times tables is not secure, this content can still be accessed by use of supporting manipulatives Important that students are understanding exactly what HCF is and not just learning an algorithm to work out the HCF	Factors Multiplication Area	HM 31
		6. Find common multiples of a set of numbers including the LCM	TBAT find the lowest common multiple of a set of numbers	Students will benefit from the modelling of a systematic method of finding the LCM Emphasis should be placed on language and student explanation to prevent confusion between HCF and LCM	Adding and subtracting fractions	HM 34
20/6/2022		7. Write a number as a product of its prime factors	TBAT write a number as a product of its prime factors	All non-prime positive integers can be written as a product of prime factors The factor tree method should be distinguished from the familiar additive part-whole model	Multiplication Division Prime numbers	HM 29
		8. Use a Venn diagram to calculate the HCF and LCM	TBAT use a Venn diagram to calculate the HCF and LCM	Identifying the intersection on a Venn diagram as common elements in both sets reinforces the idea of common factors		
		9. Make and test conjectures	TBAT make and test conjectures	Provide opportunities for students to explore the concept of a conjecture by using examples where several conjectures emerge and can be tested		
		10. Use counter examples to disprove a conjecture	TBAT use counter examples to disprove a conjecture	Useful to reinforce the importance of not making assumptions from a limited number of cases. The already familiar 'always sometimes or never true' activities help here		
		Revision & check out				
		Revision block 11				

		Revision block 12				
		Revision block 14				
4/7/2022		Revision block 15				
		Summer Assessment				
		Reflection				
		Reflection				
		Consolidation				
		Consolidation				
		Consolidation				
		Consolidation				
18/7/2022	SUMMER HOLIDAYS					