

Date:	The Bigger Picture Topic	Step	Learning Intention(s)	Support	Interleaving Topics	Hegarty Maths
	<b>Rationale:</b> 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) No higher content is taught in the first few blocks due to the cohort being in mixed sets ability wise until testing and resetting takes place. Higher steps have been integrated from block 4 onwards to facilitate this.					
6/9/2021	<b>Block 1 Sequences</b>	<b>Check in</b> 1. Describe & continue sequences 2. Predict and check next terms	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.</p> <p>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	<b>Block 2 Understand and use algebraic notation</b>	<b>Check in</b> 1. Find output of a single function machine 2. Use inverse operations to find the input	TBAT find the output of a single function machine and use inverse operations to calculate the output	Use a calculator to remove the focus on arithmetic Stick to more obvious inverses e.g. the four operations and squaring	Square numbers Estimation	
		3. Use diagrams and letters to generalise number operations	TBAT use diagrams and letters to generalise number operations	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 $ab+2$	Square numbers Estimation	
		4. Use diagrams and letters with single function machines  5. Find the function machine given a simple expression	TBAT calculate the input and output of a single function machine	Use concrete materials for bars, multilink cubes, counters Emphasise equivalence of repeated addition and multiplication  When using concrete, emphasise the difference between one of a variable and single "one" represented by a place value counter	Function machines  Inverse operations	
		6. Substitute values into single operation expressions	TBAT substitute values into single operation expressions	Use a calculator Vary questions with minimum changes e.g. substitute different values of $x$ into the same expression	Inverse operations	HM 151
		7. Find numerical inputs and outputs for a series of two function machines	TBAT calculate inputs and outputs of two step function machines	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.	Order of operations	HM 780 HM 152

4/10/2021	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 <sup>th</sup> term to emphasise work on any position number	Sequences						
	Revision & check out	TBAT revise and complete check out test								
	<b>Baseline Assessments</b>									
<b>Baseline Assessments</b>										

	<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>					
<b>Block 3</b> <b>Equality and Equivalence</b>	<b>Check in</b> 1. Understand the meaning of equality 2. Understand and use fact families numerically and algebraically	TBAT understand the meaning of equality and fact families numerically and algebraically	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	Equations Function machines Fact families	HM 3	
	3. Solve one step equations $+$ / 4. Solve one step equations $\times/\div$	TBAT solve one step equations using all four operations	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	Equations Function machines Fact families	HM 176 HM 177	
	5. Understand the meaning of like and unlike terms 7. Simplify algebraic expressions by collecting like terms	TBAT understand the meaning of like terms and to simplify algebraic expressions by collecting like terms	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.	Algebraic notation	Don't use HM 156 as it includes negatives	
	6. Understand the meaning of equivalence	TBAT understand the meaning of equivalence in an algebraic context	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			
	Revision & check out	TBAT revise and complete check out test				

	<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, <b>not decimal</b> 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. Additional higher content in this block includes writing numbers in standard form, to challenge the more able students and to best prepare them to access additional higher content within the standard form block in year 8.</p>				
	<b>Block 4</b> <b>Place Value &amp; Ordering</b>	<b>Check in</b> 1. Recognise the place value of any number in an integer 2. Understand and write integers up to one billion in words and figures  3. Work out intervals on a number line 4. Position integers on a number line	TBAT recognise the place value of any number in an integer and write numbers up to one billion in words and figures	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	HM 13
18/10/2021	6. Compare two numbers using $=$ , $\neq$ , $<$ , $>$ , $\leq$ , $\geq$ 7. Order a list of integers	TBAT compare numbers and order a list of integers	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	Substitution Sequences	HM 14
	8. Find the range of a set of numbers 9. Find the median of a set of numbers	TBAT calculate the range and median from a set of numbers	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.	Substitution to get the list of numbers for the range	HM 410 HM 409 (includes decimals and negatives)
	10. Understand place value for decimals	TBAT understand place value for decimals	Focus on tenths and hundredths only	Frequency trees Converting FDP	HM 45
	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)
		14. Write 10, 100, 1000 as powers of 10	TBAT write 10, 100 and 1000's as powers of 10.	Calculator could be used to introduce topic and will provide good practice for using terms like billion.		
		15. Write positive integers in the form $Ax10^n$	TBAT write positive integers in standard form.	Focus on whole numbers, decimals could be avoided as covered in depth in y8.		
		16. Investigate negative powers of 10	TBAT investigate negative powers of 10.	Explore powers of 10 between 0 and 1.		
		17. Write decimals in the form $Ax10^n$	TBAT write decimals in standard form.	Focus on whole numbers, decimals could be avoided as covered in depth in y8.		
		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 is extended to above one for the more able pupils. Pie charts are introduced whilst looking at percentages						
<b>Block 5</b> <b>Fraction, decimal and percentage equivalence</b>	<b>Check in</b> 1. Represent tenths and hundredths as diagrams	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	Intervals on number lines and addition of decimals.		

		2. Represent tenths and hundredths on a number line		Students should understand 0.1 is equivalent to one tenth so number lines can be interchangeable from fractions and decimals	Converting fractions to decimals (vice versa)	
15/11/2021		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
		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	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	
29/11/2021		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)		
		14. Convert fluently between fractions, decimals and percentages	TBAT convert fluently between fractions, decimals and percentages	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		
		15. Explore fractions above one, decimals and percentages	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 blocks 1 & 2				
		Revision blocks 3 & 4				
13/12/2021		Revision block 5				
		Autumn Assessment				
		Reflection				
20/12/2021		<b>CHRISTMAS HOLIDAYS</b>				
		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. Higher content on adding and subtracting number in standard form has been added to this block to ensure continuity from the additional higher content taught in block 4.				
3/1/2022	<b>Block 6 Addition and Subtraction</b>	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.	Inverse operations Addition and subtraction	HM 7 (commutative) HM 8 (associative)

			Use number lines to show adding 9 is the same as adding 10 and subtracting 1. Encourage use of calculators		HM 140
	3. Use formal methods for addition of integers 4. Use formal methods for addition of decimals	TBAT apply formal methods for addition of integers and decimals	Use place value grids, counters and base 10 to model formal methods. Encourage estimation of solutions to discuss place value. Use concrete manipulatives (place value grids, counters, base 10) Encourage students to think about whether their answer is sensible	Evaluate numbers using algebraic substitution Include fractions in the calculations that students need to convert to decimals	HM 18
	5. Use formal methods for subtraction of integers 6. Use formal methods for subtraction of decimals	TBAT apply formal methods for subtraction of integers and decimals	Use place value grids, counters and base 10 to model formal methods Demonstrate why exchanges are necessary and how they are performed Encourage estimation of solutions to discuss place value	Solving equations  Converting fractions to decimals	HM 19  HM 47
	8. Solve problems in the context of perimeter	TBAT solve problems involving perimeter	Students can use calculators to reduce cognitive load Use string to measure outside of a shape so perimeter can be seen as one continuous length	Solving equations  Formal written/mental methods  Algebraic notation	HM 549
	9. Solve financial maths problems 10. Solve problems involving tables and timetables	TBAT solve problems involving real life finance, tables and timetables.	Use coins and notes Keep contexts familiar (shop purchases) before moving to complex situations e.g. bank accounts Calculators should be used Use clocks and number lines to represent journey times Make students aware that column addition/subtraction can't be easily applied to time calculations	Estimation  Addition and subtraction	HM 743-751  All money-based problem tasks

		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
		13. Add and subtract numbers given in standard form	TBAT add and subtract numbers in standard form.	Revisit standard from notation. Adding and subtracting powers will be a common misconception.		HM 122
17/1/2022		Revision & check out	TBAT revise and complete check out test			
		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.				
	<b>Block 7</b> <b>Multiplication and Division</b>	<b>Check in</b> 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 5. Multiply by 0.1 and 0.01	TBAT multiply and divide integers and decimals by powers of 10	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

	6. Convert metric units	TBAT convert metric units	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	Equivalence	HM 705
	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. Understand and use 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 & parallelograms 13. Area of triangles 14. Area of trapezia	TBAT calculate the area of rectangles, parallelograms, triangles and trapeziums.	Use squared paper to show students why the area of a $6 \times 4$ rectangle is $24\text{cm}^2$ and it will help them see that the area of a parallelogram is base $\times$ perpendicular height Help students to understand why they divide by 2 by showing a square and rectangles divided into two equal sized triangles.	Multiplication Division	HM 554 HM 556 HM 557 HM 559

24/1/2022		15. 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
		16. Explore multiplication and division in algebraic expressions	TBAT explore multiplication and division in algebraic expressions.	Use complex expression involving repeated letters and more than one letter.		
		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. Additional higher content looks at solving problems with fractions greater than 1 and percentages greater than 1 to allow students to apply previous higher steps of exploring fractions above 1, to problem solving style questions.						
	<b>Block 8</b> <b>Fractions &amp; Percentages of Amounts</b>	<b>Check in</b> 1. Find a fraction of a given amount 2. Use a given fraction to find the whole  3. Find a percentage of a given amount using mental methods	TBAT find a fraction of a given amount and use a given amount to find the whole.  TBAT find a percentage 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  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  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	Equivalence Fractions Division Multiplication  Place value Percentage	HM 77  HM 84 HM 85

		4. Find a percentage of a given amount using a calculator 5. Solve problems with fractions greater than 1 & percentages greater than 100%	TBAT find a percentage of a given amount using a calculator, solve problems with fractions/percentages greater than 1/100%	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			
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. Additional higher content covers exploring higher powers and roots.						
7/2/2022	<b>Block 9 Directed Number</b>	<b>Check in</b> 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 and subtract directed numbers	Use double sided counters Electronic version available online on maths bot	Addition Subtraction	HM 39 HM 40

	5. Subtract directed numbers		Introduce the idea of zero pairs to help with the use of partitioning Emphasis should be on understanding the calculation rather than memorising rules 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 9. Evaluate algebraic expressions with directed number	TBAT multiply and divide directed numbers and evaluate expressions with directed number.	The result of multiplication of two negative can be justified with continuing patterns within a multiplication grid. Use bar models and fact families 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	Fact families Multiplication Division Simplifying algebraic expressions Substitution Order of operations	HM 42 HM 43 HM 785
	10. Introduction to two step equations 11. Solve two-step equations	TBAT revise solving one step equations and 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 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 Solving one step equations Fact families Function machines	HM 179-182
	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
	13. Roots of positive numbers	TBAT explore roots of positive numbers.	Using manipulatives to show why they are called square numbers.		

				Logically come to conclusion of a square root having more than one solution by finding square numbers in the multiplication grid.		
	14. Explore higher powers and roots	TBAT explore higher powers and roots		Extend knowledge of square and cube numbers. Understanding roots as the inverse operation will help understand powers. Students needs to be taught that a radical without a number means a square root.		
	Revision & check out	TBAT revise and complete check out test				
21/2/2022	<b>HALF TERM</b>					
28/2/2022	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. Higher content in this block includes addition and subtraction of algebraic fractions to challenge students further and to interleave and revisit the algebra block					
	<b>Block 10</b> <b>Addition and Subtraction of Fractions</b>	<b>Check in</b> 1. Representations of fractions 2. Convert between mixed numbers and fractions	TBAT represent fractions as diagrams and to convert between mixed numbers and fractions	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  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	Number lines	HM 63 HM 64
		3. Add and subtract unit fractions with the same denominator 4. Add and subtract fractions with the same denominator	TBAT add and subtract fractions with the same denominator	Common misconception of adding both the numerators and the denominators should be addressed here. Use bar models and number lines	Equivalent fraction	HM 65

		<p>5. Add and subtract fractions from integers 7. Add and subtract fractions where denominators share a simple common multiple</p>	TBAT add and subtract fractions from integers and add and subtract fractions	<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>	Lowest common multiple	HM 66
		<p>6. Understand and use equivalent fractions 8. Add and subtract fractions with any denominator</p>	TBAT understand and use equivalent fractions and add and subtract fractions with any denominator	<p>Explore the relationship between the numerators and the denominators of two equivalent fractions Pictorial representations such as fraction walls will help understanding</p>	Multiples Equivalence Lowest common multiple	HM 59 HM 66
		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	
		12. Add and subtract simple algebraic fractions	TBAT add and subtract simple algebraic fractions	Should compare adding expressions with fractions to adding those in integer form. Fractions should be kept simple as aimed to be an introduction to the idea.		
14/3/2022		Revision & check out	TBAT revise and complete check out test			

	<p>Rationale: This block is designed to build on KS2 skills using rulers, protractors and other measuring equipment. Whilst students may have not had as much exposure to this topic in KS2 due to school closures, a decision was made to still teach constructions. This is because the nature of the work that students may have missed out on in KS2, we felt wasn't too difficult and that the more able students accessing the higher content would not need extra time. This way the students can access the higher steps of constructing triangles, which is also consolidated in year 8.</p>				
<b>Block 11</b> <b>Constructing, measuring &amp; using geometric notation</b>	<b>Check in</b> 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
	11. Identify polygons up to a decagon 12. Construct triangles using SSS	TBAT identify polygons up to a decagon and construct triangles using SSS.	Distinguish between a regular and irregular polygon. Students will often think shapes are regular without considering interior angles. Relate vocabulary with other areas of maths/real world e.g 'dec' decimal, decathlon.		
	13. Construct triangles using SSS SAS and ASA	TBAT construct triangles using SSS, SAS AND ASA	May want students to try constructing an SSS first just using a ruler and a pencil, this will highlight that this is inaccurate, realise more accurate to use a compass.		

				Should understand why they represent the minimum information to draw a distinct triangle. Expose to ambiguous cases to construct two distinct triangles from the given information.		
	14. Construct more complex polygons	TBAT construct more complex polygons		Draw more complex polygons and diagrams constructed using multiple polygons. Opportunity to recap perimeter. Letter notation should be used for line segments, polygons and angles.		
	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
28/3/2022	Revision & check out	TBAT revise and complete check out test				
	<p>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. The higher strand will take this further, investigating and using parallel line rules. This is sequenced to build on the angle rules whilst stretching and challenging students further. 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.</p>					
<b>Block 12</b> <b>Developing geometric reasoning</b>	<b>Check in</b> 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 two 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

		<p>4. Know and apply the sum of angles in a triangle        5. Know and apply the sum of angles in a quadrilateral</p>	TBAT apply the sum of angles in a triangle and a quadrilateral	<p>Students should know that the interior angles in any type of triangle sum to 180 degrees        Derive the angle sum by considering a quadrilateral as two triangles        Revisit the properties of quadrilaterals</p>	Adding Subtracting Solving equations	HM 485 HM 560
		<p>6. Solve angle problems using properties of triangles and quadrilaterals</p>	TBAT solve angle problems	<p>The focus should be on reasoning which angle fact should be applied to each scenario        Justifications using correct vocabulary should be used throughout</p>		HM 488
		<p>7. Solve complex angle problems</p>	TBAT solve complex angle problems	<p>Angles problems where two or more known angle facts need to be applied.        Students should always give reasons for their answers using the correct vocabulary.        Different chains of reasoning should be explored and discussion of most efficient method.</p>		
		<p>8. Find and use the angle sum of any polygon</p>	TBAT find and use the angle sum of any polygon	<p>Should investigate interior and exterior angles at vertices.        Investigate sum by partitioning polygons into triangles from a single vertex.</p>		
		<p>9. Investigate angles in parallel lines</p>	TBAT investigate angles in parallel lines	<p>Investigate angles in parallel lines by measuring. Students should make and test conjectures. Encouraged to use known angle facts to justify their conjectures. Both computer software and physical mechanical apparatus should be used to demonstrate to students.</p>		
11/4/2022	<b>EASTER HOLIDAYS</b>					
25/4/2022						

		10. Understand and use parallel line angle rules		Build on previous step by looking formally at alternate, corresponding and co-interior angles. Should be aware of the converses, e.g. if a pair of corresponding angles are equal then the lines are parallel.		
		11. Use known facts to obtain simple proofs		Obtain proofs using facts from previous steps. Explore the difference between demonstration and proof. Should demonstrate the proof that angles in a triangle add up to 180. Writing proofs should be encouraged		
		Revision & check out	TBAT revise and complete check out test			
		Revision blocks 6 & 7				
		Revision blocks 8 & 9				
		Revision blocks 10				
		Spring Assessment				
		Reflection				
9/5/2022	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. Additional higher content in this block includes understanding and using the complement of a set, to ensure students are competent with this when they meet it again in year 8, allowing them to access additional higher content of using the product rule.					
<b>Block 14</b> <b>Sets and Probability</b>	<b>Check in</b> 1. Identify and represent sets	TBAT identify and represent sets	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	Multiples Factors		
	2. Interpret and create Venn diagrams	TBAT interpret and create Venn diagrams	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	Odd numbers Even numbers Square numbers		
	3. Understand and use the intersection of sets	TBAT understand and use the intersection of sets	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		
	4. Understand and use the union of sets	TBAT understand and use the union of sets	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'		HM 374
	5. Understand and use the complement of a set	TBAT understand and use the compliment of a set	Should be taught that the complement of a set is the members of the universal set that are not members of the set. Matching activities are useful to embed this understanding.		
	6. Know and use the vocabulary of probability	TBAT use the vocabulary of probability	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		
	7. Generate sample spaces for single events	TBAT generate sample spaces for single events	This step provides opportunities to link with the concepts of sets and set notation		
23/5/2022	8. Calculate the probability of a single event	TBAT calculate the probability of a single event	Students need to be taught how to calculate a single probability giving their answer as a fraction, decimal or percentage		HM 351
	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	
	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	Forming and solving equations	HM 353

		possible outcomes is 1		Finding unknown probabilities can be linked back to forming and solving equations		
	Revision	TBAT revise and complete check out test				
	Check out & check in					
30/5/2022	<b>HALF TERM</b>					
6/6/2022	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. The higher strand includes using Venn diagrams from the previous block to solve more complex HCF and LCM problems.					
<b>Block 15</b> <b>Prime numbers &amp; proof</b>	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	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 Multiples 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 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	TBAT revise.			
		Revision & check out	TBAT revise and complete check out test			
		Revision block 11				
		Revision block 12				
		Revision block 14				
4/7/2022		Revision block 15				
		Summer Assessment				
		Reflection				
		Consolidation				
		Consolidation				
		Consolidation				
		Consolidation				

SUMMER HOLIDAYS