	Mathematics Curriculum – Year 7			
Unit:	Algebraic Thinking-Sequences	Algebraic Thinking- Understand and use algebraic notation	Algebraic Thinking- Equality and Equivalence	Place Value and Proportion- Place value and ordering integers and decimals
Term:	Autumn 1: 3 Weeks	Autumn 1: 4 Weeks	Autumn 2: 6 Weeks	Autumn 2: 1 Week/ Spring 1: 3 Weeks
What We Will Learn	This time is spent exploring sequences in detail, using both diagrams and lists of numbers. Previously made graphs are used so students can appreciate and use the words "linear" and "nonlinear", linking to the patterns they have spotted. Calculators ar4e used throughout so numbers skills are not a barrier to finding the changes between terms or subsequent terms. Sequences are treated more formally later in this unit.	The focus of these four weeks is developing a deep understanding of the basic algebraic forms, with more complex expressions being dealt with later. Function machines are used alongside bar models and letter notation with time invested in single function machines and the links to inverse operations before moving on to series of two machines and substitution into short abstract expressions.	Students are introduced to forming and solving one-step linear equations, building on their study of inverse operations. The equations met will mainly require the use of a calculator, both to develop their skills and to ensure understanding of how to solve equations, rather than spotting solutions. This work will be developed when two-step equations are met in the next place value unit and throughout the course. This unit finished with consideration of equivalence and the difference between this and equality, illustrated through collecting like terms.	Students will explore integers up to one billion and decimals to hundredths, adapting these choices where appropriate. Using and understanding number lines is a key strategy explored in depth, and will be useful for later work on scales for axes. |When putting numbers in order, the concepts of the median and range will be introduced. Rounding to the nearest given positive power of ten is developed, alongside rounding to one significant figure. Decimal places will come later, to avoid similar concepts being covered at the same time. Sequences and equations will be interleaved into this unit.
What We Will Do	Describe and continue a sequence given diagrammatically, Predict and check the next terms of a sequence, Represent sequences in tabular and graphical forms, Recognise the difference between linear and non-linear sequences, Continue numerical non-linear sequences, Explain the term-to-term rule of numerical sequences in words	Given a numerical input, find the output of a single function machine. Use inverse operations to find the input given the output. Use diagrams and letters to generalise number operations • Find the function machine given a simple expression. Substitute values into single operation expressions. Find numerical inputs and outputs for a series of two function machines. Use diagrams and letters with a series of two function machines. Find the function machines given a two-step expression. Substitute values into two-step expressions. Generate sequences given an algebraic rule	Understand the meaning of equality, Understand and use fact families, numerically and algebraically, Solve one-step linear equations involving +/- using inverse operations, Solve one-step linear equations involving X/÷ using inverse operations, Understand the meaning of like and unlike terms, Understand the meaning of equivalence, Simplify algebraic expressions by collecting like terms, using the ≡ symbol	Recognise the place value of any number in an integer up to one billion, Understand and write integers up to one billion in words and figures, Work out intervals on a number line, Position integers on a number line. Round integers to the nearest power of ten. Compare two numbers using =, ≠, ≤, ≥,. Order a list of integers. Find the range of a set of numbers. Find the median of a set of numbers. Understand place value for decimals. Position decimals on a number line. Compare and order any number up to one billion. Round a number to 1 significant figure. Write 10, 100, 1000 etc. as powers of ten. Write positive integers in the form $A \times 10^n$. Investigate negative powers of ten. Write decimals in the form $A \times 10^n$
Skills Learned	Move freely between different numerical, algebraic, graphical and diagrammatical representations, Make and test conjectures about patterns and relationships,, generate terms of a sequence from a term-to-term rule, recognise arithmetic sequences, recognise geometric sequences and appreciate other sequences that arise (Fibonacci).	Further be able to move freely between different numerical, algebraic, graphical and diagrammatical representations, use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships, recognise and use relationships between operations including inverse operations, model situations or procedures by translating them into algebraic expressions, substitute values in expressions, rearrange and simplify expressions, use and interpret algebraic notation, generate terms of a sequence from a term-to0term rule, produce graphs of linear functions of one variable.	Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships, simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms, use approximation through rounding to estimate answers, use algebraic methods to solve linear equations in one variable.	Understanding of the number system and place value to include decimals, understand and use place value for decimals, measures and integers of any size, order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers, use the =, ≠, ≤, ≥, , work interchangeable with terminating decimals and their corresponding fractions, round numbers to an appropriate degree of accuracy, describe, interpret and compare observed distributions of a single variable through: the median and the range, interpret and compare numbers in standard form.

Unit:	Place Value and proportion- Fraction, Decimal and Percentage Equivalence	Application of Number: Solving problems with addition and subtraction	Application of Number- Solving problems with multiplication and division	Application of Number- Fractions and percentages of amounts
Term:	Spring 1: 2 Weeks / Spring 2: 1 Week	Spring 2: 4 Weeks	Summer 1: 4 Weeks	Summer 1: 2 Weeks
What We Will Learn	Building on the recent work on decimals, the key focus for this three weeks is for students to gain a deep understanding of the links between fractions, decimals and percentages so that they can convert fluently between those most commonly seen in real life. Whilst looking at percentages, pie charts will be introduced. In addition, various forms of representation of any fraction will be studied, focusing on equivalence, in an appropriate depth. The focus is very much on a secure understanding of the most common fractions under one, but fractions above one will be touched upon.	The focus here is building on the formal methods of addition and subtraction students have developed at Key stage 2. All students will look at this in the context of interpreting and solving problems. Problems will be drawn from contexts of perimeter, money, interpreting bar charts and tables and looking at frequency trees. Calculators will be used to check and/ or support calculations, with significant figures and equations explicitly revisited	The next part of this topic is dedicated to the study of multiplication and division, so allowing for the study of forming and solving two-step equations both with and without a calculator. Unit conversions will be the main context as multiplication by 10, 100 and 1000 are explored. As well as distinguishing between multiples and factors, substitution and simplification will also be revised and extended. The emphasis will be on solving problems, particularly involving area of common shapes and the mean. Choosing the correct operation to solve a problem will also be a focus. There will also be some exploration of the order of operations, which will be reinforced alongside much of the content in the next topic when studying directed number.	This short block focuses on the key concept of working out fractions and percentages of quantities, and the links between the two. This is studied in depth in year 8.
What We Will Do	Represent tenths and hundredths as diagrams. Represent tenths and hundredths on number lines. Interchange between fractional and decimal number lines. Convert between fractions and decimals-tenths and hundredths. Convert between fractions and decimals-fifths and quarters. Convert between fractions and decimals-eights and thousandths. Understand the meaning of percentage using a hundred square. Convert fluently between simple fractions, decimals and percentages. Use and interpret pie charts. Represent any fraction as a diagram. Represent fractions on number lines. Identify and use simple equivalent fractions. Understand fractions as division. Explore fractions above one, decimals and percentages.	Properties of addition and subtraction. Mental strategies for addition and subtraction. Use formal methods for addition of integers. Use formal methods for addition of decimals. Use formal methods for subtraction of decimals. Choose the most appropriate method: mental strategies, formal written or calculator. Solve problems in the context of perimeter. Solve financial maths problems. Solve problems involving tables and timetables. Solve problems with frequency trees. Solve problems with bar charts and line charts. Add and subtract numbers given in standard form	Properties of multiplication and division. Understand and use factors. Understand and use multiples. Multiply and divide integers and decimals by powers of 10. Multiply by 0.1 and 0.01. Convert metric units. Use formal methods to multiply integers. Use formal methods to multiply decimals. Use formal methods to divide integers. Use formal methods to divide decimals. Understand and use order of operations. Solve problems using the area of rectangles and parallelograms. Solve problems using the area of triangles. Solve problems using the area of trapezia. Solve problems using the mean. Explore multiplication and division in algebraic expressions	Find a fractions of a given amount. Use a given fraction to dins the whole and/or other fractions. Find a percentage of a given amount using mental methods. Find a percentage of a given amount using a calculator. Solve problems with fractions greater than 1 and percentages greater than 100%
Skills Learned	Consolidate an understanding of the number system and place value to include decimals and fractions, move freely between different numerical representations (equivalent fractions, decimals and percentages), express one quantity as a fraction of another, where fractions are both less than, and greater than 1. Define percentages as "number of parts per hundred", interpret percentages as a fraction or a decimal. Compare two quantifies using percentages, work with percentages greater than 100%, and interpret pie charts.	Use formal methods, applied to positive integers and decimals, recognise and use relationships between operations including inverse operations, derive and apply formulae to calculate and solve problems involving perimeter, construct and interpret appropriate tables, charts and diagrams, including frequency tables, bar charts and pictograms for categorical data, and vertical line (or bar) charts for ungrouped numerical data.	Use formal written methods, applied to positive integers and decimals, select and use appropriate calculation strategies to solve increasingly complex problems. Recognise and use relationships between operations including inverse operations. Use the concepts and vocabulary factors, multiples, common factors, common multiples, highest common factor, lowest common multiple. Change freely between related standard units (time, length, area, volume and mass). Derive and apply formulae to calculate and solve problems including perimeter and area of triangles, parallelograms. Substitute numerical values into formulae and expressions, including scientific formulae. Use algebraic methods to solve linear equations in one variable. Describe,. Interpret and compare observed distributions of a single variable through the mean.	Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions. Interpret fractions and percentages as operations.

Unit:	Directed Number: Operations and equations with directed number	Fractional Thinking: Addition & subtraction of fractions		
Term:	**Summer 2: 3 Weeks**	**Summer 2 :3 Weeks**		
What We Will Learn	This block is designed to extend and deepen their understanding of directed. Multiple representations and contexts will be used to enable students to appreciate the meaning behind operations with negative integers rather than relying on a series of potentially confusing "rules". As well as exploring directed number in its own right, this block provides valuable opportunities for revising and extending earlier topics, notably algebraic areas such as substitution and the solution of equations; in particular students will be introduced to two-step equations for the first time in this block.	This block builds on the study of "key" fractions, decimals and percentages. It will provide more experience of equivalence of fractions with any denominators, and to introduce the addition and subtraction of fractions. Bar models and concrete representations will be used extensively to support this. Adding fractions with the same denominators will lead to further exploration of fractions greater than one, and for the Core strand adding and subtracting with different denominators will be restricted to cases where one is a multiple of the other.		
What We Will Do	Understand and use representations of directed numbers. Order directed numbers using lines and appropriate symbols. Perform calculations that cross zero. Add directed numbers. Multiplication of directed numbers. Multiplication and division of directed numbers. Use a calculator for directed number calculations. Evaluate algebraic expressions with directed number. Introduction to two-step equations. Use order of operations with directed numbers. Roots of positive numbers. Explore higher powers and roots	Understand representations of fractions. Convert between mixed numbers and fractions. Add and subtract unit fractions with same denominator. Add and subtract fractions with same denominator. Add and subtract fractions from integers expressing the answer as a single fraction. Understand and use equivalent fractions. Add and subtract fractions where the denominators share a single common multiple. Add and subtract fractions with any denominator. Add and subtract improper fractions and mixed numbers. Use fractions in algebraic contexts. Use equivalence to add and subtract decimals and fractions. Add and subtract simple algebraic fractions		
Skills Learned	Select and use appropriate calculation strategies to solve increasingly complex problems. Use the four operations, including formal written methods, applied to integers, both positive and negative. Recognise and use relationships between operations including inverse operations. Use square and square roots. Use a calculator and other technologies to calculate results accurately and then interpret them appropriately. Substitute numerical values into formulae and expressions, including scientific formulae. Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors. simplify and manipulate algebraic expressions to maintain equivalence • understand and use standard mathematical formulae	move freely between different numerical, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals] • express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, , ≤, ≥ • select and use appropriate calculation strategies to solve increasingly complex problems • use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative • work interchangeably with terminating decimals and their corresponding fractions		