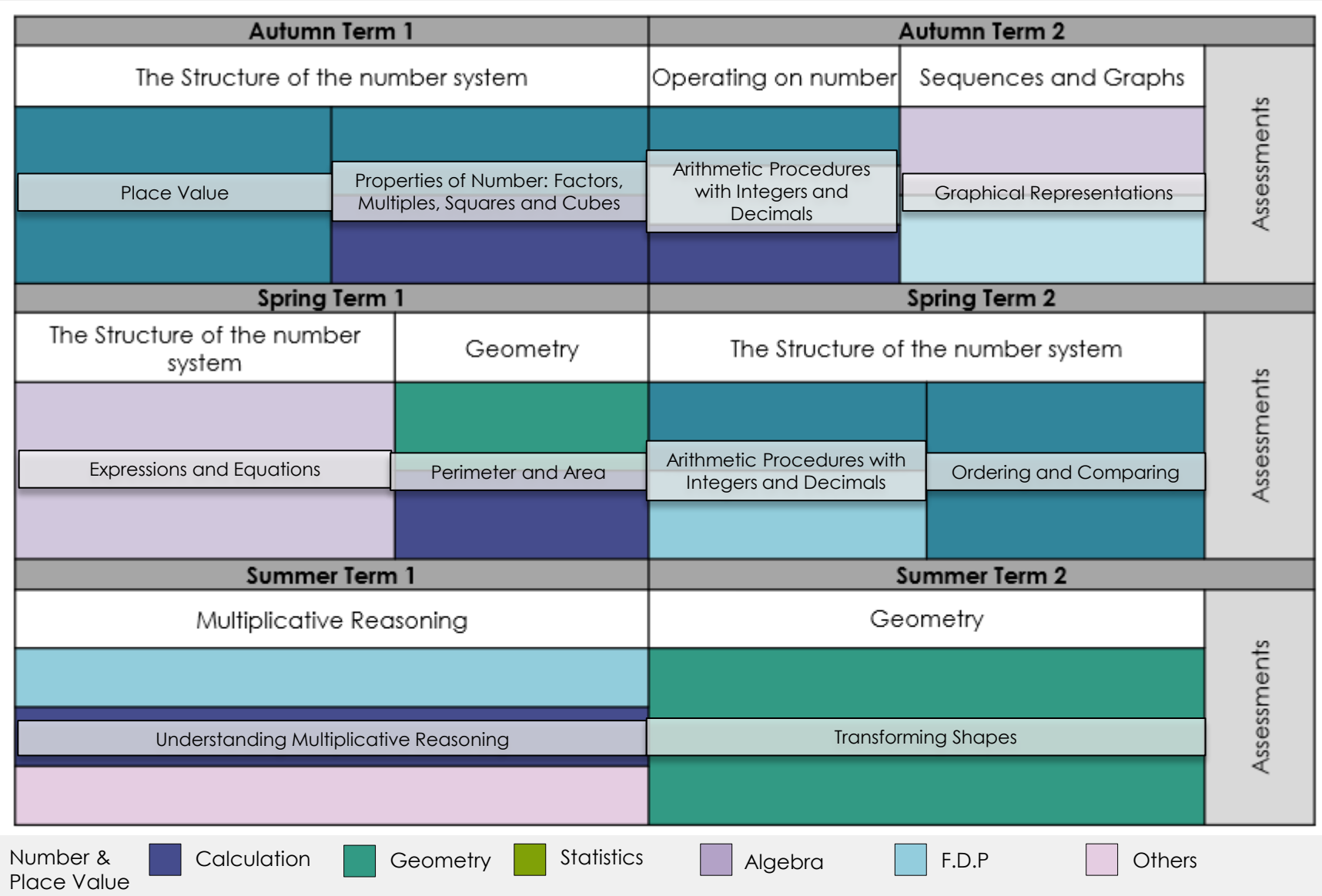
Year 7 Mathematics Overview



Year 7 Mathematics Overview

Place Value

- Understand place value in integers
- Understand place value in decimals, including recognising exponent and fractional representations of the column headings
- Understand place value in the context of measure
- Order and compare numbers and measures using <, >, =

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Properties of Number: Factors, Multiples, Squares and Cubes

- Understand what a multiple is and be able to list multiples of n
- Identify and explain whether a number is or is not a multiple of a given integer
- Understand the concept of square and cube
- Understand the concept of square root and cube root
- Understand and use correct notation for positive integer exponents
- Understand how to use the keys for squares and other powers and square root on a calculator
- Understand what a factor is and be able to identify factors of positive integers
- Understand what a prime number is and be able to identify prime numbers
- Understand that a positive integer can be written uniquely as a product of its prime factors
- Use the prime factorisation of two or more positive integers to efficiently identify the highest common factor
- Use the prime factorisation of two or more positive integers to efficiently find their lowest common multiple

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Arithmetic Procedures with Integers and Decimals

- Understand the mathematical structures that underpin addition and subtraction of positive and negative integers
- Generalise and fluently use written addition and subtraction strategies, including columnar formats, with decimals
- Understand the mathematical structures that underpin multiplication and division of positive and negative integers
- Factorise multiples of 10n in order to simplify multiplication and division of both integers and decimals, e.g. 300 × 7000, 0.3 × 0.007, 0.9 ÷ 0.03, etc.
- Generalise and fluently use written multiplication strategies to calculate accurately with decimals
- Generalise and fluently use written division strategies to calculate accurately with decimals
- Know the commutative law and use it to calculate efficiently
- Know the associative law and use it to calculate efficiently
- Know the distributive law and use it to calculate efficiently
- Calculate using priority of operations, including brackets, powers, exponents and reciprocals
- Use the associative, distributive and commutative laws to flexibly and efficiently solve problems
- Know how to fluently use certain calculator functions and use a calculator appropriately

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Graphical Representations

Describe coordinates, including non-integer values, in all four quadrants

Plot coordinates, including non-integer values, in all four quadrants

Solve a range of problems involving coordinates

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Expressions, Equations and Formulae

- Understand that a letter can be used to represent a generalised number
- Understand that algebraic notation follows particular conventions and that following these aids clear communication
- Know the meaning of and identify: term, coefficient, factor, product, expression, formula and equation
- Understand and recognise that a letter can be used to represent a specific unknown value or a variable
- Understand that relationships can be generalised using algebraic statements
- Understand that substituting particular values into a generalised algebraic statement gives a sense of how the value of the expression changes
- Identify like terms in an expression, generalising an understanding of unitising
- Simplify expressions by collecting like terms
- Understand how to use the distributive law to multiply an expression by a term
- Understand how to use the distributive law to factorise expressions where there is a common factor
- Apply understanding of the distributive law to a range of problem-solving situations and contexts

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Perimeter and Area

Use the properties of a range of polygons to deduce their perimeters

Derive and use the formula for the area of a trapezium

Understand that the areas of composite shapes can be found in different ways

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Arithmetic Procedures with Integers and Decimals

- Understand the mathematical structures that underpin the addition and subtraction of fractions
- Generalise and fluently use addition and subtraction strategies to calculate with fractions and mixed numbers
- Understand the mathematical structures that underpin the multiplication of fractions
- Understand how to multiply unit, non-unit and improper fractions
- Generalise and fluently use strategies to multiply with mixed numbers
- Understand the mathematical structures that underpin the division of fractions
- Divide a fraction by a whole number
- Divide a whole number by a fraction
- Divide a fraction by a fraction

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Ordering and Comparing

- Understand that 1 can be written in the form n / n
- Convert between improper fractions and mixed numbers
- Understand that a fraction represents a division
- Any terminating decimal can be written as a fraction with a denominator of the form 10n
- Understand the process of simplifying fractions
- Convert from fractions to decimals and back again using the converter key on a calculator
- Enter fractions as divisions on a calculator and understand the limitations of the decimal representation that results
- Compare negative integers using < and >
- Compare decimals using < and >
- Compare and order fractions by converting to decimals
- Compare and order
- Order a variety of positive and negative fractions and decimals
- Appreciate that, for any two numbers there is always another number in between them

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Understanding Multiplicative Reasoning

- Appreciate that any two numbers can be connected via a multiplicative relationship
- Understand that a multiplicative relationship can be expressed as a ratio and as a fraction
- Be able to calculate the multiplier for any given two numbers
- Appreciate that there are an infinite number of pairs of numbers for any given multiplicative relationship (equivalence)
- Use a double number line to represent a multiplicative relationship and connect to other known representations
- Understand the language and notation of ratio and use a ratio table to represent a multiplicative relationship and connect to other known representations
- Find a fraction of a given amount
- Given a fraction and the result, find the original amount
- Express one number as a fraction of another
- Be able to divide a quantity into a given ratio
- Be able to determine the whole, given one part and the ratio
- Be able to determine one part, given the other part and the ratio
- Use ratio to describe rates (e.g. exchange rates, conversions, cogs, etc.)

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Transforming Shapes

- Understand the nature of a translation and appreciate what changes and what is invariant
- Understand the minimum information required to describe a translation (vertical and horizontal displacement)
- Translate objects from information given in a variety of forms
- Understand the nature of rotations and appreciate what changes and what is invariant
- Understand the minimum information required to describe a rotation (centre of rotation, size and direction of rotation)
- Rotate objects using information about centre, size and direction of rotation
- Understand the nature of reflections and appreciate what changes and what is invariant
- Understand the minimum information required to describe a reflection (line of reflection)
- Reflect objects using a range of lines of reflection (including non-vertical and non-horizontal)
- Understand the nature of enlargements and appreciate what changes and what is invariant
- Understand the minimum information required to describe an enlargement (centre of enlargement and scale factor)
- Enlarge objects using information about the centre of enlargement and scale factor