

Year 7 Mathematics Overview Crystal Maze





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 <, >, =

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

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 , $0.9 \div 0.03$, 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
- Show the commutative law and use it to calculate efficiently
- Show the associative law and use it to calculate efficiently
- Show 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



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

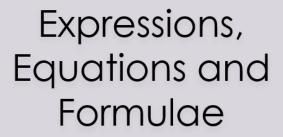
Graphical Representations



Plot coordinates, including noninteger values, in all four quadrants



Solve a range of problems involving coordinates



- 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



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





Derive and use the formula for the area of a trapezium



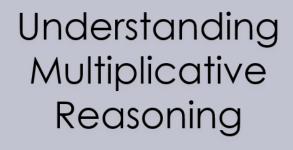
Understand that the areas of composite shapes can be found in different ways

Ordering and Comparing

- 9 Understand that 1 can be written in the form n / n
- Onvert 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
- Onvert 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 >
- Ompare 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

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
- Oivide a fraction by a fraction



- 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.)



- 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