Year 7: Curriculum Intent

Year 7 Curriculum Intent: The Year 7 maths curriculum at The Kingsway aims to build directly on students' progress from KS2 through a mastery and problem-solving approach. Mathematical concepts are explored through small steps developed from the White Rose scheme of learning to allow students to fully understand each element and avoid cognitive overload and repetition of rote methods. Students will be given the opportunity to solve problems every lesson through both independent and group tasks. There is a big focus on number skills and the implementation of numerical methods within a variety of contexts along with an introduction and exploration of algebra and use of geometric reasoning.

Year 7 Essential Knowledge Summary

Schemata 1: Algebraic Thinking

Composite Knowledge: Pupils will explore sequences in detail, using both diagrams and lists of numbers, and appreciate the concepts of "linear" and "non-linear". Pupils will develop a deep understanding of basic algebraic forms and solving one-step linear equations. Pupils will also consider equivalence and the difference between this and equality.

Component Knowledge:

Foundational Knowledge:

Declarative Knowledge:

- Algebraic notation.
- Single and multiple function machines.
- Numerical and algebraic fact families.
- Equality and equivalence of algebraic expressions.

Procedural Knowledge:

- Describe and continue sequences in diagram and number forms, both linear and non-linear.
- Compare numerical and graphical forms.
- Use single machines and a series of two function machines with numbers, bar models and letters.
- Use and interpret algebraic notation.
- Understand and use inverse operations.
- Form and substitute into expressions, including to generate sequences.
- Represent functions graphically.
- Use fact families.
- Form and solve one-step equations.
- Collect like terms.

Upper Hierarchical Knowledge

- Find missing numbers within sequences.

Schemata 2: Place Value and Proportion

Composite Knowledge: Pupils will explore integers up to one billion and decimals up to hundredths. Pupils will use and understand number lines in depth and develop their understanding of rounding. Pupils will gain a deeper understanding of the links between fractions, decimals and percentages, so that they can convert fluently between those most commonly seen in real-life.

Component Knowledge:

Foundational Knowledge:

Declarative Knowledge:

- Place value, including decimal place value.
- Intervals and number lines representation.
- The range and median.
- Powers of ten and significant figures.
- Interpret pie charts.
- Equivalent fractions.
- The definition of percentage.

Procedural Knowledge:

- Recognise and use integer place value up to one billion.
- Recognise and use decimal places to at least hundredths.
- Work out intervals and use number lines.
- Compare and order numbers.
- Use ordered lists to find the range and the median of a set of numbers.
- Round numbers to positive powers of ten.
- Round numbers to one significant figure.
- Represent tenths and hundredths on diagrams and number lines.
- Interchange between fractions, decimals and percentages for multiples of one tenth and one quarter.
- Convert between other fractions, decimals and percentages.

Upper Hierarchical Knowledge

- Explore and use standard index form.
- Explore fractions above one.
- Convert multiples of one eighth to decimals and percentages.

Schemata 3: Application of Number

Composite Knowledge: Pupils will build on the formal methods of addition and subtraction they developed at Key Stage 2, in the context of interpreting and problem solving. They will study forming one and two step equations and multiply by powers of 10 with unit conversions as the main context. They will also work with fractions and percentages of quantities and understand the links between the two.

Component Knowledge:

Foundational Knowledge:

Declarative Knowledge:

- Lowest common multiple (LCM)
- Highest common factor (HCF)
- Area of triangles, rectangles and parallelograms.
- Mean of a set of numbers
- Order of operations.

Procedural Knowledge:

- Use mental and formal written methods of addition with integers and decimals, including choosing the most appropriate method.
- Solve problems in the context of perimeter, money and frequency trees and tables.
- Solve problems in the context of bar charts and line charts.
- Multiply by 10, 100 and 1000, 0.1, 0.01 and convert metric units.
- Use mental and formal written methods of multiplication and division.
- Find the HCF and LCM of small numbers.
- Evaluate areas of triangles, rectangles and parallelograms.
- Find the mean of a set of numbers.
- Find simple fractions and percentages of amounts.
- Begin to use the order of operations.
- Work out simple fractions and percentages of amounts, with and without a calculator.

Upper Hierarchical Knowledge

- Explore addition of numbers given in standard form.
- Evaluate the area of a trapezium.
- Find the HCF and LCM of algebraic expressions.
- Find areas involving algebraic expressions.
- Use fractions greater than 1.

Schemata 4: Directed Number and Fractional Thinking

Composite Knowledge: Pupils will appreciate the meaning behind operations with negative numbers and not rely on a series of rules. As well as exploring directed numbers in their own right, pupils will revisit and extend earlier topics with directed numbers, such as substitution and solving equations. Pupils will also study "key" fractions, decimals and percentages and gain more experience of equivalence of fractions with any denominator and adding and subtracting fractions.

Component Knowledge:

Foundational Knowledge:

Declarative Knowledge:

- Directed numbers.
- Order of operations.
- Equivalent fractions.
- Mixed numbers and improper fractions.

Procedural Knowledge:

- Order directed numbers, both in contextualised and abstract situations.
- Revisit four operations to include directed numbers.

Schemata 5: Lines and Angles

Composite Knowledge: Pupils will learn to construct and measure increasingly complex diagrams using correct mathematical notation. Pie charts will be studied to gain further practice at drawing and measuring angles. Pupils will also gain a deeper understanding of geometric language, names and properties of 2D shapes. Pupils will explore angle rules and use these to form short chains of reasoning.

Component Knowledge:

Foundational Knowledge:

Declarative Knowledge:

- Labelling notation for lines and angles.
- Types of angles.
- Types and properties of triangles, quadrilaterals and other polygons.
- SSS, SAS and ASA triangle rules.
- Angle rules.

Procedural Knowledge:

- Classify angles.
- Identify and draw parallel and perpendicular lines.

Schemata 6: Reasoning with Number

Composite Knowledge: Pupils will develop an understanding of how to use known facts to find other facts, using mental strategies. Strategies for simplifying complex calculations will also be explored. Fractions, decimals and percentages equivalence will be extended in the study of probability, where students will learn about sets, set notation and systematic listing strategies. Factors and multiples will be further explored to include prime numbers. Odd, even, prime, square and triangular numbers will be used as the basis of forming and testing conjectures.

Component Knowledge:

Foundational Knowledge:

Declarative Knowledge:

- Mental arithmetic strategies.
- Set notation.
- Estimation.
- Prime, square and triangle numbers.
- Powers and roots.

Procedural Knowledge:

- Use known facts to derive other facts.
- Evaluate an algebraic expression given a related fact.
- Use estimation.

• Use a calculator with directed number. • Solve two-step equations, with and without a calculator. • Use the order of operations. • Represent tenths and hundredths on diagrams and number lines. • Convert mixed numbers and improper fractions. • Add and subtract fractions with the same denominator and different denominators. • Add and subtract fractions and decimals. **Upper Hierarchical Knowledge** • Work with roots of positive numbers. • Explore higher powers and roots. • Add and subtract simple algebraic fractions.	• Recognise types of triangle, quadrilateral and other polygons. • Construct triangles given SSS, SAS and ASA. • Draw and interpret pie charts. • Calculate and use angles at a point, angles on a straight line and vertically opposite angles. • Calculate missing angles in triangles and quadrilaterals. **Upper Hierarchical Knowledge** • Understand and use parallel lines rules. • Understand and use the sum of angles in any polygon. • Derive simple proofs using angles rules.	• Understand and use set notation. • Draw and interpret Venn diagrams. • Understand and use the language of probability. • Calculate the probability of a single event. • Use the sum of probabilities of an event is 1. • Express a number as a product of prime factors. • Make and test conjectures. • Understand and use counterexamples. **Upper Hierarchical Knowledge** • Understand and use the complement of a set. • Use prime factors to find Highest Common Factors and Lowest Common Multiples.
Year 7 Final Composite Knowledge End Point		
By the end of year 7 the maths department aims to ensure all students are able to reason with and perform all four operations with both positive and negative, integer and non-integer numbers, begin to solve problems using algebraic thinking and efficiently use a scientific calculator.		