This is an overview of the work covered in Year 7.

Not all classes will cover all of the small steps.

The letter H after a small step denotes higher topics. These are the harder topics and will not be covered in all groups, depending on ability.

Sequences

Small Steps

- Describe and continue a sequence given diagrammatically
- Predict and check the next term(s) of a sequence
- Represent sequences in tabular and graphical forms
- Recognise the difference between linear and non-linear sequences
- Continue numerical linear sequences
- Continue numerical non-linear sequences
- Explain the term-to-term rule of numerical sequences in words
- **Find missing numbers within sequences** (H)

(H) denotes higher strand and not necessarily content for Higher Tier GCSE

Understand and use notation

Small Steps

- 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
- Use diagrams and letters with single function machines
- 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
- Represent one- and two-step functions graphically

Equality and Equivalence

Small Steps

- 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 ×/÷ 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

Place Value

Small Steps

- 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 $=, \neq, <, >, \leq, \geq$
- 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

Place Value

Small Steps

- Round a number to 1 significant figure
- **Write 10, 100, 1000 etc. as powers of ten** (H)
- **Write positive integers in the form A x 10^n** (H)
- **Investigate negative powers of ten** (H)
- **Write decimals in the form A x 10^n** (H)

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FDP Equivalence

Small Steps

- 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 – eighths and thousandths** (H)
- Understand the meaning of percentage using a hundred square
- Convert fluently between simple fractions, decimals and percentages
- Use and interpret pie charts

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FDP Equivalence

Small Steps

- Represent any fraction as a diagram
- Represent fractions on number lines
- Identify and use simple equivalent fractions
- Understand fractions as division
- Convert fluently between fractions, decimals and percentages
- **Explore fractions above one, decimals and percentages** (H)

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Addition and Subtraction

Small Steps

- 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 integers
- 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

Addition and Subtraction

Small Steps

- 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** (H)

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Multiplication and Division

Small Steps

- 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** (H)
- 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

Multiplication and Division

Small Steps

- 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** (H)
- Solve problems using the mean
- **Explore multiplication and division in algebraic expressions** (H)

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Fractions & Percentages of Amounts

Small Steps

- Find a fraction of a given amount
- Use a given fraction to find 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%** (H)

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Directed Number

Small Steps

- Understand and use representations of directed numbers
- Order directed numbers using lines and appropriate symbols
- Perform calculations that cross zero
- Add directed numbers
- Subtract 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

Directed Number

Small Steps

- Solve two-step equations
- Use order of operations with directed numbers
- **Roots of positive numbers** (H)
- **Explore higher powers and roots** (H)

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Fractional Thinking

Small Steps

- Understand representations of fractions
- Convert between mixed numbers and fractions
- Add and subtract unit fractions with the same denominator
- Add and subtract fractions with the 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 denominators share a simple 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** H

Fractional Thinking

Small Steps

- Use fractions in algebraic contexts
- Use equivalence to add and subtract decimals and fractions
- **Add and subtract simple algebraic fractions** (H)

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Construction and Measuring

Small Steps

- Understand and use letter and labelling conventions including those for geometric figures
- Draw and measure line segments including geometric figures
- Understand angles as a measure of turn
- Classify angles
- Measure angles up to 180°
- Draw angles up to 180°
- Draw and measure angles between 180° and 360°
- Identify perpendicular and parallel lines
- Recognise types of triangle
- Recognise types of quadrilateral

Construction and Measuring

Small Steps

- Identify polygons up to a decagon
- Construct triangles using SSS
- Construct triangles using SSS, SAS and ASA
- Construct more complex polygons
- Interpret simple pie charts using proportion
- Interpret pie charts using a protractor
- Draw pie charts

Geometric Reasoning

Small Steps

- Understand and use the sum of angles at a point
- Understand and use the sum of angles on a straight line
- Understand and use the equality of vertically opposite angles
- Know and apply the sum of angles in a triangle
- Know and apply the sum of angles in a quadrilateral
- Solve angle problems using properties of triangles and quadrilaterals
- Solve complex angle problems

Geometric Reasoning

Small Steps

- Find and use the angle sum of any polygon (H)
- Investigate angles in parallel lines (H)
- Understand and use parallel line angle rules (H)
- Use known facts to obtain simple proofs. (H)

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Developing Number Sense

Small Steps

- Know and use mental addition and subtraction strategies for integers
- Know and use mental multiplication and division strategies for integers
- Know and use mental arithmetic strategies for decimals
- Know and use mental arithmetic strategies for fractions
- Use factors to simplify calculations
- Use estimation as a method for checking mental calculations
- Use known number facts to derive other facts
- Use known algebraic facts to derive other facts
- Know when to use a mental strategy, formal written method or a calculator

Sets and Probability

Small Steps

- Identify and represent sets
- Interpret and create Venn diagrams
- Understand and use the intersection of sets
- Understand and use the union of sets
- **Understand and use the complement of a set** (H)
- Know and use the vocabulary of probability

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Sets and Probability

Small Steps

- Generate sample spaces for single events
- Calculate the probability of a single event
- Understand and use the probability scale
- Know that the sum of probabilities of all possible outcomes is 1

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Prime Numbers and Proof

Small Steps

- Find and use multiples
- Identify factors of numbers and expressions
- Recognise and identify prime numbers
- Recognise square and triangular numbers
- Find common factors of a set of numbers including the HCF
- Find common multiples of a set of numbers including the LCM
- Write a number as a product of its prime factors
- **Use a Venn diagram to calculate the HCF and LCM** (H)
- Make and test conjectures
- Use counterexamples to disprove a conjecture

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