This is an overview of the work covered in Year 8.

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.

The letter R after a small step denotes a 'review step'. Content may have been covered earlier in Key Stage 3 and may not need revisiting depending on the group.

# Ratio and Scale

## Small Steps

- Understand the meaning and representation of ratio
- Understand and use ratio notation
- Solve problems involving ratios of the form $1:n$ (or $n:1$)
- Solve proportional problems involving the ratio $m:n$
- Divide a value into a given ratio
- Express ratios in their simplest integer form
- Express ratios in the form $1:n$   **H**
- Compare ratios and related fractions
- Understand $\pi$ as the ratio between diameter and circumference
- Understand gradient of a line as a ratio   **H**

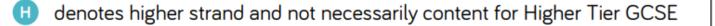> **H**   denotes higher strand and not necessarily content for Higher Tier GCSE

# Multiplicative Change

## Small Steps

- Solve problems involving direct proportion
- Explore conversion graphs
- Convert between currencies
- Explore direct proportion graphs  (H)
- Explore relationships between similar shapes
- Understand scale factors as multiplicative representations
- Draw and interpret scale diagrams
- Interpret maps using scale factors and ratios

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# Multiplying & Dividing Fractions

## Small Steps

- Represent multiplication of fractions
- Multiply a fraction by an integer
- Find the product of a pair of unit fractions
- Find the product of a pair of any fractions
- Divide an integer by a fraction
- Divide a fraction by a unit fraction
- Understand and use the reciprocal
- Divide any pair of fractions

Multiply and divide improper and mixed fractions (H)

Multiply and divide algebraic fractions (H)

Work with coordinates in all four quadrants

Identify and draw lines that are parallel to the axes

Recognise and use the line $y = x$

Recognise and use lines of the form $y = kx$

Link $y = kx$ to direct proportion problems

**Explore the gradient of the line $y = kx$** (H)

Recognise and use lines of the form $y = x + a$

Explore graphs with negative gradient $(y = -kx, y = a - x, x + y = a)$

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Link graphs to linear sequences

Plot graphs of the form $y = mx + c$

**Explore non-linear graphs** H

**Find the midpoint of a line segment** H

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# Representing Data

## Small Steps

- Draw and interpret scatter graphs
- Understand and describe linear correlation
- Draw and use line of best fit
- Identify non-linear relationships
- Identify different types of data
- Read and interpret ungrouped frequency tables
- Read and interpret grouped frequency tables
- Represent grouped discrete data
- Represent continuous data grouped into equal classes
- Represent data in two-way tables

# Tables and Probability

## Small Steps

- Construct sample spaces for 1 or more events
- Find probabilities from a sample space
- Find probabilities from two-way tables
- Find probabilities from Venn diagrams
- **Use the product rule for finding the total number of possible outcomes** Ⓗ

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# Brackets, Equations & Inequalities

## Small Steps

- Form algebraic expressions
- Use directed number with algebra
- Multiply out a single bracket
- Factorise into a single bracket
- Expand multiple single brackets and simplify
- **Expand a pair of binomials** (H)
- Solve equations, including with brackets
- Form and solve equations with brackets
- Understand and solve simple inequalities

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Form and solve inequalities

**Solve equations and inequalities with unknowns on both sides** (H)

**Form and solve equations and inequalities with unknowns on both sides** (H)

Identify and use formulae, expressions, identities and equations

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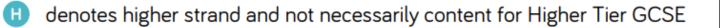
# Sequences

## Small Steps

- Generate sequences given a rule in words
- Generate sequences given a simple algebraic rule
- Generate sequences given a complex algebraic rule
- **Find the rule for the $n^{\text{th}}$ term of a linear sequence**  Ⓗ

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# Indices

## Small Steps

◄ Adding and subtracting expressions with indices

◄ Simplifying algebraic expressions by multiplying indices

◄ Simplifying algebraic expressions by dividing indices

◄ Using the addition law for indices

◄ Using the addition and subtraction law for indices

◄ **Exploring powers of powers** Ⓗ

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# Fractions and Percentages

## Small Steps

Convert fluently between key fractions, decimals and percentages **R**

Calculate key fractions, decimals and percentages of an amount without a calculator **R**

Calculate fractions, decimals and percentages of an amount using calculator methods **R**

Convert between decimals and percentages greater than 100%

Percentage decrease with a multiplier

Calculate percentage increase and decrease using a multiplier

Express one number as a fraction or a percentage of another without a calculator

Express one number as a fraction or a percentage of another using calculator methods

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Work with percentage change

Choose appropriate methods to solve percentage problems

**Find the original amount given the percentage less than 100%** (H)

**Find the original amount given the percentage greater than 100%** (H)

**Choose appropriate methods to solve complex percentage problems** (H)

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# Standard Form

## Small Steps

- Investigate positive powers of 10
- Work with numbers greater than 1 in standard form
- Investigate negative powers of 10
- Work with numbers between 0 and 1 in standard form
- Compare and order numbers in standard form
- Mentally calculate with numbers in standard form
- Add and subtract numbers in standard form
- Multiply and divide numbers in standard form
- Use a calculator to work with numbers in standard form

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**Understand and use negative indices** (H)

**Understand and use fractional indices** (H)

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# Number Sense

## Small Steps

Round numbers to powers of 10, and 1 significant figure **R**

Round numbers to a given number of decimal places

Estimate the answer to a calculation

**Understand and use error interval notation** **H**

Calculate using the order of operations **R**

Calculate with money

Covert metric measures of length

Convert metric units of weight and capacity

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**Convert metric units of area** (H)

**Convert metric units of volume** (H)

Solve problems involving time and the calendar

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# Angles in parallel lines & polygons

## Small Steps

- Understand and use basic angles rules and notation **R**
- Investigate angles between parallel lines and the transversal
- Identify and calculate with alternate and corresponding angles
- Identify and calculate with co-interior, alternate and corresponding angles
- Solve complex problems with parallel line angles
- Construct triangles and special quadrilaterals **R**
- Investigate the properties of special quadrilaterals
- Identify and calculate with sides and angles in special quadrilaterals

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**Understand and use the properties of diagonals of quadrilaterals** (H)

Understand and use the sum of exterior angles of any polygon

Calculate and use the sum of the interior angles in any polygon

Calculate missing interior angles in regular polygons

**Prove simple geometric facts** (H)

**Construct an angle bisector** (H)

**Construct a perpendicular bisector of a line segment** (H)

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# Area of Trapezia and Circles

## Small Steps

- Calculate the area of triangles, rectangles and parallelograms  **R**
- Calculate the area of a trapezium
- Calculate the perimeter and area of compound shapes (1)
- Investigate the area of a circle
- Calculate the area of a circle and parts of a circle without a calculator
- Calculate the area of a circle and parts of a circle with a calculator
- Calculate the perimeter and area of compound shapes (2)

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# Line symmetry and reflection

## Small Steps

◀ Recognise line symmetry

▷ Reflect a shape in a horizontal or vertical line 1 (shapes touching the line)

◀ Reflect a shape in a horizontal or vertical line 2 (shapes not touching the line)

▷ Reflect a shape in a diagonal line 1 (shapes touching the line)

◀ Reflect a shape in a diagonal line 2 (shapes not touching the line)

# The Data Handling Cycle

## Small Steps

◀ Set up a statistical enquiry

▷ Design and criticise questionnaires

◀ Draw and interpret pictograms, bar charts and vertical line charts   **R**

▷ Draw and interpret multiple bar charts

◀ Draw and interpret pie charts   **R**

▷ Draw and interpret line graphs

◀ Choose the most appropriate diagram for given set of data

▷ Represent and interpret grouped quantitative data

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- Find and interpret the range

- Compare distributions using charts

- Identify misleading graphs

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# Measures of Location

## Small Steps

- Understand and use the mean, median and mode
- Choose the most appropriate average
- **Find the mean from an ungrouped frequency table** (H)
- **Find the mean from an grouped frequency table** (H)
- Identify outliers
- Compare distributions using averages and the range

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