WJEC MATHEMATICS

HIGHER

Number.

- Rounding - *To the nearest 10, 100, 1000. To the nearest integer (number), to decimal places and to significant figures.*
- Converting between fractions, decimals, and percentages
- Using negative numbers (e.g. - 8 - 3)
- Understand **odd, even, multiples, factors, primes** - *Prime numbers - 2, 3, 5, 7, 11, 13, 17*
- Finding the Highest common factor (HCF) and Lowest common multiple (LCM). (Including the use of product of primes.
- Express a number as a product of its prime factors using a prime factor tree (index notation)
- Understand **square, square root, cube, cube root, reciprocal** - *Square numbers - 1, 4, 9, 16, 25, 36, 49, 64, 81, 100*
- Understand powers / indices (e.g. $2^4 = 2 \times 2 \times 2 \times 2$)
- Understand the four rules of indices (*multiplying, dividing, power of zero, power of a power*)
- Understand indices that are fractions and negative (i.e. power of a half)
- Understand and use standard form
- Without a calculator be able to add, subtract, multiply, and divide.
- BIDMAS
- Add, Subtract, multiply, and divide whole numbers, decimals, and fractions (including negatives).
- Finding a fraction (or percentage) of an amount (Use of multipliers)
- Express one number as a fraction of another
- Finding the original amount after an increase or decrease
- Calculate fractional (or percentage) increase and Decrease (including multiple applications – appreciation and depreciation)
- Direct and inverse proportion
- Share amounts using ratio
- Know that some fractions are recurring (go on forever) and some are not (terminating)
- Rounding to ONE SIG FIG to estimate
- Be able to read timetables
- Understand how to calculate profit and loss
- Understand simple interest, compound interest (Including the use of a calculator)
- Use exchange rates to exchange between currencies (E.g. pounds to dollars)
- Use Venn Diagrams to sort numbers
- Rounding in Context
- Error Bounds
- Converting recurring decimals to fractions
- Understand rational and irrational numbers
- Simplifying surds (including rationalising the denominator)
- Understand annual rates – AER, APR

Algebra.

- Recognise patterns and describe them in words (or write the next few terms)
- Find the *nth* term of a sequence (linear or quadratic)
- Use the *nth* term to write the first few terms of a sequence (or a specific term)
- Construct and interpret conversion graphs
- Construct and interpret travel graphs and other real life graphs
- Plot coordinates in all four quadrants
- Be able to draw and recognise lines such as x=5 and y=2
- Gradient of parallel and perpendicular lines
- Understand y=mx+c
- Substitution including into a worded formulae
- Simplify by collecting like terms (Circles and Squares)
- Expand a single bracket using **Santa's hat** (E.g. $3(2x + 2)$)
- Factorising to a single bracket and a double bracket (Including difference of two squares)
- Form and Solve equations (Including using the quadratic formula)
- Change the subject of the formula
- Graphs and equations describing direct and inverse proportion
- Simultaneous Equations
- Trial and Improvement
- Understand function notation ($y = f(x)$) and how to transform functions
- Draw tangents to find velocity (distance time graph) and acceleration (velocity time graph)
- Using the trapezium rule to estimate the area under a curve
- Simplifying algebraic fractions
- Using straight line graphs to locate a region given by inequalities

Geometry and Measure.

- Be able to name 2D and 3D shapes
- Be able to name parts of a circle
- Know the properties of the 4 different types of triangles
- Be able to describe the difference between acute, obtuse, right, and reflex angles and sketch them.
- Understand and recognise nets of shapes and draw nets of shapes
- Draw shapes using isometric paper
- Know how to use a ruler to draw straight lines and a pair of compasses to draw circles
- Use a pair of compasses to bisect lines and angles
- Use a ruler and pair of compasses to construct shapes (Triangles, Circles, etc)
- Constructing angles of 30, 45, 60, 90 with a compass and ruler
- Rotational Symmetry
- Drawing lines of symmetry on a shape
- Using a line to reflect a shape
- Use angle facts to solve problems

  - Angles in a triangle sum to 180 degrees
  - Angles in a quadrilateral sum to 360 degrees
  - Angles around a point sum to 360 degrees
  - Angles on a straight line sum to 180 degrees
  - All exterior angles of any shape sum to 360 degrees
- Know the difference between regular and irregular polygon (shapes)
- Pythagoras' theorem (Including in 3D)
- SOH CAH TOA trigonometry (Including in 3D)
- Sine Rule, Cosine Rule, Area of a triangle
- Circle Theorems (Including alternate segment theorem)
- Understand the difference between **similar** shapes and **congruent** shapes
- Know angle rules when a line cuts through parallel lines
- Know the four transformations
  - Reflection (*You may be given a line, or you will have to draw it e.g. x = 3, or y = 5*)
  - Rotation of 90, 180, or 270 degrees. It could be clockwise **or** anticlockwise. You may have to use the origin or use a centre of rotations. *USE TRACING PAPER*
  - Enlarge a shape using a scale factor (may be a fraction, or negative)
  - Translation (Using a column vector)
- Know how some shapes tessellate and draw tessellating patterns
- Use map scales (*E.g. 1cm = 50m)*
- Bearings
- Loci
- Speed, Distance, time and Density (Compound Measures)
- Know **metric units** and what they are used for - weight, length, volume. Use these to make sensible estimates
- Dimensional Analysis – stating if something is a volume, area, length, or none
- Be able to convert between metric units (*E.g. Change 4m to cm*)
- Convert between 12 hour and 24 hour clock
- Convert between: km - miles; cm - inches or feet; kg - lb; litres - pints or gallons
- Learn these off by heart: 8km = 5 miles; 1kg = 2.2lb; 1 litre = 1.75 pints
- Find the area of a shape by counting squares on a grid
- Find the area of shapes by using formulae and calculating.
- Be able to find the area and perimeter of a square, rectangle, triangle, parallelogram, trapezium, circle, semicircles and **Compound Shapes (*Splitting it up)***
- Be able to calculate the surface area and volume of cuboids, cylinders, cubes, prisms
- Understand graphs and behaviour of trig functions and sketching these (sin, cos, tan)
- Use ratios of Lengths, Area, and Volume in Similar 2D and 3D shapes
- Finding the length of circular arcs
- Finding perimeters and areas of sectors and segments of a circle
- Surface area and volumes of spheres, cones, pyramids, and compound solids
- Understand how to prove two triangles are congruent (SSS, SAS, ASA)

Statistics and Probability.

- Criticise questionnaire questions and design better ones
- Tally charts
- Pictogram
- Bar charts
- Pie charts
- Grouped frequency diagrams and Frequency Polygon
- Cumulative Frequency – Using this to find median and Interquartile range
- Estimate the mean and median from a grouped frequency table
- Box and Whisker Plots
- Plot scatter diagrams and comment on the correlation (*positive, negative, none)*
- Draw a line of best fit on a scatter diagram and using this to answer questions
- Be able to calculate the mean, median, mode, and range of a set of numbers
- Know the probability keywords; *certain, likely, even chance, unlikely, impossible*
- Understand that probability goes between 1 and 0
- Know how to work of the probability of something occuring (*E.g. rolling an odd number on a die*)
- Tree Diagrams
- Relative Frequency and the graph of this
- Be able to list all outcomes of an experiment or game
- Sort information into Venn Diagrams
- Know that the probability of all possibilities added together is 1
- AND rule and OR rule
- Sampling **without replacement**
- Stratified sampling
- Histograms (unequal class widths)