

Grade 3 checklist

51 skills. Tick each one when you can do it. For grade 3 you need the skills for the grades below it too.

Number

- ☐ **Use written methods for all four operations** Use column or grid multiplication and short or long division without a calculator. (Place value, ordering and order of operations)

- ☐ **Multiply and divide with decimals** Work with whole numbers, then place the decimal point, e.g. $0.3 \times 0.04 = 0.012$ and $7.2 \div 0.3 = 24$. (Place value, ordering and order of operations)

- ☐ **Find HCF and LCM by listing** List factors for the HCF and multiples for the LCM: for 12 and 18, the HCF is 6 and the LCM is 36. (Primes, factors, HCF and LCM)

- ☐ **Convert fractions, decimals and percentages** E.g. $\frac{3}{8} = 3 \div 8 = 0.375 = 37.5\%$. (Fractions and mixed numbers)

- ☐ **Add and subtract fractions** Use a common denominator: $\frac{2}{3} + \frac{1}{4} = \frac{8}{12} + \frac{3}{12} = \frac{11}{12}$. (Fractions and mixed numbers)

- ☐ **Recognise powers of 2, 3, 4 and 5** E.g. $2^5 = 32$, $3^4 = 81$, $4^3 = 64$ and $5^3 = 125$. (Indices and roots)

- ☐ **Write large numbers in standard form** Place the point after the first digit and count the moves: $45,000 = 4.5 \times 10^4$. (Standard form)

- ☐ **Round to significant figures** Start counting at the first non-zero digit: 0.03064 is 0.0306 to 3 significant figures. (Rounding, estimation and error intervals)

- ☐ **Estimate by rounding to 1 significant figure** Round every number to 1 s.f., then calculate: $38.2 \times 5.9 \approx 40 \times 6 = 240$. (Rounding, estimation and error intervals)

- ☐ **List combinations from two or three sets** Fix one item and run through every option for the others, then check you have them all. (Listing and the product rule)

Algebra

- ☐ **Substitute positive numbers into expressions** Replace each letter by its value, e.g. when $a = 4$ and $b = 3$, $5a - 2b = 20 - 6 = 14$. (Algebraic notation, substitution and identities)

- ☐ **Tell expressions, equations, formulae and identities apart** An expression has no equals sign, an equation can be solved, a formula links quantities and an identity is true for every value. (Algebraic notation, substitution and identities)

- ☐ **Expand a single bracket** Multiply every term inside by the term outside, e.g. $4(2x - 3) = 8x - 12$. (Expanding brackets)

- ☐ **Rearrange a one-step formula** Use the inverse operation, e.g. $P = x + 7$ gives $x = P - 7$. (Changing the subject)

- ☐ **Solve two-step equations** e.g. $3x - 4 = 11$, so $3x = 15$ and $x = 5$. (Linear equations)

- ☐ **Write an inequality from a number line** An open circle means the value is not included ($<$ or $>$); a filled circle means it is included ($\leq$ or $\geq$). (Inequalities)

- ☐ **Recognise square, cube and triangular numbers** Squares 1, 4, 9, 16, ...; cubes 1, 8, 27, 64, ...; triangular numbers 1, 3, 6, 10, ... (Sequences and the nth term)
- ☐ **Plot a straight line from its equation** Make a table of values, plot the points and join them with a ruler. (Straight-line graphs)
- ☐ **Complete a table of values and plot** Substitute each x (with brackets for negatives), plot the points and join them with a smooth curve. (Graphs of functions)

Ratio, proportion and rates of change

- ☐ **Share an amount in a given ratio** Find the value of one part first, e.g. £40 shared in the ratio 3 : 5 gives £15 and £25. (Ratio)
- ☐ **Write one quantity as a fraction of another** Use the same units, then write the first over the second and simplify, e.g. 40 minutes out of an hour is $\frac{2}{3}$. (Ratio)
- ☐ **Convert between fractions, decimals and percentages** For example, $\frac{3}{8} = 0.375 = 37.5\%$, and $120\% = 1.2$. (Percentages and reverse percentages)
- ☐ **Write one amount as a percentage of another** Divide the part by the whole and multiply by 100, e.g. 18 out of 24 is 75%. (Percentages and reverse percentages)
- ☐ **Scale a recipe up or down** Find the amount for one (or a scale factor) and multiply every ingredient by the same number. (Direct and inverse proportion)
- ☐ **Use speed = distance ÷ time** For example, 150 km in 2.5 hours is an average speed of 60 km/h. (Speed, density and pressure)
- ☐ **Convert money using an exchange rate** Multiply by the rate to change pounds into the other currency, and divide to change back. (Converting units)
- ☐ **Read and use a conversion graph** Read across and down carefully, working out the value of one small square first. (Converting units)

Geometry and measures

- ☐ **Find missing angles in triangles and quadrilaterals** Angles in a triangle add up to 180° , angles in a quadrilateral add up to 360° , and the base angles of an isosceles triangle are equal. (Angles, parallel lines and polygons)
- ☐ **Know the properties of special quadrilaterals** Know the sides, angles, diagonals and symmetry of squares, rectangles, parallelograms, rhombuses, kites and trapezia. (Angles, parallel lines and polygons)
- ☐ **Name the parts of a circle** Radius, diameter, circumference, chord, tangent, arc, sector and segment. (Arcs and sectors)
- ☐ **Find the area of parallelograms and trapezia** Parallelogram = base $\times$ perpendicular height; trapezium = $\frac{1}{2}(a + b)h$. (Area and perimeter)
- ☐ **Find the volume of a cuboid** Volume = length $\times$ width $\times$ height (or count the centimetre cubes). (Volume and surface area)
- ☐ **Draw the plan of a 3D solid** Draw the view from directly above, full size or to scale, on squared paper. (Plans and elevations)

- ☐ **Draw front and side elevations** Draw the views from the front and from the side, showing the correct heights. (Plans and elevations)

- ☐ **Identify congruent shapes** Congruent shapes are identical in shape and size, even if one is turned over or rotated. (Congruence and geometric proof)

- ☐ **Reflect a shape in a mirror line** Reflect in lines such as $x = 2$, $y = -1$, $y = x$ and $y = -x$; each image point is the same distance from the line. (Transformations)

- ☐ **Translate a shape using a column vector** The top number moves right (+) or left (-); the bottom number moves up (+) or down (-). (Transformations)

- ☐ **Use a scale to find real distances** e.g. on a 1 : 50 000 map, 4 cm represents 200 000 cm = 2 km. (Bearings and scale drawings)

- ☐ **Measure and draw lines and angles accurately** Measure lengths to the nearest millimetre and angles to the nearest degree. (Bearings and scale drawings)

- ☐ **Construct triangles from given sides and angles** Use a ruler and protractor for SAS and ASA, and a ruler and compasses for SSS. (Constructions and loci)

Probability

- ☐ **Use the fact that probabilities sum to 1** Find a missing probability in a table, or use $P(\text{not } A) = 1 - P(A)$. (Probability and relative frequency)

- ☐ **Complete and use a frequency tree** Split a total into groups and then subgroups, and read off the numbers you need for a probability. (Probability and relative frequency)

- ☐ **List all the outcomes systematically** Fix the first item and list every option for the second, then change the first, e.g. HH, HT, TH, TT for two coins. (Tree diagrams and combined events)

- ☐ **Use a sample space diagram** Draw a grid for two dice or spinners, then count the outcomes you want out of the total number of cells. (Tree diagrams and combined events)

- ☐ **Sort items into a two-set Venn diagram** Put items in both sets in the overlap, the rest of each set in its own circle, and items in neither set outside the circles. (Venn diagrams and set notation)

Statistics

- ☐ **Complete and use a two-way table** Use the fact that each row and each column adds up to its total to fill in the missing values. (Charts, diagrams and time series)

- ☐ **Draw and read a stem-and-leaf diagram** Put the leaves in order, include a key, and use the diagram to find the median and the range. (Charts, diagrams and time series)

- ☐ **Calculate the mean of a list** Add up all the values and divide by how many values there are. (Averages and spread)

- ☐ **Name the type of correlation** Positive, negative or no correlation, and whether it is strong or weak. (Scatter graphs and correlation)

- ☐ **Describe the relationship in context** Say how one variable changes as the other increases, using the names of the variables. (Scatter graphs and correlation)

☐ **Explain why a sample may be biased** Say which group is more or less likely to be chosen, so the sample does not represent the population. (Sampling and capture–recapture)

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