

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)

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- ☐ **Draw front and side elevations** Draw the views from the front and from the side, showing the correct heights. (Plans and elevations)
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- ☐ **Identify congruent shapes** Congruent shapes are identical in shape and size, even if one is turned over or rotated. (Congruence and geometric proof)
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- ☐ **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)
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- ☐ **Translate a shape using a column vector** The top number moves right (+) or left (-); the bottom number moves up (+) or down (-). (Transformations)
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- ☐ **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)
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- ☐ **Measure and draw lines and angles accurately** Measure lengths to the nearest millimetre and angles to the nearest degree. (Bearings and scale drawings)
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- ☐ **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)
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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)
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- ☐ **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)
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- ☐ **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)
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- ☐ **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)
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- ☐ **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)
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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)
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- ☐ **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)
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- ☐ **Calculate the mean of a list** Add up all the values and divide by how many values there are. (Averages and spread)
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- ☐ **Name the type of correlation** Positive, negative or no correlation, and whether it is strong or weak. (Scatter graphs and correlation)
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- ☐ **Describe the relationship in context** Say how one variable changes as the other increases, using the names of the variables. (Scatter graphs and correlation)
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☐ **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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