Learning Outcomes – National Curriculum (England)

Numeracy/Mathematics
Year 3

By the end of Year 3 children should be able to confidently:

- Locate any 3-digit number on a landmarked line from 0-1000 and use this to order and compare numbers.
- Understand place value in 3-digit numbers; add and subtract 1s, 10s or 100s without difficulty; use this to add and subtract multiples of 1, 10, 100 to/from 3-digit numbers.
- Know securely number pairs for all the numbers up to and including 20, e.g. pairs which make 15 (7+8, 6+9, 5+10, 4+11, 3+12, 2+13, 1+14, 0+15)
- Round to the nearest ten and hundred, e.g. 34 to the nearest ten is 30, 276 to the nearest hundred is 300.
- Mentally add or subtract any pair of 2 digit numbers, e.g. 75 + 58 or 75 – 58
- Recognise that there are two ways of completing subtractions, either by counting up (using Frog) or by counting back, e.g. 54 – 27 (counting up)

  54 – 21 (counting back)

NB. It is not entirely how close the numbers are that decides which strategy (counting up or counting back) is appropriate, it is the difficulty of the calculation involved. So 64 – 40 may be best done by counting back, but 64 – 27 is best done by counting up. Children need to be able to recognise whether they want to count back or count up using Frog. If in doubt, use Frog! Children make fewer errors!

- Subtract larger numbers with confidence, using Frog for counting up, e.g. 302 – 288
- Understand that multiplication is commutative, e.g. 4 x 8 is the same as 8 x 4.
- Know the 2x, 3x, 5x and 10x times tables. All tables need to be learned to 12th multiple. Include division facts (important). So we know how many 3s in 36, i.e. 36 ÷ 3 = 12, as well as knowing 12 x 3 = 36.
- Multiply any 2-digit number by 10 or a single-digit number by 100; divide any multiple of 10 or 100 by 10 or 100. Understand the effect of multiplying and dividing whole numbers by 10 and 100.
- Multiply a 1 digit number by a 2 digit number starting to use the grid e.g. 4 x 13 =
- Partition to 58

X 4	10	3
	40	12

40 + 12 = 52

double and halve numbers

25 + 4 = 29

- Know that division is the inverse of multiplication, e.g. that □ x 3 = 21 ≡ 21 ÷ 3 = ?
- Recognise and derive equivalent fractions for ½, ¼, ¾, e.g. ¼ ≡ $^3/_{12}$.
- Find unit and non-unit fractions of small amounts.
- Add and subtract easy amounts of money, e.g. £3.64 + £4.50, and give change by counting up, e.g. £10 – £6.95 as £6.95 + 5p + £3 so change is £3.05.

- Compare durations of events using analogue and digital times.
- Know that there are 100cm in a metre and that there are 10mm in a centimetre; use a ruler to measure lines.
- Identify right angles as 90⁰ in shapes, and also as turns; recognise angles as less than or greater than 90⁰; identify horizontal and vertical lines.

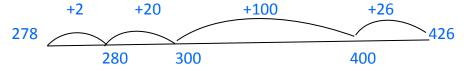# Learning Outcomes – National Curriculum (England)

Numeracy/Mathematics
Year 4

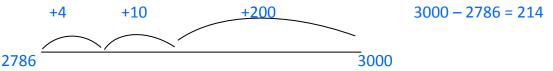By the end of Year 4, children should be able to confidently:

- Locate 4 and 5 digit numbers on a landmarked line and use this to compare and order numbers; round to ten, a hundred and a thousand.
- Understand the numbers of 1s, 10s, 100s, 1000s and 10,000s in a 5-digit number and the use of zero as a place holder.
- Know that one-place decimal numbers represent ones and tenths e.g. 3.7 = 3 ones and 7 tenths.
- Count in steps of 2, 4, 5, 10, 50, 100 and 1000.
- Recognise negative numbers in relation to number lines and temperature.
- Add multiples of 1, 10, 100, 1000 without difficulty, e.g. 15,347 + 3000, 434 + 300 and 648 – 220
- Mentally add and subtract any pair of two digit numbers.
- Know how to use the written addition: first expanded method, moving onto concise method. e.g.

300	80	5	385
300	40	6	346
100	10		11 *(these are the 'carry' digits)*
700	30	1	731

- Subtract 3 digit numbers from 3 digit numbers using 'Frog' and counting up, e.g. 426 – 278 by hopping along a line from 278 to 426

$$278 \xrightarrow{+2} 280 \xrightarrow{+20} 300 \xrightarrow{+100} 400 \xrightarrow{+26} 426$$

- Use Frog to subtract from multiples of 1000 where the difference is less than 500, e.g. 3000 – 2786 = 214

$$2786 \xrightarrow{+4} \xrightarrow{+10} \xrightarrow{+200} 3000$$

- Multiply 1 and 2 digit numbers by 10, 100 and 1000; divide 1 and 2 digit numbers by 10 and 100 to understand place value in decimal numbers with one place.
- Know and recite 2x, 3x, 4x, 5x, 9x, 10x times tables incl. division facts up to 12th multiple; include multiplying by 0 (e.g. 5 x 0 = 0, 7 x 0 = 0) or by 1 (e.g. 5 x 1 = 5, ½ x 1 = ½).
- Multiply 1- digit numbers by 2-digit or friendly 3-digit numbers using grid method.
- Know how to use 'efficient chunking' for division above the range of the tables' facts,
  e.g. 84 ÷ 6 = ?   Re-write as   □ x 6 = 84

                                       10 x 6 = $\underline{60}$

                                               = 24 (84 – 60)

                                        4 x 6 = $\underline{24}$

  Add the red numbers: so 14 x 6 = 84   0   So 84 ÷ 6 = 14

  Begin to extend this to 3 digit numbers, e.g. 145 ÷ 5 = ?
- Write the equivalent fraction for fractions with given denominators or numerators, e.g. ½ = $^?/_8$; reduce a fraction to its simplest form, e.g. $^6/_{12}$ ≡ ½.
- Convert between units of measurement, e.g. cm to m, g to Kg and ml to L; convert between units of time and between analogue and digital times.
- Identify acute and obtuse angles, compare and order angles up to 180⁰.
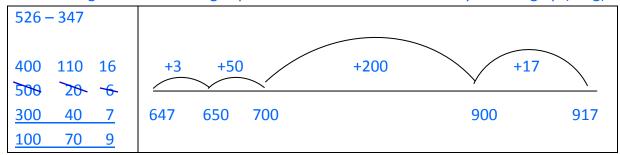- Interpret and present discreet data using bar charts and pictograms.

Learning Outcomes – National Curriculum (England)

Numeracy/Mathematics
Year 5

By the end of Year 5, children should be able to confidently:

- Locate 5 and 6 digit numbers on a landmarked line; use this to compare/order numbers.
- Round to ten, a hundred, a thousand or ten thousand.
- Begin to read scales of different types
- Understand a one-place decimal number as a number of tenths and a two-place decimal number as a number of hundredths.
- Understand the effect of multiplying and dividing by 10 and 100 to give 1-place and 2-place decimal answers. E.g. 4.5 x 10 = 45, and 678 ÷ 100 = 6.78 etc.
- Add or subtract 0.1 or 0.01 to/from any decimal number with confidence, e.g. 5.83 + 0.01 or 4.83 – 0.1
- Add and subtract mentally with confidence – where the numbers are less than 100 or the calculation relies upon simple addition/subtraction and place value. Examples include: 6,723 – 400, 78 + 46, 72 – 46, 8020 + 910, 100 – 64, 5000 + 12,000, etc.
- Confidently add 3- and friendly 4-digit numbers together using a secure written method, including adding 'piles' of numbers, e.g.   345

$$
\begin{array}{r}
621 \\
108 \\
\underline{1} \\
\underline{1074}
\end{array}
$$

- Subtract larger numbers using expanded column subtraction or by counting up (Frog).

526 – 347	
400 110 16	+3 +50 +200 +17
~~500~~ ~~20~~ ~~6~~	
300 40 7	647 650 700 900 917
100 70 9	

- Begin to subtract decimal numbers using counting up: 6.2 – 3.5

+0.5   +2.2

3.5   4   6.2

- Know and recite **all** times tables including division facts.
- Multiply 2- and 3-digit numbers by numbers ≤12 using grid method; multiply 2-digit by 2-digit numbers using grid method.
- Scale up or down by a factor of 2, 5 or 10
- Perform divisions mentally within the range of tables facts using remainders and fractions and decimal equivalences, e.g. $68 \div 8 = 8$ r4 or 8½ or 8.5
- Divide 2-digit and 3-digit numbers by one-digit numbers above the range of tables using efficient chunking.
- Reduce fractions to their simplest form, including tenths to fifths and hundredths to tenths, e.g. $40/100 = 4/10 = 2/5$ which is also 0.4
- Identify simple fraction and decimal equivalents: ½ ≡ 0.5, 0.25 ≡ ¼ and 0.75 ≡ ¾.
- Measure and compare capacities, weights and lengths, including perimeters using SI units; understand the concept of area and count squares to find areas.
- Understand the properties of triangles; find unknown angles in triangles and rectangles.

Learning Outcomes – National Curriculum (England)

Numeracy/Mathematics
Year 6

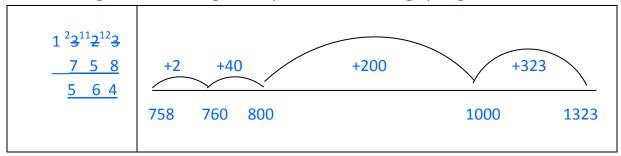By the end of Year 6, children should be able to confidently:

- Locate numbers up to 999,999 on a landmarked line; use this to compare/order numbers.

- Round to ten, a hundred and a thousand, ten thousand or one hundred thousand.
- Read scales with accuracy and confidence
- Add and subtract mentally with confidence – where the numbers are less than 100 or the calculation relies upon simple addition/subtraction and place value. Examples include: 6,723 – 400, 78 + 46, 72 – 46, 8020 + 910, 100 – 64, 5000 + 12,000, etc.
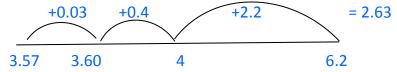- Add several large numbers using written addition, e.g. 11895

$$\begin{array}{r} 3478 \\ 3165 \\ \underline{121} \\ \underline{18538} \end{array}$$

- Add several large or decimal numbers using written addition, e.g. 18.9

$$\begin{array}{r} 3.47 \\ 11 \\ \underline{} \\ \underline{21.17} \end{array}$$

- Subtract large numbers using decomposition or counting up, e.g. 1323 – 758

$$\begin{array}{r} 1\ ^{2}3^{11}2^{12}3 \\ 7\ \ 5\ \ 8 \\ \underline{} \\ 5\ \ 6\ \ 4 \end{array}$$

+2   +40   +200   +323

758   760   800   1000   1323

- Subtract decimal numbers using counting up

+0.03   +0.4   +2.2   = 2.63

3.57   3.60   4   6.2

- Multiply numbers up to 20 by single-digit numbers mentally or using grid method.
- Multiply 3-digit by numbers up to 12 using ladder (expanded written multiplication)

$$\begin{array}{r} 368 \\ \underline{X\ \ \ \ \ 6} \\ 1800 \\ 360 \\ \underline{48} \\ \underline{2208} \end{array}$$

- Multiply 2-digit numbers by 2-digit or 3-digit numbers using grid method
- Scale up or down by a factor of 2, 5 or 10
- Perform divisions mentally within the range of tables facts using remainders or rounding the answer up or down as appropriate, e.g. 68 ÷ 8 = 8 r4 or 8½ or how many toy spiders can be made if I have 68 legs? (Ans = 8) or how many minibuses each holding 8 children will be needed to transport 68 children? (Ans = 9).
- Divide 3-digit by one-digit numbers using chunking.
- Recognise equivalent fractions, e.g. $^{4}/_{8}$ = ½; reduce fractions to their simplest form
- Identify simple fraction/decimal equivalents: ½ = 0.5, ¼ = 0.25, ¾ = 0.75, $^{1}/_{3}$ = 0.33, etc.

- Understand that if two numbers less than 1 are multiplied, the answer is smaller than either of them.
- Calculate simple percentages of whole numbers.
- Solve missing number problems.
- Generate and describe linear sequences.
- Use, read and write, and convert between, standard units.
- Measure areas and perimeters; understand that area is a measurement of covering and is measured in square units, and perimeter is a length, measured in cm, m or mm.
- Use 12 and 24 hour clocks; calculate time intervals; use timetables.
- Compare and classify geometric shapes; identify circles and parts of circles.
- Identify positions in the first and fourth quadrants on a co-ordinate grid; reflect and translate shapes.
- Find and interpret the mean (average) of several quantities.