

Stage 6

As in Stage 5, it is important that learners become confident users of calculators. They need to recognise that the calculator is a tool of which they are in control and to understand how it can help them to develop their mathematics. Learners can be taught how to use a calculator effectively and to recognise how and when it is appropriate to do so; by first deciding if mental and pencil-and-paper methods are quicker or more reliable. Note that to use a calculator effectively requires a secure knowledge of number, which has to be the prime aim.

N Number

Nn Numbers and the number system

- **6Nn1** Count on and back in fractions and decimals, e.g. $\frac{1}{3}$ s, 0.1s, and repeated steps of whole numbers (and through zero)
- **6Nn2** Know what each digit represents in whole numbers up to a million
- **6Nn3** Know what each digit represents in one- and two-place decimal numbers
- **6Nn4** Multiply and divide any whole number from 1 to 10 000 by 10, 100 or 1000 and explain the effect
- **6Nn5** Multiply and divide decimals by 10 or 100 (answers up to two decimal places for division)
- **6Nn6** Find factors of two-digit numbers
- **6Nn7** Find some common multiples, e.g. for 4 and 5
- **6Nn8** Round whole numbers to the nearest 10, 100 or 1000
- **6Nn9** Round a number with two decimal places to the nearest tenth or to the nearest whole number
- **6Nn10** Make and justify estimates and approximations of large numbers
- **6Nn11** Order and compare positive numbers to one million, and negative integers to an appropriate level
- **6Nn12** Use the $>$, $<$ and $=$ signs correctly
- **6Nn13** Estimate where four-digit numbers lie on an empty 0–10 000 line
- **6Nn14** Order numbers with up to two decimal places (including different numbers of places)
- **6Nn15** Recognise and extend number sequences
- **6Nn16** Recognise and use decimals with up to three places in the context of measurement
- **6Nn17** Recognise odd and even numbers and multiples of 5, 10, 25, 50 and 100 up to 1000
- **6Nn18** Make general statements about sums, differences and multiples of odd and even numbers
- **6Nn19** Recognise prime numbers up to 20 and find all prime numbers less than 100
- **6Nn20** Recognise the historical origins of our number system and begin to understand how it developed
- **6Nn21** Compare fractions with the same denominator and related denominators, e.g. $\frac{3}{4}$ with $\frac{7}{8}$
- **6Nn22** Recognise equivalence between fractions, e.g. between $\frac{1}{100}$ s, $\frac{1}{10}$ s and $\frac{1}{2}$ s
- **6Nn23** Recognise and use the equivalence between decimal and fraction forms
- **6Nn24** Order mixed numbers and place between whole numbers on a number line
- **6Nn25** Change an improper fraction to a mixed number, e.g. $\frac{17}{8}$ to $2\frac{1}{8}$
- **6Nn26** Reduce fractions to their simplest form, where this is $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ or a number of fifths or tenths
- **6Nn27** Begin to convert a vulgar fraction to a decimal fraction using division
- **6Nn28** Understand percentage as parts in every 100 and express $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{10}$, $\frac{1}{100}$ as percentages

- **6Nn29** Find simple percentages of shapes and whole numbers
- **6Nn30** Solve simple problems involving ratio and direct proportion

Nc Calculation

Mental strategies

- **6Nc1** Recall addition and subtraction facts for numbers to 20 and pairs of one-place decimals with a total of 1, e.g. $0.4 + 0.6$
- **6Nc2** Derive quickly pairs of one-place decimals totalling 10, e.g. 7.8 and 2.2, and two-place decimals totalling 1, e.g. $0.78 + 0.22$
- **6Nc3** Know and apply tests of divisibility by 2, 4, 5, 10, 25 and 100
- **6Nc4** Use place value and number facts to add or subtract two-digit whole numbers and to add or subtract three-digit multiples of 10 and pairs of decimals, e.g. $560 + 270$; $2.6 + 2.7$; $0.78 + 0.23$
- **6Nc5** Add/subtract near multiples of one when adding numbers with one decimal place, e.g. $5.6 + 2.9$; $13.5 - 2.1$
- **6Nc6** Add/subtract a near multiple of 10, 100 or 1000, or a near whole unit of money, and adjust, e.g. $3127 + 4998$; $5678 - 1996$
- **6Nc7** Use place value and multiplication facts to multiply/divide mentally, e.g. 0.8×7 ; $4.8 \div 6$
- **6Nc8** Multiply pairs of multiples of 10, e.g. 30×40 , or multiples of 10 and 100, e.g. 600×40
- **6Nc9** Double quickly any two-digit number, e.g. 78, 7.8, 0.78 and derive the corresponding halves
- **6Nc10** Divide two-digit numbers by single-digit numbers, including leaving a remainder

Addition and subtraction

- **6Nc11** Add two- and three-digit numbers with the same or different numbers of digits/decimal places
- **6Nc12** Add or subtract numbers with the same and different numbers of decimal places, including amounts of money
- **6Nc13** Find the difference between a positive and negative integer, and between two negative integers in a context such as temperature or on a number line

Multiplication and division

- **6Nc14** Multiply pairs of multiples of 10, e.g. 30×40 , or multiples of 10 and 100, e.g. 600×40
- **6Nc15** Multiply near multiples of 10 by multiplying by the multiple of 10 and adjusting
- **6Nc16** Multiply by halving one number and doubling the other, e.g. calculate 35×16 with 70×8
- **6Nc17** Use number facts to generate new multiplication facts, e.g. the $17 \times$ table from $10 \times + 7 \times$ tables
- **6Nc18** Multiply two-, three- or four-digit numbers (including sums of money) by a single-digit number and two- or three-digit numbers by two-digit numbers
- **6Nc19** Divide three-digit numbers by single-digit numbers, including those leaving a remainder and divide three-digit numbers by two-digit numbers (no remainder) including sums of money
- **6Nc20** Give an answer to division as a mixed number, and a decimal (with divisors of 2, 4, 5, 10 or 100).
- **6Nc21** Relate finding fractions to division and use them as operators to find fractions including several tenths and hundredths of quantities
- **6Nc22** Know and apply the arithmetic laws as they apply to multiplication (without necessarily using the terms commutative, associative or distributive)

G Geometry

Gs Shapes and geometric reasoning

- **6Gs1** Classify different polygons and understand whether a 2D shape is a polygon or not
- **6Gs2** Visualise and describe the properties of 3D shapes, e.g. faces, edges and vertices
- **6Gs3** Identify and describe properties of quadrilaterals (including the parallelogram, rhombus and trapezium), and classify using parallel sides, equal sides, equal angles
- **6Gs4** Recognise and make 2D representations of 3D shapes including nets
- **6Gs5** Estimate, recognise and draw acute and obtuse angles and use a protractor to measure to the nearest degree
- **6Gs6** Check that the sum of the angles in a triangle is 180° , for example, by measuring or paper folding; calculate angles in a triangle or around a point

Gp Position and movement

- **6Gp1** Read and plot co-ordinates in all four quadrants
- **6Gp2** Predict where a polygon will be after one reflection, where the sides of the shape are not parallel or perpendicular to the mirror line, after one translation or after a rotation through 90° about one of its vertices

G Measure

Gl Length, mass and capacity

- 6Gl1** • **6Ml1** Select and use standard units of measure. Read and write to two or three decimal places
- 6Gl2** • **6Ml2** Convert between units of measurement (kg and g, l and ml, km, m, cm and mm), using decimals to three places, e.g. recognising that 1.245 m is 1 m 24.5 cm
- 6Gl3** • **6Ml3** Interpret readings on different scales, using a range of measuring instruments
- 6Gl4** • **6Ml4** Draw and measure lines to the nearest centimetre and millimetre
- 6Gl5** • **6Ml5** Know imperial units still in common use, e.g. the mile, and approximate metric equivalents

Gt Time

- 6Gt1** • **6Mt1** Recognise and understand the units for measuring time (seconds, minutes, hours, days, weeks, months, years, decades and centuries); convert one unit of time into another
- 6Gt2** • **6Mt2** Tell the time using digital and analogue clocks using the 24-hour clock
- 6Gt3** • **6Mt3** Compare times on digital and analogue clocks, e.g. realise quarter to four is later than 3:40
- 6Gt4** • **6Mt4** Read and use timetables using the 24-hour clock
- 6Gt5** • **6Mt5** Calculate time intervals using digital and analogue times
- 6Gt6** • **6Mt6** Use a calendar to calculate time intervals in days, weeks or months
- 6Gt7** • **6Mt7** Calculate time intervals in days, months or years
- 6Gt8** • **6Mt8** Appreciate how the time is different in different time zones around the world

Ga Area and perimeter

- 6Ga1** • **6Ma1** Measure and calculate the perimeter and area of rectilinear shapes
- 6Ga2** • **6Ma2** Estimate the area of an irregular shape by counting squares
- 6Ga3** • **6Ma3** Calculate perimeter and area of simple compound shapes that can be split into rectangles

D Handling data

Dh Organising, categorising and representing data

- **6Dh1** Solve a problem by representing, extracting and interpreting data in tables, graphs, charts and diagrams, e.g. line graphs for distance and time; a price 'ready-reckoner' for currency conversion; frequency tables and bar charts with grouped discrete data
- **6Dh2** Find the mode and range of a set of data from relevant situations, e.g. scientific experiments
- **6Dh3** Begin to find the median and mean of a set of data
- **6Dh4** Explore how statistics are used in everyday life

Db Probability

- **6Db1** Use the language associated with probability to discuss events, to assess likelihood and risk, including those with equally likely outcomes

Problem solving

Using techniques and skills in solving mathematical problems

- **6Pt1** Choose appropriate and efficient mental or written strategies to carry out a calculation involving addition, subtraction, multiplication or division
- **6Pt2** Understand everyday systems of measurement in length, weight, capacity, temperature and time and use these to perform simple calculations
- **6Pt3** Check addition with a different order when adding a long list of numbers; check when subtracting by using the inverse
- **6Pt4** Recognise 2D and 3D shapes and their relationships, e.g. a cuboid has a rectangular cross-section
- **6Pt5** Estimate and approximate when calculating, e.g. use rounding, and check working

Using understanding and strategies in solving problems

- **6Ps1** Explain why they chose a particular method to perform a calculation and show working
- **6Ps2** Deduce new information from existing information and realise the effect that one piece of information has on another
- **6Ps3** Use logical reasoning to explore and solve number problems and mathematical puzzles
- **6Ps4** Use ordered lists or tables to help solve problems systematically
- **6Ps5** Identify relationships between numbers and make generalised statements using words, then symbols and letters, e.g. the second number is twice the first number plus 5 ($n, 2n + 5$); all the numbers are multiples of 3 minus 1 ($3n - 1$); the sum of angles in a triangle is 180°
- **6Ps6** Make sense of and solve word problems, single and multi-step (all four operations), and represent them, e.g. with diagrams or on a number line; use brackets to show the series of calculations necessary
- **6Ps7** Solve simple word problems involving ratio and direct proportion
- **6Ps8** Solve simple word problems involving percentages, e.g. find discounted prices
- **6Ps9** Make, test and refine hypotheses, explain and justify methods, reasoning, strategies, results or conclusions orally

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