

Year Six

NUMBERS AND THE NUMBER SYSTEM

2-15 Place value, ordering and rounding

<p>Multiply and divide decimals mentally by 10 or 100, and integers by 1000, and explain the effect. (For more on place value with decimals, see page 29.) (p.7)</p>			
<p>Use the vocabulary of estimation and approximation. Consolidate rounding an integer to the nearest 10, 100 or 1000. (For rounding decimals, see page 31.) (p.11,13)</p>			
<p>Find the difference between a positive and a negative integer, or two negative integers, in a context such as temperature or the number line, and order a set of positive and negative integers. (p.15)</p>	<p>Primary Resources 'Order the Negative Numbers'</p> <p>Standards Site 'Thermometer'</p>	<p>Fun ordering of negative numbers. Extended by children finding the difference between 2 numbers</p> <p>Interactive Thermometer. Change scale. Show difference in temperature and change in temperature. Great discussion potential</p>	<p>www.primaryresources.co.uk/online/negnumorder.swf</p> <p>www.standards.dfes.gov.uk/numeracy/publications/?pub_id=9995&top_id=0&art_id=0</p>

16-21 Properties of numbers and number sequences

<p>Recognise and extend number sequences, such as the sequence of square numbers, or the sequence of triangular numbers 1, 3, 6, 10, 15 Count on in steps of 0.1, 0.2, 0.25, 0.5, and then back. (p.17)</p>	<p>Primary Resources 'Counting Stick'</p> <p>Turquoise Box 'Counter'</p>	<p>Use to generate decimal number lines</p> <p>Use to generate sequences, children predict continuation of sequence</p>	<p>www.primaryresources.co.uk/online/numberstick.swf</p>
<p>Make general statements about odd or even numbers, including the outcome of products. (p.19)</p>	<p>Grid Club 'Alien Tables'</p>	<p>Activity allowing practice of recognition of chosen multiples. Short starter or short individual practice.</p>	<p>www.gridclub.com/have_a_go/maths/alien_tables/index.shtml</p>
<p>Recognise multiples up to 10×10. Know and apply simple tests of divisibility. Find simple common multiples. (p.19)</p>	<p>Primary Resources 'Number Square'</p> <p>Ambleside 'Scribble TablesSquare'</p>	<p>Interactive multiplication square, colour squares/blank squares out</p> <p>Multiplication square you can 'scribble' on</p>	<p>www.primaryresources.co.uk/online/numbersquare.swf</p> <p>http://ambleweb.digitalbrain.com/ambleweb/ambleweb/ambleweb/mentalmaths/scribbletable.html</p>
<p>Recognise squares of numbers to at least 12×12. (p.21)</p>	<p>Primary Resources 'Number Square'</p> <p>Ambleside 'Scribble TablesSquare'</p>	<p>Interactive multiplication square, colour squares/blank squares out</p> <p>Multiplication square you can 'scribble' on</p>	<p>www.primaryresources.co.uk/online/numbersquare.swf</p> <p>http://ambleweb.digitalbrain.com/ambleweb/ambleweb/ambleweb/mentalmaths/scribbletable.html</p>

Recognise prime numbers to at least 20. Factorise numbers to 100 into prime factors. (p.21)	Standards Site 'NumberGrid'	Interactive number square. Highlight numbers, change start number, change number of columns, show multiples and primes. VERY versatile.	www.standards.dfes.gov.uk/numeracy/publications/?pub_id=9969&top_id=0&art_id=0
<u>22-33 Fraction, decimals, percentages, ratio and proportion</u>			
Change a fraction such as $\frac{33}{8}$ to the equivalent mixed number $4\frac{1}{8}$, and vice versa. Recognise relationships between fractions: for example, that $\frac{1}{10}$ is ten times $\frac{1}{100}$, and $\frac{1}{16}$ is half of $\frac{1}{8}$. Reduce a fraction to its simplest form by cancelling common factors in the numerator and denominator. (p.23)			
Order fractions such as $\frac{2}{3}$, $\frac{3}{4}$ and $\frac{5}{6}$ by converting them to fractions with a common denominator, and position them on a number line. (p.23)	Primary Games: 'Hi/Lo Fractions'	Fraction version of 'Play Your Cards Right'!	www.primarygames.co.uk/pg3/hilo/hilo_webed.html
Use a fraction as an 'operator' to find fractions, including tenths and hundredths, of numbers or quantities (e.g. $\frac{5}{8}$ of 32, $\frac{7}{10}$ of 40, $\frac{9}{100}$ of 400 centimetres). (p.25)			
Solve simple problems involving ratio and proportion. (p.27)			
Use decimal notation for tenths and hundredths in calculations, and tenths, hundredths and thousandths when recording measurements. Know what each digit represents in a number with up to three decimal places. Give a decimal fraction lying between two others (e.g. between 3.4 and 3.5). Order a mixed set of numbers or measurements with up to three decimal places. (p.29)			
Round a number with two decimal places to the nearest tenth or to the nearest whole number. (p.31)	Primary Resources 'Counting Stick'	Use to generate decimal number lines	www.primaryresources.co.uk/online/numberstick.swf
Recognise the equivalence between the decimal and fraction forms of one half, one quarter, three quarters, one eighth and tenths, hundredths and thousandths (e.g. $\frac{700}{1000} = \frac{70}{100} = \frac{7}{10} = 0.7$). Begin to convert a fraction to a decimal using division. (p.31)			
Understand percentage as the number of parts in every 100. Express simple fractions such as one half, one quarter, three quarters, one third, two thirds, and tenths and hundredths, as percentages (e.g. know that $\frac{1}{3} = 33\frac{1}{3}\%$). Find simple percentages of small whole-number quantities (e.g. find 10% of £500, then 20%, 40% and 80% by doubling). (p.33)			

CALCULATIONS

40-47 Mental calculation strategies (+ and -)

Consolidate all strategies from previous year, including: find a difference by counting up; add or subtract the nearest multiple of 10, 100 or 1000, then adjust; use the relationship between addition and subtraction; add several numbers. (p.41,43)	Ambleside 'Callum Addition Pyramid' Grid Club 'Coordinate Cops'	Addition activity. Use levels easy and medium. (Can be used for problem solving activities by rearranging base numbers to make largest total) Coordinates in 1 st quadrant. Individual practice and whole class possibility	http://ambleweb.digitalbrain.com/ambleweb/ambleweb/ambleweb/mentalmaths/pyramid.html www.gridclub.com/have_a_go/maths/coordinate_cops/index.shtml
Use known number facts and place value to consolidate mental addition/subtraction (e.g. $470 + 380$, $810 - 380$, $7.4 + 9.8$, $9.2 - 8.6$). (p.45,47)	PrimaryResources 'Brick2'	Addition pyramid, possible extension of rearranging numbers to create largest total	www.primaryresources.co.uk/online/bricks2.swf

48-51 Pencil and paper procedures (+ and -)

Use informal pencil and paper methods to support, record or explain additions and subtractions. Extend written methods to column addition and subtraction of numbers involving decimals. (p.49,51)	Grid Club Shop till you drop	Mental addition of amounts of money to purchase good as to close to specified amount as possible. Level 3 includes £ and p.	www.gridclub.com/have_a_go/maths/puzzlemaths/shop_game.shtml
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52-57 Understanding multiplication and division

Understand and use the relationships between the four operations, and the principles (not the names) of the arithmetic laws. Use brackets. (p.53,55)			
Express a quotient as a fraction or as a decimal rounded to one decimal place. Divide £.p by a two-digit number to give £.p. Round up or down after division, depending on the context. (p.57)			

58-59 Rapid recall of multiplication and division facts

Consolidate knowing by heart: multiplication facts up to 10×10 . (p.59)	Primary Resources 'Counting Stick' PrimaryResources 'MoonMaths'	Use counting stick as a physical counting stick during mental and oral starters or with small groups. Ability to cover/uncover numbers very useful Practice at identifying multiplication facts in rather fun way. Children individually or on whiteboard	www.primaryresources.co.uk/online/numberstick.swf www.primaryresources.co.uk/online/moonmaths.swf
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		during mental and oral starter	
<p>Derive quickly: division facts corresponding to tables up to 10×10; squares of multiples of 10 to 100 (e.g. 60×60); doubles of two-digit numbers (e.g. 3.8×2, 0.76×2); doubles of multiples of 10 to 1000 (e.g. 670×2); doubles of multiples of 100 to 10000 (e.g. 6500×2); and the corresponding halves. (p.59)</p>			
60-65 Mental calculation strategies (mult and div)			
<p>Use related facts and doubling or halving. For example: double or halve the most significant digit first; to multiply by 25, multiply by 100 then divide by 4; double one number and halve the other; find the $\times 24$ table by doubling the $\times 6$ table twice. (p.61)</p>			
<p>Use factors (e.g. $35 \times 18 = 35 \times 6 \times 3$). (p.61)</p>			
<p>Use closely related facts: for example, multiply by 49 or 51 by multiplying by 50 and adjusting. Develop the $\times 17$ table by adding facts from the $\times 10$ and $\times 7$ tables. (p.63)</p>			
<p>Partition (e.g. $87 \times 6 = (80 \times 6) + (7 \times 6)$; $3.4 \times 3 = (3 \times 3) + (0.4 \times 3)$). (p.63)</p>			
<p>Use the relationship between multiplication and division. (p.63)</p>			
<p>Use known number facts and place value to consolidate mental multiplication and division. (p.65)</p>			
66-69 Pencil and paper procedures (mult and div)			
<p>Approximate first. Use informal pencil and paper methods to support, record or explain multiplications and divisions. Extend written methods to: multiplication of ThHTU \times U (short multiplication); short multiplication of numbers involving decimals; long multiplication of a three-digit by a two-digit integer; short division of TU or HTU by U (mixed-number answer); division of HTU by TU (long division, whole-number answer); short division of numbers involving decimals. (p.67,69)</p>			

70-71 Using a calculator			
Develop calculator skills and use a calculator effectively. (p.71)	Ambleside 'Online Calculator'	Online Calculator	http://ambleweb.digitalbrain.com/ambleweb/ambleweb/ambleweb/mentalmaths/Calculator.html
72-73 Checking results of calculations			
Check with the inverse operation when using a calculator. (p.73)			
Check the sum of several numbers by adding in reverse order. (p.73)			
Check with an equivalent calculation. (p.73)			
Estimate by approximating (round to nearest 10, 100 or 1000), then check result. (p.73)			
Use knowledge of sums, differences, products of odd/even numbers. (p.73)			
Use tests of divisibility. (p.73)			
SOLVING PROBLEMS			
74-75 Making decisions			
Choose and use appropriate number operations to solve problems, and appropriate ways of calculating: mental, mental with jottings, written methods, calculator. (For examples of problems see pages 34-37, 79, 82-89, 101.) (p.75)	Grid Club Puzzle Maths... 'Catapult' Standards Site 'PlayTrain' (Turquoise Box)	Similar to Hangman...but with numbers. Lots of discussion opportunities here Arranging passengers onto a train in specified grouping. Great problem solving possibilities.	www.gridclub.com/have_a_go/maths/puzzlemaths/catapult.shtml www.standards.dfes.gov.uk/numeracy/publications/?pub_id=510&top_id=0&art_id=0
76-81 Reasoning and generalising about numbers or shapes			
Explain methods and reasoning, orally and in writing. (p.77)			
Solve mathematical problems or puzzles, recognise and explain patterns and relationships, generalise and predict. Suggest extensions asking 'What if...?' (p.79)	PrimaryGames Powerlines Standards Site 'PlayTrain' (Turquoise Box) Turquoise Box	Problem solving activity similar to magic squares, making equal addition lines Arranging passengers onto a train in specified grouping. Great problem solving possibilities. Use counter for creating sequences and patterns.	www.primarygames.co.uk/pg2/powerlines/powerlines1.html www.standards.dfes.gov.uk/numeracy/publications/?pub_id=510&top_id=0&art_id=0

	'Counter'	Children predict, discuss and explain	
Make and investigate a general statement about familiar numbers or shapes by finding examples that satisfy it. Develop from explaining a generalised relationship in words to expressing it in a formula using letters as symbols (e.g. the cost of n articles at 15p each). (p.81)	Primary Resources 'Rocket Maths'	Investigation regarding adding three consecutive numbers. Use as a stimulus to promote algebraic thinking and perhaps notation?	www.primaryresources.co.uk/online/rocketmaths.swf
82-89 Problems involving 'real life', money or measures			
Identify and use appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities based on 'real life', money or measures (including time), using one or more steps, including converting pounds to foreign currency, or vice versa, and calculating percentages such as VAT. Explain methods and reasoning. (p.82-89)	Grid Club Puzzle Maths...'Shop 'til you drop' Turquoise Box 'Counter'	Mental addition of amounts of money to purchase good as to close to specified amount as possible. Using two machines, discussion as to conversion of currency.	www.gridclub.com/have_a_go/maths/puzzlemaths/shop_game.shtml
HANDLING DATA			
112-117 Handling Data			
Use the language associated with probability to discuss events, including those with equally likely outcomes. (p.113)	Mathsonline- Chase me	Probability Simulation, with supportive worksheet. Most common occurrence of dice throw total	www.mathsonline.co.uk/nonmembers/resource/prob/chaseme1.html
Solve a problem by representing, extracting and interpreting data in tables, graphs, charts and diagrams, including those generated by a computer, for example: line graphs (e.g. for distance/time, for a multiplication table, a conversion graph, a graph of pairs of numbers adding to 8); frequency tables and bar charts with grouped discrete data (e.g. test marks 0-5, 6-10, 11-15...). (p.115,117)	Standards Site 'Data Handling'	Pre set information for interegation and representation as bar chart (horizontal and vertical) and pie chart. Create own chart also an option.	www.standards.dfes.gov.uk/numeracy/publications/?pub_id=9991&top_id=0&art_id=0
Find the mode and range of a set of data. Begin to find the median and mean of a set of data. (p.117)			
MEASURES, SHAPE AND SPACE			
90-101 Measures			
Use, read and write standard metric units (km, m, cm, mm, kg, g, l, ml, cl), including their abbreviations, and relationships between them. Convert smaller to larger units (e.g. m to km, cm or mm to m, g to kg, ml to l) and vice versa. Know imperial units (mile, pint, gallon, lb, oz). Know rough equivalents of lb and kg, oz and g, miles and km,			

litres and pints or gallons. (p.91)			
Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. Record estimates and readings from scales to a suitable degree of accuracy. (p.93,95)			
Calculate the perimeter and area of simple compound shapes that can be split into rectangles. (p.97)			
Appreciate different times around the world. (p.99,101)			
<u>102-111</u> Shape and Space			
Describe and visualise properties of solid shapes such as parallel or perpendicular faces or edges. Classify quadrilaterals, using criteria such as parallel sides, equal angles, equal sides... (p.103,109)	Primary Resources 'Shape Reveal'	Mental and Oral possibilities similar to physically holding a shape behind a book. Children predict what the shape will be. Oral explanation possibilities	www.primaryresources.co.uk/online/shapereveal.swf
Make shapes with increasing accuracy. Visualise 3-D shapes from 2-D drawings and identify different nets for a closed cube. (p.105)			
Recognise where a shape will be after reflection: in a mirror line touching the shape at a point (sides of shape not necessarily parallel or perpendicular to the mirror line); in two mirror lines at right angles (sides of shape all parallel or perpendicular to the mirror line). Recognise where a shape will be after two translations. (p.107)	Primary Resources 'Reflection'	Demonstration tool allows creation of shapes/patterns and showing reflection in one or two mirror lines	www.primaryresources.co.uk/online/reflection.swf
Read and plot co-ordinates in all four quadrants. (p.109)	Standards / numeracy 'Coordinates'	Interactive coordinates. 1st quadrant, 2 quadrants and 4 quadrants optional. Plot points, plot letters, also the option of drawing shapes on grid. Option of removing squares so just left with coordinates very useful.	www.standards.dfes.gov.uk/numeracy/publications/?pub_id=9990&top_id=0&art_id=0
	PrimaryGames Billy Bug	Location of coordinates in the four quadrants.	www.primarygames.co.uk/pg2/bug2/bug2.html
Recognise and estimate angles. Use a protractor to measure and draw acute and obtuse angles to the nearest degree. Check that the sum of the angles of a triangle is 180°: for example, by measuring or paper folding. Calculate angles in a triangle or around a point. Recognise where a shape will be after a rotation through 90° about one of its vertices. (p.111)	PrimaryGames Banana Hunt Standards Site 'Whats my Angle?' (Turquoise Box) Primary Resources 'Rotation'	Activity to estimate angles to 5 degrees of error, within 360 degree Visual demonstration of measuring angles to specified accuracy Visual demonstration of rotation of 90 degrees (and 45 degrees) about the origin	www.primarygames.co.uk/pg2/bhunt/bhunt.html www.primaryresources.co.uk/online/rotation.swf www.primaryresources.co.uk/online/rotation.swf