



# Ferndale Primary and Nursery School

## Year 6

### Place value

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- ♣ round any whole number to a required degree of accuracy
- ♣ use negative numbers in context, and calculate intervals across zero
- ♣ solve number and practical problems that involve all of the above

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Place value games. Justifying which digits have greatest, least value. Reasoning discussions to compare and order numbers. Saying numbers. Talking about the value of digits in money and co</p>	<p>Using place value equipment to create numbers and compare. Reading thermometers and comparing temperature change. Making negative number lines to find differences in temperature and temperature changes Using catalogues / online prices/ cheques to talk about values of digits and compare prices</p>	<p>Negative number temperature changes and comparisons around countries / continents.  Money context to compare prices</p>	<ul style="list-style-type: none"> <li>• read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit</li> <li>• ♣ count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</li> <li>• ♣ interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero</li> <li>• ♣ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000</li> <li>• ♣ solve number problems and practical problems that involve all of the above</li> <li>• ♣ read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</li> </ul>



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### Fractions, decimals and percentages

- use common factors to simplify fractions; use common multiples to express fractions in the same denominator ♣ compare and order fractions, including fractions  $> 1$
- ♣ add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- ♣ multiply simple pairs of proper fractions, writing the answer in its simplest form
- ♣ divide proper fractions by whole numbers
- ♣ associate a fraction with division and calculate decimal fraction equivalents
- ♣ identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- ♣ use written division methods in cases where the answer has up to two decimal places
- ♣ solve problems which require answers to be rounded to specified degrees of accuracy
- ♣ recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Sharing fraction models and talking about equivalence / conversions that they have made. Explaining fractions as parts and whole.</p>	<p>Using fraction bars, models, own drawn bars to represent / compare / order / find equivalent fractions.            Use fraction bars to understand how we convert and simplify fractions to be able to calculate with them            Using models and fraction bars to convert improper to mixed fractions and mixed fractions to improper fractions.            Representing percentages, fractions on 100 grids.            Using blank number lines to round numbers.            Use place value charts and place value counters to represent decimal numbers.</p>	<p>Finding fractions, decimals and percentages of portions of food / drink.            Changing prices by finding percentages            Rounding prices, measurements to estimate</p>	<ul style="list-style-type: none"> <li>• ♣ compare and order fractions whose denominators are all multiples of the same number</li> <li>• ♣ identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths</li> <li>• ♣ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements <math>&gt; 1</math> as a mixed number</li> <li>• ♣ add and subtract fractions with the same denominator and denominators that are multiples of the same number</li> <li>• ♣ multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams ♣ read and write decimal numbers as fractions [for example, <math>0.71 = 71/100</math> ] ♣ recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents</li> <li>• ♣ round decimals with two decimal places to the nearest whole number and to one decimal place</li> <li>• ♣ read, write, order and compare numbers with up to three decimal places</li> <li>• ♣ solve problems involving number up to three decimal places</li> </ul>



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Use counters to represent exchanges in decimal numbers

- ♣ recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- ♣ solve problems which require knowing percentage and decimal equivalents and those fractions with a denominator of a multiple of 10 or 25.



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### MEASURE

solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

- ♣ use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- ♣ convert between miles and kilometres
- ♣ recognise that shapes with the same areas can have different perimeters and vice versa
- ♣ recognise when it is possible to use formulae for area and volume of shapes
- ♣ calculate the area of parallelograms and triangles
- ♣ calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units [for example, mm<sup>3</sup> and km<sup>3</sup>].

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Talk about the units of measure used in architect plans, model plans. Suggest which units are most suitable for measuring parts of the school grounds and explain how to convert if different units are needed.</p> <p>Carry out volume and perimeter investigations, justifying how they know that all</p>	<p>Create 3d models using cm cubes to find volume</p> <p>Use squared paper to find area and find formula for area of a triangle.</p> <p>Measure dimensions of parts of the school grounds and convert units / find perimeters / find areas.</p> <p>Make scaled models</p>	<p>Use recipes that have metric and imperial measures.</p> <p>Convert measures of models, diagrams and recipes.</p> <p>Make scaled models, diagrams</p>	<p>convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)</p> <ul style="list-style-type: none"> <li>♣ understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints</li> <li>♣ measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres</li> <li>♣ calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm<sup>2</sup>) and square metres (m<sup>2</sup>) and estimate the area of irregular shapes</li> <li>♣ estimate volume [for example, using 1 cm<sup>3</sup> blocks to build cuboids (including cubes)] and capacity [for example, using water]</li> <li>♣ solve problems involving converting between units of time</li> <li>♣ use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</li> </ul>



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possibilities have been found.



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### 4 operations (adding, subtracting, dividing and multiplying)

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- ♣ divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- ♣ divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- ♣ perform mental calculations, including with mixed operations and large numbers
- ♣ identify common factors, common multiples and prime numbers
- ♣ use their knowledge of the order of operations to carry out calculations involving the four operations
- ♣ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- ♣ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Use language of multiplication and factors to justify prime and composite numbers. Children to model steps of calculations and explain their actions.	Use concrete resources to reinforce misconceptions of exchanging when adding, subtracting, multiplying and dividing. Use arrays to show factors, prime numbers and composite numbers. Use number sliders and place value charts to multiply and divide by 10,100,1000	Use money and measure contexts to calculate and solve problems. Use estimating to check and predict answers to problems. Convert measures by multiplying and	<ul style="list-style-type: none"> <li>• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</li> <li>• ♣ add and subtract numbers mentally with increasingly large numbers</li> <li>• ♣ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</li> </ul> solve addition and subtraction multi-step problems in contexts,



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Use squared paper and cm cubes to model squared and cubed numbers

dividing by 10,100,1000  
Use squared numbers to find areas of square diagrams or locations in the building or rectilinear shapes. Calculate scaled measures or recipes or objects.

- deciding which operations and methods to use and why.
- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- ♣ know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
- ♣ establish whether a number up to 100 is prime and recall prime numbers up to 19
- ♣ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- ♣ multiply and divide numbers mentally drawing upon known facts
- ♣ divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- ♣ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- recognise and use square numbers and cube numbers, and the notation for squared ( 2 ) and cubed ( 3 )
- ♣ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- ♣ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- ♣ solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.



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### Geometry

draw 2-D shapes using given dimensions and angles

- ♣ recognise, describe and build simple 3-D shapes, including making nets
- ♣ compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- ♣ illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- ♣ recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

describe positions on the full coordinate grid (all four quadrants)

- ♣ draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Talk about shapes, share properties.</p> <p>Ask questions about a circle, what do we want to find out about it?</p> <p>Talk about plans of buildings and how calculating missing lengths and angles help constructors to complete a task.</p>	<p>Use nets when exploring properties of 3d shapes.</p> <p>Create own nets of 3d shapes.</p> <p>Handle and compare 3d shapes</p> <p>Sort shapes into sorting diagrams</p> <p>Use interactive programs to model and estimate angles.</p> <p>Use a protractor to measure and compare angles</p> <p>Learn turns by facing different directions using programs such as logo, make links to angles and degrees in turns.</p> <p>Use itp programs to model translations, rotations and reflections.</p>	<p>Find circle properties of objects such as bike wheels, round tables.</p> <p>Use measuring equipment to draw designs. E.g a hexagonal room for Harry Potter.</p> <p>Complete drawings of objects and use known facts to calculate missing angles.</p>	<p>identify 3-D shapes, including cubes and other cuboids, from 2-D representations</p> <ul style="list-style-type: none"> <li>♣ know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles</li> <li>♣ draw given angles, and measure them in degrees (o )</li> <li>♣ identify: ♣ angles at a point and one whole turn (total 360o ) ♣ angles at a point on a straight line and 2 1 a turn (total 180o )</li> <li>♣ other multiples of 90o</li> <li>♣ use the properties of rectangles to deduce related facts and find missing lengths and angles</li> <li>♣ distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</li> </ul> <p>identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.</p>





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### Statistics

interpret and construct pie charts and line graphs and use these to solve problems

- ♣ calculate and interpret the mean as an average.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Children to discuss and finalise own research and analysis questions. Children to present data using pictorial graphs to support environmental or whole school issues.</p>	<p>Gather own data by reading scales present graphs by drawing and measuring lines and circles. Interpret to find information including average. Gather and compare data from 2 varying sources e.g temperature and rainfall from different locations around the world. Survey children across the school about favourite items to create own pie charts.</p>	<p>Represent and compare information about different locations, temperatures, rainfall. Read timetables about journey in our locality and use them to plan events</p>	<p>solve comparison, sum and difference problems using information presented in a line graph ♣ complete, read and interpret information in tables, including timetables</p>



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### Ratio and Proportion – Year 6

solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

- ♣ solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- ♣ solve problems involving similar shapes where the scale factor is known or can be found
- ♣ solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Children to research and design scale models, presenting ideas and working with a partner to improve and adapt their work.</p> <p>Children to design potions and share ideas with a group or partner.</p> <p>Children to share strategies for finding percentages of measure and prices.</p> <p>Persuasion or discussion of findings when sugar allowance in drinks is researched.</p>	<p>Adapt measures in a recipe for different amounts of people.</p> <p>Make links to Harry Potter potions topic with ratio of ingredients.</p> <p>Making WW2 Anderson shelter using scale factors of real size measures.</p> <p>Use shop prices to find percentages.</p> <p>Children to research climates and compare percentage chances of rain, snow</p> <p>Research the ratio of different starburst sweets in a packet. Make links to product management.</p> <p>Research the percentage / proportion of daily allowance of sugar, salt in different drinks.</p>	<p>Baking using recipes.</p> <p>Constructing buildings and scale models.</p> <p>Price percentage</p> <p>Measure percentages</p> <p>Percentage chance of weather</p> <p>Ratio of types of products e.g how many different coloured sweets in a packet.</p> <p>Percentage of daily recommended food groups in food packaging.</p>	<p>n/a</p>



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### Algebra

use simple formulae

- ♣ generate and describe linear number sequences
- ♣ express missing number problems algebraically
- ♣ find pairs of numbers that satisfy an equation with two unknowns
- ♣ enumerate possibilities of combinations of two variables.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
<p>Sharing strategies to solve combination problems to explain how they know there are no other possible answers.</p> <p>Presenting and testing shape formulae.</p> <p>Working in a team to calculate and then compare costs and measures using formulae</p>	<p>Calculate the costs of a school trip using prices for adults / children.</p> <p>Finding efficient costs of stationary for the office by using different prices and options.</p> <p>Designing a new patio for the garden following an algebraic formula for different types of tile.</p> <p>Creating algebraic formula to plan designs with different sized objects.</p> <p>Use a formula to calculate speed and distance of vehicles travelling</p> <p>Find area of 2d triangles to compare.</p> <p>Find volume of a cuboid when designing and making structures in DT.</p>	<p>Finding possibilities of combinations of sports kit, ice cream flavours</p> <p>Following algebraic equations for area, perimeter</p> <p>Finding combinations of prices to make a solution</p> <p>Finding measures using missing number sequences.</p> <p>Algebraic formula for volume of a cuboid / area of a triangle</p>	<p>n/a</p>