Maths Program of Study

Daffodil Preparatory School

Email: info@daffodilprepschool.org.uk

Website: www.daffodilprepschool.org.uk

Tel: 0207 0011 411
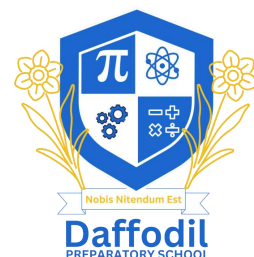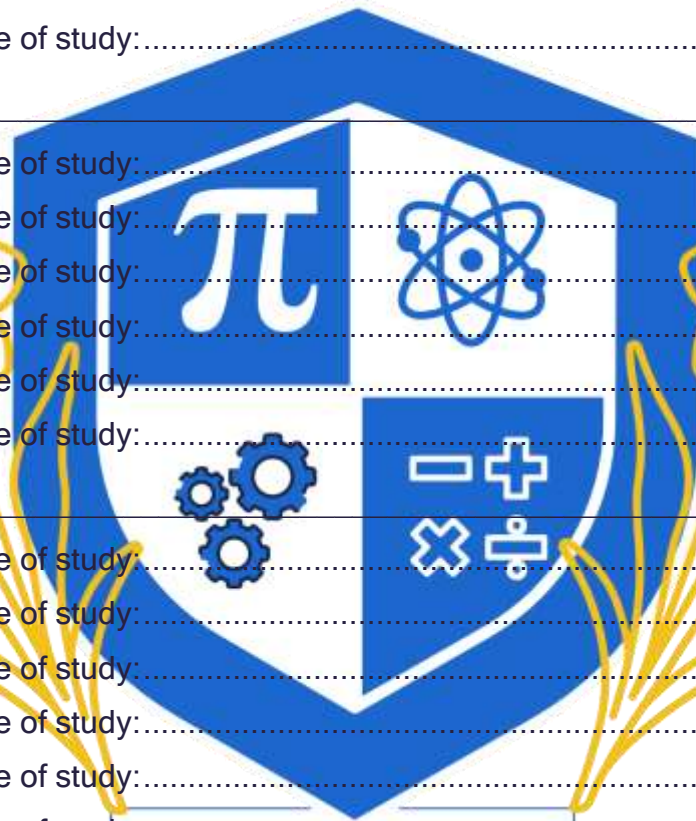
161 Commercial Road

London, E1 2DA

Daffodil
PREPARATORY SCHOOL

TABLE OF CONTENTS

INTENT

Understanding and being able to use mathematics is a key life skill and vital to our pupil's future education and beyond. At UKCC the intent of our mathematics curriculum is that all pupils leave Year 6 at least at securely expected standard with a significant percentage achieving beyond this level.

Fundamental to this is a solid understanding of concrete mathematical concepts gained in the Early Years before a move to more abstract mathematics once the pupil is ready. The key to this is that all pupils take the next step in their learning when they are ready to do so. This leads to very differentiated lessons where pupils are encountering concepts at their appropriate challenge level for the individual. Our progression is provided, but not restricted by, the Abacus Maths scheme. This is based on the expectations of the National Curriculum. Once pupils have mastered the primary curriculum they work on a range of key stage 3 materials

We aim for all pupils to:

• become fluent in the fundamentals of mathematics so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

• be able to solve problems by applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios

• reason mathematically by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.

• have an appreciation of number and number operations, which enables mental calculations and written procedures to be performed efficiently, fluently and accurately to be successful in mathematics.

IMPLEMENTATION

Planning

Planning is undertaken at two levels:

Long-term planning is based on the yearly teaching programmes set out in Abacus Evolve. Short-term planning is carried out weekly and incorporates the learning prompts on the planning sheet.

The planning is monitored by the maths coordinator and senior management team.

Cross-Curricular Links

Mathematics is taught mainly as a separate subject, but mathematical links are planned and taught within project work. By doing this children see that maths is not an isolated subject.

Organisation and Methodology

Lessons generally follow a format consisting of a mental and oral starter (10-15mins), differentiated group activities (40 mins) and a plenary session (5 mins).

The teaching of maths at UKCC provides opportunities for:	Pupils engage in:
Group work	The development of mental strategies
Paired work	Written methods
Whole class teaching	Practical work
Individual work	Investigational work
	Problem- solving
	Mathematical discussion
	Consolidation of basic skills and routines

We recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. We emphasise the use of vocabulary when planning to help determine the appropriate vocabulary to use in our teaching, and children are expected to use it in their verbal and written explanations.

We endeavour to set work that is challenging, motivating and encourages the pupils to talk about what they have been doing.

In K.S.1 and K.S.2 children are taught in ability groups. These groupings are flexible and children may be moved between groups following teacher/formal assessment. Parents should be informed of any such movement.

Impact

We believe that the use of formative and summative assessments is essential to monitor the progress of all pupils.

Assessment is carried out on three levels.

Short-term assessments are a part of every lesson. Throughout each lesson formative assessment takes place and feedback is given to the children through marking and next-step tasks to ensure they are meeting the specific learning objective. The teacher then uses this assessment to influence their planning and ensure they are providing a mathematics curriculum that will allow each child to progress. Pertinent comments are occasionally recorded on short-term planning sheets.

Medium-term assessments are carried out following the completion of each Abacus Evolve textbook (approximately once a term). A copy of these results is to be added to the database. Long-term assessments (PUMA) are carried out at three points during the school year when pupils' attainment is measured against school and national targets.

All pupils from Year 2 to Year 6 carry out weekly table tests. Pupils from Year 1 to Year 6 carry out weekly mental tests, based on the strategy taught through the BEAM scheme and our mental maths progression document. Scores from these tests are be recorded in the teacher's mark book.

NUMBER - MULTIPLICATION AND DIVISION

Pupils should be taught to:

Year 1 programme of study:

solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Year 2 programme of study:

recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Year 3 programme of study:

recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n objects are connected to m objects.

Year 4 programme of study:

recall multiplication and division facts for multiplication tables up to 12 × 12

use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers

recognise and use factor pairs and commutativity in mental calculations

multiply two-digit and three-digit numbers by a one-digit number using formal written layout

solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Year 5 programme of study:

identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.

solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors

know and use the vocabulary of prime numbers, prime factors and composite (non-prime) 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 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.

Year 6 programme of study:

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 perform mental calculations, including with mixed operationsand 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 problems involving addition, subtraction, multiplication and division

use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
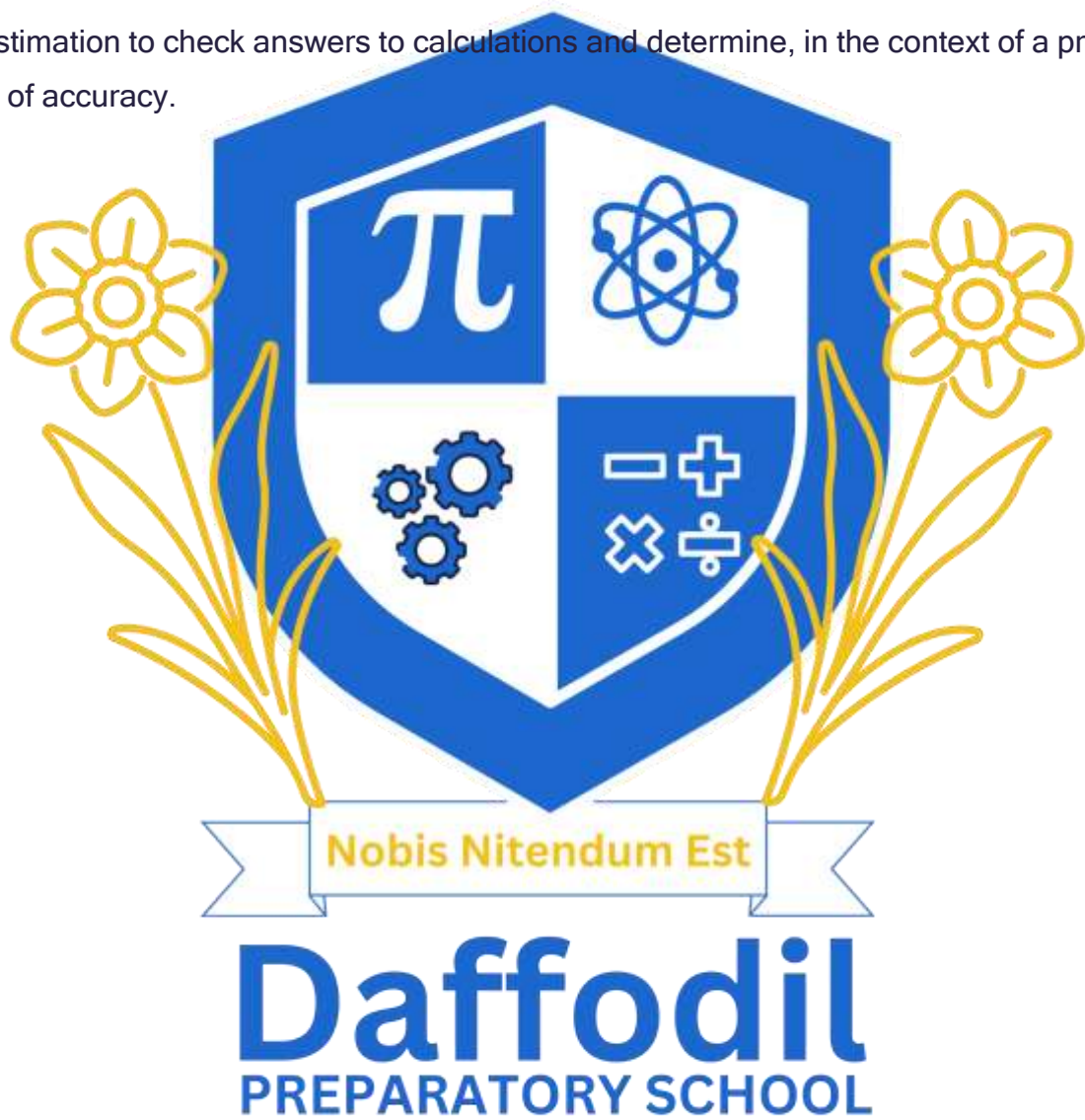
NUMBER - NUMBER AND PLACE VALUE

Pupils should be taught to:

Year 1 programme of study:

count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number

count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens

given a number, identify one more and one less

identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

read and write numbers from 1 to 20 in numerals and words.

Year 2 programme of study:

count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward

recognise the place value of each digit in a two-digit number (tens, ones)

identify, represent and estimate numbers using different representations, including the number line

compare and order numbers from 0 up to 100; use <, > and = signs

read and write numbers to at least 100 in numerals and in words

use place value and number facts to solve problems.

Year 3 programme of study:

count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.

recognise the place value of each digit in a three-digit number (hundreds, tens, ones)

compare and order numbers up to 1000.

identify, represent and estimate numbers using different representations.

read and write numbers up to 1000 in numerals and in words.

solve number problems and practical problems involving these ideas.

Year 4 programme of study:

count in multiples of 6, 7, 9, 25 and 1000

find 1000 more or less than a given number

count backwards through zero to include negative numbers

recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)

order and compare numbers beyond 1000

identify, represent and estimate numbers using different representations

round any number to the nearest 10, 100 or 1000

solve number and practical problems that involve all of the above and with increasingly large positive numbers

read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.

Year 5 programme of study:

read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit

count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero

round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000

solve number problems and practical problems that involve all of the above

read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Year 6 programme of study:

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.
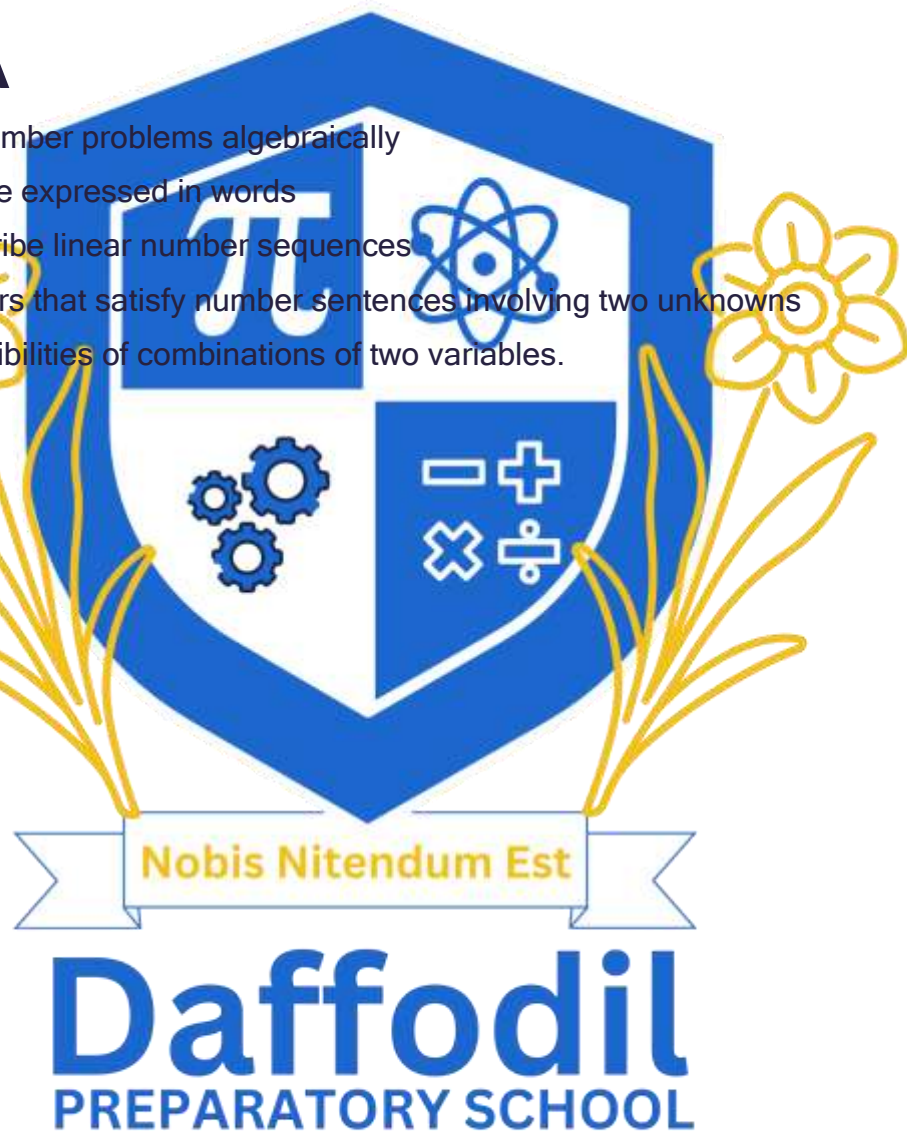
ALGEBRA

express missing number problems algebraically

use simple formulae expressed in words

generate and describe linear number sequences

find pairs of numbers that satisfy number sentences involving two unknowns

enumerate all possibilities of combinations of two variables.

NUMBER - FRACTIONS

Pupils should be taught to:

Year 1 programme of study:

recognise, find and name a half as one of two equal parts of an object, shape or quantity

recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

Year 2 programme of study:

recognise, find, name and write fractions 1/3, 1/4, 2/4 and ¾ of a length, shape, set of objects or quantity

write simple fractions e.g. 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2.

Year 3 programme of study:

count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10

recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators

recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators

recognise and show, using diagrams, equivalent fractions with small denominators

add and subtract fractions with the same denominator within one whole (e.g. 5/7 + 1/7 = 6/7)

compare and order unit fractions, and fractions with the same denominators

solve problems that involve all of the above.

Year 4 programme of study:

recognise and show, using diagrams, families of common equivalent fractions

count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.

solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number

add and subtract fractions with the same denominator

recognise and write decimal equivalents of any number of tenths or hundredths

recognise and write decimal equivalents to 1/4; 1/2; 3/4 find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths

round decimals with one decimal place to the nearest whole number

compare numbers with the same number of decimal places up to two decimal places

solve simple measure and money problems involving fractions and decimals to two decimal places.

Year 5 programme of study:

compare and order fractions whose denominators are all multiples of the same number

identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths

recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 11/5)

add and subtract fractions with the same denominator and multiples of the same number

multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

read and write decimal numbers as fractions (e.g. 0.71 = 71/100)

recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents

round decimals with two decimal places to the nearest whole number and to one decimal place

read, write, order and compare numbers with up to three decimal places

solve problems involving number up to three decimal places

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 hundred, and as a decimal fraction

solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25.

Year 6 programme of study:

use common factors to simplify fractions; use common multiples to express fractions in the same denomination

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 (e.g. 1/4 × 1/2 = 1/8) divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)

associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)

identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are 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.

RATIO AND PROPORTION

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 (e.g. of measures) 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.
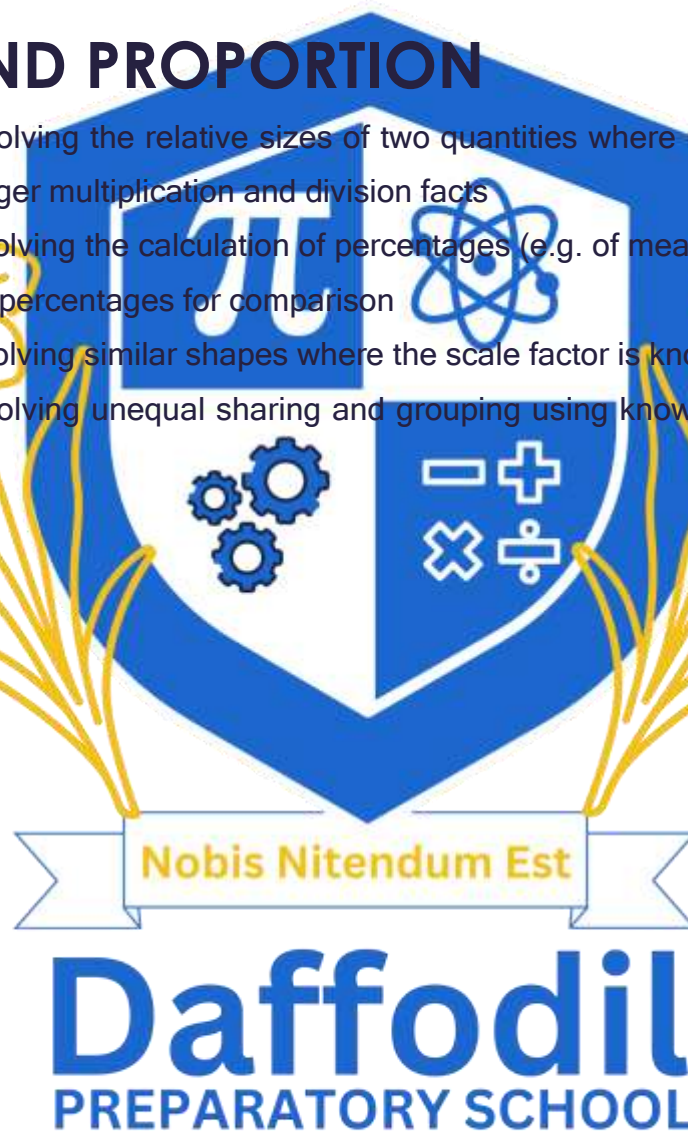
NUMBER - ADDITION AND SUBTRACTION

Pupils should be taught to:

Year 1 programme of study:

read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs represent and use number bonds and related subtraction facts within 20
add and subtract one-digit and two-digit numbers to 20, including zero
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems.

Year 2 programme of study:

solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures
applying their increasing knowledge of mental and written methods
recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
a two-digit number and ones
a two-digit number and tens
two two-digit numbers
adding three one-digit numbers
show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems
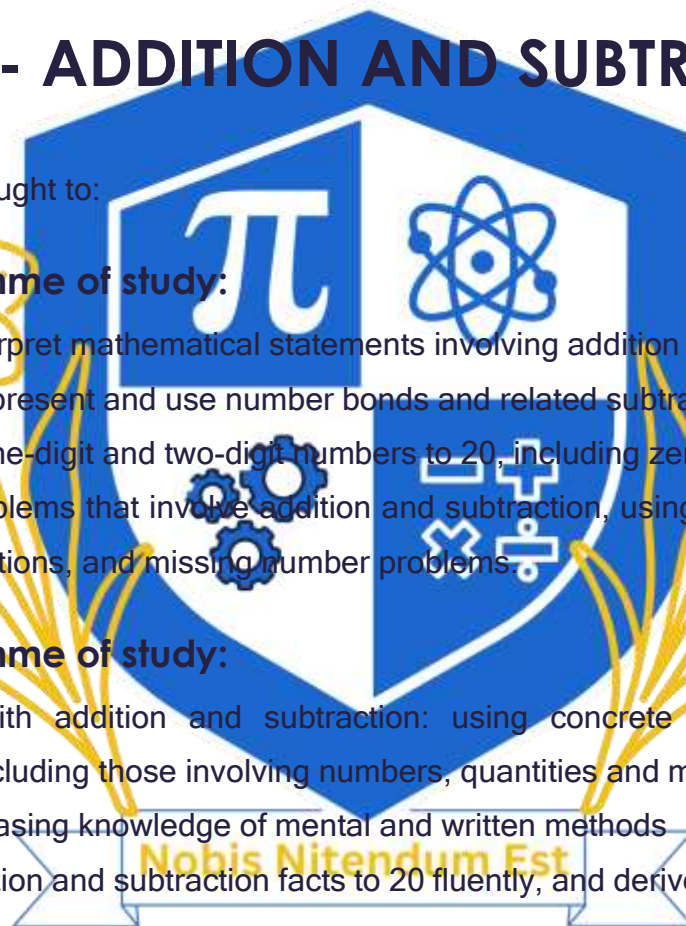
Year 3 programme of study:

add and subtract numbers mentally, including:
a three-digit number and ones
a three-digit number and tens a three-digit number and hundreds
add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
estimate the answer to a calculation and use inverse operations to check answers

solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
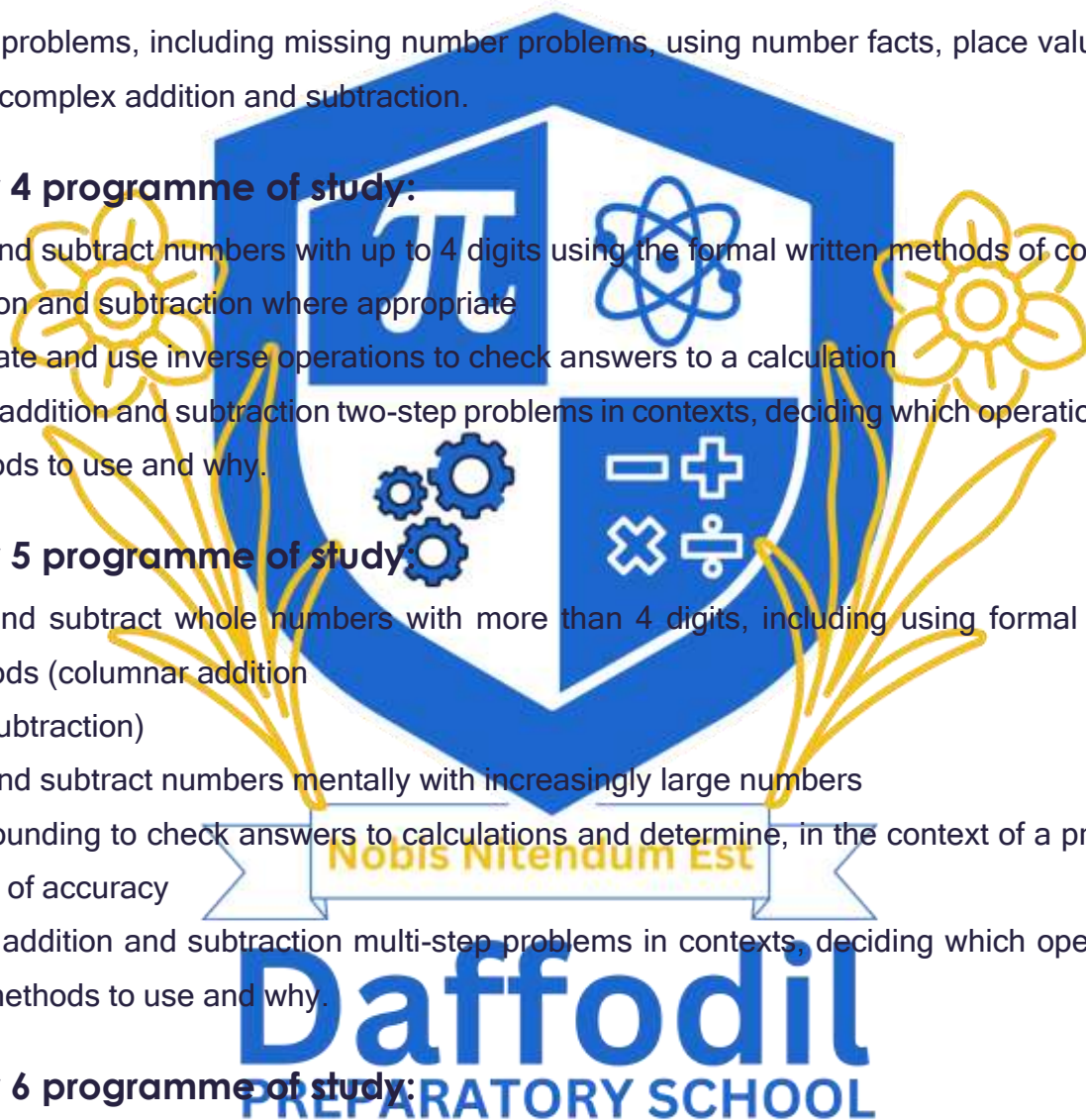
Year 4 programme of study:

add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

estimate and use inverse operations to check answers to a calculation

solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Year 5 programme of study:

add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition

and subtraction)

add and subtract numbers mentally with increasingly large numbers

use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Year 6 programme of study:

perform mental calculations, including with mixed operations and large numbers.

solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

MEASUREMENT

Pupils should be taught to:

Year 1 programme of study:

compare, describe and solve practical problems for:

lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half)

mass or weight (e.g. heavy/light, heavier than, lighter than)

capacity/volume (full/empty, more than, less than, quarter)

time (quicker, slower, earlier, later)

measure and begin to record the following:

lengths and heights

mass/weight

capacity and volume

time (hours, minutes, seconds)

recognise and know the value of different denominations of coins and notes

sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening recognise and use language relating to dates, including days of the week, weeks, months and years

tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

Year 2 programme of study:

choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels

compare and order lengths, mass, volume/capacity and record the results using >, < and =

recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value

find different combinations of coins that equal the same amounts of money

solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change

compare and sequence intervals of time

tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.

Year 3 programme of study:

measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)

measure the perimeter of simple 2-D shapes

add and subtract amounts of money to give change, using both £ and p in practical contexts

tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24- hour clocks

estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight

know the number of seconds in a minute and the number of days in each month, year and leap year

compare durations of events, for example to calculate the time taken by particular events or tasks.

Year 4 programme of study:

Convert between different units of measure (e.g. kilometre to metre; hour to minute)

measure and calculate the perimeter of a rectilinear figure(including squares) in centimetres and metres

find the area of rectilinear shapes by counting squares

estimate, compare and calculate different measures, including money in pounds and pence

read, write and convert time between analogue and digital 12 and 24-hour clocks

solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

Year 5 programme of study:

convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)

understand and use equivalences between metric units and common imperial units such as inches, pounds and pints

measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres

calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes

estimate volume (e.g. using 1 cm3 blocks to build cubes and cuboids) and capacity (e.g. using water)
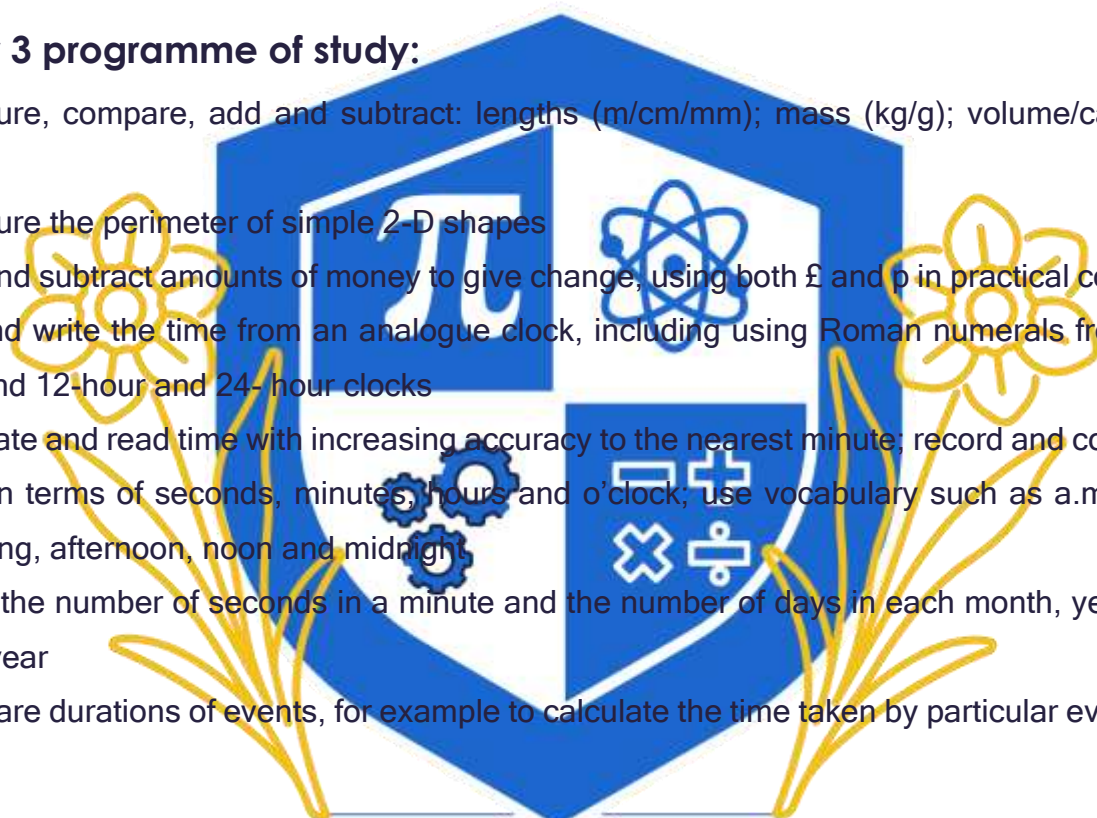
solve problems involving converting between units of time

use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.

Year 6 programme of study:

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 centimetre cubed (cm3) and cubic metres (m3); and extending to other units such as mm3 and km3.

STATISTICS

Pupils should be taught to:

Year 1 programme of study:
Year 2 programme of study:

interpret and construct simple pictograms, tally charts, block diagrams and simple tables

ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity

ask and answer questions about totalling and comparing categorical data.

Year 3 programme of study:

interpret and present data using bar charts, pictograms and tables

solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables.
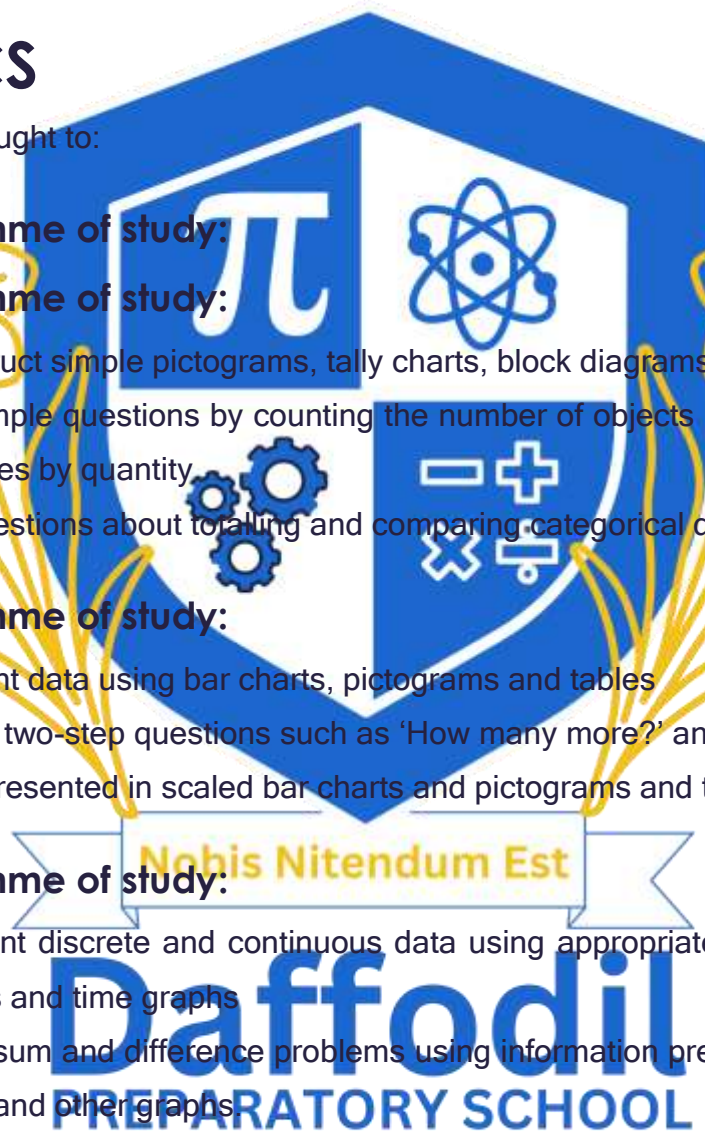
Year 4 programme of study:

interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs

solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Year 5 programme of study:

solve comparison, sum and difference problems using information presented in a line graph

complete, read and interpret information in tables, including timetables.

Year 6 programme of study:

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

calculate and interpret the mean as an average.

GEOMETRY – POSITION AND DIRECTION

Pupils should be taught to:

Year 1 programme of study:

describe position, directions and movements, including half, quarter and three-quarter turns.

Year 2 programme of study:

order and arrange combinations of mathematical objects in patterns

use mathematical vocabulary to describe position, direction and movement including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three- quarter turns (clockwise and anti-clockwise), and movement in a straight line.

Year 3 programme of study:

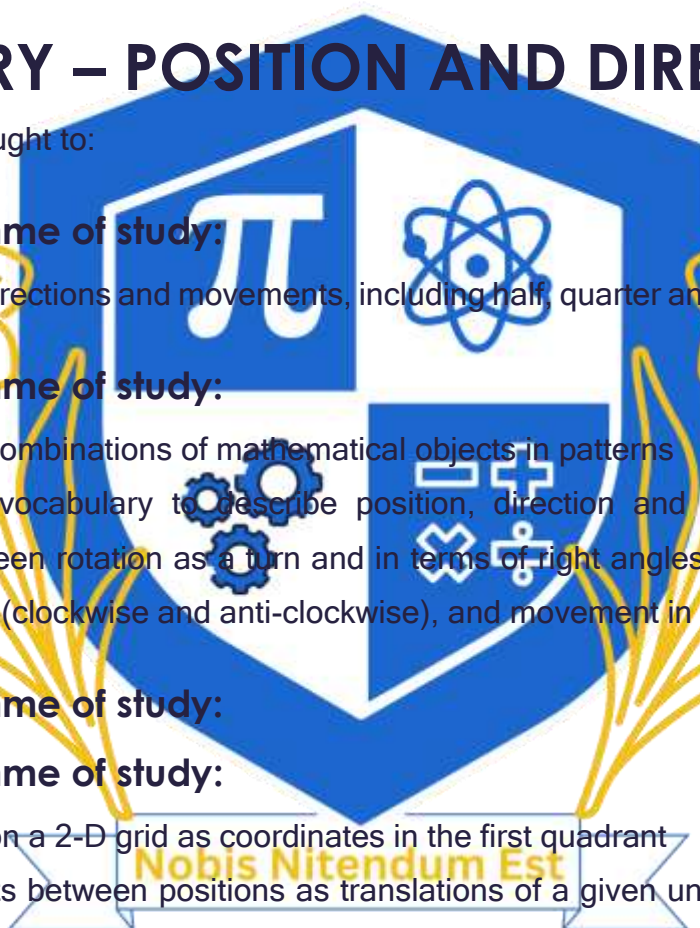### Year 4 programme of study:

describe positions on a 2-D grid as coordinates in the first quadrant

describe movements between positions as translations of a given unit to the left/right and up/down

plot specified points and draw sides to complete a given polygon.

Year 5 programme of study:

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.

Year 6 programme of study:

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.

GEOMETRY – PROPERTIES OF SHAPE

Pupils should be taught to:

Year 1 programme of study:

recognise and name common 2-D and 3-D shapes, including:

2-D shapes (e.g. rectangles (including squares), circles and triangles)

3-D shapes (e.g. cuboids (including cubes), pyramids and spheres).

Year 2 programme of study:

identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line

identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces

identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder and a triangle on a pyramid

compare and sort common 2-D and 3-D shapes and everyday objects.

Year 3 programme of study:

draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

recognise that angles are a property of shape or a description of a turn

identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle

identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
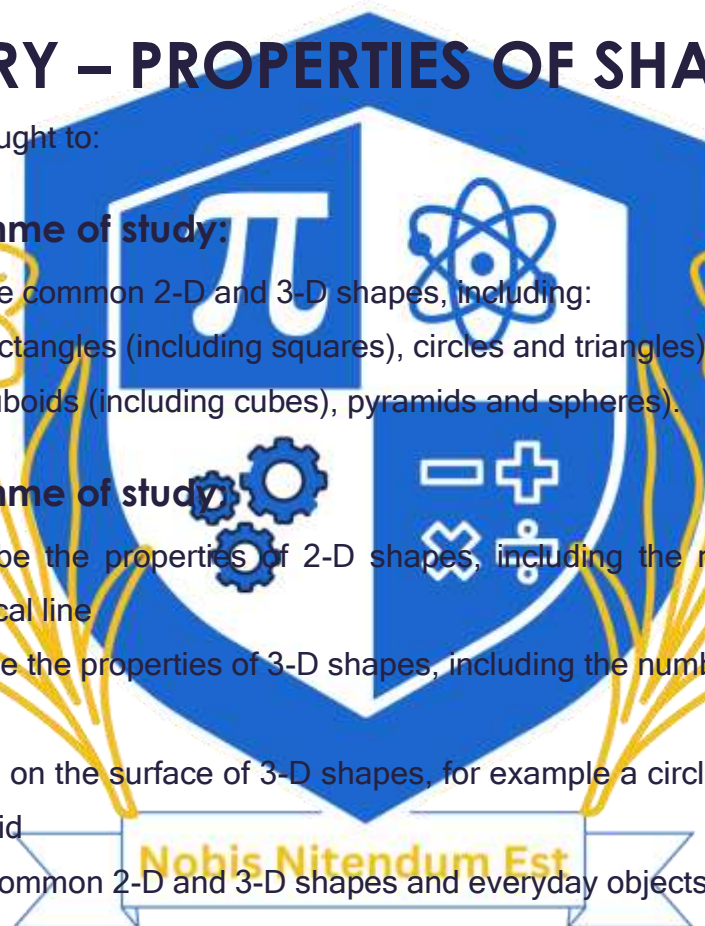
Year 4 programme of study:

compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

identify acute and obtuse angles and compare and order angles up to two right angles by size

identify lines of symmetry in 2-D shapes presented in different orientations

complete a simple symmetric figure with respect to a specific line of symmetry.

Year 5 programme of study:

identify 3-D shapes, including cubes and other cuboids, from 2-D representations

know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles

draw given angles, and measure them in degrees (o)

identify:

angles at a point and one whole turn (total 360o)

angles at a point on a straight line and ½ a turn (total 180o)

other multiples of 90o use the properties of rectangles to deduce related facts and find missing lengths and angles

distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

Year 6 programme of study:

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.