

Whole School Curriculum Overview

This is an overview of the areas of Mathematics that each year group studies. We try to cover each area of the curriculum at least twice across the year, in a spiraling format, so that each topic is revisited and reviewed throughout the year. On the following pages there is an overview of when we cover each area of the Maths Curriculum within each year group and a break-down of the curriculum objectives for each year group. These plans are guidelines for teachers – the weeks may change slightly depending on school events, such as assemblies and performances, and will depend upon the pace of children's learning within a year group.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number: Place Value	Number: Place Value	Number: Place Value	Number: Place Value	Number: Place Value	Number: Place Value
Number: Addition and Subtraction	Number: Addition and Subtraction	Number: Addition and Subtraction	Number: Addition and Subtraction	Number: Addition and Subtraction	Number: Addition and Subtraction
Number: Fractions	Number: Fractions	Number: Fractions	Number: Fractions and Decimals	Number: Fractions, Decimals and percentages	Number: Fractions, Decimals and percentages
Number: Multiplication and Division	Number: Multiplication and Division	Number: Multiplication and Division	Number: Multiplication and Division	Number: Multiplication and Division	Number: Multiplication and Division
					Number: Ratio
					Number: Algebra
Measurement (including time & money)	Measurement (including time & money)	Measurement (including time, money & perimeter)	Measurement (including time, money, are perimeter)	Measurement editacluding area, perimeter, volume & converting units)	Measurement (including area, perimeter, volume & converting units)
Geometry: shape	Geometry: shape	Geometry: shape	Geometry: shape	Geometry: shape	Geometry: shape
Geometry: position & direction	Geometry: position & direction		Geometry: position & direction	Geometry: position & direction	Geometry: position & direction
	Statistics	Statistics	Statistics	Statistics	Statistics



Year 1 - Yearly Overview

	Week 1 Week 2	Week 3	Week 4	Week 5	Week 6	Week 7 Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value (within 10)	Number: Addition and Subtraction (within 10)		Measurement : Length and Height	Geometry: Shape	Number: Place Value (within 20)	Number: Fr	Measure ment: Time Measurement:		Consolidation
Spring	Number: Addition and Subtraction (within 20)	Number: Place Value (within 50)		Measurement : Money	Geometry: Shape	Number: Addition and Subtraction			nent: nd Volume	Consolidation
Summer	and Division F		Number: Fraction s	Measurement : Time	Geometry: position and direction	Number: place value (within 100)	Number: consolid ation and investig ations	Meas urem ent: Mone y	Measure ment consolid ation	Consolidation



Year 1 NC Objectives

Number and Place value	Addition and subtraction	Multiplication and division
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	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 such as 7 = -9	 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 Fractions recognise, find and name a half as one of two equal parts of an object, shape o quantity recognise, find and name a quarter as one of four equal parts of an object, shape or quantity
Measurement		Geometry – properties of shapes
compare, describe and solve practical prob lengths and heights [for example, long/sh mass/weight [for example, heavy/light, he capacity and volume [for example, full/en quarter] time [for example, quicker, slower, earlier, 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 of	denominations of coins and notes ng language [for example, before and after, rning, afternoon and evening] res, including days of the week, weeks,	 recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles] 3-D shapes [for example, cuboids (including cubes), pyramids and spheres] Geometry – position and direction describe position, direction and movement, including whole, half, quarter and three quarter turns



Year 2 - Yearly Overview

	Week 1 Week 2	Week 3 Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value	Number: Addition and Subtraction		Geomet ry: Properti es of shape	Number: Place Value	Number: F	ractions	Measur ement: Money	Measure ment: Time	Consolidation
Spring	Number: Addition and Subtraction	Geometry: Properties of shape	Statistics	Measur ement: Money	Number: Multiplicat Division	tion and	Measu rement : Length and Height	Measur ement: Mass, Capaci ty & Tempe rature	Geomet ry: position and directio n	Consolidation Consolidation
Summer	Number: Multiplication and Division	Number: Mea sure ment : Time	Statistics	Geomet ry: position and directio n	Measur ement: Mass, Capaci ty & Tempe rature	Consoli dation of measu re	Problem solving	Investigat	ions	Consolidation



Year 2 NC Objectives

-		1
Number and Place value	Addition and subtraction	Multiplication and division
 count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and 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 	 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:	 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
Statistics	- show that addition of two numbers can be done in	Fractions
 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 	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 solve missing number problems	 recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity write simple fractions for example, ½ of 6 = 3 and recognise the equivalence of 2/4 and 1/2.
comparing categorical data		
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Measurement

- 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
- know the number of minutes in an hour and the number of hours in a day

Geometry – properties of shapes

- identify and describe the properties of 2-D shapes, including the number of sides and line 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

Geometry – position and direction

- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)



Year 3 - Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Wee k 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value Number: Addition and Subtraction				Geometry: properties of shapes	Measu Length Perime		Number: Multiplication and Division		Measu remen t: Time	Consolidation	
Spring	Number: Addition and Subtraction Weasure ment: Money		Numbe Multip Divisio	lication and	Number: Fractions		Statistics	Measu Mass o Capac		Consolidation		
Summer	Number: Multiplication and Division				Measurement	: Time	Geometry: properties of shapes	Statistics			Consolidation	



Year 3 NC Objectives

Number and Place value	Addition and subtraction	Multiplication and division
 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 	 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 	 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 positive integer scaling problems and correspondence problems in which n objects are connected to m objects Fractions
 interpret and present data using bar charts, pictograms and tables solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables Measurement 	number problems, using number facts, place value, and more complex addition and subtraction	 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
 measure, compare, add and subtract: lengths (n (l/ml)) measure the perimeter of simple 2-D shapes add and subtract amounts of money to give chocontexts tell and write the time from an analogue clock, i XII, and 12-hour and 24-hour clocks estimate and read time with increasing accurace compare time in terms of seconds, minutes and 	ange, using both £ and p in practical ncluding using Roman numerals from I to y to the nearest minute; record and	 small denominators add and subtract fractions with the same denominator within one whole [for example, 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
a.m./p.m., morning, afternoon, noon and midnig		Geometry – properties of shapes
 know the number of seconds in a minute and the leap year compare durations of events [for example to ca or tasks] 	•	 draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them recognise angles as 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 - Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value Number: Number:			Number: Add Subtraction	dition and		Measureme nt: Length and Perimeter Number: Multiplication and Division Statistics Number		Measureme nt: Time	Geometr y: propertie s of shapes	Consolidation	
Spring	Number: Place Value		cation and	Measurem ent: Area				Statistics	Numbe	er: Decimals	Measurem ent: Money	Consolidation
Summer	Number: Multiplication Division	1ultiplication and Fractions			cimals		Measurem ent: Money	Geometry: properties of shapes	of	Geometry: Position & Direction	Statistics	Consolidation



Year 4 NC Objectives

Number and Place value	Multiplication and division	Fractions
 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 	 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 	 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 one 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 ¼, ½, find the effect of dividing a one- or two-digit
Addition and subtraction	Statistics	number by 10 and 100, identifying the value of
 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 	 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 	the digits in the answer as ones, 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
Measurement	Geometry – properties o	
- Convert between different units of measure [for ex		geometric shapes, including quadrilaterals and
hour to minutel	triangles, based on the	eir properties and sizes

- 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

- 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

Geometry – position and direction

- 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 - Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: F	Place Value		Number: Ac		Statistics	Number: Multiplicat Division	ion and	Geometry: properties of shapes		Measurem ent: Perimeter and Area	Consolidation
Spring	Number: Multiplication and Division			Measureme Converting		Number: Frac	tions			: Decimals centages	Geometry: Position & Direction	Consolidation
Summer	Number: Fractions, Decimals and Percentages					Statistics	Measures : Volume	Geometry: properties shapes		Measure ment: Perimet er and Area	Consolidation	Consolidation



Year 5 NC Objectives

	Multiplication and division	Fractions
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, including 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. **Addition and subtraction** 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 statistics solve comparison, sum and difference problems using information presented in a line graph complete, read and interpret information in tables, including timetables	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.	 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 [for example, 2/5 + 4/5 = 6/5 = 1 1/5] add and subtract fractions with the same denominator and denominators that are 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 [for example, 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 100, and as a decimal solve problems which require knowing percentage and decimal equivalents of ½ ¼ 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.



Year 5 NC Objectives

Measurement Geometry – properties of shapes convert between different units of metric measure (for example, kilometre and metre; centimetre identify 3-D shapes, including cubes and other and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) cuboids, from 2-D representations understand and use approximate equivalences between metric units and common imperial units know angles are measured in degrees: such as inches, pounds and pints estimate and compare acute, obtuse and measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres reflex angles calculate and compare the area of rectangles (including squares), and including using standard draw given angles, and measure them in units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes degrees (o) estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity identify: angles at a point and one whole turn [for example, using water] (total 3600); angles at a point on a straight line solve problems involving converting between units of time and ½ a turn (total 1800); other multiples of use all four operations to solve problems involving measure [for example, length, mass, volume, 900 money] using decimal notation, including scaling 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 - Yearly Overview

	Week 1 Week 2	Week 3 Week	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Wee k 12
Autumn	Number: Place Value	Number: Addition Subtraction, Mul- Division	ultiplication & Perimeter, Area and Volume Percentage				ons, Decimals &	Geometry: properties of shapes	Statistics	Consolidation
Spring	Number: Fractions, Decimals & Percentages		Measure ment: converti ng units	Measurement: Perimeter, Area and Volume	Numbe Algebro		Geometry: Position & Direction	Geometry: properties of shapes	Statistics	Consolidation
Summer	Number: Addition, Subtraction, Multiplication & Division	SATs revision	Problem solv	ving		Investi	gations			Consolidation



Year 6 NC Objectives

Number and Place value The Four operations **Fractions** read, write, order and compare numbers up to 10 multiply multi-digit numbers up to 4 digits by a use common factors to simplify fractions; use 000 000 and determine the value of each digit two-digit whole number using the formal written common multiples to express fractions in the round any whole number to a required degree of method of long multiplication same denomination divide numbers up to 4 digits by a two-digit compare and order fractions, including fractions accuracy whole number using the formal written method use negative numbers in context, and calculate > 1 of long division, and interpret remainders as intervals across zero add and subtract fractions with different whole number remainders, fractions, or by solve number and practical problems that involve denominators and mixed numbers, using the rounding, as appropriate for the context concept of equivalent fractions all of the above **Ratio and Proportion** divide numbers up to 4 digits by a two-digit multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1/4 × solve problems involving the relative sizes of two number using the formal written method of short division where appropriate, interpreting $\frac{1}{2} = \frac{1}{81}$ quantities where missing values can be found by remainders according to the context divide proper fractions by whole numbers [for using integer multiplication and division facts perform mental calculations, including with example, $1/3 \div 2 = 1/6$] solve problems involving the calculation of mixed operations and large numbers associate a fraction with division and calculate percentages [for example, of measures, and such identify common factors, common multiples and decimal fraction equivalents [for example, 0.375] as 15% of 360] and the use of percentages for prime numbers for a simple fraction [for example, 3/8] comparison use their knowledge of the order of operations to identify the value of each digit in numbers given solve problems involving similar shapes where carry out calculations involving the four to three decimal places and multiply and divide the scale factor is known or can be found numbers by 10, 100 and 1000 giving answers up operations solve addition and subtraction multi-step to three decimal places solve problems involving unequal sharing and problems in contexts, deciding which operations multiply one-digit numbers with up to two grouping using knowledge of fractions and and methods to use and why decimal places by whole numbers multiples solve problems involving addition, subtraction, use written division methods in cases where the Algebra multiplication and division answer has up to two decimal places use simple formulae use estimation to check answers to calculations solve problems which require answers to be generate and describe linear number sequences and determine, in the context of a problem, an rounded to specified degrees of accuracy express missing number problems algebraically appropriate degree of accuracy find pairs of numbers that satisfy an equation recall and use equivalences between simple with two unknowns fractions, decimals and percentages, including in enumerate possibilities of combinations of two different contexts variables **Statistics** interpret and construct pie charts and line graphs and use these to solve problems calculate and interpret the mean as an average



Year 6 NC Objectives

Measurement

- 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 (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3]

Geometry – properties of shapes

- 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

Geometry - position and direction

- 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