Year 4

Maths Curriculum

KNOW IT!

TEACH IT!

APPLY IT!

James Cook
LEARNING TRUST

KNOW IT

New Learning | **Prior Learning**

PLACE VALUE

Roman Numerals 1-100.

Roman Numerals 1-12.

Know the value of each digit in 4-digit numbers.

Know the value of each digit in 3-digit numbers.

Count in multiples of 7, 9, 25 and 1000.

Count in multiples of 4, 6, 8, 50 and 100.

Find 1000 more or less.

Find 10 or 100 more or less than any given number.

Count backwards through 0 to include negative numbers.

FRACTIONS & DECIMALS

$^1/_{10} = 0.1$ $^1/_{100} = 0.01$ $¼ = 0.25$ $½ = 0.5$
$¾ = 0.75$ $^{100}/_{100} = 1$ whole

$^{10}/_{10} = 1$ whole

Count in hundredths forwards and backwards.

Count in tenths forwards and backwards.

MEASURES

1000m = 1 km.

1000ml = 1 litre.

1000g = 1 kg.

10 mm = 1 cm.

366 days in a leap year.

365 days in 1 year.

60 seconds = 1 minute.

30 days has September, April, June, and November. All the rest have thirty one, except for February which has 28 days clear and 29 in a leap year.

CALCULATIONS

Know all times tables up to 12 x 12.

Know 3, 6, 4 and 8 times tables.

Know all division facts for times tables up to 12 x 12.

Number bonds within and to 100.

GEOMETRY

Obtuse angles are between 90° and 180°.

Acute angles are less than 90°.

Right angle = quarter turn = 90°.

Know isosceles, equilateral, right angle and scalene triangle.

Identify rhombus.

Identify parallelogram and trapezium.

TEACH IT: NUMBER & PLACE VALUE

YEAR 4

KEY OBJECTIVES

- Count in multiples of 6, 7, 9, 25 & 1000.
- Count from 0 in multiples of 4, 8, 50 and 100.
- Find 1000 more/less than a given number.
- Find 10/100 more/less than any given number.
- Recognise the place value of each digit in a 4-digit number.
- Recognise the place value of each digit in a 3-digit number.
- Read, write, order and compare numbers beyond 1000.
- Read, write, order and compare numbers to 1000.
- Identify, represent and estimate numbers using different representations. For example, estimate weight, identify temperature etc.
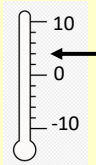
38g represented in weights

- Count backwards through 0 to include negative numbers.
- Round any number to the nearest 10, 100 or 1000.
- Read Roman numerals to 100 (I to C).

POSSIBLE TEACHING SEQUENCE

Count from 0 in multiples of 6, 7, 9, 25 and 1000.
⇒ Count in steps of 7.
⇒ Count in steps of 6 and 9 relating to counting in steps of 3.
⇒ Count in steps of steps of 25 and relate to steps of 50, 100 and ¼s.
⇒ Count in steps of 1000, linking to 10 and 100.
⇒ Make links with odd and even numbers.

Find 1000 more/less
⇒ Bridge 1000.
⇒ Count in 1000s from any given multiple of 1000, then any given number.

Read, write, order and compare beyond 1000.
⇒ Know the place value of 4-digit numbers.
⇒ Read and write numbers beyond 1000.
⇒ Order a set of numbers from largest to smallest; smallest to largest.
⇒ Use <, > and = signs.

Identify, represent and estimate numbers using different representations.
⇒ Know the place value of 4-digit numbers.
⇒ Partition 4-digit numbers (thousands, hundreds, tens and ones).
⇒ Partition in different combinations e.g. 5324 = 53 hundreds and 24 ones.
⇒ Read and write numbers up to 1000.

Count backwards through zero.
⇒ Understand zero and the concept of negative numbers.
⇒ Count backwards in steps of one.
⇒ Use the negative sign and terminology e.g. negative 4 not minus 4.

Round any numbers to the nearest 10, 100 or 1000
⇒ Recognise position of the number relative to multiples of 10/100/1000 either side and place on a number line.
⇒ Determine which multiple the number is closet to & round to given multiple.
⇒ Spot patterns and apply when rounding e.g. 4 or below then round down.

Read Roman numerals
⇒ Know history of Roman numerals, know what I, V, X, L, C stand for, know the rules of applying Roman numerals.

STEM SENTENCES

- 'There are ten hundreds in one thousand'
- 'There are one hundred tens in one thousand.'
- 'There are one thousand ones in one thousand.'
- '5342 is 5342 ones.'
- '5342 is 5 thousands and 342 ones.'
- '5342 is 53 hundreds and 42 ones.'
- '5342 is 534 tens and 2 ones.'
- '5342 is 5 thousands, 3 hundreds, 4 tens and 2 ones.'
- 'When rounding to the nearest___, if the _____digit is 4 or less, round down. If the ____ digit is 5 or more then round up.'

VOCABULARY

- **Represent**
- **Representation**
- **Value**
- **Sequence**
- **Identify**
- **Estimate/Approximate**
- **Thousands** (see STEM sentence)
- **Roman Numerals**
- **Digit** (see Y3)
- **Partition** (see Y3)
- **Inequality symbol**
- **Ascending**
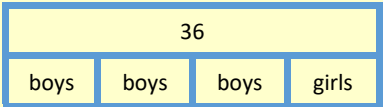- **Descending**
- **Numeral**

COMMON MISCONCEPTIONS

- Not knowing to use 0 as a place holder when a column is empty.
- Not knowing the value of a digit e.g. *'the 3 in 3421 is worth 3.'* instead of *' the 3 in 3421 is worth 3000.'*
- Misunderstanding the value of negative numbers e.g. –5 is more than –1.
- Not recognising the position of Roman numerals correctly e.g. "C X C, means 210, the X means 10." Actually means –10.
- Looking at the wrong column when rounding e.g. looking at the hundreds column when rounding to the nearest 100.
- Missing out 0 when counting forwards/backwards.

KEY DEFINITIONS

⇒ **Round** -giving a number a nearby value when you don't need it to be exact.
⇒ **Negative number** - any number less than zero written with a negative sign.
⇒ **Positive number** - any number greater than zero.
⇒ **Multiple** - product of one number multiplied by another number.

TEACH IT: ADDITION & SUBTRACTION

YEAR 4

KEY OBJECTIVES	POSSIBLE TEACHING SEQUENCE	STEM SENTENCES	VOCABULARY
• Add, subtract numbers mentally including: ⇒ 4 digit number and ones ⇒ 4 digit number and tens ⇒ 4 digit number and hundreds. • As above but with 3 digits as oppose to 4 digits. • Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction. • Add and subtract numbers with up to 3 digits using formal written methods of columnar addition and subtraction. • Estimate the answer to a calculation and use the inverse operation to check the answer.	**Add and subtract mentally including…** ⇒ Count forwards and backwards in ones, tens, hundreds and thousands. ⇒ Know the place value of 2, 3 and 4-digit numbers. ⇒ Use knowledge of place value to add and subtract multiples of 10, 100, 1000 and 1 without bridging. **Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction.** ⇒ Know the place value for 2, 3 and 4-digit numbers. ⇒ Read and write numbers up to 10,000. ⇒ Recognise 0 as a place holder. ⇒ Add two 4-digit numbers with no exchanging. ⇒ Add two 4-digit numbers with one exchange. ⇒ Add two 4-digit numbers with more than one exchange. ⇒ Follow the above addition steps for subtraction also. *Also refer to calculation policy*	• 'I know that 6 tens + 7 tens = 13 tens/130 so I know that 6 hundreds + 7 hundreds = 13 hundreds/1300.' • 'I know that 13 - 6 = 7 so I know that 130 - 60 = 70 and 1300 - 600=700.' • 'For calculations that involve both + and - steps, we can + then - or - then +; the final answer is the same.' • 'In column addition we start at the right hand side.' • 'If the column sum is equal to 10 or more then we must regroup.' • 'Subtraction cannot be done in any order.' • 'When using column subtraction, if the digit on the top is lower than that of the digit on the bottom then exchange.'	• **Mental** • **Efficient** • **Calculate** • **Calculation** • **Partition** • **Add** • **Addition** • **Sum** • **Total** • **Plus** • **Altogether** • **Subtract** • **Difference** • **Fewer** • **Less** • **Takeaway** • **Minus** • **More** • **Combined** • **Column** • **Row** • **Exchange** • **Regroup**

COMMON MISCONCEPTIONS

- Re-ordering a subtraction statement so you always take away from the greater digit instead of exchanging e.g.

  $$292 \qquad 2 - 4 \text{ becomes}$$
  $$- \underline{114} \qquad 4 - 2.$$

- Lining up columns incorrectly especially in terms of a 4-digit number subtract a 3-digit number (including decimal numbers).
- '1000 - 570 = 530' inaccurate application of number bonds.
- Knowledge of what 3420- 1120 actually means e.g. reading 400 -100 as 4 - 1.
- Thinking that formal written methods are the only way to + or - rather than choosing the most efficient methods e.g. using a column method for 9000-8999.

KEY DEFINITIONS

⇒ **Equation** - mathematical statement containing an = sign to show 2 expressions are equal.

⇒ **Expression** - one side of an equation.

⇒ **Inverse** - the operation that reverses the effect of another operation e.g. addition and subtraction are inverse operations.

New Learning | Prior Learning

KEY OBJECTIVES

- Recall multiplication and division facts from multiplication tables up to 12 x 12.

- Recall and use multiplication and division facts for 3, 4 6 and 8 times tables.

- Use place value, known and derived facts to multiply and divide mentally including, multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers.
- Use the distributive law to multiply 2 digit numbers by 1 digit.
- Recognise and use factor pairs and commutativity in mental calculations e.g. 7 x 6 = 7 x 3 x 2.
- Multiply two digit and 3 digit numbers by a one digit number using formal written methods. (See Calculation Policy).

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

- Solve correspondence problems such as n objects are connected to m objects.
- Solve integer scaling problems.

POSSIBLE TEACHING SEQUENCE

Recall multiplication and division facts...

⇒ Practise by rote.

⇒ Use pictorial representations such as arrays.

⇒ Use known facts such as doubling and halving e.g. x 2 x 4 x 8 to link tables such as 2s and 4s.

Use place value, known and derived facts/use the distributive...

⇒ Use known facts e.g. 5 x 10 = 50 therefore 5 x 100 must be 500 and commutativity e.g. 5 x 7 is equal to 7 x 5.

⇒ Use derived facts e.g. 6 x 3 = 18 therefore 6 x 30 = 180.

⇒ Use factor pairs and commutativity to multiply 3 numbers e.g. 2 x 6 x 5 = 10 x 6.

⇒ Apply knowledge to distributive law e.g. 39 x 7 = 30 x 7 + 9 x 7.

Multiply 2-digit and 3-digit numbers...

⇒ Multiply a one-digit number by a two-digit number– use numbers that are known tables to begin with.

⇒ Multiply a one-digit number by a three-digit number- using known tables.

⇒ Progress to other tables they should know e.g. x 7.

Solve correspondence problems...

⇒ Recognise different combinations can be made from objects.

⇒ Record combinations systematically.

⇒ Use mathematical calculations/number sentences to demonstrate this.

Solve integer scaling problems...

⇒ Use bar modelling as a visual representation to support children's calculations e.g. In a class of 36 there are 3 times as many boys as girls. How many girls are there?

36			
boys	boys	boys	girls

STEM SENTENCES

- 'When a number is multiplied by 0, the answer is always 0.'
- 'When a number is multiplied by 1, the number remains the same.'
- 'When a number is divided by 1, the number remains the same.'
- 'When a number is divided by itself, the answer is always 1.'

VOCABULARY

- **Multiplication**
- **Division**
- **Calculate**
- **Multiply**
- **Divide**
- **Mental**
- **Recall**
- **Double**
- **Half**
- **Efficient**
- **Derive**
- **Multiple**
- **Groups of**
- **Times**
- **Repeat**
- **Left**
- **Remainder**
- **Scale**
- **Bar model**
- **Systematic**

COMMON MISCONCEPTIONS

- Writing/saying division statement in the wrong order e.g.
  5 ÷ 45 instead of 45 ÷ 5.
- Not realising that 3 x 4 is the same as 4 x 3.
- When answering scaling problems not recognising the number of parts in the whole e.g. when working out the number of girls in a class of 36 knowing there are 3 times as many boys and then ÷ by 3 instead of ÷ by 4.

PATTERNS

Please see Y3 curriculum for other x table patterns.

9 times tables
- When multiplying by 9 the tens digit increases as the ones digit decreases.

12 times tables
- Double 6 x table to generate 12 x table.

KEY DEFINITIONS

⇒ **Factor** - a whole number that divides exactly into another number.

⇒ **Product** - the result when two numbers are multiplied together.

⇒ **Multiple** - the product of one number multiplied by another.

⇒ **Prime number** - a number divisible by only 2 factors: 1 and itself.

TEACH IT: FRACTIONS

Year 4

KEY OBJECTIVES

- Recognise and show, using diagrams, families of equivalent fractions.
- Recognise and show using diagrams, equivalent fractions with small denominators.
- Compare and order unit fractions and fractions with the same denominators.
- Add and subtract fractions with the same denominator beyond one whole.
- Add and subtract fractions with the same denominator within one whole.
- Recognise and write decimal equivalents to ¼, ½, ¾.
- Recognise and write decimal equivalents of any number of tenths or hundredths.
- Find the effect of dividing a 1 or 2 digit number by 10 and 100, identifying the value of the digit in the answer as ones, tenths and hundredths.
- 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.
- Calculate quantities involving fractions and use fractions to divide quantities including non-unit fractions where the answer is a whole number.
- Count up and down in hundredths recognising that hundredths arise when dividing an object by a hundred and dividing tenths by ten.
- Round decimals with one decimal place to the nearest whole.
- Compare and order numbers with the same number of decimal places up to two decimal places.

POSSIBLE TEACHING SEQUENCE

Recognise and show, using diagrams...
⇒ Practical investigations involving folding shapes to demonstrate how two fractions have an equal value.
⇒ Recognise how denominators and numerators link through common factors and multiples.
⇒ Begin to use factors and multiples to find equivalent fractions.

Add and subtract fractions...
⇒ Understanding the meaning of the terms numerator and denominator.
⇒ Use visual representations to show how many parts of a whole you have in total.
⇒ Show as written calculations extending beyond a whole and recognise as an improper fraction.

Recognise and write decimal.../Find the effect of...
⇒ Know that a decimal point tells us we have a fraction of a whole and that these subsequent columns tell us what fraction of the whole we have.
⇒ Recognise the value of t, h, in relation to dividing a whole by 10 and 100.
⇒ Link knowledge of fractions to decimals.
⇒ Extend to the idea that $23 \div 100 = \frac{23}{100} = 0.23$.

Calculate quantities involving...
⇒ Recognise the meaning of the terms numerator and denominator.
⇒ Find one part of the whole and use this to find multiple parts of the whole.

Round decimals...
⇒ Recognise which whole numbers are either side of the decimal.
⇒ Place the decimal on a number line in relation to the wholes and determine which whole is closer.

Compare numbers...
⇒ Visually represent decimals & use these representations to determine which decimal is larger/smaller.
⇒ Know the numerator will change but the denominator will stay the same.

STEM SENTENCES

- 'As the denominator increases, the parts become smaller.'
- 'When adding fractions, add the parts and keep the denominator the same.'
- 'I know $\frac{}{10}$ is the same as __ ÷ 10.'
- 'When rounding to the nearest whole, if the tenths digit is less than 4, round down. If the tenths digit is 5 or above, round up.'
- '1 whole is ten tenths or a hundred hundredths.'

VOCABULARY

- **Fraction**
- **Tenths**
- **Hundredths**
- **Thousandths**
- **Equal**
- **Part**
- **Equivalent**
- **Whole**
- **Factors**
- **Multiples**

COMMON MISCONCEPTIONS

- Not understanding that a unit fraction is an <u>equal</u> part of a whole.
- Adding/subtracting the denominator when adding/subtracting fractions-linked to knowledge of numerator/denominator.
- When finding fractions, dividing by the numerator and multiplying by the denominator.
- Adding/subtracting to find equivalent fractions instead of multiplying/dividing.
- Thinking that a number with more decimal places is greater e.g. 0.03 is greater than 0.3.
- Reading a decimal as zero point twenty four instead of zero point two four.

KEY DEFINITIONS

⇒ **Numerator** - how many equal parts of a whole you have.
⇒ **Denominator** - how many equal parts a whole is divided in to.
⇒ **Decimal** - a part of a whole number.
⇒ **Decimal point** - the symbol used to separate whole & parts.
⇒ **Proper fraction** - a fraction where the numerator is less than the denominator.
⇒ **Improper fraction** - a fraction where the numerator is greater than the denominator; a fraction larger than a whole.
⇒ **Mixed number** - a number made up of a whole number and a fraction.

KEY OBJECTIVES

- Convert between different units of measure e.g. km to m/ hours to minutes.
- Measure, compare, add and subtract lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).
- Measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m.
- Find the area of rectilinear shapes by counting squares.
- Measure the perimeter of simple 2D shapes.
- Estimate, compare and calculate different measures including money in pounds and pence.
- Add and subtract amounts of money to give change using both pound and pence in practical contexts.
- Read, write and convert time between analogue and digital; 12 and 24 hour clocks.
- Tell and write the time from an analogue clock including, using Roman numerals 1-12 and 12 hour/24 hour clocks.
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, am, pm, morning, afternoon, noon and midnight.
- Compare durations of events.

POSSIBLE TEACHING SEQUENCE

Convert between different units of measure…
- ⇒ Convert mm to cm and cm to mm by x and ÷ by 10.
- ⇒ Begin by converting units involving multiples of 10.
- ⇒ Progress to other numbers e.g. 73mm ÷ 10 = 7.3 cm.
- ⇒ Convert cm to m and m to cm by x and ÷ by 100.
- ⇒ Begin with multiples of 10 and progress to other numbers.
- ⇒ Convert m to km and km to m by x and ÷ by 1000.
- ⇒ Use place value grids and a range of contexts e.g. capacity /money.

Measure and calculate the perimeter of a rectilinear figure…
- ⇒ Demonstrate accurate use of ruler or metre stick to measure the sides of the shape (including decimals).
- ⇒ Calculate perimeter when given the length and width by adding sides together.
- ⇒ Progress to adding the length and width and multiplying by 2 e.g. 2 (l + w).
- ⇒ Calculate the missing lengths and explore possible perimeters of squares and rectangles.
- ⇒ Begin to calculate the perimeter of rectilinear shapes using addition and subtraction of missing sides.

Find the area of rectilinear shapes…
- ⇒ Understand that area is the amount of squares taken up by a 2D shape or surface and demonstrate this by shading in/labelling the area of a regular/irregular shape.
- ⇒ Estimate the area of a shape using non-standard and standard units of measures.
- ⇒ Begin to measure and compare area by counting squares, progressing to recognising arrays and relating to multiplication facts/squared numbers.

Estimate, compare and calculate…
- ⇒ Introduce decimal notation for pounds and pence.
- ⇒ Convert between different units of money e.g. 169p=£1.69.
- ⇒ Understand how to round different amounts of money for estimating-*see decimals guidance for rounding.*

Read, write and convert time…
- ⇒ Use a.m. and p.m. to distinguish between morning to midnight and midnight to noon.
- ⇒ Understand that digital time is about the number of minutes to the hour.
- ⇒ Recognise 24 hour clock in 12 hour format e.g. 09:30 being 9:30 a.m.

STEM SENTENCES

- 'There are 10mm in 1cm.'
- 'There are 60 seconds in 1 minute and 60 minutes in 1 hour.'
- 'A leap year occurs every 4 years and has 366 days.'
- 'A.M. is any time in the morning from midnight to noon.'
- 'P.M. is any time after midday from noon to midnight.'
- 'Add 12 hours to a 12-hour clock p.m. time to get the equivalent 24-hour clock time.'
- 'Perimeter is the distance around the outside of a 2D shape.'
- 'Area is the amount of space a shape covers and is measured in squared units.'

VOCABULARY

- **Mass**
- **Weight**
- **Scale**
- **Length**
- **Volume**
- **Capacity**
- **Perimeter**
- **Roman numerals**
- **Time**
- **Noon**
- **Leap year**
- **Increments/divisions**
- **Morning**
- **Afternoon**
- **Midnight**
- **a.m.**
- **p.m.**
- **Calendar**
- **Distance**
- **Area**
- **Analogue**
- **Digital**
- **Standard units**
- **Non-standard units**

COMMON MISCONCEPTIONS

- Not knowing the difference between perimeter and area, or confusing the time.
- Misunderstanding when comparing different units of measurements e.g. thinking that 55mm is larger than 7.1cm.
- Difficulties converting between minutes and hours e.g. thinking that 2 hours is 200 minutes as oppose to 120.

KEY DEFINITIONS

- ⇒ **Capacity** - the amount a container or object can hold, (measured in ml/l).
- ⇒ **Volume** - amount of space occupied by an object (measured in cm^3).
- ⇒ **Perimeter** - the distance around the outside of a 2D shape.
- ⇒ **Area** - the amount of space a shape covers.
- ⇒ **Rectilinear** - a shape where all sides meet at right angles.

KEY OBJECTIVES

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.

- Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them.
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

- Identify acute and obtuse angles and compare and order angles up to two right angles by size.

- Recognise angles as a property of a 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.

- Complete a simple symmetrical figure with respect to a specific line of symmetry.
- Identify lines of symmetry in 2D shapes, presented in different orientations.
- Describe positions on a 2D grid as coordinates in the first quadrant.
- Plot specified points and draw sides to complete a given polygon.
- Describe movements between positions as translations of a given unit to the left/right and up/down.

POSSIBLE TEACHING SEQUENCE

Compare and classify...
⇒ Know terminology associated with shapes e.g. vertices, sides etc.
⇒ Recognise general features of both triangles and quadrilaterals in both regular and irregular forms.
⇒ Recognise specific features of different types of quadrilaterals and triangles.

Identify acute and obtuse...
⇒ Identify if angles are greater/less than 90° and associate with terminology acute and obtuse.
⇒ Recognise obtuse and acute angles within irregular and regular shapes.
⇒ Place a number of angles in ascending or descending order.

Complete a simple symmetrical...
⇒ Understand the concept of symmetry and spot symmetrical patterns.
⇒ Complete a symmetrical pattern/figure around given lines, in different orientations.

Identify lines of symmetry...
⇒ Identify parts of 2D shapes that are mirror images of each other through physical representations such as folding.
⇒ Draw lines of symmetry on given shapes.

Describe positions on a 2D grid.../plot specified points...
⇒ Know coordinates are used to describe position/location.
⇒ Read/write coordinates and apply knowledge to plot given points (understand concept of x and y).
⇒ Join points to create a polygon, using knowledge of features to justify that they have plotted points correctly.

Describe movements between positions...
⇒ Know the difference between left and right.
⇒ Know the concept of 'translate' is to move.
⇒ Calculate how many units a point has been translated by.
⇒ Translate own points.

STEM SENTENCES

- 'A right angle is 90°.'
- 'An acute angle is less than 90°.'
- 'An obtuse angle is greater than 90° but less than 180°.'
- 'Parallel lines are lines that never meet and are an equal distance apart.'
- 'Perpendicular lines meet at a right angle.'
- 'When we read coordinates, we read x and then y.'

VOCABULARY

- **Isosceles**
- **Equilateral**
- **Scalene**
- **Right-angled triangle**
- **Rhombus**
- **Parallelogram**
- **Trapezium**
- **Quadrilateral**
- **Right angle**
- **Vertices**
- **Sides**
- **Polygon**
- **Angle**
- **Acute**
- **Obtuse**
- **Irregular**
- **Regular**
- **Plot**
- **Parallel**
- **Perpendicular**

COMMON MISCONCEPTIONS

- Not recognising the concept of an angle and mixing up the length of sides with the size of angle.
- Assuming opposite corners mean a line of symmetry e.g. in a rectangle.
- Translating instead of flipping a shape around a mirror line.
- Counting squares not jumps when translating.
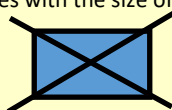
Not seeing that the angles are different.

KEY DEFINITIONS

⇒ **Translate** - sliding an object into a new position without flipping or turning.
⇒ **Coordinate** - a pair of numbers that describes the position of a point on a grid.
⇒ **Symmetrical** - when one half is a mirror image of the other half.
⇒ **Y axis** - the vertical line on a coordinate grid.
⇒ **X axis** - the horizontal line on a coordinate grid.

KEY OBJECTIVES

- Interpret and present discrete and continuous data using appropriate graphical methods including bar charts and time graphs.

- Interpret and present data using bar charts, pictograms and tables.

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

- Solve one-step and two-step questions (e.g. how many more?) using information presented in scaled bar charts, pictograms and tables.

POSSIBLE TEACHING SEQUENCE

Interpret and present…

⇒ Interpret discrete data on graphical methods = table, bar chart, pictogram, tally charts.

⇒ Collect and represent discrete data.

⇒ Understand what continuous data is.

⇒ Interpret continuous data on graphical methods = time-line graphs, bar charts.
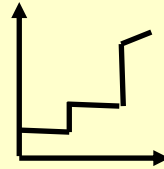
⇒ Collect and represent continuous data.

⇒ Choose and use correct graphical method to represent data, justifying their choice.

Solve comparison, sum and difference…

⇒ Determine highest & lowest values from a given set of data, including sections of data e.g. 2 out of 12 months on a line graph.

⇒ Total values from a given set of data.

⇒ Understand the term 'difference' and apply to questions such as 'how many more…'

STEM SENTENCES

- 'The symbol in the key represents _so half a symbol represents_.'

VOCABULARY

- **Pictogram**
- **Interpret**
- **Symbol**
- **Represent**
- **Key**
- **Scale**
- **Representation**
- **Data**
- **Axis**
- **Tally**
- **Venn diagram**
- **Carroll Diagram**
- **Bar chart**
- **Table**
- **Interval**

COMMON MISCONCEPTIONS

- Ignoring key 🙂 = 2 then answering 🙂🙂🙂 as 3 instead of 6 or ◖ as ½ instead of 1.

- Not checking/recognising that intervals on an axis must be equally spaced apart.

- Interpreting 'How many more…' as an addition or scale reading exercise, instead of as subtraction.

- Trying to represent discrete data on a line graph and subsequently interpreting incorrectly e.g.

There are 2.3 ducks in the pond.
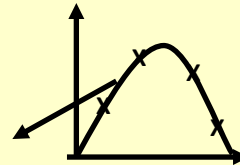
KEY DEFINITIONS

⇒ **Interval** - between 2 points or values.

⇒ **Scale** - a series of marks equally spaced apart on an axis.

⇒ **Discrete** - data that has a finite value and does not change e.g. the number of people in each group in a completed survey.

⇒ **Continuous** - data that is continually changing as it is measured over time e.g. the temperature over a year.

⇒ **Line graph** - uses lines to join points that represent data.

APPLY IT: PROBLEM-SOLVING & REASONING YEAR 4

PROBLEM-SOLVING AND REASONING SHOULD BE APPLIED THROUGHOUT ALL TEACHING NOT JUST WITHIN ISOLATED LESSONS.

PROBLEM SOLVING AND REASONING

The following strategies are a very powerful way of developing pupils' problem-solving and reasoning skills and can be used flexibly across all strands of maths.

- **Spot the mistake/Which is different?**
- **True or false?**
- **What comes next?**
- **Do, then explain.**
- **Make up an example/Write more statements/Create a question/Another and another.**
- **Possible answers/other possibilities.**
- **Missing numbers/Missing symbols/Missing information.**
- **Working backwards/Use of inverse/Undoing/Unpicking.**
- **Hard and easy questions/Order from easiest to hardest.**
- **What else do you know?/Use a fact.**
- **Fact families.**
- **Convince me/Prove it/Generalising/Explain thinking**
- **Connected calculations.**
- **Make an estimate/Size of an answer.**
- **Always, sometimes, never.**
- **Making links/Application.**
- **Can you find?**
- **Odd one out.**
- **Complete/continue the pattern.**
- **Ordering.**
- **The answer is…**
- **Visualising**
- **Answer free zone.**
- **Justify.**

PROBLEM SOLVING AND REASONING EXAMPLES FOR YEAR 4

Place Value

Fill in the boxes by finding the patterns.

3,210		1,210	
3,110			
			6,010

Addition & Subtraction

Annie, Mo and Alex are working out the solution to the calculation 6,374 + 2,823

Annie's Strategy

$6,000 + 2,000 = 8,000$
$300 + 800 = 110$
$70 + 20 = 90$
$4 + 3 = 7$
$8,000 + 110 + 90 + 7 = 8,207$

Mo's Strategy

	6	3	7	4
+	2	8	2	3
	8	1	9	7

Alex's Strategy

	6	3	7	4
+	2	8	2	3
				7
			9	0
	1	1	0	0
	8	0	0	0
	9	1	9	7

Who is correct?

Multiplication & Division

Use the digit cards to fill in the missing digits.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

$170 \div 10 = \_\ \_$

$\_20 \times 10 = 3\_00$

$1,8\_0 \div 10 = 1\_6$

$\_9 \times 100 = 5\_00$

$6\_ = 6,400 \div 100$

Fractions

Tick the **two** numbers that are equivalent to $\frac{1}{4}$

Tick two.

- 0.25 ☐
- 0.75 ☐
- $\frac{25}{100}$ ☐
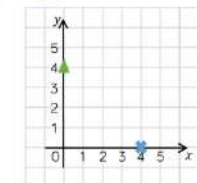- 0.5 ☐
- $\frac{2}{5}$ ☐

Geometry-Shape

Here is a square.
Inside the square is an equilateral triangle.
The perimeter of the square is 60 cm.
Find the perimeter of the triangle.
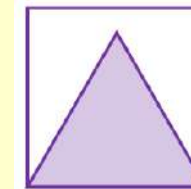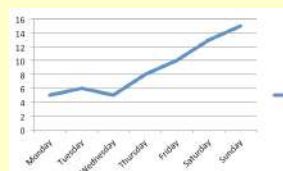
Geometry-Position & Direction

▲ to ✖ is 4 right and 4 down.
✖ to ▲ is 4 left and 4 up.

Can you plot other pairs of points where to move between them, you travel the same to left or right as you travel up or down?

Statistics

Make up a story that fits the line graph

Measures

An empty box weighs 0.5 kg. Ivy puts 10 toy bricks inside it and the box now weighs 2 kg. How much does each brick weigh?