Year 3

Maths Curriculum

KNOW IT!

TEACH IT!

APPLY IT!

JAMES COOK
LEARNING TRUST

New Learning | Prior Learning

KNOW IT

YEAR 3

PLACE VALUE

- Roman Numerals 1-12.
- Know the value of each digit in 3-digit numbers.
- Know the value of each digit in 2-digit numbers.
- Count in multiples of 4, 6, 8, 50 and 100.
- Count in steps of 2, 3 and 5 from 0 and in 10s from any number forwards and backwards.
- Find 10 or 100 more or less from any given number.
- Find 10 more or 10 less from any given number.
- Know the signs >, < and =.

FRACTIONS

- $\frac{10}{10}$ = 1 whole.
- Count in tenths, forwards and backwards.
- $\frac{2}{4}$ = one half.
- Recognise $\frac{3}{4}$ and $\frac{1}{3}$.

MEASURES

- 1000ml = 1 litre.
- 1000g = 1 kg.
- 10 mm = 1 cm.
- 100 cm = 1 metre.
- 100 pence = 1 pound.
- 366 days in a leap year.
- 365 days in 1 year.
- 60 seconds = 1 minute.
- 60 minutes = 1 hour.
- 24 hours = 1 day.

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

- Number bonds within and to100.
- Recall number bonds within and to 20 fluently.
- Know doubles and halves to 20.
- Know 3, 6, 4 and 8 times tables.
- Know 2, 5 and 10 times tables.
- Know division facts for 2, 5 & 10 times tables.

GEOMETRY

- Right angle = quarter turn = 90°.
- Right angle = quarter turn.
- Identify parallelogram and trapezium.
- Identify quadrilaterals and polygons pentagon, hexagon & octagon.
- Identify prisms and cones.

New Learning | Prior Learning

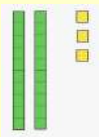
TEACH IT: NUMBER & PLACE VALUE

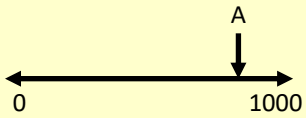
YEAR 3

KEY OBJECTIVES

- Count from 0 in multiples of 4, 8, 50 and 100.
- Count in steps of 2, 3 & 5 from 0 and in 10s from any number forwards and backwards.
- Find 10 or 100 more/less than any given number.
- Recognise place value of each digit in a 3 digit number.
- Recognise place value of each digit in a 2 digit number.
- Read and write numbers up to 1000 in numerals and words.
- Read and write numbers to at least 100 in numerals and words.
- Compare and order numbers to 1000.
- Compare and order numbers from 0-100, using >, < and = signs.
- Identify, represent and estimate numbers using different representations e.g.

Dienes | Place Value Counters | Estimate





or where would 250 go?

POSSIBLE TEACHING SEQUENCE

Count from 0 in multiples of 4, 8, 50 and 100.

⇒ Count forwards.
⇒ Count in steps of 2, 5 and 10.
⇒ Count in steps of 4 and relate to counting in steps of 8.
⇒ Count in steps of 50 and relate to counting in steps of 100.
⇒ Make links with odd and even numbers.

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

⇒ Find one more/less from a given number to 100.
⇒ Bridge 10 and 100.
⇒ Count in 10s from a given multiple of 10, a 1-digit number and a 2-digit number.
⇒ Count in 100s from a given multiple of 100.

Compare and order numbers up to 1000

⇒ Compare and order numbers to 100.
⇒ Know the place value of 2 and 3-digit numbers.
⇒ Read and write numbers up to 1000.
⇒ Know '0' as a place holder.
⇒ Use <, > and = signs.

Identify, represent and estimate numbers using different representations.

⇒ Know the place value of 2 and 3-digit numbers.
⇒ Partition 2 and 3-digit numbers (hundreds, tens and ones).
⇒ Partition in different combinations e.g. 324=32 tens+ 4 ones.
⇒ Read and write numbers up to 1000.

STEM SENTENCES

- 'There are ten tens in a hundred.'
- 'There are one hundred ones in one hundred.'
- '342 is 342 ones.'
- '342 is 3 hundreds and 42 ones.'
- '342 is 34 tens and 2 ones.'
- '342 is 3 hundreds, 4 tens and 2 ones.'

VOCABULARY

- **Represent**
- **Representation**
- **Value**
- **Composed of**
- **Sequence**
- **Number bond**
- **Identify**
- **Estimate/Approximate**
- **Hundreds (see STEM sentence)**
- **Symbols**
- **Ascending**
- **Descending**

COMMON MISCONCEPTIONS

- Not knowing to use 0 as a place holder when a column is empty.
- Knowing whether to use < or >.
- Not knowing the value of a digit e.g. *'the 3 in 342 is worth 3.'* instead of *'the 3 in 342 is worth 300.'*
- Crossing boundaries when + or - 10 or 100 e.g.
  - ⇒ forgetting 100s *' 392 + 10 = 102.'*
  - ⇒ not re-grouping *'392 + 10 = 3102.'*
  - ⇒ forgetting 0 as a place holder *'392 + 10 = 412'.*
- Looking at the ones column first when comparing 3-digit numbers e.g. 249 is greater than 302.

KEY DEFINITIONS

⇒ **Digit** - written numeral from 0-9 that forms part of a number.
⇒ **Partition** - to split or break a number into 2 or more parts.
⇒ **Multiple** - product of one number multiplied by another number.
⇒ **Inequality symbols** - < or > (less than or greater than).
⇒ **Numeral** -a symbol or a group of symbols used to show a number.

New Learning | Prior Learning

TEACH IT: ADDITION & SUBTRACTION

YEAR 3

KEY OBJECTIVES

- Add, subtract numbers mentally including:
  - ⇒ 3-digit number and ones
  - ⇒ 3-digit number and tens
  - ⇒ 3-digit number and hundreds.
- Show that the addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.
- Add and subtract numbers with up to 3 digits using formal written methods of columnar addition and subtraction.
- Add and subtract numbers using concrete objects, pictorial representation and mentally including:
  - ⇒ 2 digits and ones
  - ⇒ 2 digits and tens
  - ⇒ 2, 2-digit numbers
  - ⇒ 3, 1-digit numbers.
- Recall addition and subtraction facts to 20 fluently and derive and use related facts up to 100.
- Estimate the answer to a calculation and use the inverse operations to check answer.
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations.

POSSIBLE TEACHING SEQUENCE

Add and subtract mentally including…

- ⇒ Count forwards and backwards in ones, tens and hundreds.
- ⇒ Know the place value of 2 and 3-digit numbers.
- ⇒ Use knowledge of place value to add multiples of 10, 100, and 1 without bridging.

Add and subtract numbers with up to 3 digits using formal written methods of columnar addition and subtraction.

- ⇒ Know the place value for 2 and 3-digit numbers.
- ⇒ Read and write numbers up to 1000.
- ⇒ Recognise 0 as a place holder.
- ⇒ Know column method without regrouping.
- ⇒ Know column method with regrouping.

Refer to calculation policy.

STEM SENTENCES

- 'I know that 6 + 7 = 13 so I know 6 tens + 7 tens = 13 tens so I know 60 + 70 = 130.'
- 'I know 13 - 6 = 7 so I know 13 tens - 6 tens = 7 tens so I know 130 - 60 = 70.'
- '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.'

VOCABULARY

- **Mental**
- **Efficient**
- **Calculate**
- **Calculation**
- **Partition**
- **Add**
- **Addition**
- **Sum**
- **Total**
- **Plus**
- **Altogether**
- **Subtract**
- **Difference**
- **Fewer**
- **Less**
- **Takeaway**
- **Minus**
- **More**
- **Combined**
- **Column**
- **Row**

COMMON MISCONCEPTIONS

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

```
  2 9 2        2 - 4 becomes
- 1 1 4        4 - 2.
```

- Lining up columns incorrectly especially in terms of a 3-digit number subtract a 1-digit number etc.
- '100 - 57 = 53' inaccurate application of number bonds.
- Knowledge of what 342 - 112 actually means e.g. 4-1 is actually 40-10.

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

TEACH IT: MULTIPLICATION & DIVISION

YEAR 3

KEY OBJECTIVES

- 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.
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
- Recall and use multiplication and division facts for 3, 4 6 and 8 times tables.
- Recall and use multiplication and division facts for 2, 5 and 10 times tables including recognising odd and even numbers.
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the x ÷ and = signs.

POSSIBLE TEACHING SEQUENCE

Write and calculate mathematical statements...

⇒ Partition two-digit numbers.

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

See calculation policy.

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

⇒ Understand that division is the inverse of multiplication and vice-versa.

⇒ Recall and use multiplication facts for the 2 times table; making links to the 4 and 8 times tables.

⇒ Make links between the 3 and 6 times tables.

⇒ Make links with odd and even numbers.

STEM SENTENCES

- 'When 0 is a factor, the product is 0.'
- 'Find factors in pairs by multiplying e.g. find factors of 20: 1 and 20, 2 and 10, 4 and 5 etc.'
- 'Products in the 4 times table are also in the 2 times table.'
- '3 x 4 is double 3 x 2.'

VOCABULARY

- **Multiplication**
- **Division**
- **Calculate**
- **Multiply**
- **Divide**
- **Mental**
- **Recall**
- **Double**
- **Half**
- **Efficient**
- **Derive**
- **Groups of**
- **Times**
- **Repeat**
- **Left**

COMMON MISCONCEPTIONS

- Writing/saying a 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.
- Knowing that 5 x 3 = 15 so thinking that 6 x 3 must be 15 + 6.'
- Not understanding correct layout or place value.

```
  4 3
  x 2
  ---
    6
    8
  ---
  1 4
```

PATTERNS

4 times tables
- All even;
- Double the 2 times table;
- If the final 2 digits are divisible by 4, then the number is divisible by 4.

8 times tables
- All even;
- Double the 4 times table;
- Double the 2 times table and double again.

6 times tables
- All even;
- Double the 3 times table;
- If the digits total a multiple of 3 and it is even, it is a multiple of 6.

3 times tables
- If the digits total a multiple of 3, the number is a multiple of 3.

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.

⇒ **Remainder** - the number which is left over in a division in which one quantity does not exactly divide into another.

New Learning | Prior Learning

TEACH IT: FRACTIONS

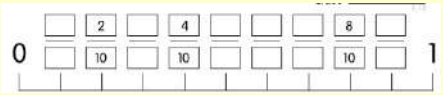
YEAR 3

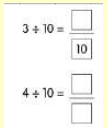
Key Objectives

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

- Recognise, find, name and write fractions of a length, shape, set of objects or quantity. ½ ¼ ¾ $^2/_4$.

- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.
- Count up and down in tenths recognising that tenths arise from dividing an object into 10 equal parts and in dividing 1 digit numbers or quantities by 10.





- Recognise and show using diagrams, equivalent fractions with small denominators.

- Write simple fractions e.g. ½ of 6=3 and recognise the equivalence of $^2/_4$ and ¼.

- Compare and order unit fractions and fractions with the same denominators.
- Add and subtract fractions with the same denominator within one whole.

Possible Teaching Sequence

Recognise and write fractions...

⇒ Understand that fractions are equal parts of a whole.

⇒ Recognise, find and write unit fractions of quantities e.g. ½ of 10.

⇒ Recognise and write non-unit fractions.

⇒ Show practically how to find a non-unit fraction, dividing a set of objects by the denominator.

Recognise and use fractions as numbers…

⇒ Know that when the numerator and denominator are equal the fraction is equal to a whole.

⇒ Know simple fractions of numbers e.g. ½ of 6 = 3.

⇒ Make links with halving and doubling.

Recognise and show using diagrams, equivalent fraction with small denominators…

⇒ Count in fractions and place on a number line.

Compare and order unit fractions and fractions with the same denominators...

⇒ Use pictorial representations to order unit fractions such as, ¼ ⅓ $^1/_7$.

⇒ Use the numerator to order non-unit fractions when the denominator is the same.

Add and subtract fractions with the same denominator.

⇒ Understand the language associated with fractions.

⇒ Know addition can be done in any order and subtraction cannot.

⇒ Know the numerator will change but the denominator will stay the same.

Stem Sentences

- 'If _ is the whole then _is a part of the whole.'
- 'A part is smaller than the whole.'
- 'The whole has been divided into _ equal/unequal parts.'
- 'Equal parts do not have to look the same.'
- 'As the denominator increases, the parts become smaller.'
- 'A unit fraction always has a numerator of 1. A non-unit fraction has a numerator that is greater than 1. An example of a unit fraction is_. An example of a non-unit fraction is_.'
- 'When a fraction is equal to a whole, the numerator and the denominator are the same.'

Vocabulary

- **Fraction**
- **Tenths**
- **Dividing**
- **Equal**
- **Parts**
- **Equivalent**
- **Whole**
- **Compare**
- **Order**
- **Half/Halves**
- **Quarter**
- **Third**
- **Sixth**
- **Seventh, etc.**

Common Misconceptions

- Equal parts have to look the same (but they do not) e.g. 
- A greater denominator = a larger fraction e.g. ⅓ is smaller ¼.
- Adding/subtracting denominators when pupils add or subtract the fractions e.g. ⅛ + ⅝= $^6/_{16}$.
- Not recognising that the same numerator and denominator = whole 1 e.g. $^3/_3$ = 1.
- Not counting shaded parts as well as unshaded parts in questions such as 'what fraction is shaded?'  = ⅓.

Key Definitions

⇒ **Mixed number** - a number made up of a whole number and a fraction.

⇒ **Numerator** - how many equal parts of a whole you have.

⇒ **Denominator** - how many equal parts a whole is divided in to.

⇒ **Equivalent fractions** - fractions of the same value $^3/_4$= $^9/_{12}$.

⇒ **Unit fraction** - a fraction with a numerator of one.

⇒ **Non-unit fraction** - a fraction with a numerator greater than 1.

New Learning | Prior Learning

TEACH IT: MEASURE

YEAR 3

KEY OBJECTIVES

- Measure, compare, add and subtract lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).
- Measure the perimeter of simple 2D shapes.

- Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (l/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 <, >, or =.

- Add and subtract amounts of money to give change using both pound and pence in practical contexts.

- 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.

- Compare durations of events e.g. to calculate the time taken by particular events or tasks.

- Compare and sequence intervals of time.

- 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.

- 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.

POSSIBLE TEACHING SEQUENCE

Measure, compare, add and subtract...

⇒ Choose and use appropriate units to estimate and measure length/height, mass, temp and capacity.

⇒ Understand more than, less than or equal to.

⇒ Understand equivalent measures.

⇒ Understand which measuring tools are appropriate and how to use them correctly.

⇒ Begin to make sensible estimates in relation to familiar units e.g. the book is about 25cm not 2 metres.

⇒ Read scales to the nearest labelled division/increment.

⇒ Draw and measure lines of different lengths.

⇒ Know to start at 0 on the equipment when making a measure.

⇒ Read a range of scales on a variety of equipment e.g. not just straight lines but weighing scales too.

Measure the perimeter of simple 2D shapes...

⇒ Recognise 2D shapes.

⇒ Understand the term and identify perimeter of shapes/objects - trace the perimeter of a variety of shapes with coloured pencil or finger.

⇒ Use tools to measure each side and find the total of them.

Add and subtract amounts of money...

⇒ Recognise all coins and notes.

⇒ Recognise and use £ and p symbols.

⇒ Add money to make particular amounts.

⇒ Find different combinations of coins that equal the same amounts of money.

Tell and write time from an analogue clock…

⇒ Tell and write the time to 5 minutes including ¼ past, ½ past, to the hour and draw the hands on a clock face to show.

⇒ Tell and write the time to 1 minute.

⇒ Tell the time on a clock face with roman numerals.

STEM SENTENCES

- 'Kilo means 1000; there are 1000g in 1kg.'
- 'There are 10mm in 1cm.'
- 'There are 60 seconds in 1 minute and 60 minutes in 1 hour.'
- 'A.M. is any time in the morning from midnight to noon.'
- 'P.M. is any time after midday from noon to midnight.'
- 'A leap year occurs every 4 years and has 366 days.'
- 'Perimeter is the distance around the outside of a 2D shape.'

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**

COMMON MISCONCEPTIONS

- Not knowing that after half past, we start to read time 'to' the next hour; instead children will read this as past-35 minutes past.
- Always drawing the hour hand at the number in the time instead of showing it accurately e.g. ½ way between 2 and 3 at 2:30pm.
- Misunderstanding time durations e.g. Abi = 55 seconds, Joe = 40 seconds therefore 'Abi is the winner because her number is bigger'.
- 10mm = 1 cm so 10cm = 1m **OR** 100cm = 1m so 100mm= 1cm.
- 120 seconds is 1 minute and 20 seconds-thinking that 100 seconds = 1 minute.
- Recording £1.00 + 5p as £1.05p or £1.5.
- The tallest container has the largest capacity.

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 (calculated by adding the length of all sides together).

New Learning | Prior Learning

TEACH IT: GEOMETRY

YEAR 3

KEY OBJECTIVES

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

- Identify and describe the properties of 2D shapes, including, the number of sides and line symmetry in a vertical line.
- Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.
- Identify 2D shapes on the surface of 3D shapes.
- Compare and sort common 2D and 3D shapes and everyday objects.

- 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.

- Use mathematical vocabulary to describe position, direction and movement, including 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 anti-clockwise.

- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

POSSIBLE TEACHING SEQUENCE

Draw 2D and 3D shapes...

⇒ Recognise 2D shapes.

⇒ Use knowledge of the properties of 2D shapes to draw 2D shapes.

⇒ Use a variety of paper (squared, dotted, triangular etc) to draw 2D shapes.

⇒ Recognise 3D shapes.

⇒ Use knowledge of the properties of 3D shapes to construct 3D shapes.

Recognise angles as a property of shape or a...

⇒ Know how to make quarter, half and full turns and refer to them in terms of right angles.

⇒ Identify where 2 sides on a shape meet as an angle-annotate and label.

⇒ Know right angles are 90° and compare visually to other angles to recognise if they are greater/less than 90°.

Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

⇒ Show lines in different orientations and identify whether they are horizontal or vertical.

⇒ Compare lines in different orientations.

⇒ Show sets of parallel lines in different orientations and compare them.

⇒ Compare parallel lines and non-parallel lines, discussing if the lines will ever meet.

⇒ Recognise two lines joining or intersecting at a right angle as perpendicular.

⇒ Compare sets of perpendicular lines.

STEM SENTENCES

- 'A right angle is 90°.'
- '4 right angles make a full turn.'
- 'Parallel lines are lines that never meet and are an equal distance apart.'
- 'Perpendicular lines meet at a right angle.'

VOCABULARY

- **Pentagonal**
- **Hexagonal**
- **Octagonal**
- **Quadrilateral**
- **Right-angle**
- **Vertices-3D/2D**
- **Edges-3D**
- **Faces-3D**
- **Sides-2D**
- **Polygon**
- **Angles**
- **Clockwise**
- **Anticlockwise**
- **Triangular prism**
- **Triangular-based pyramid**
- **Square-based pyramid**
- **Hemisphere**
- **Irregular**
- **Regular**

COMMON MISCONCEPTIONS

- Thinking that because every square is a rectangle that every rectangle must be a square.
- Not including enough faces when creating a net for a 3D shape-often missing the one that touches the surface it is sitting on.
- Not knowing that irregular six-sided shapes are still hexagons, five-sided shapes are still pentagons, etc.
  For example, knowing that this is a pentagon  but thinking this is not  .
- Thinking that all 3D shapes are prisms.
- Drawing the wrong 2D faces when drawing a net for a cylinder.

KEY DEFINITIONS

⇒ **Parallel lines** - lines that are always an equal distance apart.

⇒ **Perpendicular lines** - lines that meet or intersect at a right angle.

⇒ **Horizontal lines** - a line that lies flat and is parallel to the horizon.

⇒ **Vertical lines** - a line that stands upright.

⇒ **Prism** - a solid 3D shape with 2 identical parallel faces.

⇒ **Face** - a flat surface within a 3D shape.

⇒ **Edge** - the line where two faces meet.

New Learning | Prior Learning

TEACH IT: STATISTICS

YEAR 3

KEY OBJECTIVES

- Interpret and present data using bar charts, pictograms and tables.
- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.
- Solve one-step and two-step questions (e.g. how many more?) using information presented in scaled bar charts, pictograms and 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.

POSSIBLE TEACHING SEQUENCE

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

⇒ Collect data, interpret and construct simple **pictograms.**

⇒ Understand the key within a pictogram and that the value of it can differ from one pictogram to another.

⇒ Interpret pictograms where the value of the symbol is more than one.

⇒ Interpret pictograms where there are fractions of symbols within the data linking to known facts about fractions of amounts. For example, if each symbol = 2 what will be the value of ½ a symbol.

⇒ Collect information and show in a table, using the information to construct bars on a given **bar chart**.

⇒ Construct own simple bar charts; read and label axis and create own titles.

⇒ Interpret simple bar charts.

⇒ Check the scale and the size of the intervals.

⇒ Interpret bar charts with scales of 1,2,5 and 10.

⇒ Complete missing numbers on scales.

⇒ Decide on appropriate scales to use when drawing on bar charts.

⇒ Interpret tables answering one and two-step problems.

⇒ Ask own questions about data in a table.

⇒ Construct and interpret simple **Venn diagrams and Carroll diagrams.**

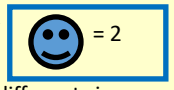
STEM SENTENCES

- '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**

COMMON MISCONCEPTIONS

- Ignoring key  = 2 then answering  as 3 instead of 6 or  as ½ instead of 1.
- Intervals at different sizes on a bar chart-not checking.
- Interpreting 'How many more…' as an addition or scale reading exercise, instead of as subtraction.
- Misunderstanding time durations presented in a table: Who finished first? Marking Fred as the winner with 51 seconds as his number was biggest rather than Alex who had the lowest number of seconds.

KEY DEFINITIONS

⇒ **Table** - a diagram made up of rows and columns.

⇒ **Bar chart** - a graph using bars to show quantities or numbers so they can be easily compared.

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

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

New Learning | Prior Learning

APPLY IT: PROBLEM-SOLVING & REASONING YEAR 3

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 3

Place Value

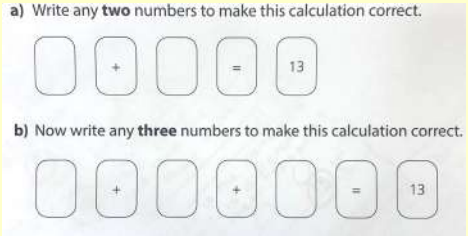
Use <, >, = sign

32 tens ☐ 320

320 ☐ 30 tens + 2 ones

32 ☐ 32 tens + 0 ones

Addition & Subtraction



Multiplication & Division

True or False?

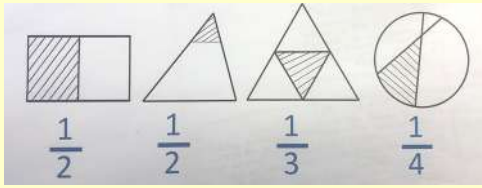
6 x 7 = 6+6+6+6+6+6+6

7 x 6 = 7 x 3 + 7 x 3

2 x 3 + 3 > 5 x 3

Fractions

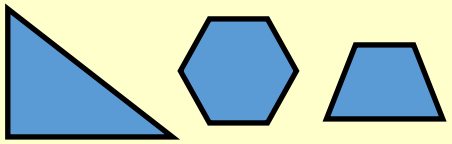
True or False?



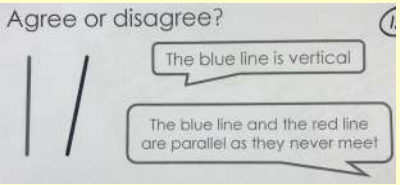
Why? Explain.

Geometry-Shape

What is the same and what is different?



Geometry-Position & Direction



Statistics

How many questions about the shop can you create for your partner using this table?

Days	No. of hours shop open
Mon	8
Tues	8
Wed	4
Thurs	10
Fri	7

Measures

Use the clues to work out who has which container: