



## Statutory Requirements for Mathematics

### Reception

#### Students can...

##### ELG: Number

- Have a deep understanding of numbers to 10, including the composition of each number.
- Subitise (recognise quantities without counting) up to 5
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

##### ELG: Numerical Pattern:

- Verbally count beyond 20, recognising the pattern of the counting system
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
- Explore and represent patterns within numbers up to 10, including events and odds, double facts and how quantities can be distributed equally.



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### Year One

#### Students can...

##### Place Value:

- 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?
- 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?
- When given a number, identify one more and one less?

##### Addition and Subtraction:

- 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 0?
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as  $7 = X - 9$ ?



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### Multiplication and Division:

- 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 or quantity?
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity?

### Measurement:

- Compare, describe and solve practical problems for:
  1. Lengths and heights, e.g. long/short, longer/shorter, tall/short, double/half?
  2. Mass/weight, e.g. heavy/light, heavier than, lighter than?
  3. Capacity and volume, e.g. full/empty, more than, less than, half, half full, quarter?
  4. Time, e.g. quicker, slower, earlier, later?
- Measure and begin to record the following:
  1. Lengths and heights?
  2. Mass/weight?



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3. Capacity and volume?

4. Time (hours, minutes, seconds)?

- Recognise and know the value of different denominations of coins and notes?
- Sequence events in chronological order using language, e.g. before and after, next, first, today, yesterday, tomorrow?
- Recognise and use language relating to dates, including days of the week, weeks, months and years?
- Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times?

#### Geometry:

- Recognise and name common 2-D and 3-D shapes, including:
  1. 2-D shapes, e.g. rectangles (including squares), circles and triangles?
  2. 3-D shapes, e.g. cuboids (including cubes), pyramids and spheres?
- Describe position, direction and movement, including whole, half, quarter and three-quarter turns?



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Year Two

Where there is yellow, it means this is an additional or new aspect of the skill.

### Students can...

#### Place Value:

- 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?**

#### Addition and Subtraction:

- Solve problems with addition and subtraction:
  1. **Using concrete objects and pictorial representations, including those involving numbers, quantities and measures?**
  2. **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:
  1. A two-digit number and ones?
  2. **A two-digit number and tens?**
  3. **Two two-digit numbers?**



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### 4. Adding three one-digit numbers?

- Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot?
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems?

### Multiplication and Division:

- 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 ( $\times$ ), division ( $\div$ ) 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?

### Fractions:

- Recognise, find, name and write fractions  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$  and  $\frac{3}{4}$  of a length, shape, set of objects or quantity?
- Write simple fractions, e.g.  $\frac{1}{2}$  of  $6 = 3$ , and recognise the equivalence of  $\frac{2}{4}$  and  $\frac{1}{2}$ ?



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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 ( $^{\circ}\text{C}$ ); 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:

- 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, e.g. a circle on a cylinder and a triangle on a pyramid?
- Compare and sort common 2-D and 3-D shapes and everyday objects?
- Order and arrange combinations of mathematical objects in patterns and sequences?



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- 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 anti-clockwise)?

Year Three

Where there is yellow, it means this is an additional or new aspect of the skill.

### Students can...

#### Place Value:

- 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 1,000?
- Identify, represent and estimate numbers using different representations?
- Read and write numbers up to 1,000 in numerals and in words?
- Solve number problems and practical problems involving these ideas?

#### Addition and Subtraction:

- Add and subtract numbers mentally, including:
  1. A three-digit number and ones?
  2. A three-digit number and tens?
  3. A three-digit number and hundreds?
- Add and subtract numbers with up to three-digits, using formal written methods of columnar addition and subtraction?





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- Estimate the answer to a calculation and use inverse operations to check answers?
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction?

### Multiplication and Division:

- 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:

- 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?



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- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators?
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators?
- Recognise and show, using diagrams, equivalent fractions with small denominators?
- Add and subtract fractions with the same denominator within one whole, 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?

### Measurement:

- Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)?
- Measure the perimeter of simple 2-D shapes?
- Add and subtract amounts of money to give change, using both pound (£) and pence (p) in practical contexts?
- Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks?
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight?
- Demonstrate they know the number of seconds in a minute and the number of days in each month, year and leap year?
- Compare durations of events, e.g. to calculate the time taken by particular events or tasks?



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### Geometry:

- 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?

### Statistics:

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



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Year Four

Where there is yellow, it means this is an additional or new aspect of the skill.

**Students can...**

### Place Value:

- Count in multiples of 6, 7, 9, 25 and 1,000?
- Find 1,000 more or less than a given number?
- Count backwards through 0 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 1,000?
- Identify, represent and estimate numbers using different representations?
- Round any number to the nearest 10, 100 or 1,000?
- 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 0 and place value?

### Addition and Subtraction:



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- Add and subtract numbers with up to **four-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?

#### Multiplication and Division:

- Recall multiplication and division facts for multiplication tables up to  **$12 \times 12$** ?
- 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?

#### Fractions:



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- 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 100 and dividing tenths by 10?
- Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number?
- Add and subtract fractions with the same denominator?
- **Recognise and write decimal equivalents of any number of tenths or hundredths?**
- **Recognise and write decimal equivalents to  $1/4$ ,  $1/2$ ,  $3/4$ ?**
- **Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as 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:

- **Convert between different units** of measure, e.g. kilometre to metre; hour to minute?
- Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres?
- Find the area of rectilinear shapes by counting squares?
- Estimate, compare and calculate different measures, including money in £ and p?
- 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;**



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years to months; weeks to days?

### Geometry:

- Compare and **classify** geometric shapes, including quadrilaterals and triangles, based on their properties and sizes?
- Identify **acute and obtuse angles** and **compare and order angles up to two right angles by size?**
- Identify **lines of symmetry in 2-D shapes** presented in different orientations?
- **Complete a simple symmetric figure with respect to a specific line of symmetry?**
- **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?**

### Statistics:

- 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?**



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Year Five

Where there is yellow, it means this is an additional or new aspect of the skill.

### Students can...

#### Place Value:

- 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 0?
- Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000?
- Solve number problems and practical problems that involve all of the above?
- Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals?





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### Addition and Subtraction:

- Add and subtract whole numbers with **more than four-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?

### Multiplication and Division:

- **Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers?**
- **Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers?**
- Establish whether a **number up to 100 is prime** and recall prime numbers up to 19?
- **Multiply numbers up to four-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 four-digits by a one-digit number using the formal written method of short division** and interpret remainders appropriately for the context?



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- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000?
- 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?

### Fractions:

- Compare and order fractions whose denominators are all multiples of the same number?
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths?
- Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements  $> 1$  as a mixed number, e.g.  $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$ ?
- 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, e.g.  $0.71 = 71/100$ ?



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- 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 **percent symbol (%)** and understand that **percent 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 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25?**

#### Measurement:

- Convert between different units of metric measure, for example, kilometre and metre?
- **Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints?**
- Measure and calculate the perimeter of **composite rectilinear shapes** in centimetres and metres?
- Calculate and compare the **area of rectangles** (including squares), including using standard units, square centimetres ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ) and estimate the area of irregular shapes?
- **Estimate volume**, e.g. using  $1 \text{ cm}^3$  blocks to build cuboids (including cubes), and



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capacity, e.g. using water?

- Solve problems involving converting between units of time?
- Use all four operations to solve problems involving measure, e.g. length, mass, volume, money, using decimal notation, including scaling?
- 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?
- Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed?

### Geometry:

- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations?
- Demonstrate they know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles?
- Draw given angles, and measure them in degrees?
- Identify:
  1. Angles at a point and one whole turn (total  $360^{\circ}$ )?
  2. Angles at a point on a straight line and  $1/2$  a turn (total  $180^{\circ}$ )?
  3. Other multiples of  $90^{\circ}$ ?



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### Statistics:

- Solve comparison, sum and difference problems using information presented in a line graph?
- Complete, read and interpret information in tables, including timetables?

Year Six

Where there is yellow, it means this is an additional or new aspect of the skill.

### Students can...

#### Place Value:

- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit?
- Round any whole number to a required degree of accuracy?
- Use negative numbers in context, and calculate intervals across 0?
- Solve number and practical problems that involve all of the above?



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### Addition, Subtraction, Multiplication and Division:

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

### Fractions:

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination?
- Compare and order fractions, including fractions  $> 1$ ?



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- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions?
- Multiply simple pairs of proper fractions, writing the answer in its simplest form, e.g.  $1/4 \times 1/2 = 1/8$ ?
- Divide proper fractions by whole numbers, e.g.  $1/3 \div 2 = 1/6$ ?
- Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction?
- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places?
- Multiply one-digit numbers with up to two decimal places by whole numbers?
- Use written division methods in cases where the answer has up to two decimal places?
- Solve problems which require answers to be rounded to specified degrees of accuracy?
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts?

### Proportion and Ratio:

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts?
- Solve problems involving the calculation of percentages and the use of percentages for comparison?
- Solve problems involving similar shapes where the scale factor is known or can be found?
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples?



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### Algebra:

- Use simple formulae?
- Generate and describe linear number sequences?
- Express missing number problems algebraically?
- Find pairs of numbers that satisfy an equation with two unknowns?
- Enumerate possibilities of combinations of two variables?

### 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 ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units, e.g.  $\text{mm}^3$  and  $\text{km}^3$ ?





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### Geometry:

- Draw 2-D shapes using given dimensions and angles?
- Recognise, describe and build simple 3-D shapes, including making nets?
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons?
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius?
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles?
- Describe positions on the full coordinate grid (all four quadrants)?
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes?

### Statistics:

- Interpret and construct pie charts and line graphs, and use these to solve problems?
- Calculate and interpret the mean as an average?