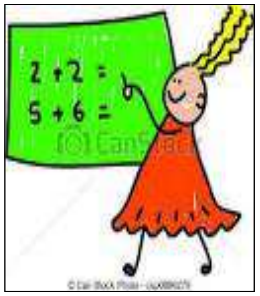
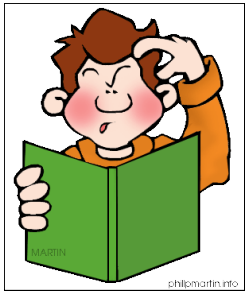
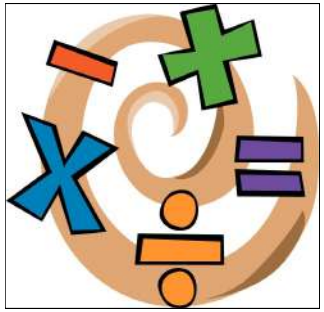
Tilstock CofE Primary and Nursery School



What does your child need to know? (Mathematics)



A parents/carers guide to age related expectations in mathematics.



Created by Mr M Cusden December

The National Curriculum

The National Curriculum has 3 over arching aims that when combined are designed to increase children's mathematical proficiency.

Fluency

- Children must know the fundamentals of maths.
- Children must frequently practice the fundamentals of maths.
- Children must tackle increasingly harder problems using the fundamental of maths.
- Children must be able to rapidly recall the fundamentals of maths with accuracy.

Reasoning

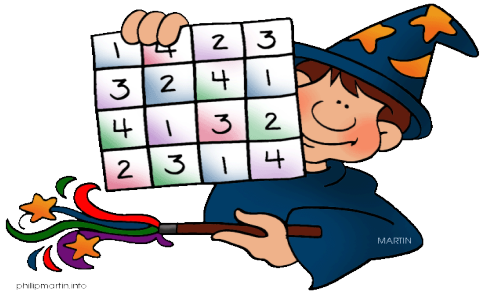
- Children must be able to follow a line of enquiry.
- Children must be able to use conjecture ***(prediction)*** as part of their mathematics.
- Children must be able to generalise about their mathematics ***("I know that if I do this then this will happen so if I do this then this should happen")***.
- Children must be able to justify and prove using mathematical language.

Problem Solving

- Children must be able to apply their mathematical skills.
- Children must be able to solve routine and non-routine mathematical problems.
- Children need to become increasingly sophisticated in terms of formal methods used to solve problems.
- Children need to be able to break a complex problem down into a series of smaller steps so it can be solved.

NUMBER

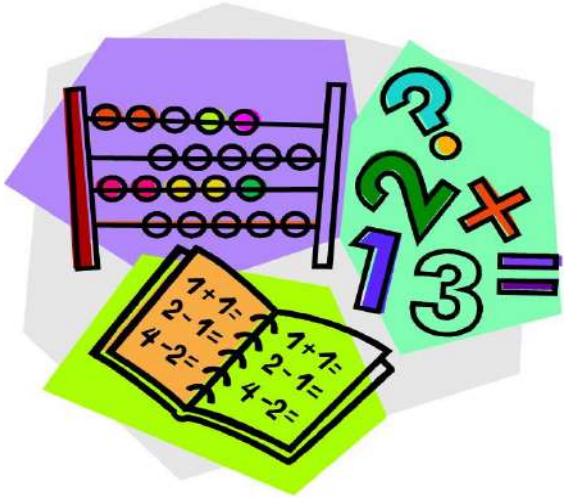
- Count to and across 100 from zero or any given number.
- Count read and write numbers to 100.
- Count in multiples of 2, 5,and 10.
- Say a number 1 more or 1 less than a given number.
- Write the numbers 1-20 in words.
- Be able to show their calculations on a blank number line.



FRACTIONS

- Be able to recognise, find and name half as part of a shape or quantity.
- Recognise, find and name one quarter as a part of a shape or quantity.

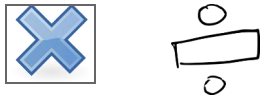
Year 1



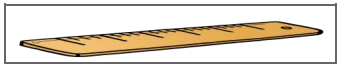
ADDITION AND SUBTRACTION

- To be able to use the notation of +, - and = in a number sentence.
- Add and subtract 1-digit or 2-digit numbers to 20.
- Solve missing number problems 7 = __ - 9.

MULTIPLY AND DIVIDE

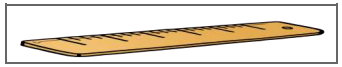


- To be able to divide into groups using objects.
- To be able to multiply using objects.
- To show there working in pictures.



MEASURES

- Compare describe and solve problems with; ***length and height*** (bigger/smaller, longer/shorter, double/half), ***mass/weight*** (heavier/lighter, heavier than/lighter than), ***capacity/volume*** (full/empty, more left/less left, half empty, half full, quarter), ***time*** (quicker, slower, earlier, later)
- Measure and begin to record; lengths and heights, mass/weight, capacity/volume, time (hours/minutes/seconds)
- Recognise and know the value of different coins and notes.
- Sequence events using language (first, later, before, after, today, tomorrow, morning, afternoon, evening)



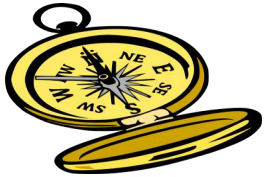
MEASURES

- Recognise and use the language relating to days, months and years.
- Tell the time to the hour and half past the hour and be able to draw hands on a clock face to show this.

Year 1

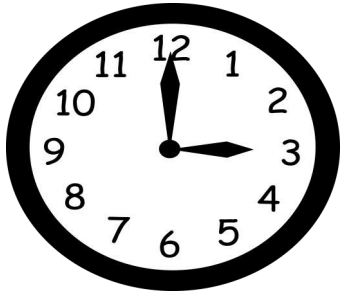
SHAPE

- Recognise and name common 2-d shapes.
- Recognise and name common 3-d shapes.



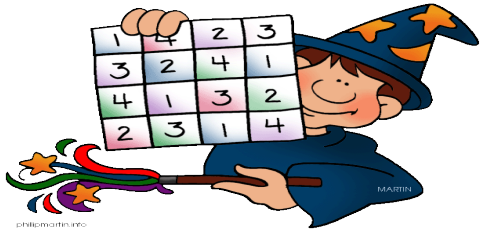
POSISTION AND DIRECTION

- Describe position, direction and movement.
- Know left and right.
- Be able to use compass point North, South, East and West.
- Be able to show a half turn, quarter turn, three quarter turn and a full rotation.



NUMBER

- Count in steps of 2, 3, 5 from zero and in 10's from any number forwards and backwards.
- Recognise the place value of each digit in a 2-digit number (tens and ones)
- Identify, estimate and represent different number on scales and number lines.
- Compare numbers to 100 using <, > and =.
- Read and write numbers to at least 100 in words.
- Use place value and number facts to solve problems.

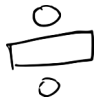


FRACTIONS

- Recognise, find and name fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or a quantity.
- Find simple fractions of an amount 1/2 of 6 = 3.
- Recognise equivalent fractions for 1/2 or 1/4.

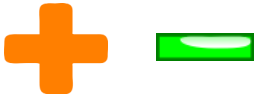
Year 2

MULTIPLY AND DIVIDE



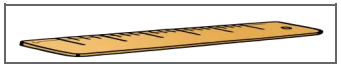
- Be able to multiply and divide mentally for x2, x5 and x10.
- Be able to use a written method to X and ÷ and record their working in a number sentence.
- Know that multiplication can be done in any order but division cannot.
- To be able to use efficient written methods and mental methods to solve problems.

ADDITION AND SUBTRACTION



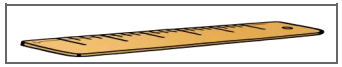
- Solve problems using written methods (number lines).
- Solve problems mentally.
- Know all bonds to 20 for + and –.
- Use mental maths and knowledge of bonds to find pairs that = 100.
- Be able to solve; ***TU +/- U***, ***TU +/- a 10's number***, ***TU +/- TU***, ***U +/- U +/- U***. Using ***written methods*** and ***mental maths***.
- Recognise and use the fact that + is the opposite of - and vice versa.

Year 2



MEASURES

- Be able to measure length/ height in m/cm.
- Be able to weigh mass in kg/g.
- Be able to measure temperature in °c.
- Be able to measure capacity in l/ml.
- Be able to use and read rulers, scales, thermometers, and measuring vessels.
- Compare and order lengths, mass and volume using <,> and =.
- Recognise and use £ and p.
- Combine £ and p to make a given amount.
- Know different ways to combine coins to make a total.
- Be able to solve problems when adding or subtracting money.

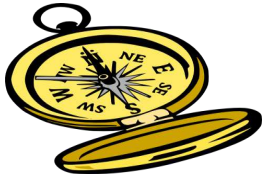


MEASURES

- Be able to work out and give change.
- Compare and sequence time.
- Tell time in five minute intervals and show this by drawing hands on a clock.

SHAPE

- Identify and describe the properties of 2-d shapes.
- Identify and describe the properties of 3-d shapes.
- Identify the faces on a 3-d shape.
- Compare and sort common shapes.



POSISTION AND DIRECTION

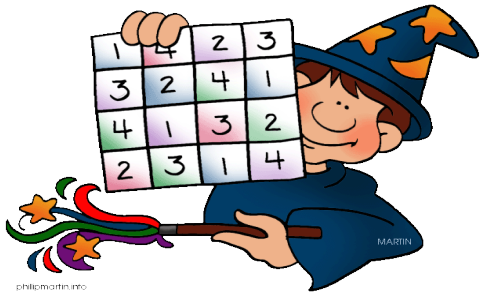
- Order and arrange combinations of mathematical objects in patterns and sequences.
- Use mathematical vocabulary to describe position and movement.
- Be able to rotate through all 4 quarters.

STATISTICS

- Make simple pictograms, tally charts, block charts, and tables.
- Ask and answer questions by sorting into categories and counting.
- Answer questions by interpreting data in categories.

NUMBER

- Count from 0 in multiples of 4, 8, 50 and 100.
- Find 10/100 more or less than a given number.
- Know the place value of each digit in a 3-digit number.
- Compare and order numbers to 1000.
- Use a variety of skills to solve problems/ calculations.
- Read and write numbers up to 1000 in words.
- Solve number problems and practical problems using the above skills.



FRACTIONS

- Be able to count up and down in tenths.
- Recognise that tenths are made by splitting an object or amount into 10 equal parts.
- Recognise, find and write fractions of a shape.
- Recognise, find and write fractions of a number.
- Order and compare fractions and find equal fractions.
- ***Add and subtract fractions with the same denominator***.

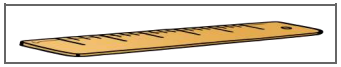
Year 3

MULTIPLY AND DIVIDE

- Be able to multiply and divide using the x3, x4 and x8 tables.
- Be able to solve multiplication and division calculations using tables they know both ***mentally*** and ***in a written form*** - ***including TU by U***.
- Solve missing number calculations.
- Use tables they know to ***scale up or down***.
- Begin to ***use n and m notation to replace numbers*** in a calculation.

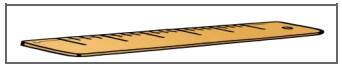
ADDITION AND SUBTRACTION

- ***Mentally*** add and subtract to solve; ***3-digit +/- ones***, ***3-digit +/- tens***, ***3-digit +/- hundreds***.
- Use formal columns to add and subtract numbers with up to 3-digits.
- Be able to use the inverse operation to check an answer.
- Solve problems, ***including missing number problems***, using their skill set. E.g 397 - ___ = 178 or 189 = ___ + 73 or ___ + 476 = 982



MEASURES

- Measure, compare add and subtract lengths in m/ cm/mm.
- Measure, compare add and subtract mass in kg/g
- .Measure, compare add and subtract capacity in l/ ml.
- Measure the perimeter of 2-d shapes.
- Add and subtract money and give change using £ and p in practical contexts.
- Tell and write the time on an analogue clock and on digital12hr, 24hr clocks and use ***Roman numerals*** on an analogue clock.
- Be able to use the vocabulary o'clock, am/pm, midday, noon, midnight to compare time.



MEASURES

- Know the amount of seconds in a minute.
- Know how many days are in each month, each year and each leap year.
- Be able to calculate the duration of an event in hours, seconds, days, weeks etc.

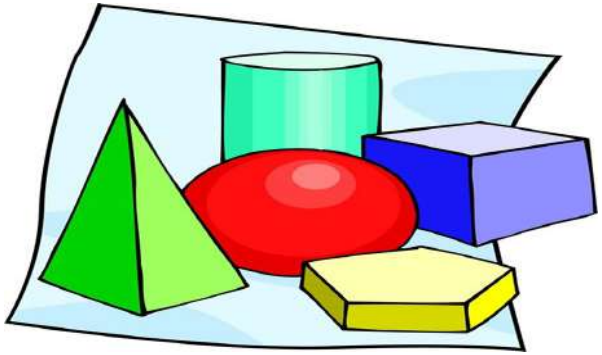
Year 3

SHAPE

- Draw 2-d shapes accurately.
- Make models of 3-d shapes.
- Recognise angles as a property of a shape.
- Recognise horizontal and vertical lines.
- Identify right angles. And use them to make half and three-quarter turns.

SHAPE

- Know what a parallel line is.
- Identify 2 perpendicular lines.



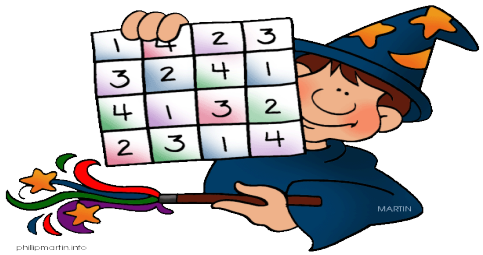
STATISTICS

- Interpret data from bar charts, pictograms and tables.
- construct data into bar charts, pictograms and tables.
- Solve problems based upon bar charts, pictograms or tables - ***How many more?, How many fewer?***.

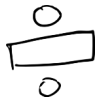
Year 4

NUMBER

- Count in multiples of 6, 7, 9, 25 and 1000.
- Find 1000 more or less than a given number.
- Count backwards through 0 into negative numbers.
- Recognise the place value of each digit in a 4-digit number.
- Order and compare numbers beyond 1000.
- Round any number to the nearest 10,100 or 1000.
- Solve number problems with increasingly large numbers.
- ***Be able to read Roman Numerals to 100***.



MULTIPLY AND DIVIDE



- ***Recall multiply and division facts up to 12 x 12***.
- Recognise and use ***factor pairs***.
- Multiply and divide 2 and 3-digit numbers by a unit using a formal written method.
- Be able to scale up or down using tables.
- Be able to use n and m notation efficiently.
- Be able to recognise and use the link between a small table and a large one - ***600 ÷ 3 = 200 can be derived from 6 ÷ 3 = 2***.

FRACTIONS AND DECIMALS

- Recognise and show 'families' of equivalent fractions.
- Count up or down in hundredths and know that a hundredth is made by dividing something by 100.
- Add and subtract fractions with the same denominator.
- Compare decimals with up to 2 places.
- ***Know the decimal equivalent of any tenth or hundredth***.

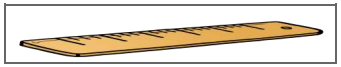
ADDITION AND SUBTRACTION

- Use formal columns to add and subtract numbers with up to 4 digits.
- Estimate answers before completing a calculation.
- Check answers using the inverse operation.
- ***To solve problems deciding which maths they need to use and why***.

FRACTIONS AND DECIMALS

- ***Know the decimal equivalents of 1/2, 1/4 and 3/4***.
- Be able to divide a 1 or 2-digit number by 10 or 100.
- Round a one place decimal to the nearest whole number.
- Use decimals for money.

Year 4



MEASURES

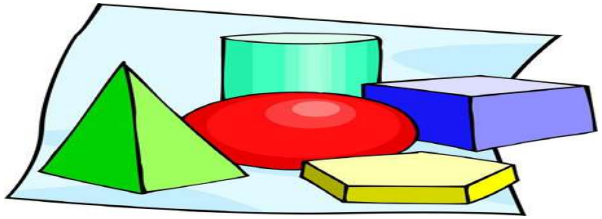
- Convert between different units of measure - ***a minute into an hour, kilograms into grams and vice versa***.
- Measure and calculate the perimeter of regular shapes.
- ***Find the area*** of rectilinear shapes ***by counting squares***.
- Estimate, compare and calculate with different measures including money.
- Read, write and ***convert time*** between the three clock types - analogue, 12hr and 24hr.
- Solve problems that involve converting hours to minutes, minutes to seconds, years to months and months to days.

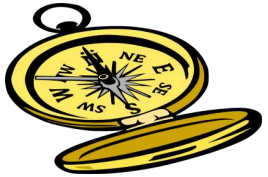
SHAPE

- Compare and classify shapes based on their properties and sizes.
- ***Identify acute and obtuse*** angles and order angles up to 180° by size.
- Identify lines of symmetry in 2-d shapes.

SHAPE

- Complete a simple mirror image across a given line of symmetry.





POSISTION AND DIRECTION

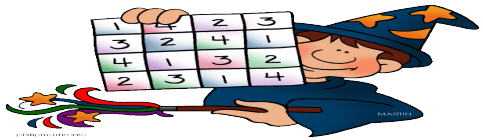
- Be able to ***give co-ordinates*** in the first quadrant.
- Be able to understand how translation moves a shape.
- Be able to say using left/right and up/down how something has been translated.
- Plot points to create a shape.

STATISTICS

- Be able to interpret bar and ***time/line graphs***.
- Be able to ***draw bar and time/line graphs***.
- Solve ***comparison***, ***sum*** and ***difference*** problems using bar charts, pictographs, tables and other charts.

NUMBER

- ***Read, write, compare*** and ***order*** numbers ***to at least 1,000,000***.
- Be able to say the value of each digit to at least 1,000,000.
- Be able to ***count forward or backwards*** in ***steps and powers of 10*** up to 1,000,000.
- Be able to count forwards and backwards with negative numbers.
- Be able to use negative numbers in context (temperature especially).
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10000 or 100000.
- ***Read Roman numerals to 1000***.



MULTIPLY AND DIVIDE

- Be bale to ***find all factor pairs of a number***.
- ***Find common factors of two numbers***.
- Know and use the vocabulary of ***prime number***, ***prime factors*** and ***composite (non-factor) numbers***.
- ***Establish whether a number up to 100 is prime*** and ***recall all prime numbers to 19***.
- Multiply a 4-digit by a one or two digit number using a formal method ***(long multiplication)***.
- Multiply and divide number mentally.
- Divide 4-digit numbers by a unit using a formal method.

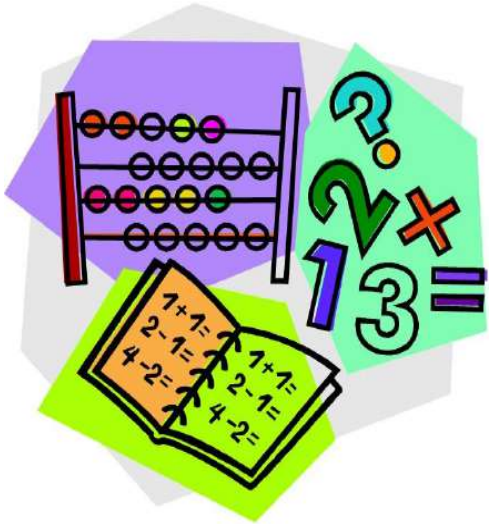
Year 5

MULTIPLY AND DIVIDE

- ***Multiply and divide numbers, including decimals, by 10,100,1000***.
- Recognise and use ***squared numbers*** and ***cubed numbers*** including ***the notation (²) and (³)***.
- Solve problems using knowledge of squares, factors and cubes.
- Understand what the = sign actually means.
- Solve problems that involve simple rates.

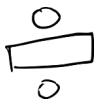
ADDITION AND SUBTRACTION

- Add and subtract whole numbers with more than 4 digits using formal column methods.
- Add and subtract mentally with increasingly large numbers.
- Use rounding to check answers and accuracy.
- Be able to solve multi-step problems saying which maths to use and why.



FRACTIONS AND DECIMALS

- Compare and order fractions whose denominators are multiples (1/3, 1/6, 1/12, 1,21).
- Identify, name and write equivalent fractions of a given fraction.
- ***Recognise mixed and irregular fractions***.
- ***Convert between mixed and irregular fractions and vice versa***.
- Add and subtract fractions who share a denominator or have denominators that are multiples.
- ***Multiply proper fractions and mixed numbers with support***.



Year 5

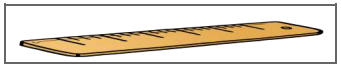
FRACTIONS AND DECIMALS

- Read and write decimal numbers as fractions (0.71 = 71/100).
- Recognise and use thousandths and relate them to the decimal equivalent.
- Round decimals with two places to the nearest whole number and tenth.
- Read write and order numbers with up to 3 decimal places.
- Solve problems using numbers with up to 3 decimal places.

FRACTIONS AND DECIMALS

- ***Recognise the % symbol and understand that percent means parts of 100***.
- ***Write percentages as a fraction with 100 as the denominator***.
- ***Write percentages as a decimal (0.01 = 1% up to 1.00 = 100%)***
- ***Solve problems using % or decimal equivalents for 1/2, 1/4, 1/5, 2/5, 4/5***.
- ***Solve problems that use %, decimal equivalents of any tenth of 1/25***.

Year 5



MEASURES

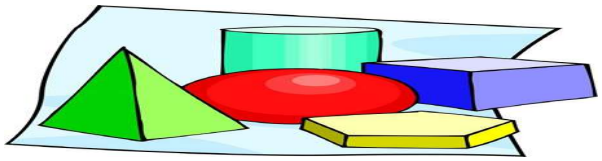
- Be able to convert between different units of metric measure (km>m, cm>m, l>ml, kg>g) and vice versa.
- Understand and use the approximate equivalences between metric and common imperial units (inches, pounds and pints).
- Measure and calculate the perimeter of shapes in m and cm.
- ***Calculate and compare the area of shapes*** in cm^2 and m^2 and estimate the area of irregular shapes.
- Estimate volume in cm^3 of cuboids (cube, cuboid)
- Estimate capacity of a liquid holder.
- Solve problems that involve converting measures of/units of time.
- Use all four operations to solve problems involving measure including decimal notation when required.

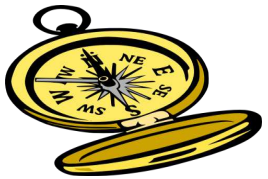
SHAPE

- Identify 3-d shapes from their 2-d representations (nets).
- Know angles are measured in degrees.
- Estimate and compare acute, obtuse and reflex angles.
- Draw a requested angle and measure them in degrees (º).
- Identify angles around a circle (365º)

SHAPE

- Identify angles on a straight line (180º).
- Find missing angles using mathematical rules.
- ***Distinguish between regular and irregular polygons***.





POSISTION AND DIRECTION

- Identify, describe or show the position of a shape after reflection or translation.
- Be able to explain how a shape has been reflected or translated using mathematical vocabulary.

STATISTICS

- Solve comparison, sum or difference problems using information presented in a line graph.
- Complete, read or interpret information from tables including timetables (trains, buses planes, TV guides etc..)

NUMBER

- Read, write and compare numbers up to 10, 000, 000.
- Know the place value of each digit in any number up to 10, 000, 000.
- Round any whole number to the required degree of accuracy.
- Use negative numbers in context.
- Calculate intervals (gaps) across zero.

MULTIPLY AND DIVIDE

- Use the formal method of long multiplication to solve 4-digit (including those with decimal places) x 2-digit calculations.
- Divide number up to 4-digits by a 2-digit number using the formal method of ***long division***.
- ***Be able to show a remainder as fraction (without using a calculator!)***.
- Be able to round a remainder as required by a question.
- Be able to routinely use multiplication or division as part of mental calculations.

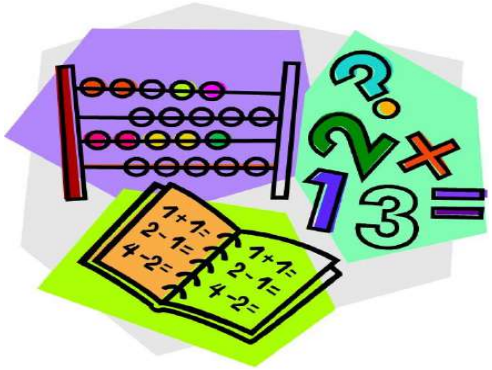
Year 6

MULTIPLY AND DIVIDE

- ***Be able to use their knowledge of the order of operations to solve complex problems (BODMAS)***.
- Solve any problem involving addition, subtraction or multiplication.
- Use estimation to check answers or determine accuracy.
- ***Be able to understand the role of brackets eg. 2+ (1x3) = 5 can change to (2+1) x 3 = 9 by changing the location of the bracket***.

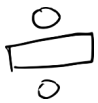
ADDITION AND SUBTRACTION

- Be able to routinely use addition and subtraction as part of mental calculations.
- ***Be able to use their knowledge of the order of operations to solve complex problems (BODMAS)***.
- Solve any problem involving addition, subtraction or multiplication.
- Use estimation to check answers or determine accuracy.



FRACTIONS AND DECIMALS

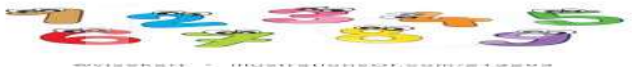
- Use common factors to simplify fractions.
- Use common multiples to show fractions as having the same denominator.
- Compare and order fractions.
- Add and subtract fractions with different denominators by finding a common denominator.
- Add and subtract fractions and mixed numbers by finding a common denominator.
- ***Multiply simple pairs of fractions***.
- ***Reduce an answer to it smallest form (fraction)***.



Year 6

FRACTIONS AND DECIMALS

- ***Associate a fraction with division and calculate a decimal equivalent for a simple fraction (3/8 = 0.375)***.
- Know the place value of each digit in a number with up to 3 decimal places.
- Be able to multiply or divide by 10, 100 or 1000 using number up to 3 decimal places.
- Multiply 1-digit numbers with up to 3 decimal places by a whole number.



FRACTIONS AND DECIMALS

- Use written division methods and then be able to ***use knowledge of fractions to convert a remainder to a number with up to 2 decimal places***.
- Solve problems that need answers to be rounded to a specific degree of accuracy (2 significant figures etc.)
- Recall and use equivalences between simple fractions in different contexts.

RATIO AND PROPORTION

- Solve problems involving the relative sizes of two quantities.
- Solve missing number problems where multiplication and division facts are needed.
- Solve problems where the % of a quantity is needed (15% of 360).
- Use percentages to compare.
- Solve problems that involve scaling shapes up or down.
- Solve problems that involve unequal sharing using knowledge of multiplication and fractions.
- Be able to create pie charts by working out the % of 360º as an angle.

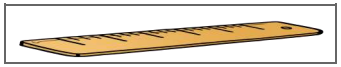



Year 6

Algebra

- Be able to use simple formulae.
- Generate and describe linear number sequences ***(the pattern increases or decreases by the same amount each time eg the x2 table could be shown as n+2)***.
- Express missing number problems algebraically ***(32 + __ = 56 could be shown as 32 + n = 56)***.
- Find pairs of numbers that satisfy a problem with two unknowns ***(a+b = 34 could be 16 + 18 = 34 or 20 + 14 = 34 etc..)***.
- Enumerate possibilities of combinations of two variables.

Year 6



MEASURES

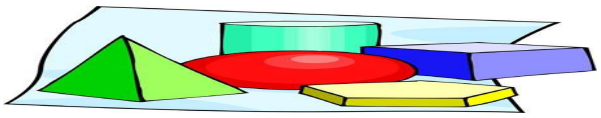
- Solve problems that involve the conversion of measure with up to 3 decimal places.
- Use, read , write and convert between standard measures with up to 3 decimal places.
- Convert between miles and kilometres.
- Recognise that shapes with the same area can have different perimeters and vice versa.
- Recognise when it is possible to use formulae for the area and volume of shapes.
- ***Calculate the area of parallelograms and triangles***.
- Calculate, estimate and compare the volume of cubes and cuboids using standard metric units (cm^3 and m^3) and extend to other standard units (mm^3 and km^3).

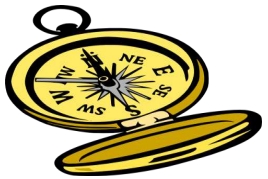
SHAPE

- Draw 2-d shapes using given dimensions and angles.
- Recognise, describe and build 3 -d shapes. (nets)
- Compare and classify geometric shapes.
- ***Find any unknown angle in a triangle, quadrilateral or regular polygon***.

SHAPE

- Illustrate and name parts of circles; ***radius, circumference, diameter***.
- Know that diameter is twice the radius.
- Recognise angles around a point and identify missing angles.





POSISTION AND DIRECTION

- Describe position on a full (4 quadrant) co-ordinates grid.
- Draw and translate simple shapes on a co-ordinate plane.
- Reflect simple shapes across the axes.

STATISTICS

- ***Interpret and construct pie charts***.
- Interpret and construct line graphs.
- Use pie charts and line graphs to solve problems.
- ***Calculate and interpret the MEAN of a set of data as the average***.