

Maths strategies for parents



Wednesday 24th January 2018

Jan 19-16:59

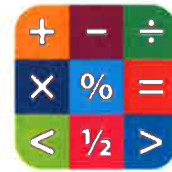


Aims of this meeting:

- To show you a range of strategies to solving 4 operations, fractions and problem solving.
- To give you the opportunity to practise these strategies.
- To develop your confidence in helping your child/children at home.
- To have your questions and queries answered.

Jan 19-17:00

We will look through a range of strategies for the 4 operations, fractions and problem solving.

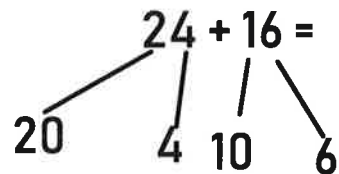


At times, throughout the meeting, teachers from a certain year group will come in to explain in more detail the strategies they use.

Jan 19-17:03

Addition

Partitioning



$$20 + 10 = 30$$

$$4 + 6 = 10$$

$$30 + 10 = 40$$

Children are encouraged to partition numbers into tens and ones. They add the tens first, then the ones.

Jan 19-17:05

Once children have secured this method they will move on to the column method.



First - this will be taught with no carrying.

e.g. $23 + 6$

$$\begin{array}{r} 23 \\ +6 \\ \hline 29 \end{array}$$

Children add from the ones column first.

Jan 19-17:06

Once children have mastered this method, they will then practise adding where they need to carry.



$$123 + 189 =$$

$$\begin{array}{r} 123 \\ +189 \\ \hline 312 \\ 11 \end{array}$$

Again, children start from the ones column.

$3 + 9 = 12$ so the 2 goes in the ones column and the ten gets carried over to the tens column.

Jan 22-16:33

Here are a couple of examples for you to try.

1. $238 + 623 =$



2. $4189 + 3459 =$

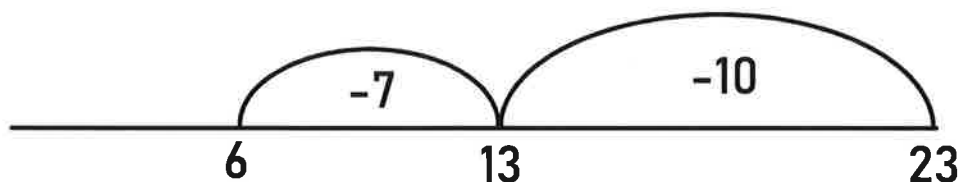
Jan 19-17:10

Subtraction



Children start off in Year 3 using an empty numberline.

e.g. $23 - 17$



Jan 19-17:11

Once children are confident in using a  numberline, they move onto the column method.

Again place value is absolutely imperative.

First, they will do it where there is no borrowing.

$$89 - 46 =$$

$$\begin{array}{r} 89 \\ -46 \\ \hline 43 \end{array}$$

Children start from the ones column.

Jan 19-17:14

Children will then move on to subtracting with borrowing. 

e.g. **76 - 47**

$$\begin{array}{r} \overset{1}{\cancel{7}}6 \\ -47 \\ \hline 29 \end{array}$$

Here, we cannot take away 7 from 6. So we go to the tens column and steal a ten from there and carry it into the ones column.

Therefore it is now 16 - 7 and 60 - 40.

Jan 19-17:16

Children will use the column method in Years 4-6, using numbers appropriate to the year group.

Have a go!

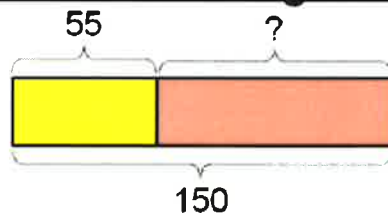


1. $654 - 321 =$

2. $834 - 687 =$

Jan 19-17:17

Bar model for adding and subtracting



Through this bar model, we can see the question mark is $150 - 55$. Therefore the question mark equals 95.

We can also see that:

$$55 + 95 = 150$$

$$95 + 55 = 150$$

$$150 - 95 = 55$$

Jan 19-17:23

Multiplication

In Year 3 children will multiply 2 x 1 digit numbers through a grid method.



e.g. **23 x 5**

x	20	3
5	100	15

$$100 + 15 = 115$$

Here we have partitioned the number and multiplied accordingly.

Jan 19-17:18

Once secure with this method, they are introduced to the column method.



First, they will use the expanded method.

23 x 5

$$\begin{array}{r} 23 \\ \times 5 \\ \hline 15 \quad (3 \times 5) \\ 100 \quad (20 \times 5) \\ \hline 115 \end{array}$$

Jan 19-17:19

The next stage forward is the **short column method**. Children will use this method throughout Years 4-6.



If children are not confident with this process then they can use the **expanded method**.

Clever clouds are encouraged.



Jan 19-17:19

For example:

$$4567 \times 4$$

$$\begin{array}{r} 4567 \\ \times \quad 4 \\ \hline 18268 \\ \hline 222 \end{array}$$

Start from the ones column: $7 \times 4 = 28$. We carry the 20 into the tens column. Then $60 \times 4 = 240$, plus the carried over 20 equals 260 so 6 goes in the tens column. The 200 is carried into the hundreds column etc.

Clever cloud



$$\begin{array}{l} 1 \times 4 = 4 \\ 2 \times 4 = 8 \\ 3 \times 4 = 12 \\ 4 \times 4 = 16 \\ 5 \times 4 = 20 \text{ etc} \end{array}$$

Jan 19-17:21

Now you have a go:



$$342 \times 6$$

Jan 19-17:22

Division

In Years 3 and 4, children divide using times table facts.



For example $4 \times 3 = 12$

Therefore $12 \div 3 = 4$

$$12 \div 4 = 3$$

Children can use objects to help them.

Jan 19-17:22

Once children are confident, they will then move on to using the short division method with no remainders.



e.g.: $64 \div 2$

$$\begin{array}{r} 32 \\ 2 \overline{)64} \end{array}$$

In this case, the children work left to right. Then they divide the first digit (6) by the divisor (2). The answer is 3. The children will be taught this is 30 and the 6 represents 60.

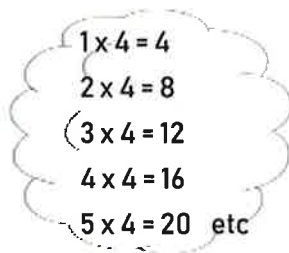
Jan 22-16:16

The short method is used throughout the school to divide. Children unsure of their times table facts will be encouraged to draw a clever cloud.



$1792 \div 4 =$

$$\begin{array}{r} 448 \\ 4 \overline{)1792} \end{array}$$



Children understand their place value and divide each digit accordingly. If the digit does not divide, it is carried over. Any remainders get carried over.

Jan 22-16:16

Try:

$$4695 \div 5$$



Jan 22-16:31

Fractions

Fractions will first be visualised using diagrams.



$$\frac{2}{6}$$



$$\frac{1}{3}$$



$$\frac{2}{6}$$



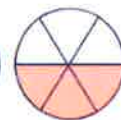
$$\frac{4}{12}$$



$$\frac{1}{2}$$



$$\frac{2}{4}$$



$$\frac{3}{6}$$



$$\frac{4}{8}$$

Jan 22-16:31

Fraction of amounts

28			
7	7	7	7

$\frac{1}{4}$ of 28

Here we use the bar model to visualise to find fractions of amounts. We look at the denominator (4) to understand into how many parts we need to divide the number. Then draw the appropriate amount of boxes underneath. We then decide the number which goes into each box. e.g. $28 \div 4 = 7$

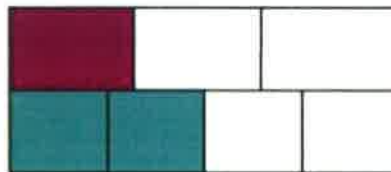
Jan 22-16:31

Ordering fractions

Either through the bar model or by converting the denominators.

Comparing fractions with models.

$$\frac{1}{3} < \frac{2}{4}$$



Jan 22-16:43

Converting fractions

We use this skill for finding equivalents, ordering and adding or subtracting fractions.

$$\frac{5}{8} - \frac{1}{4} =$$

$$\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$$

To convert a fraction, you have to find a common denominator. To make the fraction equivalent, you multiply the numerator and denominator by the same number. In this example, $\frac{1}{4}$ both the numerator and denominator have been multiplied by 2.

Jan 22-16:42

Problem solving

**A bag of 5 lemons costs £1. A bag of 4 oranges costs £1.80.
How much more does one orange cost than one lemon?**

Pupils could represent this problem in the below bar model, simply by asking and answering 'what do we know?'



$$45p - 20p = 25p$$

Jan 21-12:52

Ratio



Tim and Sally share marbles in the ratio of 2:3

If Sally has 36 marbles, how many are there altogether?

Using the bar model, we can see that Tim has 24 marbles and Sally has 36. In total this is 60 marbles.

Jan 24-12:57

Year 3 objectives

As taken from the National Curriculum

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.
- compare and order numbers up to 1000
- add and subtract numbers mentally, including: HTU+U, HTU+T and HTU+H
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- 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
- compare and order unit fractions, and fractions with the same denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]
- 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 £ and 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
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines
- identify whether angles are greater or less than a right angle
- interpret and present data using bar charts, pictograms and tables

Year 4 objectives

As taken from the National Curriculum

- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number
- round any number to the nearest 10, 100 or 1000
- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$
- 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
- Convert between different units of measure; estimate, compare and calculate different measures, including money in pounds and pence
- find the area of rectilinear shapes by counting squares
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days
- compare and classify geometric shapes, including quadrilaterals and triangles, based on properties and sizes
- 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
- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs

Year 5 objectives

As taken from the National Curriculum

- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals
- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number
- 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
- 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
- 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
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- 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), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes
- 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.

•know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles

•draw given angles, and measure them in degrees ($^{\circ}$)

•identify angles at a point and one whole turn (total 360°); at a point on a straight line and $\frac{1}{2}$ a turn (total 180°)

•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

•complete, read and interpret information in tables, including timetables

Year 6 objectives

As taken from the National Curriculum

- use negative numbers in context, and calculate intervals across zero
- divide numbers up to 4 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
- use their knowledge of the order of operations to carry out calculations involving the four operations
- use common factors to simplify fractions
- use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- 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
- divide proper fractions by whole numbers
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction
- multiply one-digit number 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 involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- 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 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.
- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- calculate the area of parallelograms and triangles
- calculate, estimate and compare volume of cubes and cuboids using standard units
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

•find unknown angles in any triangles, quadrilaterals, and regular polygons
•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.
•interpret and construct pie charts and line graphs
•calculate and interpret the mean as an average