Dear Parents/Guardians

The following leaflet has been created to help support your child's progress for Numeracy. Some parents felt that it would be useful to see which methods were used in school as many methods have changed. Included in this leaflet are the main methods that we use as a school for calculating, using all four methods – addition, subtraction, multiplication and division. In addition to this leaflet your child can also work on Mathletics, Moodle and Purplemash for a fun environment to learning Numeracy and complete homework tasks. We have also introduced a new CLIC scheme (Counting, Learn-its, It's Nothing new, Calculations) to help children learn the basics in Maths such as tables and number bonds. The week finishes off with a Big Maths Beat That Challenge, in which each pupil needs to try to beat their own score from the previous week.

Numeracy Co-Ordinator
Mrs J Foley

Addition Methods to use at home

Children are taught to understand addition as combining sets and counting on. Calculations are put into practical contexts so that the child sees the relevance of the method they are learning.

2 + 3 =

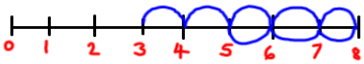
At a party, I eat two cakes and my friend eats three. How many cakes did we eat altogether?

Children could draw a picture to help them work out the answer or use practical equipment to model the problem. They can use dots or tally marks to represent the objects instead.

|| ||| = |||||

5 + 3 =

What is the total of the numbers on these two dice?

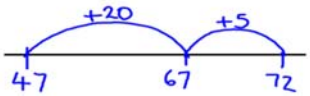


3+5=8 (on the top row of the number line)
OR
5+3=8 (on the bottom row of the number line)

Children can count along a number line, making 'jumps' to reach the answer. They can also see that the addition can be done in any order, developing awareness that it is often more efficient to put the larger number first.
Children can use their hands to calculate. Numbers greater than 10 can be worked out by holding the larger number in their head and counting on, using their fingers.

47 + 25 =

My sunflower is 47cm tall. My friend's is 25cm taller. How tall is my friend's sunflower?



Drawing an empty number line helps children to record the steps they have taken in a calculation. If the pupil starts on 47, add on 20, then add on 5. This is more efficient than counting on in ones.
Empty number lines can be used with numbers of any size.

There 48 boys and 54 girls in a school. How many children are there altogether?

```
  T U
  5 4
+ 4 8
 10 12
```

2685 people visited the museum last year. The number of visitors increased by 1546 this year. How many people visited this year?

```
   2 6 8 5
+  1 7 4 6
   4 14 13 11
```

Children are taught the importance of placing digits in the correct columns (PV- place value). Initially the children are encouraged to place T (tens) and U (units) above the digits to keep the numbers in the correct columns to help with PV.
Children are taught written methods for those calculations they cannot do in their heads. The language used is very important – starting with the units, adding the 4+8 to equal 12, placing the 2 in the units column and the ten next to the tens column below the line. Then add up the tens column.
Once children have established the addition of TU, they can progress onto more difficult numbers, again working across from right to left.

Subtraction Methods to use at home

Children are taught to understand subtraction as taking away (counting back) and finding the difference (counting on/up). Calculations are put into practical contexts to aid the child.

8 – 3 =

We baked eight biscuits. I ate three.

How many were left?

Take away

Lisa has eight felt tip pens and Tim has three. How many more does Lisa have?

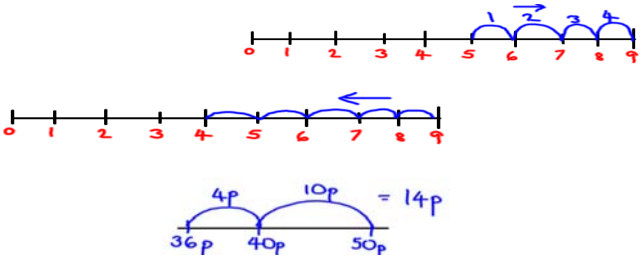
What's the difference between the dots

Drawing a picture helps children to visualise the problem. The use of practical equipment, such as bricks, buttons etc helps to model the problem.

Using dots or tally marks is quicker than using a picture.

9 – 5 =

I had nine pence. I spent five pence. How much did I have left?



The number line is used for counting back, jumping back or even counting on.
Using a number line and the counting on method is particularly helpful when numbers are actually quite close to each other, e.g. 2008-1996, use counting on method. See the example with the number line at the side going from 5 up to the number 9.

For bigger numbers it is easier to count up in multiples of 10 or 100, e.g. 50p-36p = 14p. See the number line on how to use this method.

I had 63 marbles at the start of the day, but lost 26 when at school. How many marbles do I have left?

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{1}3 \\ -\ 2\ 6 \\ \hline 3\ 7 \end{array} \qquad \begin{array}{r} {}^{1}\cancel{2}\,{}^{9}\cancel{0}\,{}^{1}6 \\ -\ \ 9\ 8 \\ \hline 1\ 0\ 8 \end{array}$$

This demonstrates the decomposition method. When the value of the units digit on the bottom line is bigger than the top line, then the 60 value is 'exchanged' to 50 and 10 (as seen in the example), thus making the units column on the top line have a new value of 13 in order to subtract 6 from it.

For 206-98, you cannot 'exchange' from the 0 in the tens column, so you need to go across to the hundreds column and 'exchange' from there. The word 'borrow' is not used for subtraction anymore.

6463 – 2686 =

There were 6463 fans at a football stadium. Before the game finished 2686 fans went home as their team was losing. How many fans were left?

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{13}\cancel{4}\,{}^{15}\cancel{6}\,{}^{13} \\ -\ 2\ 6\ 8\ 6 \\ \hline 3\ 7\ 7\ 7 \end{array}$$

Children progress onto more difficult subtraction using the decomposition method. This method can be used with any numbers, but children should first check the closeness of numbers, as it may be more efficient to complete the calculation on a number line (using the counting on method e.g. 4832-4824=8).
The decomposition occurs for each of the digits on the top line as the values on the bottom line are of a higher value.

Multiplication Methods to use at home

Children are taught to understand multiplication as repeated addition. Calculations are put into practical contexts so that the child can visualise what they are learning.

Times tables

A good knowledge and quick recall of times tables is essential to children's mathematical progress. The target is for **all children** to know their multiplication facts up to 10x10 **by the end of Yr 4**. These can be extended up to 12 x 12 for Yrs 5 & 6.

Children are also taught the reversible effect of multiplication, so for each known times table fact, e.g. 6 x 7 = 42, they also need to know that 7 x 6 = 42, 42 ÷ 7 = 6 and 42 ÷ 6 = 7. There is a times-tables scheme in school called the 11-99 Club for Years 3-6 and for Year 2 in the Summer term. Children take part in this activity on a weekly basis and receive a certificate for each stage that is achieved and then progress onto the next level.

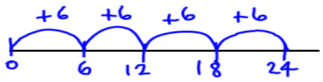
5 x 3 =

There are five cakes in a pack. How many cakes are in three packs?

Drawing a picture is a helpful way to visualise a problem.
Dots or tally marks are often drawn in groups.
The tally shows 5 lots of 3.
The circle shows three lots of five. The children can clearly see the repeated addition.

6 x 4 =

There are four cats. Each cat has six kittens. How many kittens are there altogether?



Children can count on in equal steps recording each jump on an empty number line.
This number line shows four jumps of six.

6 x 124 =

124 books were sold. Each book cost six pounds. How much money was taken?

x	100	20	4
6	600	120	24

600
120
+ 24
844

x	70	2
30	2100	60
4	280	8

2100
280
60
+ 8
2148

There is a main method of multiplication that we currently use in school called the 'grid' method of multiplication.
124 is partitioned (split) into hundreds, tens and units. Each part is then multiplied by six. The answers are then added together vertically.

This also works for 'long' multiplication e.g. 72x34. All off the numbers are partitioned (split up), each part is multiplied separately and then the numbers on the inside of the grid are added together. It can also be used for numbers such as 126x63, by placing in another section of a grid.

28 x 7 =

In a school there were seven classes each with 28 children. How many children were in the school?

T U
2 8
x 7
196

From the grid method, the children begin to use more efficient and standard written methods, working vertically. This is known as the 'short' method of multiplication.
Children are reminded that digits need to be kept in their correct place value. The multiplication starts with the units (U), 8 x 7 = 56. The 6 goes in the units column and the 5 tens are carried into the tens column.
Then 2 tens x 7 = 140, add 5 more tens equals 190.

36 x 24=

There are 24 packets of exercise books. In each packet there are 36 books. How many books altogether?

36
x24
144
+720
864

All the previous work builds up to using the more compact standard written method for long multiplication.
Children multiply the 36 by 4. Then they place a zero in the units' column as they are now multiplying the 36 by 2**0**.
Finally they add the two sets of answers together.
These methods are also good for the children to use in order to check the grid method of calculation to see if they get the same answer twice.

Division Methods to use at home

Children are taught to understand division as sharing and grouping. They are aware of the relationship between multiplication and division.

6 ÷ 2 =

Six sweets are shared between two children. How many sweets does each child get?

sharing between two

There are six sweets. How many children can have two each?

grouping in 2's

Drawing pictures make it easy for the child to visualise the problem and it often makes it easier for them to solve. Practical equipment can also be used to model and solve the problem.

Dots or tally marks can either be shared out one at a time or split up into groups. This then clearly shows how many groups or how many in each group.

Children can use their fingers to count up in multiples to reach an answer or use a number line.

48 ÷ 4 =

There are 48 chairs in the hall and they are put into 4 rows. How many chairs are in each row?

```
 12
4|48
```

There are 56 children playing altogether. They needed to be sorted into 4 equal groups. How many children are in each group?

```
 1 4
4|5 16
```

Short division is using the 'bus stop' method and involves bringing forward remainders when necessary.

How many 4's are in 40 = 10, so the 1 is positioned on the top. As there are no remainders, how many 4's are in 8 = 2. Therefore the answer is 12.

The second example shows where there is a remainder of 10 brought over to make the 6 a 16.

84 ÷ 6 =

Each ladybird has six legs. How many ladybirds are there if there are 84 legs?

```
   14
 6|84
 -60   (10x6)
  24
 -24   (4x6)
  00
```

It would take a long time to jump in sixes up to 84, so children can jump in bigger 'chunks'. This method is known as the 'chunking' division method.

A jump of 10 lots of 6 takes you to 60, so you subtract that from 84 to leave you with 24. Then you need another four lots of six to make 24. Altogether that is 14 sixes.

You can also subtract chunks on the number line until your reach zero. Then you count up how many chunks you have used to reach your answer.

184 ÷ 7 =

184 chairs are needed for a concert. They are arranged in rows of seven. How many rows of chairs are needed?

```
  26 r 2
7| 184
 -140   (20x7)
   44
 -42    (6x7)
   2
```

This question continues the 'chunking' method with bigger numbers. In this example, you are taking away chunks of seven. First, subtract 140 (20 'chunks' of 7) and you are left with 44. Then subtract 42 (6 'chunks' of 7) to leave 2. Altogether there are 26 sevens with a remainder of 2.

You now need to refer back to the question to ensure you give the correct answer. So 26 rows are needed with seven chairs in each and one row of 2 chairs is left over, therefore 27 rows are needed altogether to ensure there are enough chairs.

347 ÷ 24 =

24 apples can fit into a box. How many full boxes will you create with 347 apples?

```
  14 r 11
24| 347
 -240   (10x24)
  107
 -96    (4x24)
   11
```

The 'chunking' method works equally well when dividing by a two digit number. This time you are taking away chunks of 24. First, subtract 240 (10 'chunks' of 24) and you are left with 107. Then subtract 96 (4 'chunks' of 24) and you are left with 11.

Finally refer back to the questions again. The answer is 14 r 11, so that will make 14 full boxes, and there will be 11 apples left over which will not make up a full box.

Counting ideas to use at home

- Practice chanting the numbers in order. Encourage your child to join in with you. When they are confident, try starting from different numbers – e.g. 4, 5, 6 etc. You can also try counting backwards.

- Sing number rhymes together.

- Give your child the opportunity to count objects (coins, pasta, shapes, buttons, setting the table for enough people etc.) Encourage them to move each object as they count them.

- Count things you cannot touch – window panes, jumps, claps, oranges in a bag.

- Play games that involve counting – e.g. snakes and ladders, dice games, connect four, cards, number bingo, ludo.

- Look for numerals in the environment – e.g. car number plates, numbers on doors, clocks, numbers on the TV remote, prices when shopping.

- Make mistakes when chanting, counting or ordering numbers. Can your child spot what you have done wrong?

- Chose a number of the week e.g. 5. Practice counting in 5's, up to 5, on from 5, collect groups of 5 items. Change the number the following week.

- Recall number bonds to 10 and 20, e.g. 7+3, 5+5, 12+8, 16+4 etc, extending onto number bonds to 50 and 100, 25+26, 10+40 and 25+75, 80+20, 17+83 etc.

- Ask what is one more or one less than a given number, extending onto what is 10 more or 10 less.

Practicing Number Facts at home

- Practice number bonds and multiplication facts for a few minutes each day if possible.

- Play 'ping pong' to practice components with your child. You say a number and they reply with how much more is needed to make 10, 20, 100 or 1000. Encourage your child to answer quickly without counting or using fingers.

- Throw two dice. Ask your child to find the total of the numbers (+), the difference between them (-), the product of the numbers (x) or even try to divide the numbers (÷).

- Use a set of playing cards (without the picture cards). Turn over two cards and ask your child to add or multiply the numbers. If they answer correctly, they keep the cards. How many cards can they collect in two minutes?

- Play Bingo. Each player chooses five answers (e.g. numbers to 10 to practice simple addition, multiples of 5 to practice the five times table etc). Ask a question and if a player has the answer, they can cross it off. The winner is the first player to cross off all their answers. You can use dice or playing cards to generate numbers e.g. roll a 5 and 3, you could cross of 8 or 15 or 2.

- Give your child an answer - 16. Ask them to write as many number sentences as they can with this answer e.g. 10+6=16 or 18-2=16 or 4x4=16. You could even extend this to see if they could write a word problem to go with their number sentence.

- Give your child a number fact e.g. 5 + 8 = 13. Ask them what else they can find out from this fact e.g. 50 + 80 = 130, 8 + 5 = 13, 13 – 8 = 5, 130 – 50 = 80 etc

- Look out for car number plates. What is the number on the plate? What is this to the nearest 10 or 100 or 1000? How many more would you need to reach the next multiple of 10, 100 or 1000? What do the total of the digits add up to? Subtract the smallest from the biggest number.

- Make up rhymes together to help your child remember tricky times tables.

Shape and Measure ideas to use at home

- Choose a shape of the week. Look for this shape in the environment. Ask your child to describe the properties of the shape to you – sides, corners, curved faces etc.

- Play 'guess my shape'. You think of shape. Your child asks questions to try to identify it but you can only answer 'yes' or 'no'.

- Hunt for right angles around your home. Can your child spot angles that are bigger or smaller than a right angle?

- Look for symmetrical objects. Help your child to paint or draw symmetrical pictures/patterns.

- Make a model using different boxes/containers of different sizes. Ask your child to describe their model to you. What 3D shapes have been created?

- Practise measuring the lengths and heights of objects in metric measurements (mm, cm or m). Help your child use different rulers or tape measures correctly. Encourage them to estimate before measuring. How tall is your child? Compare measurements in metric (m or cm) and imperial (inches). Revisit in a few months to see how much they have grown.

- Let your child help with the cooking. Help them to measure ingredients accurately. Talk about what each division on the scale represents.

- Choose some food items out of the cupboard. Try to put the objects in order of weight by feel alone. Then check by looking at the weights on the back of the packets. This can be carried out with liquids, measuring the capacity of something – how many litres? How many milliliters?

- Practise telling the time with your child. Use both digital and analogue clocks. Ask your child to be a 'timekeeper' – e.g. tell me when it is half past four because we are going swimming.

- Use a stop watch to time how long it takes to do everyday tasks –e.g. how long does it take to get dressed. Encourage your child to estimate first.

- Use a TV guide. Ask your child to work out the length of their favourite tv programmes. Can they calculate how long they spend watching TV each day/week? How many more days is it going to be until the holidays?

- Recite the months of the year in order and discuss the changes in the seasons. What season are we in? Can we collect leaves in the autumn and work out the area of the leaf?

Real Life Problems

Getting children involved in real life situations where they are using mathematical skills is motivating and stimulating.

- Go shopping with your child to buy two or three items. Ask them to work out the total amount spent and how much change you will get.

- Buy items with a percentage extra free. Help your child to calculate how much of the product is free.

- Plan an outing during the holidays. Ask your child to think about what time you will need to set off and how much money you will need to take.

- Use a bus or train timetable. Ask your child to work out how long a journey between two places should take. Go on the journey. Do you arrive earlier/later than expected? By how much?

- Work out the cost of the tickets for the journey, how much change will you get from £20?

- Help your child to scale a recipe up or down to feed the right amount of people.

When faced with a calculation problem, encourage your child to ask:

- Can I do this in my head?
- Could I do this in my head using drawings or jottings to help me?
- Do I need to use a written method?
- Should I use a calculator?

Also help your child to estimate and then check the answer. Encourage them to ask:

Is the answer sensible?

Use the **RUCSAC** rule – **r**ead, **u**nderstand, **c**alculate, **s**olve, **a**nswer, **c**heck.