HELPING YOUR CHILD WITH MATHS

A booklet for parents and carers

Calculation...

The maths work your child is doing at school may look very different to the kind of 'sums' you remember. This is because children are encouraged to work mentally, where possible, using personal jottings to help support their thinking. Even when children are taught more formal written methods (from late year 2 onwards), they are encouraged to use these methods for calculations alongside the skills they have built up by doing them in their heads.

Discussing the efficiency and suitability of different strategies is an important part of maths lessons.

Talk to your child about how you work things out.

Ask your child to explain their thinking.

Shapes and Measures...

-Choose a shape of the week e.g. cylinder. Look for this shape in the environment (tins, candles etc) Ask your child to describe the shape to you (2 circular faces, 2 curved edges etc)

-Play 'Guess My Shape'. You think of a shape. Your child thinks of questions to try and identify it but you can only answer 'yes' or 'no'. (e.g. Does it have more than 4 corners? Does it have any curved sides?)

-Hunt for right angles around your home. Can you find angles bigger or smaller than a right angle?

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

-Make a model using boxes/containers of different sizes. Ask your child to describe their model.

-Practise measuring lengths or heights of objects (in centimetres or metres). Help your child to use different rulers and tape measures accurately. Encourage them to estimate before measuring.

-Let your child help with cooking. Help them to measure ingredients accurately using weighing scales or measuring jugs. Talk about what each division on the scales stands for.

-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 then we are going swimming)

-Use a stopwatch to time how long it takes to do everyday tasks (e.g. how long does it take to get dresses?) Encourage your child to estimate first.

Make maths fun!

FOR MORE INFORMATION SEE THE SCHOOL WEBSITE

Practising Number Facts…

-Find our which number facts your child is learning at school (addition facts to 10, times tables, doubles etc) Try to practise for a few minutes each day using a range of vocabulary.

-Have a 'fact of the day'. Pin this up around the house. Practise reading it in a quiet, loud, squeaky voice. Ask your child over the day if they can recall the fact.

-Play 'ping pong' to practise compliments with your child. You say a number, they reply with how many more is needed to make 10. Play with numbers totalling 20, 100, 1000. Encourage quick answers!

-Throw 2 dice. Ask your child to find the total of the two numbers (+), the difference between them (-) or the product (x). Can they do this without counting?

-Play bingo. Each person chooses 5 answers (e.g. numbers to 10 to practise simple addition, multiples of 5 to practise the 5 times tables) Ask a question and if the player has the answer, they cross it off. The winner is the first to cross off all of their answers.

-Give your child an answer. Ask them to write as many addition sentences as they can with this answer (e.g 10 = ? + ?) Try with multiplication or subtraction.

-Give your child a number fact (e.g. 5+3=8). Ask them what else they can find out from this fact. (e.g. 3+5=8, 8-5=3, 8-3=5, 50+30=80, 500+300=800, 5+4=9, 15+3=18) Add to the list over the next few days. Try starting with a x fact as well.

MULTIPLICATION

Stage 4 – multiply 2 and 3-digits by a single digit (using multiplication facts up to 12 x 12)

Developing the grid method…

Eg. 136 x 5 = 680

X	100	30	6
5	500	150	30

Move onto **short multiplication** if and when children are confident and accurate multiplying 2 and 3-digit numbers by a single digit this way, **and** are already confident in "carrying" for written addition.

```
  500
  150
+  30
```

Column addition is encouraged to add accurately.

Stage 5 – multiply up to 4-digits by 1 or 2 digits

Introduce the column

Compare a grid method calculation to a short multiplication method. See how the steps are related, but notice how there are less steps involved in the column method.

x	300	20	7
4	1200	80	28

Short multiplication by multiplying by a single digit

```
  3 2 7
×     4
  1 3 0 8
    1  2
```

Introduce long multiplication for multiplying by 2-digits

18 x 3 on the 1st row (8 x 3 = 24, carrying the 2 for twenty, then „1" x 3). 18 x 10 on the 2nd row. Put a zero in ones first, then say 8 x 1, and 1 x 1.

THEN MORE COMPLEX…

```
  1 2 3 4
×     1 6
  7 4 0 4
1 2 3 4 0
1 9,7 4 4
```

Stage 6 - Short and long multiplication as in Stage 5, and multiply decimals with up to 2d.p by a single digit.

```
  3 · 1 9
×     8
2 5 · 5 2
  1     7
```

- Line up the decimal points in the question and the answer.
- Remind children that the single digit belongs in the units column.
- This works well for multiplying money (£.p) and other measures.

MULTIPLICATION

Children are taught to understand multiplication as repeated addition and scaling. Language also includes 'lots of' and 'array'.
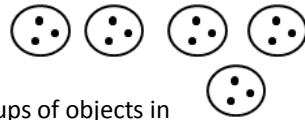

Stage 1 – multiply with concrete objects, arrays and pictorial representations

How many legs will 3 teddies have?

There are 3 sweets in one bag. How many sweets are there in 5 bags altogether?

2 + 2 + 2 = 6

Give children experience of counting equal groups of objects in 2s, 5s and 10s.

Stage 2 – multiply using arrays and repeated addition (using at least 2s, 5s and 10s)

Use repeated addition on a number line – start from 0. Make equal jumps up a number line to work out multiplication facts. Use x and =.

4 X 5 =...   4 lots of 5

+5 +5 +5 +5
0   5   10 15 20

4 X 5 = 20
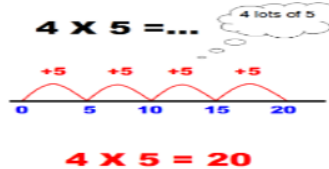
Use arrays – help teach children to understand the cumulative law of Multiplication and give an example. E.g. 3 x __ = 6

5 x 3 = 15
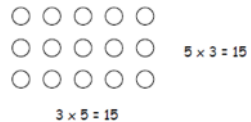
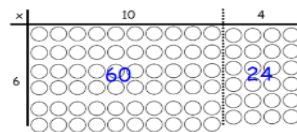Use practical apparatus.

5 x 3 = 5 - 5 - 5

3 x 5 = 15

Stage 3 – multiply 2-digit by a single digit number

Introduce the grid method for multiplying 2-digit by single digit…

Eg.   23 × 8 = 184

X	20	3
8	160	24

Link the layout of the grid to an array initially.

|	10	4
6	60	24

Introduce the grid method with children physically making an array to represent the calculation (e.g. make 8 lots of 23 with 10s and 1s place value counters), then translate this to grid method format.

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?

4 x 5 =   2 x 3 =
9 x 15 =   12 ÷ 2 =
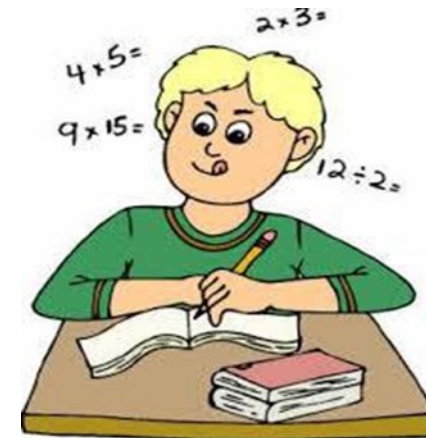
Also, help your child to estimate and then check the answer. Encourage them to ask…

IS THE ANSWER SENSIBLE?

ADDITION

Children are taught to understand addition as combining two sets and counting on .

Stage 1 – Add with numbers up to 20
Use numbered number lines to add by counting on in ones. Encourage children to start with the larger number.
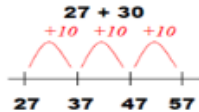
$6+3=9$

0 1 2 3 4 5 6 7 8 9 10
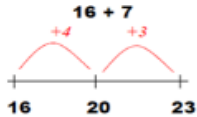
Children could draw a picture or number line to help them work out the answer.

'At a party, I eat 6 cakes and my friend eats 3. How many cakes did we eat altogether?'

Stage 2 – Add with 2-digit numbers

Add 2-digit numbers and tens

27 + 30
+10 +10 +10
27 37 47 57

Add 2 digit numbers and ones

16 + 7
+4 +3
16 20 23

Drawing an empty number line helps children to record the steps they have taken in a calculation. This is much more efficient than counting on in ones.

Add pairs of 2-digit numbers, moving to partitioned column method when secure adding tens and ones.

```
  20 + 3
+ 30 + 4
  50 + 7
     = 57
```

Examples which do not cross the tens boundary until they are happy with the method.

Move on to number which then cross the tens boundary

These methods take time to practise, patience and lots of praise before they will be confident and consistently successful.

```
  50 + 8
  40 + 3
  90 + 11
     = 101
```

SUBTRACTION

Stage 3 – subtraction with 2 and 3-digit numbers

89 – 35 = 54
80 + 9
- 30 + 5
50 + 4

72 - 47

Step 1 – introduce this method with examples where no exchanging is required.

70 + ¹2
- 40 + 7
20 + 5 = 25

Step 2 – introduce exchanging through practical subtraction.

Before subtracting 7 from the 72 blocks, they will need to exchange a row of 10 for 10 ones.

Stage 4 – subtracting with up to 4-digit numbers

2754 – 1562 = 1192
2000 + 700 + 50 + 4   (600)
- 1000 + 500 + 60 + 2
1000 + 100 + 90 + 2

```
  2 7 5 4
- 1 5 6 2
  1 1 9 2
```

Compact column subtraction. It is vital that a link is made between the place value of each digit and the actual digit. E.g. in 2754 it is not 7 it is 700. This will aid their understanding of each number and what it is worth.

Stage 5 – Subtract with at least 4-digit numbers (including money, measures and decimals)

Compact method with 'exchanging'.

```
  3 1 0 3 6
-   2 1 2 8
  2 8 , 9 2 8
```

Opportunities needed for money and measures.

```
  7 1 6 8 . 0
-   3 7 2 . 5
  6 7 9 6 . 5
```

Stage 6 – subtracting with increasingly large and more complex decimal values

```
  1 5 0 , 6 9 9
-   8 9 , 9 4 9
  6 0 , 7 5 0
```

Subtracting with a range of complex numbers

```
  1 0 5 . 4 1 9 kg
-   3 6 . 0 8   kg
  6 9 . 3 3 9 kg
```

DIVISION

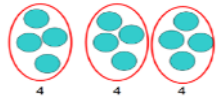Children are taught to understand division as sharing and grouping

Stage 1 – group and share small quantities

This stage uses objects, diagrams and pictorial representations to solve problems involving both grouping and sharing.

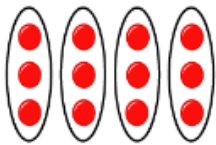Grouping – how many groups of 4 can be made with 12 stars? = 3

Sharing – 12 shared between 3 is 4

Familiar context – there are 3 people on this table and we have 12 pieces of fruit to share. How many will each get?
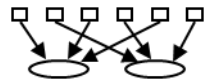
Stage 2 – group **and** share using the ÷ and = signs

Use objects, arrays, diagrams and pictorial representations as well as grouping on a number line.

This represents 12÷3, posed as how many groups of 3 are in 12?

Pupils should also know that the same array can represent 12÷4=3 if grouped horizontally.

6 sweets are shared between 2 people, how many do they get each?

There are 6 sweets, how many people can have 2 sweets each?

Grouping and sharing

Grouping using a number line – group from zero in equal jumps to find out how many __ in __? Can also use practical equipment to assist this stage. This is an important method to develop understanding as groupi

0 1 2 3 4 5 6 7 8 9 10 11 12

12 ÷ 3 = 4
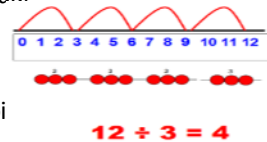
Stage 3 – divide 2-digit numbers by a single digit

Continue to work out unknown facts by grouping or number line from zero. They are also now taught th concept of remainders.

13 ÷ 3 = 4 r 1

+3   +3   +3   +3   r 1

0 1 2 3 4 5 6 7 8 9 10 11 12 13
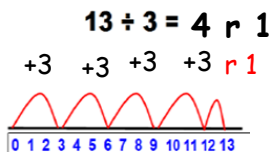
REAL LIFE PROBLEMS

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

-Buy some 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 TV guide. Ask your child to work out the length of their favourite programmes. Can they calculate how long they spend watching TV each day? What about each week?

-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 or later than expected? How much earlier/later?

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

-Work together to plan a party or a meal on a budget.

These are just a few ideas to give you a starting point. Try to involve your child in as many problem solving activities as possible. The more 'real' the problem is, the more motivated they will be when trying

COUNTING IDEAS

-Practise chanting the number names. Encourage your child to join in with you. When they are confident, try starting from different numbers – 4, 5, 6…

-Sing number rhymes together – there are lots of commercial tapes and CDs available.

-Give your child the opportunity to count a range of interesting objects (coins, pasta, shapes, buttons etc). Encourage them to touch and move each object as they count.

-Count things you cannot touch or see (this is more difficult!). Try lights on the ceiling, window panes, jumps, claps or oranges in a bag.

-Play games that involve counting (e.g. snakes and ladders, dice games, games that involve collecting objects).

-Look for numerals in the environment. You can spot numerals in the home, in the street or when out shopping.

-Cut out numbers from newspapers, magazines or birthday cards. Then help your child to put the numbers in order.

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

-Choose a number of the week e.g. 5. Practise counting to 5 and on from 5. Count out groups of 5 objects (5 dolls, 5 bricks, 5 pens). See how many places you can spot the numeral 5.

DIVISION

Stage 4 – divide up to 3-digit numbers by a single digit (without remainders to start with)

Continue to develop short division. Divide a 2-digit number by a single digit with no remainders. They must understand what a remainder is before they can do this as part of this stage.

Move on to division with 3-digits. Real life contexts should be used where possible to give meaning to the maths.

Stage 5 – divide up to 4-digit numbers by a single digit (including remainders)

Pupils are now introduced to division with remainder answers. Division here needs to have a real life context where the child can understand the meaning of the remainder and how to express it (e.g. as a fraction, a decimal or as a rounded number of value depending on the context of the problem)

### Stage 6 – divide at least 4-digits by both single and 2-digit numbers

Short division with a single digit – this is the same as previously however here it is converted into a decimal. Rather than expressing the remainder as an r1, a decimal point is added after the ones as there is still a remainder. The one remainder is then carried onto the zeros following the decimal point (which show there was no value there in the original number). Keep dividing until the question is solved!

Introduce long division by chunking – subtract chunks of 36 until zero is reached. Create a 'WIKA' (What I Know Already) box of useful facts to help the subtraction (e.g 10x36=360 so 20x36=720)

```
        27
36 ) 972
    - 720      20x
      252
    - 252      7x
        0

Answer :   27
```
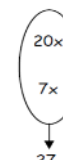
SUBTRACTION

Children are taught to understand subtraction as taking away (counting back) and finding the difference (counting up)

Stage 1 – subtract from numbers up to 20
Following one more and one less than and counting forwards and backwards, children consolidate by subtracting practically using equipment and number lines.

Counting back in ones on a number line to take away.

$7 - 4 = 3$

This can be introduced practically with the language 'difference between and how many more.

7
4

The difference between 7 and 4 is 3.
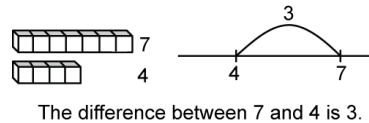
Drawing pictures will help children to visualise the problem.

Stage 2 – subtract with 2-digit numbers on a number line by counting back
$47 - 23 = 24$ partition the second number and subtract in tens and ones as below…   THEN…Move towards more efficient jumps…

-1 -1 -1 - 10 - 10
24 25 26 27 37 47

-3 -20
24 27 47

Teaching children to bridge through ten can help them to become more efficient. For example $42 - 25$

-3 -2 -20
17 20 22 42
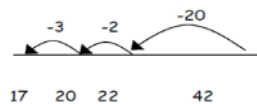
Mental strategy…subtract numbers close together by counting on.
Children are taught to recognise that when the number are close together it is more efficient to count on (find the difference) They need to be clear about the relationship between + and -. (Start low and count on…)
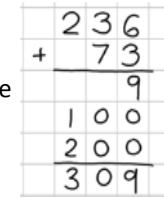
$42 - 38 = 4$

+1 +1 +1 +1
37 38 39 40 41 42
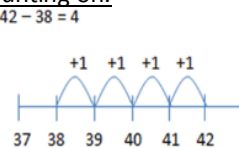
ADDITION

Stage 3 – Add numbers with up to 3 digits
Introduce the expanded column method
Children need to recognise the value of the hundreds, tens and ones without writing the partitioning.

```
  2 3 6
+   7 3
      9
  1 0 0
  2 0 0
  3 0 9
```

Add the ones first in preparation for the compact method. Expanded methods build on mental methods and make the value of digits clear to children. The language used is very important.

Move to the compact method with carrying when confident with the above method

```
  236
+  73
  309
   1
```
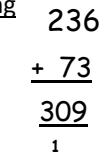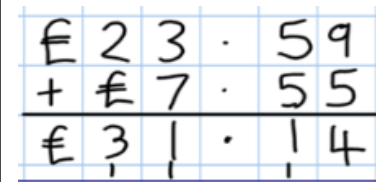
Move on to then adding larger numbers which challenge the children's knowledge of the value of each digit.

```
  3 5 1 7
+   3 9 6
  3 9 1 3
```
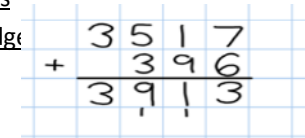
Stage 4 – Add numbers with 4 digits or more which include money, measures and decimals with different numbers of decimal places.

```
  £ 2 3 . 5 9
+ £ 7 . 5 5
  £ 3 1 . 1 4
```

The decimals should always be in line. If there is a decimal in the question, there is one in the answer! Numbers should exceed 4 digits…

```
  2 3 . 4 8 1
+   1 3 6 2
  2 4 8 4 3
```

```
  1 9 . 0 1
  3 . 6 5
+ 0 . 7 0
  2 3 . 3 6
```
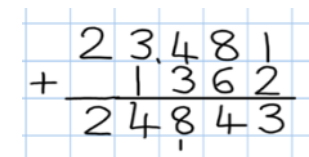
Empty decimal places can be filled with **0** to show the place value in each column.