A Guide to

3 5 10 54 7 26 18

Numeracy at Home

Introduction to Supporting Numeracy at Home

The information here is to help you to help your child with maths. We explain some of the strategies used for mental and written calculations in school. It gives you variety of ways of helping your child at home, including details of a selection of websites which your child may enjoy.

The National Numeracy Strategy provides a clear approach to teaching number. Much time is spent on teaching mental calculation strategies. Up to the age of about 9 (Year 4) informal written recording should take place regularly as it is an important part of learning and understanding. Formal written methods, which you will be more familiar with, should follow only when your child is able to use a wide range of mental calculation strategies.

MENTAL STRATEGIES

The National Numeracy Strategy teaches a range of mental strategies to pupils. At Key Stage 1, children learn their number bonds to 10 and 20, so that they have rapid recall of facts such 7 + 3 making 10 and 17 + 3 making 20.

Strategies for teaching mental addition include:

❖ Putting the largest number first:
   5 + 36 is the same as 36 + 5. Start at 36 and count on in ones.

   30 + 60 is the same as 60 + 30. Start at 60 and count on in tens.

❖ Partitioning:
   14 + 25 =   (10 + 4) + (20 + 5)

   (10 + 20) = 30
   (4 + 5) = 9
   The answer is 39

❖ Compensation:
   17 + 9 = (17 + 10) − 1 = 26
   26 + 11 = (26 + 10) + 1 = 37

❖ Doubles or near doubles:
   8 + 8 = 16
   so   8 + 9 = (8 + 8) + 1 = 17

❖ Bridging through 10, 20 etc
   8 + 7 = (8 + 2) + 5
   10 + 5 = 15
   15 + 9 = (15 + 5) + 4
   20 + 4 = 24

smallest   largest

hundreds   estimate

                                         tens

ones   units

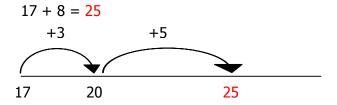position   digits
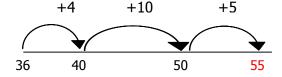
WRITTEN STRATEGIES

Up to Year 3 the emphasis is on children working mentally, with calculations recorded in horizontal number sentences, with some jottings for more challenging numbers.
In Years 3-6 children will be taught more formal written methods of calculation.

PROGRESSION FROM MENTAL TO WRITTEN METHODS – ADDITION

- Mental calculations – the children are encouraged to ask the question 'Can I do this in my head?' If not they are encouraged to do informal jottings. Some of these informal jottings are shown in the following pages.

- Children are encouraged to use a number line for addition, subtraction, multiplication and division. They are used to support mental calculations and do not need to be drawn to scale.

$17 + 8 = 25$

```
        +3              +5
    ⌒            ⌒
   17        20              25
```

$36 + 19 = 55$

```
      +4        +10       +5
   ⌒       ⌒      ⌒
  36      40        50      55
```
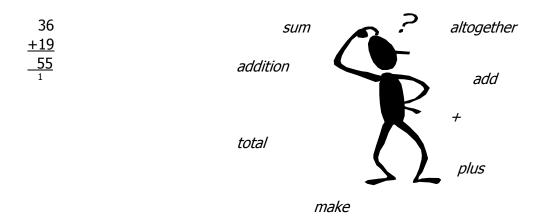
- If your child is asked to add 36 and 19 he or she may choose one of the following methods:

$$36 + 19 = (36 + 20) - 1$$
$$\text{or} = (36 + 10) + 9$$
$$\text{or} = (30 + 10) + (6 + 9)$$

- This will progress to using an expanded form:

  e.g.   36 + 19 is the same as 30 + 6 + 10 + 9.

  Add the units first and then the tens

     6 + 9 = 15   then 30 + 10 = 40 then 40 + 15 = 55

  ```
     36
    +19
     15    (6+9)
     40  (30+10)
     55              Add 40 & 15 together mentally
  ```

- Standard written form

  ```
     36
    +19
     55
      1
  ```

  sum   altogether

  addition

                                         add

                                       +

  total

                                     plus
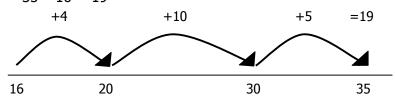
              make

PROGRESSION FROM MENTAL TO WRITTEN METHODS - SUBTRACTION

- Mental calculations – the children are encouraged to ask the question 'Can I do this in my head?' If not, they are encouraged to do informal jottings. For example:

    45 – 37 = 8 is best solved by counting up.
    Start at 37, add 3, add 5 (3 + 5 = 8)

    262 – 95 = 167 could be done by counting back.
    Subtract 100 then add 5 (95 is 5 less than 100)

- Informal jottings to support mental calculation using a number line.
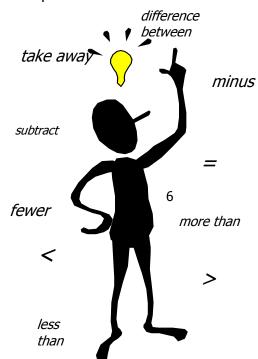   35 – 16 = 19

    +4   +10   +5   =19

    16   20   30   35

- They will progress to using these expanded methods of decomposition:

Example 1: 563 – 241 =

```
 500    60    3
-200    40    1
 300   +20   +2      =322
```
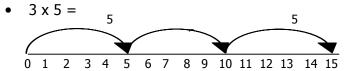
Example 2: 563-278=

```
 500   60     3    cannot do this, so partition 60 into
-200   70     8    50+10. The 10 goes with the 3 to
                   make 13.

 500   50    13    cannot do this, so partition 500 into
-200   70     8    400 + 100. The 100 goes with the 50
              5    to make 150

 400   150   13
-200    70    8
 200   +80   +5                              =285
```

This way of thinking eventually leads to:

```
         4  ¹5
 5  6  3     5  6  ¹3
-2  7  8 =  -2  7  8
             2  8  5
```

take away

difference between

minus

subtract

=

fewer

more than

<

>

less than

PROGRESSION FROM MENTAL TO WRITTEN METHODS METHODS – MULTIPLYING

Children can use a number line for multiplication and division.
- 3 x 5 =

- Multiplication by grid method – based on the ability to partition:

$$29 \times 6 = 174 \qquad 28 \times 34 = 840 + 112 = 952$$

X	20	9	Total
6	120	+54	174

X	20	8	Tot
30	600	240	840
4	80	32	112
			952

This leads to:
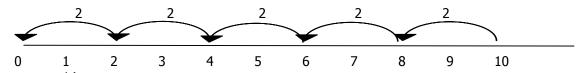
```
      36
  x    8
      48      (6x8)
     240      (30x8)

     288
```
Add 240 & 48 together mentally

And then:

```
      36
    x 8

     288
      4
```
8 x 6 = 48
carry the 40 into the tens column
8 x 30 = 240, plus the 4 tens

PROGRESSION FROM MENTAL TO WRITTEN METHODS METHODS – DIVIDING

- How many 2s are there in 10? $10 \div 2 = 5$

```
      2           2           2           2           2
 ⌒⌒⌒    ⌒⌒⌒    ⌒⌒⌒    ⌒⌒⌒    ⌒⌒⌒
 0   1   2   3   4   5   6   7   8   9   10
```

- "Chunking" or "Repeated Subtraction":

Division by chunking: $327 \div 7$

```
        327
        -70   (7x10)
        257
        -70   (7x10)
        187
        -70   (7x10)
        117
        -70   (7x10)
         47
        -42   (7x6)
          5        46 lots of 7 with 5
                        left over
```

$327 \div 7 = 46$ r 5
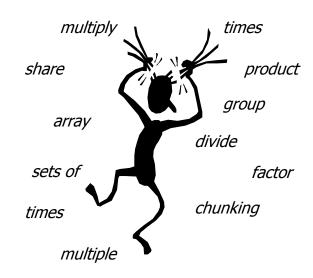
- When pupils are more confident:

$327 \div 7 =$

```
        327
       -280        7x   40   = 280
         47
        -42        7x    6   = 42
          5             46
```

Answer: 46 r5

- This leads to:

$327 \div 7 =$

```
         46  r5     7 into 32 goes 4
      7/327         times
       -28 ↓        The remainder is 4.
         47         Bring the 7 down.
                    7 goes into 47 goes
       -42          6 times. 6x7 = 42
          5         There is a
                    remainder of 5
```

- And then to:

$$327 \div 7 =$$

$$\underline{4 \ 6 \ r5}$$
^{4}
$$7/ \ 3 \ 2 \ 7$$

- 7 into 32 goes 4 times with a remainder of 4.
- 7 into 47 goes 6 times with a remainder of 5

multiply   times

share   product

                    group
array
              divide

sets of   factor

times   chunking

    multiple

        remainder

How You Can Help Your Child at Home

❖   It is most important that you *talk & listen* to your child about their work in maths. It will help your child if they have to explain their methods to you.
❖   Share and discuss the maths activity with your child.
❖   Be positive about maths, even if you don't feel confident about it yourself.
❖   Remember, you are not expected to teach your child maths, but please share, talk and listen to your child.
❖   If your child cannot do their homework, do let the teacher know by either writing a note in your child's book or telling the teacher.
❖   A lot of maths can be done using everyday situations and will not always need pencil and paper methods.
❖   Play games and have fun with maths!

Here are some examples of how you can include mathematics at home:

SHOPPING

£   Looking at prices
£   Calculating change – which coins, different combinations.
£   Weighing fruit and vegetables in the supermarket.
£   Counting pocket money.
£   Reading labels on bottles, packets to discuss capacity, weight, shape and colour.
£   Estimating the final bill at the end of shopping while waiting at the till.
£   Calculating the cost of the family going to the cinema swimming baths, etc.

Calculator Activities

Use a basic calculator to find the cost of one sweet:
Clues:
1. Enter the cost of the packet of sweets on the calculator display, for example 35 (pence).
2. Press the divide button [÷]
3. Count the number of sweets in the packet, and enter this number on the calculator, for example 42 (sweets).
4. Press the equals button [=]
5. The answer is 0.833 (pence), which is less than 1p for each sweet.
Now use your calculator to find the cost of:
•   One stick of chewing gum;
•   One finger of a chocolate bar;
•   One segment of a tangerine;
•   One mint; and so on.

Time

- Looking at the clock – identify the numbers telling the time using analogue and digital clocks.
- Calculating how long a journey will take looking at train/bus/airline timetables.
- Using a TV guide to calculate the length of programmes.
- Programming the video or the microwave.
- Looking at the posting times on the post box.
- Discussing events in the day e.g. teatime, bed time, bath time.
- Setting an alarm clock.

Starting Off

Discuss what would be the most popular outings with the family: countryside, seaside, a theme park, a museum, a tourist attraction or just a picnic in the local park?
Which outings can you reach from home in…?
- Less than 1 hour
- Between 1 and 2 hours

More than 2 hours   11

SEQUENCING

- The main events of the day;
- Routines and what comes next;
- The instructions for a recipe;
- Getting dressed;
- Tying shoe laces;
- Imagine you have a week to do whatever you wish. Plan your week on the timetable:

	Morning			Afternoon	
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

MEASUREMENT

❍ Calculating distances in a journey - how much further?
❍ Calculating heights of family members – who is the tallest?
❍ Measuring weights of ingredients for baking.
❍ Playing with plastic jugs and containers in the bath.
❍ Comparing sizes of clothes – bigger than, smaller than.
❍ Wrapping parcels – what amount of paper, string do we need?
❍ Reading the scales on weighing machines and calculating the calibrations.
❍ Measuring ingredients out for a recipe using different sizes of spoons.

• Weigh your child on the bathroom scales.
• Weigh them again while they are holding the family pet. Can they work out how much heavier they are?

• Can your child find two things heavier and two things lighter than themselves around the house?

COUNTING

♦ Collections of objects – shells, buttons, cards, stones.
♦ Cars on a journey - how many red cars?
♦ Stairs up to bed, steps etc.
♦ Sports scores – cricket averages, goal averages.
♦ Pages in a storybook.
♦ Counting up to 10, 20, and 100 – backwards and forwards.
♦ Tidy a cupboard or shelf and count the contents - tins, shoes, etc.
♦ Counting particular vehicles on a journey - Eddie Stobart lorries, motorbikes, etc.

Beat the Clock

Time your child as they do one of the following:

- Count back from 100 in tens.
- Count back from 75 in fives.
- Starting at six, count up in tens to 206.
- Starting at 39, count up in twenties to 239.
- Starting at 67, count up in thirties to 367.

Can they beat their record?

ACTIVITIES USING NUMBERS AROUND US

❋ Using car number plates – add the digits to find biggest, smallest and total.
❋ Sharing out sweets, toys in groups of 2, 3, 4, 5, 6 etc. to help with times tables.
❋ Using telephone numbers – value of each digit.
  For example 987654321 (4 is worth 4000)
❋ Using sandwiches to show fractions ½, ¼.
❋ Using a round cake to show fractions ½, ¼, 1/6, 1/8 etc.

Pizza Please!

Your pizza costs £3.60. Cut it into six equal slices.
How much does each slice cost?
The answer is that each slice costs 60p.

- How much is half a slice?
- How much do two slices cost?
- How much does half (1/2) of the whole pizza cost?

If you cut your pizza into four equal slices (quarters):

- How much does one slice (1/4) cost now? (Is it the same, more or less than above?)
- How much does half cost now? (Is it the same, more or less than above?)

NUMBER GAMES

- Skipping – every skip count 2, 3, 4 etc.
- Hop scotch
- Ludo
- Snakes and ladders
- Dominoes
- Cards – number sequences
- Cards – Rummy, Patience, Pontoon, Snap
- Bingo
- Yahtzee
- Darts
- Heads & Tails and keep a tally
- Chess and draughts
- Monopoly
- Computer programmes
- Beetle
- Connect 4
- Counting games to practise times tables
- I spy a number in town, on a journey
- Number jigsaws
- Croquet, crazy golf on holiday to help counting
- Snooker and pool
- Number Lotto
- Dot to dot with numbers
- Skittles
- Happy families
- Whist
- Cribbage
- Number crosswords, dot to dot, puzzles

The level of mathematical challenge in a board game can be altered by introducing more dice & either adding or subtracting the numbers thrown.

REASONING

?   Laying the table for four people, 'How many knifes, forks and spoons will I need altogether?'

?   Planning a TV viewing session, 'How long will the programme last?'

SORTING AND MATCHING

✧   Setting the table and sorting cutlery. This teaches 1 to 1 correspondence and is helpful for you!
✧   Sorting clothes for washing – size, colour.
✧   Matching pairs of socks, gloves, shoes.
✧   Sorting groceries.

A FEW WEB SITES

🖰   www.counton.org has lots of ideas and games to play.
🖰   www.learn.co.uk help for all children with reading, maths and revision.
🖰   www.bbc.co.uk/schools games to play and links to many subjects.
🖰   www.dfes.gov.uk/homework
🖰   www.standards.dfes.gov.uk/homework

NUMBER FUN FOR YOU AND YOUR CHILD.

Try the questions below. Work together; talk about the question, make jottings and record your answer.

- Make the biggest number you can, using each of these digits only once.

  4   3   6   8
  Write the number in figures and write it in words.

- How many rectangles can you count?

- The total of the bill below is correct, but there are two mistakes in the entries. Find them and correct them.

  Bobby's Bakers

2 loaves at 80p each.	£1.60
6 cakes at 30p each	£1.08
4 packets of doughnuts at 70p each.	£2.90
Swiss roll	£0.75
	£6.95

- Alex had £375. He spent £240 on a CD player. How much did he have left?

- Ola had £264 in the bank. She puts another £37 into her bank account. How much does she have in the bank now?