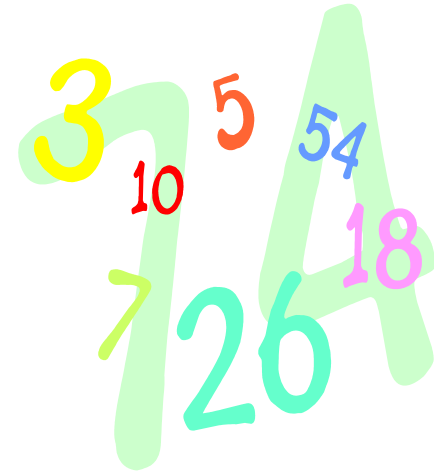


A guide to



**Numeracy at
Home**

Numeracy Booklet

The information in this booklet is to help you to help your child with maths.

It explains some of the different strategies used for mental and written calculations in school.

It gives a wide variety of ways of helping your child at home.

It also includes 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.

USE OF MENTAL STRATEGIES

The National Numeracy Strategy teaches a range of mental strategies to pupils. At Key Stage 1 a lot of time is spent teaching number bonds to 10 and 20, so that children know that $7 + 3$ make 10 and $17 + 3$ make 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

$$8 + 7 = (8 + 2) + 5$$

$$10 + 5 = 15$$

$$15 + 9 = (15 + 5) + 4$$

$$20 + 4 = 24$$

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

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

NUMBER FUN!

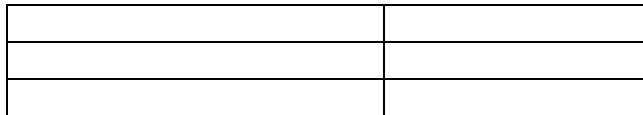
Try the questions below. Work with a partner, talk about the question, make jottings and record your answer.

- 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	£1.60
6 cakes at 30p each	£1.08
4 packets of crisps	£6.40
Swiss roll	<u>£0.75</u>
	£4.79

smallest

largest

hundreds

estimate

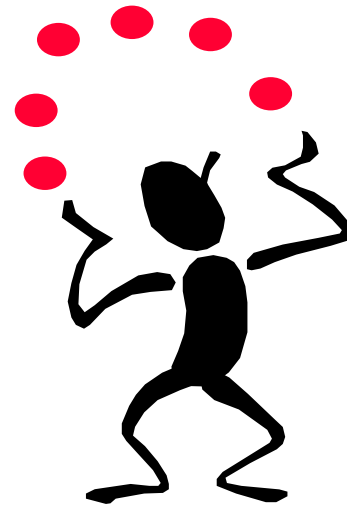
tens

ones

digit

position

digits



WRITTEN STRATEGIES

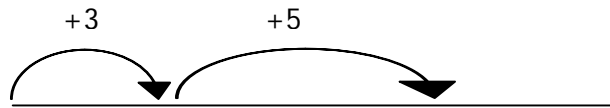
Up to Year 3 the emphasis is on children working mentally, with calculations recorded in horizontal number sentences, with some jottings for more challenging numbers.

In Year 3-6 children will be taught more formal written methods of calculation.

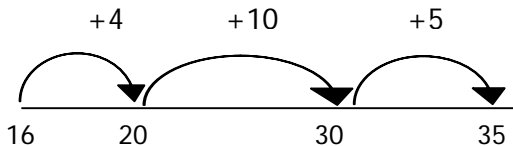
PROGRESSION FROM MENTAL TO WRITTEN METHODS – ADDITION

- 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.

$$17 + 8 =$$



$$35 - 16 =$$



- If your child is asked to add 36 and 19 he or she may choose one of the following methods:

$$36 + 19 = 36 + 20 - 1$$

$$\text{or } = 36 + 10 + 9$$

$$\text{or } = 30 + 10 + 6 + 9$$

Rather than showing your child the method you use, you can ask 'Can you explain the method to me?'

REASONING

- ? Laying the table for four people, 'How many knives, 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.



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 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
- ⊙ Clock golf, 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.

- Using an expanded form and adding the most significant digits first
e.g. $36 + 19$ is the same as $30 + 6 + 10 + 9$.

Add the tens first and then the units
 $30 + 10 = 40$ $6 + 9 = 15$ $40 + 15 = 55$

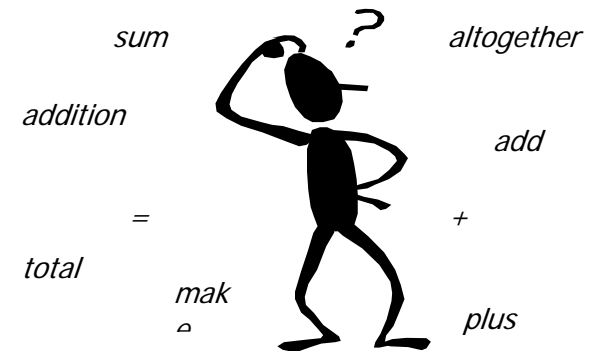
$$\begin{array}{r}
 36 \\
 +19 \\
 \hline
 40 \quad (30+10) \quad \text{Add 40 \& 15 together mentally} \\
 15 \quad (6+9) \\
 \hline
 55
 \end{array}$$

- Expanded form and adding the units first e.g. $36 + 19$
 $6 + 9 = 15$ $30 + 10 = 40$ $15 + 40 = 55$

$$\begin{array}{r}
 36 \\
 +19 \\
 \hline
 15 \quad (6+9) \quad \text{Add 15 \& 40 together mentally} \\
 40 \quad (30+10) \\
 \hline
 55
 \end{array}$$

- Standard written form

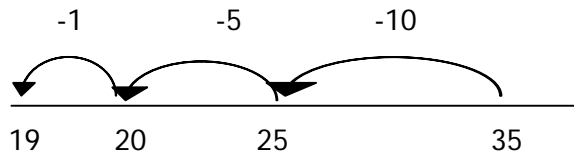
$$\begin{array}{r}
 36 \\
 +19 \\
 \hline
 55 \\
 1
 \end{array}$$



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 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.

$35 - 16 = 19$



- Subtraction by decomposition

Example 1: $563 - 241 =$

$$\begin{array}{r} 500 \quad 60 \quad 3 \\ -200 \quad 40 \quad 1 \\ \hline 300 \quad 20 \quad 2 \end{array} = 322$$

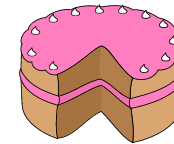
Example 2: $563 - 278 =$

$$\begin{array}{r} 500 \quad 60 \quad 3 \\ -200 \quad 70 \quad 8 \\ \hline \end{array} \quad \begin{array}{l} \text{cannot do this, so partition 60 into} \\ \text{50+10. The 10 goes with the 3 to} \\ \text{make 13.} \end{array}$$

$$\begin{array}{r} 500 \quad 50 \quad 13 \\ -200 \quad 70 \quad 8 \\ \hline \end{array} \quad \begin{array}{l} \text{cannot do this, so partition 500 into} \\ \text{400 + 100. The 100 goes with the 50} \\ \text{to make 150} \end{array}$$

ACTIVITIES USING NUMBERS AROUND US

- Using car number plates – add the digits to find biggest, smallest and total.
- Sharing out sweets, toys etc in groups of 2, 3, 4, 5, 6 etc to help with times tables.
- Using telephone numbers – value of each digit.
- Using sandwiches to show fractions $\frac{1}{2}$, $\frac{1}{4}$.
- Using a round sandwich cake to show fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$ 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 ($\frac{1}{2}$) of the whole pizza cost?

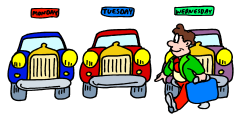
What if you cut your pizza into four equal slices (quarters)?

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



COUNTING

- ◆ Collections of objects – shells, buttons, pretty stones.
- ◆ Cars on a journey e.g. how many red cars?
- ◆ Animals in a field e.g. sheep, cows.
- ◆ 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.
- ◆ Counting buttons, shoes, socks as a child gets dressed.
- ◆ Tidy a cupboard or shelf and count the contents e.g. tins, shoes, etc.
- ◆ Counting particular vehicles on a journey e.g. Eddie Stobart lorries, motorbikes, etc.



Beat the clock

Time your child as they do one of the following:

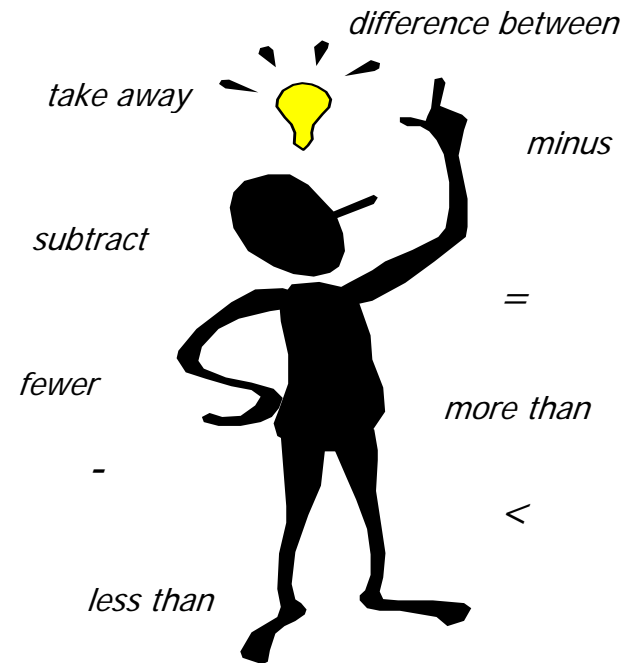
- Count back from 100 in tens.
- Count back from 75 in fives.
- Starting at six, count up in tens to 206.
- Starting at 39, count up in twenties to 239.
- Starting at 67, count up in thirties to 367.

Can they beat their record?

$$\begin{array}{r} 400 \quad 150 \quad 13 \\ -200 \quad 70 \quad 8 \\ \hline 200 \quad 80 \quad 5 \quad =285 \end{array}$$

This way of thinking eventually leads to the child writing:

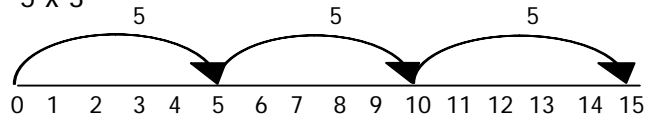
$$\begin{array}{r} 5 \quad 6 \quad 3 \\ -2 \quad 7 \quad 8 \\ \hline \end{array} = \begin{array}{r} 4 \quad ^15 \\ 5 \quad 6 \quad ^13 \\ -2 \quad 7 \quad 8 \\ \hline 2 \quad 8 \quad 5 \end{array}$$



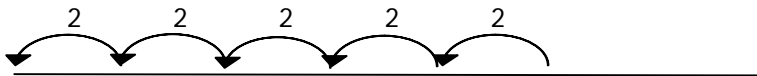
METHODS OF TEACHING
MULTIPLICATION AND DIVISION

Children can use a number line for multiplication and division.

- 5×3



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



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

$$29 \times 6 = 174$$

X	20	9	Total
6	12	54	174

$$28 \times 34 = 840 + 112 = 952$$

X	20	8	Total
30	60	24	840
4	80	32	112
			952

- Division by chunking: $327 \div 7$

$$\begin{array}{r}
 327 \\
 \underline{-70} \quad (7 \times 10) \\
 257 \\
 \underline{-70} \quad (7 \times 10) \\
 187 \\
 \underline{-70} \quad (7 \times 10) \\
 117 \\
 \underline{-70} \quad (7 \times 10) \\
 47 \\
 \underline{-42} \quad (7 \times 6) \\
 5 \quad \text{46 lots of 7 with 5} \\
 \quad \quad \quad \text{left over}
 \end{array}$$

$$327 \div 7 = 46 \text{ r } 7$$

MEASUREMENT

- Calculating distances in a journey e.g. 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 scale on weighing machines and calculating the calibrations.
- Measuring ingredients out for a recipe using different types of spoons
- Estimating the quantity of milk from a cow/herd.
- Estimate the amount of time to harvest a field

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 you find two things heavier than your child and two things lighter than your child around the house?



SEQUENCING

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

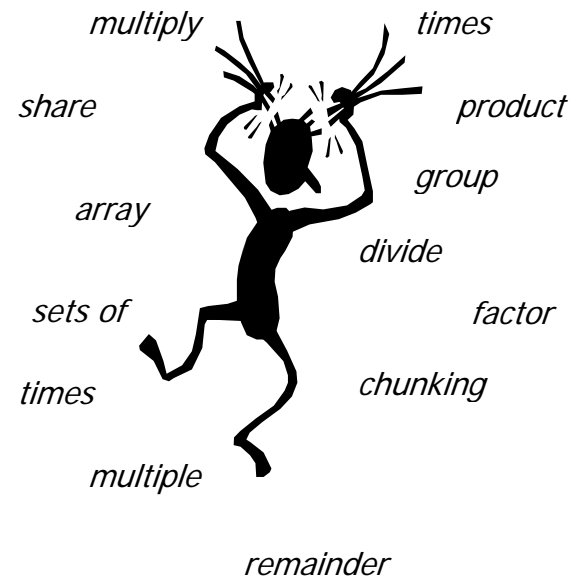
	Morning			Afternoon	
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

- or when pupils are more confident

$$327 \div 7 = \begin{array}{r} 327 \\ -280 \\ \hline 47 \\ -42 \\ \hline 5 \end{array} \qquad 7 \times 40 = 280$$

$$\qquad \qquad \qquad 7 \times \frac{6}{46} = 42$$

Answer: 46 R5



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 to you.
- ❖ Share the maths activity with your child and discuss it with them.
- ❖ 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 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, in order to discuss capacity, weight, shape and colour.
- £ Estimating the final bill at the end of shopping while waiting at the cash out.
- £ Calculating the cost of the family going to the cinema, swimming baths, etc.



Calculator costs



Use a 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 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 with the family what would be the most popular outings. 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