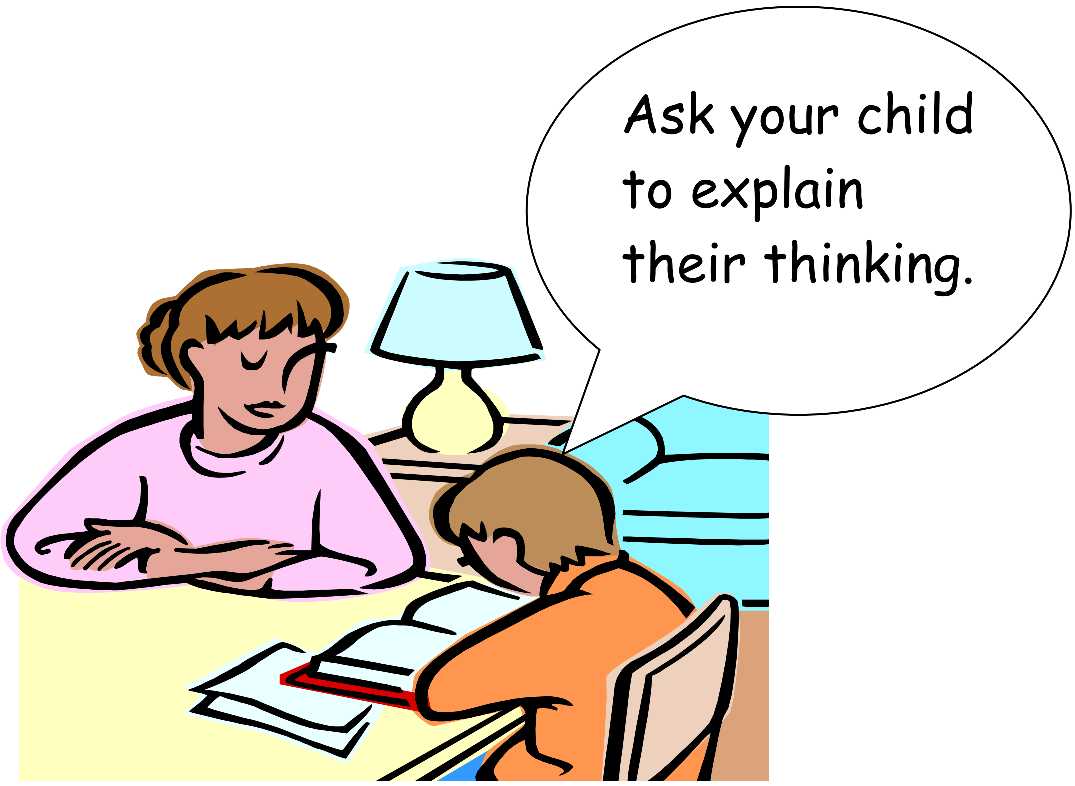
Saighton Church of England Primary School

'Nurturing Children in a Christian Environment to achieve excellence'

Calculation a guide for parents

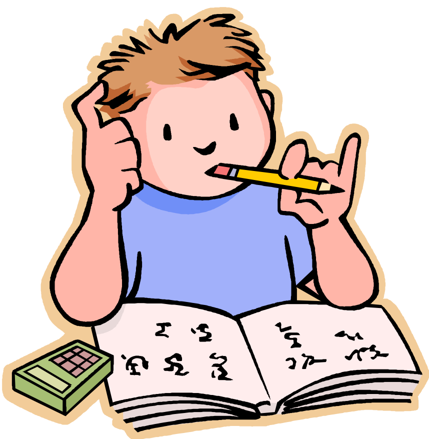
Calculation

The maths work your child is doing at school may look very different to the kind of 'maths' 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, they are only encouraged to use these methods for calculations they cannot solve in their heads.



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?



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

Is the answer sensible?

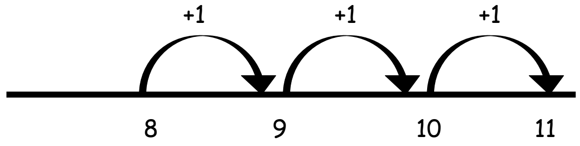
ADDITION

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

2 + 3 =  **Add**	**Working practically or drawing a picture helps children to visualise the problem.**
At a party, I eat 5 cakes and my friend eats 3. How many cakes did we eat **altogether**? 	
7 people are on the bus. 4 more get on at the next stop. How many people are on the bus now? IIIIIII IIII	**Children are encouraged to progress towards using dots or marks.**

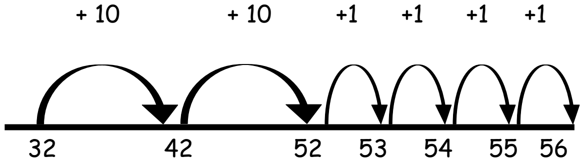
Counting forwards

8 + 3



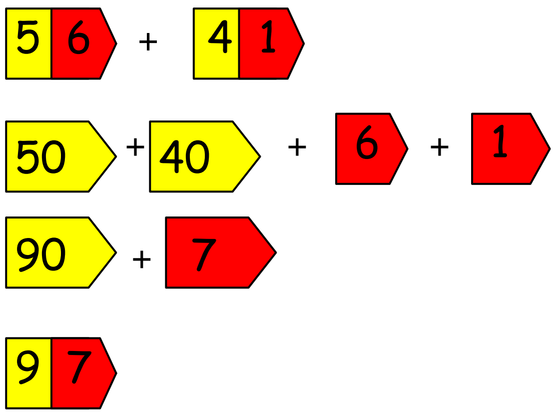
Children can count up using an empty number line. This is a really good way for them to record the steps they have taken.

What is 32 + 24 ?



They are encouraged to use the most efficient method to solve a given calculation, therefore you may see children putting the largest number first or partitioning a number into tens and ones

56 + 41 =



An expanded approach is introduced when children are secure with the mental calculation methods.

366 + 172

```
  366
+ 172
  400
  130
    8
  538
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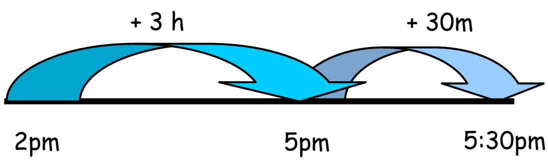
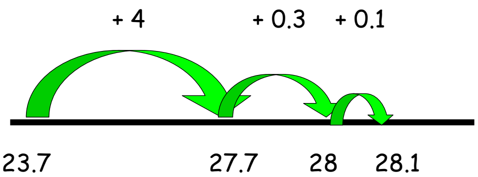
Initially children will add the most significant digit first (i.e. working from left to right).

546 +487 13 120 900 1033	**Children progress to working from the least significant digit first, i.e. units, but still need to read the numbers as 6 + 7, 40 + 80, 500 + 400, to secure full understanding of the approach used.**
546 +487 1033 1 1	**The compact method is used when children are confidently using the expanded approach.**
The train leaves at 2 o'clock in the afternoon and arrives at 5:30pm. How long is the journey?  The journey takes 3 hours 30 minutes **23.7 + 4.4**  	**Children are encouraged to use a blank numberline to solve money, time, decimal and other calculations.**

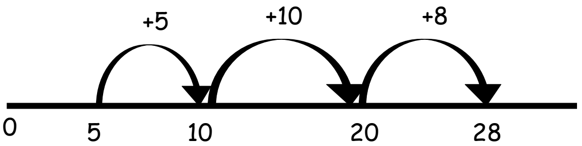
SUBTRACTION

Children are taught to understand subtraction as taking away and finding the difference by counting on

5 – 2 = I had five balloons. Two burst. How many did I have left?  Take away A teddy bear costs £5 and a doll costs £2. How much more does the bear cost?  Find the difference Lisa has 5 felt tip pens and Tim has 2. How many more does Lisa have? ●●●●● ●●	**Working practically or drawing a picture helps children to visualise the problem.** **Children are encouraged to progress towards using dots or marks.**

There are 28 children in the class, 5 have sandwiches for lunch. How many have a hot dinner?

28 - 5 = 23

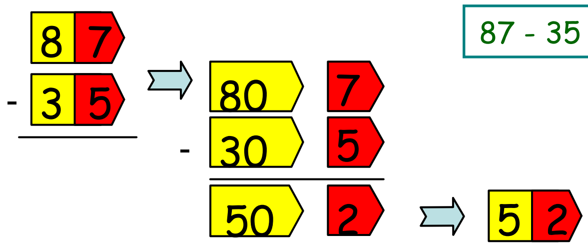


23 children have a hot dinner

5 + 10 + 8

Children can count up or back using an empty number line. This is a really good way for them to record the steps they have taken.

87 - 35 =



This expanded approach is introduced when children are secure with the mental calculation methods.

563 - 248

500 and **60 and** 3
-200 and 40 and 8

Exchange 60 into 50 and 10

500 and 50 and 13
-200 and 40 and 8
300 and 10 and 5

This is used to develop a more compact method. The word 'and' is used to show what the numbers are partitioned into and is preferred to '+' so as not to confuse addition with subtraction.

643 - 358

600 and **40 and** 3
-300 and 50 and 8

Exchange 40 into 30 and 10

600 and **30** and 13
-300 and 50 and 8

Exchange 600 into 500 and 100

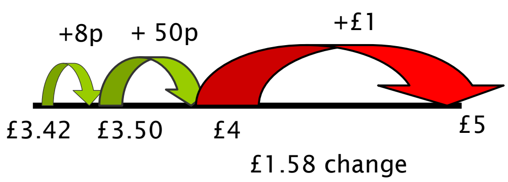
500 and 130 and 13
-300 and 50 and 8
200 and 80 and 5

Numbers are 'exchanged' to enable the children to complete the process.

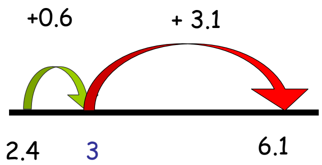
$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{1}\cancel{4}{}^{3}\,{}^{1}3 \\ -358 \\ \hline 285 \\ \hline \end{array}$$

Mum went shopping and spent £3.42. She gave the Shopkeeper £5. How much change did she get?

£5 - £3.42 = £1.58



What is the difference between 6.1 – 2.4 ?



3.1 + 0.6 = 3.7

The compact method hides the understanding and can confuse children – 'I know I need to cross out but which numbers?' They may not reach this stage until they are in KS3 at High School.

Children are encouraged to use the most efficient method to solve a given calculation, therefore you may see children using a blank numberline to solve money, time, decimal and appropriate calculations.

MULTIPLICATION

Children are taught to understand multiplication as repeated addition.

2 x 4

Each child has two feet. How many feet do four children have?

2 + 2 + 2 + 2

Working practically or drawing a picture helps children to visualise the problem.

6 x 3

There are 6 eggs in a box. How many eggs in 3 boxes?

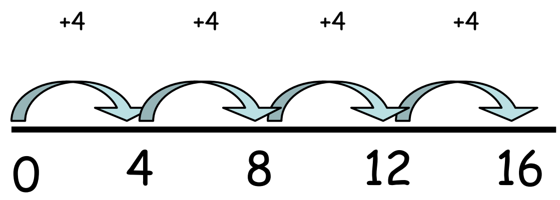
•••••• •••••• ••••••

6 + 6 + 6

Dots or tally marks are often drawn in groups. This shows 3 groups of 6.

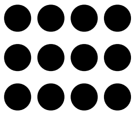
4x4

There are 4 cats. Each cat has 4 kittens. How many kittens are there altogether?

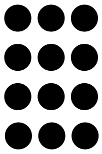


Children can count on in equal steps using an empty number line. This shows 4 jumps of 4.

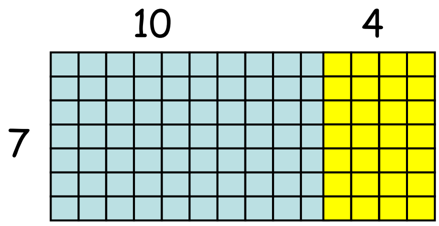
4 x 3

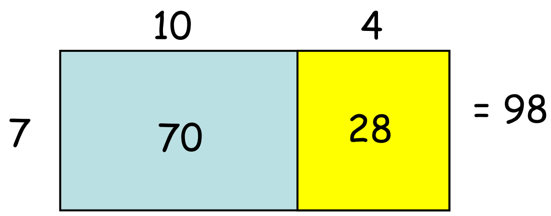


3 x 4

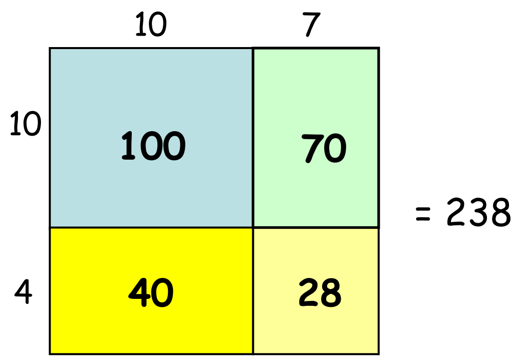


14x7=

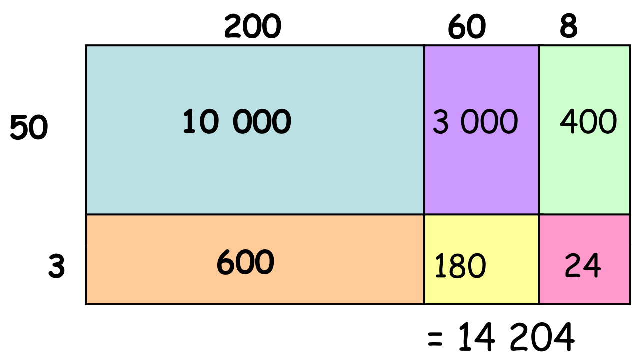




17 x 14



268 x 53



Drawing an array (3 rows of 4 or 4 rows of 3) gives children an image of the answer. It also helps to develop the understanding that 4x3 has the same value as 3x4.

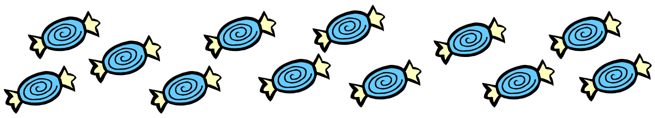
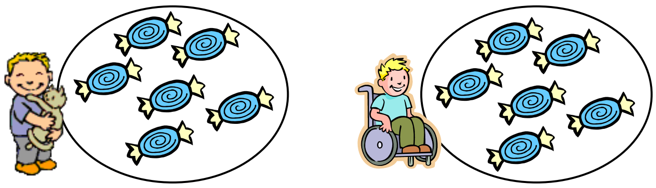
When numbers get bigger, it is inefficient to do lots of jumps on a number line or to draw an array.

Children progress to the grid method. 14 is partitioned into 10 and 4, and each of these is multiplied by 7. The two answers are then added together.

This method is also used with larger numbers. Again partition the numbers and multiply each part. Add the numbers together.

Division

Children are taught to understand division as sharing, grouping and chunking.

 **12 ÷ 2** There are 12 sweets and 2 children. They share the sweets equally, how many sweets does each child have?  Each child has 6 sweets	Working practically or drawing a picture helps children to visualise the problem. Sharing is a skill children come to school with. 'One for me one for you' is repeated subtraction of one. Sharing between two.
12 ÷ 2 There are 12 sweets and each party bag needs two sweets. How many party bags can be made?  There are 6 party bags	Grouping in twos.

12÷4=

4 apples are packed in a basket. How many baskets can you fill with 12 apples?

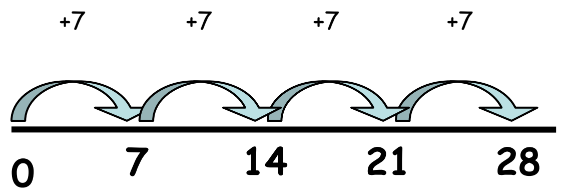
●●●● ●●●● ●●●●

Dots or tally marks are often drawn in groups. This shows 3 groups of 4.

Grouping in fours

28÷7=

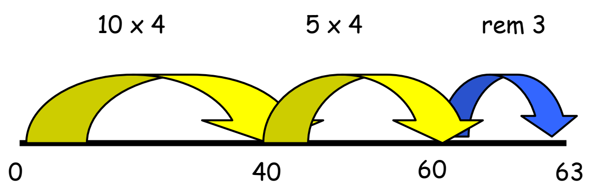
A chew bar costs 7p. How many can I buy with 28p?



Children can count on in equal steps using an empty number line to work out how many 7's there are in 28. This shows you need 4 jumps of 7 to reach 28.

63 children need to be seated in groups of 4. How many tables will be needed to seat all the children?

63 ÷ 4 = 15 r 3



16 tables will be needed to seat all the children, one will only have 3 seats.

When numbers get bigger, it is inefficient to do lots of jumps on a number line. Children begin to jump in 'chunks.' A jump of 10 groups of 4 takes you to 40. Then you need another 5 groups of 4 to reach 60, leaving a remainder of 3.

63 ÷ 4 = 15 r 3

$$
\begin{array}{r|l}
4 & 63 \\
 & \underline{40} \quad 10 \times 4 \\
 & 23 \\
 & \underline{20} \quad 5 \times 4 \\
 & 3
\end{array}
$$

412 ÷ 7 = 58 r 6

$$
\begin{array}{r|l}
7 & 412 \\
- & \underline{350} \quad 50 \times 7 \\
 & 62 \\
- & \underline{56} \quad 8 \times 7 \\
 & 6
\end{array}
$$

Things I know about 7:

7x1=7 ∴ 7x10=70

7x2=14 ∴ 7x20=140

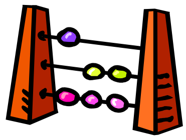
7x5=35 ∴ 7x50=350

Children progress to this method which is known as 'chunking'. The chunks of 4 are subtracted (10 groups of 4, then 5 groups of 4) until no more chunks of 4 remain. This example shows 15 groups of 4 and a remainder of 3.

This method is also used with larger numbers. Children need to have a secure knowledge of 'tables' facts and be able to derive associated facts.

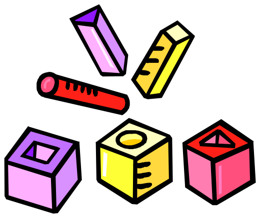
In this calculation children might start by generating facts they know about 7. It is important that children try not to write out the whole table but just significant ones.

PRACTISING NUMBER FACTS



- Find out 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 fact 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 complements with your child. You say a number. They reply with how much more is needed to make 10. You can also play this game with numbers totalling 20, 100 or 1000. Encourage your child to answer quickly, without counting or using fingers.
- Throw 2 dice. Ask your child to find the total of the numbers (+), the difference between them (-) or the product (x). Can they do this without counting?
- Use a set of playing cards (no pictures). 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 2 minutes?
- Play Bingo. Each player chooses five answers (e.g. numbers to 10 to practise simple addition, multiples of 5 to practise the five times tables). 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.
- 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, 15 + 3=18). Add to the list over the next few days. Try starting with a x fact as well.

- Choose some food items out of the cupboard. Try to put the objects in order of weight, by feel alone. Check by looking at the amounts on the packets.
- 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 stop clock 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.



REAL LIFE PROBLEMS

? 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 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 / 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.

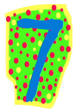
? Work together to plan a party or meal on a budget.

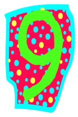
These are just a few ideas to give you a starting point. Try to involve your child in as many problem-solving activities as possible. The more 'real' a problem is, the more motivated they will be when trying to solve it.

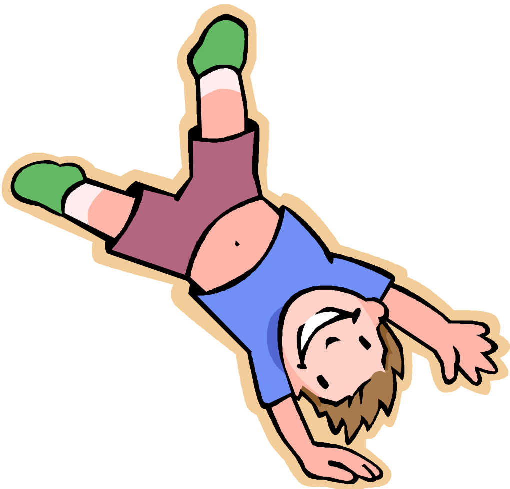
COUNTING IDEAS

- 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 CD's 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 (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 at home, in the street or when out shopping.

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







Make Maths Fun!