This booklet has been compiled to outline some of the approaches that are used in teaching and recording calculations throughout school. You will notice many changes in the way children are taught to record their calculations. The aim is always to encourage understanding so that children can apply their skills in different contexts.

KIRF's

KIRF's are Key Instant Recall Facts.

These are the things your children should know by heart, such as **number bonds to 10, 20 or 100** and **times tables' facts!**

They are very important; as they will make maths easier once your child has mastered them!

Reasoning

Encourage children to talk about their calculation strategies.

Ask questions such as,

'How did you work that out?'

'Can you think of any other ways?'

'What if you started with…?'

Finally…**HAVE FUN!**

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Carnagill Community Primary

Guide to calculation methods (KS2).

How to support your child in Mathematics

Revised 2017

Mental calculation strategies

Many parents, keen to support their children, ask about the calculation methods we teach. We have produced this short leaflet which we hope will explain the methods your children use, and also why they are taught.

Why teach so many different methods?

How would you work out the following?

12+18, 24+24, 15+16, 73+99, 72-14, 154-19, 63-58, 43+88, 529+738

The chances are you used many different methods.

- You know that 2+8=10 and used it for 12+18.
- For 24+24 & 15+16 you probably used your knowledge of doubles and near-doubles.
- To add 99 it is likely you added 100 and took 1 away.
- For 72-14 you might take away 12 first and then 2.
- To take-away 19 you might subtract 20 then add 1.
- You might 'count-the-gap' between 58 and 63.
- For 43+88 you might add the units and tens separately,
- And for the last you might resort to pen and paper (or calculator).

ALL OF THESE METHODS ARE 'RIGHT'

We teach all these different methods…

… and when to use each one

Useful websites

The following sites are aimed at parents to help them with supporting their children with Maths at home, they include advice, activity booklets and other resources.

http://www.familymathstoolkit.org.uk/

http://www.oxfordowl.co.uk/maths-owl/maths

http://www.maths4mumsanddads.co.uk/

List of Maths Websites for Children

http://amathsdictionaryforkids.com/

https://www.bbc.co.uk/education/subjects/z826n39

http://www.ictgames.com/resources.html

http://www.ilovemathsgames.com/

http://www.mathsisfun.com/index.htm

http://www.mathszone.co.uk/

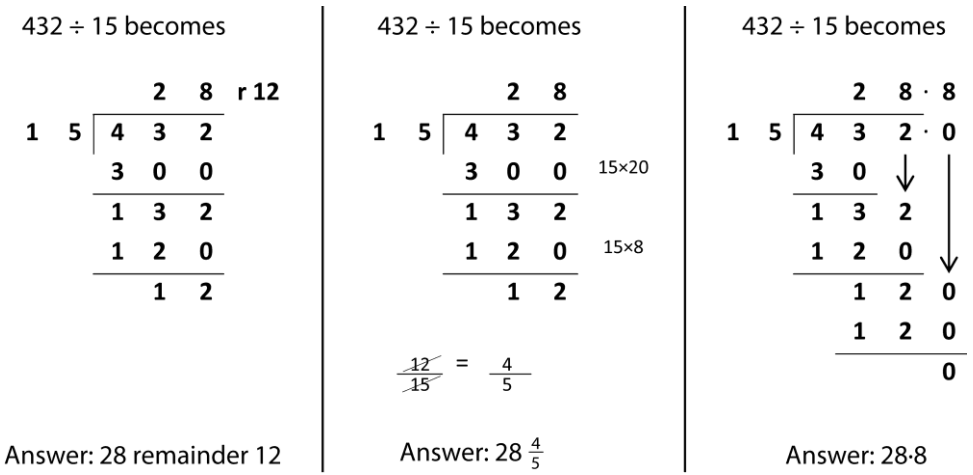
http://www.multiplication.com/

http://www.primarygames.co.uk/

http://resources.woodlands-junior.kent.sch.uk/maths

http://www.topmarks.co.uk/

Long division:



Remainders can be shown as a number, fraction or decimal, in the examples above the remainder when dividing by 15 is 12.

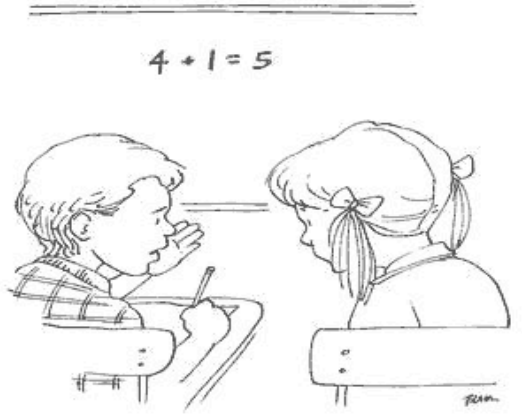
Expressed as a fraction it is $\frac{12}{15}$ which in its lowest terms is $\frac{4}{5}$

Shown as a decimal it is 12÷15 which is 0.8

Children are encouraged to make informal jottings of multiplication facts they know to help them with their calculation.

We call these our 'known facts' or our 'key facts':

If I know 1x 15 is 15, then I know 10x15=150, 5x15 will be half of 150, 2x15 will be double 15, 4x15 will be double 2x15, 3x15 will be 2x15 add 15 etc... until all the blanks are filled in.



But yesterday 5 was 3 + 2!

Useful vocabulary

Children are expected to be able to understand and use a range of mathematical vocabulary. Being able to identify the correct skills needed by having the ability to access a diverse vocabulary is vital. Below are some of the operative vocabulary the children are expected to know.

+	-	x	÷	=
add more plus and make sum total increase altogether	subtract take away less difference reduce how many more	multiply times product lots of groups of multiply of array repeated double addition	divide share group divisible	equal makes total same as equivalent balance

Addition

When are children ready for written calculations?
Addition and subtraction:

- Do they know addition and subtraction facts to 20?
- Do they understand place value and can they partition numbers?
- Can they add three single digit numbers mentally?
- Can they explain their mental strategies orally and record them using informal jottings?

In our school we use **the column method** to add:

789 + 642 becomes

$$\begin{array}{rccc} & 7 & 8 & 9 \\ + & 6 & 4 & 2 \\ \hline & 1 & 4 & 3 & 1 \\ \hline & & 1 & 1 & \end{array}$$

Answer: 1431

Top tips:
Understanding the value of the digit is important.
E.g. in the number 427 the 2 is referred to as 20.

When adding, children always start by adding the most significant digit.

Division

Initially division is taught as '**sharing**' with lots of practical activities where children get equal amounts.
Children should also experience practical examples of '**grouping**' where quantities are split into groups of equal size.

At KS2 division should be taught as the **inverse** of multiplication.

E.g. 35 ÷ 5 -> 5 x Δ = 35 What is Δ?
72 ÷ 8 -> 8 x Δ = 72 What is Δ?

We then move onto more formal written methods:
Short division:
98 ÷ 7 becomes

$$\begin{array}{r|cc} & 1 & 4 \\ \hline 7 & {}^{2}9 & 8 \end{array}$$

Answer: 14

Children will find dividing easier if they know their times tables facts!

With remainders:

432 ÷ 5 becomes

$$\begin{array}{r|ccc} & 8 & 6 & r\,2 \\ \hline 5 & {}^{3}4 & 3 & 2 \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r|ccc} & 4 & 5 & r\,1 \\ \hline 1\,1 & {}^{5}4 & 9 & 6 \end{array}$$

Answer: $45\frac{1}{11}$

When tackling multiplication calculations mentally we encourage children to **partition** the numbers into their place value groupings and to multiply each number separately, e.g.:

23 x 3
20 x 3 = (20 + 20 + 20) = 60
3 x 3 = (3 + 3 + 3) = 9
Recombine 60 + 9 = 69

With trickier calculations we apply this principle using the **column method**, e.g.:

Short multiplication:

24 × 6 becomes

$$\begin{array}{r} 2\ 4 \\ \times\ \ 6 \\ \hline 1\ 4\ 4 \\ \hline {\scriptstyle 2} \end{array}$$

Answer: 144

342 × 7 becomes

$$\begin{array}{r} 3\ 4\ 2 \\ \times\ \ \ 7 \\ \hline 2\ 3\ 9\ 4 \\ \hline {\scriptstyle 2\ 1} \end{array}$$

Answer: 2394

2741 × 6 becomes

$$\begin{array}{r} 2\ 7\ 4\ 1 \\ \times\ \ \ \ 6 \\ \hline 1\ 6\ 4\ 4\ 6 \\ \hline {\scriptstyle 4\ 2} \end{array}$$

Answer: 16 446

Long multiplication:

24 × 16 becomes

$$\begin{array}{r} {\scriptstyle 2\ \ } \\ 2\ 4 \\ \times\ 1\ 6 \\ \hline 2\ 4\ 0 \\ 1\ 4\ 4 \\ \hline 3\ 8\ 4 \\ \hline \end{array}$$

Answer: 384

124 × 26 becomes

$$\begin{array}{r} {\scriptstyle 1\ 2\ \ } \\ 1\ 2\ 4 \\ \times\ \ 2\ 6 \\ \hline 2\ 4\ 8\ 0 \\ 7\ 4\ 4 \\ \hline 3\ 2\ 2\ 4 \\ \hline {\scriptstyle 1\ 1\ \ } \end{array}$$

Answer: 3224

124 × 26 becomes

$$\begin{array}{r} {\scriptstyle 1\ 2\ \ } \\ 1\ 2\ 4 \\ \times\ \ 2\ 6 \\ \hline 7\ 4\ 4 \\ 2\ 4\ 8\ 0 \\ \hline 3\ 2\ 2\ 4 \\ \hline {\scriptstyle 1\ 1\ \ } \end{array}$$

Answer: 3224

Real-life context

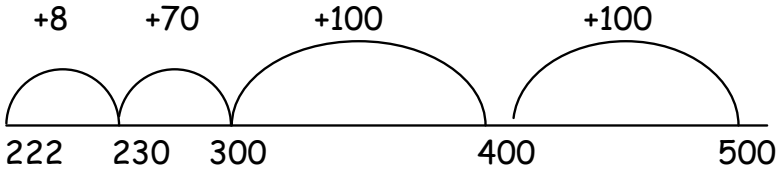
We want children to be able to apply their skills to a variety of situations and not just repeat a process, which is meaningless to them.
Children develop greater understanding when their maths is real and relevant!

E.g. "I go to the shop and buy some sweets for 55p and a drink for £1.67. I pay with a £5.00 note. How much change will I get?"

First step:
£1.67 + 55p =
167p + 55p
100 + 0 = 100
60 + 50 = 110
7 + 5 = 12
100 + 110 + 12 = 222p = £2.22

It is not only important that your child gets the correct answer, but that they also understand what they are doing.

Second step:
£5.00 - £2.22=
500p – 222p =



8 + 70 + 100 + 100 = 278p = £2.78

I will get £2.78 change!

Subtraction

Top tip!
It really helps if children know their number bonds.

Children are encouraged to understand subtraction as 'finding the difference' between the smallest and largest number.

At KS2 the column method will be used as a formal written method for subtraction.

Children will draw a column and place the largest number at the top with the number being taken away placed underneath. The columns need to be lined up correctly so the place value is correct.

874 – 523 becomes

	8	7	4
–	5	2	3
	3	5	1

Answer: 351

932 – 457 becomes

	8	12	1
	~~9~~	~~3~~	2
–	4	5	7
	4	7	5

Answer: 475

Children are encouraged to us the inverse to check their answers, so they can check if 874-523=351 by adding 523 and 351 which should equal 874.

Some calculations can be worked out mentally by counting on in their heads:
345-295 (count on from 295 to 300 which is 5, then add on the 45)
N.B Sometimes it may be easier to calculate through counting back. (E.g. 8004- 6 would not be sensible to count up from 6 to 8004 if the child was secure counting back across 1000 boundary)

Multiplication

Please encourage your child to learn their times tables. They are VERY important in many aspects of life.

Can children use multiplication facts they know to derive other multiplication facts that they do not know?

E.g. 'To find 9 x 6 I could say 10 x 6 = 60
I could take away 6. The answer would be 54.'

'If I know 3 x 4 = 12 then 3 x 8 must be double 12 which is 24!'

Don't forget: 70 x 4 = 7 x 4 x 10 = 280

We reinforce the message that multiplication is **repeated addition**, e.g.:

7 x 8 = 8 + 8 + 8 + 8 + 8 + 8 + 8 = 56
8 x 7 = 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 = 56

Top tip: please do not say that we multiply by ten by adding zero to a number or by moving the decimal point. The digits move one place to the left and the zero becomes a place holder.