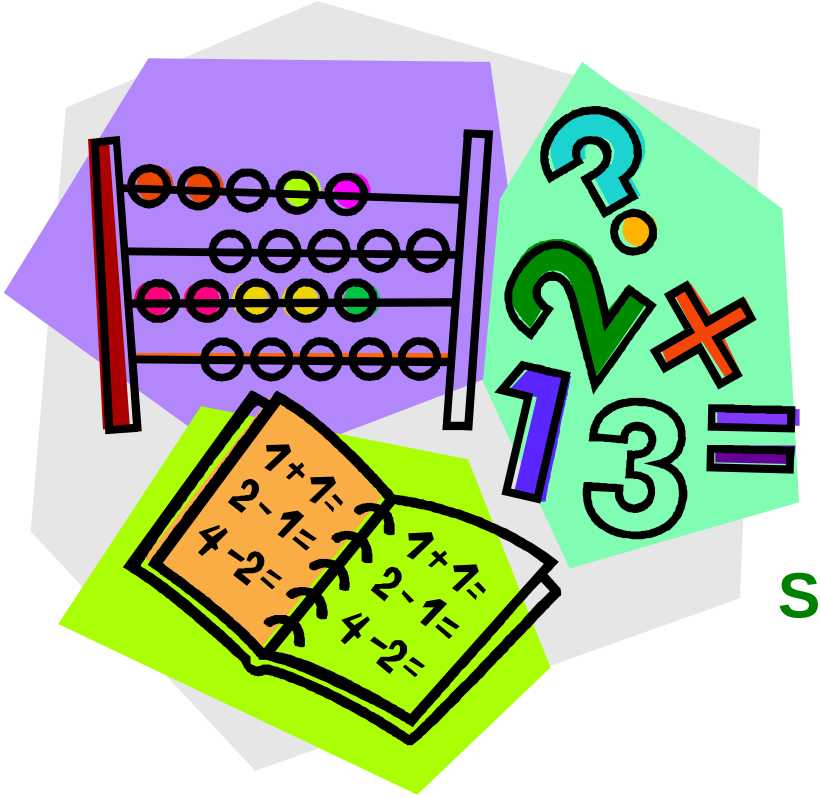
MAKE YOUR CHILD A MATHS STAR!

A PARENTS' GUIDE TO HELPING YOUR CHILDREN WITH MATHS



Booklet 3 of 3:

Key Stage 2
Stage 5 to Stage 6

"IT WASN'T LIKE THIS WHEN I WAS AT SCHOOL!"

Have you ever wished that you understood current Maths methods better? Many parents find that their children are using methods or strategies, which are very different from those used in the past. This can often cause confusion when trying to support your child at home. This booklet has been prepared to give you a record of the strategies your child will be using in school.

The main methods used in each stage by the majority of pupils for addition, subtraction, multiplication and division are shown. These methods are introduced throughout the teaching year so most pupils should be familiar with all methods by the end of the year. Each sheet also shows typical maths vocabulary that children will be acquiring and using at this stage. The multiplication section also explains which tables facts they are expected to know in that stage.

This is a guide only; children will always progress at different speeds. However, support from you will undoubtedly be of great benefit to them at all times. If you have any questions, your child's teacher will be pleased to discuss the strategies with you.

This booklet is part of a series of 3, covering Stage 1 to Stage 6.

Turn your child into a Mathemagician!

STAGE 5 - Addition

Standard compact addition:

By stage 5, children should be using standard compact addition with numbers beyond four digits and rounding to estimate answers:

```
   587
 + 475
  1062
   1 1
```

```
   58587
 +  4675
  63262
  1 1 1 1
```

Using similar methods, children will:

- ✓ **add several numbers with different numbers of digits**
- ✓ **begin to add two or more decimal numbers with up to three digits and the same number of decimal places**
- ✓ **know that decimal points should line up under each other, particularly when adding mixed amounts e.g. 3.2m + 280cm**

For example:

£6.72 + £8.56 + £2.30

```
  £6.72
  £8.56
+ £2.30
 £17.58
    1
```

72.5cm + 546mm

```
  72.5
+ 54.6
 127.1
   1
```

Answer: 127.1 cm

Vocabulary:

add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make? inverse

STAGE 6 - Addition

Standard compact addition:

Children should extend the carrying method to numbers with any number of digits and rounding to estimate answers:

$$\begin{array}{r} 7648 \\ +\ 1486 \\ \hline 9134 \\ {\scriptstyle 1\ 1\ 1} \end{array} \qquad \begin{array}{r} 6584 \\ +\ 5848 \\ \hline 12432 \\ {\scriptstyle 1\ 1\ 1} \end{array} \qquad \begin{array}{r} 3 \\ 42 \\ 786 \\ 6432 \\ +\ 4683 \\ \hline 11946 \\ {\scriptstyle 1\ 2\ 1} \end{array}$$

Using similar methods, children will:

- ✓ **add several numbers with different numbers of digits**
- ✓ **add two or more decimal numbers with up to four digits and either one or two decimal places**
- ✓ **know that decimal points should line up under each other, particularly when adding mixed amounts e.g. 14.5kg + 750g**

For example:

124.9 + 7.25

$$\begin{array}{r} 124.9 \\ +\ 7.25 \\ \hline 132.15 \\ {\scriptstyle 1\ 1} \end{array}$$

401.2 + 26.85 + 0.71

$$\begin{array}{r} 401.2 \\ 26.85 \\ +\ 0.71 \\ \hline 428.76 \\ {\scriptstyle 1} \end{array}$$

N.B. For the above examples, many children will put zeros in the empty columns.

Vocabulary:

add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make? inverse, is the same as, equals

STAGE 5 - Subtraction

Compact column subtraction (decomposition):

This should be the main strategy for subtraction for the majority of children in stage 5. Rounding should be used to estimate answers.

```
   6 14
  ~~7~~ ~~5~~ 1 4
-   2 8 6
    4 6 8
```

Steps to say:

- 4 take 6 can't be done.
- Exchange one group of ten from 50, leaving 4 tens.
- This now gives us 14 take 6 which is 8.
- 4 tens take 8 tens can't be done.
- Exchange one group of a hundred from 700, leaving 6 hundred.
- This now give us 14 tens take 8 tens which is 6 tens.
- 6 hundred take 2 hundred leaves 4 hundred.

Include examples with zeros:

804 - 286

```
      9
    7 ~~10~~
  ~~8~~ 0 1 4
- 2 8 6
  5 1 8
```

Children should:

- ✓ ***be able to subtract numbers with different numbers of digits, including numbers with more than 4 digits;***
- ✓ ***find the difference between two decimal fractions with up to three digits and the same number of decimal places;***
- ✓ ***know that decimal points should line up under each other.***

For example:

£9.42 - £6.78

72.5km – 4.6km

Vocabulary

subtract, take away, minus, decrease, how many are left/left over? difference between, half, halve, how many more/fewer is …than…? how much more/less is…? inverse, is the same as, equals

STAGE 6 - Subtraction

Compact column subtraction (decomposition):

This should be the main strategy for subtraction in stage 6. Rounding should be used to estimate answers:

$$\begin{array}{rr} & {\scriptstyle 5\ 13} \\ & 6\not{4}^{1}6\ 7 \\ - & 2\ 6\ 8\ 4 \\ \hline & 3\ 7\ 8\ 3 \end{array}$$

See stage 5 for language to be used when exchanging.

Children should:

- ✓ ***be able to subtract numbers with different numbers of digits;***
- ✓ ***be able to subtract decimal numbers with different numbers of decimal places;***
- ✓ ***know that decimal points should line up under each other.***

For example:

324.9 – 7.25

14.24 – 8.7

Vocabulary:
subtract, take away, minus, decrease, how many are left/left over? difference between, half, halve, how many more/fewer is …than…? how much more/less is…? inverse, is the same as, equals

STAGE 5 - Multiplication

Tables Focus: *Children need to know all tables facts up to 12 x 12 and related division facts. They should also be able to use them to use them to multiply pairs of multiples of 10 and 100. They should recognise square and cube numbers, be able to find factor pairs of a number and common factors of two numbers. They also need to use their understanding of place value to multiply (and divide) whole numbers and decimals by 10, 100 or 1000.*

Standard short multiplication:

In stage 5, children will consolidate the standard compact method of short multiplication learnt in stage 4:

```
  64
 x 8
 512
  3
```

They will also learn to use this method for decimals:

```
  4.9
x 3
 14.7
  2
```

Grid method for long multiplication:

Children will revise use of grid method, but for long multiplication problems (TO x TO):

72 x 38 ≈ 70 x 40 = 2800

x	70	2
30	2100	60
8	560	16

```
  2160
+  576
  2736
   1
```

Expanded long multiplication:

Later in stage 5, the children will be introduced to expanded long multiplication, with the links to grid method made clear. Children should describe what they do by referring to the actual values of the digits in the columns. For example, 70 x 30 not 7 x 3:

```
   72
 x 38
   16  (2 x 8)
  560  (70 x8)
   60  (2 x 30)
 2100  (70 x 30)
 2736
   1
```

Lead on to recording without the multiplications stated in brackets. If children are ready, they will be introduced to the more compact method taught in stage 6.

Vocabulary:

lots of, groups of, times, product, multiply, multiplied by, multiple of, once, twice, three times, four times, five times…ten times, times as (big, long, wide and so on), repeated addition, array, row, column, double

STAGE 6 - Multiplication

Tables Focus: *Children need to know all tables facts up to 12 x 12 and the associated division facts. They should also use their knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12 and the corresponding squares of multiples of 10. They should be able to identify common factors and multiples of numbers. They also need to use their knowledge of place value and multiplication facts to 12 x 12 to derive related multiplication (and division) facts involving decimals (e.g. 0.8 x 7, 4.8÷6).*

Standard short multiplication:

In stage 6, children should focus on securing use of short multiplication with decimals:

```
   4.92
 x  6
  29.52
   5 1
```

Standard method for long multiplication:

Revise expanded method for long multiplication as introduced in stage 5. Extend by reducing the recording further:

```
   56
x  27
  392 (56 x 7)
1120 (56 x 20)
1512
  1
```

Extend this to HTO x TO and ThHTO x TO and leaving out the detail in brackets:

```
   4286
   x  29
  38574
  85720
 124294
  11
```

N.B. If, after practice, children cannot use the standard method without making errors, they should return to using grid multiplication.

Vocabulary:

lots of, groups of, times, product, multiply, multiplied by, multiple of, once, twice, three times, four times, five times…ten times, times as (big, long, wide and so on), repeated addition, array, row, column, double

STAGE 5 - Division

Repeated subtraction (chunking):

Children will continue to use repeated subtraction but for problems such as HTO ÷ TO. They should be encouraged to estimate answers by using multiples of the divisor e.g.

They are encouraged to estimate answers by using multiples of the divisor e.g.

758 ÷ 28 ≈ 750 ÷ 30 = 25

They record useful facts first by starting with x10 and doubling/halving etc:

28 x 5 = 140
28 x 10 = 280
28 x 20 = 560

758
-560 (28 x 20)
198
-140 (28 x 5)
58
-56 (28 x 2)
2

Answer: 27 r2

NB If they are confident with this method, they will be introduced to traditional long division (see stage 6).

They begin to express remainders as whole numbers, fractions or decimals, depending on the context of the problem. For example they give the answer to 23 ÷ 4 as 5 r3, 5 ¾ or 5.75 in the following contexts:

- **Tennis ball are packed in boxes of fours. How many boxes can I fill with 23 balls?**
- **I have 23 pizzas to share between 4 hungry children. How much pizza will each child get?**
- **Four people are going on a trip. They share they cost of the petrol. The petrol costs £23. How much does each person pay?**

Short division:

N.B. This should be the main form of division for most children in stage 5. They should estimate first.

257 ÷ 7 ≈ 280 ÷ 7 = 40

Initially show HTO but work towards leaving these out:

```
  H T O
    0 3 6 r5
  7)2 2 5 4 7
```

Also include examples where remainders are given as decimals rather than remainders:

258 ÷ 4 ≈ 240 ÷ 4 = 60

```
    0 6 4 . 5
  4)2 2 5 1 8 .2 0
```

Vocabulary:

halve, share, share equally, one each, two each, three each…, group in pairs, threes…tens, equal groups of, divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse

STAGE 6 - Division

Short division:

Continue to develop use of short division as established in stage 5. Extend to decimal calculations with up to two decimal places:
238.44 ÷ 6 ≈ 240 ÷ 6 = 40

$$\begin{array}{r} 0\,3\,9\,.\,7\,4 \\ \hline 6\,)2^{2}3^{5}8\,.^{4}4^{2}4 \end{array}$$

Repeated subtraction (chunking) is revised for long division:

977 ÷ 36 ≈ 1000 ÷ 40 = 25

Encourage children to jot down useful tables facts first, using multiples of 10 and doubling/halving:

36 x 5 = 180
36 x 10 = 360
36 x 20 = 720

977
-720 (36 x 20)
257
-180 (36 x 5)
77
-72 (36 x 2)
5
Ans 27 r 5

Traditional long division will be the main method of division for long division in stage 6. (Mathletics has a very useful tutorial to explain this method):

$$\begin{array}{r} 28 \\ \hline 15\,)432 \\ 30 \\ \hline 132 \\ 120 \\ \hline 12 \end{array}$$

Ans 28 r12 or 28 12/15 = 28 4/5 or 28.8

Vocabulary:
halve, share, share equally, one each, two each, three each…, group in pairs, threes…tens, equal groups of, divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse

The following are some suggested websites that can help support you child's maths.

BBC Maths
http://www.bbc.co.uk/bitesize/ks2/maths/
http://www.bbc.co.uk/education/mathsfile/index.shtml

Woodlands Junior School Maths Zone
http://www.woodlands-junior.kent.sch.uk/maths/index.html

Ambleside Primary School
http://www.amblesideprimary.com/ambleweb/numeracy.htm
Go to Tools for Teaching section

TopMarks Education Resources
http://www.topmarks.co.uk/

CoolMath4kids (US Site)
http://www.coolmath4kids.com/

Primary Games (evaluation versions but playable)
http://primarygames.co.uk

Counton
http://counton.org

Maths is Fun (includes explanations/games/puzzles and quizzes)
http://mathsisfun.com

Teaching Tables (evaluation versions but playable)
http://teachingtables.co.uk

Maths Dictionary
http://www.amathsdictionaryforkids.com

Nrich (good for problems/puzzles)
http://nrich.maths.org/

Also the pupils will have access to the following sites using their given log-ins:

http://www.mathletics.co.uk/

http://www.mymaths.co.uk/