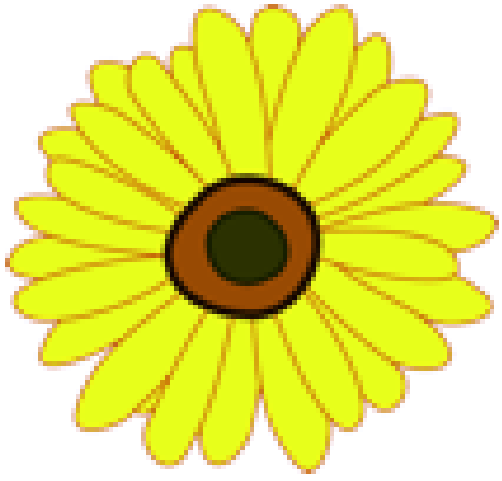
Calculation

Guilden Sutton Church of England Primary School



A guide for Parents

Calculation

We are working towards children having a systematic approach to solving problems as they progress through school.

Each stage should be taught using as many different practical materials as possible. Children of all ages will use a variety of apparatus, numbers and diagrams to solve problems.

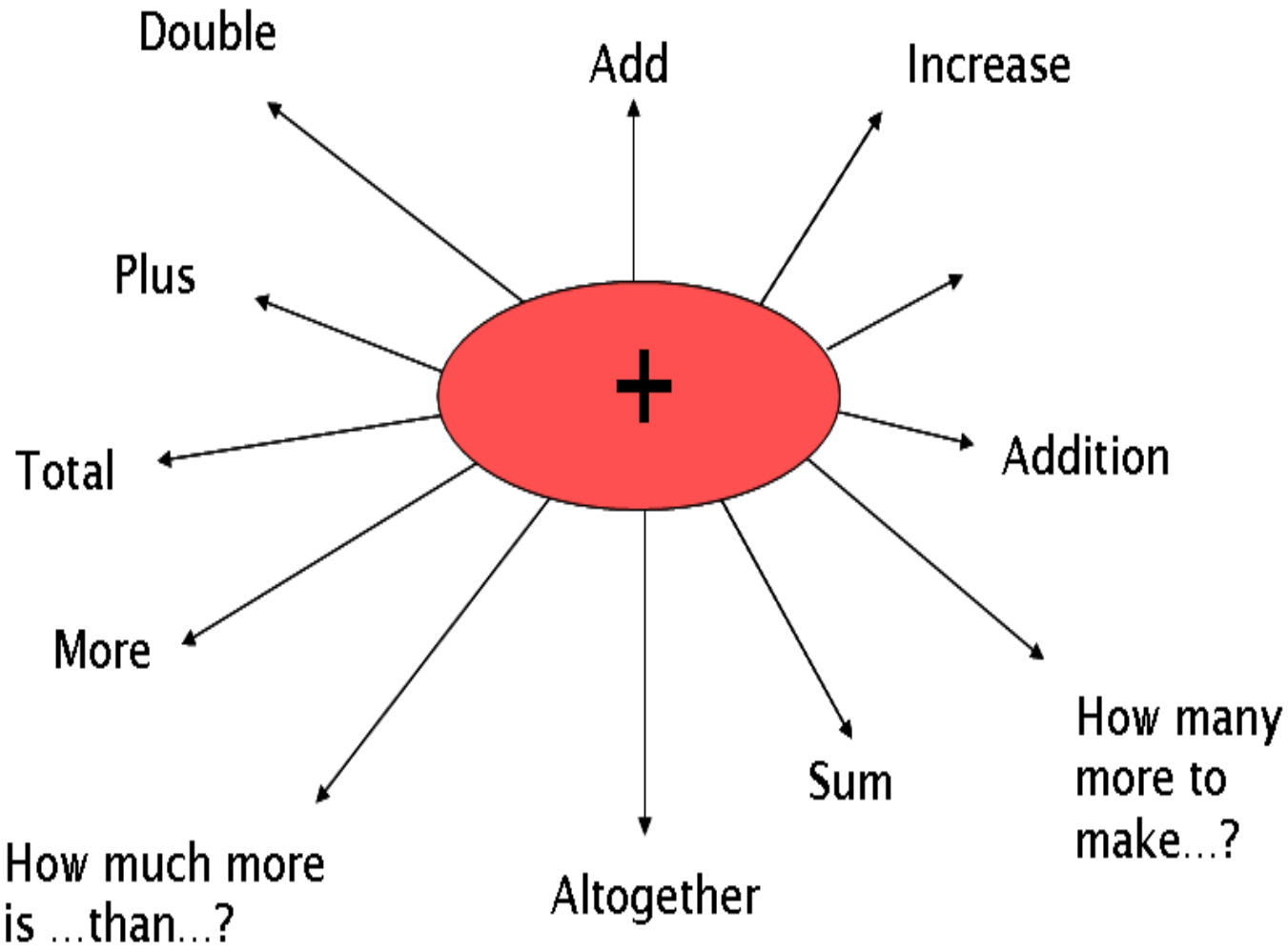
This booklet shows the steps that children experience throughout their primary teaching in maths calculation.

Remember… each stage takes a long time!

ADDITION

A progression from R to Y6

A variety of vocabulary should be used for these calculations.



2 + 3 =

Add

At a party, I eat 5 cakes and my friend eats 3.
How many cakes did we eat **altogether?**

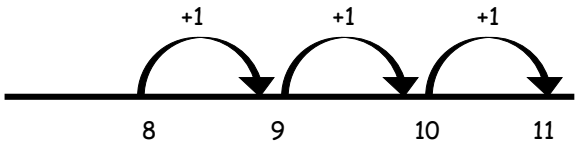
7 people are on the bus. 4 more get on at the next stop. How many people are on the bus now?

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

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.

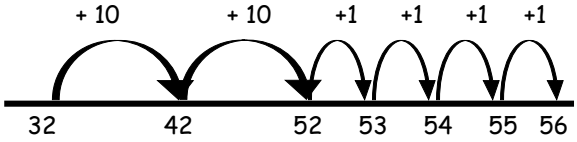
5 + ☆ = 11

☆ + 4 = 7

What are the missing numbers?

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

What is 32 + 24?



56 + 41 =

5 6 + 4 1

50 + 40 + 6 + 1

90 + 7

9 7

An expanded approach is introduced when children are secure with the mental calculation methods.(See arrow cards in resource pack).

1)

T	U
2	4
+ 3	2
5	6

2)

T	U
2	8
+ 4	8
7	6
1	

3)

H	T	U
4	0	5
+ 2	1	3
6	1	8

4)

Th	H	T	U
	6	5	9
+	7	4	9
1,	4	0	8
1	1	1	

5)

Th	H	T	U
4	7	4	7
2	8	0	2
+ 6	2	9	5
13,	8	4	4
1	1	1	

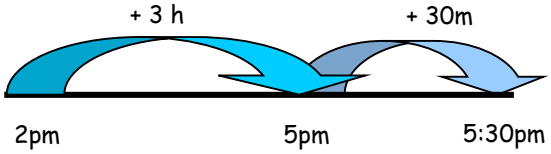
H	T	U
3	□	6
+ 1	2	8
4	4	4
	1	

Formal addition will be introduced towards the end of Yr 2.At this stage children are secure with place value.

1) **Tens and units without carrying.**
2) **Tens and units with carrying.**
3) **Hundreds, tens and units without carrying.**
4) **Hundreds, tens and units with carrying.**
5) **Moving onto thousands and millions**

Progression to missing numbers will follow.

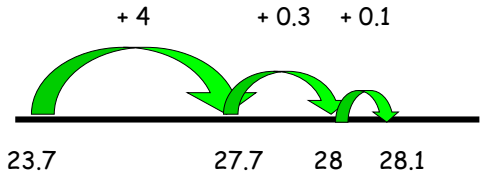
The train leaves at 2 o'clock in the afternoon and arrives at 5:30pm. How long is the journey?



The journey takes 3 hours 30 minutes

Children are encouraged to use a blank number line to solve money, time, decimal and other calculations.

23.7 + 4.4



Formal addition of decimals will be introduced after this.

```
  1 0.3
+ 1 1.4
  2 1. 7
```

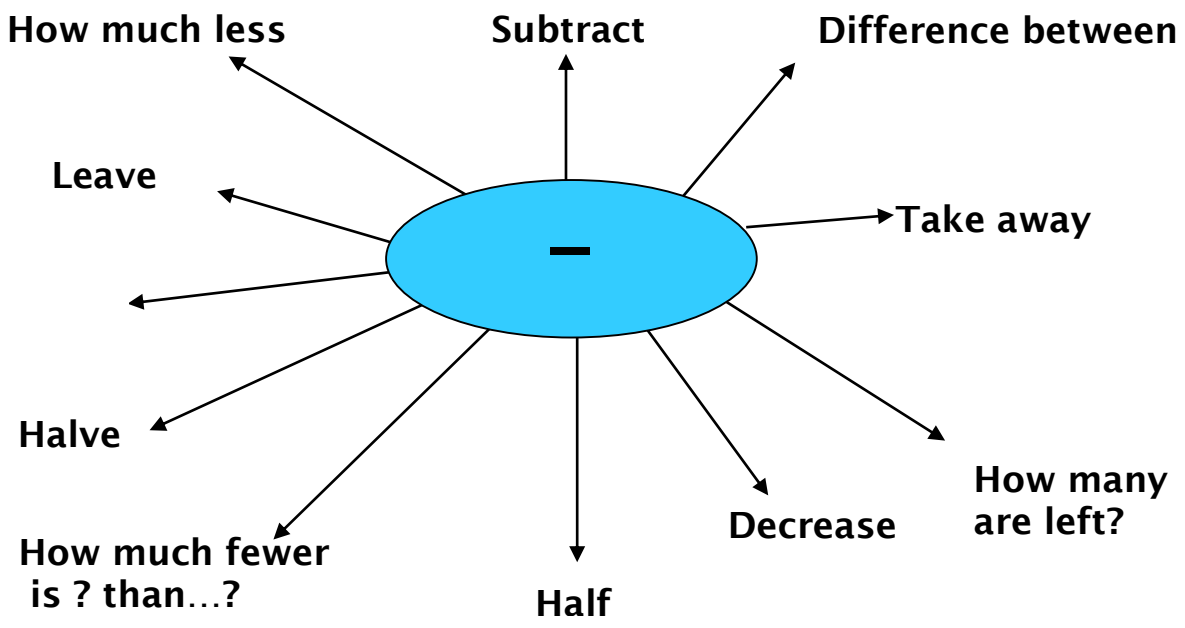
Zero can be put into the spaces so that the children keep each number in its correct column.

```
  1, 3 0 4. 6
+       4. 6 1 3
  1 ,3 09. 2 13
      1
```

SUBTRACTION

A progression from R to Y6

A variety of vocabulary should be used for these calculations.



5 – 2 =

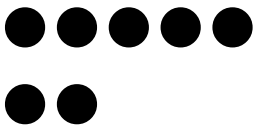
I had five balloons. Two burst. How many did I have left?

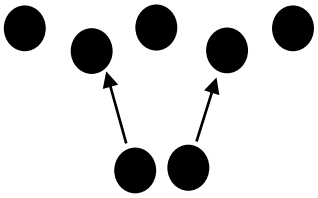
Take away

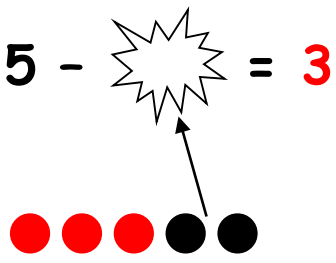
A teddy bear costs £5 and a doll costs £2. How much more does the bear cost?

Find the difference

Lisa has 5 felt tip pens and Tim has 2. How many more does Lisa have?







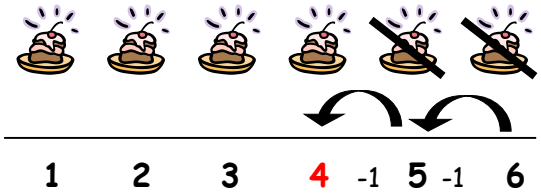
Working practically or drawing a picture helps children to visualise the problem.

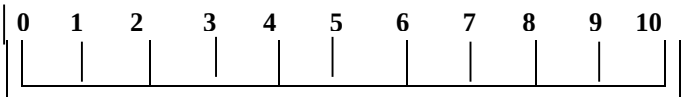
Children are encouraged to progress towards using dots or marks.

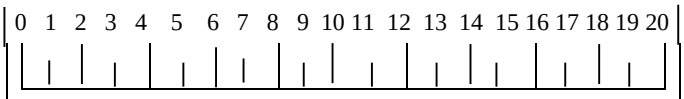
1:1 Correspondence

Matching

6 - 2



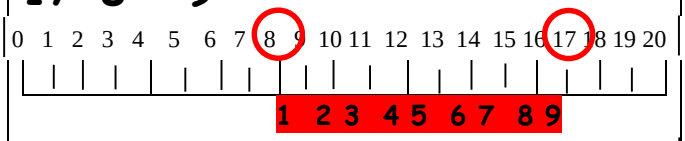




Children can count up or back using numbered or empty numbered lines.

Rulers can also be used in place of a number line.

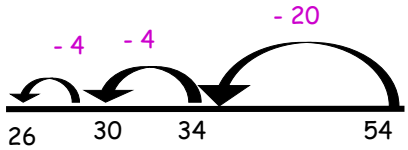
17-8 = 9



9 spaces

The baker makes 54 loaves and sells 28.
How many has he left?

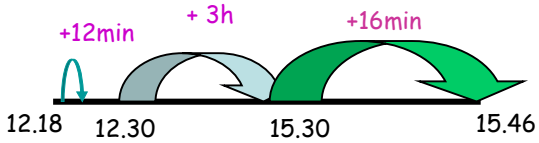
54 - 28



26 loaves are left

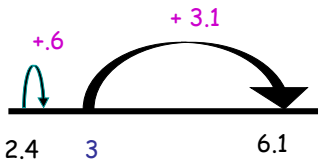
The train leaves at 12.18 and arrives at 15.46.
How long is the journey?

The journey takes 3h 28min



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

6.1 – 2.4



3.1 + 0.6 = 3.7
So:6.1 – 2.4 = 3.7

T	U
8	5
– 3	3
5	2

T	U
~~5~~	4
– 2	6
2	8

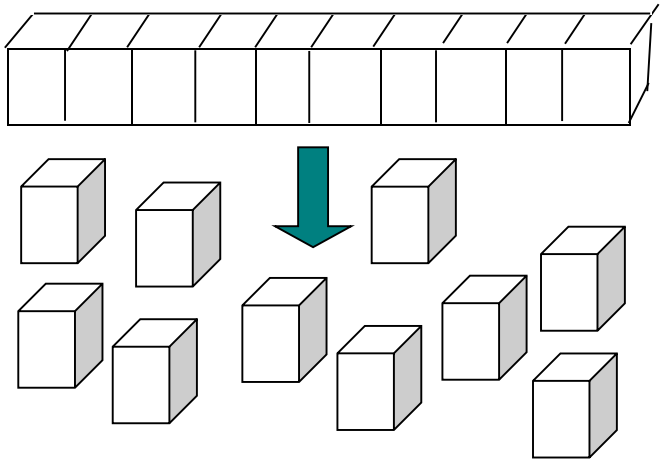
H	T	U
~~2~~	5	4
– 1	7	2
	8	2

H	T	U
~~4~~	~~0~~	6
– 3	1	9
	8	7

Th	H	T	U
~~5~~	~~0~~	~~0~~	7
– 1	4	3	8
3,	5	6	9

£		
~~5~~	.~~6~~	2
– 4	. 7	4
£ 0	. 8	8

£			
~~2~~	~~0~~	~~3~~	. 0 2
– 1	4	7	. 4 0
£	5	5	. 6 2



Pupils recognise the relationship between addition and subtraction to help them solve problems.

A variety of practical apparatus will be used to demonstrate that a '10' is moved into the units column as 10 individual units.

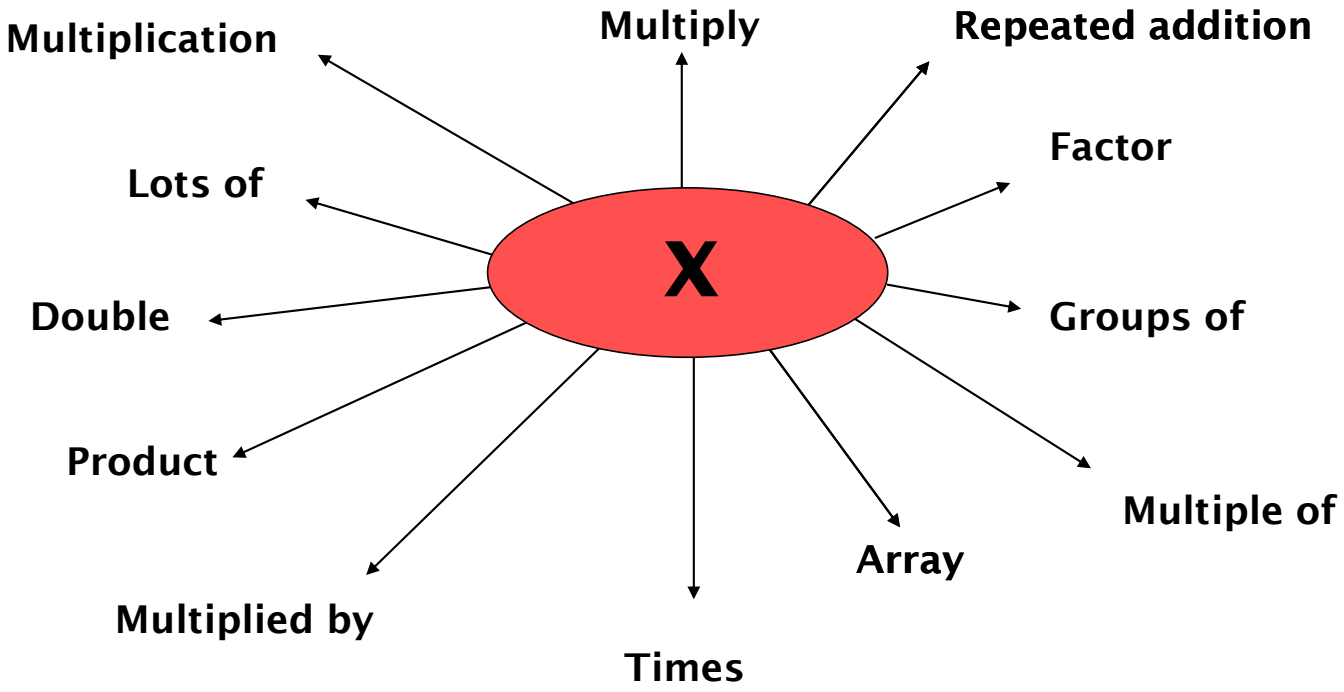
Continue into hundreds and thousands if appropriate.

For example, by exchanging a solid rod equal to 10, into 10 units.

MULTIPLICATION

A progression from R to Y6

A variety of vocabulary should be used for these calculations.



0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

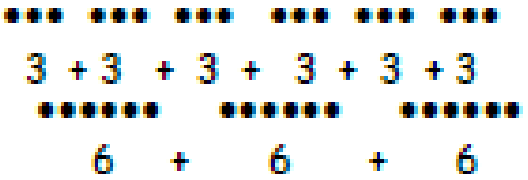
2 x 4

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

2 + 2 + 2 + 2

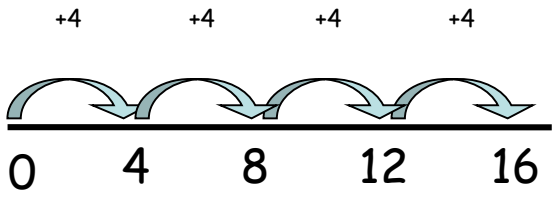
6 x 3 or 3 x 6

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



4 x 4

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



Children are introduced to multiplication by counting on and back in equal steps of ones, twos, fives and tens

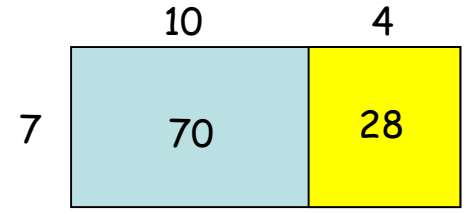
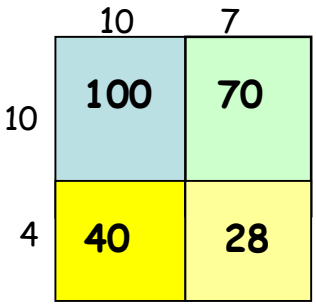
The children will work practically or draw pictures to help visualise the problem.

In Yr2 the multiplication sign will be introduced, as is the idea that multiplication is commutative; for example,
5X4 is the same as 4X5.

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

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

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 4 x 3 has the same value as 3 x 4.

T U 6 2 x 4 2 4 8 H T U 6 0 3 x 3 1 8 0 9 T U 1 7 x 5 8 5 3 H T U 1 0 5 x 6 6 3 0 3  70 + 28 = 98 **17 x 14**  100 + 70 + 40 + 28 = 238 T U 4 6 x 2 2 9 2 + 9 2 0 1 0 1 2 1 Th H T U 2 3 6 5 x 4 2 4 7 3 0 + 9 4 6 0 0 9 9 3 3 0 1	**At this stage a grid method may be used. When calculating 14 x 7, 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.** **The children are taught the formal method of long multiplication in upper KS2.**

Multiplying Decimals

Keep the decimal point in line.

Examples of multiplication being applied to real life:

```
   2.26
×     5
-------
  11.30
   1 3
```

5 train tickets costing €2.26 each = €11.30

```
   12.9
×    5
------
  64.5
  1 4
```

5 fence posts, each one 12.9cm wide = 64.5cm

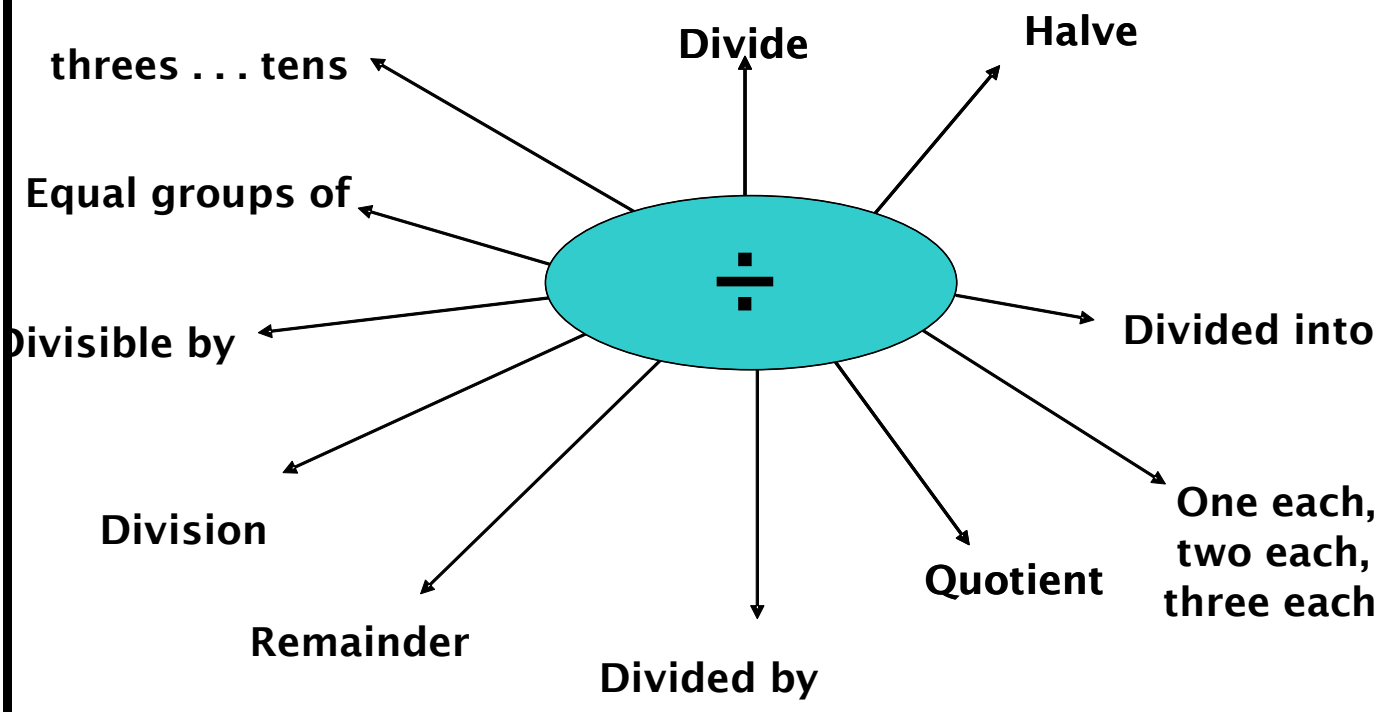
```
   33.95
×     4
-------
 135.80
  1 3 2
```

4 concert tickets costing €33.95 each = €135.80

DIVISION

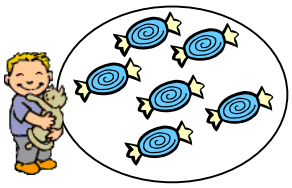
A progression from R to Y6

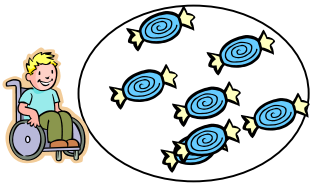
A variety of vocabulary should be used for these calculations.



There are 12 sweets and 2 children. They share the sweets equally, how many sweets does each child have?

Sharing between two





Each child has 6 sweets

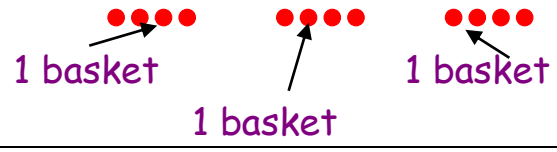
Grouping in threes

There are 12 sweets and each party bag needs three sweets. How many party bags can be made?

There are 4 party bags

"How many 4's in 12?"

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



Sharing is a skill children come to school with. 'One for me one for you' is repeated subtraction of one.

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

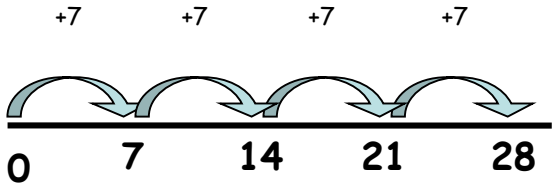
In this example children 'share' the 12 sweets between the two children until there are none left.

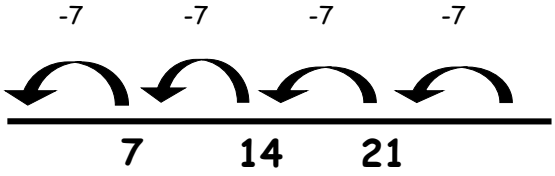
Children progress to removing 'groups' of a number. In this example children put 'groups of three sweets' into the party bags until they have no sweets left.

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

28÷7=

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





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

63÷4=

$$4\overline{)63} \quad 15 \text{ r } 3$$

A: 16 tables will be needed but one will only have 3 seats.

Bus Shelter Method

The total weight of 7 people is 289.5kg. What is the average weight of each person?

289.52÷7=

$$7\overline{)289.52} \quad 041.36$$

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

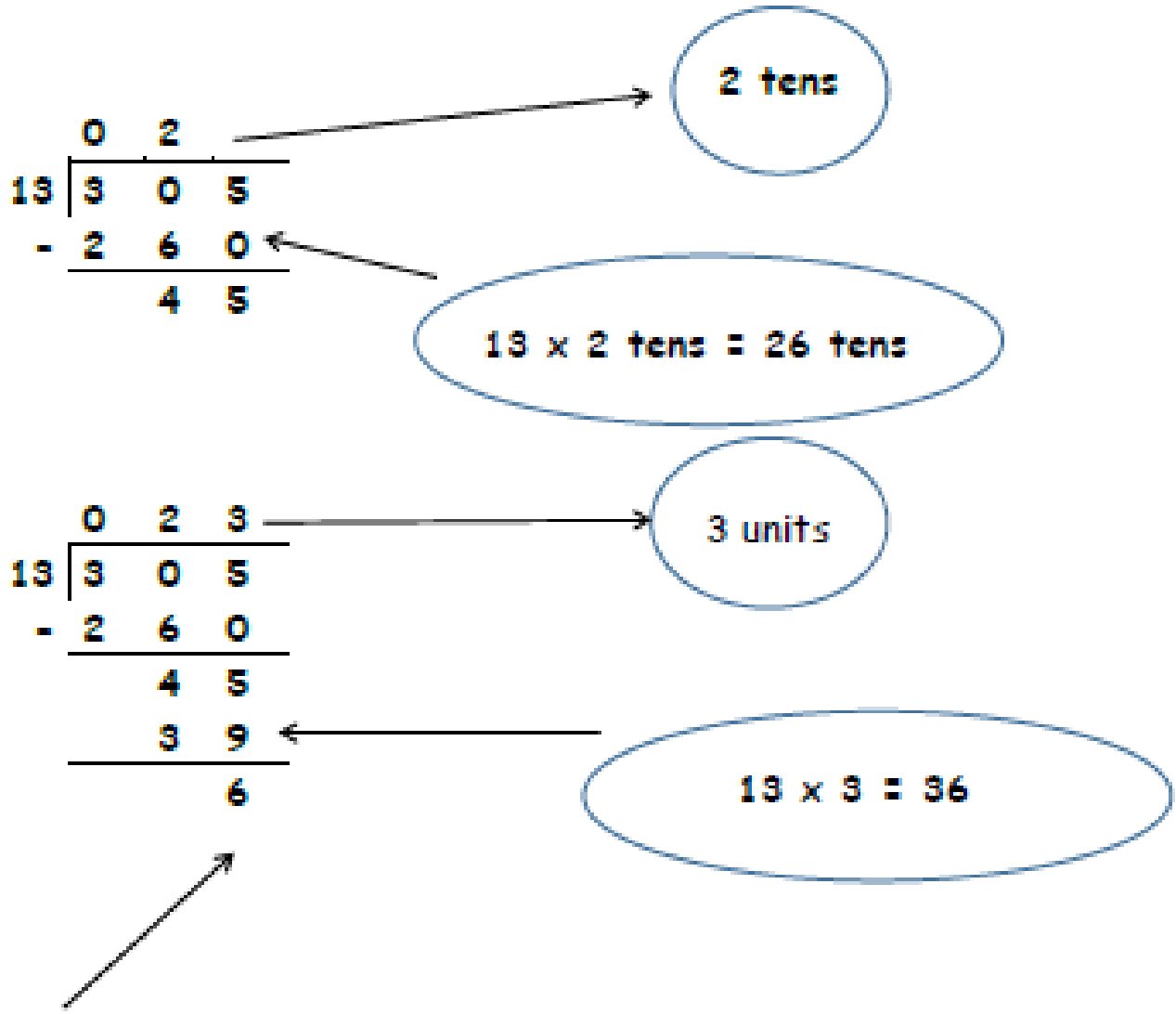
Or, also $4\overline{)28}$ 7

The same problem can also be done in reverse.

Using remainders is applicable too.

Long Division

305 ÷ 13



You've got 6 left

= 23 r 6

Fractions

Adding fractions with the same denominator:

$$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$$

Adding fractions with a different denominator:

$$\frac{3}{10} + \frac{2}{5}$$

Need to find a common denominator - a multiple of both.

$$\frac{3}{10} + \frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$$

Becomes:

$$\frac{3}{10} + \frac{4}{10} = \frac{7}{10}$$

Subtracting Fractions

Subtracting fractions with the same denominator:

$$\frac{4}{7} - \frac{2}{7} = \frac{2}{7}$$

$$\frac{5}{7} - \frac{2}{3}$$

Subtracting fractions with different denominators:

As for adding fractions, need to find a common denominator - a multiple of both.

$$\frac{5}{7} \times \frac{3}{3} - \frac{2}{3} \times \frac{7}{7}$$

$$\frac{15}{21} - \frac{14}{21} = \frac{1}{21}$$

Multiplying Fractions

$$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$$

When multiplying fractions, multiply both numerators and then multiply both denominators.

$$\frac{3}{4} \times 3$$

When multiplying fractions by whole numbers, multiply the whole number by the numerator.

$$\frac{3}{4} \times 3 = \frac{9}{4}$$

An improper fraction

or $2\frac{1}{4}$ A mixed number

Dividing fractions by a whole numbers

$$\frac{3}{8} \div 3$$

Multiply the denominator by the whole number.

8 x 3 = 24

The numerator remains the same.

The answer is → $\frac{3}{24}$

Multiplying Decimals

Keep the decimal point in line.

$$\begin{array}{r} 1.3 \\ \times \quad 2 \\ \hline 2.6 \\ \hline \end{array} \qquad \begin{array}{r} 12.9 \\ \times \quad 5 \\ \hline 64.5 \\ \hline {\scriptstyle 1\ 4} \end{array} \qquad \begin{array}{r} 33.95 \\ \times \quad 4 \\ \hline 135.80 \\ \hline {\scriptstyle 1\ 3\ \ 2} \end{array}$$

Calculation of Percentages

60% of €360

Find 10% of 360 (divide by 10) = €36
Then times by 6 to find 60%
€36 x 6 = €216

44% of €280

Find 10% of 280 = €28

To find 40%
€28 x 4 = €112

To find 4%, find 1%
€280 ÷ 100 = €2.80

4% of €280
€2.80 x 4 = €11.20

So 44% of €280
= €112 + €11.20
= €123.20

Brackets

The number outside the brackets multiplies the part inside the brackets

3 (9+6)
= 3 (15)
= 3 x 15
= 45

(7-3) x 5+2
= 4x5+2
= 20+2
= 22

BODMAS tells you the order to do the calculations in:

B = Brackets
O = Order
D = Division
M = Multiplication
A = Addition
S = Subtraction

Expressions

You can only add or subtract the SAME LETTER together.

b+b+b+b = 4 x b = 4b

f+2f+f-g-g = 4f-2g

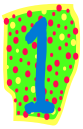
p+p+p-2p = 3p-2p = p

2+c+1+3c+4 = 7+4c

(2x3xfxg)+(4xg)=6fg+4g

A few ideas for you to try at home . . .

COUNTING



- Practise saying 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 CDs 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.

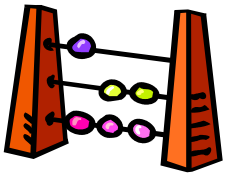
- Play games that involve counting (e.g. snakes and ladders, dice games, games that involve collecting objects).

- Look for numerals in the environment. You can spot numerals at home, in the street or when out shopping.

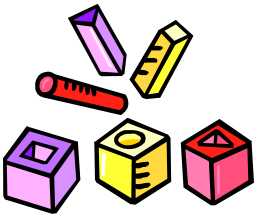
- Cut out numerals from newspapers, magazines or birthday cards. Then help your child to put the numbers in orders.

- Make mistakes when counting or ordering numbers. Can your child spot what you have done wrong?

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 number bonds 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.



SHAPES AND MEASURES

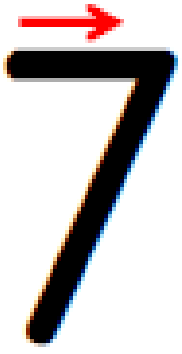
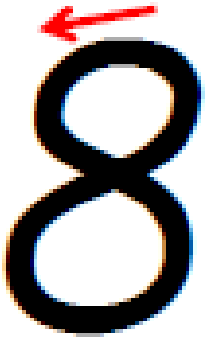
- Choose a shape of the week e.g. cylinder. Look for this shape in the environment (tins, candles etc). Ask your child to describe the shape to you (2 circular faces, 2 curved edges).
- Play 'guess my shape'. You think of a shape. Your child asks questions to try to identify it but you can only answer 'yes' or 'no' (e.g. Does it have more than 4 corners? Does it have any curved sides?)
- Hunt for right angles around your home. Can your child also spot angles bigger or smaller than a right angle?
- Look for symmetrical objects. Help your child to draw or paint symmetrical pictures / patterns.
- Make a model using boxes/containers of different shapes and sizes. Ask your child to describe their model.
- Practise measuring the lengths or heights of objects (in metres or cm). Help your child to use different rulers and tape measures correctly. Encourage them to estimate before measuring.
- Let your child help with cooking at home. Help them to measure ingredients accurately using weighing scales or measuring jugs. Talk about what each division on the scale stands for.
- 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.

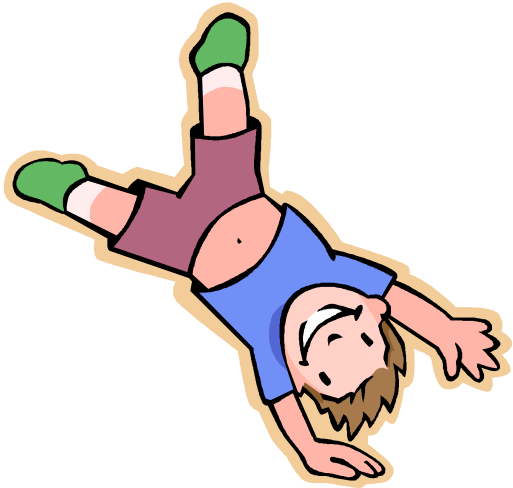
REAL LIFE PROBLEMS

- 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.

Correct number formation is very important, Please ensure your child is forming all numbers correctly.



Make Maths Fun!

Guilden Sutton C. of E. Primary School 2022