Hook-with-Warsash C of E Academy Calculation Policy

Helping your child with Mathematics
Updated December 2022

This policy should also be used alongside the Visual Coding Key Representations Progression from years 1-6 documents which are updated every term.

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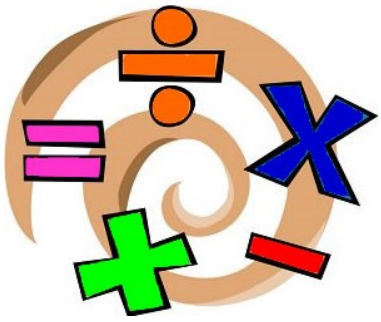


CALCULATIONS IN MATHEMATICS

The Maths work your child is doing at school may look very different to the kind of 'sums' that you may remember doing. Please be assured that mathematics has not changed! The work looks different because children are encouraged to create clear visual methods to help solve problems before moving onto formal methods. We teach children using concrete materials (things they can touch and hold), moving onto pictorial representations to help their understanding, and then onto abstract methods (written methods) to complete their understanding: (CPA)
Not all children or adults learn in this order so the order of CPA may change depending on the needs of the learner.

Concrete Pictorial Abstract

3 + 7 = 10

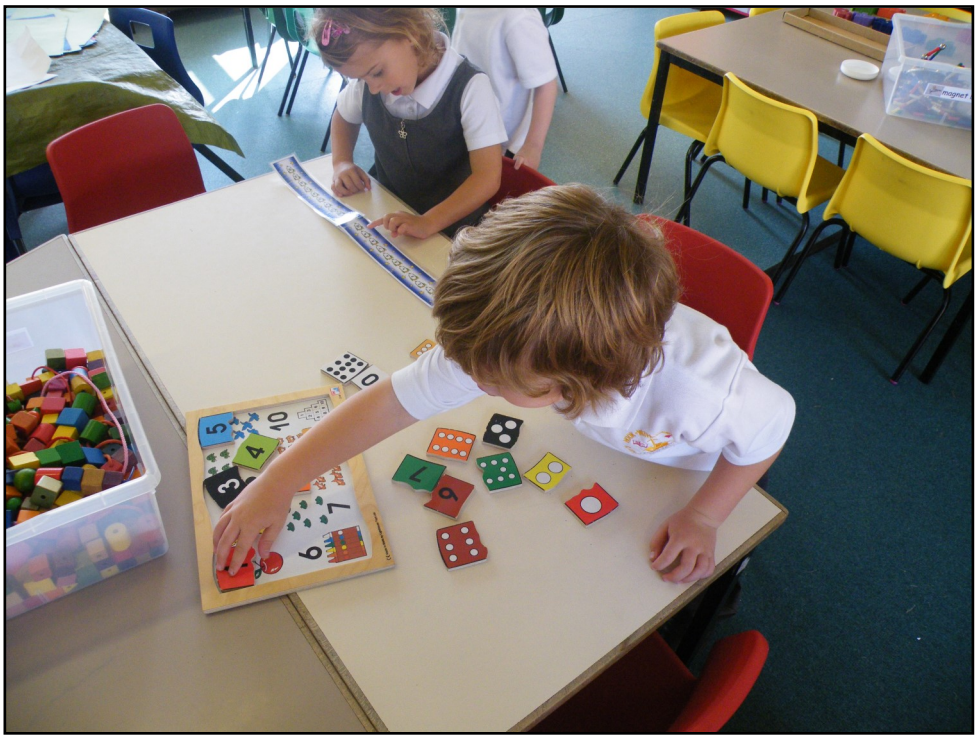
Discussing the efficiency and suitability of different strategies is an important part of maths lessons

Talk to your child about how you work things out.

Ask you child to explain their thinking.

NUMERACY IN THE EARLY YEARS

In Early Years many of the activities carried out are in a practical context.
Children learn to chant, recognise and write numbers but they first need to develop the pre-numeracy skills of one to one correspondence for counting and matching. They need to recognise patterns and be able to sort objects into groups saying why they 'go together'.
Vocabulary plays a big part in helping young children to understand mathematical activities. Phrases such as 'altogether makes', 'one more' or 'one less' and positional language; next, after, before and between are commonly used and need to be understood.
Various different resources are use to support their mathematical development from multi-sensory number shapes, stacking cubes, beads for threading and counting, number lines and objects for sorting and matching. They will use coins in role play and begin to appreciate their value. As they develop more confidence with practical activities and language use, they are encouraged to record their work in a variety of ways.
This may involve drawing pictures or writing numbers and they will be expected to explain what they have done and why.



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 CDs available.

*Give your child the opportunity to count a range of objects (coins, 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 order.

*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 number 5.

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 the entrance costs will be to an attraction.

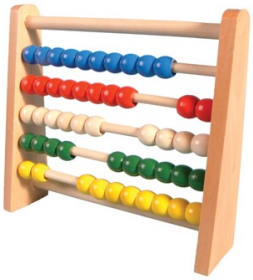
*Use a TV guide. Ask your child to work out the length of their favourite TV programme. Can they calculate how long they spend watching TV each day? Each week?

*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.

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.

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.

*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 2 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 5 answers (e.g. numbers to 10 to practise simple addition, multiples of 5 to practise the 5 times tables). Ask a question and if the player has the correct 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 possible 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). Add to the list over a few days. Try starting with a multiplication fact as well.

*Ask them how many different ways they create single digit numbers
e.g. 1 +7 = 8, 2 + 6 = 8, 3 + 5 = 8, 4 + 4 = 8, Can they apply this to 80? 800?

*Using missing gaps– a sequence of examples such as:

3 + □ = 8, ▭ + 3 = 9 3 + □ = 10 3 + □ = 11

helps children develop their understanding that the = symbol means equivalence. This sequence of examples does the same at a deeper level:

3 × □ + 2 = 20 3 × □ + 2 = 23 3 × □ + 2 = 26 3 × □ + 2 = 29

3 × □ + 2 = 30 + ▭

Children should also be given examples where the empty box represents the operation, for example: 4 × 5 = 10 □ 10 6 □ 5 = 15 + 15

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? Any curved sides?

*Hunt for right angles around your home. Can your child 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 them to describe their model.

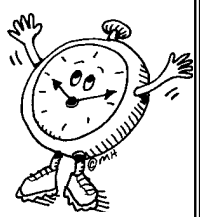
*Practise measuring the lengths or heights of objects (in metres or cm). Help your child to use different rulers and tape measures correctly. Encourage them to estimate before measuring.

*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 pockets.

*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). Encourage your child to wear a watch.

*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.



Develop children's fluency with basic number facts

Fluent computational skills are dependent on accurate and rapid recall of basic number bonds to 20 and times-tables facts. Spending a short time every day on these basic facts quickly leads to improved fluency. This is an important step to developing conceptual understanding through identifying patterns and relationships between the tables (for example, that the products in the 6× table are double the products in the 3× table). It has been found that this has helped children develop a strong sense of number relationships, an important prerequisite for procedural fluency.

×10	×5	×2	×4	×8	×3	×6	×9	×7

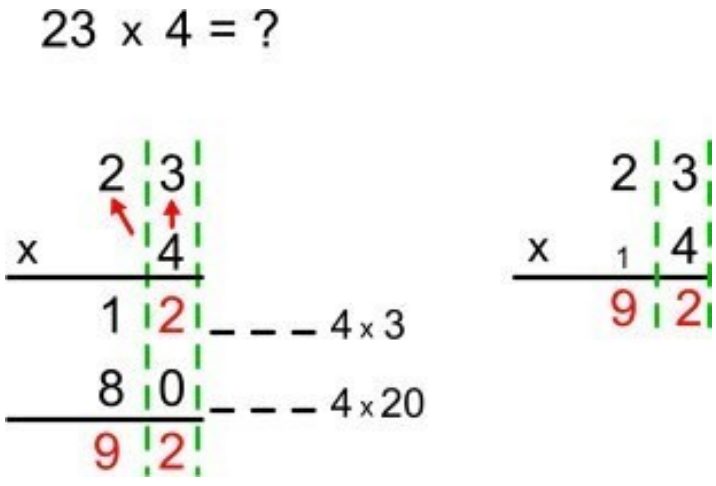
Develop children's fluency in mental calculation

Efficiency in calculation requires having a variety of mental strategies. In particular the importance of 10 and partitioning numbers to bridge through 10. For example:

9 + 6 = 9 + 1 + 5 = 10 + 5 = 15.

Develop fluency in the use of formal written methods

Teaching column methods for calculation provides the opportunity to develop both procedural and conceptual fluency. Informal methods of recording calculations are an important stage to help children develop fluency with formal methods of recording.



Stepping stones to Formal Written Methods

Develop children's understanding of the = symbol

The symbol = shows equivalence. If we write: 3 + 4 = 6+1 then we are saying that what is on the left of the = symbol is equivalent to what is on the right of the symbol. But many children interpret = as being simply an instruction to evaluate a calculation, as a result of always seeing it used like this:

3 + 4 = **5 × 7 =**

If children only think of = as meaning "work out the answer to this calculation" then they are likely to get confused by empty box questions such as: **3 + □= 8**

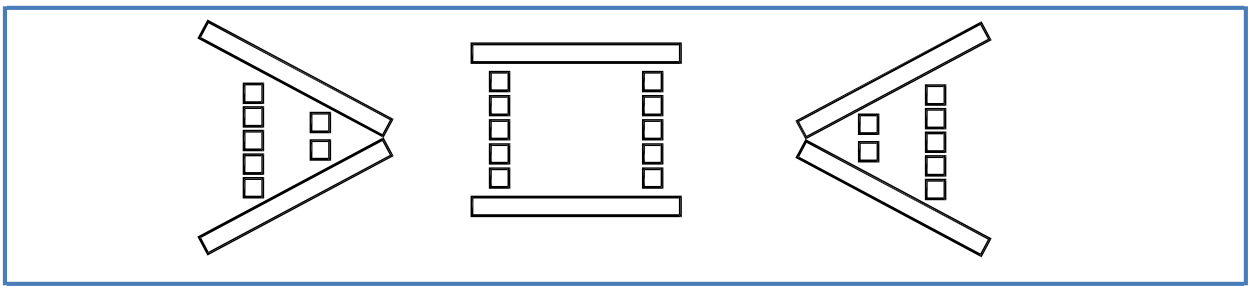
Later they are very likely to struggle with even simple algebraic equations, such as: **$3y = 18$**

One way to model equivalence such as 2 + 3 = 5 is to use balance scales.

Varying the position of the = symbol and include empty box problems to deepen children's understanding of the = symbol.

Teach inequality alongside teaching equality

To help young children develop their understanding of equality, they also need to develop understanding of inequality. One way to introduce the < and > signs is to use rods and cubes to make a concrete and visual representations such as:



This shows that 5 is greater than 2 (5 > 2), 5 is equal to 5 (5 = 5), and 2 is less than 5 (2 < 5).

Balance scales can also be used to represent inequality. For example, in this empty box problem children have to decide whether the missing symbol is <, = or >: **5 + 7 □ 5 + 6**

An activity like this also encourages children to develop their mathematical reasoning: "I know that 7 is greater than 6, so 5 plus 7 must be greater than 5 plus 6".

Asking children to decide if number sentences are true or false also helps develop mathematical reasoning. For example, in discussing this statement: **4 + 6 + 8 > 3 + 7 + 9**

A child might reason that "4 plus 6 and 3 plus 7 are both 10. But 8 is less than 9. Therefore 4 + 6 + 8 must be less than 3 + 7 + 9, not more than 3 + 7 + 9".

Don't count, calculate

Young children benefit from being helped at an early stage to start calculating, rather than relying on 'counting on' as a way of calculating. For example, with a sum such as: **4 + 7** = Rather than starting **at 4** and counting **on 7,** children could use their knowledge and bridge to 10 to deduce that because **4 + 6 = 10, so 4 + 7** must equal **11.**

Connections

Children are required to reason and make connections between calculations. The connections made improve their fluency for example:

2 × 3 =	6 × 7 =	9 × 8 =
2 × 30 =	6 × 70 =	9 × 80 =
2 × 300 =	6 × 700 =	9 × 800 =
20 × 3 =	60 × 7 =	90 × 8 =
200 × 3 =	600 × 7 =	900 × 8 =

Use empty box problems

Empty box problems are a powerful way to help children develop a strong sense of number. They provide the opportunity for reasoning and finding easy ways to calculate. They enable children to practise procedures, whilst at the same time thinking about conceptual connections. A sequence of examples such as:

$$3 + \square = 8$$

$$3 + \square = 9$$

$$3 + \square = 10$$

$$3 + \square = 11$$

helps children develop their understanding that the = symbol shows equivalence, and invites children to spot the pattern and use this to work out the answers.

This sequence of examples does the same at a deeper level:

$$\mathbf{3 \times \square + 2 = 20}$$

$$\mathbf{3 \times \square + 2 = 23}$$

$$\mathbf{3 \times \square + 2 = 26}$$

$$\mathbf{3 \times \square + 2 = 29}$$

$$\mathbf{3 \times \square + 2 = 35}$$

Children should also be given examples where the empty box represents the operation, for example:

$$\mathbf{4 \times 5 = 10 \square 10}$$

$$\mathbf{6 \square 5 = 15 + 15}$$

$$\mathbf{6 \square 5 = 20 \square 10}$$

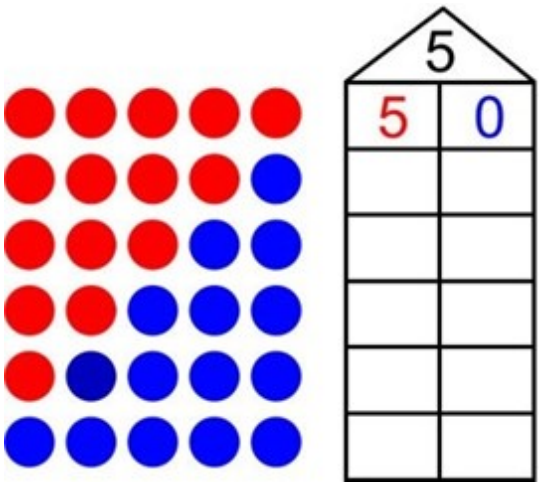
$$\mathbf{8 \square 5 = 20 \square 20}$$

$$\mathbf{8 \square 5 = 60 \square 20}$$

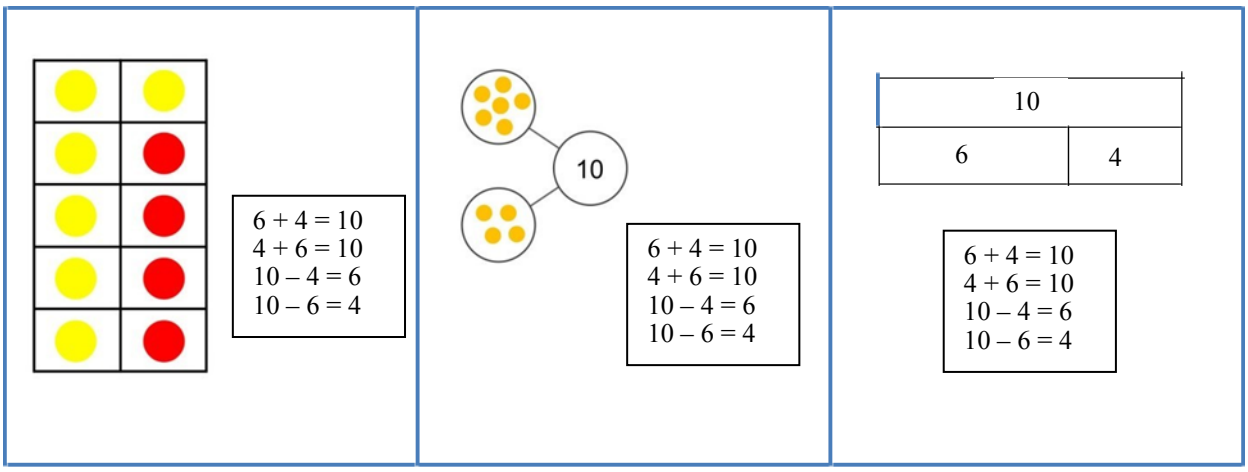
These examples also illustrate the careful use of variation to help children develop both procedural and conceptual fluency.

Expose mathematical structure and work systematically

Developing instant recall alongside conceptual understanding of number bonds to 10 is important. This can be supported through the use of images such as the example illustrated below:



The image above lends itself to seeing patterns and working systematically and children can connect one number fact to another and be certain when they have found all the bonds to 5. Using other structured models such as tens frames, part whole models or bar models can help children to reason about mathematical relationships.



Tens Frame **Part Whole Model** **Bar Model**

Connections between these models should be made, so that children understand the same mathematics is represented in different ways. Asking the question "What's the same what's different?" has the potential for children to draw out the connections.

Illustrating that the same structure can be applied to any numbers helps children to generalise mathematical ideas and build from the simple to more complex numbers, recognising that the structure stays the same; it is only the numbers that change. For example:

10	
6	4

$6 + 4 = 10$

$4 + 6 = 10$

$10 - 6 = 4$

$10 - 4 = 6$

247	
173	74

$173 + 74 = 247$

$74 + 173 = 247$

$247 - 173 = 74$

$247 - 74 = 173$

6.2	
3.4	2.8

$3.4 + 2.8 = 6.2$

$2.8 + 3.4 = 6.2$

$6.2 - 3.4 = 2.8$

$6.2 - 2.8 = 3.4$

Grids such as the ones below could be used to practice addition facts once children are secure on concrete and pictorial representations.

+	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

+	5	9	1	3	2	4	7	6	10	8
4										
2										
5										
8										
9										
1										
10										
3										
6										
7										

ADDITION

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

Addition with pictures

Initially children are encouraged to use pictures to help them with their calculations.
E.g. **2 + 3 =**

At a party, I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether?

Addition using marks on a page

Children move on to using Dienes apparatus and marks on a page e.g. dots or crosses to represent objects as this is quicker than drawing a picture.

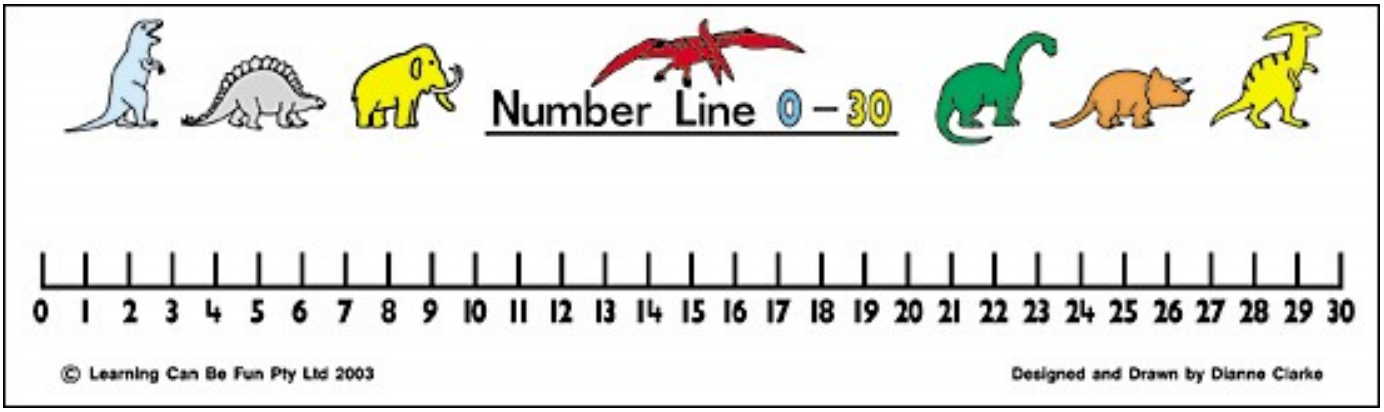
E.g. 7 people are on the bus. 4 more get on at the next stop. How many people are on the bus now?

7 + 4 =

X X X X X X X X X X X

Structured Number Lines

As numbers get bigger they are encouraged to use structured number lines to help with their calculations. E.g. **9 + 7 =**



ADDITION continued

Addition with Dienes Apparatus

Children will be taught to use Dienes to represent tens and units.

E.g **21** + **42** = **63**

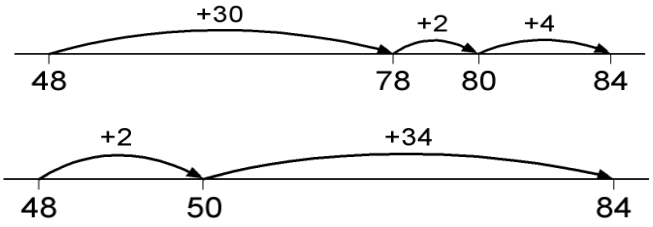
Unstructured Number Lines

Drawing on an empty number line helps children to record the steps they have taken in a calculation (start on 48, + 30 , then + 2 and 4). This is much more efficient than counting on in ones.

E.g My sunflower is 48cm tall. It grows another 36cm. How tall is it now?

48 + 36 =

OR:



Written Methods

Children will be taught written methods for those calculations they cannot do 'in their heads'. Expanded methods build on mental methods and make the value of the digits clear to children:

E.g. There are 87 boys and 46 girls in the football club. How many children are there altogether? **87 + 46=**

```
  8 7
+ 4 6
  1 3  (7 + 6)
1 2 0 (80 + 40)
1 3 3
```

OR **87 + 46 = 7 + 6 = 13**

80 + 40 = 120+

133

Compact Written Method

When children are confident using the expanded method this can be 'squashed' into the traditional compact method.

E.g. 786 people visited the museum last month. The numbers increased by 568 this month. How many people altogether visited this year?

786 + 568=

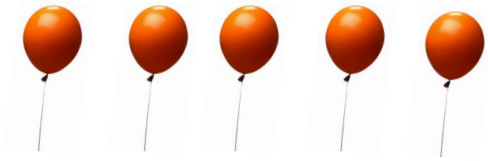
```
  7 8 6
+ 5 6 8
1 3 5 4
1 1 1
```

SUBTRACTION
Children are taught to understand subtraction as: 'taking away' (counting back) and 'finding the difference' (counting up).

Subtraction with pictures

Drawing a picture, or using apparatus, helps children to visualise the problem.
E.g. I had 5 balloons. 2 burst. How many did I have left?

5 - 2= Take away



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

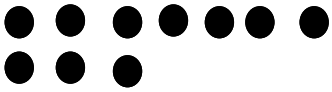
Find the difference

Subtraction using marks on a page

Using dots or crosses or is quicker than drawing a detailed picture.
E.g. Mum baked 7 biscuits. I ate 3. How many were left?

7 - 3=

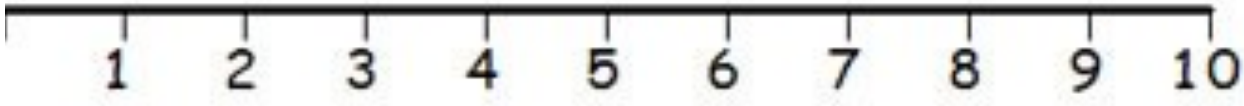
Lisa had 7 felt tip pens and Tim has 3. How many more does Lisa have?



Find the difference.

Structured Number Lines

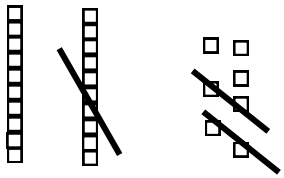
Children can use a structured number line to 'count back' for subtraction.
E.g. Counting Back **8 - 5 =**



SUBTRACTION

Subtraction with Dienes Apparatus

Children will be taught to use Dienes apparatus to represent Tens and Units and help with subtractions.

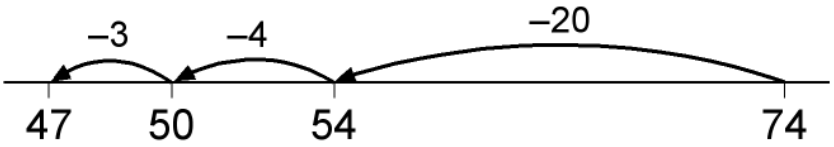


E.g. 27 – 14

Unstructured Number Lines

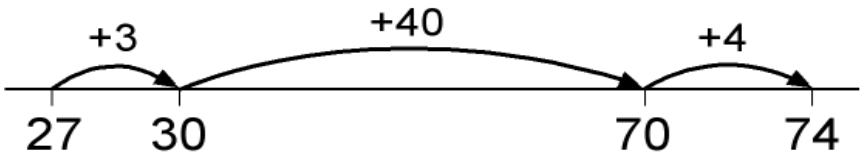
Counting down: To help with subtraction children can 'count down' on an unstructured number line. This is a good way for them to record the steps they have taken (start on 74, -20, then –7).

E.g. 74-27 =



Counting up: Alternatively children can use an empty number line to 'count up' from the smaller to the larger number. This can be recorded using either number lines or vertically in columns.

E.g. 74-27 =

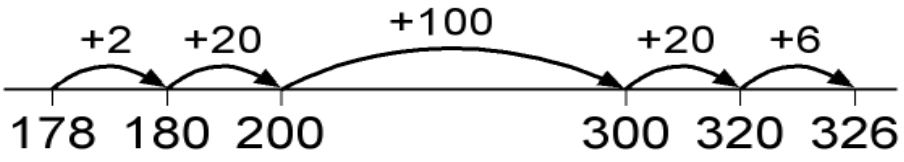


I cut 27cm off a ribbon measuring 74cm. How much is left?

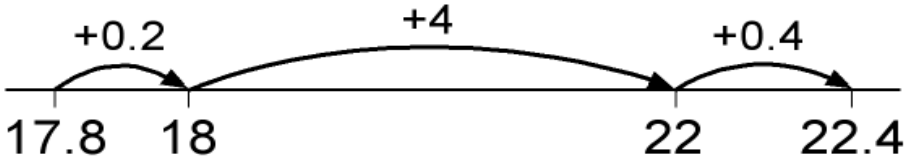
Unstructured Number Lines with larger numbers

Children are encouraged to count up to a multiple of 10 or 100. This method also works well with decimals.

E.g. **326-178 =**



E.g. **22.4-17.8 =**



SUBTRACTION

Moving onto a more compact written method

With this stage in subtraction children are taught to divide the numbers into tens and ones. This reinforces the children's knowledge of place value leads into the compact method. Partitioned numbers are written under one another:

E.g. 74 − 27

Step 1:

$$\begin{array}{r} 70+4 \\ -\ 20+7 \\ \hline \end{array}$$

Step 2:

$$\begin{array}{r} \overset{60}{\cancel{70}}+\overset{14}{\cancel{4}} \\ -\ 20+7 \\ \hline 40+7 \end{array}$$

Step 3:

$$\begin{array}{r} \overset{6}{\cancel{7}}\ \overset{14}{\cancel{4}} \\ -\ 2\ 7 \\ \hline 4\ 7 \end{array}$$

Traditional Written Methods

This leads children to the more compact method and shows them how the numbers have been broken down in order to make subtraction easier. This method can now by applied to larger numbers:

E.g. 741 − 367

Step 1:

$$\begin{array}{r} 700+40+1 \\ -\ 300+60+7 \\ \hline \end{array}$$

Step2

$$\begin{array}{r} \overset{600}{\cancel{700}}+\overset{130}{\cancel{40}}+\overset{11}{\cancel{1}} \\ -\ 300+60+7 \\ \hline 300+70+4 \end{array}$$

Step 3

$$\begin{array}{r} \overset{6}{\cancel{7}}\ \overset{13}{\cancel{4}}\ \overset{11}{\cancel{1}} \\ -\ 3\ 6\ 7 \\ \hline 3\ 7\ 4 \end{array}$$

NC Examples

874 – 523 becomes

$$\begin{array}{r} 8\ 7\ 4 \\ -\ 5\ 2\ 3 \\ \hline 3\ 5\ 1 \end{array}$$

Answer: 351

932 – 457 becomes

$$\begin{array}{r} \overset{8}{\cancel{9}}\ \overset{12}{\cancel{3}}\ \overset{1}{2} \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

932 – 457 becomes

$$\begin{array}{r} \overset{1}{9}\ \overset{1}{3}\ 2 \\ -\ \overset{5}{\cancel{4}}\ \overset{6}{\cancel{5}}\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

MULTIPLICATION

Multiplication is introduced to children as repeated addition.

Using Pictures

Pictures are key to help children's understanding of multiplication.
4 birds have 2 feet each so:

E.g. **4 x 2 = 8**

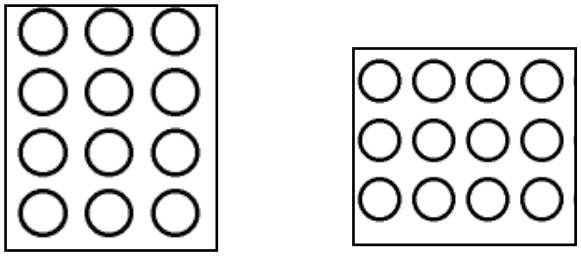
Multiplication using marks on a page

Dots or crosses are often drawn in groups. Children will use apparatus such as Mulitilink to help with these concepts.

E.g. This shows 3 groups of 5.

Arrays

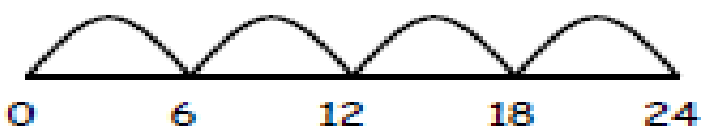
Drawing an array (3 rows of 4 or 4 rows of 3) gives children an image of the answer. It also helps develop the understanding that 4 x 3 is the same as 3 x 4.



Number lines

Children use number lines to help them count on in equal steps to calculate answer for multiplication. This shows 4 jumps of 6.

4 x 6 = There are 4 cats. Each cat has 6 kittens. How many kittens are there altogether?



MULTIPLICATION

Multiplication Facts

Pupils are encouraged to learn their multiplication facts as soon as possible in order to help them recognise patterns in multiplication and division calculations. They are encouraged to learn them in the following order to help them see connections e.g. once they now their 2 times tables they can double these to learn their 4 times tables, then double again for 8 x tables:

×10	×5	×2	×4	×8	×3	×6	×9	×7

By the end of year 4 they are expected to know their multiplication facts off by heart up to 12 x 12. From 2019 Year 4 pupils will be formally tested on these through an online assessment produced by the DFE in the summer term.

Pupils are encouraged to recognise patterns in their multiplication facts using multiplication grids. E.g. all numbers in the 4 x tables are always even. Double 3 times tables to get 6 times tables. Filling in blank grids, or sections of grids, helps children to recognise numbers from their tables.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

MULTIPLICATION

Useful grids for you to photocopy and fill in with your children:

X	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

x	4	6	9	8	3	11	12	2	1	5	10	7
4												
6												
9												
8												
3												
11												
12												
2												
1												
5												
10												
7												

MULTIPLICATION

Multiples of 10

As pupils become more confident with their multiplication facts they are encouraged to use them to help multiply multiples of 10. e.g. 7 x 3 = 21

7 x 30 = 210
70 x 3 = 210
70 x 30 = 2100

Partitioning

As numbers get bigger children are taught how to split them into tens and units to help calculations. E.g.

There are 13 biscuits in a packet. How many biscuits in 7 packets?

13 x 7 Split 13 into parts (10 and 3).

This gives you two jumps (10 x 7 and 3 x 7).

Partitioning larger numbers

The next stage is to break down a number and multiply each part separately. Children must be secure with their multiplication facts in order to do this effectively.

E.g. **42 x 6 = 40 x 6 = 240**
2 x 6 = 12
240 + 12 = 252

This can be applied to larger numbers but once children are at this stage they are ready to move onto more compact methods of recording:

124 x 7 = 100 x 7 = 700
20 x 7 = 140
4 x 7 = 28
700 + 140 + 28 =868

MULTIPLICATION

Column Methods

The next step is to represent the method of recording in a column format, but showing the working. Children should describe what they do by referring to the actual values of the digits in the columns. E.g. the first step in 38 x 7 is 30 multiplied by seven, not just 3 times 7, although the relationship with the known times tables fact 3 x 7 should be stressed.

38 x 7 = 8 x 7 = 56
30 x 7 = 210
266

```
   38
x   7
  56  (7 x 8)
 210  (7 x 30)
 266
```

Formal Methods

The next step is to further reduce the amount of recording by using the more formal method including 'carrying' to the tens column.
This would be extended to 2 digit multiplying by multiples of 10.

38 x 7 =

```
  38
x  7
 266
  5
```

This would be extended to: 38 x 70 = 2660

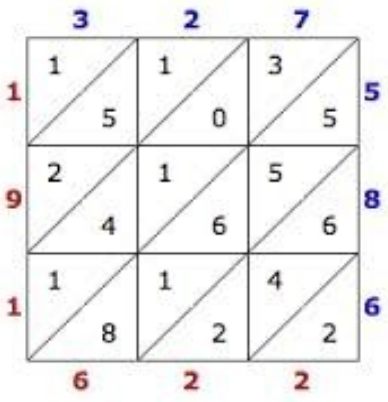
Multiplying 2 digit numbers

When multiplying 2 digit numbers together i.e. TU x TU, children are asked to estimate the answer first. This helps them to get a feel for the size of the numbers involved.
56 x 27 = 56 x 27 is approximately 60 x 30 = 1800

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

Chinese Grid Method

Alternative methods such as the Chinese Grid method may also be used.
See examples at http:// www.youtube.com/ watch?



MULTIPLICATION

More examples of Short Multiplication:

24 × 6 becomes

	2	4
×		6
1	4	4
	2	

Answer: 144

342 × 7 becomes

	3	4	2
×			7
2	3	9	4
	2	1	

Answer: 2394

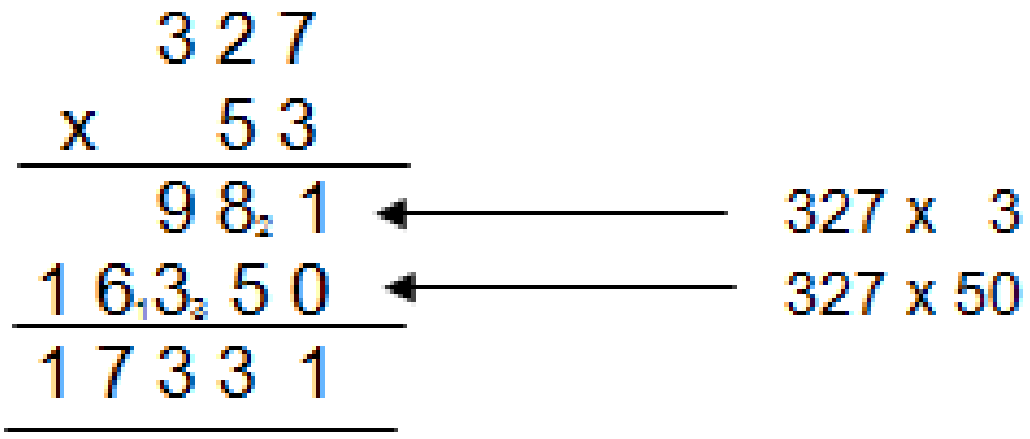
2741 × 6 becomes

	2	7	4	1
×				6
1	6	4	4	6
	4	2		

Answer: 16 446

Long Multiplication:

In Hook-with-Warsash we teach the children to multiply by the units first and then the tens with carrying any numbers at the bottom of the line.
See example below:



DIVISION
Children are taught to understand division as sharing and grouping.

Using Pictures

More pictures! Drawing often gives children a way into solving the problem.

6 ÷ 2 = 6 Easter eggs are shared between 2 children. How many eggs do they get each?

Sharing between 2

There are 6 Easter eggs. How many children can have two each?

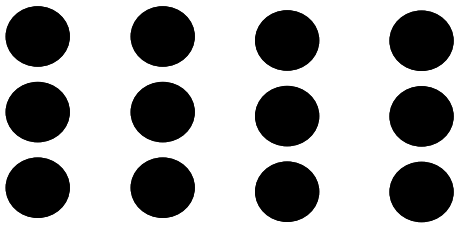
Grouping in twos

Division using marks on a page

Dots or crosses can either be shared out one at a time or split up into groups.

12 ÷ 4 =

This is then extended into groups including remainders.

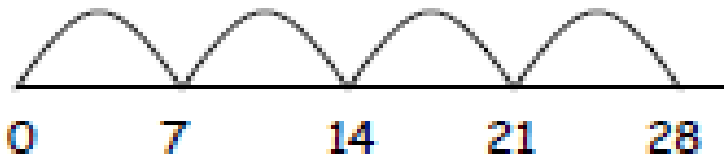


Number lines

To work out how many 7's there are in 28, draw jumps of 7 along a number line. This shows you need 4 jumps of 7 to reach 28.

28 ÷ 7 =

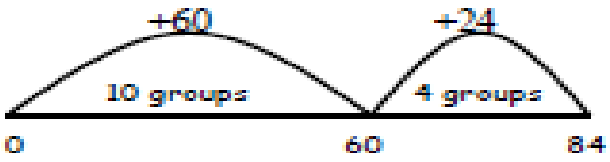
A sweet costs 7p. How many can I buy with 28p?



DIVISION

More number lines and 'chunking'

To calculate the answers to bigger problems like **84 ÷ 6** it would take a long time to jump in sixes to 84 so children can jump on in 'bigger' chunks. They are encouraged to divide numbers into known facts and then add the answers.



E.g. 84 ÷ 6 = (10 x 6) + (4 x 6)

A jump of 10 groups of 6 takes you to 60. Then you need another 4 groups of 6 to reach 84. Altogether that is 14 sixes.

This can also be used with larger number. Children are expected to choose multiples of 10 to help them with 'chunking.

E.g. 192 ÷ 8= (20 x 8) + (4 x 8)

Short division

Short division of TU ÷ U can be introduced as an alternative, more compact recording.

*We begin by asking "How many 6s in 84?" (the answer must be a multiple of 10). This gives 10 sixes or 60, with 24 remaining. We now ask: "How many sixes in 24?" which is 4, add this to ten and the answer is 14.

```
  1 4
6 ) 8 4
  - 6 0  (10 x 6)
    2 4  (4 x 6)
  - 2 4
    0 0
```

This is further reduced to:

```
    1 4
6 ) 8 24
```

DIVISION

More Short Division examples:

98 ÷ 7 becomes

$$\begin{array}{r} 1\ 4 \\ 7\overline{)\ 9\ 8} \\ \quad\ 2 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 8\ 6\ r\,2 \\ 5\overline{)\ 4\ 3\ 2} \\ \quad\ 3 \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 4\ 5\ r\,1 \\ 1\ 1\overline{)\ 4\ 9\ 6} \\ \quad\ 5 \end{array}$$

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

Long division

Once children are confident with the short division method they can move on to long division with larger numbers.

$$\begin{array}{r} 24\overline{)\ 560} \\ -\underline{480} \quad 24\times 20 \\ 80 \\ \underline{72} \quad 24\times 3 \\ 8 \end{array}$$

Answer: 23 R 8

$$\begin{array}{r} 23 \\ 24\overline{)\ 560} \\ -480 \\ 80 \\ -72 \\ 8 \end{array}$$

Answer: 23 R 8

432 ÷ 15 becomes

$$\begin{array}{r} 2\ 8\ r\,12 \\ 1\ 5\overline{)\ 4\ 3\ 2} \\ 3\ 0\ 0 \\ 1\ 3\ 2 \\ 1\ 2\ 0 \\ 1\ 2 \end{array}$$

Answer: 28 remainder 12

432 ÷ 15 becomes

$$\begin{array}{r} 2\ 8 \\ 1\ 5\overline{)\ 4\ 3\ 2} \\ 3\ 0\ 0 \quad 15\times 20 \\ 1\ 3\ 2 \\ 1\ 2\ 0 \quad 15\times 8 \\ 1\ 2 \end{array}$$

$\frac{\cancel{12}}{\cancel{15}} = \frac{4}{5}$

Answer: $28\frac{4}{5}$

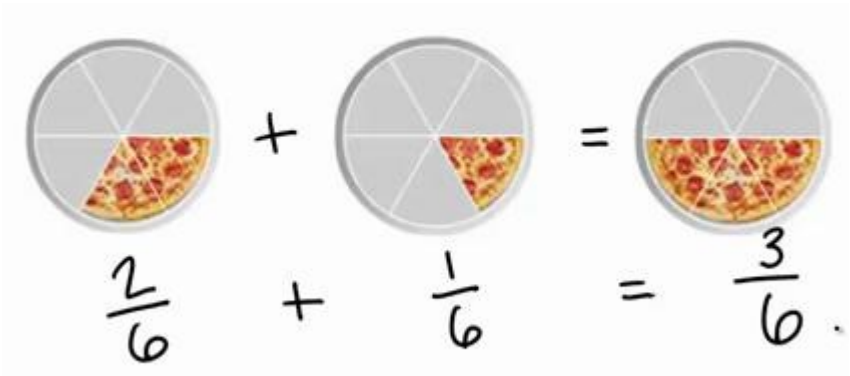
432 ÷ 15 becomes

$$\begin{array}{r} 2\ 8\cdot 8 \\ 1\ 5\overline{)\ 4\ 3\ 2\cdot 0} \\ 3\ 0 \\ 1\ 3\ 2 \\ 1\ 2\ 0 \\ 1\ 2\ 0 \\ 1\ 2\ 0 \\ 0 \end{array}$$

Answer: 28·8

Calculating with Fractions

Adding fractions with the same denominator:



$$\frac{3}{7} + \frac{2}{7} = ?$$

$$\frac{3}{7} + \frac{2}{7} = \frac{3+2}{7} = \frac{5}{7}$$

Same

Adding fractions with different denominators:

1. Find the lowest common denominator.
2. Convert them to fractions with the same denominator.
3. Add the numerators.

Add $\frac{2}{3}$ and $\frac{4}{6}$

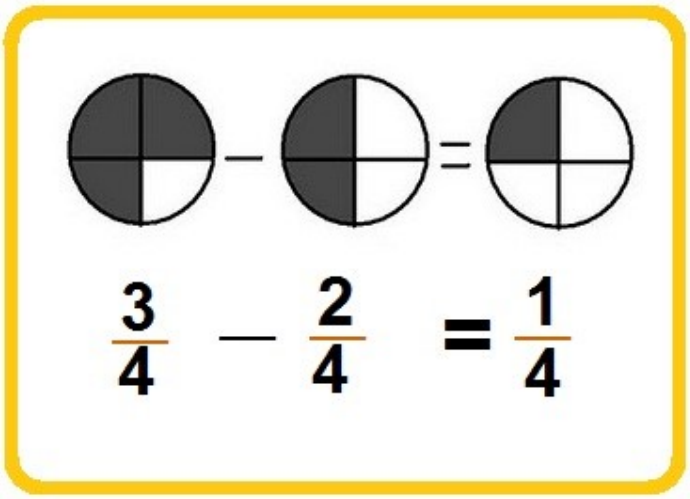
LCM (3,6) = 6

$$\frac{2}{3} + \frac{4}{6} = \frac{4+4}{6} = \frac{8}{6} = \frac{4 \times 2}{3 \times 2} = \frac{4}{3}$$

$$\frac{2}{3} + \frac{4}{6} = \frac{4}{3}$$

Calculating with Fractions

Subtracting fractions with the same denominator:



$$\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$$

$$\frac{3}{7} - \frac{2}{7} = ?$$

$$\frac{3}{7} - \frac{2}{7} = \frac{3-2}{7} = \frac{1}{7}$$

Same

Subtracting fractions with different denominators:

1. Find the lowest common denominator.
2. Convert them to fractions with the same denominator.
3. Subtract the numerators.

$$\frac{3}{4} - \frac{1}{3} = \frac{3 \times 3}{4 \times 3} - \frac{1 \times 4}{3 \times 4}$$

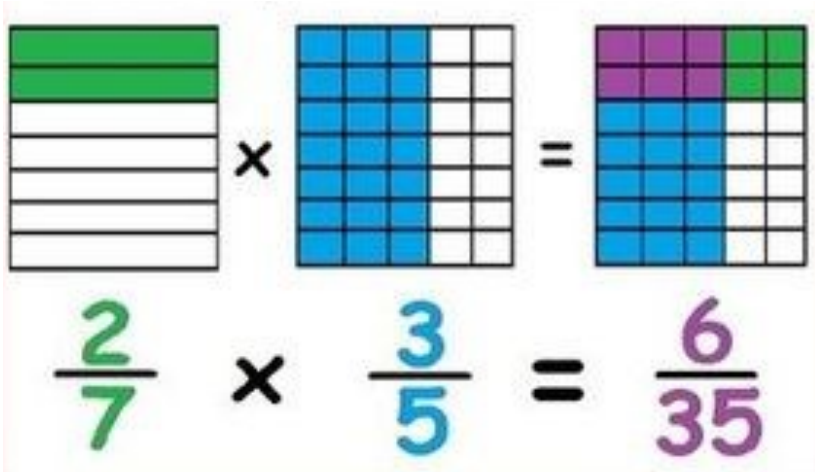
$$= \frac{9}{12} - \frac{4}{12}$$

$$= \frac{5}{12}$$

Calculating with Fractions

Multiplying fractions:

Multiply the numerators and denominators. Simplify.

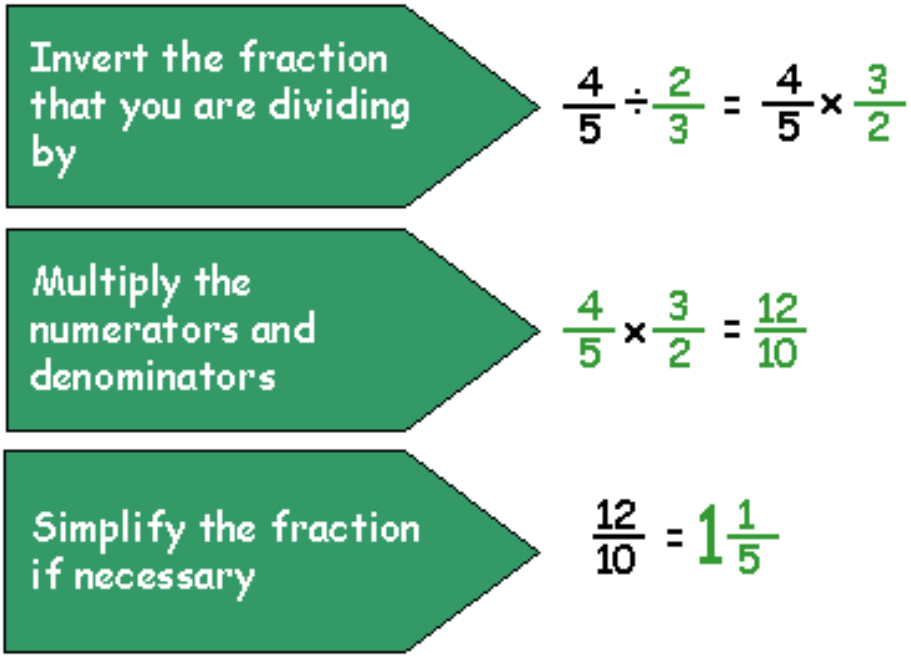


$$\frac{2}{7} \times \frac{3}{5} = \frac{6}{35}$$

$$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$$

$$\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12} = \text{reduces to } \frac{1}{6}$$

Dividing Fractions



Mathletics

Mathletics provides an opportunity for children to practise fun Maths activities at home which link to their work at school. Teachers will use Mathletics is used to set homework for the children and are able to monitor their results and track progress on-line. Please encourage your child to visit the site **www.mathletics.co.uk.**

Times Tables Rock Stars

Times Tables Rock Stars https://ttrockstars.com/ is a website that the school subscribe to that allows children to compete against each other on their times tables and earn money to buy items for a rock avatar. Please encourage your child to visit this site.

Other useful websites include:

https://www.mathsisfun.com/

https://www.poissonrouge.com/

http://www.bbc.co.uk/schools/ks1bitesize/numeracy/

http://www.bbc.co.uk/schools/ks2bitesize/maths/

http://www.amathsdictionaryforkids.com/

www.brainbashers.com

www.murderousmaths.co.uk

www.funbrain.com

http://www.coolmath4kids.com/

https://www.iseemaths.com/early-number/

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

www.nrich.maths.org.uk

www.numberlinelane.co.uk

GLOSSARY

Teachers at Hook-with-Warsash refer to the NCETM glossary of terms for teaching which can be found on our website

Some of the words your child uses about Mathematics may be familiar from your school days, and some may not. This section describes some of the vocabulary used in maths lessons at school.

capacity– sometimes referred to as volume, this is the measure of how much a container holds, and can be measured in litres and millilitres.
denominator– the number below the line in a fraction. It tells you how many pieces the object has been divided into. So in ⅜ the denominator is 8.
difference– the difference between two numbers is what you get if you subtract the smaller number from the larger one.
dividend– the number that is divided by another, so in 24 ÷ 6, the dividend is 24.
divisor– the number you divide into another, so in 24 ÷ 6, the divisor is 6.
empty number line– an empty number line is just a line drawn by the child, without numbers marked on it. The child then write on only the numbers needed to help with the calculation.
factors– a factor is a number that divides exactly into another. For example, 1, 2, 5 and 10 are all factors of 10.
HTU– stands for hundreds, tens and units. In 279 there are 2 hundreds, 7 tens and 9 units (ones).
mass– at primary school this is used as an alternative word to weight. The mass of a bag of sugar is 1 kilogram.
numerator– the number above the line in a fraction. It tells you how many thirds, quarters, fifths, etc you have. The numerator in ⅜ is 3.
partitioning– splitting a number, often into hundreds, tens, and units, so 84 can be partitioned into 80 and 4, or into 70 and 14.
place value– this refers to the fact that digits have different values depending on their place in a number. For example, the 3 in 37 means 30 because it is in the tens column, whereas the 3 in 356 means 3 hundred. Children also learn that because 4 x 7 = 28, then 4 x 70 = 280, and similar related facts.
product– the answer in a multiplication calculation; the product of 5 and 2 is 10.
quotient– the answer in a division calculation, as in 24 ÷ 6 = 4, the quotient is 4.
TU– stands for tens and units. In 84, there are 8 tens and 4 units (or ones).
units– this can describe what you are using to measure something, for example centimetres, kilograms, minutes, etc.
It is also used to mean the "ones" when numbers are written in columns, as in "hundreds, tens and units". The units digit of 84 is 4.

Please let use know if there are other mathematical words that it would be helpful to have in this glossary.

Explore the Magic of Mathematics