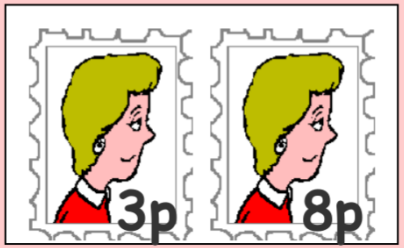
Brough Primary School:

Information evening based around the multiplication and division calculation policy

Aunt Sophie has 3p and 8p stamps only.

It will cost 73p to post a parcel.

How many of each type of stamp should she put on the parcel?



Can you solve this problem?

Aims of the evening:

- Look at how the multiplication and division policy looks in the classroom.
- Recap how mathematics is taught through a CPA approach (Concrete - Pictorial- Abstract)
- Look at the the concrete resources/manipulatives that we use at school to support mathematical teaching and learning.
- How to support your children at home with their maths learning including the learning of times tables.

Before we look at our multiplication and division calculation policy in more detail, let's put it in the context of our Maths lessons.

What does multiplication and division look like in our school?

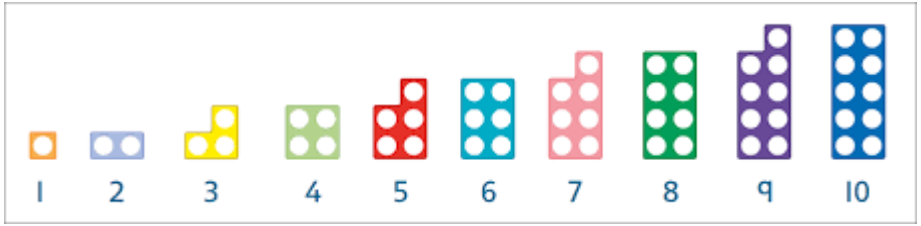
CPA Approach: Concrete Pictorial Abstract

Concrete

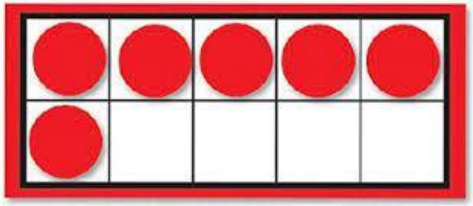
Concrete resources (also referred to as manipulatives) are objects or physical resources that children can handle and manipulate to aid their understanding of different maths concepts.

Children are able to 'see' the Maths and make sense of what is happening.

Bead strings

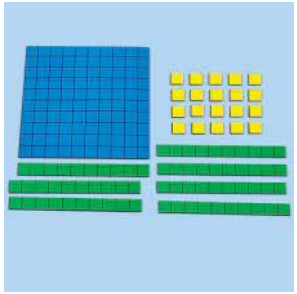


Numicon



Ten frames

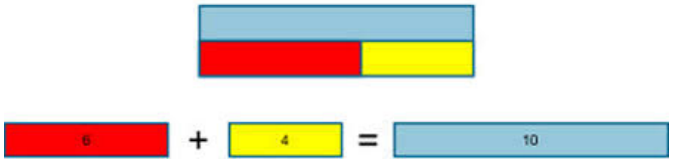
Place value counters



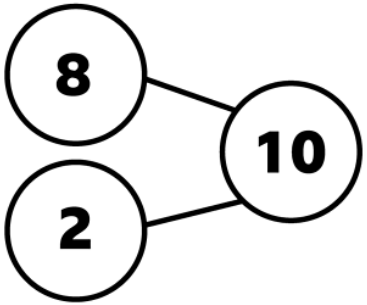
Base 10

Pictorial

Once children are confident with a concept using concrete resources, they progress to drawing pictorial representations or quick sketches of the objects. By doing this, they are no longer manipulating the physical resources, but are still benefiting from the visual support the resources provide.



Bar model



Part whole model

Abstract

Once children have a secure understanding of the concept through the use of concrete resources and visual images, they are then able to move on to the abstract.

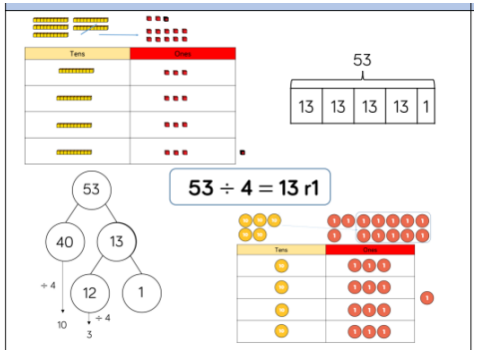
Why is C-P-A so important?

In the past, children were taught procedures, but not why or how the procedure worked. In other words, children learnt the methods to get to an answer, without any understanding of the maths behind each method or procedure.

While there are children who are able to access the maths through just learning a procedure by rote, many others have great difficulty coping with the abstract nature of it.

Teaching methods without meaning leads to misconceptions, errors and difficulties in retaining the methods. Once children can actually 'see' the maths, they are much more likely to understand and accurately remember the methods.

Multiplication/division - an overview of skills in different year groups.



Welcome to Brough Primary School

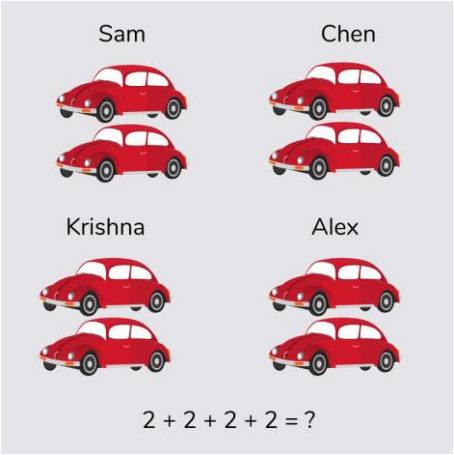
At the beginning of the multiplication and division calculation policy, there is an additional section purely on the teaching of times tables

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

These are again initially taught using the same concrete and pictorial methods as introduced earlier.

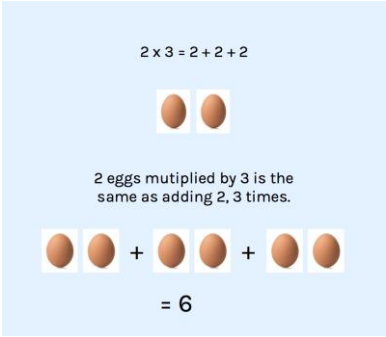
Year 1	Count in multiples of 2, 5 and 10. Recall and use all doubles to 10 and corresponding halves.
Year 2	Recall and use multiplication and division facts for 2, 5, and 10 times tables.
Year 3	Recall and use multiplication and division facts for 3, 4 and 8 times tables.
Year 4	Recall and use multiplication and division facts for 6, 9, 7, 11 and 12 times tables. **It is the expectation that children will know all of their multiplication and division facts up to 12 x12**
Year 5	Revision of all multiplication and division facts up to 12 x 12
Year 6	Revision of all multiplication and division facts up to 12 x 12

Using concrete and pictorial methods to help learn times tables at home.

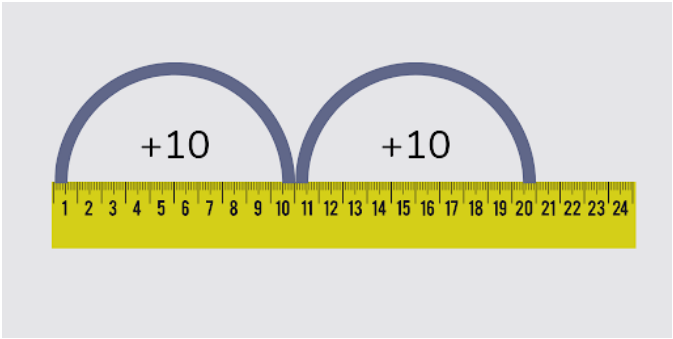


Using play or objectives e.g pair up toys cars and count them.

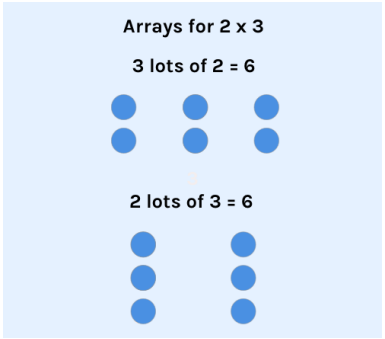
Helping with the laundry! How many pairs of socks will I have if there are 20 socks in total?



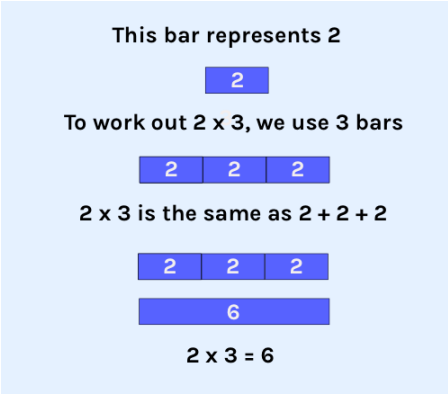
Help to understand that it is repeated addition: 2 x 3 = 2 lots of 3.



Use a number line to help visualise the jumps.



Draw/use practical equipment to create arrays



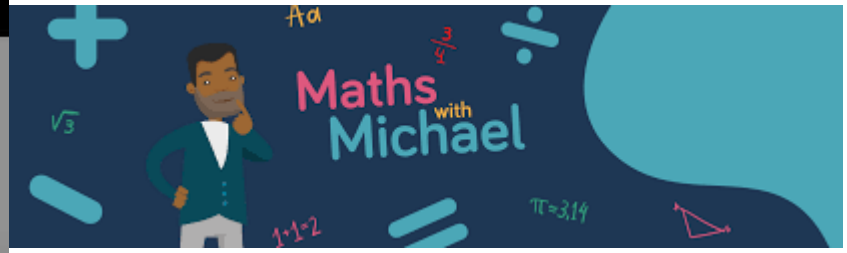
Visualise it as a bar model

Four Facts

Use the three numbers in the bubbles to make four facts.

4 x 7 = 28 28 ÷ 4 = 7

7 x 4 = 28 28 ÷ 7 = 4



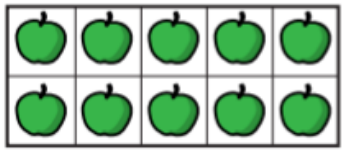
A short 'how to' guide providing information on how you can help your child understand Multiplication.

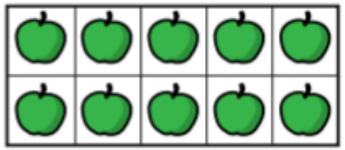
Year 1 National Curriculum expectations

solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

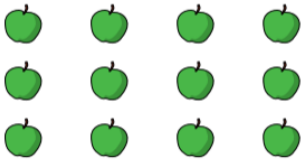
10	20					

70		50					





Circle each column of apples.

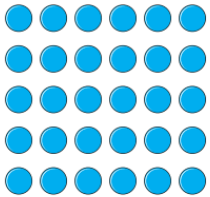


How many columns are there?

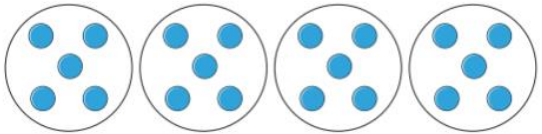
a)

There are ☐ equal groups of ☐

Use 30 counters.



a) Share the counters between 2 friends.
How many counters does each friend get?

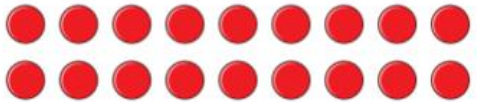


Year 2 National Curriculum expectations

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

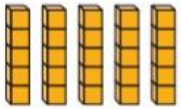
Addition	Multiplication
2 + 2 + 2 + 2	4 × 2
5 + 5 + 5	
3 + 3 + 3 + 3 + 3	
	2 × 10

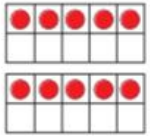
Write two multiplications for this array.

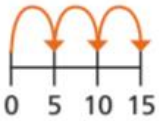


Year 2 - what does this look like

a) Match the picture to the times-table fact.

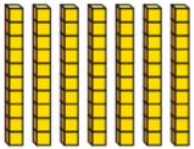


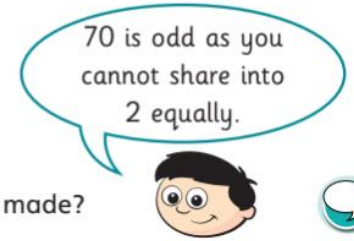




3 × 5 2 × 5 1 × 5 5 × 5

Dexter makes the number 70 from base 10

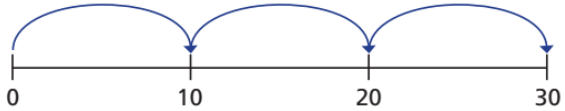




What mistake has Dexter made?

Use the number line to help you.

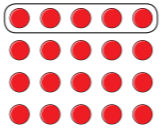
a) 30 ÷ 10 = ☐



30 is made of ☐ equal groups of ☐

Complete the number sentences for each array.

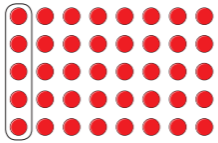
a)



☐ × 5 = 20

20 ÷ 5 = ☐

b)



☐ × 5 = ☐

☐ ÷ 5 = ☐

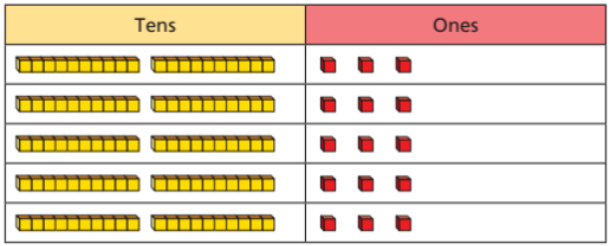
20 ÷ 2 = ☐

Is there another way to work this out?

Year 3- National Curriculum Expectations

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

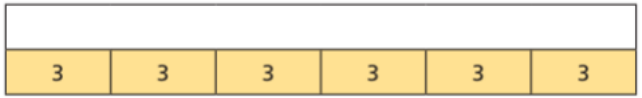
Year 3 - what does this look like



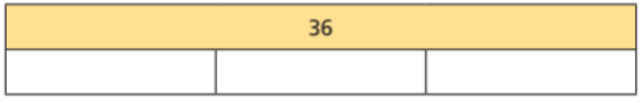
How many marbles are there in total?

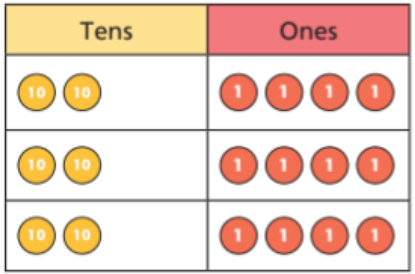
Work out the missing values in each bar model.

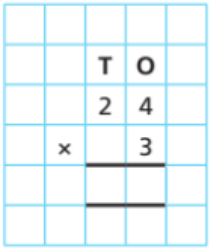
a)



b)



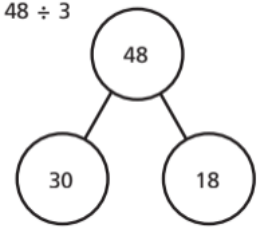




1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

What two patterns do you notice?

a) 48 ÷ 3

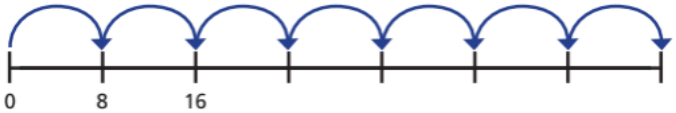


30 ÷ 3 = ☐

18 ÷ 3 = ☐

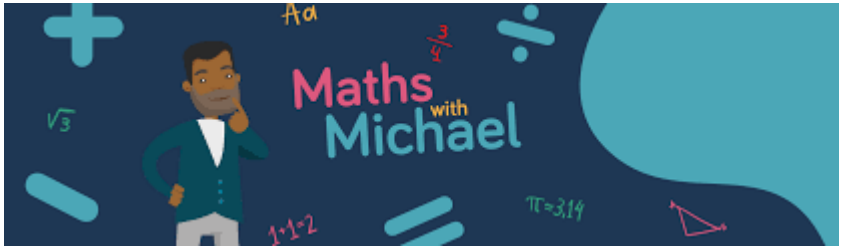
48 ÷ 3 = ☐

a) Amir draws 7 jumps of 8 on a number line.



What number does Amir end on?

Explain how you worked it out.



A short 'how to' guide providing information on how you can help your child understand Division.

Maths with Michael: Parent's guide to division

1

We are going to divide 471 by 3 using place value counters and a place value grid to help us.

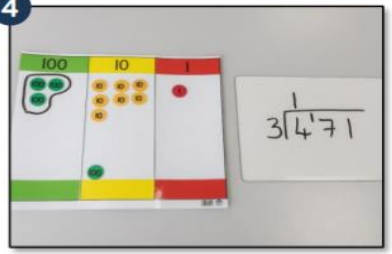
2

First build the number 471 on a place value grid and record the calculation as a short division on a whiteboard or piece of paper.

3

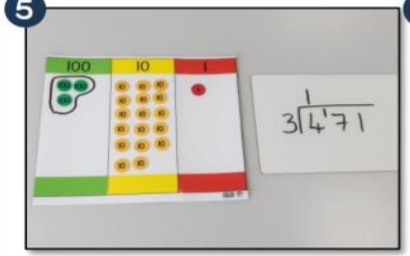
Ask "How many groups of 3 hundreds are there in 4 hundred?" They should be able to tell you that there is 1 group of 3 hundreds and there is 1 hundred left over.

4



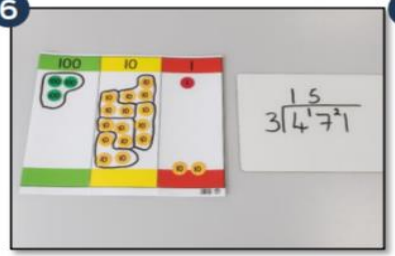
Show this in the place value grid and in the calculation. There aren't any more groups of 3 hundreds so the remaining hundred counter is placed in the tens column.

5



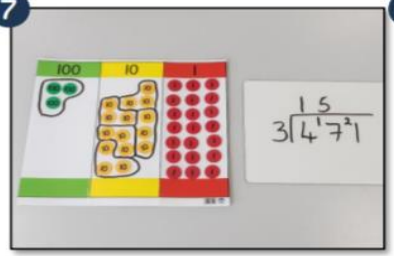
Ask "How many tens can we exchange 1 hundred for?" 1 hundred is equal to 10 tens so replace the hundred counter with 10 tens.

6



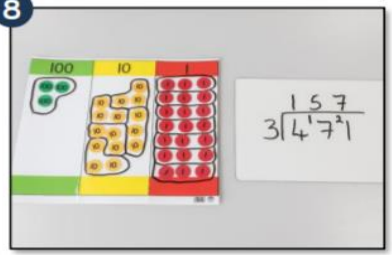
Ask "How many groups of 3 tens are there in 17 tens?" There are 5 groups of 3 tens and 2 tens left over. These tens are placed in the ones column.

7



Ask "How many ones can we exchange each ten for?"
1 ten is equal to 10 ones so we can exchange 2 tens for 20 ones.

8



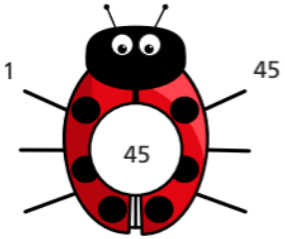
Ask "How many groups of 3 ones are there in 21 ones?" There are 7 groups of 3 ones in 21 ones and no ones left over.
471 divided by 3 is equal to 157

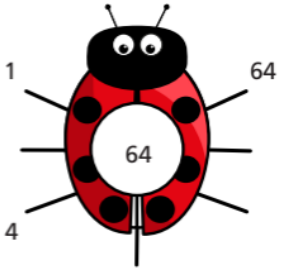
Now Try These

Year 4 - National Curriculum Expectations

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Year 4 - what does this look like





3 times-table

0 × 3 = ☐

1 × 3 = 3

2 × 3 = 6

3 × 3 = 9

6 times-table

0 × 6 = ☐

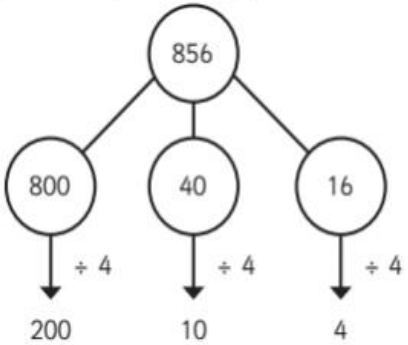
1 × 6 = ☐

2 × 6 = 12

3 × 6 = ☐

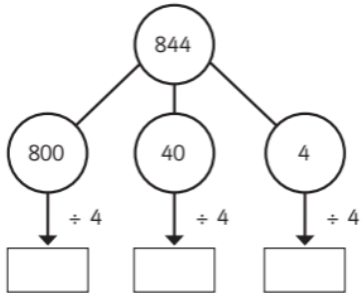
Tens	Ones
10	1 1
10	1 1
10	1 1
10	1 1

1



H	T	O
100 100	10	1 1 1 1 1
100 100	10	1 1 1 1 1
100 100	10	1 1 1 1 1

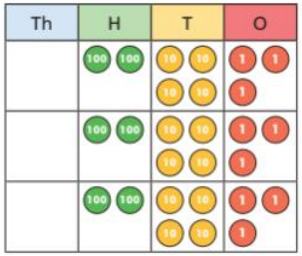
		H	T	O	
		2	1	5	
	×			3	



Year 5- National Curriculum Expectations

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Year 5 - what does this look like



a) 52 × ☐ = 5,200

b) 95 × ☐ = 950

c) 136 × ☐ = 1,360

f) ☐ × 370 = 3,700

g) ☐ × 100 = 8,200

h) ☐ × 100 = 82,000

a)

Th	H	T	O
			7

7 × 10

b)

Th	H	T	O
		3	9

39 × 10

c)

Th	H	T	O
	2	0	5

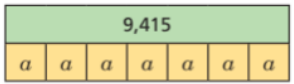
205 × 10

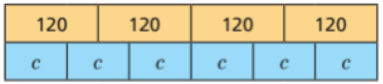
×	20	6
30		
2		

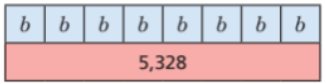
26 × 32 = ☐

			4	3		
	×		1	3		
		1_1	2	9		(43 × 3)
		4	3	0		(43 × 10)

	4	8	4	0	4	







Year 6- National Curriculum Expectations

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Year 6 - what does this look like

.

	5	5	6	5

	5	6	6	5

	5	4	6	5	0

a)

		1	2	3	5
	×			5	3

b)

		4	0	3	6
	×			2	4

c)

		6	9	7	8
	×			7	6

a)

260 → ÷ 10 → ÷ 2 → ☐

260 ÷ 20 = ☐

b)

360 → ÷ 10 → ÷ 3 → ☐

360 ÷ 30 = ☐

		0	3	6
1	2	4	3	2
	–	3	6	0
			7	2
	–		7	2
				0

(×30)

(×6)

M

a) (3 + 2) × 3

b) 3 + (2 × 3)

c) 2 + 3 × 3

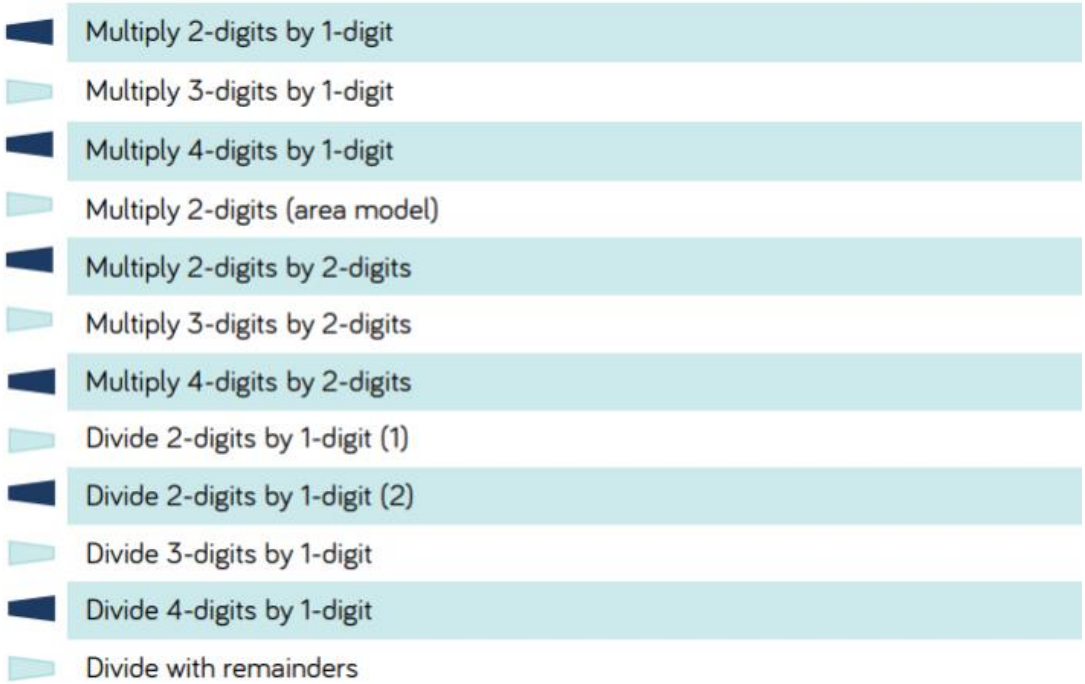
d) 3 × (2 × 3)

A small step approach

Multiplication and division - Year 5

We've divided each block of knowledge into a series of small learning steps. Together, these small steps cover all the curriculum content that your child needs to know.

Your child will remember more by learning maths in small, related chunks.



Multiplication

X

An operation that finds the total of repeated equal groups. (Repeated addition)

Factor

5 x 4 = 20

The numbers that are being multiplied together.

Product

5 X 4 = 20

The answer to a multiplication equation.

Multiple

10 20 30 40 50

All the products of a certain number. (Example x 10)

Division

An operation that finds how many things are divided equally into groups

Divisor

20 ÷ 5 = 4

The number that does the dividing.

Dividend

20 ÷ 5 = 4

The number that will be divided.

Quotient

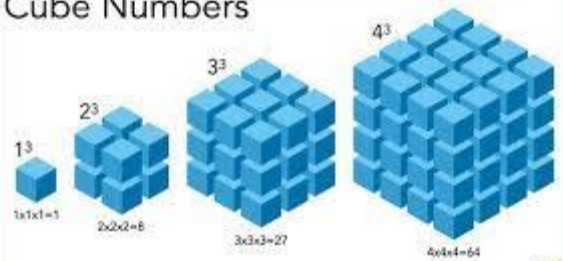
20 ÷ 5 = 4

The answer to a division equation.

Prime Numbers

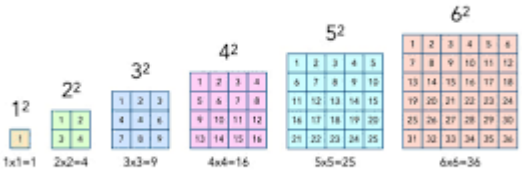
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Cube Numbers



PlanBee

Square Numbers



PlanBee

Fluency, reasoning and problem solving skills

What is fluency?

Fluency starts with the ability to apply procedures accurately and efficiently. This means that children quickly become confident in the methods they will later need to use to solve more complex problems.

What is reasoning?

Reasoning enables children to make use of all their other mathematical skills; it could be described as the glue that helps mathematics make sense.
Reasoning is children understanding mathematics well enough that they can apply it to new situations and explain it.

What is problem solving?

Problem solving is applying the mathematics children have learnt to solve problems. If children are fluent in the mathematical procedures required for each topic, problem solving becomes much easier.
When approaching problems, children must first work out what the problem is asking them to do, before then applying their procedural knowledge to find a solution.

Using and applying these multiplication and division skills

Reasoning 1 — Multiply Four Digits by One Digit

Rosie calculated 1,531 x 5.
Here is her answer.

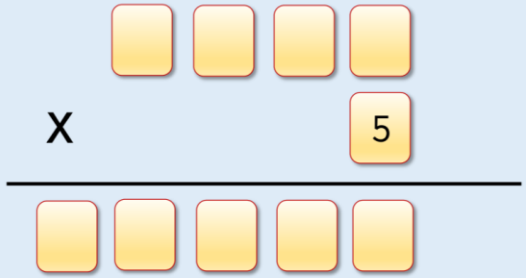
	TH	H	T	O
	1	5	3	1
x				5
	5	25	15	5

1,531 x 5 = 525,155

Can you explain what Rosie has done wrong?

Reasoning 2 — Multiply Four Digits by One Digit

Can you work out the missing numbers using the clues?



- The four digits being multiplied by 5 are consecutive numbers.
- The first two digits of the product are the same.
- The sum of the answer's fourth and fifth digits is the third digit.

Reasoning 1 Multiply Two Digits by Two Digits

??

It is not possible to make 999 by multiplying two 2-digit numbers.

Esin says,

Do you agree?
Explain your answer.

Reasoning 2 Divide with Remainders

Always, Sometimes, Never?

A three-digit number made of consecutive descending digits divided by the next descending digit always has a remainder of 1.

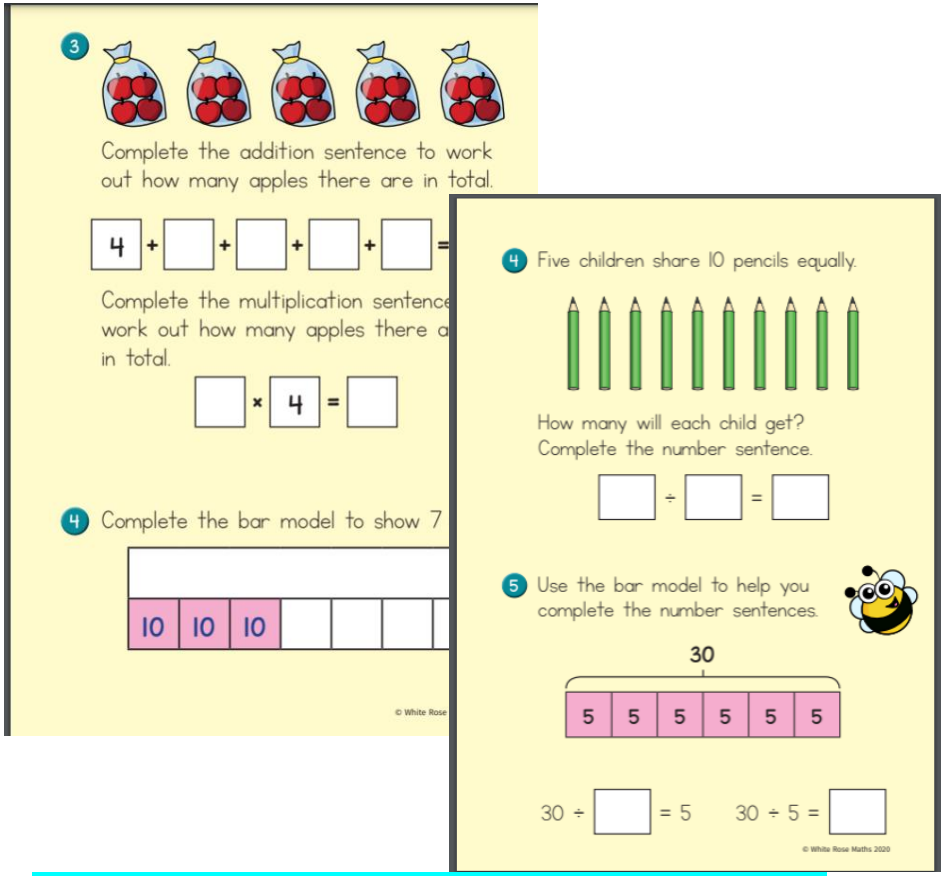
$765 \div 4 = 191$ remainder 1

How many possible examples can you find?

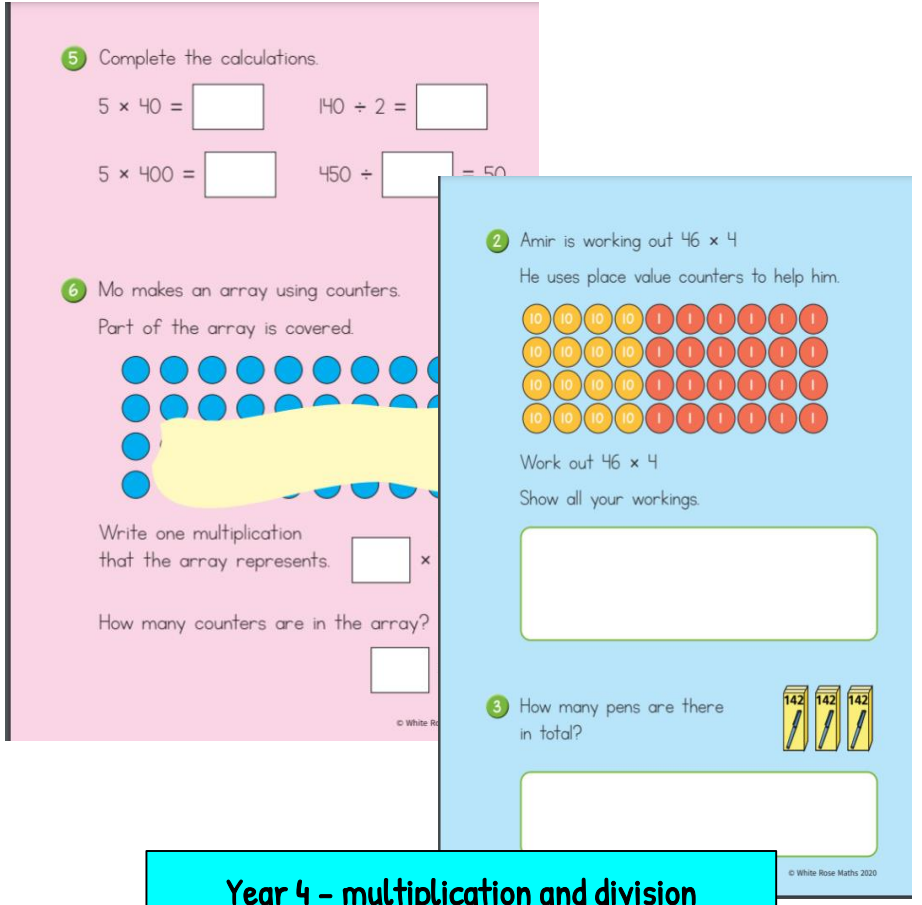
How can you help at home?

Useful website: https://whiterosemaths.com/parent-resources

Free workbooks on for each of the blocks in each year group.



Year 2 – multiplication and division workbooks



Year 4 – multiplication and division workbooks

Super Fingers!

This is a game for two players!

The game is basically a version of rock, paper, scissors but with numbers. Two players count to 3 and then make a number using their fingers.

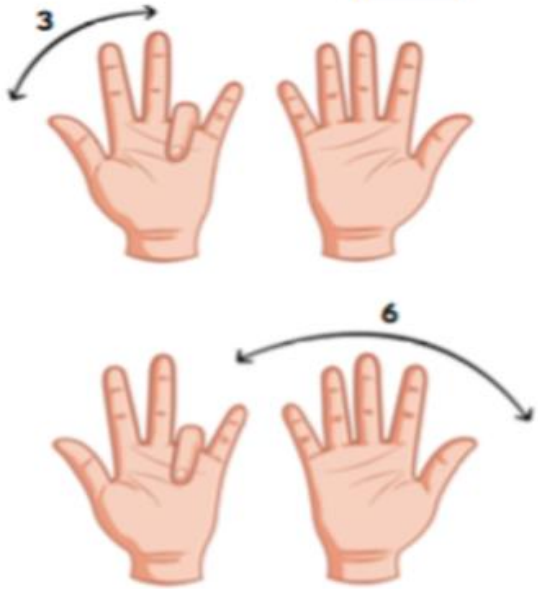
Both players then have to multiply both numbers together and the quickest wins.

You can:

- Adapt other games to focus on multiplication tables, or create some totally new tables games with your child.
- Start the game by giving children a copy of the times table to refer to if they need it. Then, when they're ready for the challenge, they can try the game without.

9 Times Tables on your Fingers!

1. Hold your hands in front of you with your fingers spread out.
2. For 9 x 4 bend your 4th finger down (like the picture).
3. You have 3 fingers in front of the bent finger and 6 after the bent finger. Thus the answer must be 36!
4. The technique works for the 9 times table up to 10.



You can:

- Explore with your child which method helps them most with the 9 times table – the more physical hand trick, or the more visual exploration of number patterns.

Bingo!

This game will need 2 players!

Make a grid of six squares on a piece of paper and ask your child to write a number in each square from the target tables. Give them a question and if they have the answer, they mark them off. First one to mark off all their numbers is the winner!

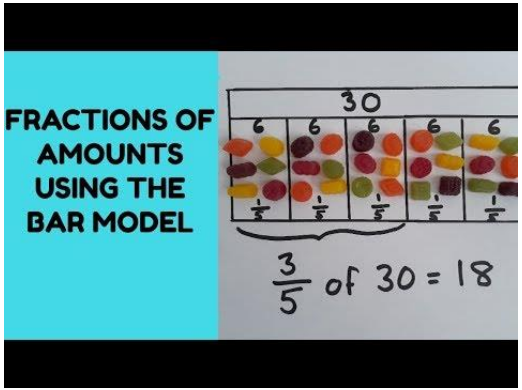
You can:

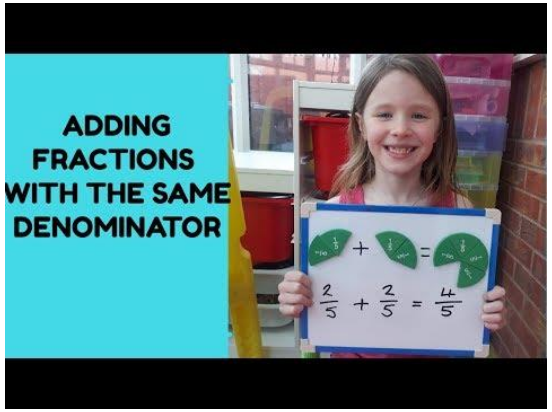
- Turn this into a family game and include a reasonable reward/incentive to entice your child.

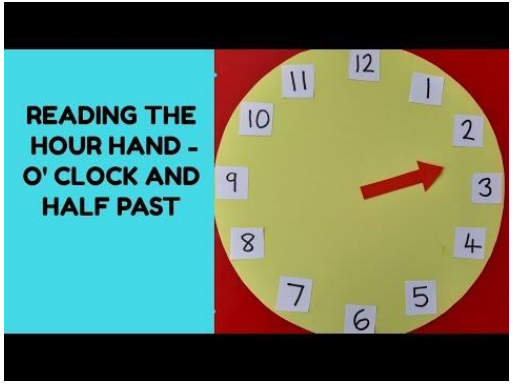
A useful blog:

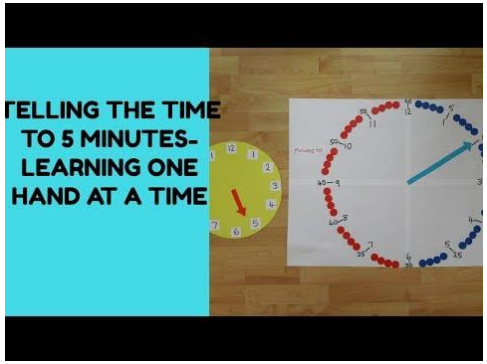
https://thirdspacelearning.com/blog/concrete-resources-cpa-explained/

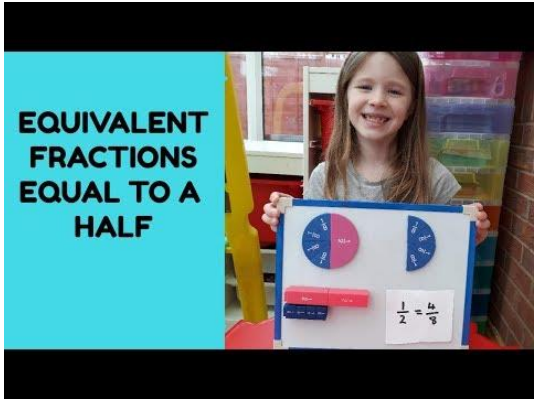
Also includes links to Maths 4 kids video tutorials on:











https://www.youtube.com/watch?v=4EcMON3F1yE

Maths information evening- multiplication and division

Thank you for coming to the information evening tonight. We hope that you found it useful.

We would be very grateful if you could take the time to answer these three short questions to evaluate the evening. This will be used to improve our information to parents further.

What have you gained from tonight's information evening and how will this help you support your child?

How do you think the information evening could have been more effective?

Other comments about the evening.