



Year 1 and 2 Maths parent workshop



Elizabeth Jones

Fluency lead



Objectives:

- Explain and demonstrate how mathematics is taught in Year 1 and 2 at Fox
- Understand what is meant by 'Mastery' in mathematics.
- Identify how fluency impacts upon achieving mastery.
- Increase confidence and understanding in supporting your child at home.



What words or feelings do you think of when thinking about your own experience of maths?



Fixed vs Growth mindset

Carol Dweck



*We believe that **everyone** can get better at maths...when they put in the **effort** and work at it.*

- Do not praise children for being clever when they succeed at something, but instead should praise them **for working hard**.
- Children learn to associate **achievement with effort** (which is something they can influence themselves - by working hard!), not 'cleverness' (a trait perceived as absolute and that they cannot change).

https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve/discussion



KS1 statutory curriculum

The curriculum is designed so that pupils explore mathematical ideas **in depth**.

- Number - number and place value
 - Number - addition and subtraction
 - Number - Multiplication and division
 - Number - fractions
 - Measurement
 - Geometry: properties of shape
 - Geometry - position and direction
 - Statistics (Year 2 only)

 - **Mastery** curriculum
 - Reading and spelling of mathematical vocabulary
- Confidence
 - Understanding
 - Fluency
 - Enjoyment

What does it look like in the classroom?

Children move together i.e. same objective from National curriculum.
Differentiation through scaffolding/resources used.

- 4-5 lessons per week.

Typical lesson is made up of 6 parts:

1. Do now
2. Introduce Learning
3. Talk task
4. Develop learning
5. Independent and/or adult led activity
6. Plenary

- Maths Meeting x 2-3 per week

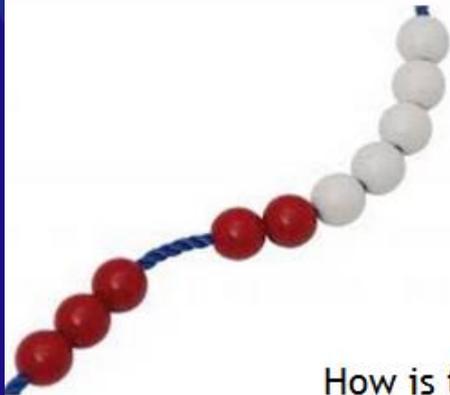


Mastery in Mathematics



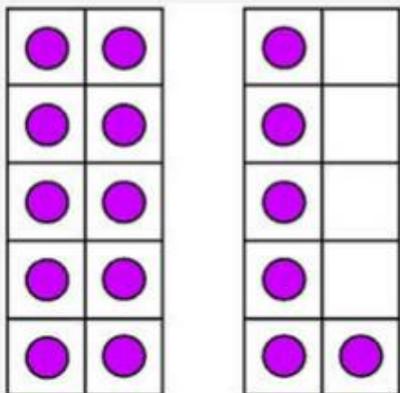
- A deep **conceptual understanding** (understanding why a mathematical idea is important and the kinds of contexts in which it is useful).
- Ability to understand and use mathematical **vocabulary**
- An ability to spot **patterns, reason and generalise**
- **Fluency** - being efficient, flexible and accurate
- An ability to solve problems in a range of **contexts**

- *Requires a particular ethos and identity*
- *Requires opportunities to overlearn*
- *Requires collaboration*
- *Places emphasis on discussion and proof*
- *Pupils move at broadly the same pace*



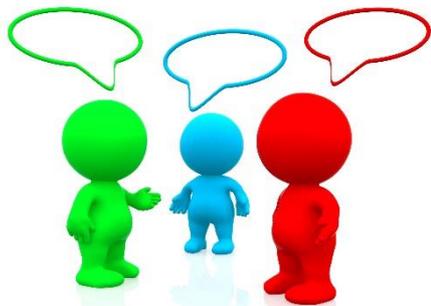
Conceptual variation

How is the concept presented in different ways through the representations used, the language used, the examples and explanations provided (including calculations presented in different ways , equals sign in different positions, linking of concepts eg inverse relationships)



Speaking and listening

- Vocabulary
- Questioning
- Full sentences with sentence scaffolds
- Reasoning and explanation
- Problem solving



How do you know?

Can you show me?

Prove it to me...

Can you show me in a
different way?



Fluency is:

- Being flexible with numbers
- Understanding how numbers relate to each other
- Recognising how numbers can be composed and decomposed
- Developing number sense
- Being **efficient, flexible and accurate**

More than memorisation!



Mastery of number bonds

- Memorising facts
- Using and applying facts
- Understand the laws and principles
- Making patterns and connection
- Generalising

Facts that children need to master

Number bonds

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

Times Tables

Times Tables 1 to 12

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



What is the danger?

- Asking children to 'memorise' all of these facts will lead to cognitive overload.
- Doesn't allow children to explore and understand relationships and structures.
- Children aren't encouraged to use and apply their knowledge.
- Children are unlikely to retain all this information.



How do children become fluent?

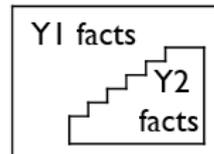
Lots of practise!

Short and regular rather than long and irregular.





Adding 1	Bonds to 10	Adding 10	Bridging/ compensating
Adding 2	Adding 0	Doubles	Near doubles



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

Commutativity?

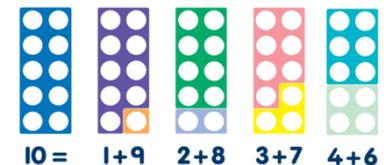
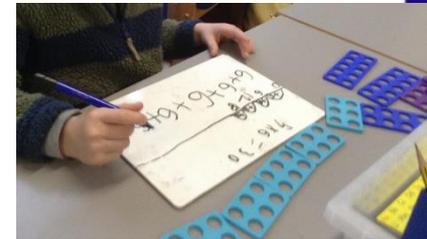
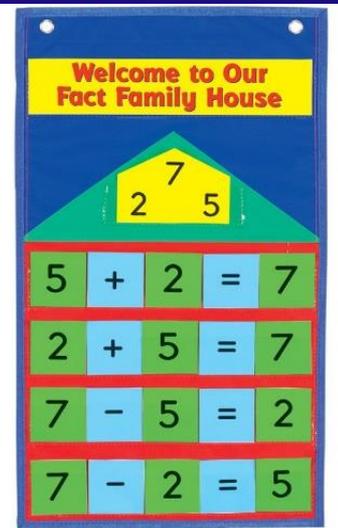
Created by Clare Christie
– shared on NCETM.

Key strategies in Year 1

- Counting forwards and backwards within 100
- Adding 1 (e.g. $7 + 1$ and $1 + 7$)
- Doubles of numbers to 5 (e.g. $4 + 4$)
- Adding 2 (e.g. $4 + 2$ and $2 + 4$)
- Number bonds to 10 (e.g. $8 + 2$ and $2 + 8$)
- Adding 10 to a number (e.g. $5 + 10$ and $10 + 5$)
- Adding 0 to a number (e.g. $3 + 0$ and $0 + 3$)

- The ones without a family: $5 + 3$, $3 + 5$, $6 + 3$, $3 + 6$

Knowing these facts by the end of Year 1 will mean children will know 87 of the 121 addition facts in the grid.





Key strategies in Year 2

Know or derive a quick & efficient strategy (not counting):

- Doubles: $7 + 7$
- Near doubles: $8 + 9 = 8 + 8 + 1$
- Bridging: $8 + 9 = 8 + 2 + 7$
- Compensation $8 + 9 = 8 + 10$

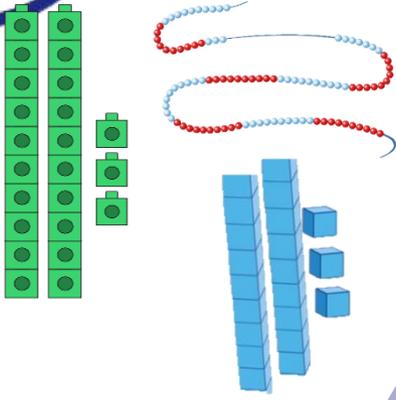
Skip counting in 2s, 5s, 10s and 3s

Times tables – x2, x5, x10 and start to know x3



Multiple representations

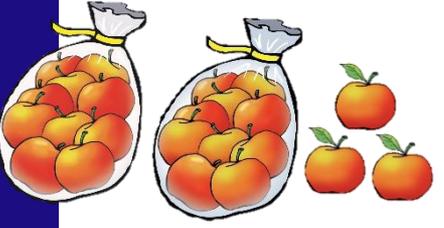
Concrete
The DOING



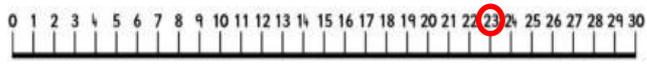
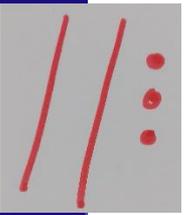
Tens	Ones
2	3

/ 'twenti 'θri /

Pictorial
The SEEING



Abstract
The SYMBOLIC



Place Value

Place value is at the heart of our number system.

We work in base 10.

All digits have a value and this changes depending on where it is in a number.

A secure understanding of this will enable children to use and understand different calculation methods.

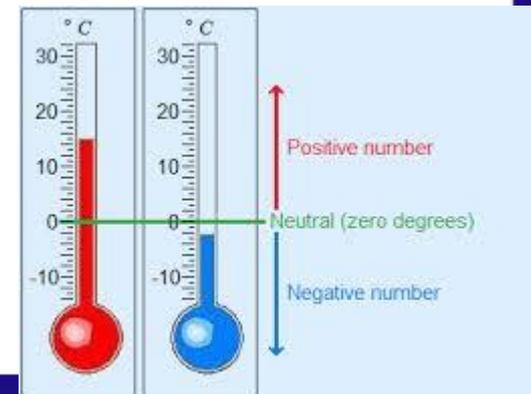
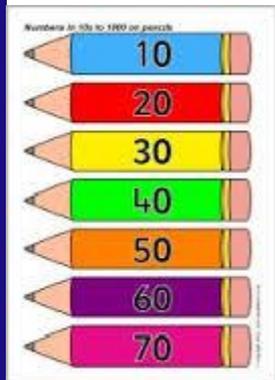


4 4



Keep Counting!

- Forwards and backwards in 1s, 2s, 5s, 10s, 100s.
 - Count with a purpose: money, measurements, time, temperature etc



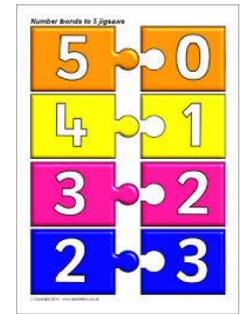
It is important that children recognise number bonds, different pairs of numbers with the same total.

$7 + 3$

$6 + 2$



$5 + 3$



$6 + 4$



$1 + 4$



$6 + 3$

$6 + 1$

$3 + 4$

$5 + 4$



$3 + 3$



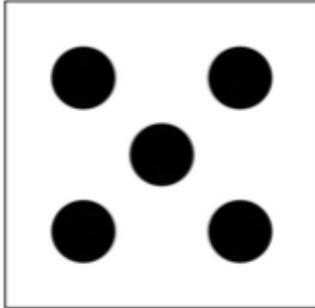
Subitising

The process of immediately knowing how many objects there are in a small group without needing to count them.

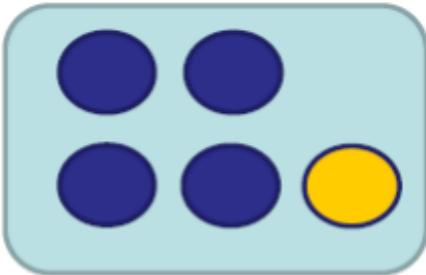
Subitising needs to be practiced explicitly so children need to be given lots of opportunities to do this. Games involving dice (eg. snakes and ladders) and dominoes are a great example of this.



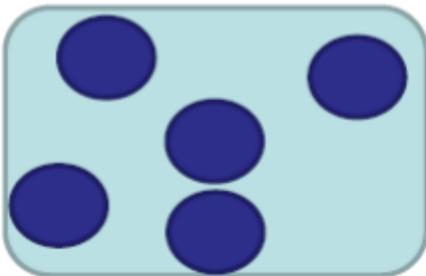
Subitising



Familiar and structured dot patterns



structured dot patterns

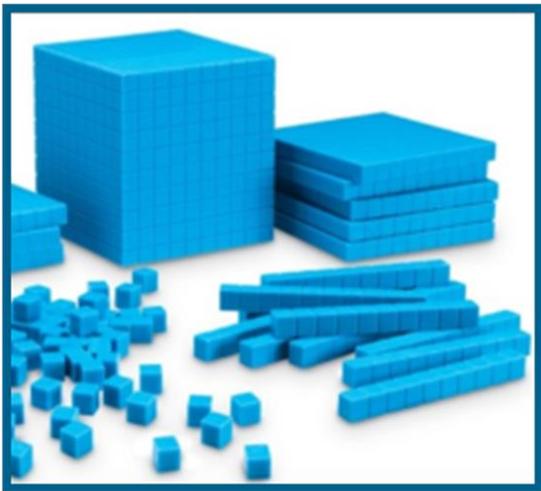


unstructured dot patterns



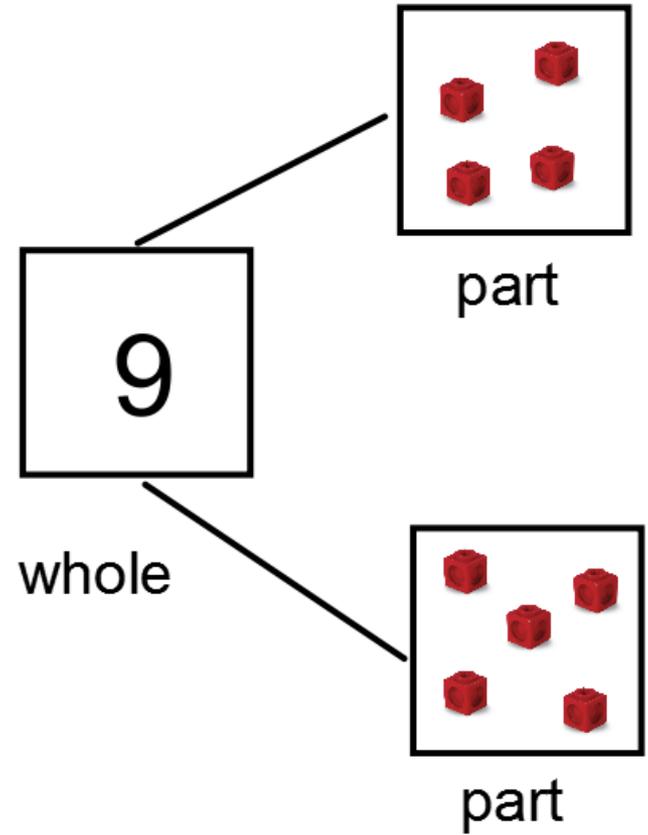
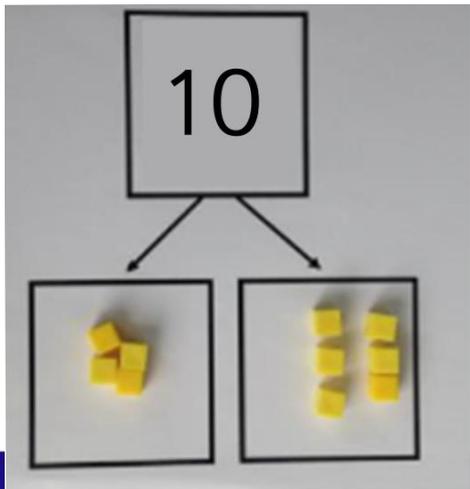
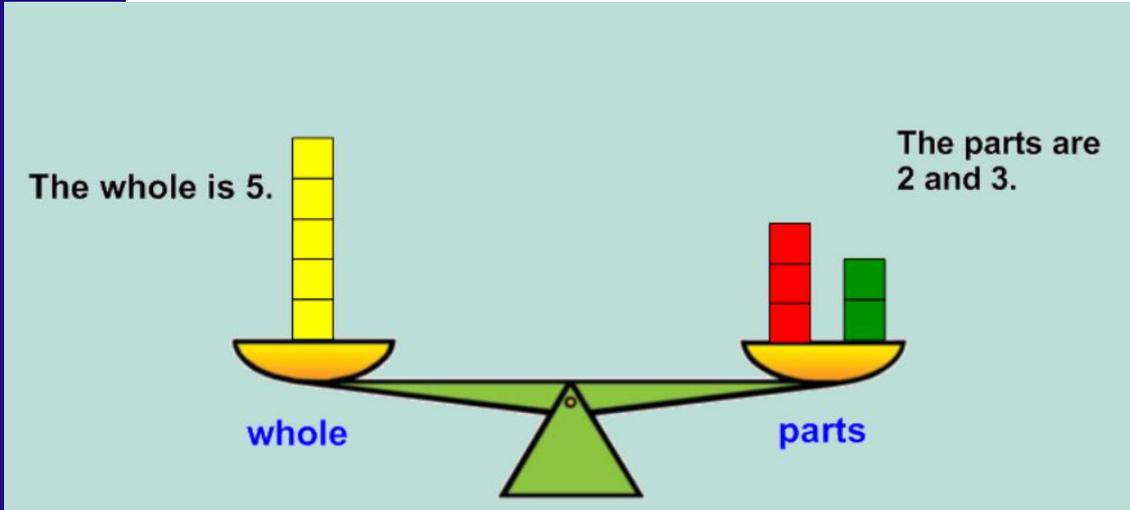
Models and representations

Key models and images used in KS1





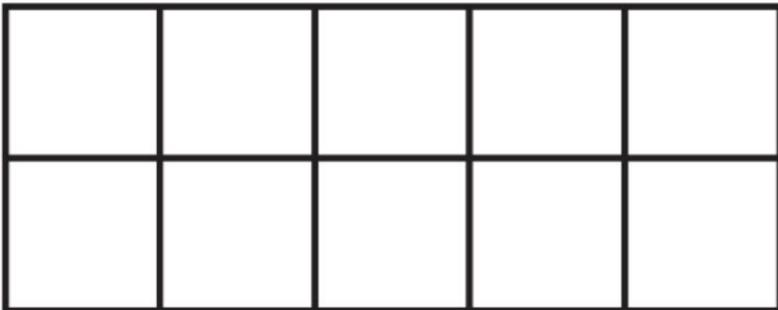
Part-part whole



Ten frame

We are learning to count sets of objects within ten.

ten frame



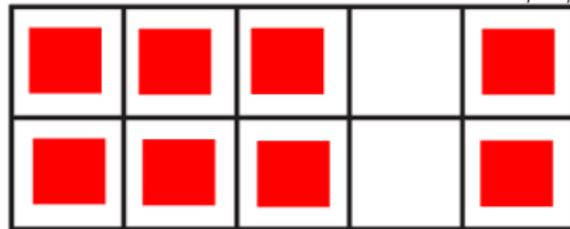
infinite clone



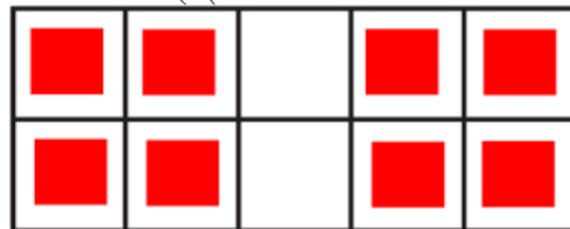
This is a picture of a ten frame that can be used alongside the ten frame and cubes on the carpet. Model placing the cubes on top of the images you are counting and moving them to the ten frame.

Task 20

There are 8 cubes.
I see 6 and 2.



There are 8 cubes.
I see 4 and 4.

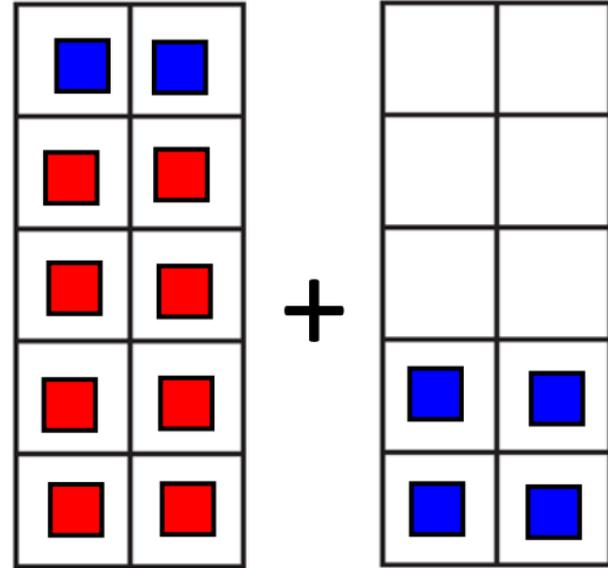
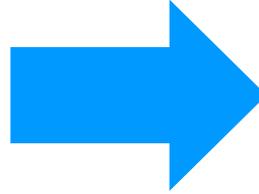
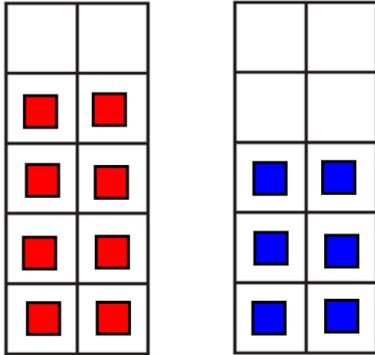


Make 10 strategy/ bridging 10

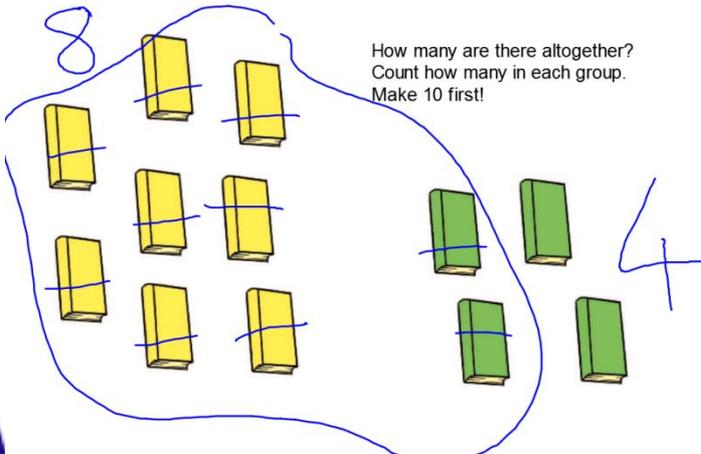
To add two single digits by making ten first

How many cubes need to be added to the group of eight to make ten?

$$\square = \square + \square$$



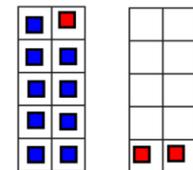
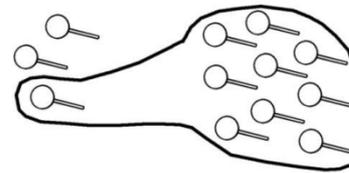
To add two single digits by making ten first



How many are there altogether?
Count how many in each group.
Make 10 first!

To add two single digits by making ten first

Independent task



$$3 + 9 = 12$$

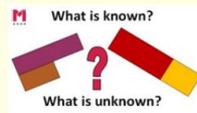
$$10 + 2 = 12$$

$$2 + 10 = 12$$

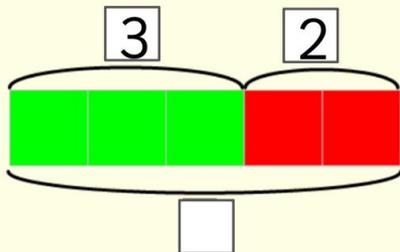
Bar model

- **Bar models** are pictorial representations of problems or concepts that can be used for any of the operations: addition, subtraction, multiplication and division.
- In word problems, **bar models** hold the huge benefit of helping children decide which operations to use or visualise problems.

I bought 3 green apples and 2 red apples.
How many apples did I buy altogether?



$$3 + 2 = 5$$



How could we write this equation?

3	2
5	



Home learning

- One activity per week with a fluency focus
- This won't be marked at school - the expectation is that you support your child with this at home and revisit anything they have found challenging.
- Create maths resource box for home.
- Revisit previous Maths learning.

You can always revisit old homework games or activities!

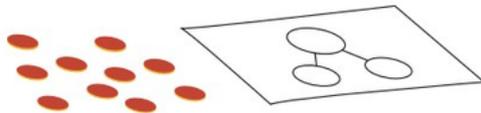
Home learning

- Number sense maths - a 'phonics style' approach to maths fluency.

Exercise 2

Play Make and Break 10

Take the part part whole floor mat and 10 counters (or any other small items) and put them all in the whole circle at the top.



Break the 10:

Ask your child to move the counters down into the part circles in different combinations. Talk about the size of each part and its pair and what is going on "I had 10, and I broke up that set into two parts, one part is 4 and the other part is 6."

Make the 10:

Ask your child to move the counters from the part circles back into the whole circle. Talk about what is going on. "I had two parts, and I am putting them together to make the whole. One part was 4, the other part was 6, and now I have 10 altogether."

- Please always read the talking tips to support and extend your child's thinking and learning.

Exercise 6

Complete the part part whole to match the picture above it

Example

Talking Tip

Talk about what you can see in the picture. "I can see 10 ice creams, 5 with cherries and 5 without. The parts are 5 and 5. Altogether they make 10."

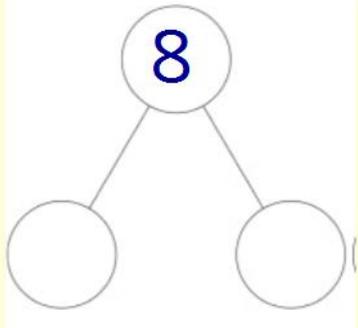
Try to "see" how many are in each part rather than count (though you might count to check you are right).



Fluency games



I spy...



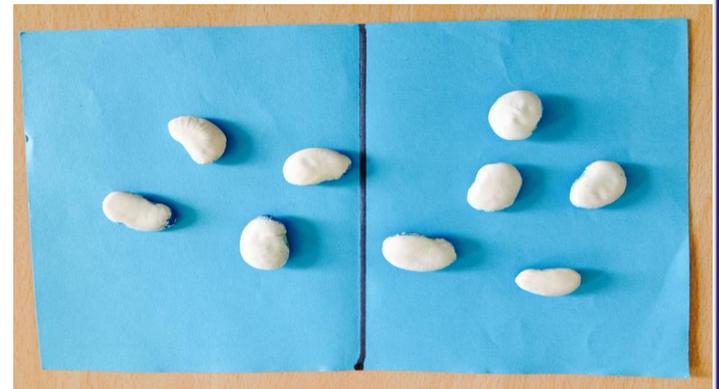
I spy a whole of...

Did you see...



Magic bean game

- Choose a number or a number card and count that number of beans.
- Hide some. How many are hidden? How do you know?
- Choose a number of beans. Throw them onto a piece of paper split into two. What equation do you see?





Play 5, 10, 20 Nice Things

- Count out 5/10/20 'nice things' each - we use multilink but buttons, beans etc would also work.
- Roll a dice and pass that number of items to your partner
- Your partner now rolls the dice and passes back his / her amount
- The winner is the person with all / the most multi link
- Keeping track with addition and subtraction equations is a great way to extend the game.





Number line ideas

Draw a line. Mark 0 and 10 (or any number range needed). Roll a dice. Decide where that number would go and write it in. Repeat. You can also start at any number and include whatever your child needs.



Number line ideas

Strike it out - Nrich



$$3 + 8 = 11$$

Inbetweens

- Start by asking for a 2 digit number. Place it at the start of the line. Now ask for a higher 2 digit number and place at the end of the line. Now keep asking for numbers in between.
-

Tug of war - Nrich website

One player is called "PLUS"

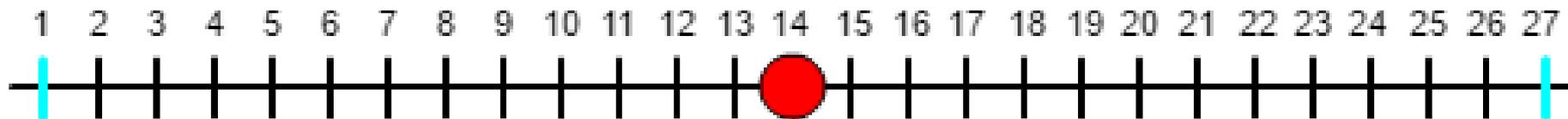
The other is called "MINUS" so decide who is who.

Plus moves from left to right and Minus moves from right to left. (The children may be encouraged to think about why that might be.)

Take it in turns to throw the two dice and add up the numbers on the two dice.

Move that number of places in your direction.

If the counter reaches **1**, Minus has won and so, of course if the counter reaches **27**, Plus has won.





Nrich

2018 Primary Advent Calendar

Age 5 to 11 ★

Click on each number to reveal a problem or game that uses dice for each day in the run up to Christmas.

We hope you enjoy working on the tasks!



Maths Seeds

<http://mathseeds.co.uk/>

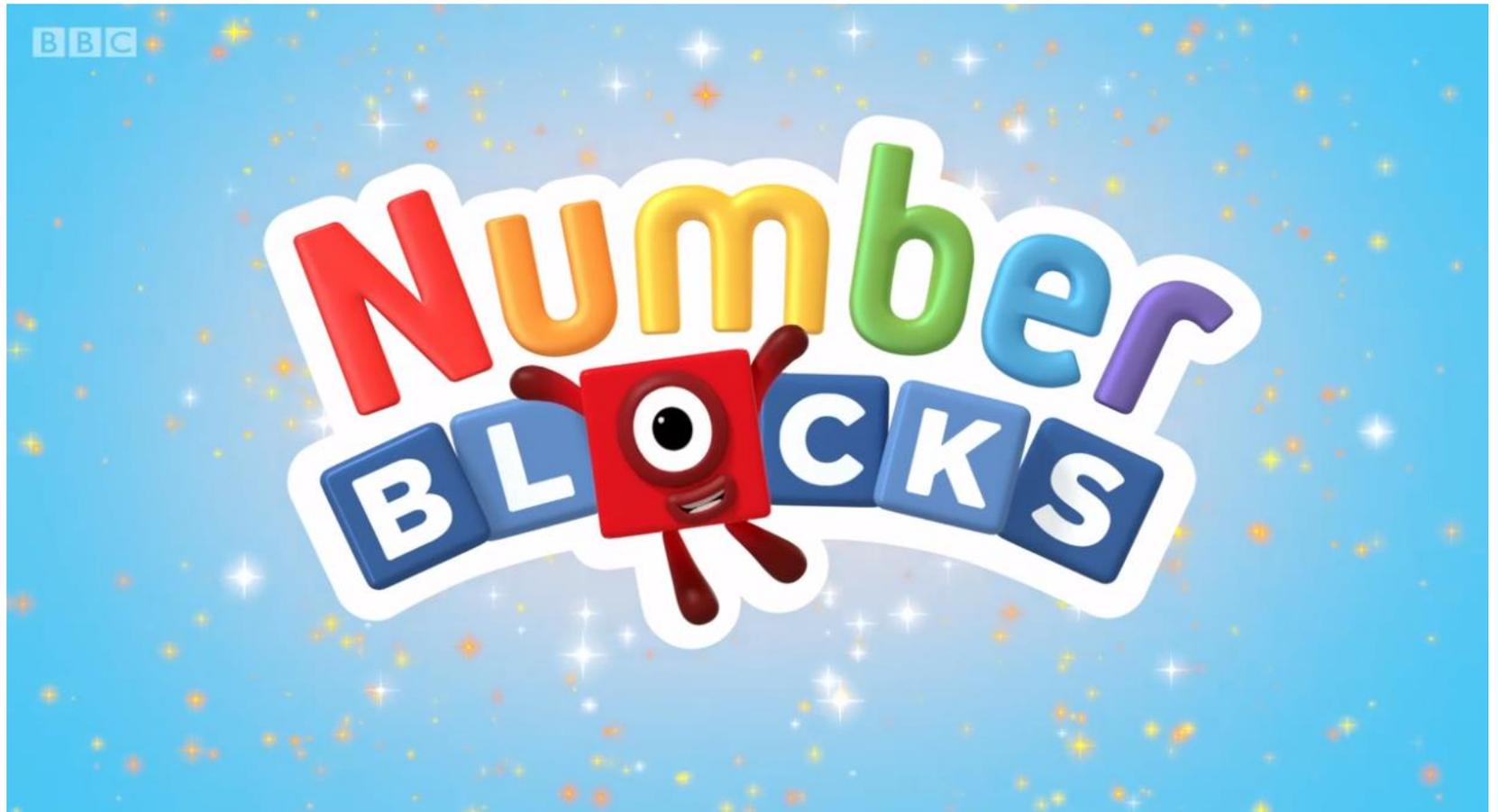


ICT Games





Number blocks



Web sites to use for practising fluency and other resources...

- Number blocks - BBC iPlayer

- Top Marks - <https://www.topmarks.co.uk/>

- Mathseeds - <https://mathseeds.com/>

- Free numicon resources -

https://global.oup.com/education/content/primary/series/numicon/?facet_type_facet=Teaching+Support&facet_subtype=Teaching+and+classroom+resources&facet_subtype=Activities®ion=uk&view=ProductList

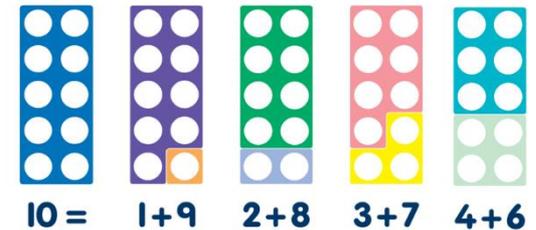
- Nrich [website](#)

- Purple mash - <https://www.purplemash.com/#tab/pm-home/maths>

- Maths is fun

- ICT games

- Oxford Owl Maths





Please do...



- Play games involving maths.
- Discuss maths wherever possible.
- There are opportunities for impromptu learning in games with real people that you can't get from an ipad or DS!
- Let your child win or be better than you! Otherwise all they learn is that you are better at maths than them.
- Recognise that there is more than one way of doing calculations
 - You may have learnt one method, but children are actively encouraged to seek out alternative methods in school and choose one which works for them, no matter how long winded.
- Share your enthusiasm!
 - Get excited about maths and your child will get excited too.





Other ideas

- **Follow a recipe:** work together to find out the quantities needed, ask your child to weigh the ingredients, discuss how you might halve or double the recipe and discuss the ratio of ingredients.
- **Talk about the weather forecast:** is today's temperature higher or lower than yesterday? What do the numbers mean?
- **Going shopping:** talk about the cost of items and how the cost changes if you buy two items instead of one. Let your child count out the coins when paying and discuss the change you get back. Use coins to explore addition, subtraction, multiplication and division.
- **Planning an outing:** discuss how long it takes to get to the park, and so work out what time you need to leave the house. Encourage your child to work out the best solution based on the time and distances. Discuss what shapes you see when you get there.





Please try not to...



- Don't expect them to understand after you've explained it once.

It is normal for a child to 'get it' one day, and then in a different context not know how to find an answer.

- Don't tell them you are hopeless at maths.

You may remember maths as being hard, but you were probably not hopeless, and even if you were, that implies to your child, “I was hopeless at maths, and I'm a successful adult, therefore maths is not important”.

- Don't get into an argument over homework.

It will be something that your child has covered in class, and if they really can't do it without a lot of tears and frustration, leave it and LET US KNOW!



Chinese Bamboo



When you plant it, nothing happens in the first year, nor in the second year or the third or the fourth years. You don't even see a single green shoot.

And yet, in the fifth year, in a space of just six weeks, the bamboo will grow nine feet high.

The question is, did it grow nine feet in six weeks or in five years?



Questions...



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