

Maths Mastery: Early Years to Year Two

What is Maths Mastery?



- Mastering maths - pupils of all ages acquiring a deep, long-term and adaptable understanding of the subject.
- ‘Teaching for mastery’ - elements of our classroom practice that gives pupils the best chances of mastering maths.
- NCETM Maths Hub – teachers are trained as mastery specialists.
- ‘I just can’t do maths’ – teaching for mastery rejects this idea.
ALL pupils are encouraged by the belief that working hard and working within the strategies in the programme mean they can succeed.

Mastery in Maths



Our aim today is inform you about what we teach in maths, how we teach it and to equip you with the skills to help support your child in understanding number.

- **Fluency**
- **Rapid number facts**
- **Variation**

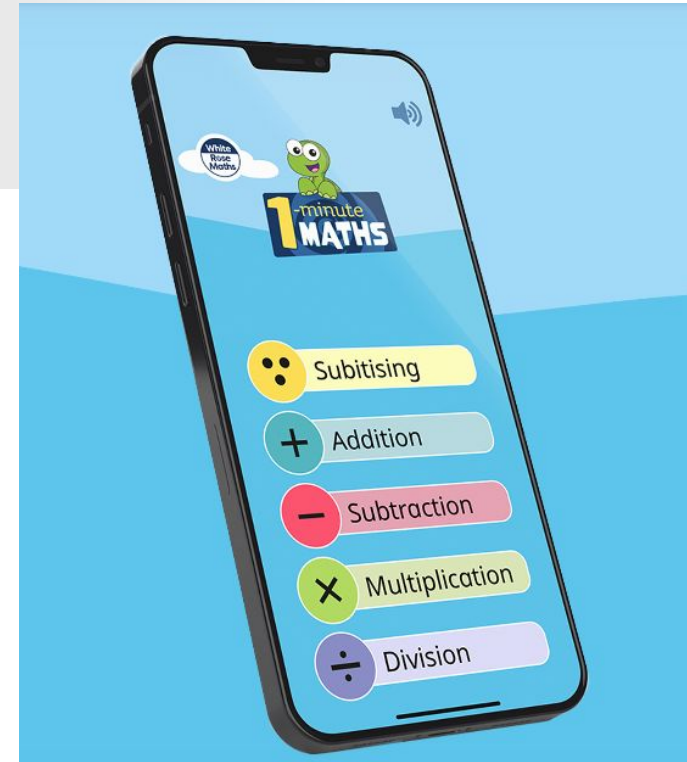
Maths at King's



- Range of resources to support teachers
 - White Rose Maths
 - One hour of maths everyday
 - Blocks of learning about a particular topic
 - More time spent in KS1 building strong number skills. Essential core skills lay a solid foundation for more complicated learning later on.
 - Each block of knowledge is broken down into small steps
 - Includes review and recap of past learning. We know that children remember more by learning maths in small, related chunks and repetition.
 - NCETM Early number
 - I See Reasoning
 - NRich
 - My Maths – homework


Check out these 7 top reasons for using 1-minute maths!

1. Excellent practice — and no distractions.
2. A clear, intuitive process that children pick up straight away.
3. No login or internet access needed. Just download and play.
4. Enjoyable and motivating... How many can they get correct in one minute?
5. Helpful hints match those used in class.
6. Brilliant for building number fluency and confidence.
7. It's **FREE!**



Vocabulary





- exchange (-) or regroup (+)
- calculation
- number sentence/ equation
- oblong 

hundreds tens ones
H T **1's**

digit
→
→
62

number
62



- borrow or steal
- sum = total (+)
- rectangle
(family name)
 
- units

Addition

$$\underset{\text{addend}}{6} + \underset{\text{addend}}{7} = \underset{\text{sum}}{13}$$

Subtraction

$$\underset{\text{minuend}}{13} - \underset{\text{subtrahend}}{8} = \underset{\text{difference}}{5}$$

Multiplication

$$\underset{\text{factor}}{6} \times \underset{\text{factor}}{8} = \underset{\text{product}}{48}$$

Division

$$\underset{\text{dividend}}{48} \div \underset{\text{divisor}}{8} = \underset{\text{quotient}}{6}$$

Scaffolding the talk – stem sentences



- One less than ___ is ____
- I have counted ____ altogether
- ___ comes after/before ____
- ___ has more than ____ because ____
- ___ has the least because ____
- ___ more than ____ is ____
- I have ___ and he has ___ so we have ____ altogether
- I had ___ and took ____ away so now we have ____

My whole number is 10. Part of my number is 4, the other part is 6.

60 is the same as 6 tens.
9 tens is the same as 90.

Number

Fluency

Reasoning

**Problem
solving**

Concrete 
Pictorial 
Abstract 

Reception

Children count reliably with numbers from one to 10, place them in order and say which number is one more or one less than a given number.

Year One

Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.
Count, read and write numbers from 1-100 in numerals and words.

Use counting strategies to solve problems

Year Two

To read and write numbers to at least 100 in words and numerals.

To use the signs: $<$, $>$ and $=$

To compare and order numbers 0 to 100.

To identify, represent and estimate numbers.

Number

Early Years

- Matching amounts
- 1:1 correspondence
- Finding the total

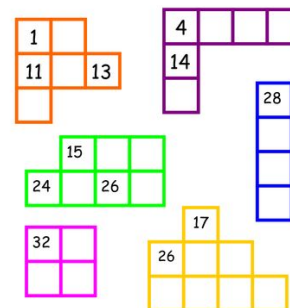


1	2	3	4	5	6	7	8	9	10
one	two	three	four	five	six	seven	eight	nine	ten
•	••	•••	••••	•••••	••••••	•••••••	••••••••	•••••••••	••••••••••



Years One and Two

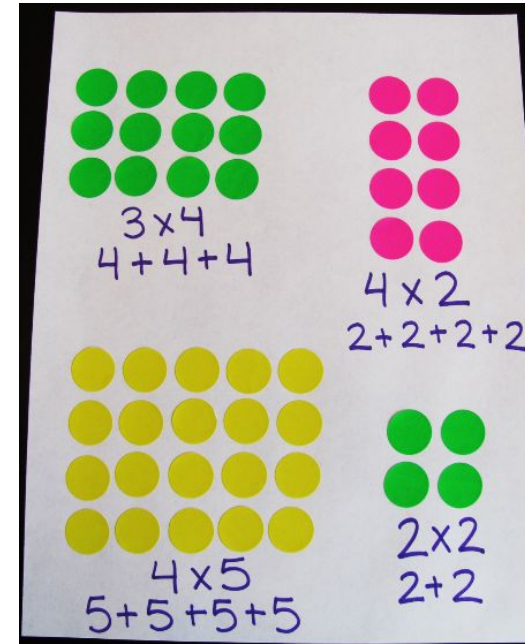
- Counting (reliably)
- Comparing ($>$, $<$, where numbers are in relation to one another)
- Composition (what's hidden inside numbers, structures)



Fluency in Number

Fluency demands more of learners than just memorisation of facts.

E.g. Counting in 2s, 5s and 10s



It encompasses a mixture of efficiency, accuracy and flexibility.

Progression in number skills

$$7 - 3 = 4$$



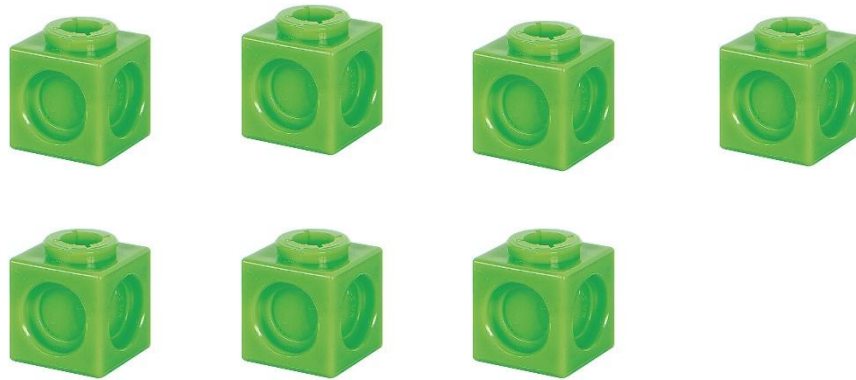
$$7 - 4 = 3$$



$$3 + 4 = 7$$

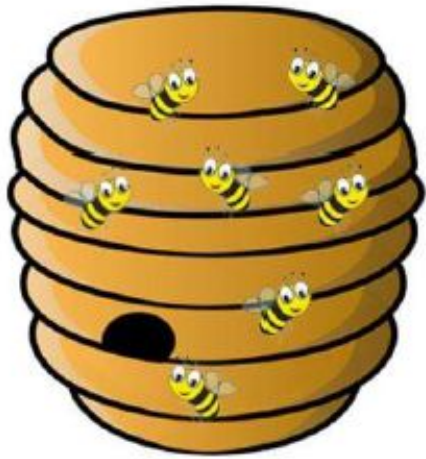


$$5 = 7 - 2$$



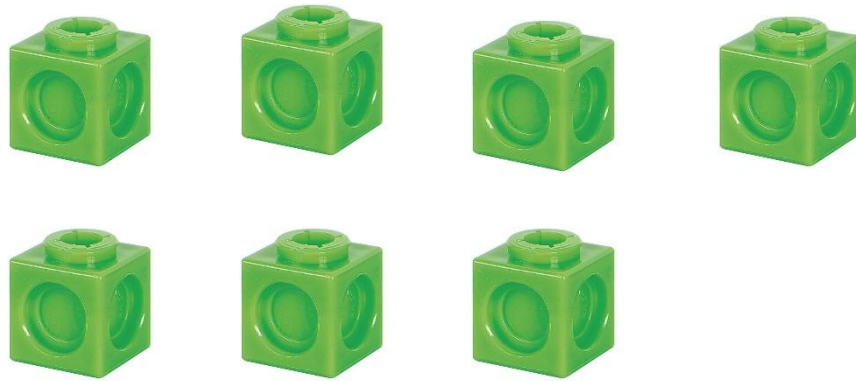
Talk task

How many calculations can you complete?



$$\square = 7 - \square$$

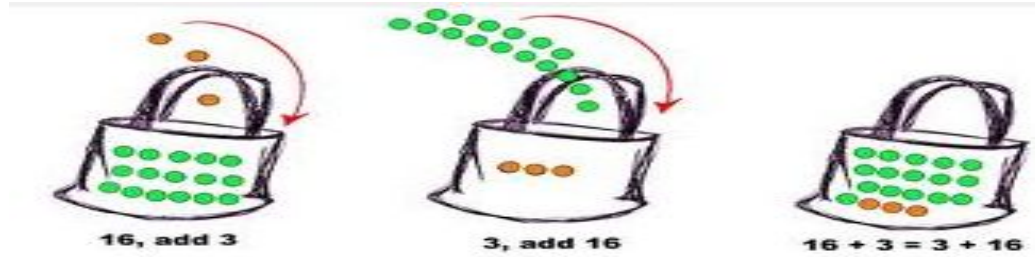
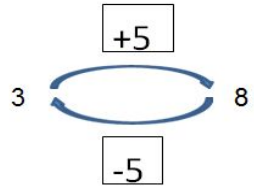
Why can't the digits 8 or 9 be used?



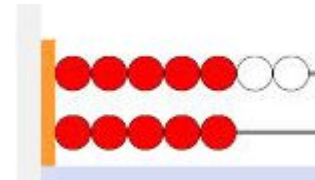
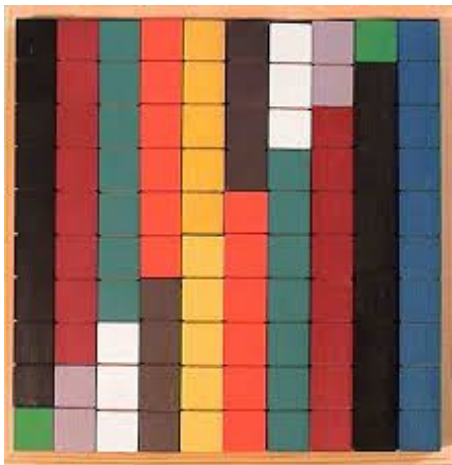
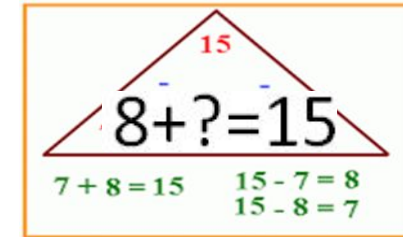
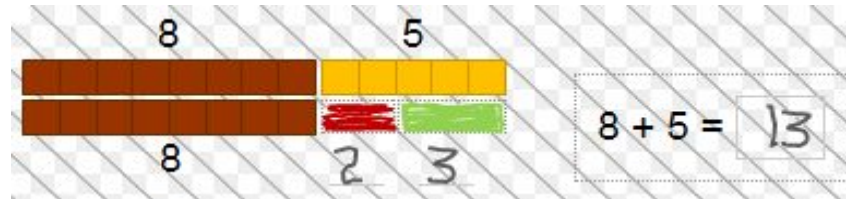
Variation and representations

Conceptual variation

The opportunity to work on different representations of the same mathematical idea.

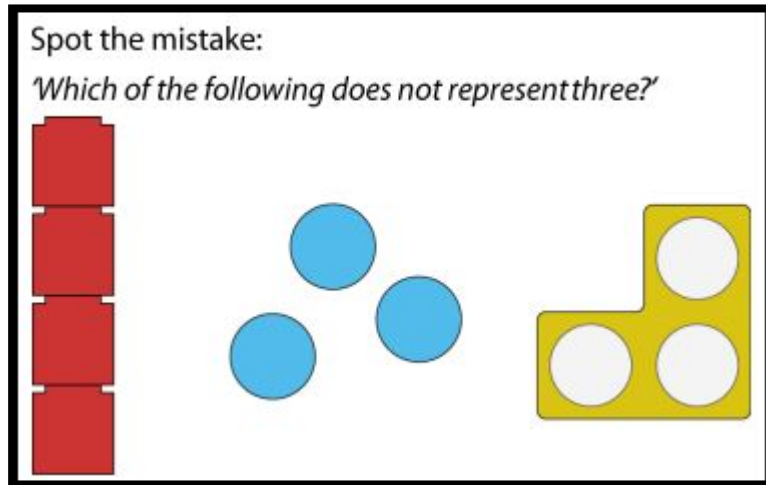


- 1 + 9
- 2 + 8
- 3 + 7
- 4 + 6
- 5 + 5
- 6 + 4
- 7 + 3
- 8 + 2
- 9 + 1



Variation and representations

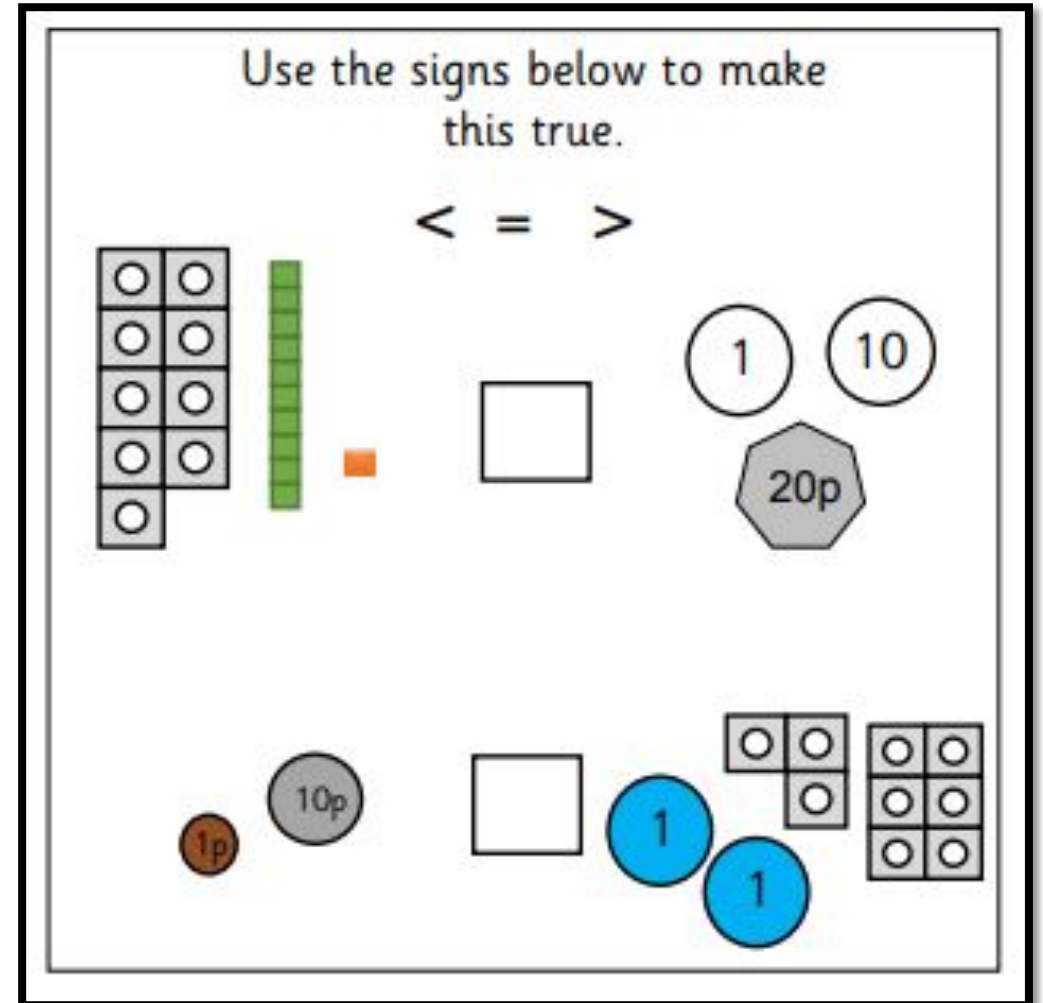
Spot the mistake:
Which of the following does not represent three?



The image shows three different visual representations of the number 3. The first is a vertical stack of four red rectangles. The second is three blue circles arranged in a triangular pattern. The third is a yellow shape with three white circles inside, arranged in a 2-1 pattern.

Use the signs below to make this true.

$<$ $=$ $>$



The image shows a math problem using various objects to represent numbers. The top row shows a 2x5 grid of circles, a vertical bar of 7 green squares, a small orange square, a square box, a circle with '1', a circle with '10', and a 20p coin. The bottom row shows a 1p coin, a 10p coin, a square box, two circles with '1', a 2x2 grid of circles, and a 2x3 grid of circles.

Challenges

- Are bigger numbers challenging your children?
- Is there an easier way to work out the answer?

Which questions are easy, which are hard?

$453 + 10 =$

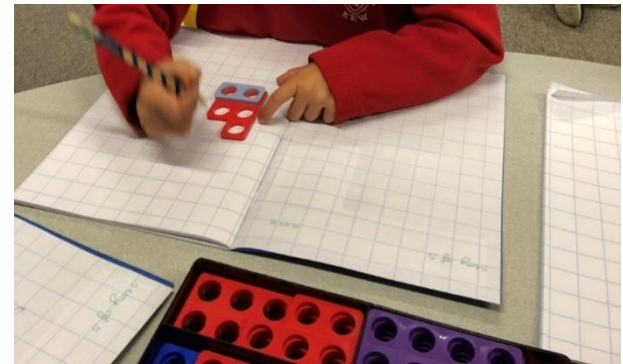
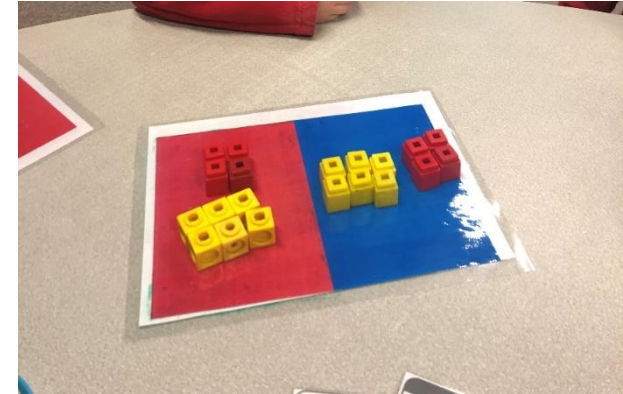
$930 - 100 =$

$493 + 10 =$

$910 - 120 =$



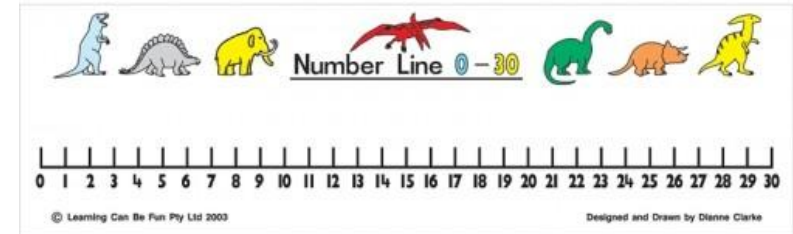
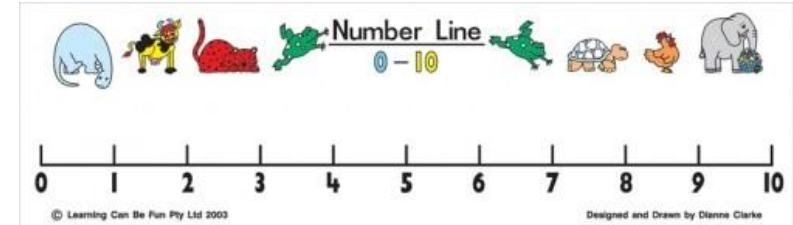
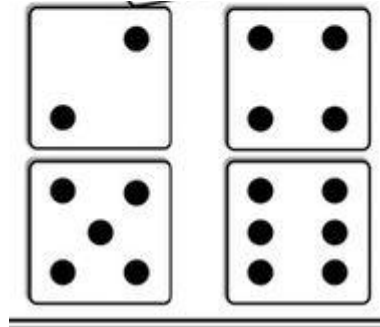
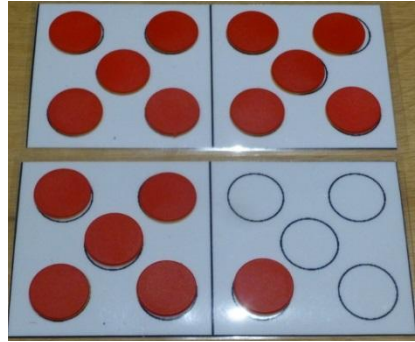
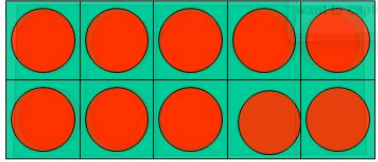
Why are some easy and some hard? Explain your reasons.



- Partitioning?
- Using 100 square
- It is ok to give your child manipulatives to work out answers!



Manipulatives at home



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

Free digital tools

Place value chart

Algebra tiles

Rekenrek

Bar model

Double-sided counters



Concrete \longrightarrow Pictorial \longrightarrow Abstract

Concrete representation of the equation $4 = 3 + 1$. On the left, a diagram shows a large box labeled '4 whole' connected to two smaller boxes labeled '3 part' and '1 part'. On the right, a photograph shows a stack of four blocks: three purple blocks on top and one red block at the bottom.

Pictorial representation of the number 19. A string of 19 red beads is shown above a red heart cutout. The heart is split vertically, with the number '1' on the left half and '9' on the right half.

Abstract representation of addition facts using colored sticks. On the left, five sticks are stacked: orange (10+0), brown (8+2), blue (9+1), green (7+3), and pink (6+4). On the right, three sticks are stacked: yellow (5+0), pink (4+1), and green (2+3).

Pictorial representation of the equation $10 = 5 + 5$. A blue polka-dot card has a '10' written on it. Below it, two boxes labeled 'part' contain five red dots and five yellow dots respectively.

Pictorial representation of the equation $10 = 5 + 5$ using red squares. The top row contains five red squares, and the bottom row contains one red square followed by four empty boxes.

Abstract representation of the equation $10 = 5 + 5$ using a part-whole diagram. A large rectangle is divided into two 'Part' sections and one 'Whole' section at the bottom.

Abstract representation of addition facts using dot patterns. The top row shows $10 = 1+9$, $2+8$, $3+7$, and $4+6$ with corresponding colored dots. The bottom row shows $5+5$, $6+4$, $7+3$, $8+2$, and $9+1$ with corresponding colored dots.

Abstract representation of addition facts using dot patterns in boxes. Two columns of boxes are shown. The left column contains boxes with 1, 2, 3, 4, and 5 dots. The right column contains boxes with 5, 6, 7, 8, and 9 dots. Each box is divided into two sections, representing the parts of the sum.

Abstract representation of a missing part problem. A dashed box contains the text 'What's the missing part?'. Below it, a diagram shows a box with 6 dots on top, a box with 3 dots on the bottom left, and an empty box on the bottom right.

Abstract representation of a number pyramid. A pyramid of triangles is shown with numbers in each triangle. The top triangle is 10. The second row has 4 and 9. The third row has 7, 1, 7, 8, 2. The fourth row has 3, 5, 5, 3, 9, 5. The fifth row has 5, 10, 5, 5, 1, 5, 5. The bottom row has 4, 2, 5, 1.

Concrete

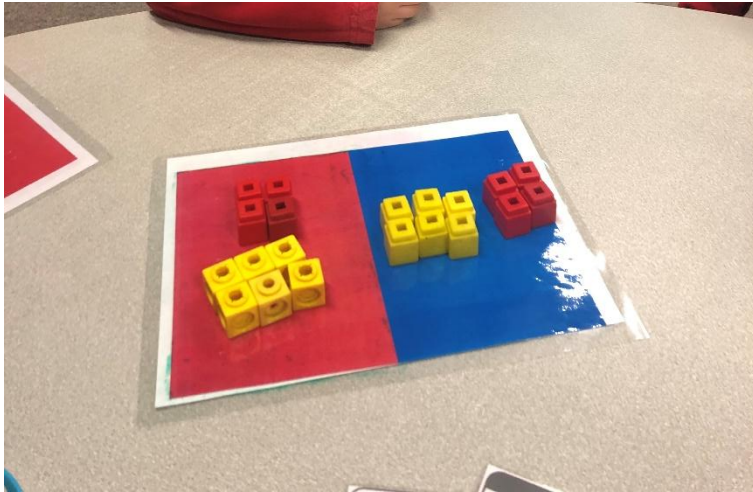


Pictorial

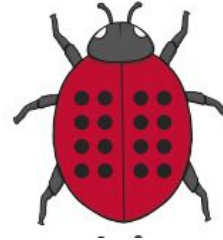


Abstract

• Concrete



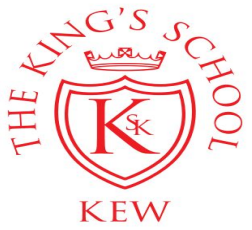
Pictorial



$$8 + 8 = \underline{\hspace{2cm}}$$

Sita earns £10 every time she helps her mum tidy the house. If she helps her mum 2 times, how much money does she earn?

Mastering Early Number



NCETM Maths Hub: Mastering Early Number

- 4x 10 minute 'Early Maths Mastery'
 - This project aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. The aim over time is that children will leave KS1 with fluency in calculation and a confidence and flexibility with number.

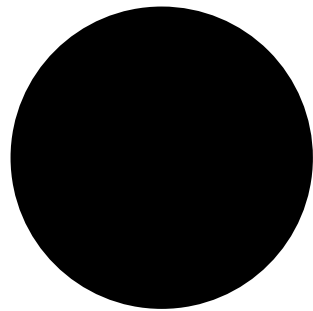
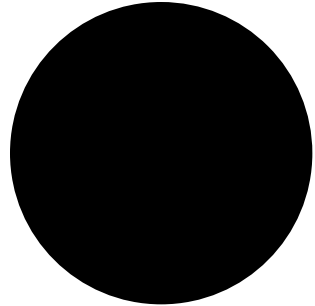
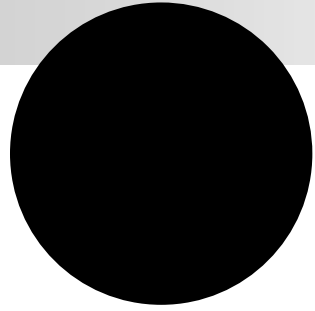
<https://www.ncetm.org.uk/maths-hubs-projects/mastering-number-at-reception-and-ks1/>

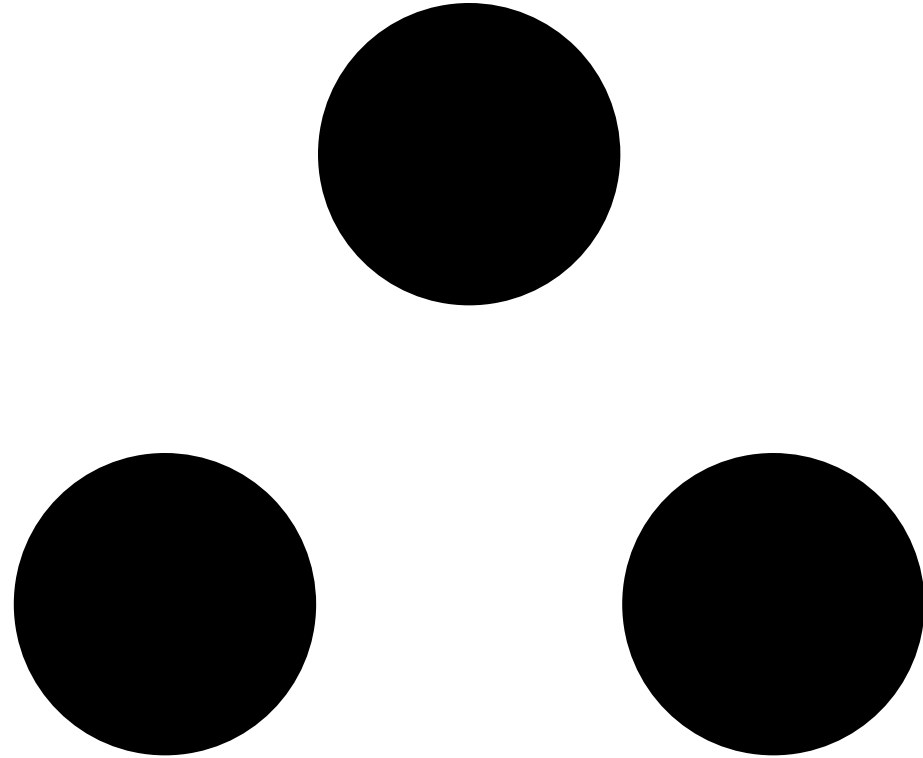
Mastering Early Number

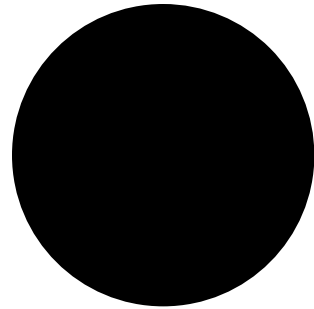
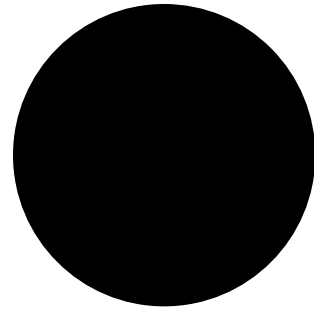
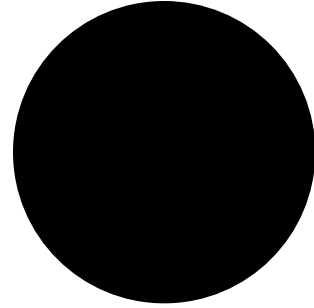


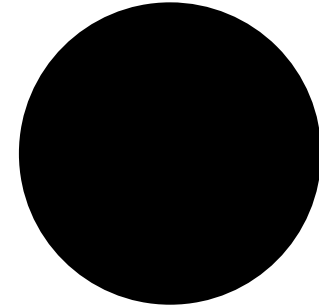
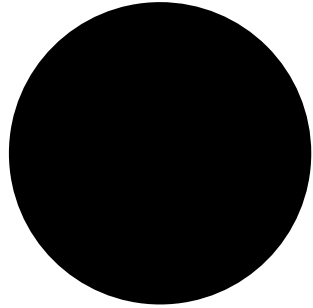
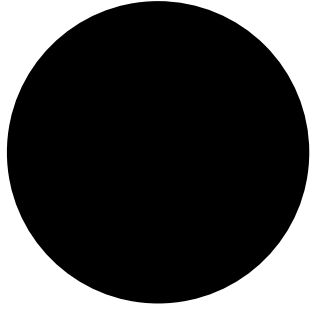
Subitising

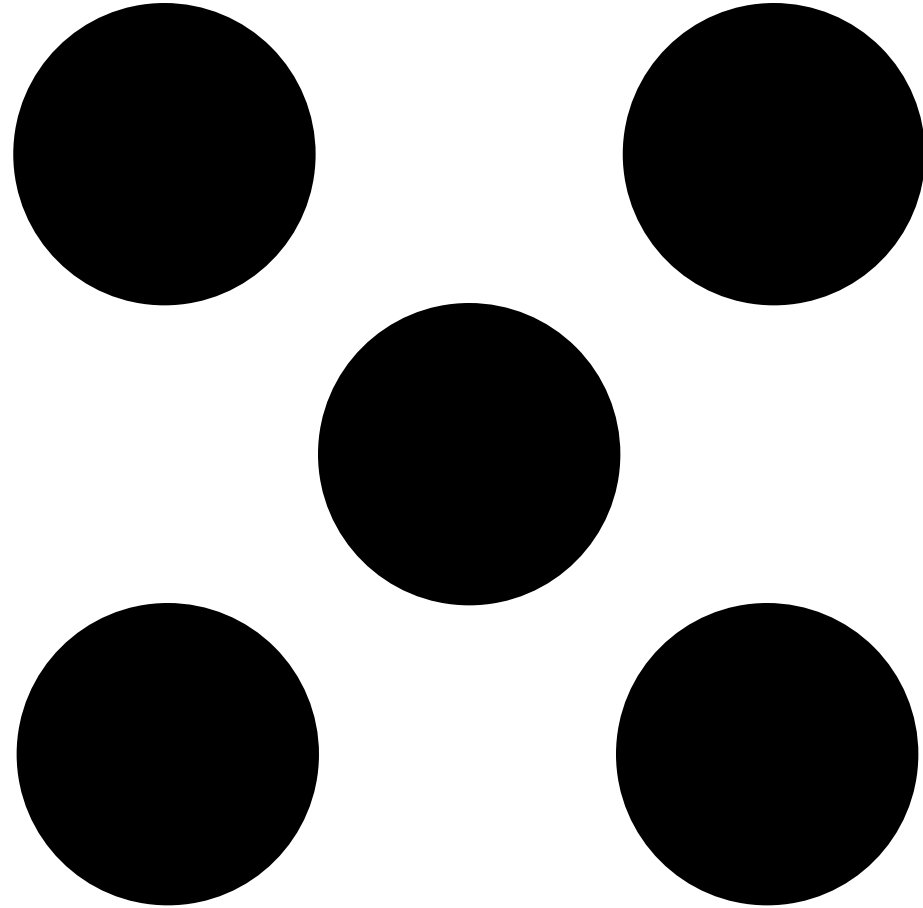
The way of recognising the quantity of something, without counting.

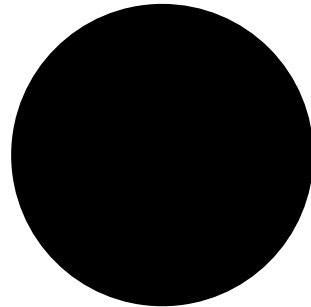
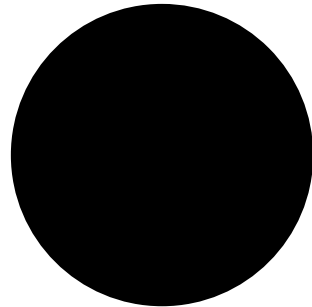
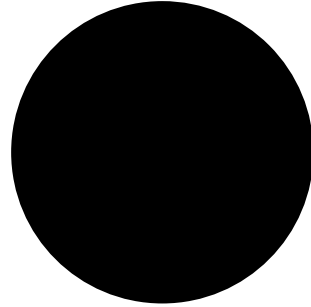
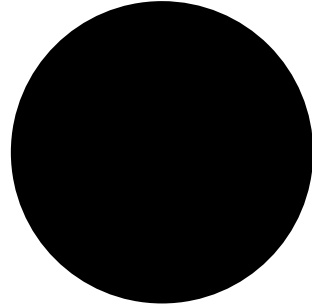


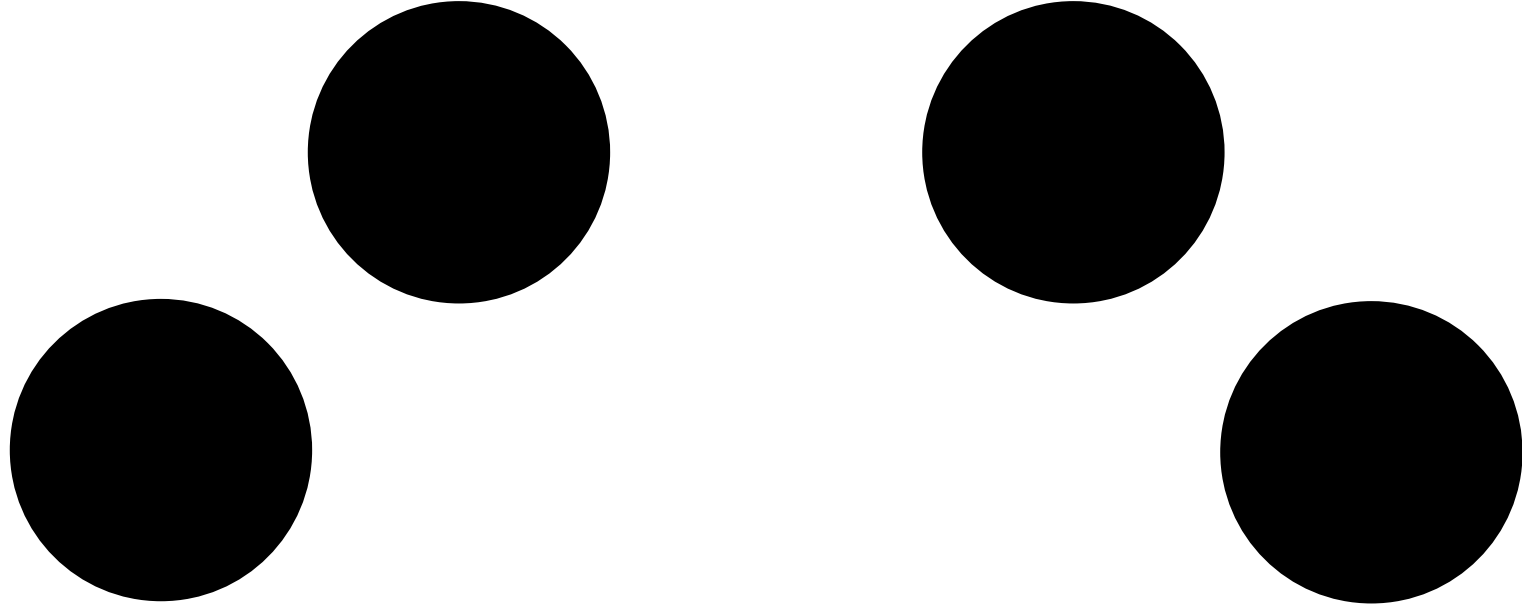




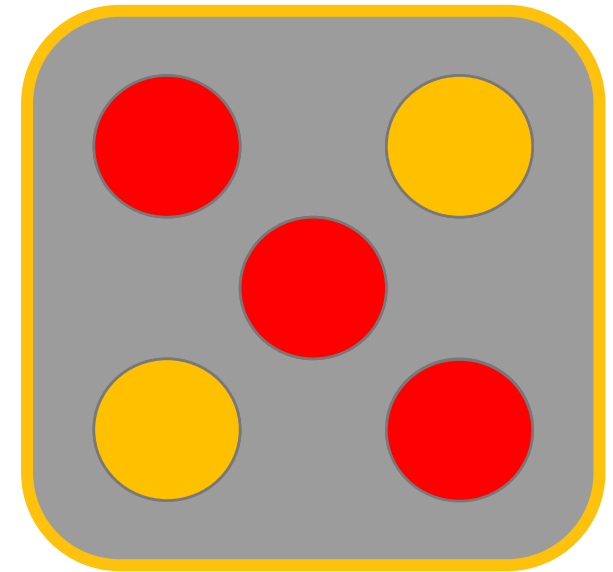
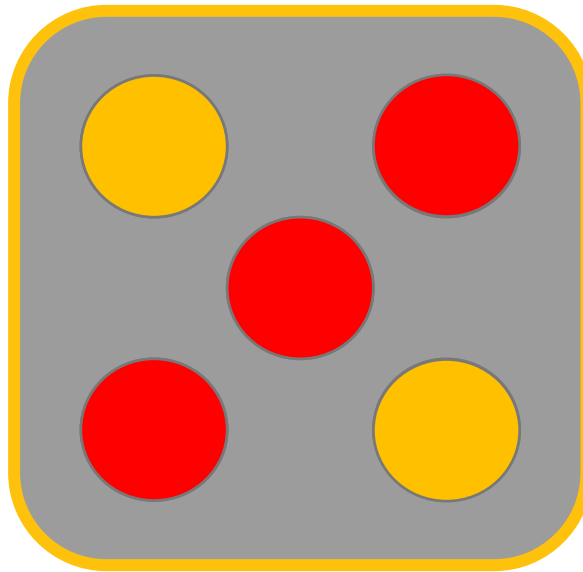
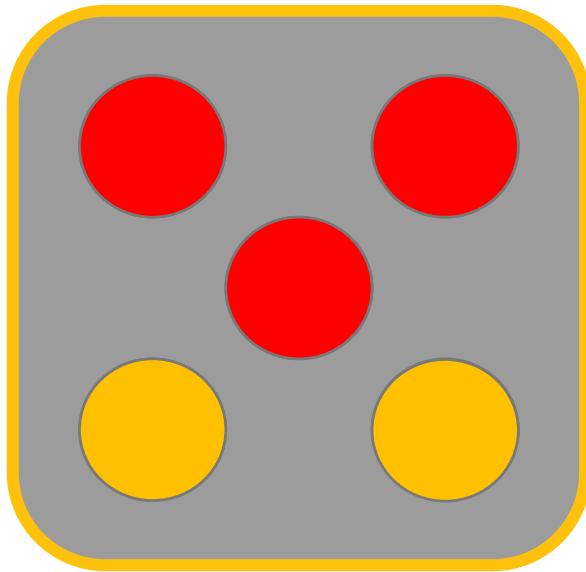
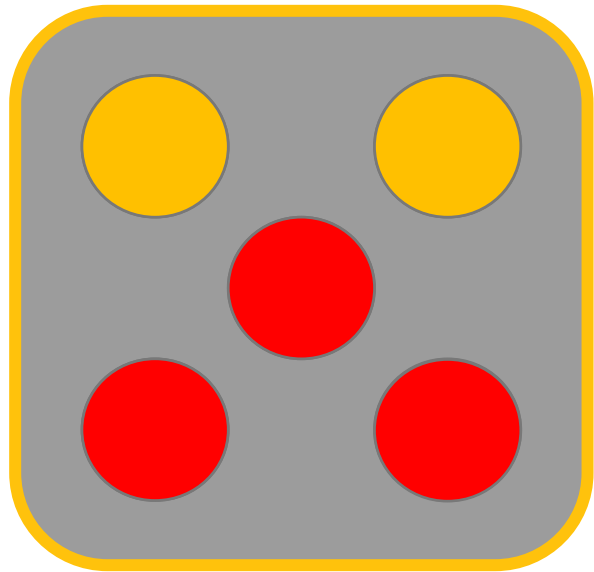








What is the same? What is different?
Which pictures are most similar?



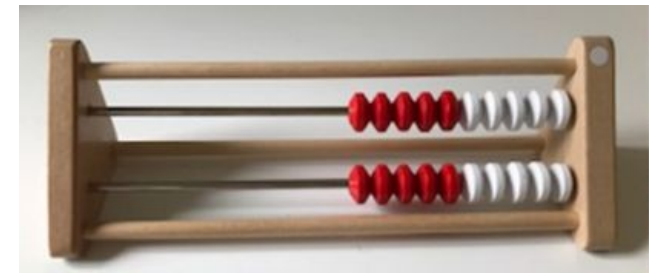
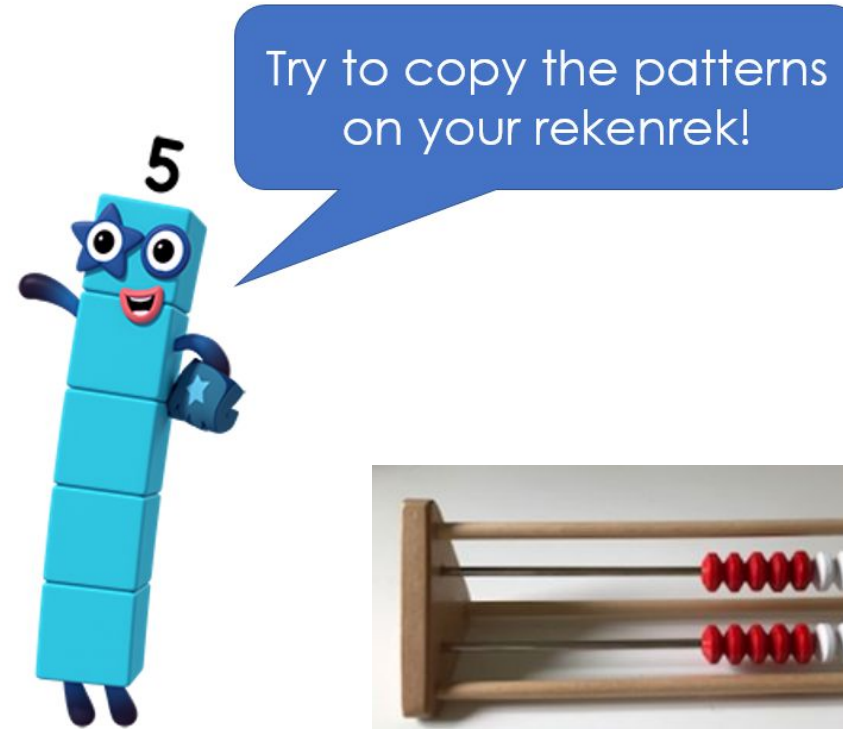
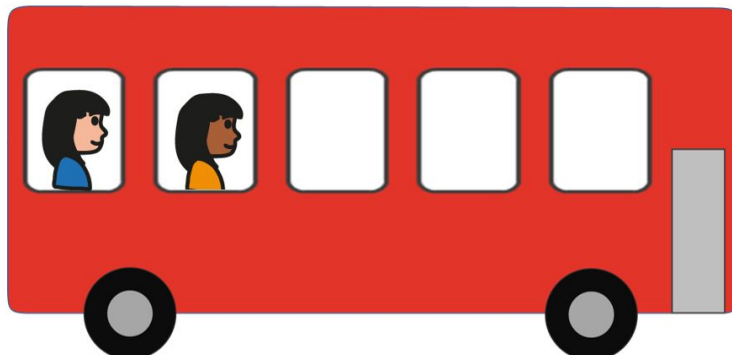
Mastering Early Number

Rekenrek

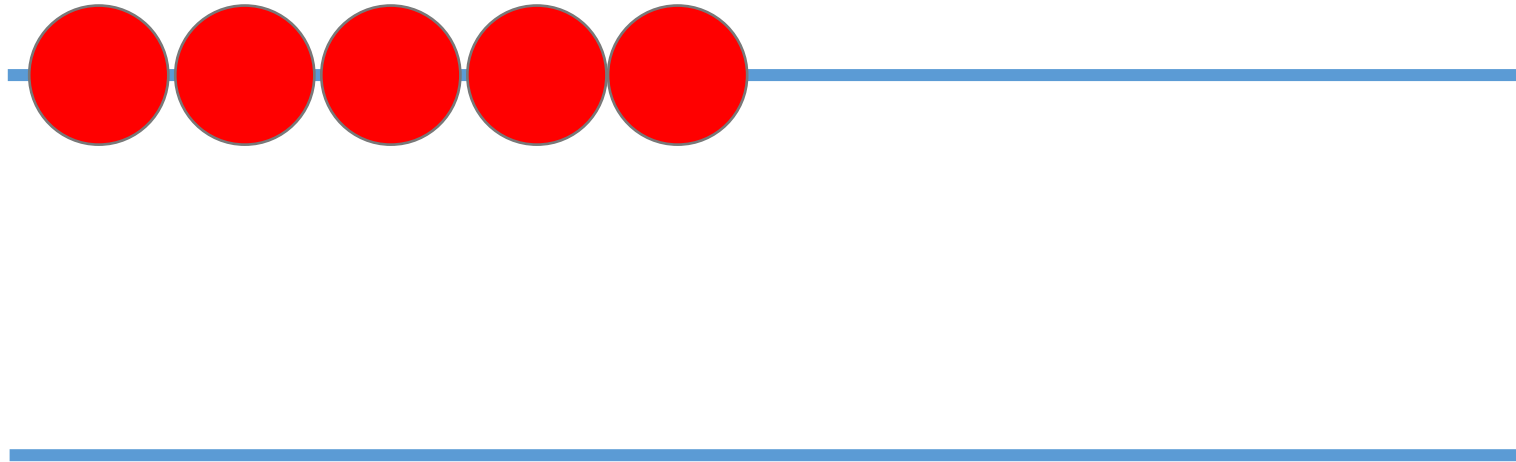
- Exposes mathematical structure for all children
- It highlights the 5 and 10
- Children can 'see' relationships
- Encourages children to be mathematically observant
- It encourages subitising



Rekenrek



Can you work systematically to show all the ways to make 5?



How many on the bottom row to make 5?



____ and ____ make 5.

For each expression, show 1 number on the top row and 1 number on the bottom row of your rekenrek.



$4 < 7$

$7 < 9$

$7 > 4$

$9 > 7$

_____ is greater than _____ ;
_____ is less than _____ .

True or false? Convince me!



$$8 > 4$$

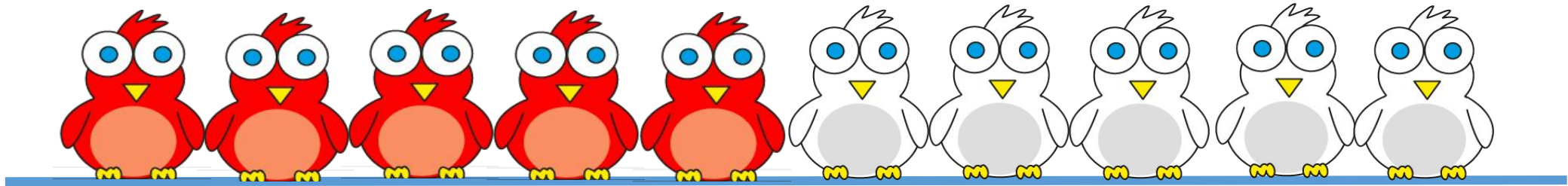


True or false? Convince me!



$$9 > 5 + 4$$

Show on your rekenrek and your fingers HOW MANY MORE birds are needed to make 12

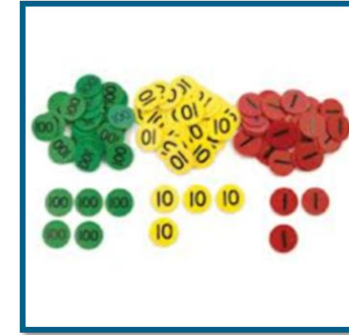
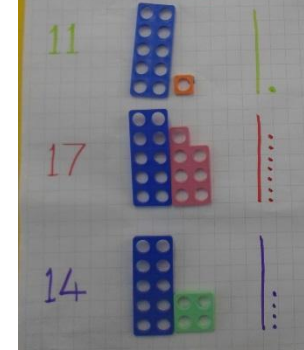


_____ needs _____ to make 10;
10 needs _____ to make _____;
so, _____ needs _____ to make _____.

Place Value

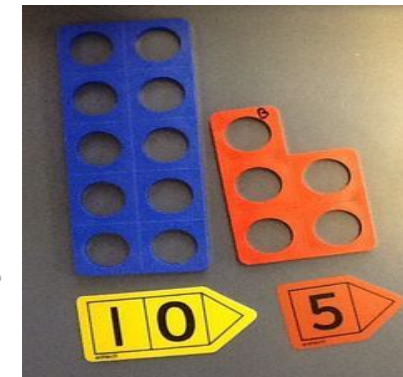
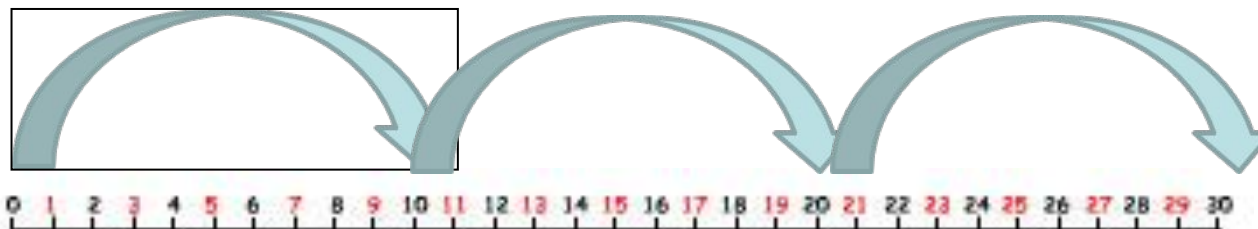
Early Years

- Matching
- Identifying
- Grouping



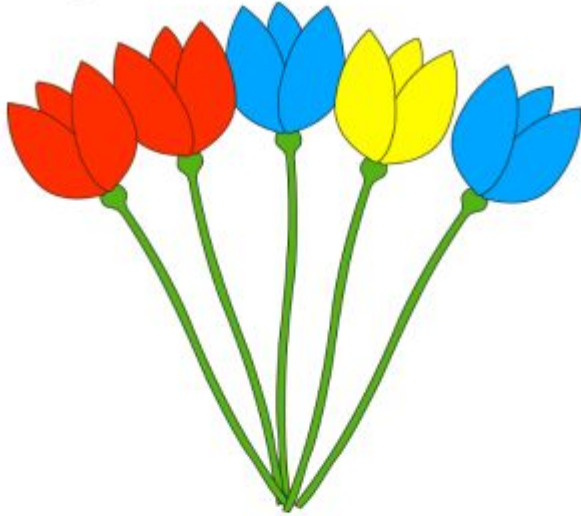
Years One and Two

- Partitioning
- Place value
- Use and apply this knowledge to problem solve.

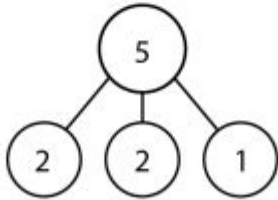


Partitioning – the beginning

Partitioning into three parts:

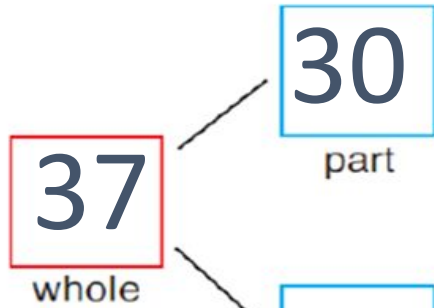


'There are five flowers. Two are red, two are blue and one is yellow.'



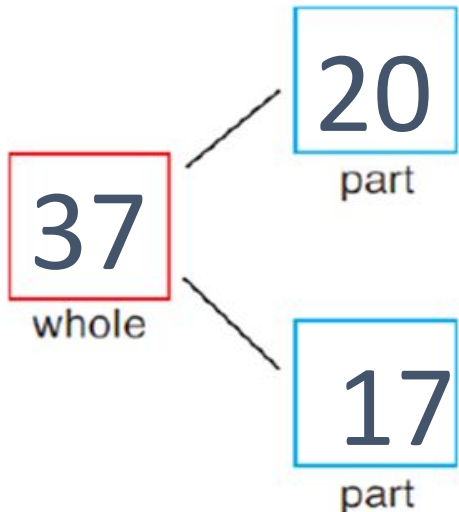
'Five is the whole; two is a part, two is a part and one is a part.'

Place value the next



3 tens

7 ones



2 tens

17 ones

What's the odd one out?

71, 77, 17, 70

Miss Platt bought 65 apples and Mrs Barchha bought 59 apples.

Mrs Barchha bought more apples.

True or False? **How do you know?**

Number Bonds

Fluency

Reasoning

**Problem
solving**

Concrete 
Pictorial 
Abstract 

Reception

Children use quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing

Year One

To show and use number bonds to 20. In addition and subtraction.

Year Two

I can recall and use + and - facts to 20 and use number facts to 100

To apply mental strategies to problems

To apply written strategies to problems

Prompting thinking everyday



- Show me...
- Here is the answer – what could the question have been?
- Odd one out
- Find the mistake and how it went wrong
- Can you see a pattern?
- True or false?
- Always true? Sometimes true? Never true?
 - Does an even number always end in 2?

Useful Links



NCETM National Centre for Excellence in the Teaching of Mathematics

<https://www.ncetm.org.uk/>

NCETM National Curriculum Glossary

<https://www.ncetm.org.uk/media/hpihrj3s/national-curriculum-glossary.pdf>

Nrich

<http://nrich.maths.org/frontpage>

I See Reasoning

<https://www.iseemaths.com/i-see-reasoning-ks1/>

NCETM Mastering Number Video

<https://www.ncetm.org.uk/maths-hubs-projects/mastering-number-at-reception-and-ks1/>