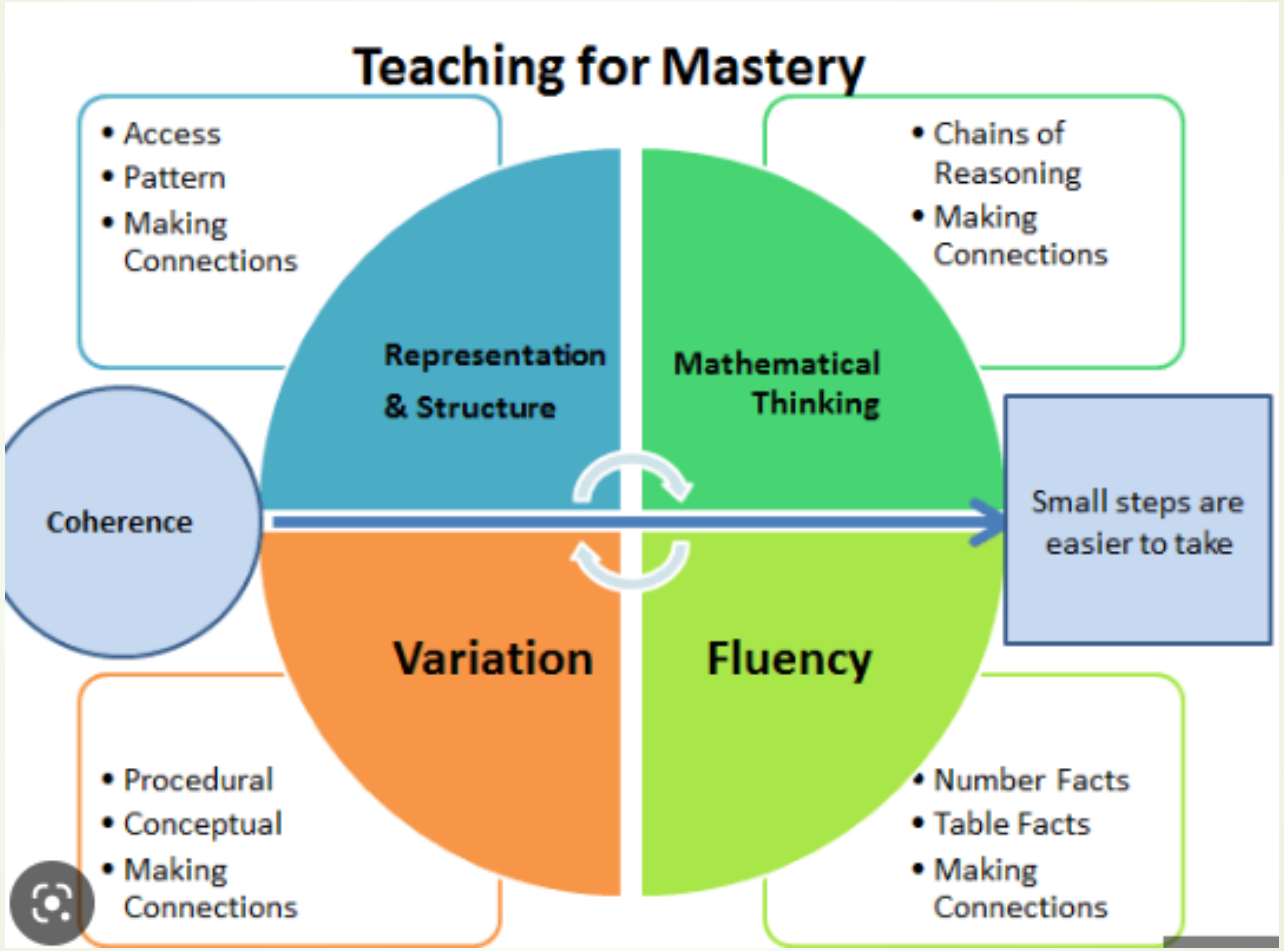
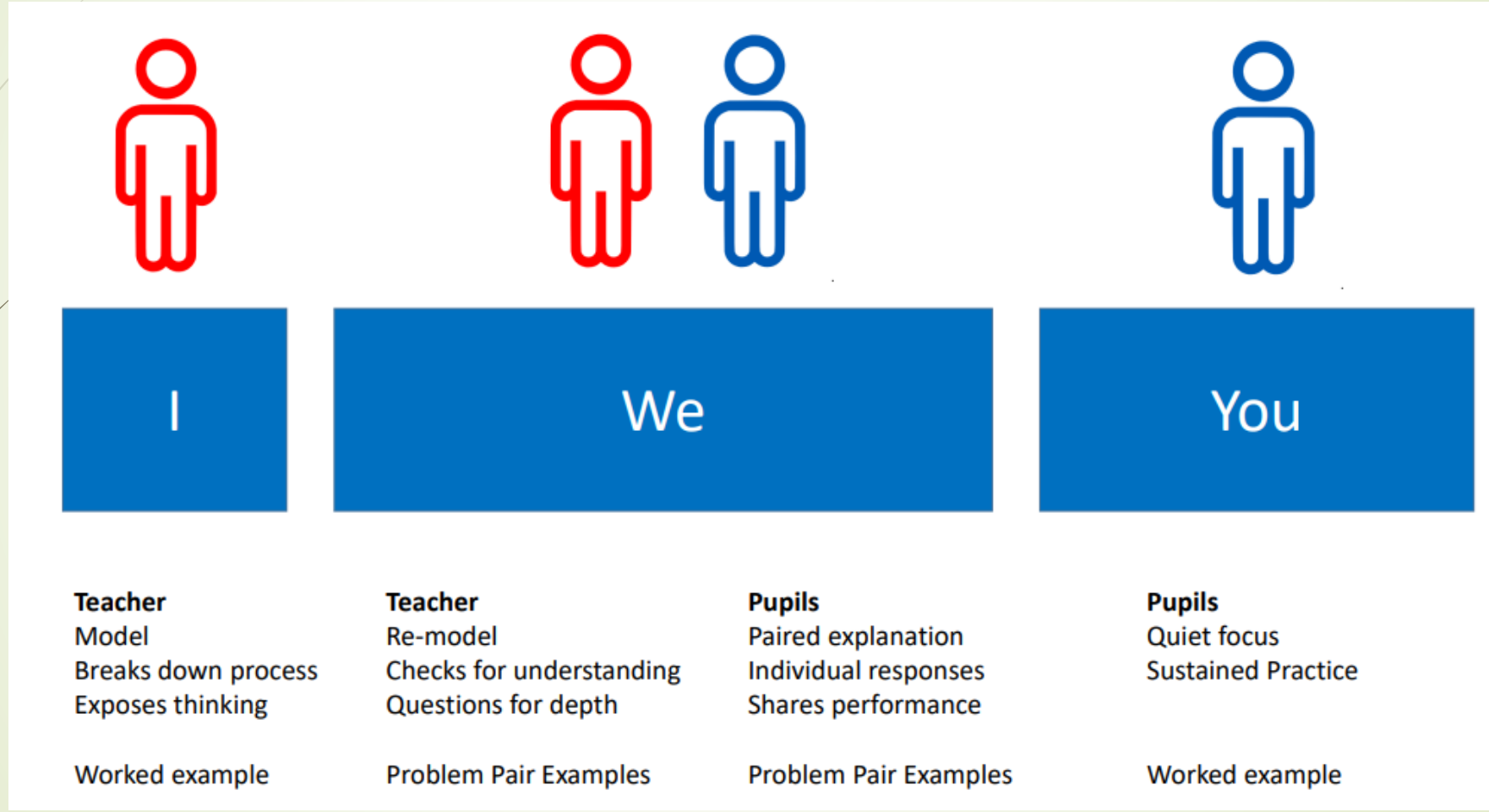
Maths Parents workshop 29th November


Teaching for Mastery
• Access
• Pattern
• Making Connections
• Chains of Reasoning
• Making Connections
Representation & Structure
Mathematical Thinking
Coherence
Small steps are easier to take
Variation
Fluency
• Procedural
• Conceptual
• Making Connections
• Number Facts
• Table Facts
• Making Connections

How it looks in action.

- Teacher teach whole class input, TA supports



Stem sentences and generalisations

Rationale for using stems and generalisations.

Maintaining children's **focus**...

Enabling all children to recognise **what's important** and what needs to be **remembered** for later learning.

Reducing cognitive load to enable learning to happen.

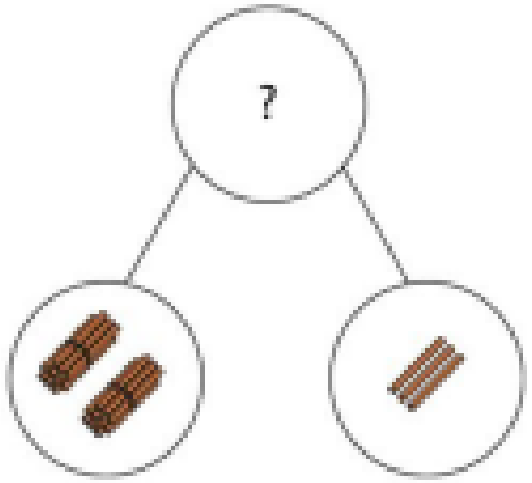
Returning to ideas and enabling ideas to be **connected.**

Providing the **correct language** for all children to **think** about and **communicate** mathematical ideas.

Providing high quality **shared** language to **discuss**, connect and share ideas.

Try this stem

There are ___ tens which is ___ and ___ ones which is ___.
This makes ___ altogether.



There are two tens which is twenty and three ones which is three. This makes twenty-three altogether: 23.
The '2' represents two tens. It has a value of twenty.
The '3' represents three ones. It has a value of three.

Generalisations:

*'Understanding the underlying structures of mathematics is **fundamental to mastering** the subject. This involves being fluent at **generalising** and proving.'*

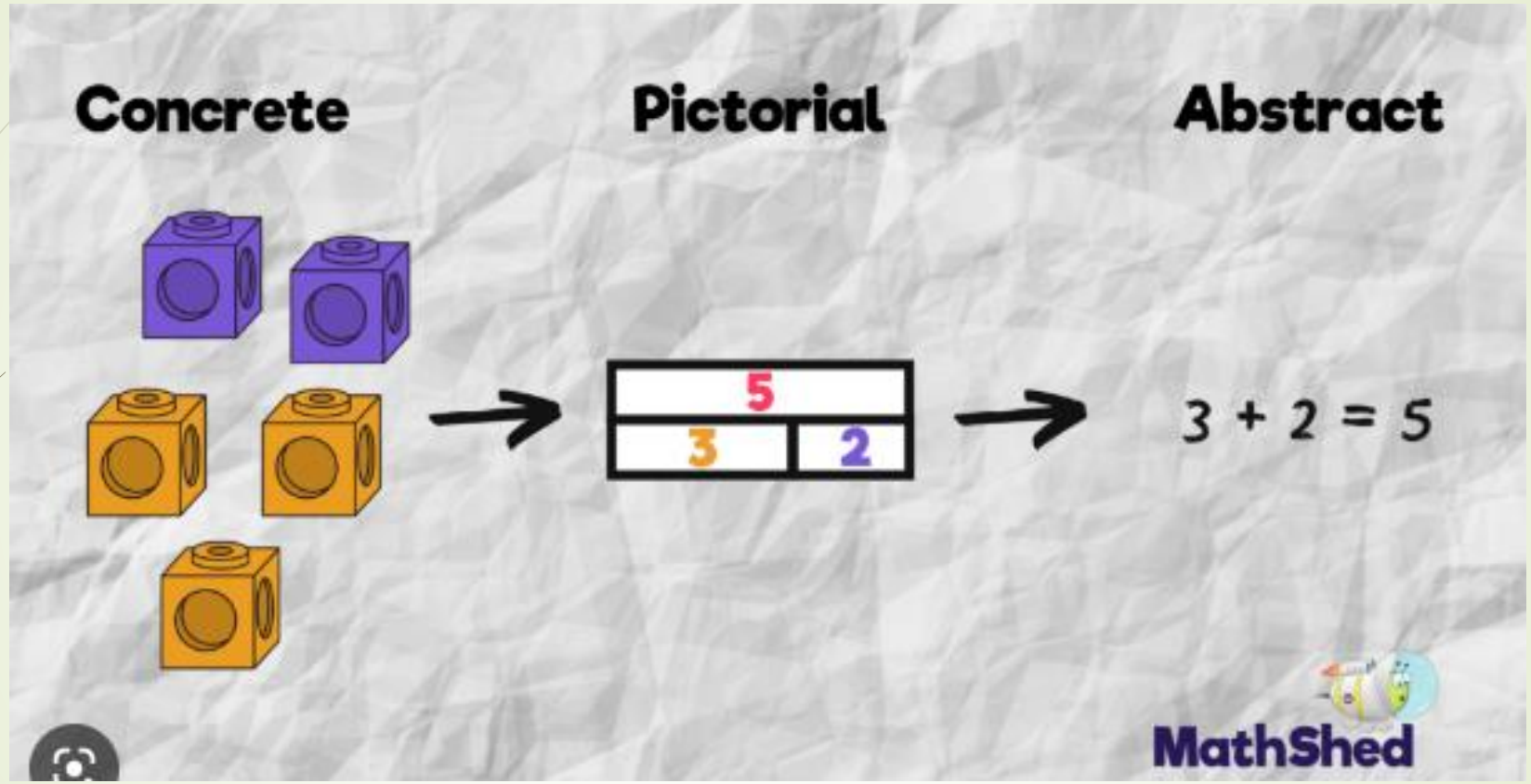
Pennant and Woodham (2018)

Make 37

Four bags contain a large number of 1s, 3s, 5s and 7s.

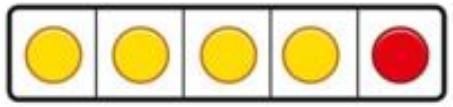
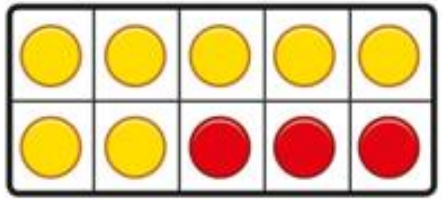
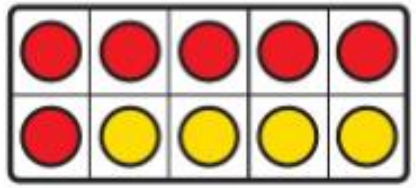
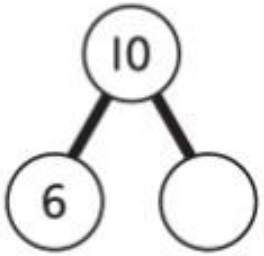
Can you pick ten numbers from the bags that add up to 37?

nrich.maths.org

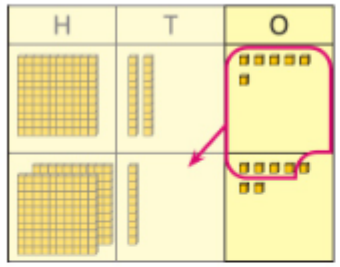
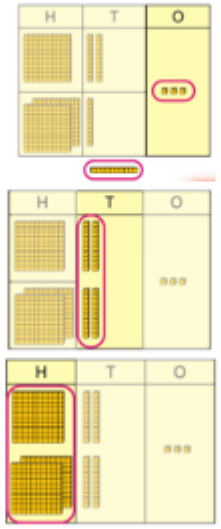
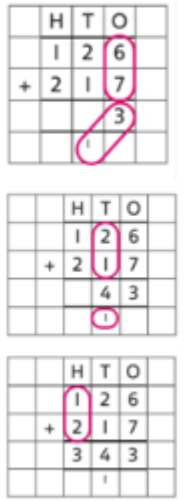

Concrete
Pictorial
Abstract
5
3
2
3 + 2 = 5
MathShed

Addition

EYFS and KS1

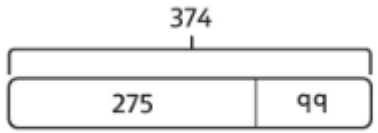
Knowing and finding number bonds within 10	Break apart a group and put back together to find and form number bonds. *3 + 4 = 7* *6 = 2 + 4*	Use five and ten frames to represent key number bonds.  *5 = 4 + 1*  *10 = 7 + 3*	Use a part-whole model alongside other representations to find number bonds.   Make sure to include examples where one of the parts is zero.

LKS2

3-digit number + 3-digit number, exchange required	Use place value equipment to enact the exchange required.  *There are 13 ones.* *I will exchange 10 ones for 1 ten.*	Model the stages of column addition using place value equipment on a place value grid. 	Use column addition, ensuring understanding of place value at every stage of the calculation.  *126 + 217 = 343*

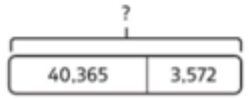
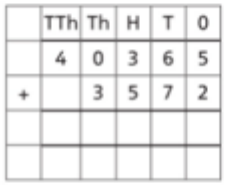
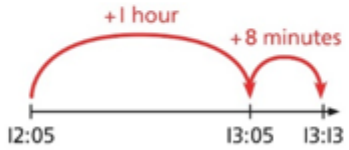
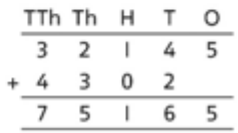
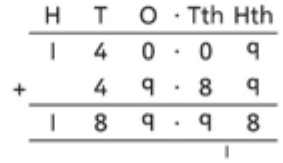
Children understand and create bar models to represent addition problems.

275 + 99 = ?



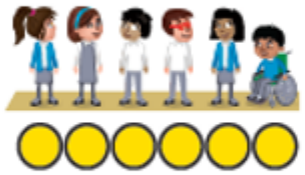
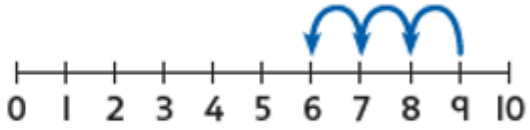
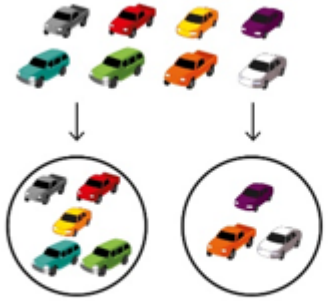
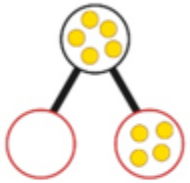
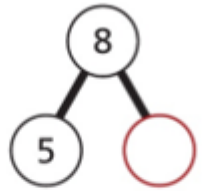
275 + 99 = 374

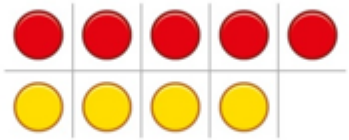
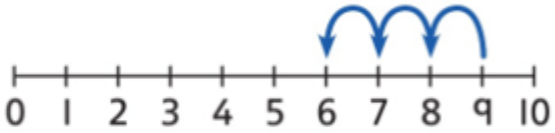
UPKS2

	Concrete	Pictorial	Abstract
Year 6 Addition			
Comparing and selecting efficient methods	Represent 7-digit numbers on a place value grid and use this to support thinking and mental methods. 	Discuss similarities and differences between methods, and choose efficient methods based on the specific calculation. Compare written and mental methods alongside place value representations.   Use bar model and number line representations to model addition in problem-solving and measure contexts. 	Use column addition where mental methods are not efficient. Recognise common errors with column addition. *32,145 + 4,302 = ?*  *Which method has been completed accurately?* *What mistake has been made?* Column methods are also used for decimal additions where mental methods are not efficient. 

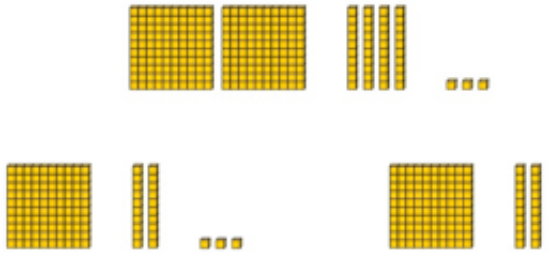
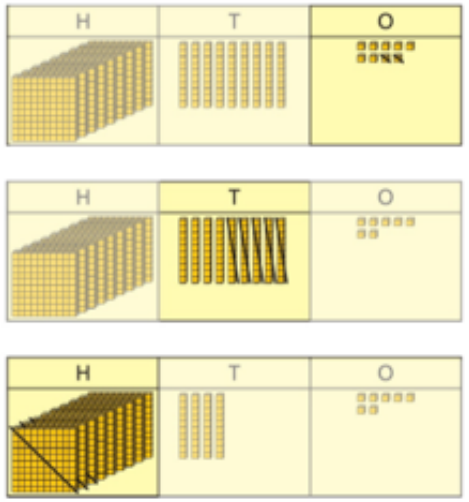
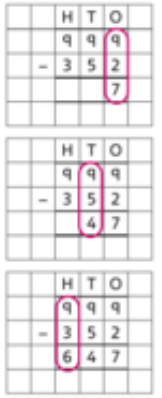
Subtraction

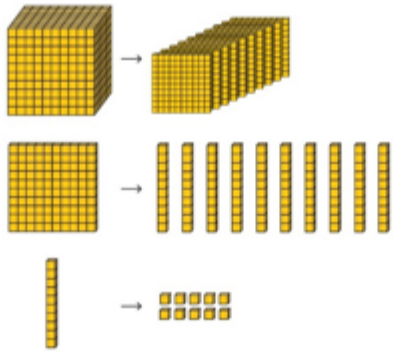
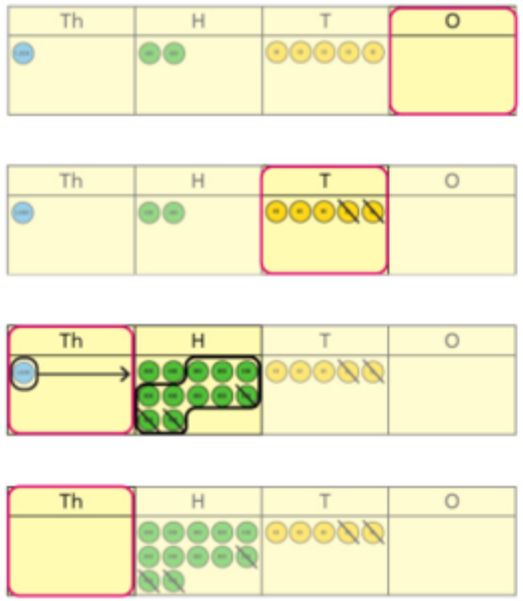
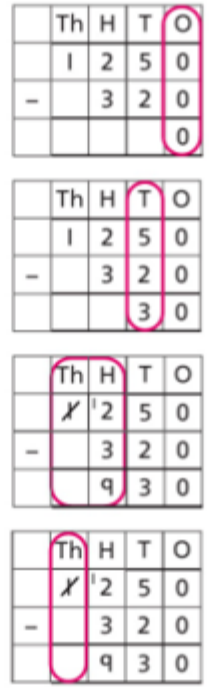
EYFS and KS1

Counting back and taking away	Children arrange objects and remove to find how many are left. *1 less than 6 is 5.* *6 subtract 1 is 5.*	Children draw and cross out or use counters to represent objects from a problem.  Now there are 6 children.	Children count back to take away and use a number line or number track to support the method.  *9 − 3 = 6*
Finding a missing part, given a whole and a part	Children separate a whole into parts and understand how one part can be found by subtraction.  *8 − 5 = ?*	Children represent a whole and a part and understand how to find the missing part by subtraction.  	Children use a part-whole model to support the subtraction to find a missing part.  *8 − 5 = ?* Children develop an understanding of the relationship between addition and subtraction facts in a part-whole model.

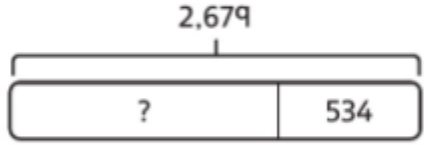
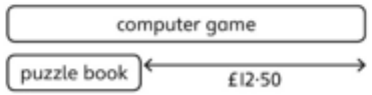
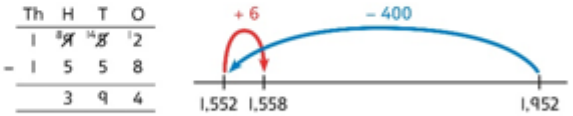
Finding the difference	Arrange two groups so that the difference between the groups can be worked out. *8 is 2 more than 6.* *6 is 2 less than 8.* *The difference between 8 and 6 is 2.*	Represent objects using sketches or counters to support finding the difference.  *5 − 4 = 1* *The difference between 5 and 4 is 1.*	Children understand 'find the difference' as subtraction.  *10 − 4 = 6* *The difference between 10 and 6 is 4.*

LKS2

3-digit number – up to 3-digit number	Use place value equipment to explore the effect of splitting a whole into two parts, and understand the link with taking away. 	Represent the calculation on a place value grid. 	Use column subtraction to calculate accurately and efficiently. 

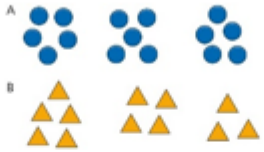
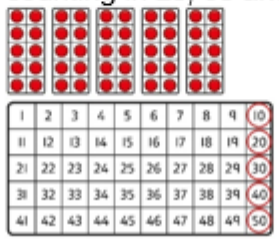
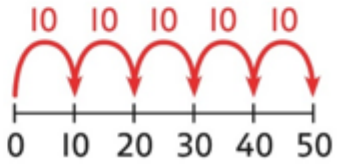
Column subtraction	Understand why exchange of a 1,000 for 100s, a 100 for 10s, or a 10 for 1s may be necessary. 	Represent place value equipment on a place value grid to subtract, including exchanges where needed. 	Use column subtraction, with understanding of the place value of any exchange required. 

UKS2

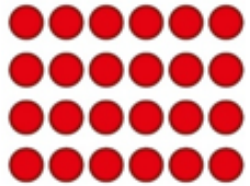
Year 6 Subtraction			
Comparing and selecting efficient methods	Use counters on a place value grid to represent subtractions of larger numbers. 	Compare subtraction methods alongside place value representations.  Th H T O 2 6 7 9 − 5 3 4 2 1 4 5 Use a bar model to represent calculations, including 'find the difference' with two bars as comparison. 	Compare and select methods. Use column subtraction when mental methods are not efficient. Use two different methods for one calculation as a checking strategy.  Use column subtraction for decimal problems, including in the context of measure. H T O · Tth Hth 3 0 9 · 6 0 − 2 0 6 · 4 0 1 0 3 · 2 0

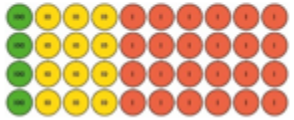
Multiplication

EYFS and KS1

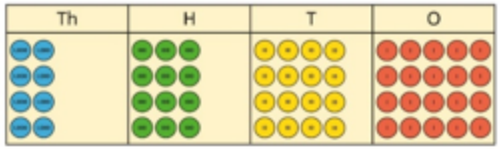
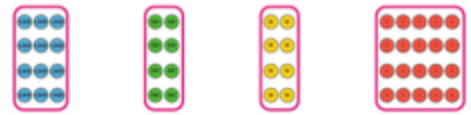
Recognising and making equal groups	Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal. 	Children draw and represent equal and unequal groups. 	*Three equal groups of 4.* *Four equal groups of 3.*
Finding the total of equal groups by counting in 2s, 5s and 10s	 There are 5 pens in each pack … 5…10…15…20…25…30…35…40…	100 squares and ten frames support counting in 2s, 5s and 10s. 	Use a number line to support repeated addition through counting in 2s, 5s and 10s. 

LKS2

Using commutativity to support understanding of the times-tables	Understand how to use times-tables facts flexibly. *There are 6 groups of 4 pens.* *There are 4 groups of 6 bread rolls.* *I can use 6 × 4 = 24 to work out both totals.*	Understand how times-table facts relate to commutativity.  *6 × 4 = 24* *4 × 6 = 24*	Understand how times-table facts relate to commutativity. *I need to work out 4 groups of 7.* *I know that 7 × 4 = 28* *so, I know that* *4 groups of 7 = 28* *and* *7 groups of 4 = 28.*

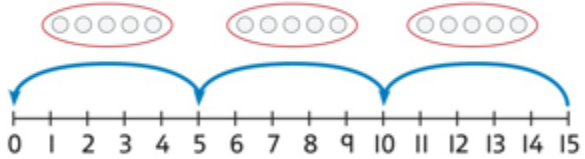
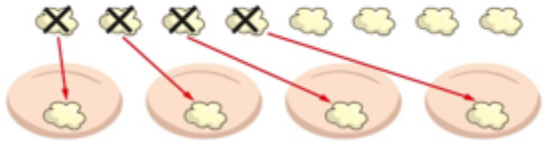
Column multiplication for 2- and 3-digit numbers multiplied by a single digit	Use place value equipment to make multiplications. *Make 4 × 136 using equipment.*  *I can work out how many 1s, 10s and 100s.* *There are 4 × 6 ones… 24 ones* *There are 4 × 3 tens … 12 tens* *There are 4 × 1 hundreds … 4 hundreds* *24 + 120 + 400 = 544*	Use place value equipment alongside a column method for multiplication of up to 3-digit numbers by a single digit. 3 1 2 × 3 9 3 6	Use the formal column method for up to 3-digit numbers multiplied by a single digit. 3 1 2 × 3 9 3 6 Understand how the expanded column method is related to the formal column method and understand how any exchanges are related to place value at each stage of the calculation. 2 3 × 5 1 5 1 0 0 1 1 5 2 3 × 5 1 1 5 1

UKS2

Year 6 Multiplication			
Multiplying up to a 4-digit number by a single digit number	Use equipment to explore multiplications.  *4 groups of 2,345* *This is a multiplication:* *4 × 2,345* *2,345 × 4*	Use place value equipment to compare methods. **Method 1** 3 2 5 5 3 2 2 5 3 2 2 5 + 3 2 2 5 1 2 9 0 0 **Method 2**  4 × 3,000 = 12,000 + 4 × 200 = 800 + 4 × 20 = 80 + 4 × 5 = 20 = 12,900	Understand area model and short multiplication. Compare and select appropriate methods for specific multiplications. **Method 3** 3,000 200 20 5 4 12,000 800 80 20 12,000 + 800 + 80 + 20 = 12,900 **Method 4** 3 2 2 5 × 4 1 2 9 0 0

Division

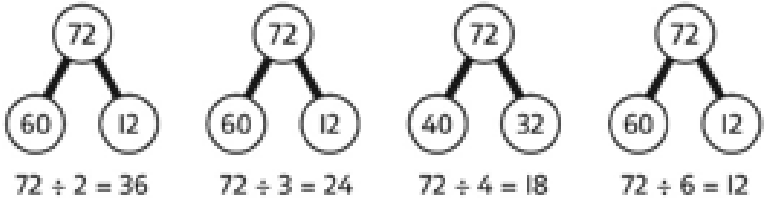
EYFS and KS1

Year 1 Division			
Grouping	Learn to make equal groups from a whole and find how many equal groups of a certain size can be made. Sort a whole set people and objects into equal groups. *There are 10 children altogether.* *There are 2 in each group.* *There are 5 groups.*	Represent a whole and work out how many equal groups. *There are 10 in total.* *There are 5 in each group.* *There are 2 groups.*	Children may relate this to counting back in steps of 2, 5 or 10. 
Sharing	Share a set of objects into equal parts and work out how many are in each part. 	Sketch or draw to represent sharing into equal parts. This may be related to fractions. 	*10 shared into 2 equal groups gives 5 in each group.*

LKS2

2-digit number divided by 1-digit number, with remainders	Use place value equipment to understand the concept of remainder. *Make 29 from place value equipment. Share it into 2 equal groups.* *There are two groups of 14 and 1 remainder.*	Use place value equipment to understand the concept of remainder in division. *29 ÷ 2 = ?* *29 ÷ 2 = 14 remainder 1*	Partition to divide, understanding the remainder in context. *67 children try to make 5 equal lines.* *67 = 50 + 17* *50 ÷ 5 = 10* *17 ÷ 5 = 3 remainder 2* *67 ÷ 5 = 13 remainder 2* *There are 13 children in each line and 2 children left out.*

Make decisions about appropriate partitioning based on the division required.



Understand that different partitions can be used to complete the same division.