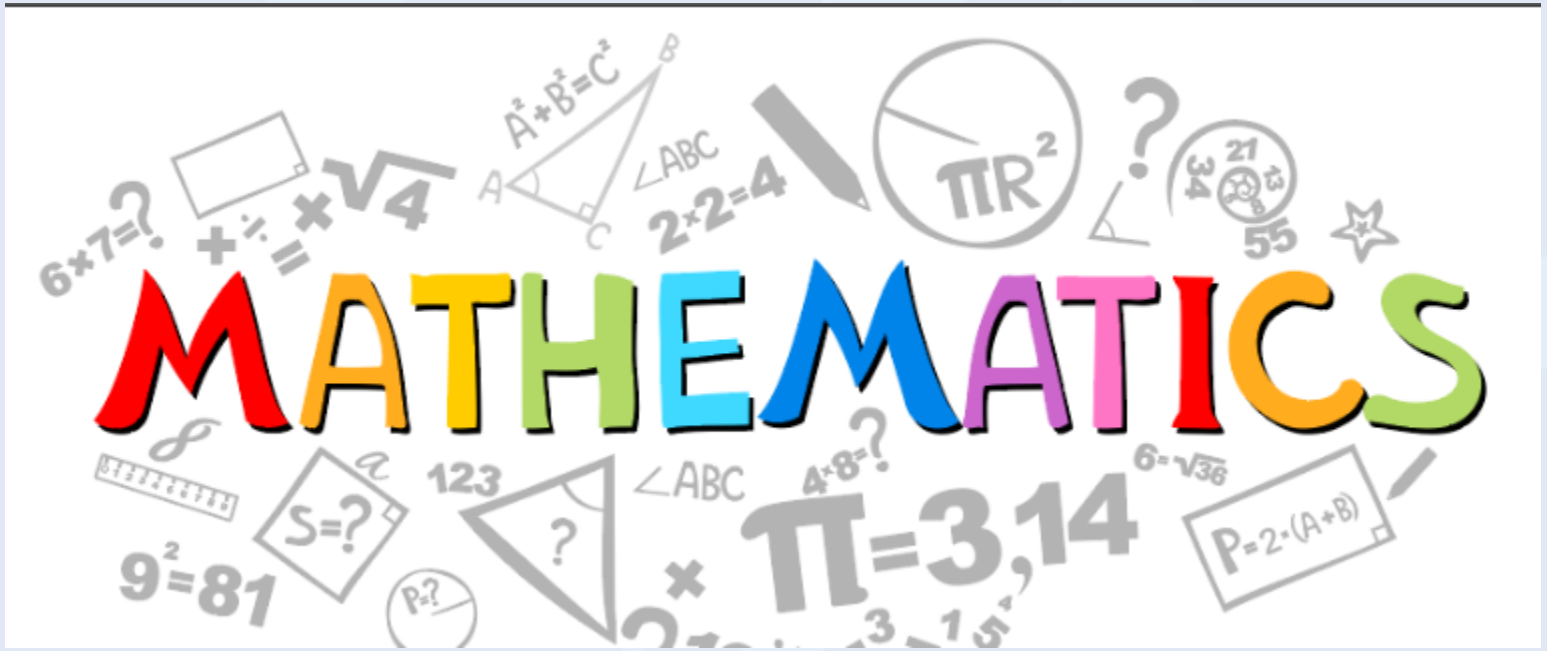
Maths- how we teach it at Burrowmoor



Aims:

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of routine non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Fluency Definition: What is Fluency in Maths?

Fluency in maths is about developing number sense and being able to choose the most appropriate method for the task at hand; to be able to apply a skill to multiple contexts.

The National Curriculum states that pupils should become fluent in the fundamentals of mathematics through varied and frequent practice. While a part of this is about knowing key mathematical facts and recalling them efficiently, fluency means so much more than this as it allows pupils to delve much deeper.

DIAMOND
EDUCATION & PROFESSIONAL LEARNING

What is reasoning in maths?

Reasoning in maths is the process of applying logical thinking to a situation to derive the correct problem solving strategy for a given question, and using this method to develop and describe a solution.

Put more simply, mathematical reasoning is the bridge between fluency and problem solving. It allows pupils to use the former to accurately carry out the latter.

What is problem solving in maths?

It's sometimes easier to start off with what problem solving is not. Problem solving is not necessarily just about answering word problems in maths. If a child already has a readily available method to solve this sort of problem, problem solving has not occurred. Problem solving in maths is finding a way to apply knowledge and skills you have to answer unfamiliar types of problems.

What we use at Burrowmoor:

- White Rose Maths
- NCTEM- Mastering Number- Reception to Year 3
- Numbots- Lower Years
- TT RockStars- End of Year 2 onwards
- Maths Sentence Stems

Jamming: Can choose the number of questions and which times table

Gig: can perform once a month and it shows how you have improved

Garage: Will focus on the tables that are need of most work

Studio: Earn a Rock Status

Multiplayer: Where you can play against other people and challenge your friends at home.

Sentence and Question Stems:

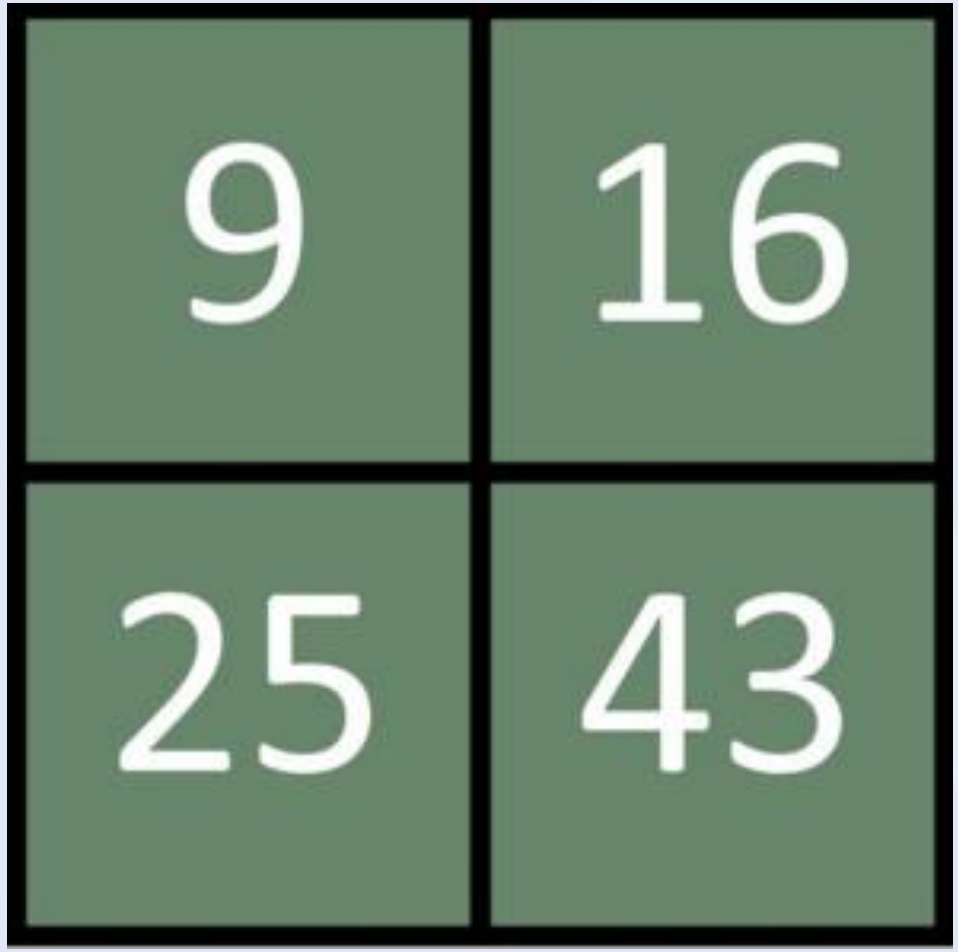
Does it always work? Why?

It can't be ... because ...

Is there another way?

I was systematic because I ...

Which number doesn't belong?



The pattern I noticed was ...

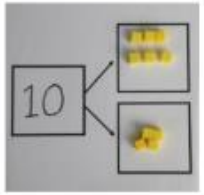
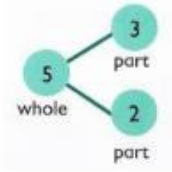
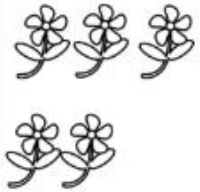
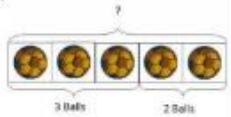
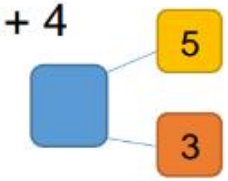
It can't be ... because ...

This is different because ...

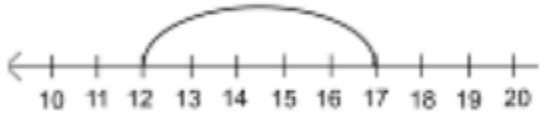
This is the same because ...

Concrete → Pictorial → Abstract

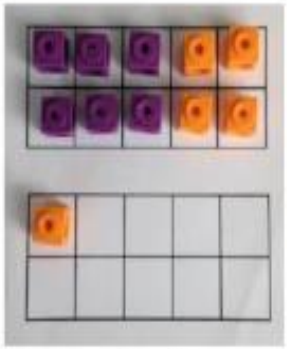
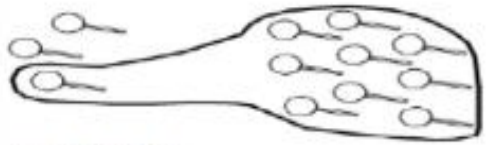
Addition

Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	   Use cubes to add two numbers together as a group or in a bar. 	   Use pictures to add two numbers together as a group or in a bar. 	4 + 3 = 7 10= 6 + 4  Use the part-part whole diagram as shown above to move into the abstract.

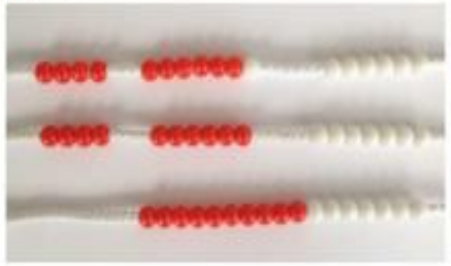
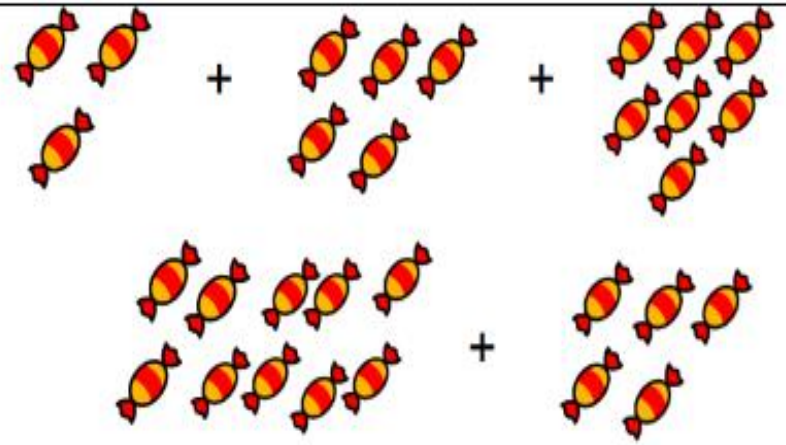
Concrete → Pictorial → Abstract

Starting at the bigger number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.

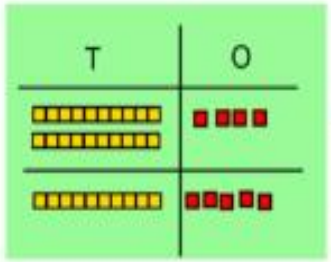
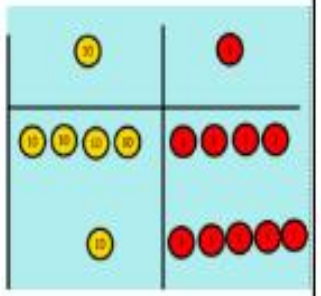
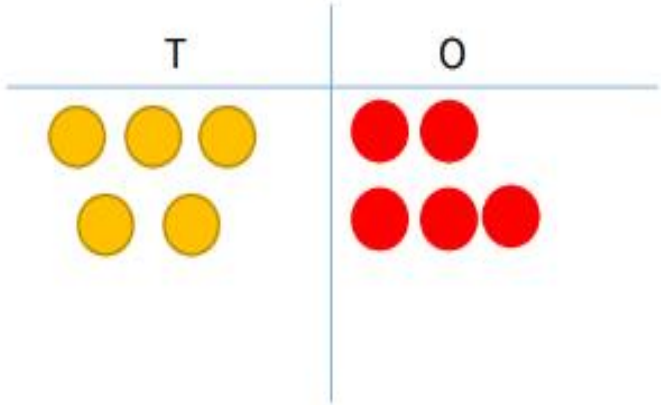
Concrete → Pictorial → Abstract

Regrouping to make 10.	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10.	 3 + 9 = Use pictures or a number line. Regroup or partition the smaller number to make 10. 9 + 5 = 14 1 4 +1 +4 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	7 + 4= 11 If I am at seven, how many more do I need to make 10. How many more do I add on now?

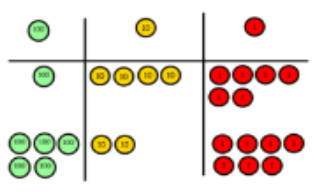
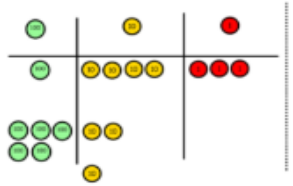
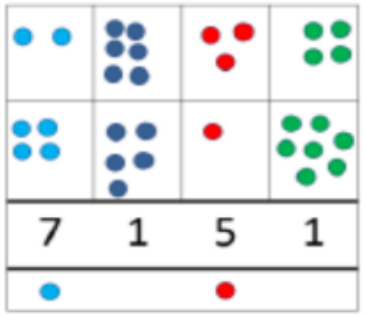
Concrete → Pictorial → Abstract

Adding three single digits	4 + 7 + 6= 17 Put 4 and 6 together to make 10. Add on 7.  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	$\underbrace{4 + 7 + 6}_{10} = 10 + 7$ $= 17$ Combine the two numbers that make 10 and then add on the remainder.

Concrete → Pictorial → Abstract

Column method- no regrouping	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.  	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.  	Calculations 21 + 42 = 21 + 42

Concrete → Pictorial → Abstract

Column method- regrouping	Make both numbers on a place value grid.  146 + 527 Add up the units and exchange 10 ones for one 10.  146 + 527 Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. As children move on to decimals, money and decimal place value counters can be used to support learning.	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.  7 1 5 1	Start by partitioning the numbers before moving on to clearly show the exchange below the addition. 20 + 5 40 + 8 60 + 13 = 73 As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here. 536 + 85 621 1 1 72.8 + 54.6 127.4 1 1 £23.59 + £7.55 £31.14 23.361 9.080 59.770 + 1.300 93.511 2 1 2

How can you help?

- Practise the fluency aspects of maths at home:
  - Counting
  - Recognising numbers
  - Number bonds (also encourage the use of Numbots)
  - Mental addition and subtraction
  - Times tables (also encourage the use of TT Rock Stars)
- Talk about time- https://www.youtube.com/watch?v=0QVPUIRGthI
- Use Maths when at home- in cooking, when using money etc.