EYFS & KS1
MATHS INFORMATION
FOR PARENTS

NUMBERLESS

If all the numbers in the world were rubbed out, removed, taken away:
I wouldn't know how old I was,
I wouldn't know the time of day,
I wouldn't know which bus to catch,
I wouldn't know the number of goals I had scored, I wouldn't know how many scoops of ice-cream I had, I wouldn't know the page on my reading book,
I wouldn't know how tall I was,
I wouldn't know how much I weighed,
I wouldn't know how many sides there are in a hexagon,
I wouldn't know how many days are in the month,
I wouldn't be able to work my calculator.
And I wouldn't be able to play hide-and-seek!

But I would know
As far as my mum was concerned,
I was still her NUMBER ONE!

Ian Souter

OUTLINE

- National Curriculum Aims
- How we teach maths
- Practical and Pictorial Resources
- How we use the resources

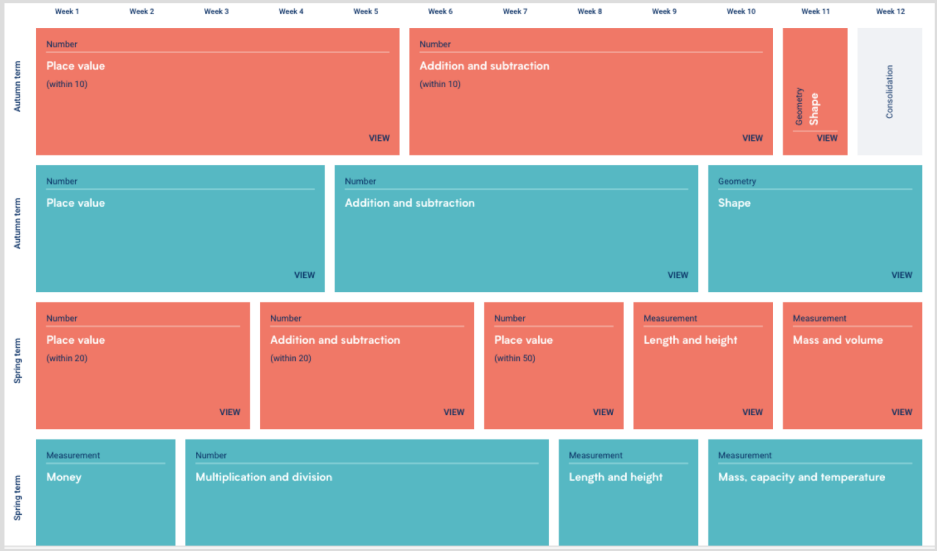
PERCEPTION OF MATHS

- What is your experience of maths at school? Positive / Negative?
- If children hear 'I can't do maths' from parents, teachers, friends they begin to believe it isn't important
- People become less embarrassed about maths skills as it is acceptable to be 'rubbish at maths'
- We all need to be positive role models about maths so that our children see that it is a subject where they can succeed.

NATIONAL CURRICULUM

- **<u>Aims for all pupils to:</u>**
- 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 and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

KS1 STATUTORY CURRICULUM COVER:



- Number and place value
- Addition and subtraction
- Multiplication and Division
- Fractions
- Measurement
- Geometry (properties of shape/position and direction)
- Statistics (Year2)

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

HOW WE TEACH MATHS

White Rose Maths

– Resources produced by Maths specialist and primary school teachers

– Provides us with a clear structure and sequence to teach the objectives outlined in the National Curriculum

– Has a particularly strong emphasis on **fluency**, **problem-solving** and **reasoning**

HOW WE TEACH MATHS

Concrete representation

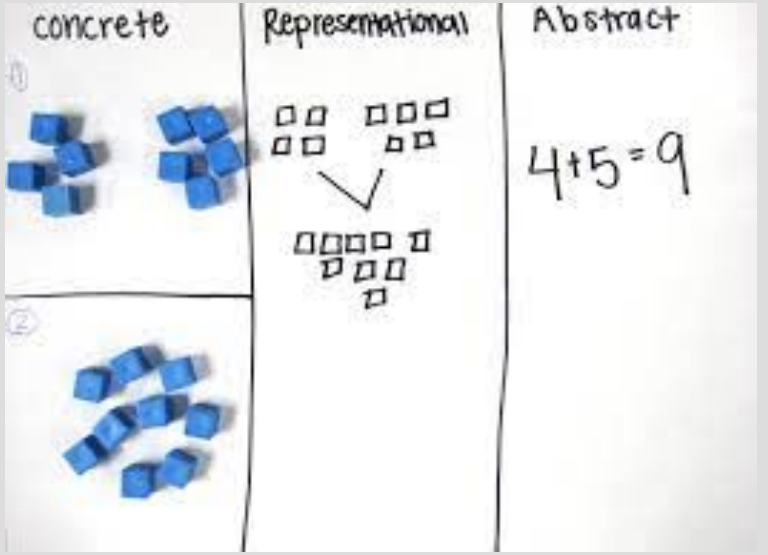
- This is a 'hands on' component using real objects and it is the foundation for conceptual understanding

Pictorial representation

- Using representations, such as a diagram or picture of the problem.

Abstract Experiences

- The symbolic stage- when a student is now capable of representing problems by using mathematical notation, for example: 12 ÷ 2 = 6



HOW WE TEACH MATHS

Maths is about spotting patterns, making links and understanding how pieces of knowledge fit together. **NOT** purely memorising facts and procedures by rote.

- Prompting thinking and questioning
- Providing opportunities to manipulate, experience and see (through use of resources)
- Develop thinking through investigation and real contexts
- Reasoning & making connections
- Encouraging children to make links and generalise
- Engaging in 'maths talk' using mathematical vocabulary

Sentence Starters

1. I agree with you because...
2. I disagree with you because...
3. The strategy I used was...
4. I solved the problem by...
5. I can prove my thinking by...
6. I noticed that...
7. A different way to solve it is...

Maths Talk

Questions to ask:

a) How did you get...?
b) What strategy did you use...?
c) Why did you...?
d) How did you know which operation to use...?
e) What did I forget...?
f) Can you explain how...?

Good Partners...

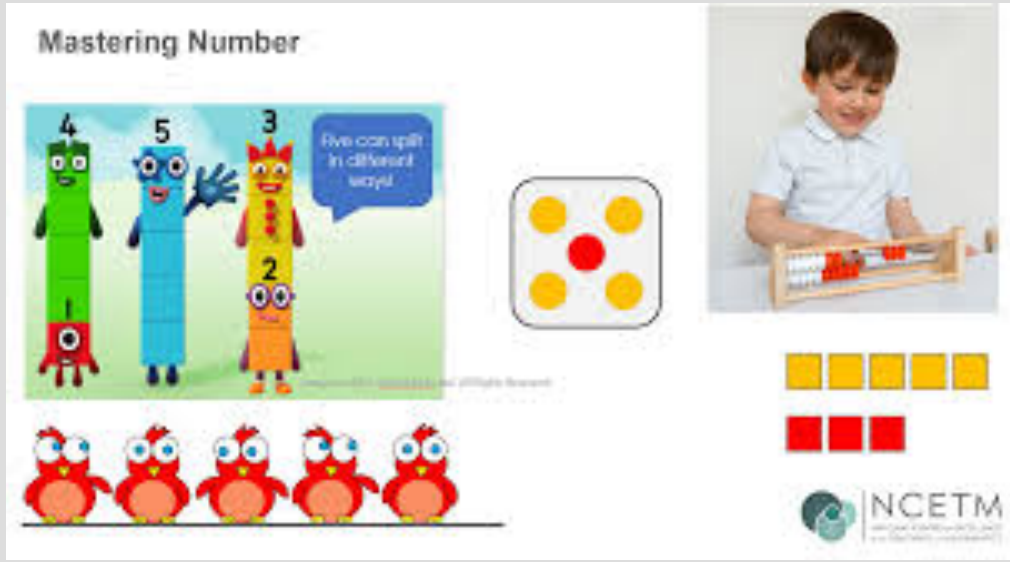
- Disagree in a kind way.
- Explain their ideas using our maths vocab.
- Share their thinking.
- Work together to solve problems.
- Ask questions when you don't understand.
- Are kind and helpful.

RECEPTION

Aims of the Mastering Number Programme:

- Build firm mathematical foundations (good number sense)
- Develop automaticity with number facts
- Developing fluency in calculation and number sense for all children
- Develop mathematical structures and relationships with the use of manipulatives

*Shape, Space and Measure through White Rose Maths



RECEPTION

Principles of counting:

Stable Order – the ordering of numbers in relation to one another e.g. (1, 2, 3, 4, 5...) Children need to learn the correct names of numbers so that they can then count correctly.

Cardinal – This is the understanding that the final number said when counting tells you how many objects are in that group.

Abstraction - This is idea that we count everything in the same way, no matter what it is. Anything can be counted, from physical things to things that can't be touched.

One-to-one correspondence – This describes the necessity to count each item in a group only once. When we count, we assign one distinct name to each number. Children need a lot of practice doing this, because they have a tendency to:

Skim – Children may count too quickly and miss out an object.

Flurry – Children may count an object more than once.

RECEPTION

Conservation of number – 'recognising that a value of objects are the same, even if they are laid out differently' – e.g.

Composition – Composing and de-composing numbers involves the children investigating part–part–whole relations, e.g. seeing that 3 can be composed of 1 and 2. They will begin to recognise that numbers can be made by combining parts in different ways.

Maths language – using mathematical words verbally in every-day situations e.g. 'I have ***more than*** you' / 'You have ***fewer than*** me'

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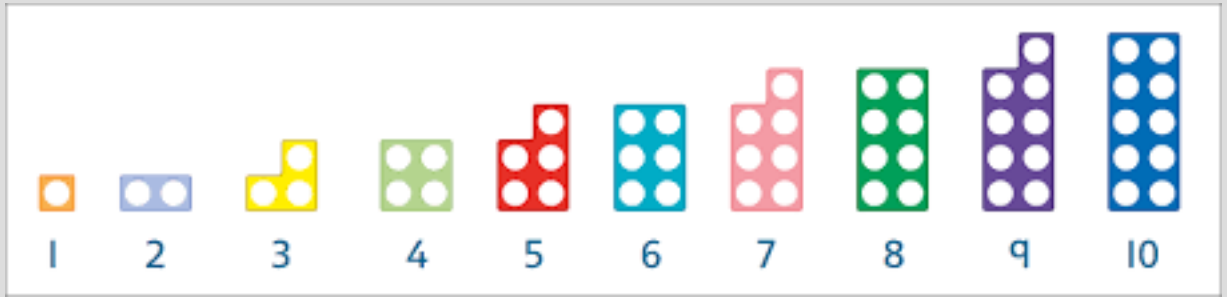
RECEPTION

Subitising – is the ability to accurately determine a number without having to consciously count. For example, we are able to determine the numbers on one face of a dice without having to actively count the dots. e.g. → five

PRACTICAL & PICTORIAL RESOURCES

NUMICON

- Is a system of flat plastic shapes with holes in, with each shape representing a number from one to 10. Each number has its own colour.
- The aim of Numicon is to make numbers real for children through them being able to see and touch them.
- Each Numicon shape gives children an image of what a number looks like. They begin to see the relationship between numbers, with each piece having one hole more than the previous one.
- It appeals to their strong sense of pattern, and helps them understand how numbers fit together.



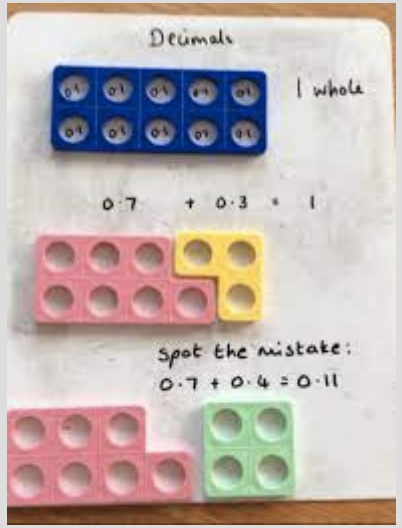
NUMICON

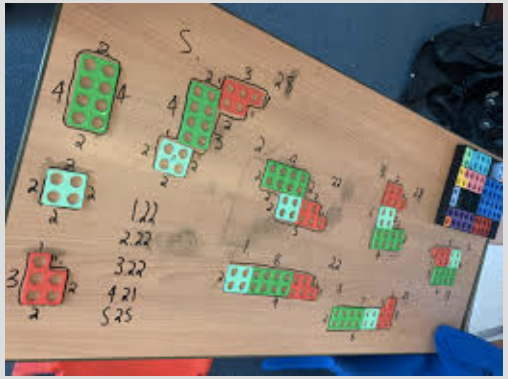
Children using Numicon typically progress through four stages:

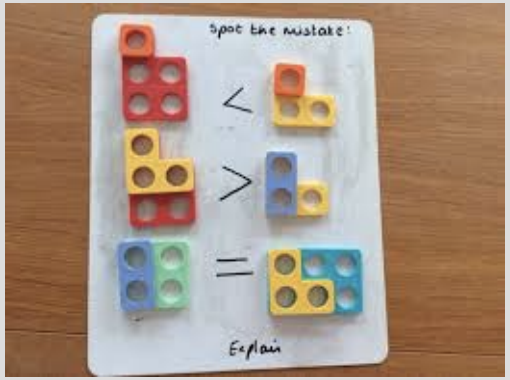
1. **Pattern:** for example, finding shapes that match and stacking them on the peg board.
2. **Ordering:** putting the shapes into sequence from the smallest to largest number, and vice versa.
3. **Counting:** counting each hole one by one to find out what number the piece represents.
4. **Early calculating:** using the pieces to solve simple problems, for example working out that a three- piece and a four-piece are equal to a seven-piece.

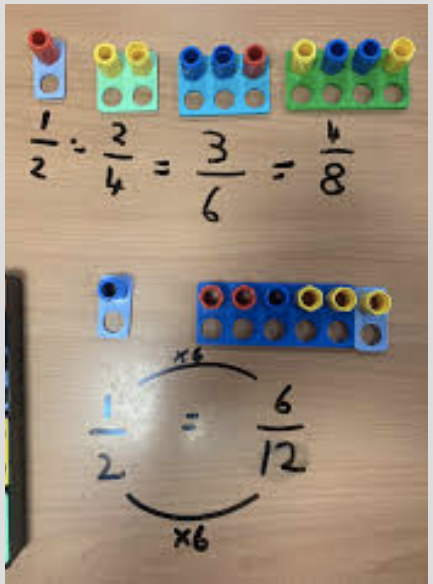
NUMICON – YOUR TURN!

- Find the shapes and order them 1 – 10
- What do you notice about the shapes?
- What happens when you add a 1 to the 2? (show me!)
- Show me half of a number? Prove it?

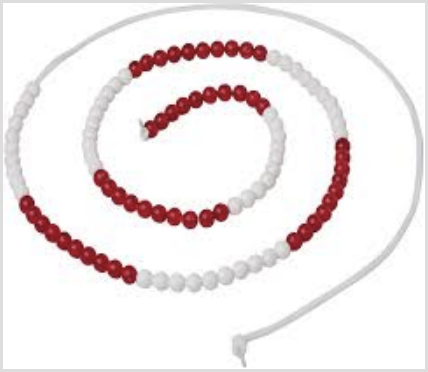




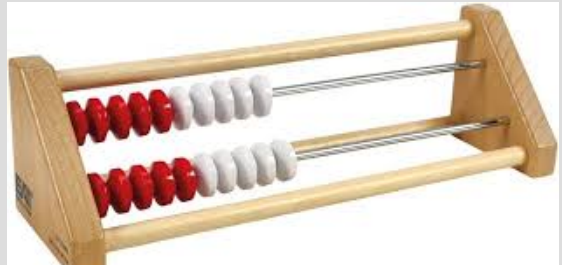




BEAD STRINGS



- Bead strings are brilliant for visualising numbers with a moveable object. You can hide or cover certain parts of a bead string so children find it easier to count each individual bead.
- It's important that children know how each bead string works, typically a 100 bead string counts up in tens by alternating from red to white beads. A 10 bead string has five white and five red.
- So many opportunities with a bead string – counting 1:1, counting in 10s, addition and subtraction practically, place value etc.



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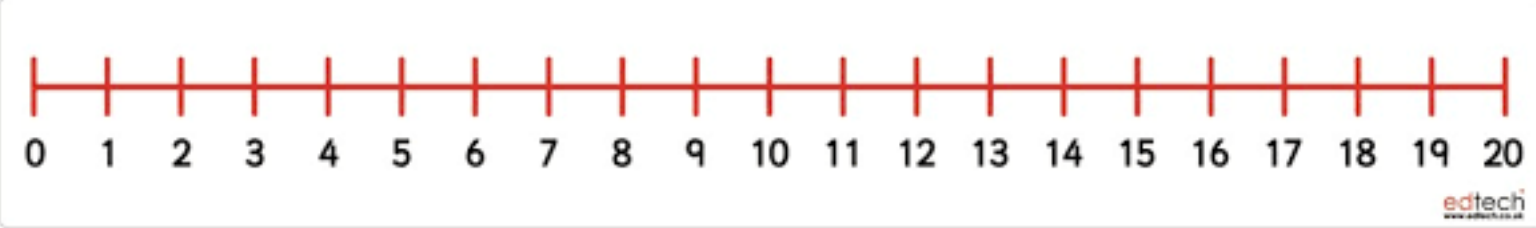
BEAD STRINGS- YOUR TURN!

- Make me the number 25? How do you know?
- Make me the number 56? How do you know?
- Count in 2s up to 20 with a partner
- Count in 10s up to 100 with a partner
- Count back in 10s from 100 with a partner

NUMBER LINES

- Number lines are a brilliant too and related closely to a bead string. They are effectively the pictorial representation of a bead string.
- Like bead strings, number lines can have different representations 0 – 10, 0 – 20, 0 – 30, 0 – 50, 0 – 100 and blank ones for any range of number.
- They are useful tool for jottings and can be used to support counting forwards and backwards, addition, subtraction, multiplication and division.



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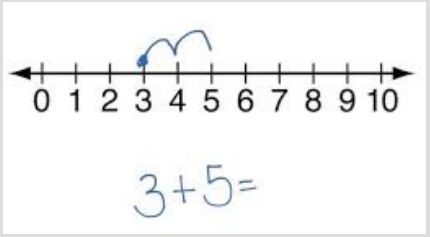
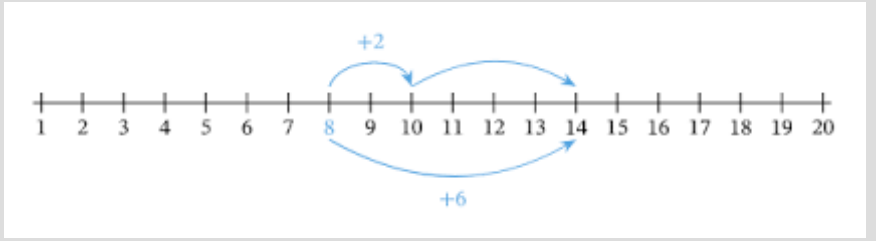
NUMBER LINES

- Here a number line has been used for addition in work related to adding 2 one digit numbers:





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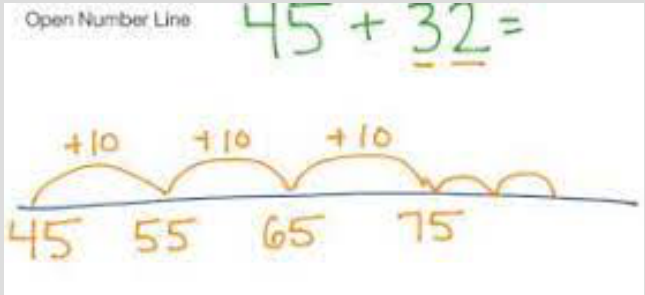
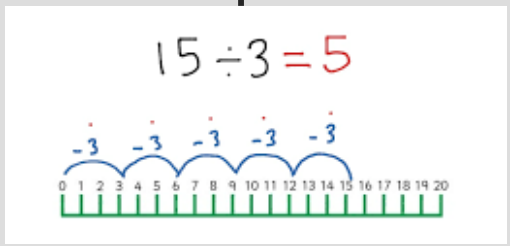


- Here a number line has been used for repeated subtraction in work related to division:



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NUMBER LINES- YOUR TURN!

- Complete the missing numbers on the number line
- You are going to work out 13 + 5 =

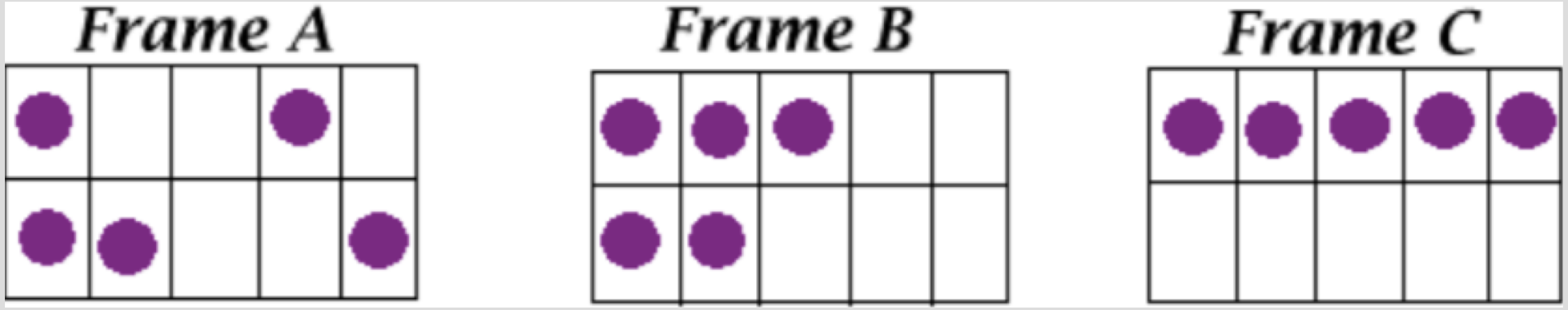
*Circle the largest number and then count on

*This could be in 5 ones or as one jump of 5 or.....

*The total is the final number we jump on

TENS FRAMES

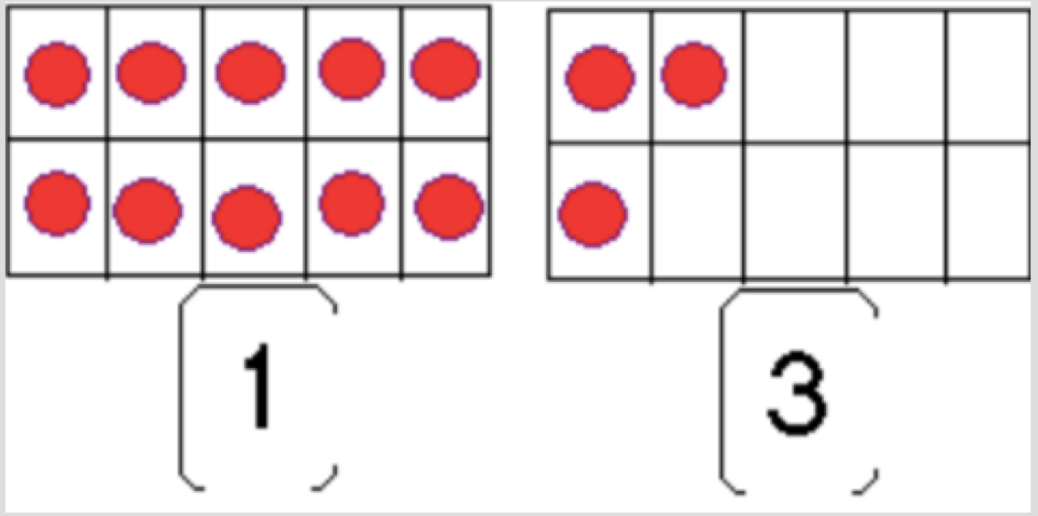
- Tens frames are another tool that work within base ten.
- Ten-Frames are two-by-five rectangular frames into which counters are placed to illustrate numbers less than or equal to ten, and are therefore very useful devices for developing number sense within the context of ten.



- What numbers are illustrated? What does the particular arrangement of the counters prompt you to think about the numbers? What can you say about each number's relationship to ten?

TENS FRAMES

- Ten-frames can provide a first step into understanding two-digit numbers simply by the introduction of a second frame.
- Placing the second frame to the right of the first frame, and later introducing numeral cards, will further assist the development of place-value understanding.



TENS FRAMES- YOUR TURN!

- Can you make 7 on a tens frame in three different ways?
- Can you make 17 on a tens frame? How is this different to the 7 you made before?
- How could you show 4 + 6 = 10

BASE TEN

- A series of blocks which help children to represent our number system with larger numbers.
- They are particularly helpful for place value and number sense concepts, but also for supporting methods of addition, subtraction and multiplication.
- Physically being able to build number and 'manipulate' them, supports a deeper understanding.

BASE TEN- YOUR TURN!

- Can you make me the number 15? Prove it?
- Can you make me the number 56? Prove it?
- Can you make me the number 101? Prove it?

PLACE VALUE COUNTERS

These are different representations of the base tens structure. Becoming a bit more abstract.

Place Value Counters are circular counters with the place value representation written on.

- All the same size but the colour indicates their value = 1s, 10s or 100s
- A great tool for seeing the place value of a number as well as for addition, subtraction, multiplication and division when moving to more formal methods but children still need a practical and visual tool to support their understanding.

PLACE VALUE CARDS

These are a different representation of the base tens structure. Becoming a bit more abstract.

Place Value Cards are strips of card with the place value written on.

• Great to build numbers alongside tools like base ten to support the sense of number. Helps children to see what is happening when we partition numbers and recombine.

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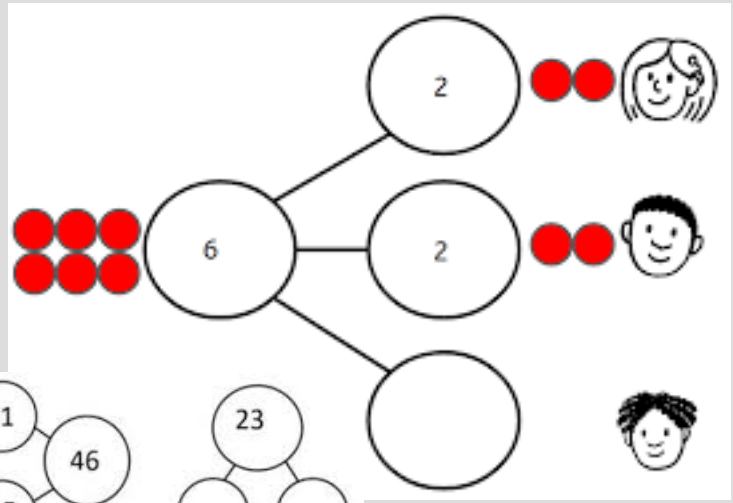
PLACE VALUE COUNTERS AND CARDS- YOUR TURN!

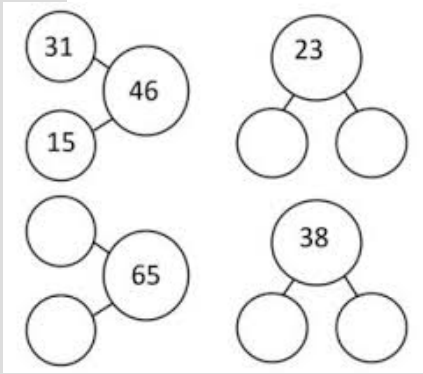
- Make the number 37 using both place value counters and place value cards
- Make the numbers 23 and 33 using place value counters? What is the same, what is different?

PART-WHOLE MODEL

These are technically known as whole, part, part model. Can be used with concrete apparatus or pictorially as a jotting.

- Part-part-whole thinking refers to how numbers can be split into parts.
- It allows children to see the relationship between a number and its component parts.
- Children need to understand that the parts are smaller than the whole.
- When the parts are added together (combined) they make the whole.





PART-WHOLE MODEL- YOUR TURN!

- Make the whole 8 on your part-whole model
- If we were to partition 8, what could the parts be?
- How many different ways could you partition 8?

BAR MODELS

- Bar models are pictorial representations of problems or concepts that can be used for any of the operations: addition, subtraction, multiplication and division.
- It also relates to a whole, part, part model. Another way of showing how numbers can be split into parts.
- Allows children to see the relationship between a number and its component parts.
- Children need to understand that the parts are smaller than the whole.
- When the parts are added together (recombined) they make the whole.

BAR MODELS- YOUR TURN!

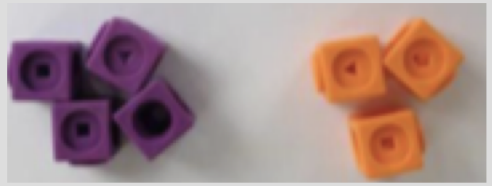
- Make the whole 10 on your bar model – choose your apparatus
- What parts might you have?
- How many different ways can you show the parts? You can do a pictorial representation to show your thinking.
- How do you know you've got all the possible ways?

EXAMPLES OF HOW WE USE PRACTICAL & PICTORIAL RESOURCES IN KS1

PART-WHOLE MODEL & BAR MODEL

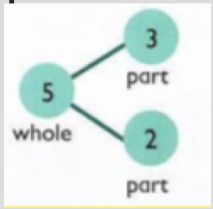
Combining two parts to make a whole:

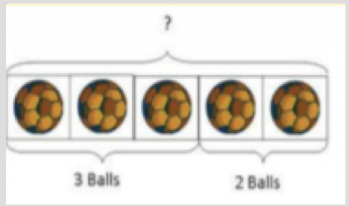
Concrete - Use cubes to add two numbers together as a group or in a bar.

or

Pictorial - Use pictures to add two numbers together as a group or in a bar.





Abstract - Use the part-part whole diagram as shown above to move into the abstract:

3 + 2 = 5

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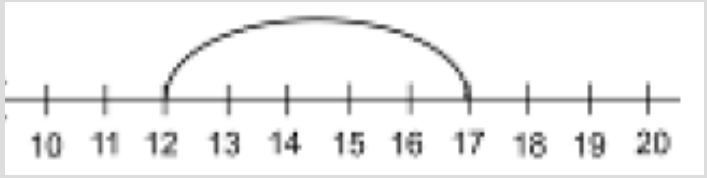
BEAD STRINGS & NUMBER LINES

Starting at the bigger number and counting on

Concrete - Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.

Pictorial - Start at the larger number on the number line and count on in ones or in one jump to find the answer.



Abstract - Place the larger number in your head and count on the smaller number to find your answer: **12 + 5 = 17**

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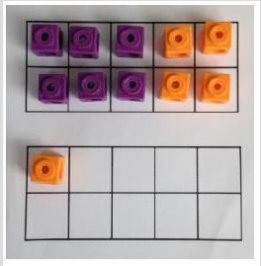
TEN FRAME, BEAD STRING & NUMBER LINE

Regrouping to make 10

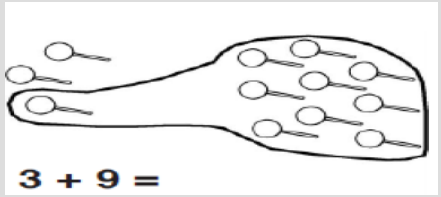
Concrete - Start with the bigger number and use the smaller number to make 10.

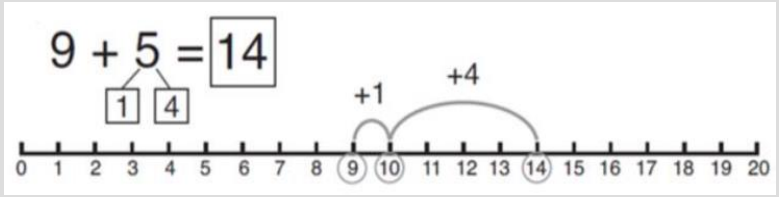
6 + 5 = 11



9 + 3 = 12

Pictorial - Use pictures or a number line. Regroup or partition the smaller number to make 10.





Abstract - If I am at seven, how many more do I need to make 10. How many more do I add on now? **7 + 4 = 11**

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WHAT ARE THE CHARACTERISTICS OF A CHILD WHO IS GOOD AT MATHS?

A child who:

- takes risks
- asks questions and explores alternative solutions without fear of being wrong
- enjoys exploring and applying mathematical concepts to understand and solve problems
- explains their thinking and presenting their solutions to others in a variety of ways
- reasons logically and creatively through discussion of mathematical ideas and concepts
- becomes a fluent, flexible thinker able to see and make connections

SUPPORTING YOUR CHILD AT HOME

- Encourage your child to talk to you about what they are learning / doing in maths
- Ask them to show you how to use the models and images they are using in the classroom
- Ask an adult if you are not sure how a strategy works
- Don't move them on to formal written methods – KS1 maths contains lots of important foundations to enable you children to be successful when they move on to them in KS2

***Resource pack to take home which includes:**

– Part-whole model / bar model / tens frames /number lines/ 100-square

White Rose Maths