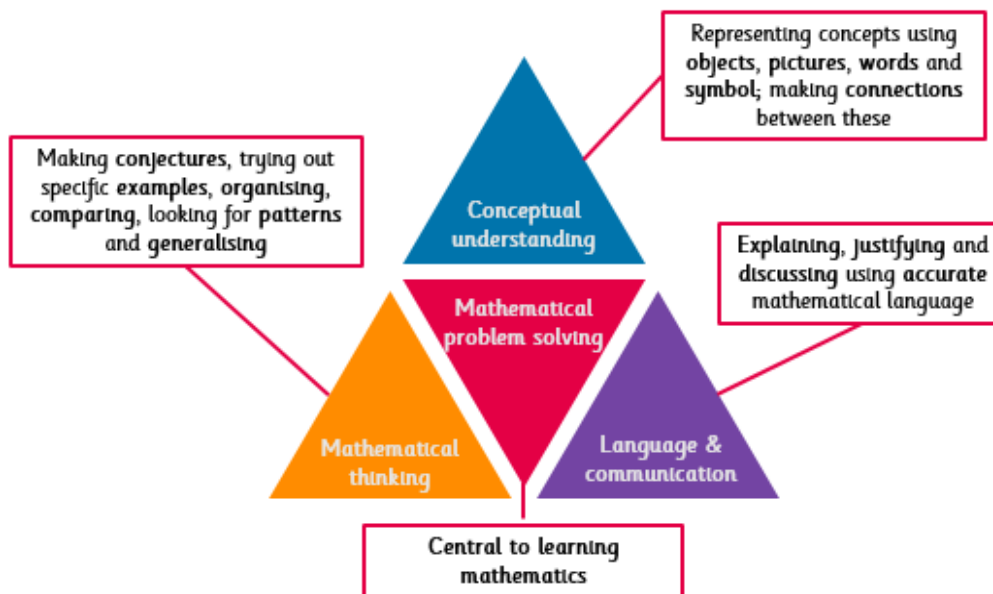


Year 2 handout – Autumn 2020

Mathematics Mastery

What is 'Mastery'?

The 'mastery approach' to teaching mathematics is the underlying principle of Mathematics Mastery. Instead of learning mathematical procedures by rote, we want your child to build a deep understanding of concepts which will enable them to apply their learning in different situations. To achieve this we aim to develop pupils' **Conceptual Understanding, Mathematical Thinking and Language and Communication**. (See diagram below).



Success for all

At school we believe **all** pupils can achieve success in maths. We encourage pupils to have a 'growth mindset' – a belief that effort leads to success and that challenges are opportunities to learn.

Here are a few tips to encourage your children at home with maths:

- ✓ Talk to your child about everyday maths
- ✓ Play games with them
- ✓ Value mistakes as learning opportunities
- ✓ Recognise that there is more than one way to work things out.
- ✓ Praise your child for effort over outcome.
- ✓ Avoid saying things like "I'm useless at maths".

Year 2 Autumn Curriculum Map

Year 2

Autumn Term

Numbers within 100 <ul style="list-style-type: none">• Read, write, represent, partition, compare and order numbers to 100• Explore patterns including odds and evens, tens and ones	Addition and subtraction of 2-digit numbers <ul style="list-style-type: none">• Apply number bonds to add and subtract• Represent and explain addition and subtraction of two 2-digit numbers.• Add three 1-digit numbers	Addition and subtraction word problems <ul style="list-style-type: none">• Introduction to bar models as a representation• Create, label and sketch bar models
Measures: Length <ul style="list-style-type: none">• Draw and measure lengths in centimetres• Use $<$, $>$ and $=$ to compare and order lengths in metres and centimetres	Graphs <ul style="list-style-type: none">• Represent and interpret: pictograms, block diagrams, tables and tally charts.	Multiplication and division: 2, 5, and 10 <ul style="list-style-type: none">• Calculate the times tables of 2, 5, and 10 by skip counting• Relate the 2 times table to doubling• Explore representations of multiplication and division• Commutativity

In this handout we have chosen to focus on addition and subtraction as this a big focus for pupils this term and learning from these units will be used and applied throughout the remainder of the year.

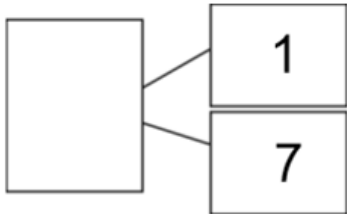
In Year 2, pupils are required to use number bonds explored in Year 1 to calculate with numbers up to 100. Mathematics Mastery is a cumulative curriculum meaning that learning is built over time, with new learning that makes connections to prior learning.

Pupils begin by re-familiarising their number bonds and using these to make connections to other facts. They move on to calculating with two digit numbers using a range of strategies that link to facts they know. Pupils then look at addition and subtraction problems in context. Bar models are a pictorial representation used to show the mathematical structure of a problem and we will look at these later in the workshop.

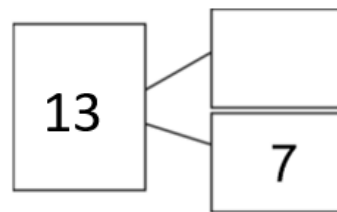
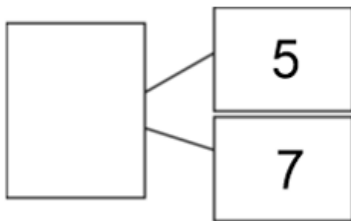
Number bonds

In Year 1, pupils will have explored number bonds within 20 and by Year 2 pupils should now be familiar with these. The part whole model which was used throughout Year 1 helps to support pupils with the structure of calculations.

For example, “My parts are 1 and 7, my whole is 8. 1 plus 7 is equal to 8”.



Here are some other examples using the part part whole model.



My parts are 5 and 7, my whole is 12. 5 plus 7 is equal to 12.

My whole is 13 and one part is 7. The other part is 6. 13 subtract 7 is equal to 6.

Pupils can use concrete manipulatives such as counters to support them, but should aim to become familiar with these facts so that they can recall them to support them with other areas of maths. You can practise number bonds at home verbally with your children.

Star words are introduced in each lesson. Children are expected to use these words in their full sentences.

Star words

part whole
is equal to plus
subtract

Using our number bonds – to derive new facts

It is really important that pupils make connections to facts that they already know – once children are familiar with their number bonds they can use them to work out other facts.

Pupils are often asked to explain their answers and manipulatives are used to support those discussions or to “convince someone” that they are right. The manipulatives are not used to help pupils work out the answer, but to support their understanding of the structure of the numbers and help them to reason and discuss.

A common manipulative (resource) used in Year 2 are Dienes.



This represents 10.



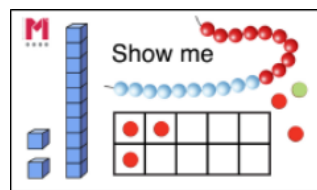
This represents 1.

For example,

If I know $5 + 4 = 9$

What is ...

- a) $15 + 4?$
- b) $25 + 4?$
- c) $50 + 40?$



Star words

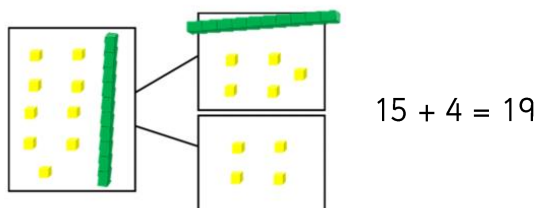
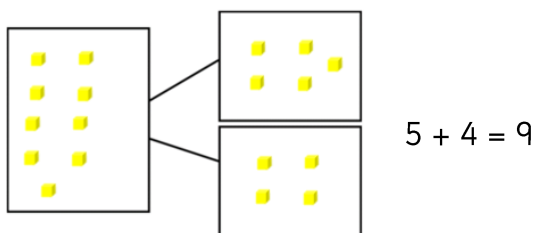
ones tens add

subtract is equal to

If I know...then I know...

“If I know 5 add 4 is equal to 9 then I know 15 add 4 is equal to 19, as 15 is ten more than 5.”

“We have not added any ones so the ones digit remains the same”.



** Feel free to explore parts b and c, using the part part whole model and Dienes.

Using our number bonds – adding and subtracting two-digit numbers

In Year 2, pupils add and subtract two-digit numbers. Pupils are encouraged to use mental strategies and continue to make connections to their number bonds.

Each lesson pupils carry out a verbal task before completing their independent work to build their mathematical language and reasoning as well as giving teachers an opportunity to assess their understanding.

Here are the star words for the talk task below:

Star words

ones tens

add subtract

is equal to partition

If I know...then I know...

part whole

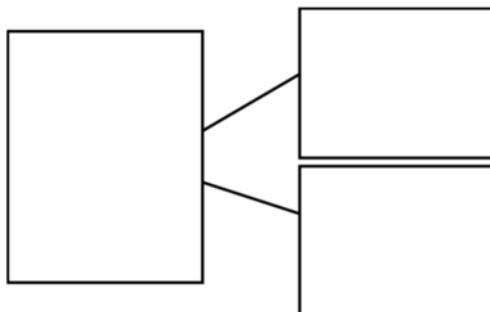
Definition of partitioning: A way of breaking a number into at least two parts resulting in a number bond for that number, for example, 12 is equal to ten and two.

Example of a Talk task:

How many different mental strategies can you use to solve:

1) $23 + 46 =$

2) $89 - 64 =$



Talk Task

Partner A: chooses a calculation and partitions both numbers into tens and ones.

"I am going to partition both numbers. I know 3 ones plus 6 ones is 9 ones. I know 2 tens and 4 tens is 6 tens which is 60. 60 + 9 is equal to 69."

Partner B: thinks of the number bonds required for the tens and ones.

"I am going to count on from 46. I will partition 23 into tens and ones—20 + 3. I know 4 tens + 2 tens = 6 tens, which is 60, so 46 + 20 = 66. I still need to add the 3 ones. I know 6 + 3 = 9, so 66 + 3 = 69."

Introduction to bar modelling representation

Problem solving is a very important element within our maths lessons and our scheme. Bar models are used to support pupils make sense of a problem so that they can identify the correct operation and calculation.

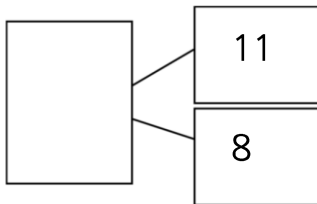
For example:

Question: Anna bought 11 red apples. Joe bought 8 bananas. How many pieces of fruit did they both buy?

We know that one part is 11 and one part is 8. The children would then work out what is unknown: the whole! We then complete our part part whole model with this information.

Star words

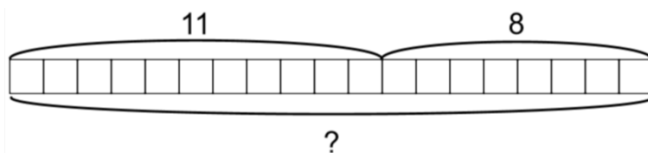
part	whole
add	subtract
bar model	value
worth	known
	unknown



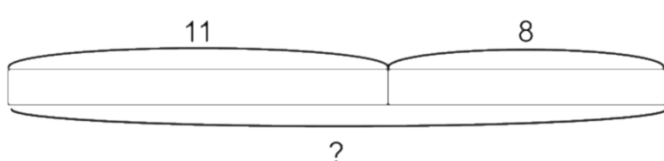
Bar models are another way of representing this and this representation will support pupils to understand the mathematical structure of a problem and the relationship between the given numbers. It is useful to introduce these in Year 2 so allow the children to make sense of more complex problems later in the school so it is important they get regular exposure to them.

Bar models may not always look the same. For this bar model we could make it in the following ways:

- concretely with cubes
- draw it with individual squares (see below)



- draw a continuous bar (see below) – it is important to note that as numbers get larger we move more towards the continuous model.



Here is another example of bar modelling

Question: The fruit seller has 67 carrots but he sells 35 of them. How many does he have still to sell?



67	
35	?

$$67 - 35 = 32$$

Try this at home – workshop games

Make 100

For this game, you need dice, a pencil and paper.
Each player draws an addition grid like this:

$$\begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} + \begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} = \underline{\hspace{2cm}}$$

Take it in turns to roll the dice. After you have rolled the dice, you decide which box to place that number in. Once all four numbers have been placed, add your two 2-digit numbers to get your total. Closest to 100 wins.

Adapting: You can change the target total, or try using subtraction.

ones tens add subtract is equal to If I know...then I know...

Zero the hero

4	0	3	1
6	3	2	2
7	1	7	5
6	4	5	8

For this game you need the number grid, (or make your own filled with numbers under 10) two cubes/counters, a plastic cup and pencil and paper.

Write 50 down as your starting score. Put two cubes into the plastic cup and roll them onto the grid. Add the two numbers together then subtract from 50. Take it in turns to do this. The first to reach zero is the winner.

ones tens add subtract is equal to If I know...then I know...

Try this at home – more ideas

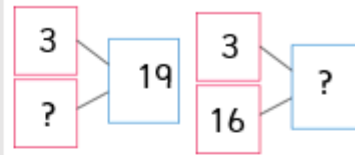
Daily practice: number bonds

Challenge your children with missing number problems verbally.

Example

"The whole is 9. One part is 3. What is the missing part?"

Or "I think of a number, I subtract 3 and I am left with 6, what was my number?"



Dice games

Playing with dice can be a great way to support your children with number bonds. If you don't have a pair of dice, try these online dice:

<https://www.random.org/dice/?num=2>

Fact of the day/week

Have a 'fact of the day', e.g. $15 - 7 + 8$. Pin this fact up around the house. Practise reading it in a quiet, loud, or squeaky voice. Ask your child over the day if they can recall the fact.

Board games, sports and leisure

Board games and sports provide lots of opportunities to develop mathematical skills such as problem solving and strategy. Additionally lots of board games and sports also allow opportunities for addition and subtraction when totalling scores or finding the difference. When playing, ask questions such as:

- "How many points do Amy and Mina have altogether?"
- "What's the difference between my score and yours?"
- "How much more does Charlie have compared to Ahmed?"
- "How many more do I need to win?"

Money, money, money

Allow children to have experience handling money. Some experiences could include:

- Counting amounts
- Regrouping – e.g. exchange ten 10 pennies for 1 pound
- Finding a change
- Discussing prices in the supermarket and involving your children when paying
- Saving up pocket money for something. "How much more do you need?"

Questions to support thinking

- What do you think would happen if...
- What's the same? What's different?
- How do you know that?
- Can you see a pattern? What would come next?
- What else could go in this set? What couldn't?