

KS1 Math's Workshop

"PURE MATHEMATICS IS, IN ITS WAY, THE POETRY OF LOGICAL IDEAS."

ALBERT EINSTEIN



What are we going to cover?

- ▶ Maths at St Peter's
- ▶ Daily Fluency Sessions
- ▶ Independent Learning Tasks
- ▶ Tools to support learning
- ▶ Methods and strategies taught
- ▶ How can you help at home?



Maths at St Peter's

At St. Peter's we want children to develop deep and sustainable subject knowledge. We achieve this by focusing teaching and learning on:

- Fluency – mental agility, slick written methods and clarity of language.
- Problem solving and reasoning – pupils develop a range of skills that allow them to 'crack' into and solve a range of problem
- Teaching for mastery. All lessons are planned and delivered with the 5 principles of mastery in mind: Cohesion, representation and structure, fluency, variation and deep mathematical thinking.



Number Sense Daily Sessions

Rather than children learning number facts in isolation and by simply memorising them, this systematic and structured programme helps children visualise the maths and gives them a deep understanding of number and how they relate to each other. They become fluent in addition and subtraction facts.

Number Sense teaches a core set of number facts and the calculation strategies you can use to solve them.

Modelled on the phonics programmes used in early reading, the programme groups facts and teaches them systematically alongside the calculation strategies that can be used to solve them.

At the core of the programme are the Addition and Subtraction Fact Grids.

Addition Grid Facts

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
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6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

Subtraction Grid Facts

-	0	1	2	3	4	5	6	7	8	9	10
0	0-0										
1	1-0	1-1									
2	2-0	2-1	2-2								
3	3-0	3-1	3-2	3-3							
4	4-0	4-1	4-2	4-3	4-4						
5	5-0	5-1	5-2	5-3	5-4	5-5					
6	6-0	6-1	6-2	6-3	6-4	6-5	6-6				
7	7-0	7-1	7-2	7-3	7-4	7-5	7-6	7-7			
8	8-0	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8		
9	9-0	9-1	9-2	9-3	9-4	9-5	9-6	9-7	9-8	9-9	
10	10-0	10-1	10-2	10-3	10-4	10-5	10-6	10-7	10-8	10-9	10-10
11		11-1	11-2	11-3	11-4	11-5	11-6	11-7	11-8	11-9	11-10
12			12-2	12-3	12-4	12-5	12-6	12-7	12-8	12-9	12-10
13				13-3	13-4	13-5	13-6	13-7	13-8	13-9	13-10
14					14-4	14-5	14-6	14-7	14-8	14-9	14-10
15						15-5	15-6	15-7	15-8	15-9	15-10
16							16-6	16-7	16-8	16-9	16-10
17								17-7	17-8	17-9	17-10
18									18-8	18-9	18-10
19										19-9	19-10
20											20-10

Calculation Strategies

One More, One Less

Two More, Two Less: Think Odds and Evens

Number 10 Fact Families

Five and A Bit

Know About Zero

Doubles and Near Doubles

Number Neighbours: Spot the Difference

7 Tree 9 Square

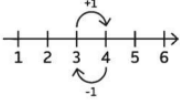

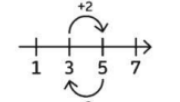
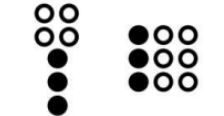
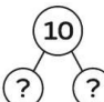
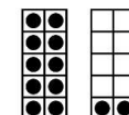

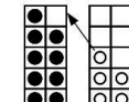

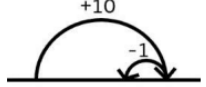

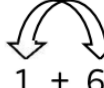
Ten and A Bit

Make 10 and Then

Adjusting

Swap It

Strategies Taught

<p>One More, One Less</p> 	<p>When we add one, we get the next counting number. When we subtract one, we get the previous counting number (e.g. $5 - 1 = 4$).</p>	<p>Number Neighbours: Spot the Difference</p> 	<p>Adjacent numbers have a difference of 1. Adjacent odds and evens have a difference of 2.</p> <p>Spot number neighbours (adjacent, odds or evens) to solve subtractions of adjacent numbers (e.g. $5 - 4 = 1$), of adjacent odds (e.g. $9 - 7 = 2$) or adjacent evens (e.g. $6 - 4 = 2$)</p>
<p>Two More, Two Less: Think Odds and Evens</p> 	<p>If we add two to a number, we go from odd to next odd or even to next even. If we subtract two from a number, we go from odd to previous odd or even to previous even.</p>	<p>7 Tree and 9 Square</p> 	<p>Use these visual images to remember addition and subtraction fact families that children can find tricky. For example, visualising the 7 tree helps remember that $7 - 3 = 4$. Visualising the 9 square helps remember that $3 + 6 = 9$.</p>
<p>Number 10 Fact Families</p> 	<p>Go beyond just recalling the pairs of numbers that add to 10. Make sure that we can also spot additions and subtractions which we can use number bonds to 10 to solve.</p>	<p>Ten and A Bit</p> 	<p>The numbers 11 – 20 are made up of 'Ten and a Bit'. Recognising and understanding the 'Ten and a Bit' structure of these numbers enables addition and subtraction facts involving their constituent parts (e.g. $3 + 10 = 13$, $17 - 7 = 10$, $12 - 10 = 2$).</p>
<p>Five and A Bit</p> 	<p>The numbers 6, 7, 8 and 9 are made up of 'five and a bit'. This can be shown on hands, and supports decomposition of these numbers into their five and a bit parts (e.g. $5 + 3 = 8$, $9 - 5 = 4$).</p>	<p>Make Ten and Then...</p> 	<p>Additions which cross the 10 boundary can be calculated by 'Making Ten' first, and then adding on the remaining amount (e.g. $8 + 6$ can be calculated by thinking '$8 + 2 = 10$ and 4 more makes 14'). The same strategy can be applied to subtractions through 10.</p>
<p>Know about 0</p> 	<p>When we add 0 to or subtract 0 from another number, the total remains the same. If we subtract a number from itself, the difference is 0.</p>	<p>Adjust It</p> 	<p>Any addition and subtraction can be calculated by adjusting from a fact you know already, (e.g. $6 + 9$ is one less than $6 + 10$).</p>
<p>Doubles and Near Doubles</p> 	<p>Memorise doubles of numbers to 10, using a visual approach. Then use these known double facts to calculate near doubles and hidden doubles. Once we know $6 + 6 = 12$ then $6 + 7$ and $5 + 7$ is easy.</p>	<p>Swap It</p>  $1 + 6$	<p>When the order of two numbers being added (addends) is exchanged the total remains the same. E.g. $1 + 8 = 8 + 1$. Sometimes reversing the order of the two addends makes addition easier to think about conceptually.</p>



Independent Learning Tasks


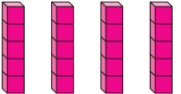
Children complete a range of challenges after learning about a new concept. All children will start with challenge 1 and work through to challenge 3.

Challenge 1:

This challenge is designed to practice the core skills learnt in the lesson.

Challenge 1: Can you write the matching number sentences to the representations?

1.  2. 

3.  4. 

V- What do you notice about the totals of each group?

Challenge 2:

This challenge is designed so the children can apply their new learning.

Challenge 2:

True or false?

$$5 + 5 = 2 + 2 + 2 + 2 + 2$$

Explain your **reasoning**


Challenge 3

This challenge is designed to really stretch their thinking., encourage reasoning and problem solve in unfamiliar contexts.

Challenge 3:

2. Amy buys some bags of marbles. They are sold in bags of 3 or 10, but she is only allowed to buy one type of bag at a time.

She has room to carry up to 6 bags home, and her total number of marbles is more than 10 but less than 50.



Number of bags	Addition - amount in each bag	Total number of marbles
2	10 + 10	20

Investigate how many bags she could have bought and the different totals she would have. Complete the table above.



Representation and Structure

Representation and structure refers to how different pictures and models can be used to show a particular number or to explain a concept.

In KS1, we use a wide range of different representations and structures within both the lesson sequence and the independent learning tasks the children complete.

Representation and Structure

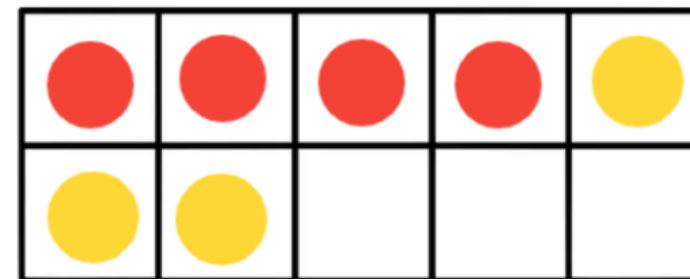
Multilink



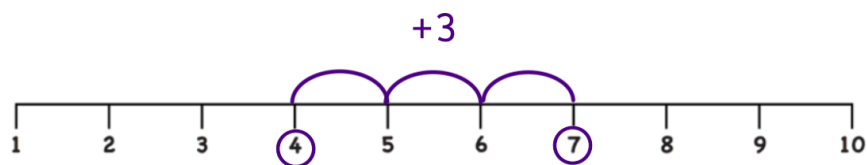
Number Sentence

$$4 + 3 = 7$$

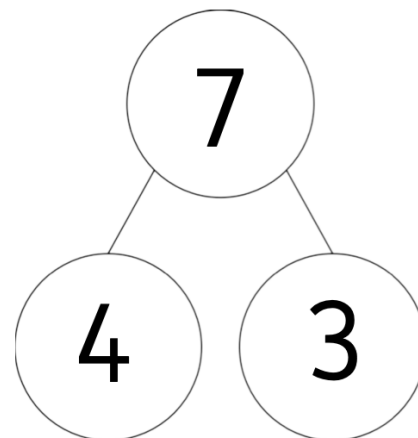
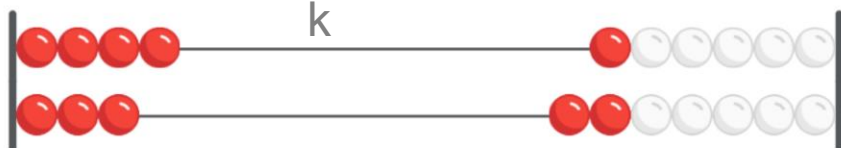
Tens Frame



Number Line



Rekenrek



Part Whole Model

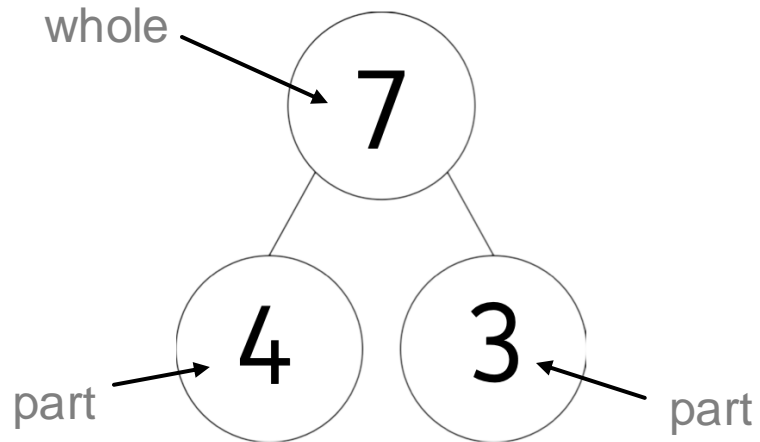
Bar Model



Representation and Structure

Part-whole models and bar models are pictorial representations that show the relationship between a whole and its parts. This helps to expose the links between different areas in maths. e.g. The links between addition and subtraction.

Part Whole Model



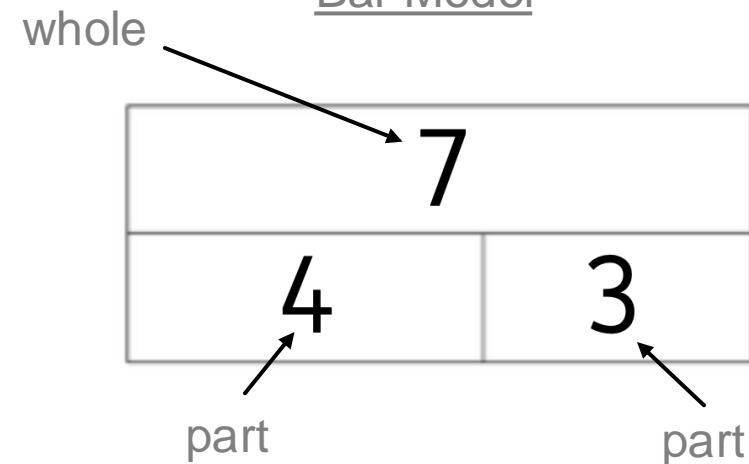
$$4 + 3 = 7$$

$$3 + 4 = 7$$

$$7 - 4 = 3$$

$$7 - 3 = 4$$

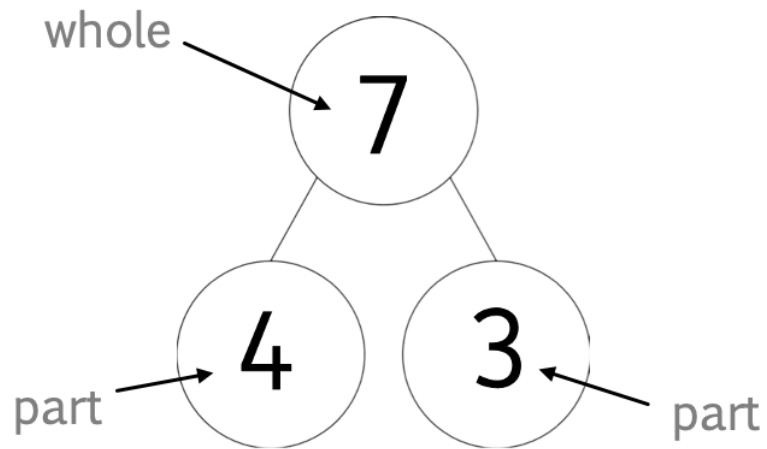
Bar Model



Using Known Facts

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

Part Whole Model



If I know $4 + 3 = 7$

Then I know $40 + 30 = 70$

If I know $7 - 3 = 4$

Then I know $70 - 30 = 40$

Key Vocabulary

Addition:

$$4 + 3 = 7$$

addend + addend = sum

Multiplication:

$$2 \times 3 = 6$$

factor x factor = product

Subtraction:

$$7 - 3 = 4$$

minuend - subtrahend = difference

Division:

$$6 \div 2 = 3$$

dividend ÷ divisor = quotient

The language of the addition and multiplication can highlight that they are commutative.

Written Methods

Partitioning: Adding two 2-digit numbers.

Not bridging through 10

$$42 + 23 = 65$$

$$40 + 20 = 60$$

$$2 + 3 = 5$$

$$60 + 5 = 65$$

Bridging through 10

$$46 + 27 = 73$$

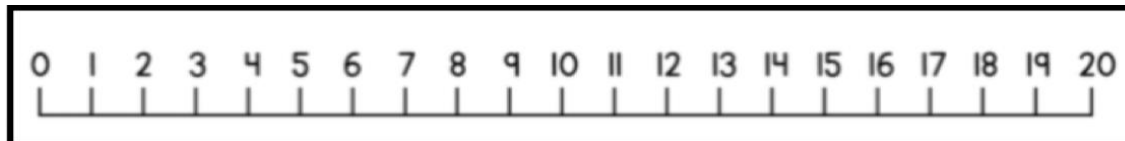
$$40 + 20 = 60$$

$$6 + 7 = 13$$

$$60 + 13 = 73$$

Method Steps:

1. Partition into tens and ones.
2. Add the tens.
3. Add the ones.
4. Recombine the tens and ones



Written Methods

Partitioning: Subtracting a 2-digit number from a 2-digit number.

Not bridging through 10

$$64 - 21 = 43$$

$$60 - 20 = 40$$

$$4 - 1 = 3$$

$$40 + 3 = 43$$

Method Steps:

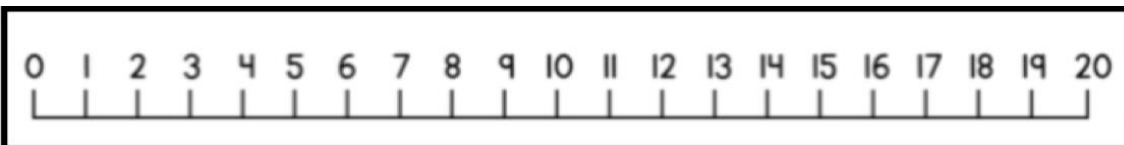
1. Partition into tens and ones.
2. Subtract the tens.
3. Subtract the ones.
4. Recombine the tens and ones

Not bridging through 10

$$64 - 21 = 43$$

$$64 - 20 = 44$$

$$44 - 1 = 43$$



Written Methods

Partitioning: Subtracting a 2-digit number from a 2-digit number.

Bridging through 10

$$\begin{array}{r} 81 - 26 = 55 \\ \swarrow \quad \searrow \\ 70 \quad \quad 11 \end{array}$$

$$70 - 20 = 50$$

$$11 - 6 = 5$$

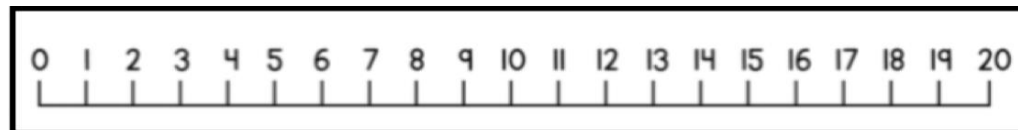
$$50 + 5 = 55$$

Bridging through 10

$$81 - 26 = 55$$

$$81 - 20 = 61$$

$$61 - 6 = 55$$



Written Methods

Equal Groups



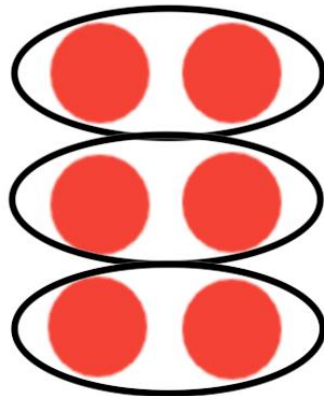
Unitising

(seeing the numbers as a group)



Multiplication

Array



$$2 + 2 + 2 = 6$$

3 groups of 2 equals 6

$$3 \times 2 = 6$$

Written Methods

Division

Grouping



6	
3	3

Sharing



6		
2	2	2

$$6 \div 3 = 2$$

6 divided into groups of 3. There are 2 equal groups.

6 shared equally between 3 groups. There are 2 in each group.



What can you do to help at home?

- Counting backwards and forwards up to 100 (Year 1).
- Counting in 2s, 3s, 5s and 10s.
- Practising adding and subtracting within 20 (e.g. $9 + 7 = 16$)
- Practising rapid recall of number bonds to 10 (e.g. $1 + 9 = 10$) and number bonds to 20 (e.g. $11 + 9 = 20$).
- Rapid recall of 2, 5 and 10 times tables (Year 2 - Times Table Rock Stars – Spring Term)
- Dojo Home Learning – this will consolidate their basic understanding of number.