Maths at St Vigor and St John Primary School

Intent:

Our curriculum intent for Maths reflects the purpose and aims of the national curriculum by encouraging our children to make rich connections between mathematical ideas in order to:

- Become fluent in the fundamentals of Mathematics
- Reason mathematically
- Solve increasingly complex problems by applying Mathematics

Our curriculum is sequenced in long- and medium-term plans (following White Rose Maths Scheme of Learning) to help pupils progressively accumulate knowledge towards the expected standards in the disciplines of number fluency, reasoning and problem solving.

Our curriculum design helps pupils develop **unique** perspectives by establishing classroom environments that promote thinking, reasoning, and mathematical discussion. New mathematical vocabulary is systematically introduced across the key stages in Number, Geometry and Measure to promote a high level of subject-specific literacy. We aim to encourage our children to become **adventurous** mathematicians by promoting mathematical enquiry using an array of high-quality 'mastery' resources that foster interest and encourage communication, systematic working, and trial and improvement.

Implementation:

Teachers are committed to planning sequences of lessons to ensure a logical progression throughout the key stages. During EYFS, pupils develop a love of using concrete resources. Accordingly, teachers across Key Stage 1 and Key Stage 2 integrate a systematic handling of 'concrete', 'pictorial' and 'abstract' resources to encourage mathematical fluency in our children.

Our 'Progression in Calculation' document ensures that teachers are aware of pre-existing learning. Teachers use this to plan appropriate mathematical activities that allow children to **connect** new concepts with their existing knowledge in order to evolve their understanding. Teachers recognise a need to visualise an abstract calculation, or problem-solving structure, to make sense of a mathematical problem.

Across *EYFS, Key Stage 1* and *Key Stage 2*, we use part-whole models to represent how numbers can be split into parts. Such models allow children to see the relationship between the whole number and the component parts – making the connections between addition and subtraction visible.

During EYFS, children are introduced to 10-frame models which underpin the bar model structures that are embedded in lessons from Year 1 to 6. Such models assist our children in visualising a problem solving structure as they allow them to make sense of 'what' they are doing and 'why' they are doing it by noticing a relationship between number.

Formative Assessment takes place daily and feedback is given through marking to generate on-going teach-pupil dialogue. Children are regularly given a 'next step' or 'self-correction' task to either extend or reinforce learning in line with the learning intention. Summative assessment takes



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place each term (autumn, spring, summer) to allow pupils to demonstrate their current understanding. A *combination* of formative and summative assessment informs future mathematics planning, and necessary intervention, to ensure each child makes expected progress.

Impact:

Mathematics is a highly inter-connected discipline as it is necessary to everyday life - including being critical to science, technology and engineering. Teachers inspire children to:

- Make valid **connections** in between maths and other subjects,
- Reason mathematically to formulate **unique** justifications using subject-specific vocabulary,
- Become **adventurous** problem solvers by fluently moving between concrete, pictorial and abstract representations of mathematical ideas.

The curriculum breadth establishes Mathematics as a fundamental, creative discipline that evolves inquisitive, resilient minds which apply mathematical skills to the wider world.

Our Curriculum:

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Our Progression in Mathematical Vocabulary.....45

Maths: Teaching and Learning at SVSJ

Teacher Planning:

- Teachers plan progressive sequences of lessons following the White Rose Mathematics Curriculum Blocks.
- All children will access a daily maths lesson of 60 minutes.
- Teachers follow our "Progression in Calculation" policy to develop our pupil's number fluency in a structured way across the Key Stages.

Developing Recall:

- In addition to planning derived from White Rose Maths, teachers develop number fluency by regularly recalling number bonds and times tables and giving opportunity to practice the skills of arithmetic.
- To facilitate times table recall, SVSJ use TT Rockstar, and The Ashley Down Times Table Scheme

- Pupils from Year 2-6 each have an individual TT Rockstar log-in.
- This scheme is a carefully sequenced programme designed for daily times table practice. This will be set at home learning.
- Every week, progress in times tables on TT Rockstar is celebrated by pupils receiving 'rock status' certificate.

ASHLEY DOWN SCHOOLS FEDERATION

Progressive Times Table Scheme (Ashley Down Schools Federation)

- In year 3-4, pupils rehearse their times tables daily using a systematic, whole school approach.
- This scheme is designed to break down the learning of times tables into systematic, manageable chunks.
- It recognises the importance of the commutative law, and the relationship with division facts.
- Towards the end of Year 2, pupils will be introduced to this scheme (10x) to ensure suitable progress from KS1 to KS2.

Maths: Teaching and Learning at SVSJ

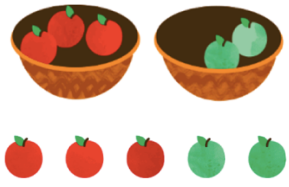
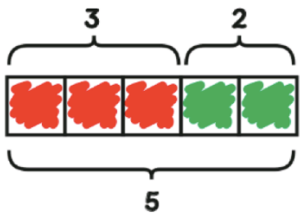
Times Table Overview:

ASHLEY DOWN SCHOOLS FEDERATION

Year 3			Year 4				
2 x	**5 x**	**3 x**	**4 x**	**6 x**	**7 x**	**8 x**	**9 x**
2 x 2							
3 x 2	3 x 5	3 x 3					
4 x 2	4 x 5	4 x 3	4 x 4				
5 x 2	5 x 5						
6 x 2	6 x 5	6 x 3	6 x 4	6 x 6			
7 x 2	7 x 5	7 x 3	7 x 4	7 x 6	7 x 7		
8 x 2	8 x 5	8 x 3	8 x 4	8 x 6	8 x 7	8 x 8	
9 x 2	9 x 5	9 x 3	9 x 4	9 x 6	9 x 7	9 x 8	9 x 9
8 facts	**7 facts**	**6 facts**	**5 facts**	**4 facts**	**3 facts**	**2 facts**	**1 fact**
By end of Y3: 21 facts learnt 15 facts still to learn			By end of Y4: 15 facts learnt to complete building blocks 21 more facts for times table check (see below)				

Concrete, Pictorial, Abstract Approach

- At St Vigor and St John, we aim to use a range of concrete, pictorial and abstract resources to allow them to become fluent in problem solving across a progressive sequence of lessons.
- Our calculation progression policy is reflective of this approach.
- The CPA approach has been adopted by Singapore – a country which has proven that this technique facilitates teaching maths for mastery.
- Within a lesson (and/or across a sequence of lessons), we aim to expose pupils to an array of different concrete resources, pictorial representations, and subsequent abstract calculations to develop mathematical fluency in our children:

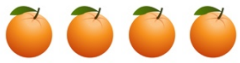
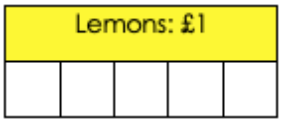
Concrete	Pictorial	Abstract
		3 + 2 = 5
KS1: Progressive Concrete, Pictorial, Abstract for Adding 2, 1-digit numbers		

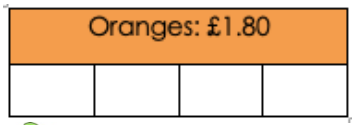
Maths: Teaching and Learning at SVSJ

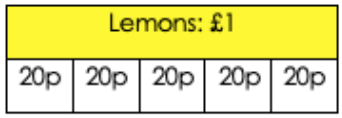
Bar Models:

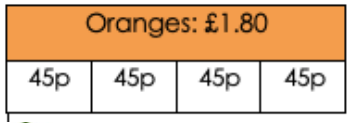
- Across both Key Stage 1 and Key Stage 2, we use bar models to allow our pupils to visualise a problem structure.
- Bar models underpin mathematics teaching in Singapore – clearly reflecting the effectiveness of these models in allowing children to go from a word problem to a solution via different representations.
- At St Vigor and St John, we use the bar model method to secure our pupil's knowledge of 'what' they are doing and 'why' they are doing it by noticing the relationship between number.

<table>
<tr><th>Word Problem:</th><th colspan="2">Bar Models
A whole split into EQUAL parts</th><th>Solution</th></tr>
<tr>
<td>A bag of 5 lemons costs £1. A bag of 4 oranges costs £1.80. How much more does one orange cost than one lemon?

£1

£1.80</td>
<td>Part 1:




 Lemons: 1 whole (£1) chopped into 5 equal parts.
 Oranges: 1 whole (£1.80) chopped into 4 equal parts.</td>
<td>Part 2:




 Lemons: £1 ÷ 5 = 20p
 Oranges: £1.80 ÷ 4 = 45p</td>
<td>Therefore...
45p-20p =25p
So....
oranges cost 25p MORE than oranges.</td>
</tr>
<tr><td colspan="4">Example drawn from UKS2 teaching</td></tr>
</table>



Maths: Our Bank of Resources

Long Term Scheme of Work:

- White Rose Maths

Developing Reasoning and Problem Solving:

- NCETM Assessments
  - *Teaching for Mastery: Questions, tasks and activities to support assessment* outline the key mathematical skills and concepts within each yearly programme.
  - The questions, tasks, and activities that are offered in the materials are intended to be a useful vehicle for assessing whether pupils have mastered the mathematics taught.

- I See Reasoning
  - Available for KS1 and KS2 (SharePoint), these resources develop mathematical reasoning.
  - Visual prompts help pupils to see mistakes, notice similarities between questions and develop strategies for calculation.
  - Techniques such as "Read the Pictures", "Explain the Mistakes" and "Which Answer?" draw attention to key learning points and help to generate focused talk.

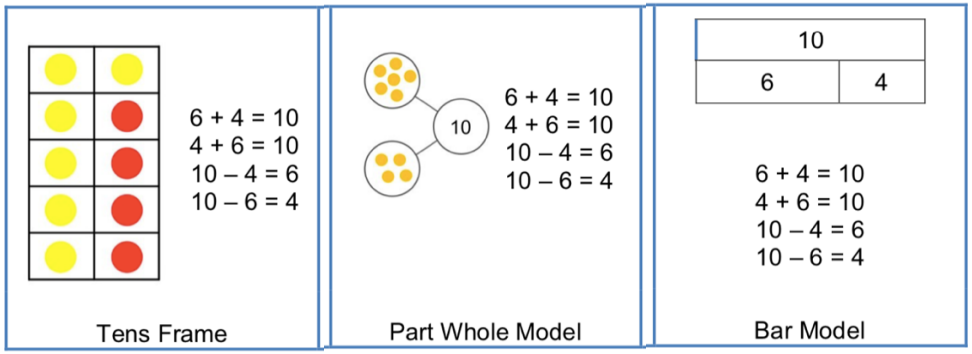
- Can you Convince Me?
  - Available for KS1 and KS2 (SharePoint), these resources encourage pupil's thinking, reasoning and mathematical discussion.
  - The resources can also be a helpful introduction to making a proof for more able pupils.

- Dip and Pick Problem Solving
  - Available for KS2, these cards provide structured opportunities for pupils to consolidate mathematical knowledge, skills and understanding at different levels of challenge.
  - Each task supports the development of problem-solving skills such as, reasoning and communicating, systematic working, and trial and improvement.

- What If?
  - Available for KS2, The 'What if...' cards follow the principles of 'low threshold, high ceiling' task.

Our Top Tips for Developing Number Fluency

Firstly, use pictorial representations to expose mathematical structure and work systematically.



Empty box problems:	At a deeper level...	Deeper still...	Develop children's understanding of the = symbol:	Teach inequality alongside teaching equality	Intelligent Practice!
These develop a strong sense of number through intelligent practice. **3 + ☐ = 8** **3 + ☐ = 9** **3 + ☐ = 10** **3 + ☐ = 11** Sequence	247 (173, 74) 173 + 74 = 247 74 + 173 = 247 247 – 173 = 74 247 – 74 = 173 6.2 (3.4, 2.8) 3.4 + 2.8 = 6.2 2.8 + 3.4 = 6.2 6.2 – 3.4 = 2.8 6.2 – 2.8 = 3.4	**3 × ☐ + 2 = 20** **3 × ☐ + 2 = 23** **3 × ☐ + 2 = 26** **3 × ☐ + 2 = 29** **3 × ☐ + 2 = 35** Sequence	The symbol **=** means "**the same as**". Encourage children to link their calculations: For example: 3+ 4 = 6 + 1	5 **>** 2 (greater than), 5 is **=** 5 (equal to) 2 is **<** 5 (less than). Extend this by children deciding whether the missing symbol is <, = or >: 5 + 7 ☐ 5 + 6	Make connections between calculations to develop fluency. 2 x 3 = 6 2 x 30 = 60 2 x 300 = 600 20 x 3 = 60

Maths Curriculum Overview – White Rose Maths Curriculum Blocks

	Autumn Term												Spring Term												Summer Term											
Week	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Year 1	Number: Place Value (within 10)				Number: addition and subtraction (within 10)				Shape	Place Value (within 20)		Consolidate	Number: addition and subtraction (within 20)				Place Value (within 50)			Measure Length and Height		Measure: Weight and Volume			Number x and ÷			Number: Fractions			Position/ Direction	Number: Place Value (within 50)			Measure: Money	Measure: Time			Consolidate
Year 2	Place Value		Number: addition and subtraction						Money		Number x and ÷		Number: x and ÷		Statistics		Properties of Shape			Number: Fractions		Measure: Length and Height			Geometry: Position and Direction		Problem Solving and Efficient Methods		Measure: Time		Measure: Mass, Capacity, and Temperature			Investigations			
Year 3	Place Value		Number: addition and subtraction					Number x and ÷				Consolidate	x and ÷			Money	Statistics		Measure Length and Perimeter			Number: Fractions			Number: Fractions			Measure: Time			Geometry: Properties of Shape		Measure: Mass and Capacity				Consolidate
Year 4	Number: Place Value			Number + and -			Perimeter		Number x and ÷				Number: x and ÷			Area	Number: Fractions				Number: Decimals				Number Decimal		Money		Time	Statistics		Geometry: Properties of Shape			Position/ Direction		
Year 5	Number Place Value			+ and -		Statistics		Number x and ÷			Area/ Perimeter		Number: x and ÷			Number: Fractions						Number: Decimals & %			Number: Decimals				Geometry: Properties of Shape			Position/ Direction	Measure: Converting Units		Measure Volume		
Year 6	Place Value	Number: Addition, Subtraction, Multiplication, Division					Number: Fractions				Position/ Direction		Number: Decimals	Number: Percentages	Number: Algebra	Converting	Perimeter Area & Volume				Number Ratio				Properties of Shape	Problem Solving			Statistics		Investigations						



Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

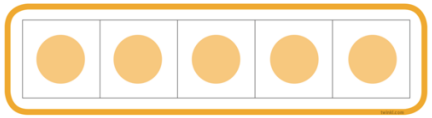
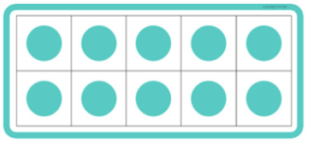
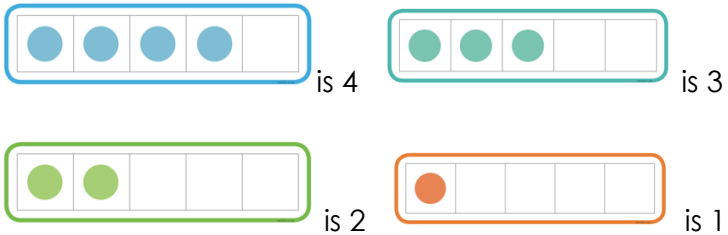
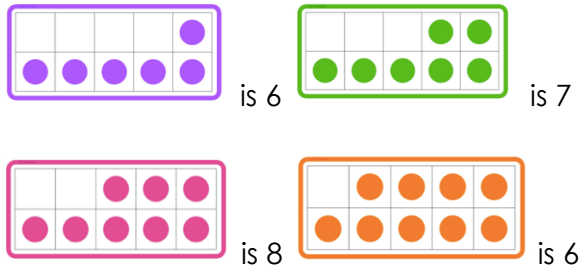
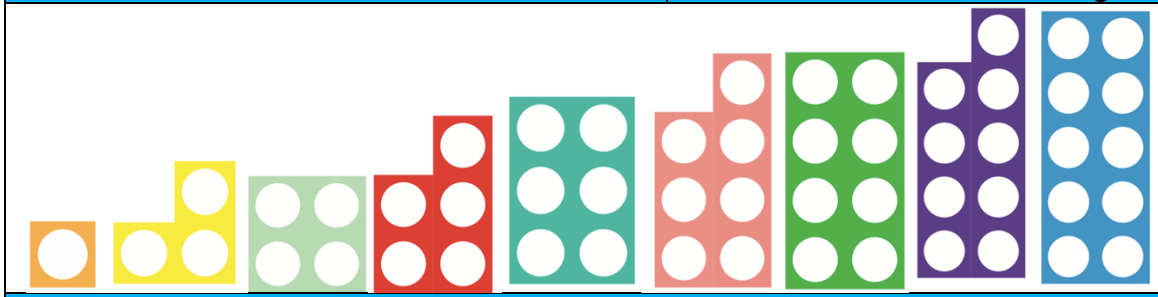
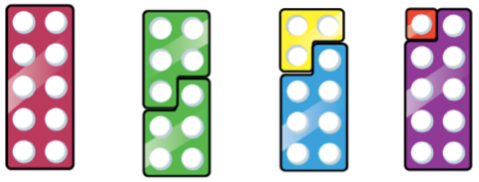
ADDITION: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

	EYFS	KS1		KS2			
	YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Number	zero, one, two..twenty number How many ...? count, count (up) to, count on (from, to), count back (from, to) is the same as more/less few pattern pair	twenty-one - one hundred numeral forwards/backwards odd/even equal to equivalent to most/least many multiple of	two hundred - one thousand Tally Sequence Continue Predict Rule > Greater than < Less than	Factor of Relationship Roman Numerals	ten thousand - hundred thousand - million next consecutive integer positive negative above zero below zero minus negative numbers	factor pair ≥ greater than/equal to ≤ less than/equal to formula divisibility square number prime number ascending/descending order	factorise prime factor digit total
Addition	add/more/and make/sum/total altogether One more, two more ...	addition near double equals is the same as number bonds/pairs ten more	one hundred more number facts tens boundary	Hundreds boundary	inverse	Ones boundary Tenths boundary	

Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

EYFS – use **quantities** and **objects** to add **two single digit** numbers and **count on** to find the answer.			
We start EYFS with **LOTS** of number recognition using **CONCRETE** resources.			
			
We start by knowing a hand is 5 (without counting).	*We can then look for patterns and spot 5 using 5 frames.*	*Once, we can spot 5, we can use this pattern to spot 10 (know our hands).*	*We can also spot 10 using a 10 frame.*
			
We love using ourselves to spot 5 and 10!	*Once we can spot 5 and 10, we can look for patterns in numbers using 5 frames.*	*Then, we can spot patterns in numbers using 10 frames.*	
			
We love using Numicon to recognise number.	*We can then use Numicon to make 10.*		

Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

EYFS – use **quantities** and **objects** to add **two single digit** numbers and **count on** to find the answer.

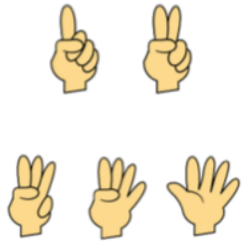
Once EYFS has developed **number recognition**, finding '**one more**' can then be explored using CONCRETE resources.



How many items have you used for each step?

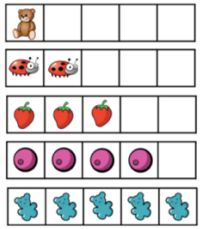
How many more have you used each time?

Construction



Children use their counting and comparing skills

Fingers



Use a 5 frame (or 10 frame) to represent numbers and then make one more.

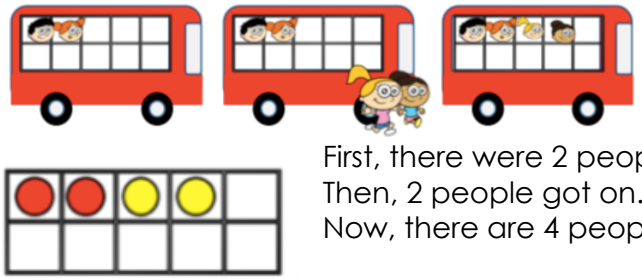
Concrete Objects





One more than 3 makes 4.

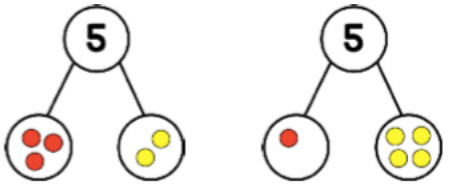
We love grouping ourselves!

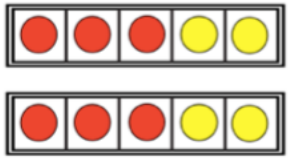


First, there were 2 people on a bus.
Then, 2 people got on.
Now, there are 4 people on the bus.

Number Stories

Pictorial Representation





Could you show your counters on a 5 frame or part whole model?

Part Whole and 5 Frame (extending to 10 frame)

Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

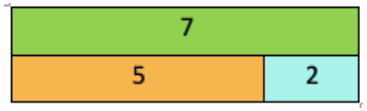
Year 1 – adding **one-digit** and **two-digit** numbers **to 20**

CONCRETE resources developing **ABSTRACT** calculations

Concrete Resource:



Pictorial:

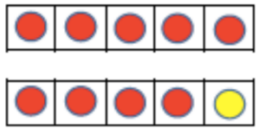


Abstract:

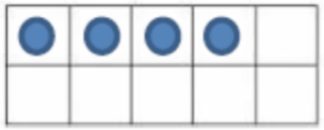
5 + 2 = 7

Building on our learning in EYFS, we can begin counting on with fingers.

*Concrete Resource: **5 frame:***



*Concrete Resource **10 frame:***



Abstract: 4 + 6 = 10

Building on our learning in EYFS, we can use 5 frames (extending to 10 frames).

*Concrete Resource: **Counters/Cubes***



*Concrete Resource: **Base 10:***

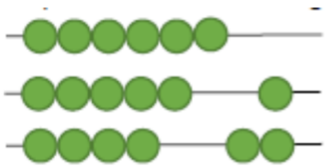


*Concrete Resource: **Everyday Objects:***



Using a Range of Concrete Objects

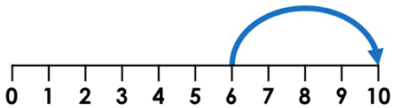
Concrete - Abstract



6 = 6 + 0
6 = 5 + 1
6 + 4 + 2

Bead Strings can help us spot patterns

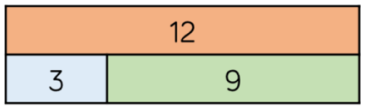
Concrete Resource/Pictorial Representation:



Abstract: 6 + 4 = 10

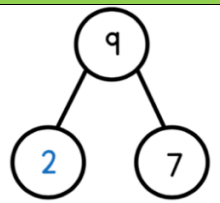
Using a number line to count on.

Pictorial Representation – Abstract Calculation



3 + 9 = 12

Bar Model



7 + 2 = 9

Part Whole Model

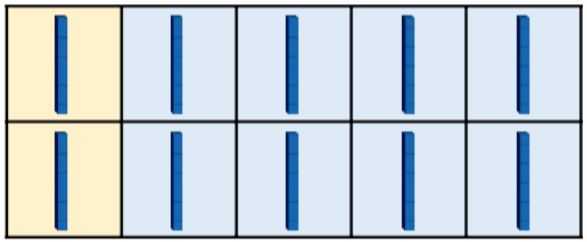
Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

Year 2 – adding a **two-digit number** and **ones**; a **two-digit number** and **tens**; **two two-digit** numbers; adding **three one-digit** numbers

Concrete Resource:

Using Base 10:



2 tens + 8 tens = 10 tens

Abstract: *20 + 80 = 100*

We can use a 10 frame and base 10 to spot number bonds to 100.

Concrete Resource:

Using 10 frame:



Abstract:

2 + 8 = 10

20 + 80 = 100

10 Frame –spotting patterns

Concrete Resource:

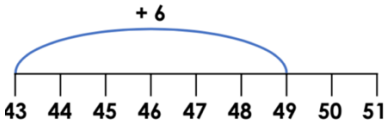


Abstract:

4 + 3 + 3 = 10

We can also use a 10 frame to add 3 one digit numbers

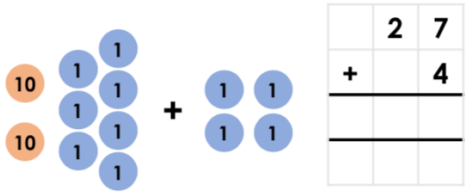
Concrete Resource/Pictorial Reoresentation:



43 + 6 = 49

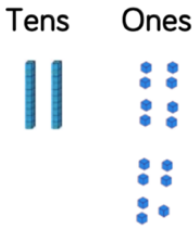
Number line – 2 digit number add ones

Concrete Resource: ***Place Value Counters***



Abtract calculation

Concrete Resource: **Base 10**

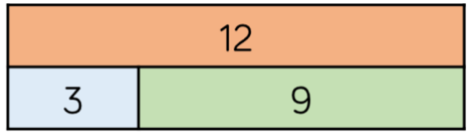


$$\begin{array}{r} 2\ 8 \\ +\ 7 \\ \hline 3\ 5 \\ \hline 1 \end{array}$$

Abtract calculation

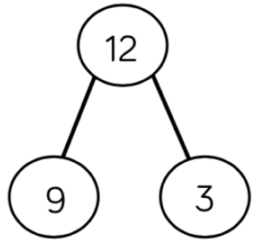
We can use conrete resources to introduce us to column addition

Pictorial Representation – Abstract Calculation



3 + 9 = 12

Bar Model



9 + 3 = 12

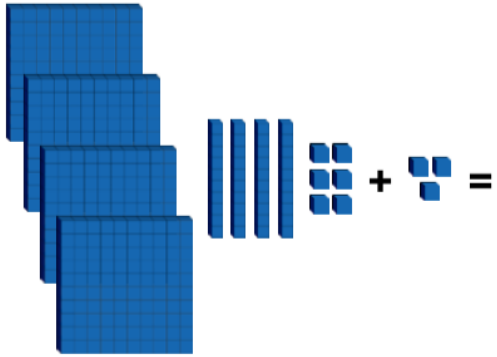
Part Whole Model

Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

Year 3 - adding a **three-digit** number and **ones**; a **three-digit number** and **tens**; a **three-digit number** and **hundreds**

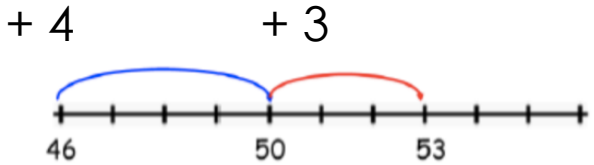
Concrete Resource:



Abstract: 446 + 3 = 449

Base 10 (or PV Counters) – Adding Ones

Concrete Resource/Pictorial Representation:



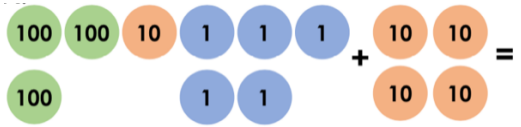
Abstract: 46 + 7 = 53

so

346 + 7 = 353

Number Line– Adding Ones

Concrete Resource:



Abstract: 315 + 40 = 355

Place Value Counters (or Base 10) – Adding Tens

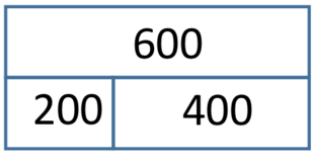
Concrete Resource:



Abstract: 422 + 200 = 622

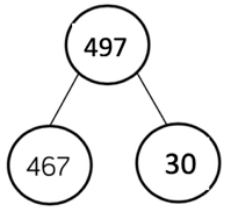
Base 10 (or PV counters) – Adding Hundreds

Pictorial Representation – Abstract Calculation



200 + 400 = 600

Bar Models



467 + 30 = 497

Part Whole Model

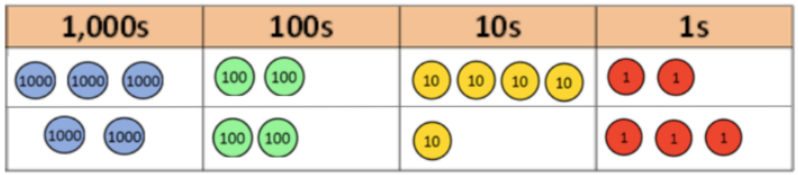
Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

Year 4 - add numbers **with up to** 4 digits

Concrete Resourse (PV counters):

Column Addition (without crossing):

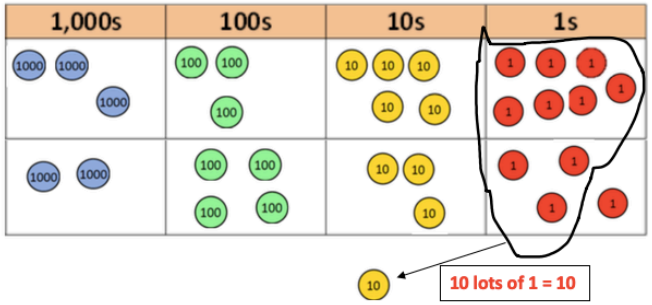


5 4 5 5

Abstract

3 2 4 2
+ 2 2 1 3
5 4 5 5

Column Addition (with crossing)

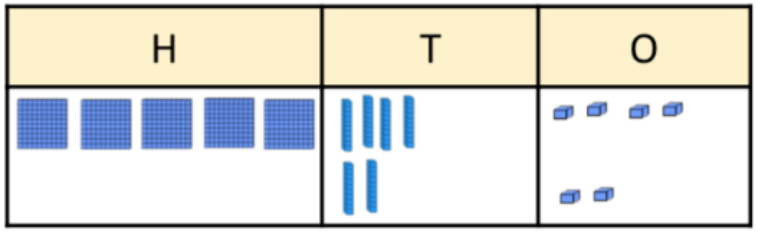


Abstract

3 3 5 7
+ 2 4 3 4
5 7 9 1

Place Value Counters – Column Addition (with and without crossing)

Concrete Resourse (Base 10):



5 4 4
+ 2 2
5 6 6

Abstract

Base 10 – Column Addition (with and without crossing)

4,844
+ 2,156
7, 000
1 1 1

Abstract

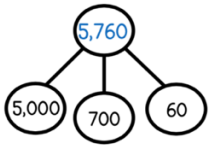
Column Addition

2 503
2 811
+ 814
6 128
2

Abstract

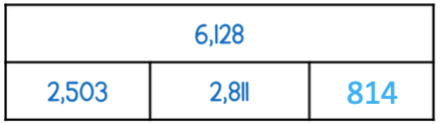
Column Addition

Pictorial Representation – Abstract Calculation



5000 + 700 + 60 = 5760

Part Whole Model

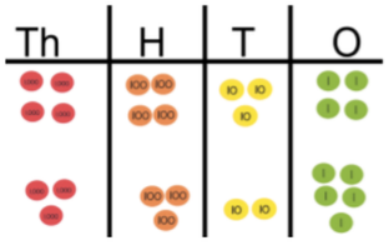


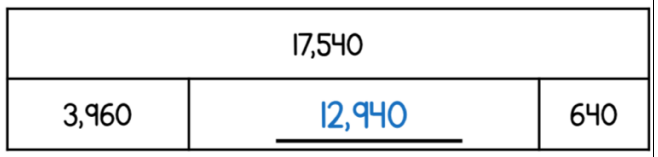
2503 + 2811 + 814 = 6128

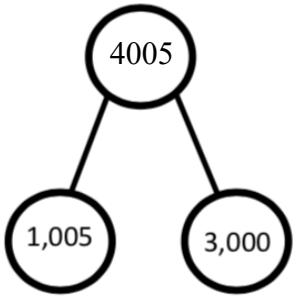
Bar Model

Our Progression in Calculation – Addition

Concrete – Pictorial - Abstract

<table>
<tr><th colspan="4">Year 5 - add whole numbers with more than 4 digits
Year 6 - solve addition multi-step problems in contexts</th></tr>
<tr><td rowspan="2">Concrete Resources: Place Value Counters/Base 10


4434
+3325
7759
Abstract</td><td rowspan="2">Abstract Calculations:
32 461
+ 4 352
36 813
1</td><td colspan="2">Pictorial Representation – Abstract Calculation</td></tr>
<tr><td>

12 940
3 960
+ 640
17 540
2 1
Abstract</td><td>

1005 + 3000 = 4005
Abstract</td></tr>
<tr><td>Place Value Counters/Base 10 Column Addition</td><td>Column Addition</td><td>Bar Model</td><td>Part-Whole Model</td></tr>
</table>



Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

SUBTRACTION: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

	EYFS	KS1		KS2			
	YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Number	zero, one, two..twenty number How many ...? count (up) to, count on (from, to), count back (from, to) is the same as more/less few pattern	twenty-one - one hundred numeral forwards/backwards odd/even equal to equivalent to most/least many multiple of	two hundred - one thousand Tally Sequence Continue Predict Rule > Greater than < Less than	Factor of Relationship Roman Numerals	ten thousand - hundred thousand - million next consecutive integer positive/negative above/below zero minus negative numbers	factor pair ≥ greater than/equal to ≤ less than/equal to formula divisibility square number prime number ascending/descending order	factorise prime factor digit total
Subtraction	How many more to make ..? How many more is..than.? Take away How many are left over? How many have gone? One less, two less…. How much less/fewer is ...?	half, halve subtract equals is the same as number bonds/pairs missing number ten more/less	one hundred more/less number facts tens boundary	Hundreds boundary	inverse	Ones boundary Tenths boundary	

Our Progression in Calculation – Subtraction

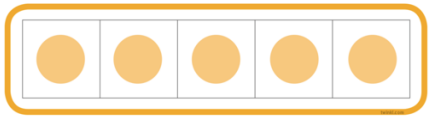
Concrete – Pictorial - Abstract

EYFS – use **quantities** and **objects** to subtract **two single digit** numbers and **count back** to find the answer.

As with addition, we start EYFS with **LOTS** of number recognition using **CONCRETE** resources



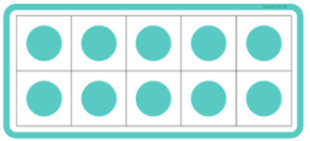
We start by knowing a hand is 5 (without counting).



We can then look for patterns and spot 5 using 5 frames.



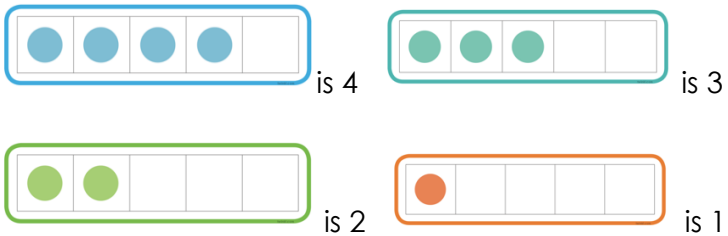
Once, we can spot 5, we can use this pattern to spot 10 (know our hands).



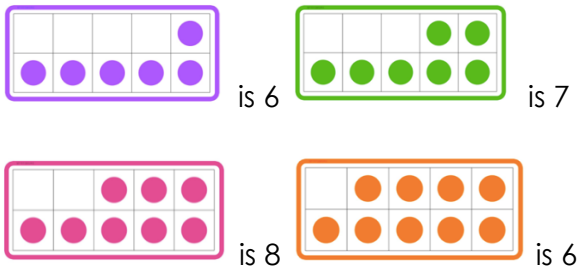
We can also spot 10 using a 10 frame.



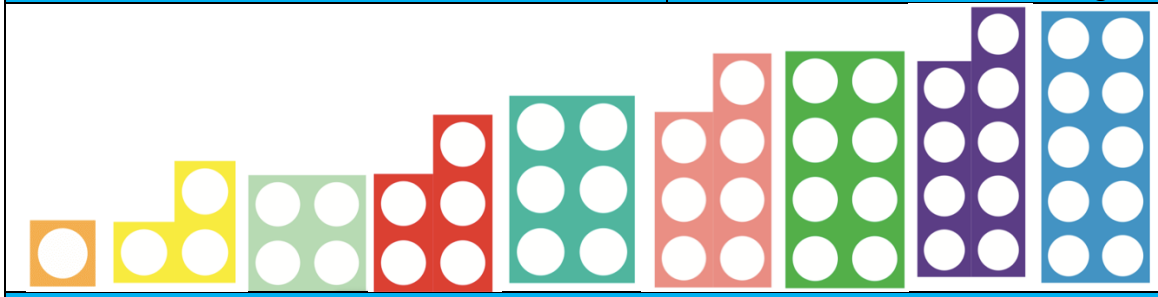
We love using ourselves to spot 5 and 10!



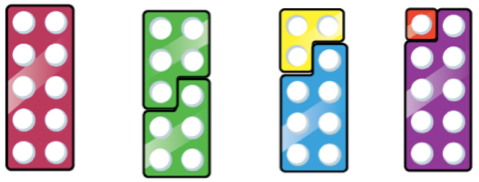
Once we can spot 5 and 10, we can look for patterns in numbers using 5 frames.



Then, we can spot patterns in numbers using 10 frames.



We love using Numicon to recognise number.



How many ways can you build 10?

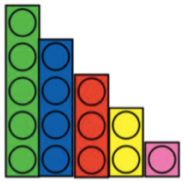
We can then use Numicon to make 10.

Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

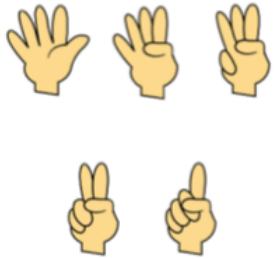
EYFS – subtract **two single-digit** numbers and count on or back to find the answer

Once EYFS has developed **number recognition**, finding '**one less**' can then be explored using CONCRETE resources.



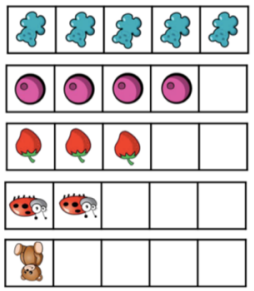
How many items have you used for each step?
Children should see the link that one less than a number is the next number that they are saying.

Construction



Children use their counting and comparing skills to find one less.

Fingers



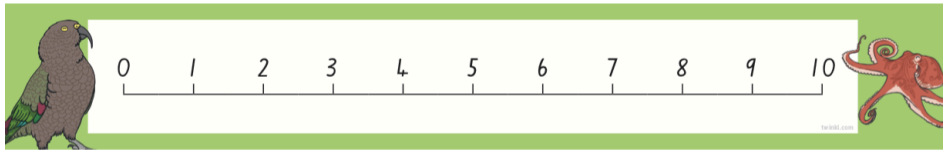
Use a 5 frame (or 10 frame) to represent numbers and then make one less.

5 or 10 Frame



1 **less than** 5 makes 4

We love using objects (including ourselves) to jump back!



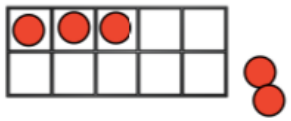
We use number lines to count/jump back.

Numicon



First, there were 5 people on a bus.

Then, 2 people got off.



Now, these are 3 people on the bus.

Number Stories

Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

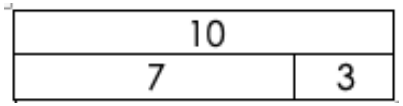
Year 1 – subtract **one-digit** and **two-digit** numbers **to 20**

CONCRETE resources developing **ABSTRACT** calculations

Concrete Resource:



Pictorial:



Abstract:

10 – 3 = 7

Building on our learning in EYFS, we can begin counting back with fingers.

Concrete Resource: **5 frame:**

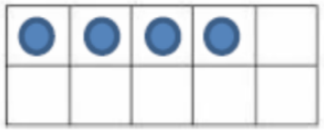


5 – 5 = 0



5 – 4 = 1

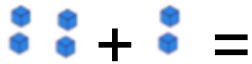
Concrete Resource: **10 frame:**



Abstract: 10 - 6 = 4

Building on our learning in EYFS, we can use 5 and 10 frames.

Concrete Resource: ***Base 10*:**



Concrete Resource:

***Everyday Objects*:**



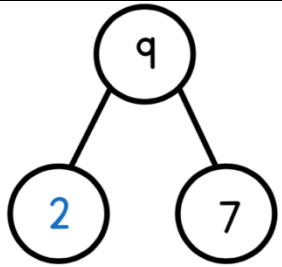
Abstract: 8 – 6 = 2



Abstract: 6 – 2 = 4

Using concrete objects

Pictorial Representation – Abstract Calculation

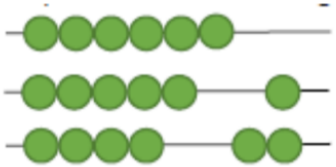


9 – 7 = 2

9 - 2 = 7

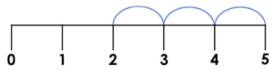
Part Whole Model

Concrete Resource:

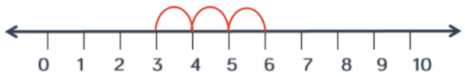


Abstract: 6 - 0 = 6 or 6 – 1 = 5

Concrete/Pictorial:



Abstract: 5 – 3 = 2



Abstract: 6 - 3 = 3

Concrete/Pictorial:



How many more cakes does Beth have?

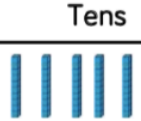
Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

Bead Strings can help us spot patterns	*Using a number line to count back.*	*Finding the difference – counting on*

Year 2 - subtracting a **two-digit number** and **ones**; a **two-digit number** and **tens**; **two two-digit** numbers

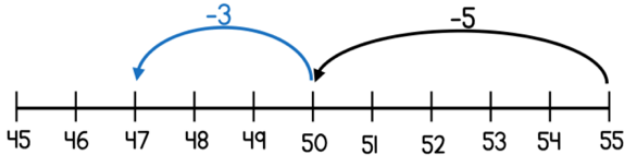
Concrete/Pictorial:

Tens	Ones
	
	
2	6

$$\begin{array}{r} 5\ 6 \\ -\ 3\ 0 \\ \hline 2\ 6 \end{array}$$

Abstract

Concrete/Pictorial:

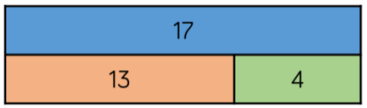


Abstract: 55 - 8 = 47

Pictorial Representation – Abstract Calculation

17 – 13 = 4

17 – 4 = 13



Base 10 (or Place Value Counters) – column subtraction

Abstract:

34 – 13 = 21

34

30 4

–10 –3

20 1

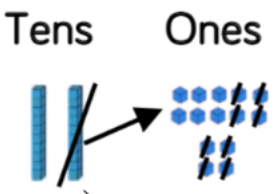
20 + 1 = 21

Partition 30 into 30 and 4

Partition 13 into 10 and 3

Number Line – with partitioning

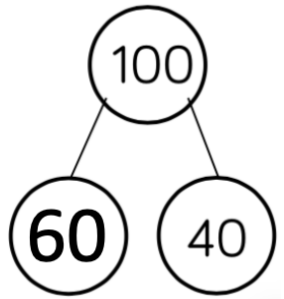
Concrete/Pictorial *Abstract*



$$\begin{array}{r} {}^{1}\not{2}\ {}^{1}4 \\ -\ \ 8 \\ \hline 1\ 6 \end{array}$$

Exchange 1 tens for ten ones

Bar Model



100 – 60 = 40

100 – 40 = 60

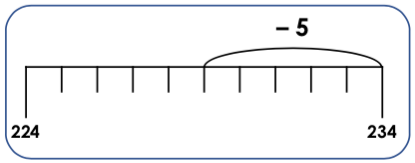
Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

Partitioning – This could be supported by concrete resources such as Place Value Counters	*Base 10 (or Place Value Counters) – column subtraction with exchanging*	*Part Whole Model*

Year 3 - subtracting a **three-digit** number and **ones**; a **three-digit number** and **tens**; a **three-digit number** and **hundreds**

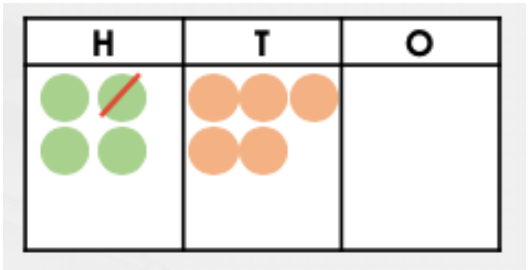
Pictorial:



Abstract:
234 – 5 = 229

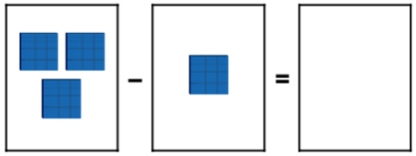
Using number lines can help us subtract ones.

Concrete Resources: Place Value Counters/Base 10



Abstract: 450 – 100 = 350

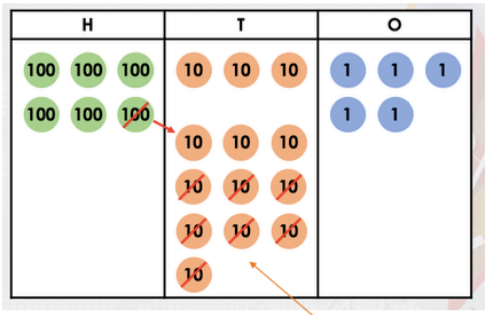
Concrete/Pictorial:



Abstract:
300 – 100 = 200

Using base 10 can help up subtract multiples of 100.

Concrete Resources: Place Value Counters/Base 10

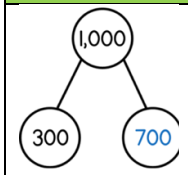


5 1
6 3 5
- 7 0
5 6 5

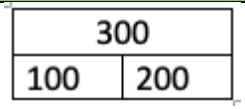
Abstract

Place Value Counters – Column Subtraction (with or without exchanging)

Pictorial Representation – Abstract Calculation



1000 – 700 = 300
1000 – 300 = 700 Abstract

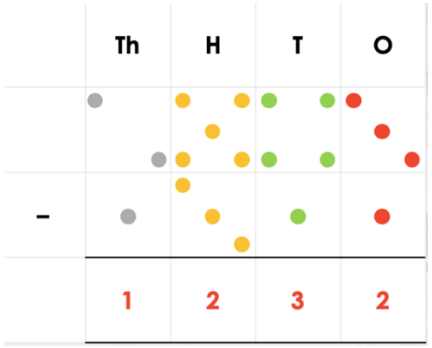
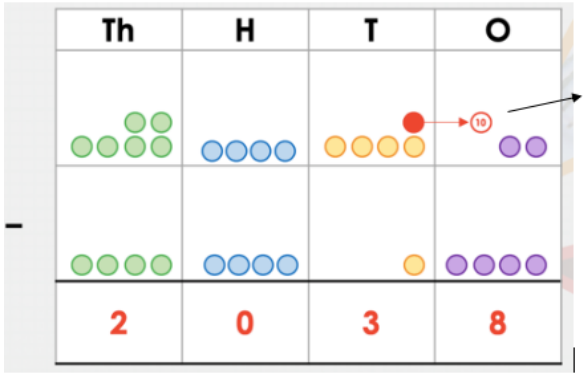
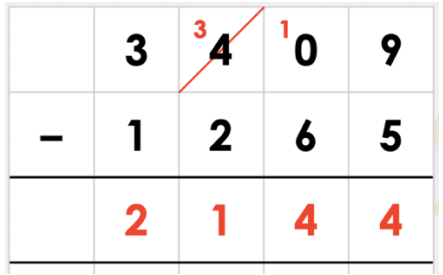


Abstract: 300 – 200 = 100 or 300 – 100 = 200

Part Whole Model | *Bar Model*

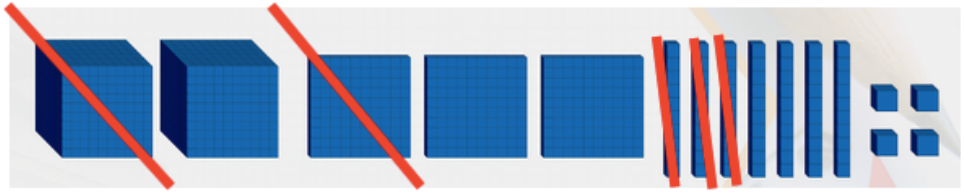
Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

<table>
<tr><th colspan="3">Year 4 - subtract numbers with up to 4 digits</th></tr>
<tr>
<td>Concrete Resources:

</td>
<td>Concrete Resources:

</td>
<td>Abstract Calculation:

</td>
</tr>
<tr><td>Place Value Counters/Base 10 – without exchanging</td><td>Place Value Counters/Base 10 – with exchanging)</td><td>Column Subtraction</td></tr>
<tr><td colspan="2"></td><td>Pictorial Representation – Abstract Calculation</td></tr>
</table>

Our Progression in Calculation – Subtraction

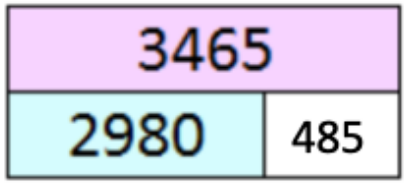
Concrete – Pictorial - Abstract



Abstract:

2374 – 1130 = 1244

Base 10 – Column Subtraction (with or without exchanging)

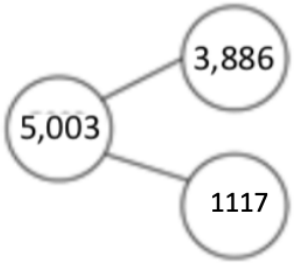


Abstract:

3465 – 2980 = 485

3465 – 485 = 2980

Bar Model



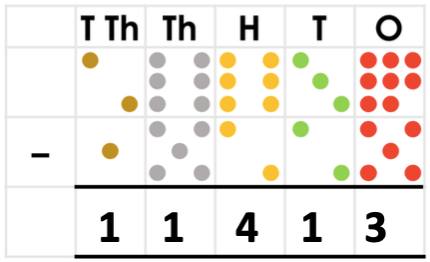
5003 – 3886 = 1117

5003 – 1117 = 3886

Part Whole Model

Year 5 – subtract whole numbers with **more than** 4 digits
Year 6 - solve subtraction **multi-step problems** in contexts

Concrete Resources:



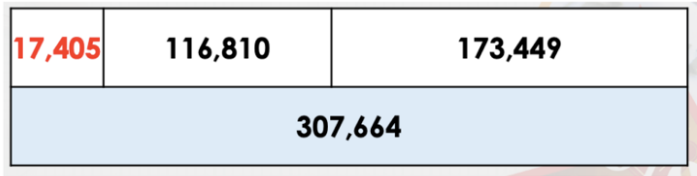
Abstract:

26638 – 15225 = 11413

Abstract Calculation:



Pictorial Representation – Abstract Calculation



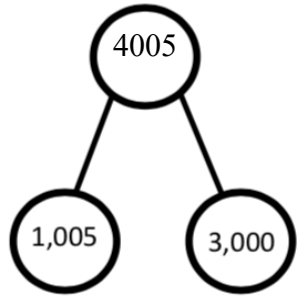
Step 1:

116 810
+ 173 449
290 259

Step 2:

307 664
- 290 259
017 405

Abstract Calculation:



Abstract:

4005 – 3000 = 1005



Our Progression in Calculation – Subtraction

Concrete – Pictorial - Abstract

		116 810 + 173 449 = 290 259 307 664 – 290 259 = 17 405	4005 – 1005 = 3000
Place Value Counters/Base 10 Column Subtraction (with or without exchanging)	*Column Subtraction (with or without exhanging)*	*Bar Model – Multi-step*	*Part-Whole Model*



Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

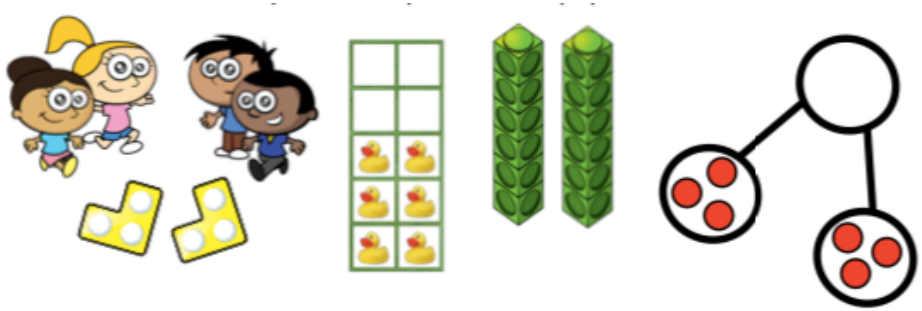
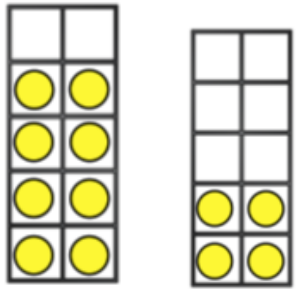
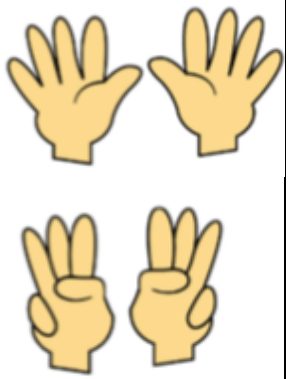
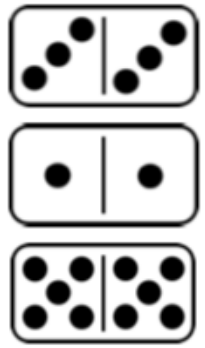
MULTIPLICATION: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

	EYFS	KS1		KS2			
	YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Place Value	ones/tens/digit the same number as as many as more/larger/bigger/greater fewer/smaller/less most/biggest/larges/greatest compare/order first, second, third... last/last but one before/after/next/between	equal to half-way between above/below one more/ten more one less/ten less	place value stands for represents exchange	one hundred more one hundred less	one thousand more one thousand less		
Multiplication	doubling number patterns	multiplication multiply multiplied by multiple grouping array	groups of times once, twice, three times ... ten times repeated addition group in pairs/three/tens equal groups of row/column multiplication table multiplication/division fact	factor product	inverse square/squared cube/cubed		

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

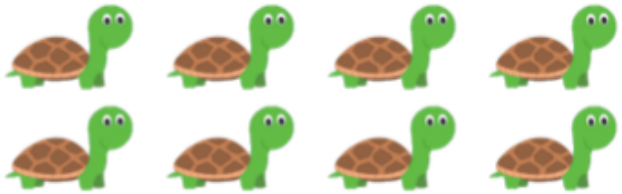
EYFS – solve problems by **doubling**.			
As with division, we start EYFS with **LOTS** of **concrete** resources.			
	 Building numbers in pairs		
Build Doubles using Concrete Resources	*10 Frame*	*Fingers*	*Matching Pairs*

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 1 – solve 1 step multiplication calculations using concrete objects, pictorial representations and arrays

Concrete Resources (various objects):



Abstract Calculation:

2 + 2 + 2 + 2 = 10 (4 **equal** groups of 2 is 8)
or
4 + 4 = 8 (2 **equal** groups of 4 is 8)

Making Arrays – Repeated Addition

Concrete Resources (everyday objects):



There are 4 groups of 4 pencils.



There are 4 groups of 2 flowers.

Abstract Calculation:

4 + 4 + 4 + 4 = 16 pencils
or
2 + 2 + 2 + 2 = 8 pencils

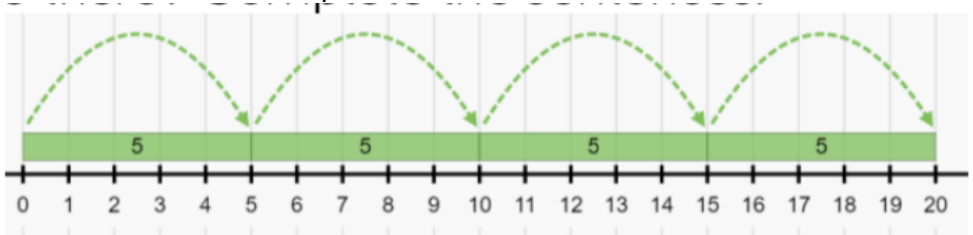
Making Equal Groups

Concrete Resource:



5 + 5 + 5 + 5 = ____

Pictorial Representation:



Abstract Calculation:

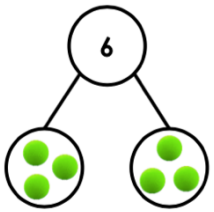
Number Line – Repeated Addition

Concrete Resource:

Abstract Calculation:
10 + 10 + 10 + 10 = 40

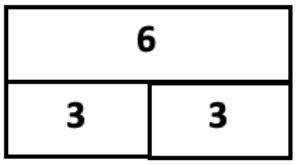
Bead Strings – Counting in 10s

Pictorial Representation – Abstract Calculation



Abstract:
2 group of 3 = 6

Part Whole Model – Making Doubles



Abstract: 2 groups of 3 = 6

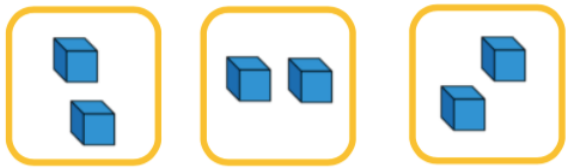
Bar Model

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 2 - calculate multiplication within the multiplication tables (x2, x5, x10), and write them using the multiplication symbol "x"

Concrete/Pictorial:



Abstract Calculation:

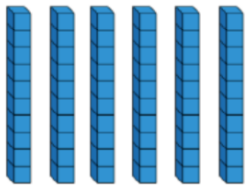
3 x 2 = 6 **or** 2 x 3 = 6

3 **lots of** 2 = 6

3 **equal** groups of 2 = 6

Base 10 - Equal Groups

Concrete:



Abstract:

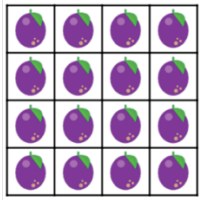
6 x 10 = 60

or

10 x 6 = 60

Base 10 – Equal Groups (x10)

Concrete/Pictorial:



Abstract:

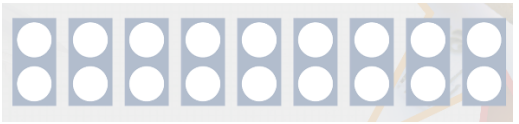
4 x 4 = 16

or

4 **lots of** 4 = 16

Making Arrays

Concrete:



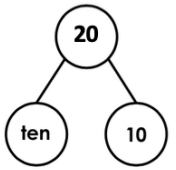
Abstract:

9 x 2 = 18

9 **lots of** 2 = 18

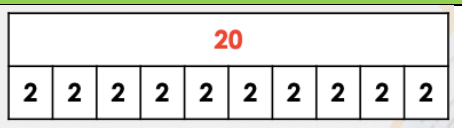
Numicon – Equal Groups (x2, x5, x10)

Pictorial Representation – Abstract Calculation



Abstract: 2 **lots of** 10 = 20

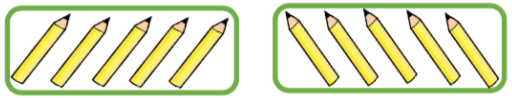
Part Whole Model



Abstract: 10 x 2 = 20 or 2 x 10 = 20

Bar Model

Concrete/Pictorial:



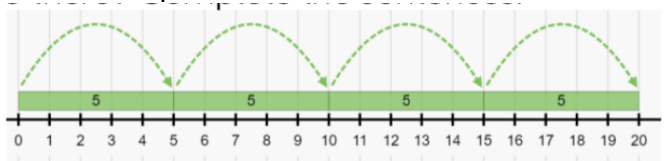
Abstract Calculation:

2 x 5 = 10 **or** 5 x 2 = 10

2 **lots of** 5 = 10

Concrete Objects – Equal Groups

Pictoria Representionl:



Abstract Calculation:

4 x 5 = 20 **or** 5 x 4 = 20

4 **equal** jumps of 5 = 20

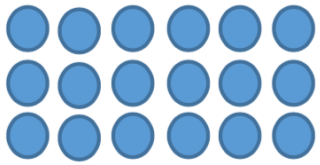
Number Line – Repeated Addition

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 3 – use multiplication (x3, x4 and x8); multiply **two-digit numbers** times **one-digit numbers** using formal written methods

Concrete/Pictorial:



Abstract Calculation:

3 x 6 = 18 **or** 6 x 3 = 18

3 lots of 6 = 18

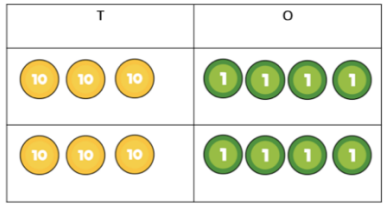
6 **equal** groups of 3 = 18

Making Arrays – Repeated Addition

Concrete/Pictorial:

34 x 2 =

34 is the **same as** 3 tens and 4 ones



Abstract Calculation:

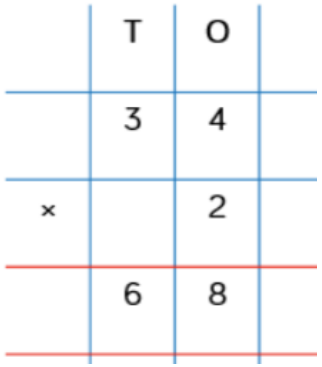
2 lots of 34 = 68

2 x 34 = 68

Place Value Counters

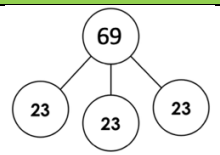
Abstract:

34 x 2 =



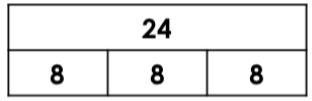
Column Multiplication

Pictorial Representation – Abstract Calculation



Abstract: 23 x 3 = 69

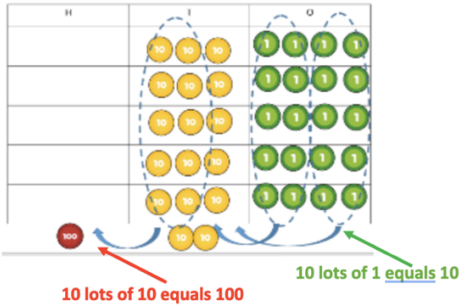
Part-Whole Model



Abstract: 3 x 8 = 24

Bar Model

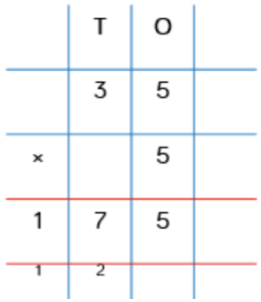
Concrete/Pictorial:



Abstract: 34 x 5 = 170

Place Value Counters – Column Multiplication (with crossing)

Abstract Calculation: 35 x 5 = 175



Written Column Multiplication (with crossing)

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 4 - multiply **two-digit** and **three-digit numbers** by a **one-digit number** using formal written layout

Concrete/Pictorial:



Abstract Calculation:

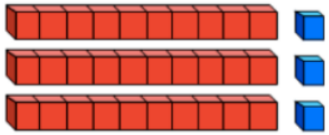
5 x 9 = 45

9 **lots of** 5 = 45

5 **equal** groups of 9 = 45

Making Arrays

Concrete:



Abstract:

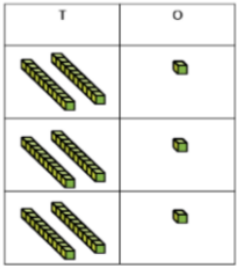
3 x 11 = 33

3 **lots of** 11 = 33

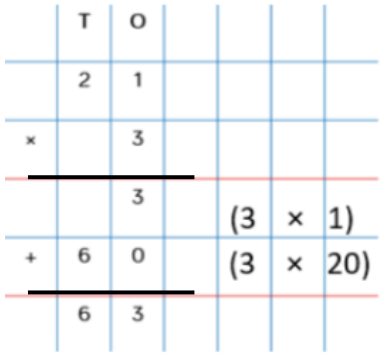
3 **equal** groups of 11

Base 10 – Equal Groups

Concrete:



Abstract:



Abstract: 21 x 3 = 63

3 **lots of** 21 = 63

Base 10 – expanded method

Concrete:

Hundreds	Tens	Ones
●●●●	●●	●
●●●●	●●	●
●●●●	●●	●

Abstract:

	4	2	1
x			3
			3
		6	0
1	2	0	0
1	2	6	3

(3 x 1)
(3 x 20)
(3 x 400)

421 x 3 = 1263

Place Value Counters

Concrete:

Hundreds	Tens	Ones
●●●●	●●●●●	●●●

5 **lots of** 253 = 1265

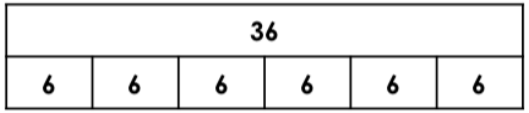
Abstract:

	2	5	3
x			5
1	2	6	5
	2	1	

253 x 5 = 1265

Place Value Counters – Column Multiplication

Pictorial Representation – Abstract Calculation



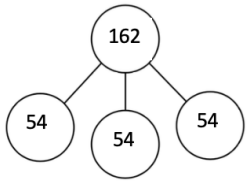
Abstract Calculation:

6 **lots of** 6 = 36

6 **equal** groups of 6 = 36

6 x 6 = 36

Bar Model



Abstract Calculation

3 **equal** groups of 54 = 162

3 x 54 = 162

Part Whole Model

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

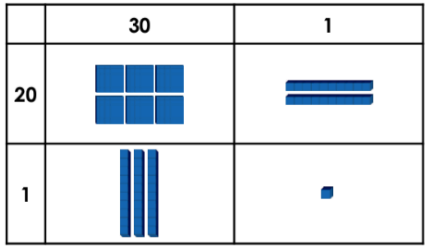
Year 5 – multiply numbers up to **4 digits** by a **one- or two-digit number** using a formal written method
Year 6 - solve multiplication **multi-step problems** in contexts

Base 10 – Area Model

Concrete/Pictorial:

31 x 21 =

(30 + 1) x (20+1)



630 + 21 = 651

Abstract: 31 x 21 = 651

Place Value Counters

Concrete/Pictorial:

1221 x 4 =

4 **lots of** 1221 = 4884

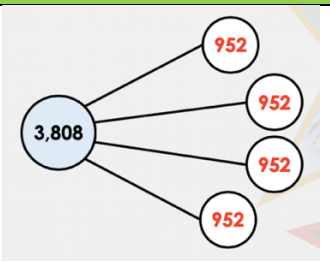


Abstract Calculation:

	1	2	2	1
x				4
	4	8	8	4

Part Whole Model

Pictorial Representation – Abstract Calculation



Abstract Calculation:

952 x 4 = 3808

4 **lots of** 952 = 3808

Written Column Multiplication

Abstract Calculation:

			5	2	
x			3	6	
		3	1 (1)	2	(6 x 52)
	1	5	6	0	(30 x 52)
	8	8	7	2	

Written Column Multiplication

Abstract Calculation:

		1	3	4	3	
x				3	2	
		2	6	8	6	
	4 (1)	0 (1)	2	9	0	← Place Holder
	4	2	9	7	6	
			(1)			

Bar Model

5,244			
1311	1311	1311	1311

Abstract Calculation:

1311 x 4 = 5244

4 **lots of** 1311 = 5244



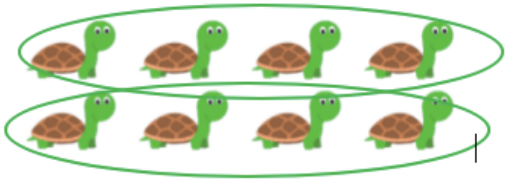
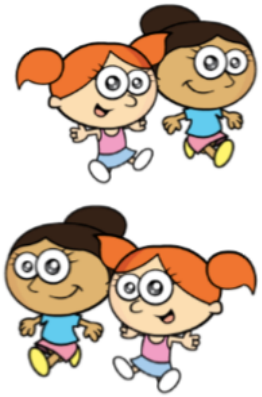
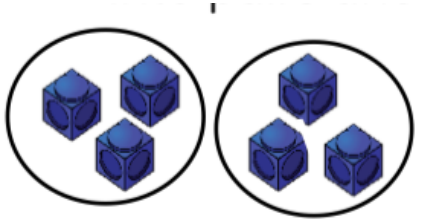
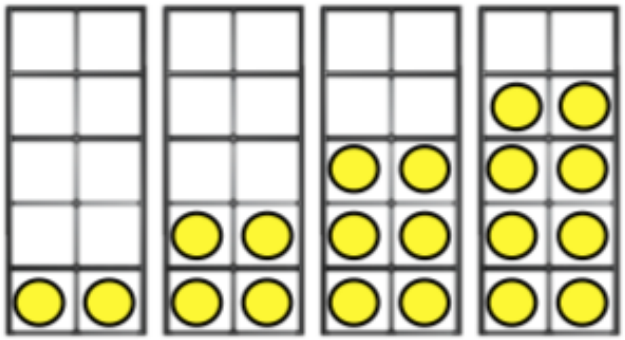
Our Progression in Calculation - Division

DIVISION: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

	EYFS	KS1		KS2			
	YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Place Value	ones/tens/digit the same number as as many as more/larger/bigger/greater fewer/smaller/less most/biggest/larges/greatest compare/order first, second, third... last/last but one before/after/next/between	equal to half-way between above/below one more/ten more one less/ten less	place value stands for represents exchange	one hundred more one hundred less	one thousand more one thousand less		
Division	sharing halving number patterns	division dividing grouping array	groups of times repeated addition divide/divide by share equally left/left over one/two/three/ten each group in pairs/three/tens equal groups of row/column	factor product remainder	inverse square/squared cube/cubed		

Our Progression in Calculation - Division

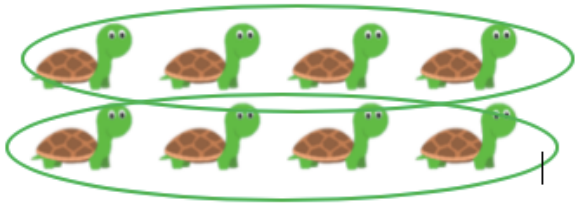
EYFS – solve problems by **halving** and **sharing**.			
As with multiplication, we start EYFS with **LOTS** of **concrete** resources.			
		 	
Making Equal Groups		*We love putting ourselves in groups*	*6 in 2 groups (halves)*
			
Base 10 – Doubles and Halves			*We love chopping things in halves!*

Our Progression in Calculation - Division

Year 1 – solve 1 step division calculations using concrete objects, pictorial representations and arrays

Making Arrays – Grouping

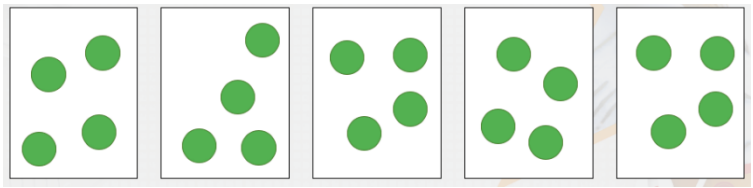
Concrete/Pictorial:



Abstract Calculation:
8 **grouped equally** in 2 is 4

Concrete objects (shared equally)

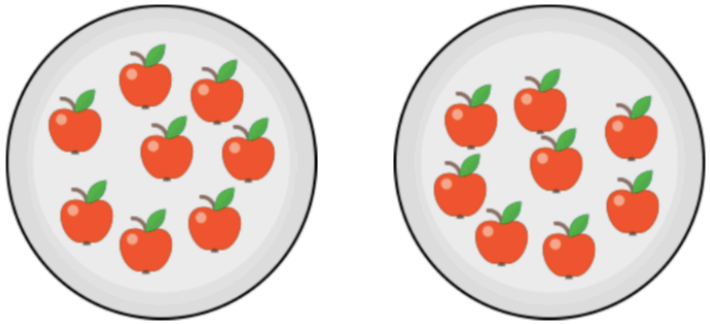
Concrete/Pictorial:



Abstract Calculation:
20 **shared equally** between 5 is 4

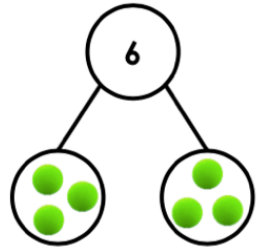
Pictorial Objects – Shared Equally

Concrete/Pictorial:



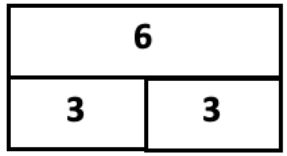
Abstract:
*16 apples **shared equally** between 2 plates.*
There are 8 apples on each plate.

Pictorial Representation – Abstract Calculation



Abstract Calculation:
6 **shared equally** between 2 is 3

Part Whole Model – Making Doubles



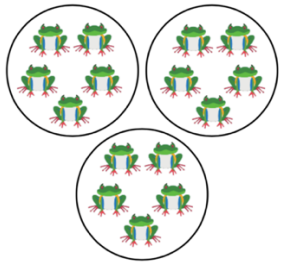
Abstract Calculation:
6 **shared equally** between 2 is 3

Bar Model

Our Progression in Calculation - Division

Year 2 - calculate division facts within the multiplication tables (x2, x5, x10), and write them using the division symbol "÷"

Concrete/Pictorial:



Abstract Calculation:

There are 3 **equal groups** with 5 in each group.

15 ÷ 3 = 5

Equal Groups

Concrete/Pictorial:



Abstract Calculation:

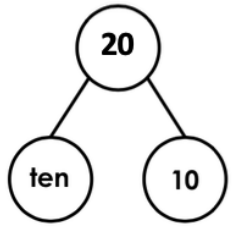
20 ÷ 5 = 4

20 **shared equally** between 4 is 5

20 **grouped equally** between 4 is 5

Base 10 – dividing by 5

Pictorial Representation – Abstract Calculation



Abstract Calculation:

20 ÷ 2 = 10

20 **shared equally** between 2 is 10

Concrete:



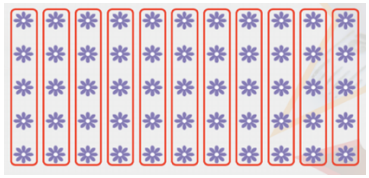
Abstract Calculation:

How many groups of ten? 9

90 ÷ 10 = 9

Base 10 – dividing by 10

Concrete/Pictorial:



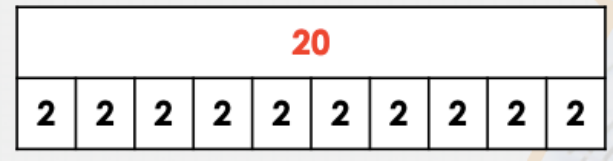
Abstract Calculation:

55 ÷ 5 = 11

There are 11 **equal groups** with 5 in each group.

Making Arrays

Part Whole Model



Abstract Calculation: 20 ÷ 10 = 2

20 **grouped equally** between 10 is 2

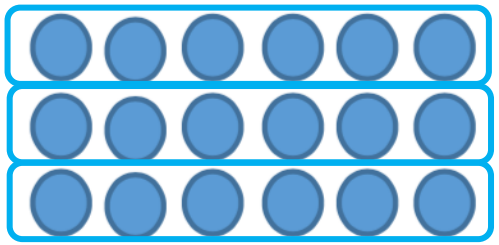
Bar Model

Our Progression in Calculation - Division

Year 3 – use division facts within the multiplication tables they know (x3, x4 and x8)

Making Arrays – Grouping

Concrete/Pictorial:



Abstract Calculation:

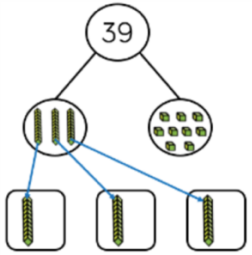
18 ÷ 3 = 6

There are 3 **equal groups** with 6 in each group.

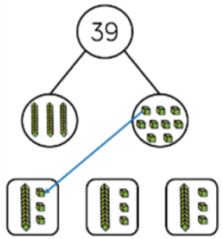
Base 10 – Partitioning and Sharing Equally

Concrete/Pictorial: 39 ÷ 3 =

Step 1: Share the tens



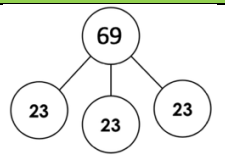
Step 2: Share the ones



Abstract: There are 3 **equal groups** with 13 in each group.

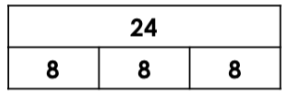
39 ÷ 3 = 13

Pictorial Representation – Abstract Calculation



Abstract: 69 ÷ 3 = 23

Part-Whole Model



Abstract: 24 ÷ 8 = 3

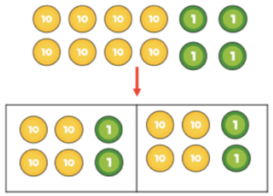
Bar Model

Place Value Counters Shared Equally

Concrete/Pictorial:

*84 **shared equally** between 2.*

There are 42 counters in each group.



Abstract Calculation: 84 ÷ 2 = 42

Base 10 Shared Equally

Concrete/Pictorial:

There are 11 counters in each group.

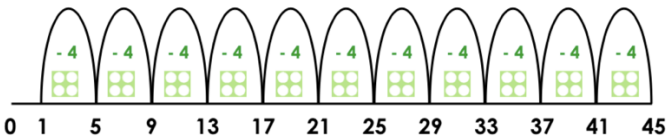


There are 11 counters each.

Number Line – Repeated Subtraction

Pictorial/Abstract:

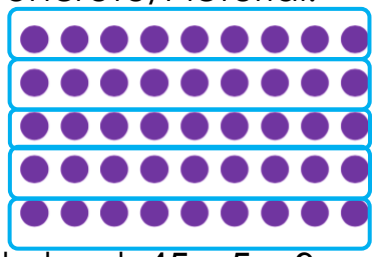
45 ÷ 4 = 11 r 1



Our Progression in Calculation - Division

Year 4 – recall division facts for multiplication tables up to 12 × 12; use place value, known and derived facts to divide mentally - including dividing by 1 digit numbers

Concrete/Pictorial:

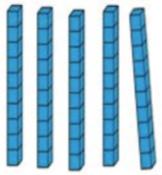


Abstract: 45 ÷ 5 = 9

5 **equal groups** with 9 in each group.

Making Arrays

Concrete/Pictorial:



Abstract:

5 x 10 = 50 or 10 x 5 = 50

50 ÷ 10 = 5 or 50 ÷ 5 = 10

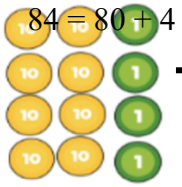
Base 10 – Fact Families

Concrete/Pictorial:

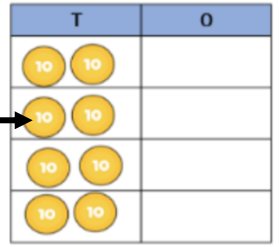
84 ÷ 4 = 21

Step 1: Build the number

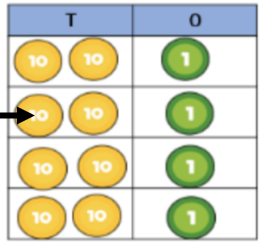
84 = 80 + 4



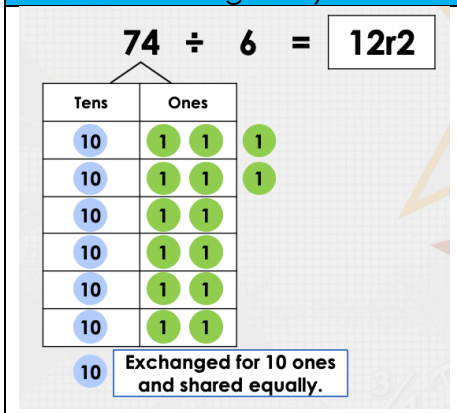
Step 2: Share the tens into 4 equal groups



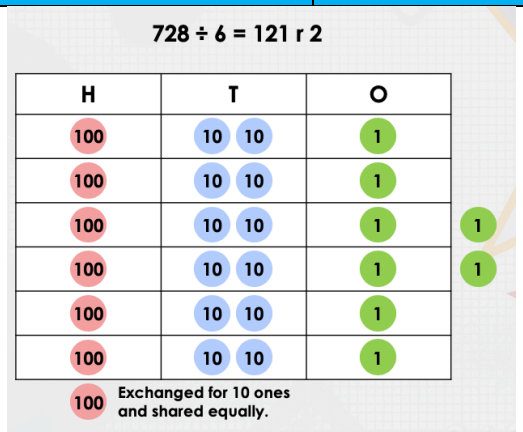
Step 3: Share the one into 4 equal groups



Place Value Counters – Sharing Equally (no exchanging)

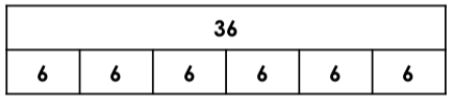


Place Value Counters (with exchanging)



Place Value Counters (with exchanging)

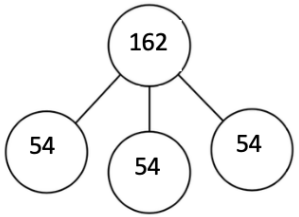
Pictorial Representation – Abstract Calculation



36 **shared equally** between 6 is 6.

36 ÷ 6 = 6

Bar Model



162 **shared equally** between 3 is 54.

162 ÷ 3 = 54

Part Whole Model

Our Progression in Calculation - Division

Year 5 – divide numbers up to **4 digits by a one-digit number** using the **formal written method** of short division and interpret remainders appropriately for the context

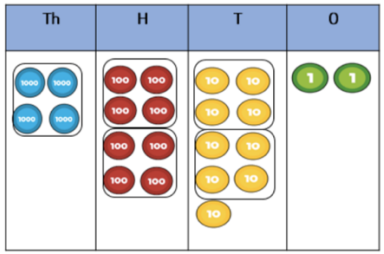
Concrete/Pictorial:

Abstract:

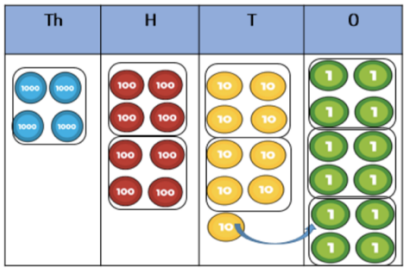
4892 ÷ 4 = 1223

Step 1: Build the number and group equally in 4

4892 = 4000 + 800 + 90 + 2



Step 2: Exchange the remaining ten for ten, ones. Then, group remaining ones equally in 4



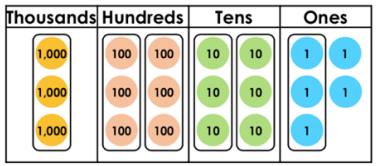
Step 3: Write as a formal written method

$$\begin{array}{r} 1223 \\ 4\overline{)4892^{1}} \end{array}$$

Place value counters progressing to formal written method

Concrete/Pictorial:

3665 ÷ 3 =

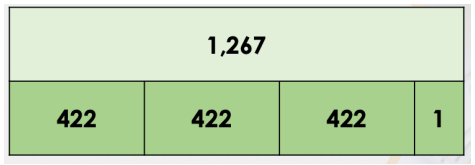


$$\begin{array}{r} 1221\ r2 \\ 3\overline{)3665} \end{array}$$

Abstract Calculation: 3665 ÷ 3 = 1221 r 2

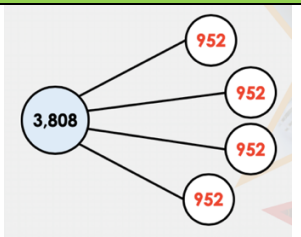
Place value counters - formal written method with remainers

Pictorial Representation – Abstract Calculation



Abstract: 1267 ÷ 3 = 422 r 1

Bar model



3808 ÷ 4 = 952

Part Whole model

Our Progression in Calculation - Division

Year 6 – divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division and of short division

Abstract Calculation:

2649 ÷ 8 = 331 r 1

	0	3	3	1	r1
8	2	$^{2}6$	$^{2}4$	9	

Abstract Calculation: 364 ÷ 14 = 26

Step 1: Write key number facts for times table.

Key facts

2 x 1 4 = 2 8
5 x 1 4 = 7 0
1 0 x 1 4 = 1 4 0
2 0 x 1 4 = 2 8 0

		0	2	6	
1	4	3	6	4	
	–	1	4	0	(x10)
		$^{1}2$	$^{1}2$	4	
	–	1	4	0	(x10)
		0	8	4	
			8	4	(x6)
				0	

Step 2: Multiply the divisor (e.g. 14 x 10).
Step 3: Record the product beneath the dividend.
Step 4: Subtract the product

Step 5: Repeat the process

Short Division (with exchanging and remainders)

Long Division

Pictorial Representation – Abstract

432 ÷ 15 becomes

		2	8	r 12
1	5	4	3	2
		3	0	0
		1	3	2
		1	2	0
			1	2

Answer: 28 remainder 12

432 ÷ 15 becomes

		2	8	
1	5	4	3	2
		3	0	0
		1	3	2
		1	2	0
			1	2

15×20
15×8

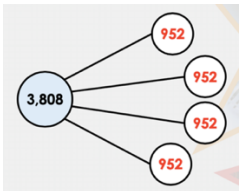
$\frac{12}{15} = \frac{4}{5}$

Answer: $28\frac{4}{5}$

432 ÷ 15 becomes

		2	8 ·	8
1	5	4	3	2 · 0
		3	0	↓
		1	3	2
		1	2	0
			1	2 0
			1	2 0
				0

Answer: 28·8



3808 ÷ 4 = 952

34 567			
11 522	11 522	11 522	1

Abstract:
34 567 ÷ 3 = 11 522 r1

Interpreting Remainders: Fractions and Decimals

Part Whole

Bar Model



Our Progression in Mathematical Vocabulary

NUMBER: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

NUMBER VOCABULARY PROGRESSION		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
	Place Value	ones/tens/digit the same number as as many as more/larger/bigger/greater fewer/smaller/less most/biggest/larges/greatest compare/order first, second, third... last/last but one before/after/next/between	equal to half-way between above/below one more/ten more one less/ten less	place value stands for represents exchange	one hundred more one hundred less	one thousand more one thousand less		
	Number	zero, one, two..twenty number How many ...? count (up) to, count on (from, to), count back (from, to) is the same as more/less few	twenty-one - one hundred numeral forwards/backwards odd/even equal to equivalent to most/least multiple of	two hundred - one thousand Tally Sequence/Continue Predict Rule > Greater than < Less than	Factor of Relationship Roman Numerals	ten thousand - hundred thousand - million next consecutive integer positive/negative above/below zero negative numbers	factor pair ≥ greater than/equal to ≤ less than/equal to formula divisibility square number prime number ascending/ descending order	factorise prime factor digit total

Our Progression in Mathematical Vocabulary

NUMBER VOCABULARY PROGRESSION		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
	Addition	add/more/and make/sum/total altogether One more, two more ...	addition near double equals is the same as number bonds/pairs ten more	one hundred more number facts tens boundary	Hundreds boundary	inverse	Ones boundary Tenths boundary	
	Subtraction	How many more to make ..? How many more is..than.? Take away How many are left over? How many have gone? One less, two less…. How much less/fewer is ...?	half, halve subtract equals is the same as number bonds/pairs missing number ten more/less	one hundred more/less number facts tens boundary	Hundreds boundary	inverse	Ones boundary Tenths boundary	
	Multiplication	doubling number patterns	multiplication multiply multiplied by multiple grouping array	groups of times once, twice,... ten times repeated addition group in pairs/three/tens equal groups of row/column multiplication table multiplication/division fact	factor product	inverse square/squared cube/cubed		
	Division	sharing halving number patterns	division dividing grouping array	repeated addition divide/divide by share equally left/left over one/two/three/ten each group in pairs/three/tens equal groups of	factor product remainder	inverse square/squared cube/cubed		



Our Progression in Mathematical Vocabulary

		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
NUMBER	Fractions	parts of a whole half quarter	fraction equal part equal grouping equal sharing one of two equal parts one of four equal parts	equivalent fraction mixed number numerator/denominator two halves two quarters/three quarters one third/two thirds one of three equal parts	sixths sevenths eighths tenths	hundredths decimal decimal fraction decimal point decimal place decimal equivalent proportion	proper fraction. improper fraction equivalent. reduced to cancel thousandths for every percentage, per cent (%)	ratio
	Algebra							formula formulae equation unknown variable

MEASURE: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.



Our Progression in Mathematical Vocabulary

MEASURE VOCABULARY PROGRESSION		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
	Length	metre length height width/depth long/short tall/high/low wide/narrow thick/thin longer/shorter, taller/higher longest/shortest tallest/highest	centimetre ruler metre stick	Further furthest tape measure	millimetre kilometre mile distance apart/between to/from perimeter	breadth edge area covers square centimetre cm^2	square metre (m^2) square millimetre (mm^2)	yard foot feet. inch inches circumference
	Weight	weigh balances heavy/light heavier than lighter than heaviest/lightest scales	kilogram half kilogram	gram		Mass: big/bigger/small smaller weight: heavy/light/ weight: heavier/lighter weight: heaviest/lightest		tonne pound ounce
	Capacity	full empty half full container holds	litre half litre capacity. volume more than/less than quarter full	millilitre contains		Measuring cylinder	pint gallon	centilitre. cubic centimetres(cm^3), cubic metres (m^3), cubic millimetres (mm^3), cubic kilometres (km^3)



Our Progression in Mathematical Vocabulary

MEASURE VOCABULARY PROGRESSION		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
	Temp			temperature degree	centigrade			
	Money	money coin penny/pence/pound price/cost buy/sell spend/spent pay	change dear/costs more cheap/costs less cheaper costs the same as how much ...? how many ...? total	bought sold			discount currency	profit loss
	Time	time days of the week day/week birthday/holiday morning/afternoon/evening, night bedtime/dinner time/playtime today/yesterday/tomorrow before/after next/last now/soon early/late quick/quicker/quickest/quickly slow/slower/slowest/slowly old/older/oldest new/newer/newest takes longer/takes less time hour /o'clock/clock watch hands	weekend month/year months of the year seasons/date spring/summer/autumn/winter earlier/later midnight how long ago? how long will it be to ..? how long will it take to.? how often? always/never often/sometimes/usually once/twice half/quarter past quarter to clock face/hour/minute hand hours/minutes	Fortnight. 5/10/15..minutes past digital/analogue clock/watch timer seconds	century calendar earliest. latest a.m./p.m. Roman numerals 12-hour clock time 24-hour clock time	leap year century millennium noon date of birth timetable arrive. depart		Greenwich Mean Time. British Summer Time. Internation al Date Line



Our Progression in Mathematical Vocabulary

GEOMETRY: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

GEOMETRY VOCABULARY PROGRESSION		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
	Shape	shape pattern flat/curved/straight round hollow/solid make/build/draw size symmetrical pattern repeating pattern match corner/side rectangle square. circle triangle cube pyramid sphere	symmetry symmetrical pattern. point pointed cylinder cuboid	line symmetry surface circular rectangular triangular pentagon hexagon octagon	perimeter pentagonal hexagonal octagonal quadrilateral right-angled parallel perpendicular hemisphere prism. triangular prism	Angle/right-angled base/square-based reflect/reflection regular/irregular 2-D/two-dimensional oblong/rectilinear equilateral/isosceles/ scalene triangle heptagon parallelogram rhombus trapezium polygon 3-D three-dimensional spherical cylindrical tetrahedron polyhedron	Radius diameter congruent. axis of symmetry reflective symmetry x-axis/y-axis. quadrant octahedron	circumference concentric arc net intersecting intersection plane. kite dodecahedron



Our Progression in Mathematical Vocabulary

GEOMETRY VOCABULARY PROGRESSION		EYFS	KS1		KS2			
		YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
	Position/Direction	over/under/above/below top/bottom/side on/in/outside/inside/around in front/behind/front/back beside/next to/opposite apart/between middle/edge/corner direction left/right/up/down forwards/backwards sideways/across/next to close/near/far along/through to/from/towards/away from slide/roll/turn stretch/bend whole turn/half turn	underneath centre journey quarter turn, three- quarter turn	route higher/lower. clockwise. anti- clockwise. right angle. straight line	compass point north/south/east/west N/S/E/W horizontal/vertical diagonal angle ...is a greater angle than.... ....is a smaller angle than.... acute angle obtuse angle	north-east north-west south-east south- west NE/NW/SE/SW translate translation rotate rotation degree reflection ruler set square angle measurer compass	coordinate protractor	reflex angle
	Statistics	count sort group set list	table vote	Tally/graph block graph pictogram represent label/title most/least popular most/least common	chart bar chart frequency table Carroll diagram Venn diagram axis/axes	survey questionnaire data	data base bar line chart line graph maximum value outcome minimum value outcome	pie chart mean mode median statistics distribution