



DOVER COURT
INTERNATIONAL SCHOOL
SINGAPORE
A NORD ANGLIA EDUCATION SCHOOL

Maths

29th October 2019 | Teaching of Primary Maths



Meet the Team



Rachael Cox KS1
Maths Lead



Anna Vessey
Lower KS2 Maths



Ella Bashford
Upper KS2 Maths



Claire Garvey
EYFS Maths



Anne Richardson
Technology in Maths



Sophia Knight
Transitions &
Progression of skills

Objectives

How this morning will work – three stations



- To give an overview of how assessment informs teaching
- To share the reasons for our approach in mathematics
- To share the tools we use to deliver mathematics teaching



- To provide an overview of how skills are taught and deepened to secure understanding.
- To highlight misconceptions that can impact on the teaching of maths
- To provide activities to try at home to support the teaching of maths at DCIS.



The teaching of maths at DCIS



DCIS follow the National Curriculum (England)

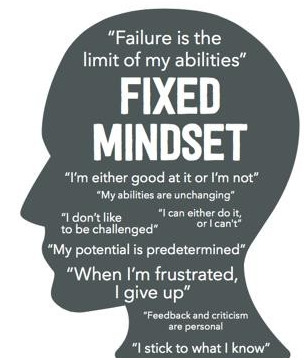
At DCIS, we teach the strategies and follow the guidance from the National Curriculum (England)

<https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4>

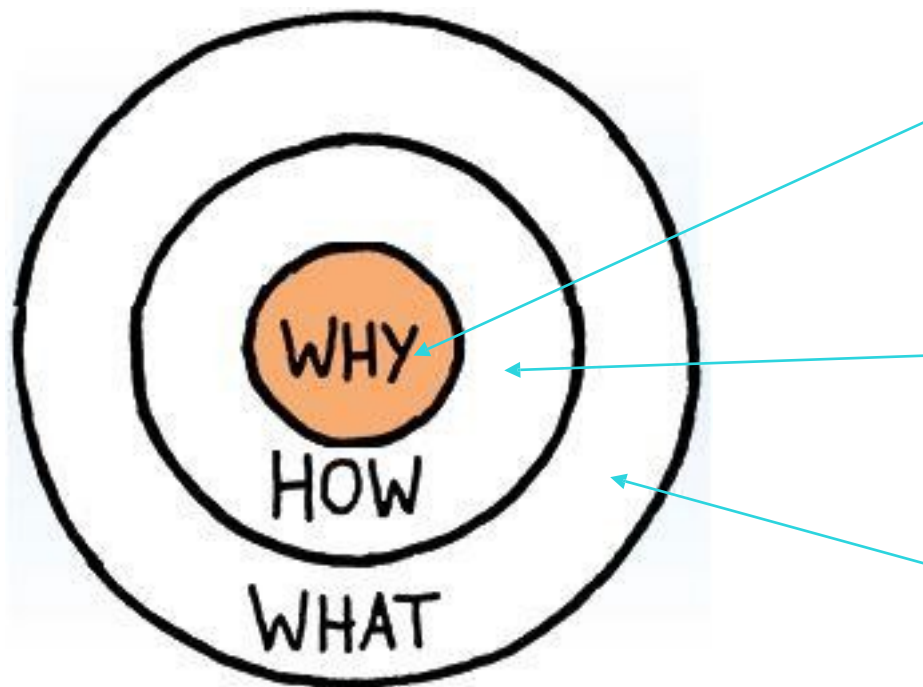
Tools & approaches we use to teach



- Modelling
- Mental Starters
- Practical resources
- Practice – Embed –Apply
- Differentiated and personalised
- Real life links
- Fun and engaging games
- Textbooks
- Extend and challenge
- Mastery
- Individual, paired and group activities
- Varied activities
- Creative
- Assessments
- Homework
- Technology
- STEAM



Maths – DCIS approach

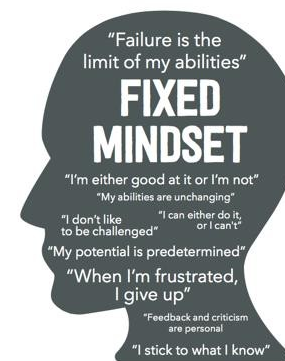
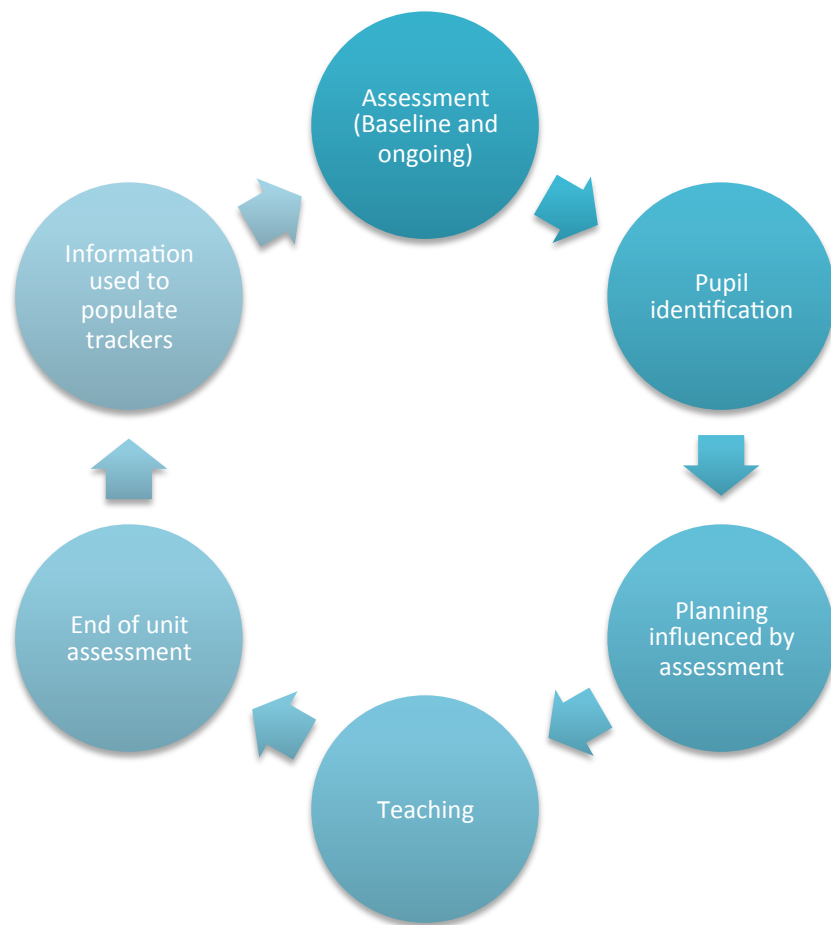


To ensure all pupils have the opportunity to make maximum progress in maths to secure skills and deepen their understanding.

To ensure the primary maths curriculum supports and challenges at all levels.

To ensure that all children make maximum progress based on the level they are working.

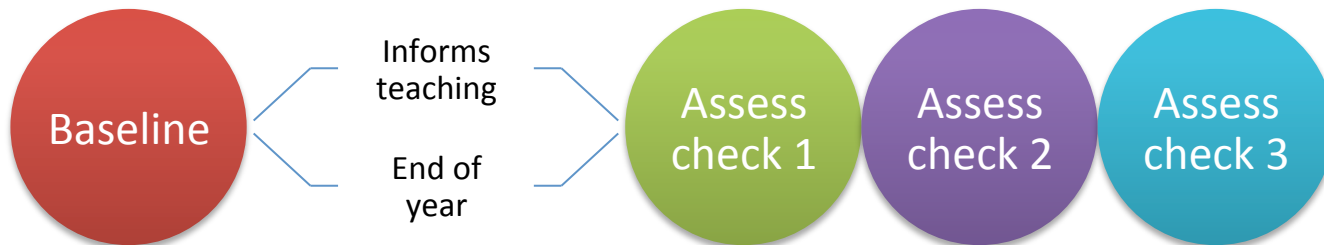
The cycle of teaching



Baseline and termly assessment



Assertive Mentoring



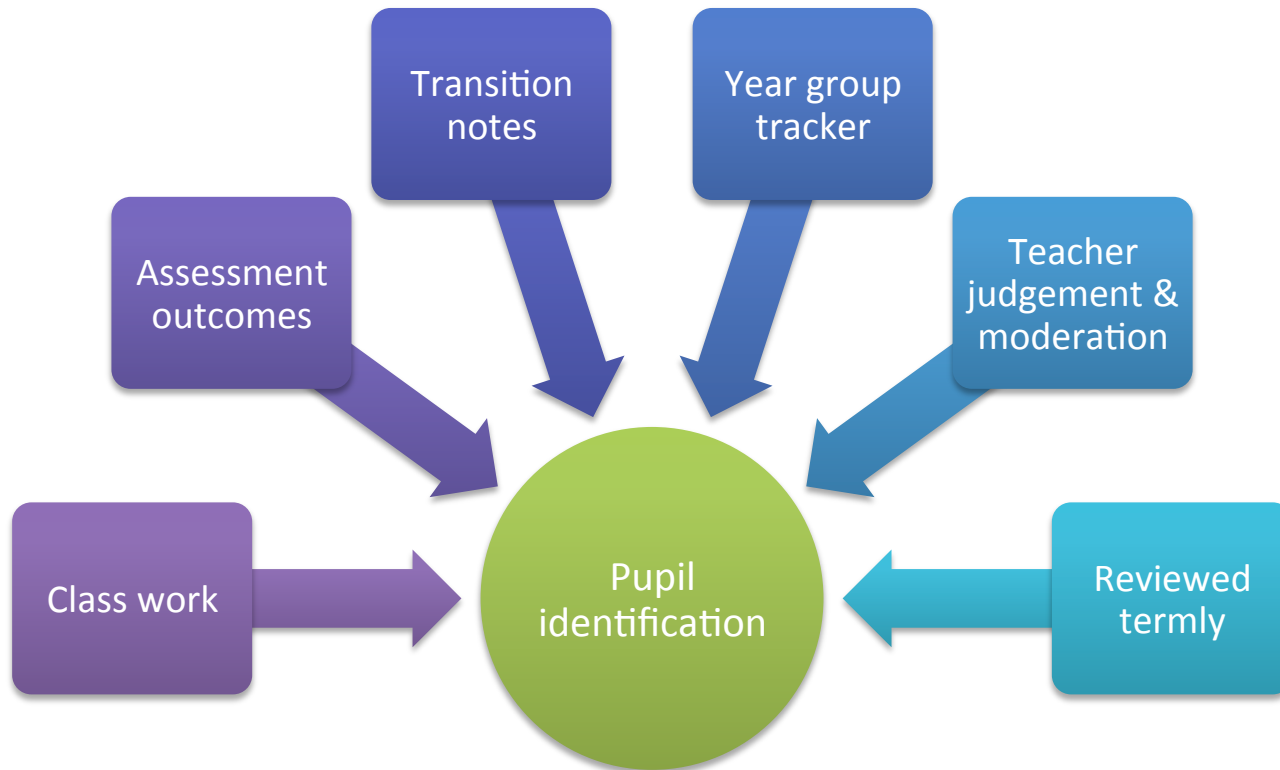
Why?

It is standardised assessment of pupils mathematical skills and knowledge. It assesses two dimensions of maths learning; mathematical content and application through reasoning and problem solving.

Why?

It is a child centred, collaborative approach based on dialogue about the child's present and future learning needs. It allows a child to understand their next steps and how to achieve these

Pupil Identification



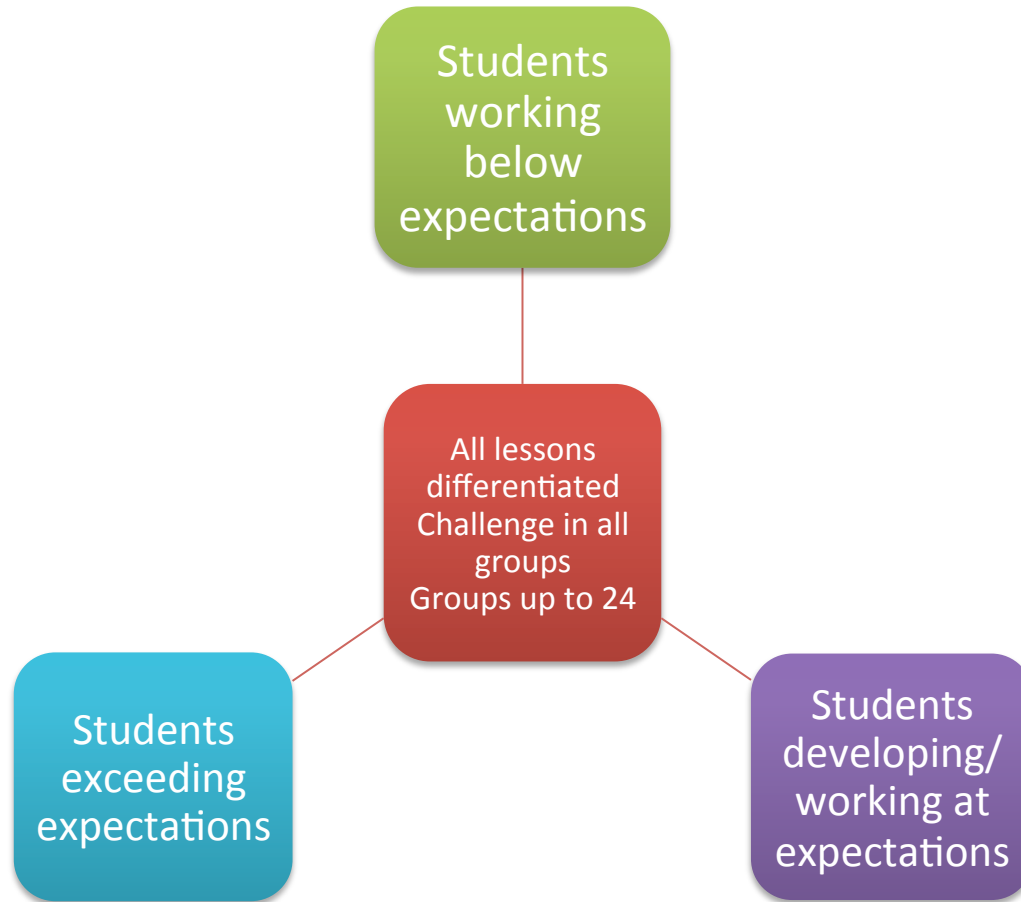
1 x 24

5 x 24

1 x 24

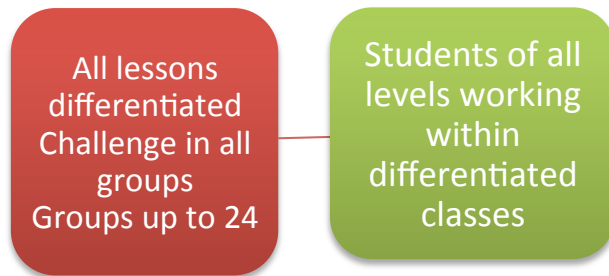
- All children accessing P1 curriculum.
- Pathways 3 children who are already integrating. (24)

Teaching groups

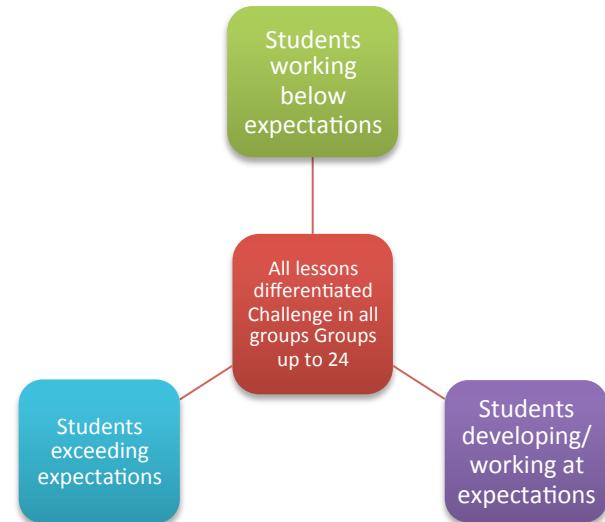


Why this approach?

From this...



To this...



Research informed – an action research study found significant gains

- **It focused on:**
 - the impact of partial grouping
 - coupled with team teaching – support in class/group
 - led by assessment
- **Versus:**
 - Mixed ability
 - Removal for support

The study researched two year groups (3 and 4)

The research study

- Took place over two terms during academic year 2017-18
- Involved over 300 students
- Children were assessed at the start, part way and end of the study
- Year 3 students were assigned according to working towards, meeting or exceeding year group expectations
- Year 3 students in the working towards group were supported by an additional teacher in a team teach arrangement
- Year 4 students were taught in fully mixed groups in line with existing practice at the time of the study.
- Year 4 students requiring support were removed for intervention to ensure a fair reflection of practice at the time

The findings

Year 4	Progress %
Towards (29)	8%
Meeting (59)	25%
Exceeding (31)	19%

Year 3	Progress %
Towards (22)	17%
Meeting (151)	33%
Exceeding (23)	29%

- Progress was greater in Year 3 for all groups when compared to Year 4.
- Progress for lowest achievers in Year 3 was double that seen in Year 4.
- Progress for the lowest and middle achievers was over 50% better in Year 3 compared to Year 4.
- Feedback from teachers supports the model of team teaching.

Procedural Understanding versus Conceptual Understanding

A procedure is a sequence of steps by which a frequently encountered problem may be solved. These 'routines' can be learned and children know that they will arrive at the right answer if they follow the prescribed steps.

Conceptual knowledge refers to an understanding of meaning. This is often indicated by a child's ability to explain the mathematics they are working with. They can justify their opinion and connect their understanding to prior learning.

Knowing that double $5 = 10$ is not the same thing as **understanding why** it is true.



How to avoid misconceptions:

- Follow the calculation policy
- Don't take shortcuts (*"To multiply by 10, just add a zero"*)
- Question your child (*Are you sure? How do you know? Can you prove it? Tell me why... Show me another way.*)
- Avoid memory aids until conceptual understanding is in place

$$\begin{array}{r} 38 \\ + 93 \\ \hline 131 \\ \hline 1 \end{array}$$

Butterfly Method
for Adding + Subtracting Fractions w/ unlike den.

$\frac{1}{3} + \frac{2}{4} = \frac{10}{12} = \frac{5}{6}$ (Reduce)

$\frac{2}{5} - \frac{1}{4} = \frac{3}{20}$ (Will not reduce)

What is mastery? What is it not?

Mastery is a deepening of your child's understanding of mathematical concepts. It is not **accelerated** learning.

Although it might appear as though your child is 'ready' to move on, it is important for them to have the opportunity to apply the skills learnt to a range of problems.

Maths mastery is accessible for everyone.

Concrete, Pictorial, Abstract

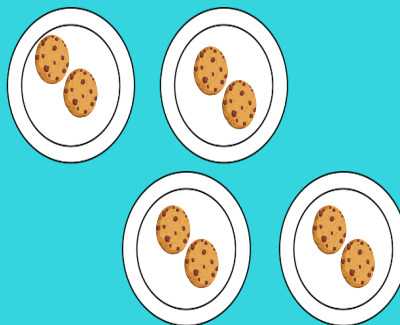
To avert any misconceptions developing, we ensure that the learning is embedded by using this strategy.

Concrete



Pictorial

$$8 \div 4 =$$

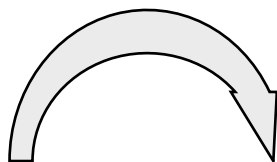


Abstract

$$8 \div 4 = 2$$

Using mental strategies, counting on fingers, remembering a times table song

Objective: I can add 3 one-digit numbers by recognising number bonds/near bonds.



$$8 + 4 + 2 = 14$$

Add these one-digit numbers together. If you can spot a number bond, use it to help you calculate.

This task is allowing the children to practise a new method after a skill has been introduced. The concept is in place but the learning is instructional and ‘on the surface’.

Maths Mastery – what does it look like?

KS1

Objective: I can add 3 one-digit numbers by recognising number bonds/near bonds.

Do you **agree** or **disagree** with Tom? Why? Prove it.



If you pick 3 one-digit numbers to add together, the biggest number you can make is 28.

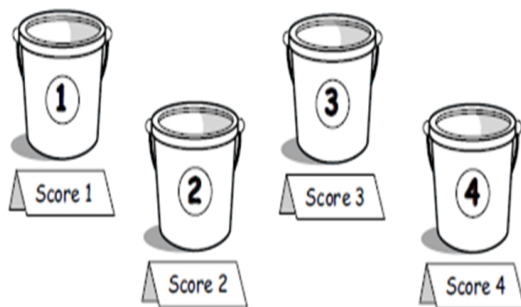
Children are developing their conceptual understanding. They can now use this new knowledge and skill and apply it in a purposeful context. This embeds the learning.

Maths Mastery – what does it look like?

KS1

Objective: I can add 3 one-digit numbers by recognising number bonds/near bonds.

Dan threw 3 bean-bags. Each bag went in a bucket. More than one bag can go in a bucket.



1. What is the highest score Dan can get?
2. Find three ways to score 6.
3. Find three ways to score 9.
4. What other scores can Dan get?

Children's understanding is challenged by a problem that requires the employment of other additional skills as well as the application of the objective in question.

Objective: I can add whole numbers with more than 4 digits, including using formal written methods

	3	7	8	5
+	5	1	3	4

Add these four digit numbers together using column method.

This task is allowing the children to practise a new method after a skill has been introduced. The concept is in place but the learning is instructional and ‘on the surface’.

Maths Mastery – what does it look like?

KS2

Objective: I can add whole numbers with more than 4 digits, including using formal written methods



Lottie	Sam	Izzy	Abdul	Ffion
32 357	30 541	34 057	31 647	33 587

These five children have been playing a times tables game. Here are their scores:

Who has a combined score of exactly 62,188?

Children are developing their conceptual understanding. They can now use this new knowledge and skill and apply it in a purposeful context. This embeds the learning.

Maths Mastery – what does it look like?

KS2

Objective: I can add whole numbers with more than 4 digits, including using formal written methods

Ravi has been practising his column addition but he has made some mistakes.

What has he done incorrectly?

Why was the mistake made? Can you explain this to Ravi? Write your response in your Maths book.

	3	2	5	6	1
+		7	6	3	5
	3	9	1	9	6

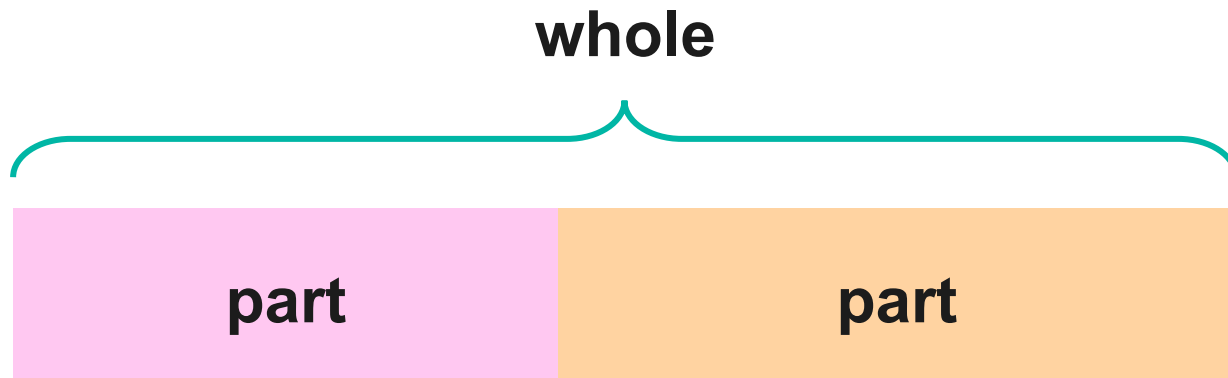
Finally, complete the calculation correctly.

Children's understanding is challenged by a problem that requires the employment of other additional skills as well as the application of the objective in question.

Bar Model Explained

A bar model can be defined as a pictorial representation of a number in the form of bars or boxes used to solve number problems.

Bar models help us to attain an understanding of how a problem needs to be solved and calculated.



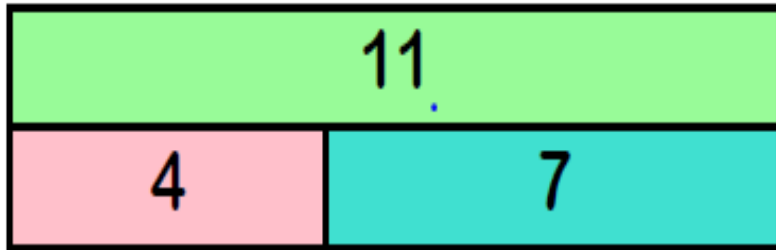
$$\text{part} + \text{part} = \text{whole}$$

$$\text{part} + \text{part} = \text{whole}$$

$$\text{whole} - \text{part} = \text{part}$$

$$\text{whole} - \text{part} = \text{part}$$

Bar Model Explained



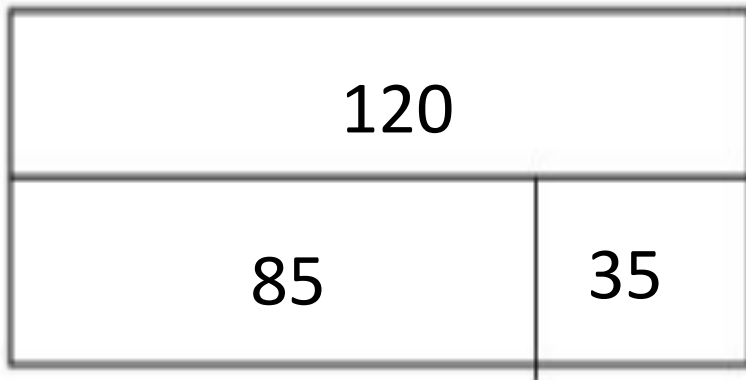
Fact Family

$4 + 7 = 11$	$11 - 4 = 7$
$7 + 4 = 11$	$11 - 7 = 4$

What information can we get from this bar model?

Bar Model Explained

Jenny has read 85 pages of her book. The book has 120 pages. How many pages does she have left to read?



We can use the information that we know and place it into the bar model to help us visualise the question.

$$120 - 85 = ?$$

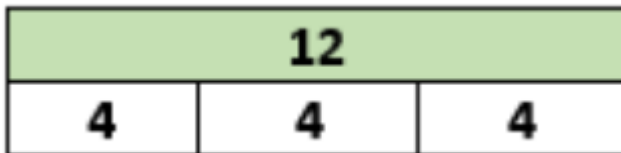
OR

$$85 + ? = 120$$

Bar Model Explained

A bar model can be defined as a pictorial representation of a number in the form of bars or boxes used to solve number problems.

Bar models help us to attain an understanding of how a problem needs to be solved and calculated.



$$\text{Part} \times \text{number of parts} = \text{whole}$$

$$\text{Number of parts} \times \text{part} = \text{whole}$$

$$\text{Whole} \div \text{part} = \text{number of parts}$$

$$\text{Whole} \div \text{number of parts} = \text{part}$$

Strategies to try at home

Whiteboards

- Quick fire quizzes
- Bar Model
- Odd and Even numbers
- Number bonds
- Design your own word problem!

$$345 + \square = 431$$

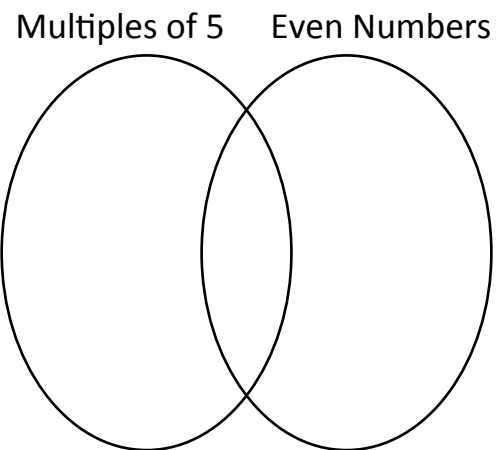


Can order from Amazon or make your own with a plain piece of paper and a plastic wallet

Strategies to try at home

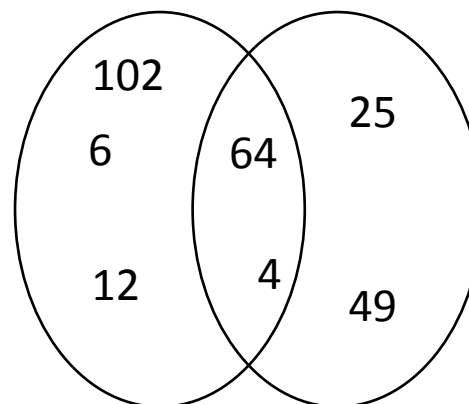
Sorting

2D	3D



	Odd	Not odd
Multiple of 3		
Not a multiple of 3		

What is my rule? (One to plan before!)



Fill these numbers into the Carroll diagram, then add your own numbers.

7, 16, 21, 12, 25, 150, 76, 0, 34, 2, 129, 27, 66, 240

Strategies to try at home

Post-it notes!



Ordering

- Write down a range of numbers/fractions/decimals
- Ask your child to order the numbers from smallest to largest

What is my symbol?

12  6  2  36

Number Families

Fact Families	
$7 + 3 = 10$	$10 - ? = 7$
$3 + ? = 10$	$10 - 7 = 3$
Complete the Fact Family	
	

Place Value

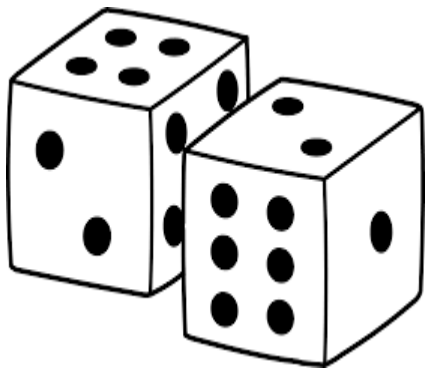
- How many combinations can you find?

Roll or bust

- Take turns to roll a dice
- Keep track of the score – cumulative
- If you roll a 6, you go bust! Back to 0.
- How high can you go?

Great for boosting mental calculation and mathematical fluency



Roll and Round!

- Roll 3 dice to build a 3 digit number
- Round it to the nearest 10/100

Place Value War

- Roll enough dice to build a 2/3/4 digit number
- Arrange the digits to make the biggest number possible
- Partner repeats
- Compare your numbers – largest wins!

Multiply me!

- Roll the dice
- Multiply the numbers

Strategies to try at home

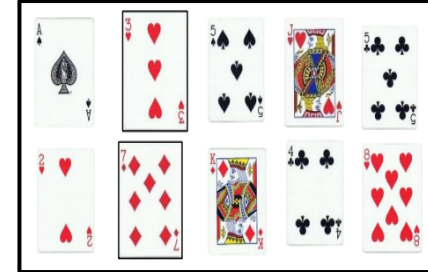
Pack of cards

Pairs

- Turn cards over
- Take turns to find pairs
- If you don't find a pair, place the cards back face down.
- Keep your pairs once you've found them!

I Spy!

- Place the cards face up
- Pick two cards next to each other
- "I spy, with my little eye, two cards that add upto 10!"
- "I spy, with my little eye, two cards that have a product of 40!"



Great for Working Memory!



Place Value War

- Turn over enough cards to build a 2/3/4 digit number
- Arrange the digits to make the biggest number possible
- Partner repeats
- Compare your numbers – largest wins! You get to keep all of the cards for that round!

Strategies to try at home

Spend time exploring the resources and tasks laid out on tables. We are available to answer any questions you might have.

Thank you.



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