Welcome

Maths for parents

The aim of this session

- What we have to do - our National Curriculum expectations for maths
- What we do - how we teach maths in school
- What you can do - strategies you may want to use when supporting your children at home

Quality First Education Trust

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Excellent education for all

Aims

Our aim is that all children and adults:

- Are safe
- Are excellent learners
- Have excellent social and emotional skills
- Fulfil their potential

<u>What, why, where, when and how…</u>

What approach we use?

Why we use it?

Where it happens?

When it happens?

How it happens?

<u>What we have to do!</u>

National Curriculum for maths

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National Curriculum - Maths

The **National Curriculum for Mathematics** aims to ensure that all pupils:

- become **fluent in the fundamentals of mathematics**, including through varied and frequent practice with **increasingly complex problems** over time, so that pupils **develop conceptual understanding** and the **ability to recall and apply knowledge** rapidly and accurately.

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National Curriculum - Maths

The **National Curriculum for Mathematics** aims to ensure that all pupils:

- **reason mathematically … developing an argument, justification or proof** using **mathematical language.**
- can **solve problems**…**routine and non-routine problems** … **persevering** in seeking solutions.
- The expectation is that the majority of pupils will move through the programmes of study at **broadly the same pace.**
- Pupils who grasp concepts rapidly should be **challenged** …**before any acceleration** through new content.
- Those who are not sufficiently fluent … should **consolidate their understanding**, … **through additional practice**, before moving on.

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National Curriculum - maths

The National Curriculum for Mathematics reflects the importance of spoken language and all pupils mastering maths:

- developing **mathematical vocabulary**
- presenting a **mathematical justification, argument or proof**
- **articulating** their thinking
- building secure foundations by using **discussion** to probe and remedy their misconceptions
- all pupils **mastering the content taught each year** and discourages the acceleration of pupils into content from subsequent years.

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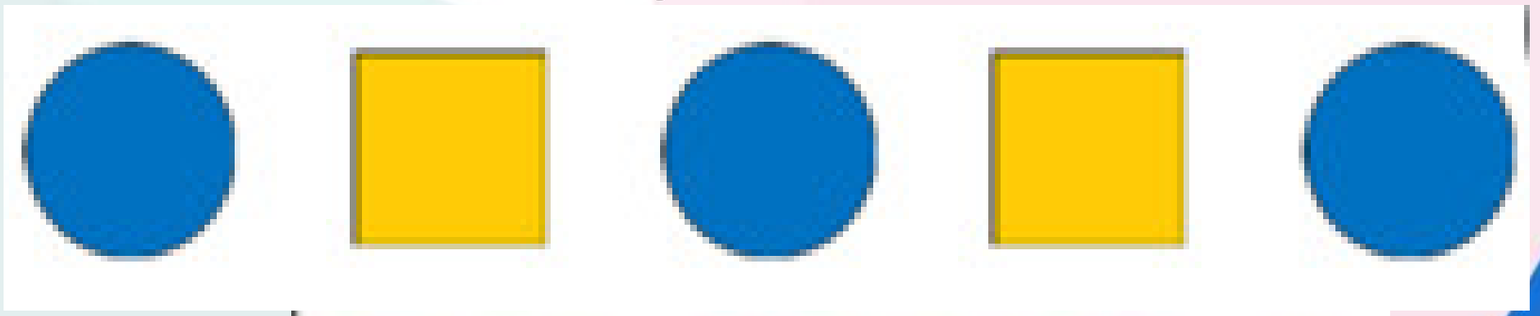
Maths in the early years

Children should be able to **count confidently,** develop a **deep understanding of the numbers to 10**, the relationships between them and the patterns within those numbers.

Develop a secure base of **knowledge and vocabulary** from which mastery of mathematics is built.



Maths in the early years

Develop **spatial reasoning** skills across all areas of mathematics including **shape, space and measures**.

Develop **positive attitudes** and interests in mathematics, look for patterns and relationships, spot connections, ‘have a go’, talk to adults and peers about what they notice and not be afraid to make mistakes.

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Key stage 1

Pupils develop **confidence and mental fluency** with whole numbers, counting and place value.

Working with **numerals, words and the four operations**, including practical resources [for example, concrete objects and measuring tools].

Develop ability to recognise, describe, draw, compare and sort different **shapes and use the related vocabulary**.

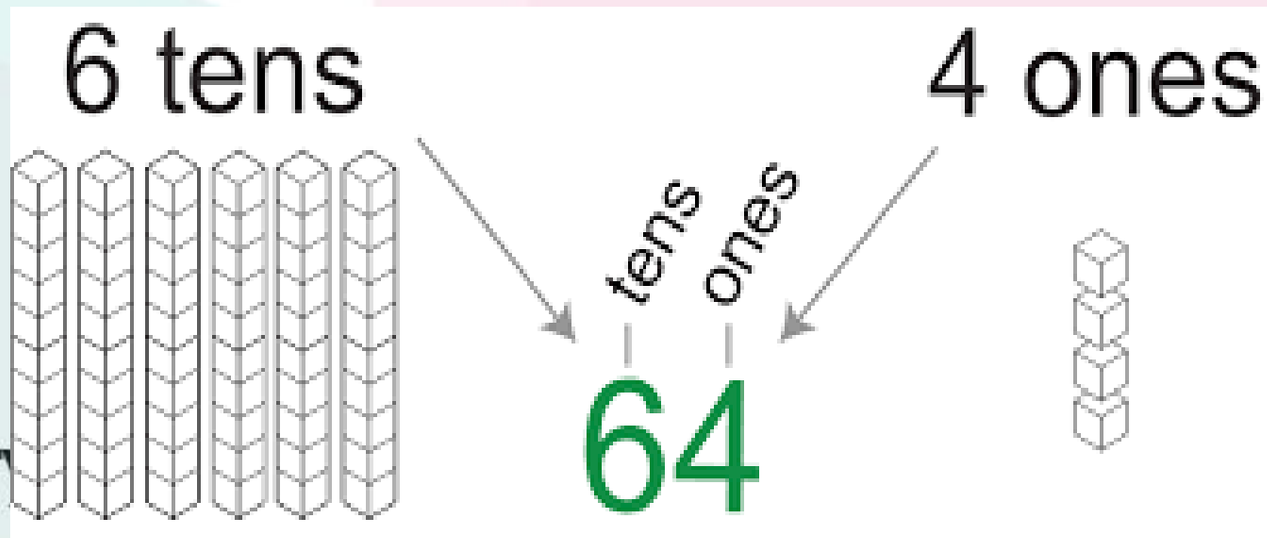
Describe and compare different quantities such as **length, mass, capacity/volume, time and money**.

Key stage 1

By the end of year 2, pupils should know the **number bonds to 20** (the pairs of numbers that make 20)

Be precise in using and understanding **place value**.

Read and spell **mathematical vocabulary**, at a level consistent with their increasing word reading and spelling knowledge at Key stage 1.



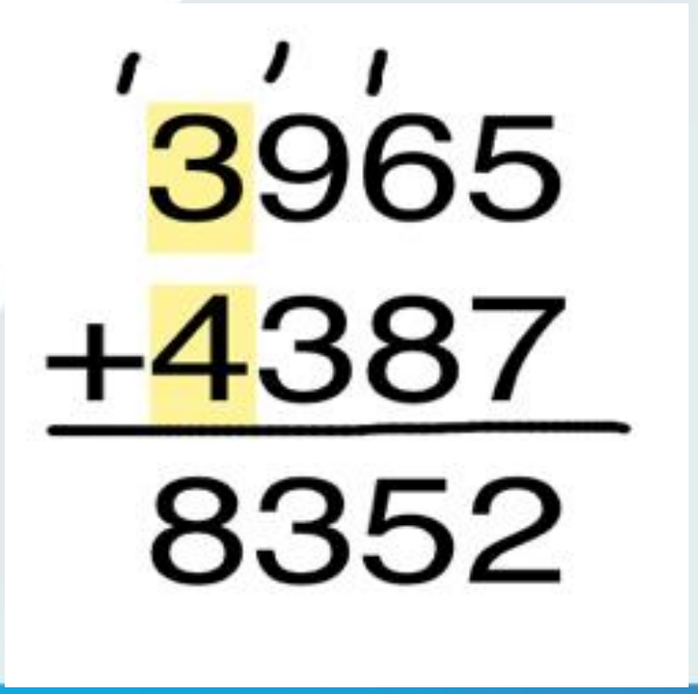
Lower Key Stage 2

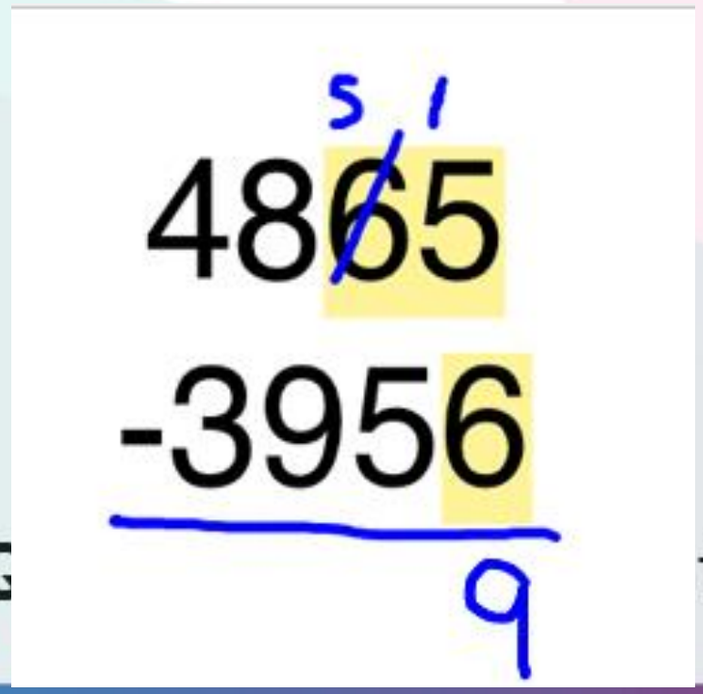
- Develop ability to **solve a range of problems**, including with **simple fractions** and **decimal place value**.
- Increasing accurate and develop mathematical reasoning to **analyse shapes and their properties**, and confidently describe the relationships between them.
- **Use measuring instruments with accuracy** and make connections between measure and number.

Lower Key Stage 2

- Pupils become increasingly fluent with whole numbers and **the four operations,** including number facts and the **concept of place value**.

- Pupils **develop efficient written and mental methods** and perform calculations accurately with increasingly large whole numbers.





Lower Key Stage 2

- By the end of year 4, pupils should have memorised their **multiplication tables**, and associated division facts, up to and including the 12 x tables (They are tested! MTC, national tables test in June)

- Show precision and fluency in work

- Read and spell **mathematical vocabulary** correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

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Upper Key Stage 2

- Pupils extend their understanding of the number system and **place value** to include larger integers (*whole numbers*)

- Develop the connections that pupils make between **multiplication and division with fractions, decimals, percentages and ratio**.

Ratio	Decimal	Percent
$\frac{3}{10} = \frac{30}{100}$	0.30	30%
$\frac{1}{2} = \frac{50}{100}$	0.50	50%
$\frac{3}{4} = \frac{75}{100}$	0.75	75%

Upper Key Stage 2

- Develop ability to solve a wider range of problems, including **complex problems**.
- Pupils are introduced to the **language of algebra** as a means for solving a variety of problems.
- Pupils **classify shapes with increasingly complex geometric properties** and that they learn the vocabulary they need to describe them.

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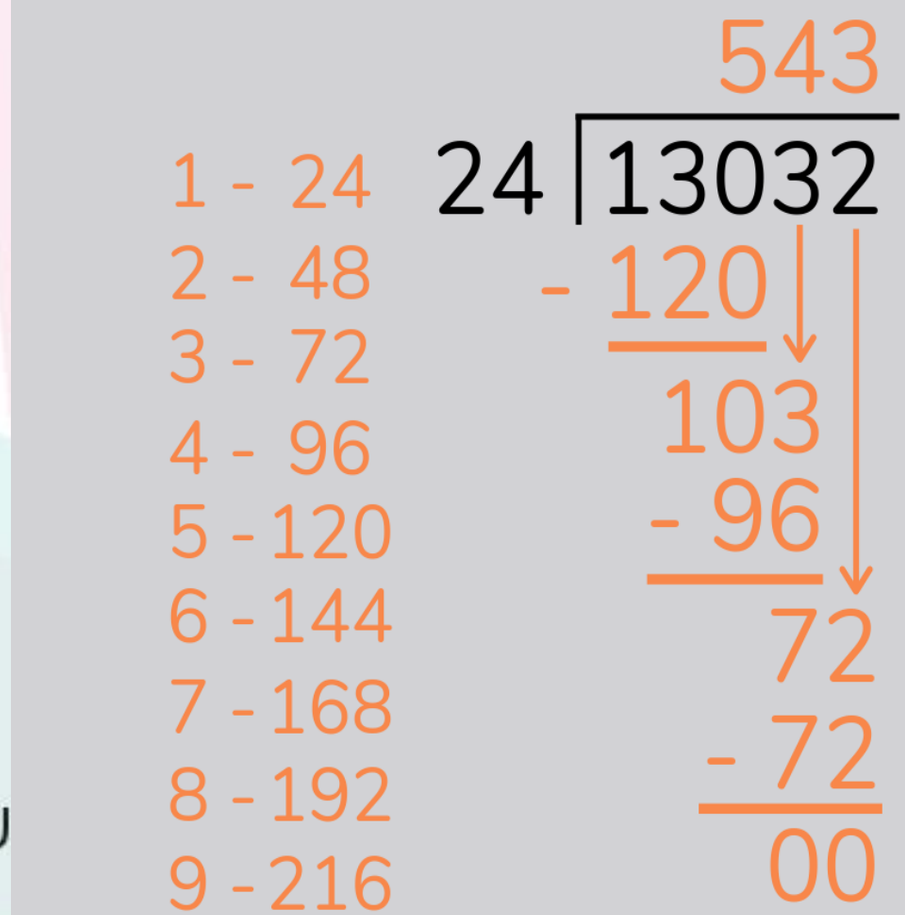
Upper Key Stage 2

- By the end of year 6, pupils should be **fluent in written methods for all four operations**, including long multiplication and division, and in **working with fractions, decimals and percentages**

- Pupils should read, spell and pronounce **mathematical vocabulary** correctly.



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<u>What we do!</u>

How we teach ‘our’ maths

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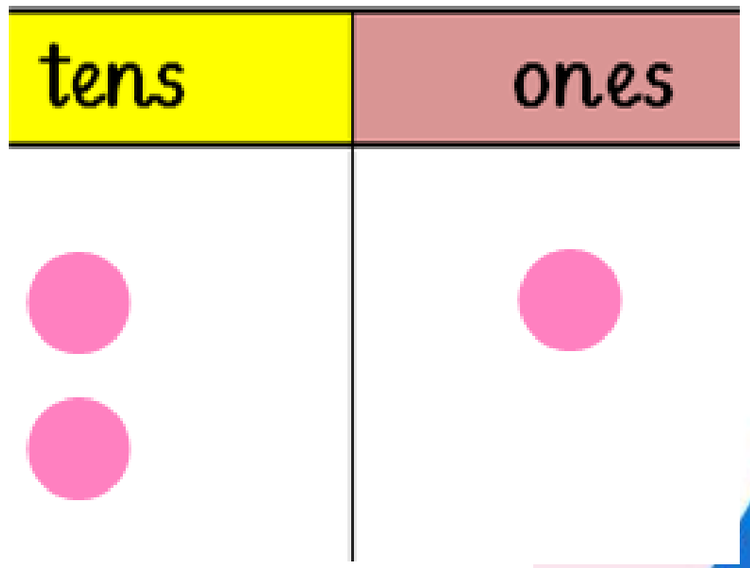
WHAT?

- Singapore style mastery approach to maths teaching
- Problem solving in a real-life context
- Concrete-Pictorial–Abstract approach
- Textbooks (and workbooks)



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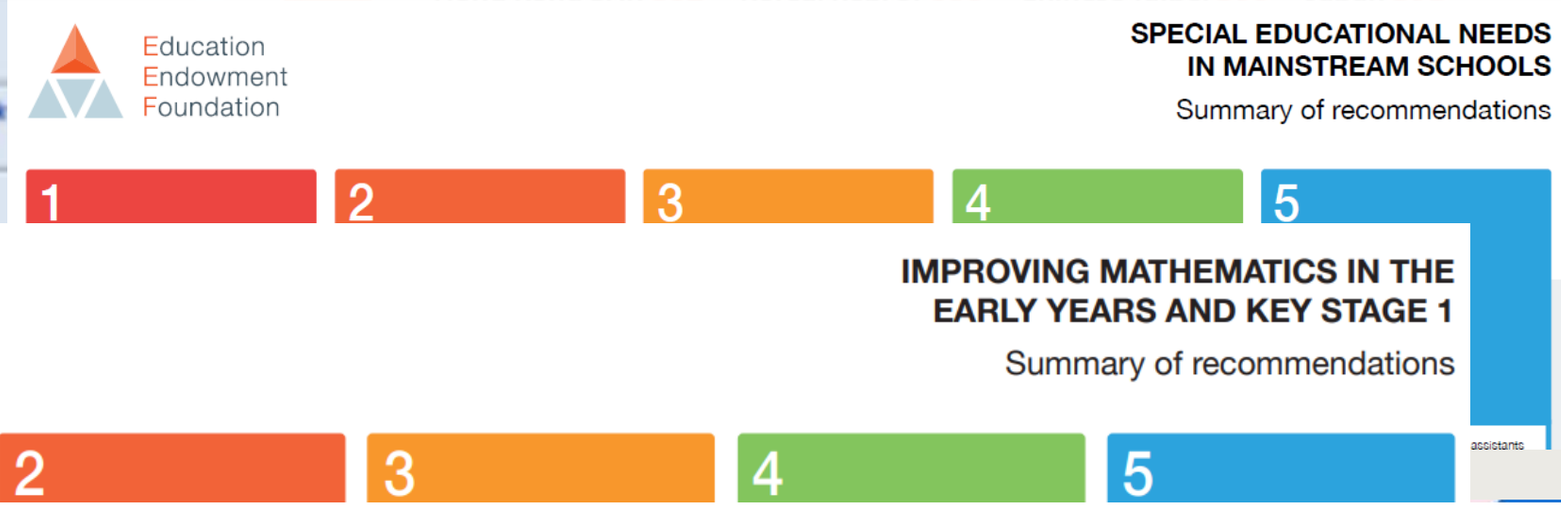
Why ‘Singapore’ style maths?

- PISA results (OECD) and TIMSS scores
- EEF recommendations (Sutton Trust)



Explore

Problem solving in a real-life context.

How can Elliott put the flowers equally into 2 vases?

Concrete-pictorial-abstract approach

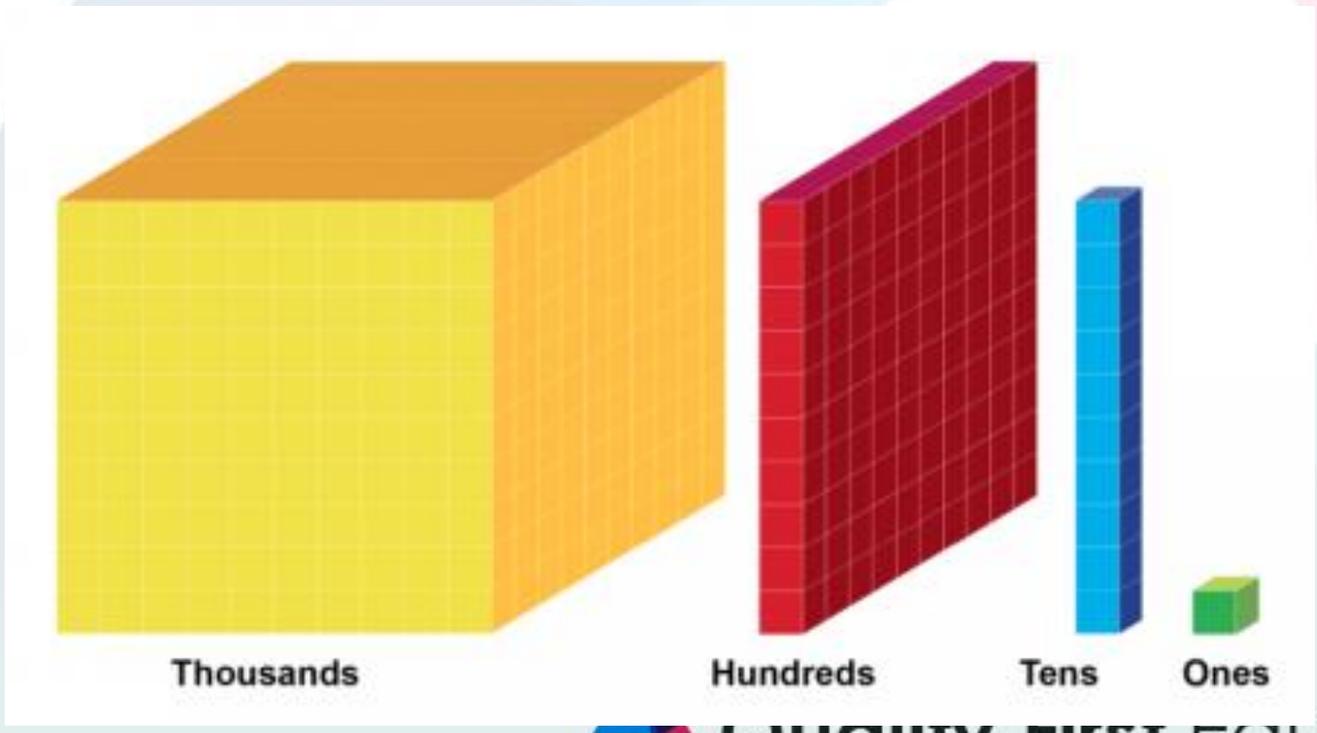
Concrete – The DOING stage

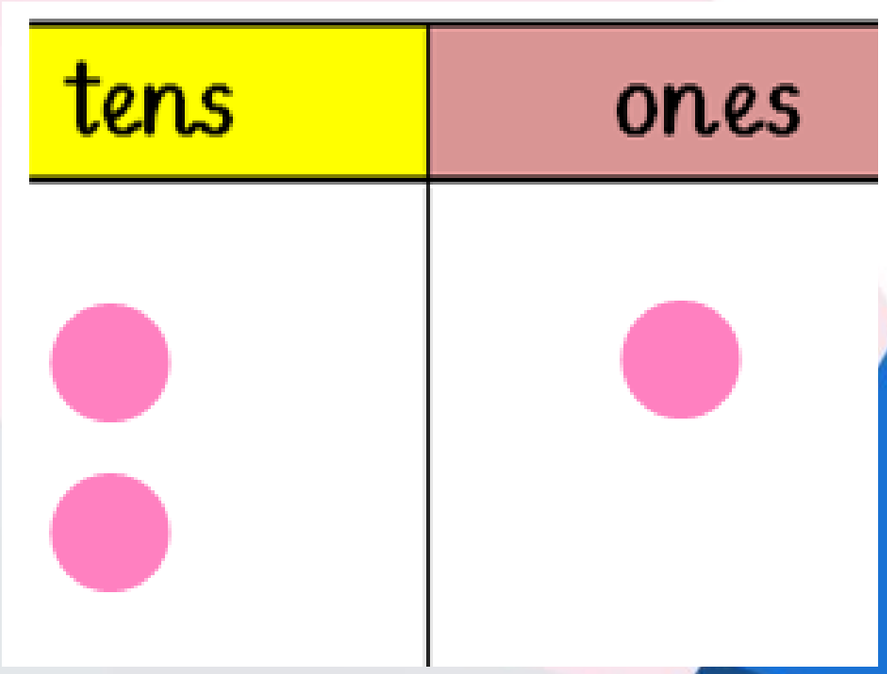
The first introduction to an idea or a skill is by acting it out with real objects.
This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

Concrete-pictorial-abstract approach

Pictorial – The SEEING stage

When our children understand their hands-on experiences, have performed them they can now relate them to representations, such as a diagram or picture of the problem.





Concrete-pictorial-abstract approach

Abstract – The SYMBOLIC Stage

A child is now capable of representing problems by using mathematical notation, for example:

21 + 9 = 30

2 tens and 1 one and 9 ones makes 3 tens

2 tens and 1 ten make 3 tens

30 = 20 and 1 + 9

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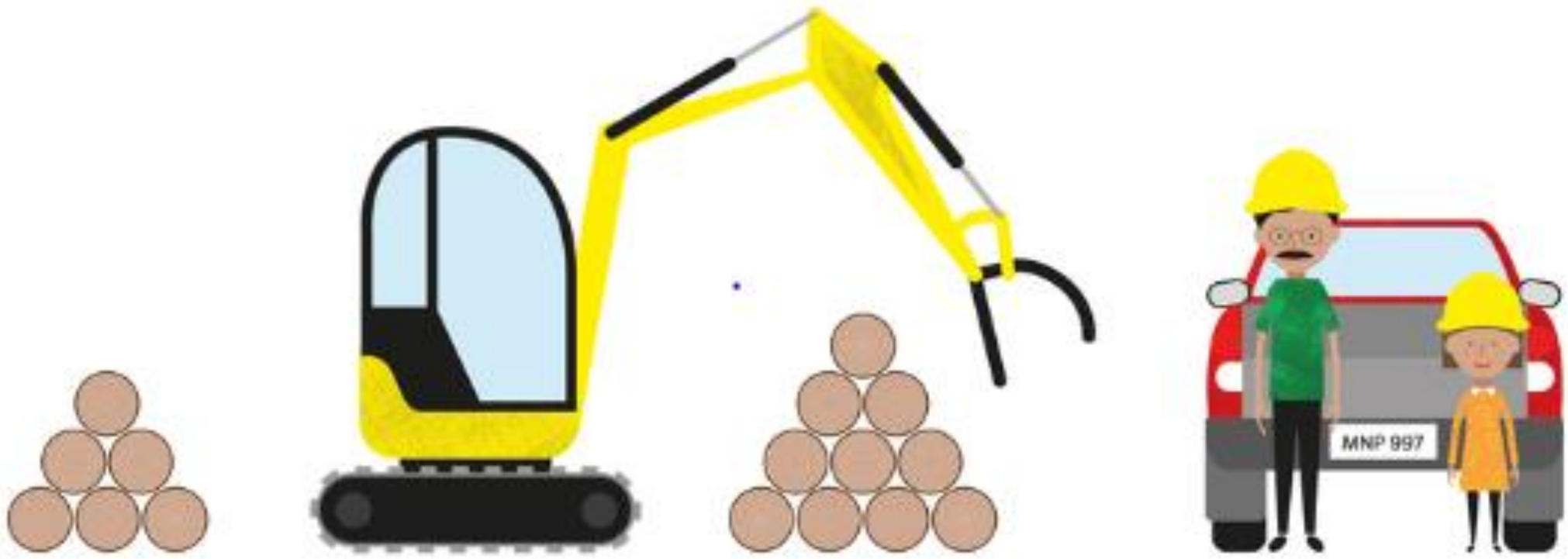
Our lesson structure – maths and…

Our maths lessons:

- **Factual fluency** - recall of existing knowledge, aiming for rapid recall of known facts
- **Trigger prior learning** – recap/linking previous knowledge
- **Anchor task** – class problem with a ‘live’ context
- **Guided practice** – paired practice using progressively harder questions
- **Independent** – series of questions moving into unfamiliar (+ consolidation or deepening tasks)

Anchor task – ‘Explore’
A problem that promotes discussion

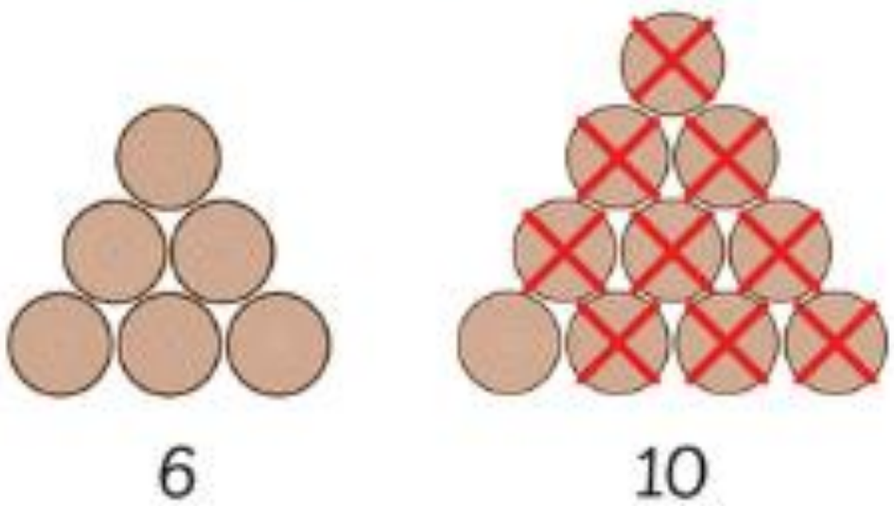
Explore



There are 16 logs altogether.
9 logs are taken away.
How many logs are left?

Master

16 − 9 = ☐

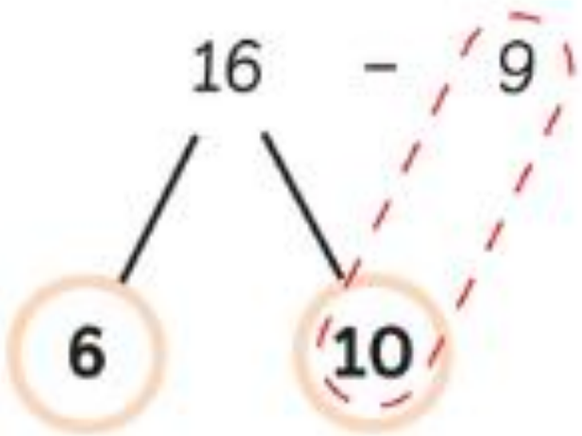


6

10

I can take away 9 logs from the stack of 10.

I then need to add to find how many are left.



10 − 9 = 1
1 + 6 = 7

16 − 9 = 7

There are 7 logs left.

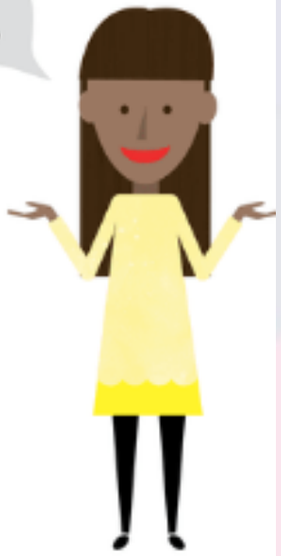
Guided Practice

Subtract.

1 (a) 14 − 6 = ☐

10 − 6 = ☐

☐ + 4 = ☐



(b) 13 − 7 = ☐

10 − 7 = ☐

☐ + 3 = ☐

(c) 11 − 5 = ☐

10 − 5 = ☐

2 (a) 12 − 4 = ☐ (b) 15 − 8 = ☐

Guided practice

A series of problems for children to work through in pairs.

Progression between questions.

Independent work
To assess children's understanding of the learnt concept.

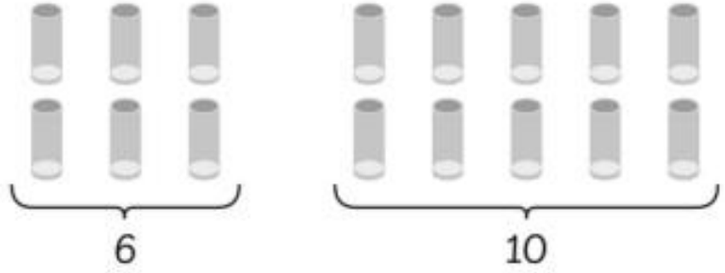
Worksheet 6

Subtract from 10


is subtracting from 10 first to help him complete subt

Can you help Charles by filling in the blanks?

1 (a)



6

(b)

(c)

2 (a) 14 − 6 = ☐

(b) 12 − 4 = ☐

(c) 16 − 9 = ☐

3 (a) 15 − 9 = ☐

(b) 16 − 8 = ☐

(c) 14 − 7 = ☐

(d) 12 − 7 = ☐

Where? When?

- Reception classes use the same approach in teaching maths in their new curriculum
- Years 1 to 6 use the Singapore structured textbook and workbook
- Daily maths lessons

Year 1		
Autumn term	**Spring term**	**Summer term**
Book A: Unit 1 - Numbers to 10	Unit 8 - Shapes and patterns	Unit 15 - Numbers to 100
Unit 2 - Number Bonds	Unit 9 - Length and height	Unit 16 - Time
Unit 3 - Addition within 10	**Book B:** Unit 10 - Numbers to 40	Unit 17 - Money
Unit 4 - Subtraction within 10	Unit 11 - Addition and subtraction word problems	Unit 18 - Volume and capacity
Unit 5 - Positions		
Unit 6 - Numbers to 20	Unit 12 - Multiplication	Unit 19 - Mass
Unit 7 - Addition and subtraction within 20	Unit 13 - Division	Unit 20 - Space
	Unit 14 - Fractions	

Year 2		
Autumn term	**Spring term**	**Summer term**
Book A: Unit 1 - Numbers to 100	Unit 6 – Mass	Unit 13 - Fractions (may start Spring term)
Unit 2 - Addition and subtraction	Unit 7 - Temperature	Unit 14 - Time
	Unit 8 - Picture graphs	Consolidation: Shape, time and money
Unit 3 - Multiplication 2, 5 & 10	**Book B:** Unit 9 – More word problems	
Unit 4 - Multiplication & division 2, 5 and 10	Unit 10 - Money	
Unit 5 – Length	Unit 11 - Two dimensional shapes	
Unit 6 – Mass (Continued in Autumn term)	Unit 12 - Three dimensional shapes	
	Book B: Unit 15 - Volume	
	Consolidation: Time	

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How?

Year 5 coverage overview

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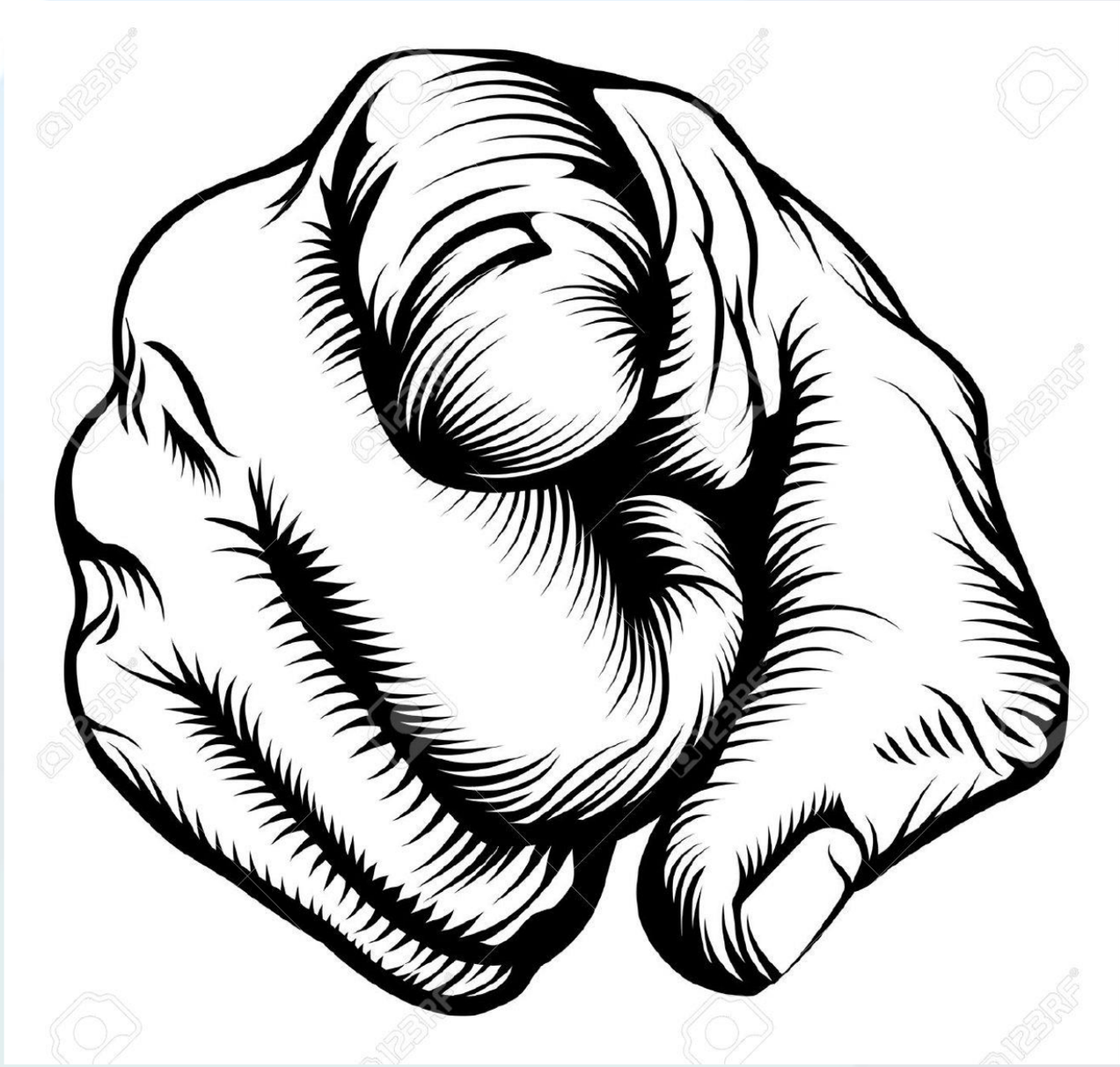
Autumn 1: 38 lessons				
1 Chapter 1: Numbers to 1 000 000				
INSET day	**INSET day**	**Lesson 1: Reading & Writing Numbers to 100 000** To read and represent numbers to 100 000. *NB: Revisit expectations for consolidation/ deepening tasks*	**Lesson 2: Reading & Writing Numbers to 1 000 000** To read and represent numbers to 1 000 000.	**Lesson 3: Reading & Writing Numbers to 1 000 000** To read and represent numbers to 1 000 000 using number discs.
2 Chapter 1: Numbers to 1 000 000				
Lesson 4: Comparing Numbers to 1 000 000 To compare numbers to 1 000 000 using place value.	**Lesson 5: Comparing Numbers to 1 000 000** To compare numbers to 1 000 000 using place value.	**Lesson 6: Comparing Numbers to 1 000 000** To compare numbers to 1 000 000 using pictorial representations and proportionality.	**Lesson 7: Comparing Numbers to 1 000 000** To compare numbers to 1 000 000 from pi0ctorial representations, using lists and number lines.	**Lesson 8: Making Number Patterns** To make and identify patterns in numbers using knowledge of place value.
3 Chapter 1: Numbers to 1 000 000 *(FF: include rounding to the nearest 10, 100, 1000)*				
Lesson 9: Making Number Patterns To make number patterns that decrease in multiples of 10 000 or 100 000.	**Lesson 10 over 2 days: Rounding Numbers to the Nearest 10 000** To round numbers to the nearest 10 000 using number lines & bar graphs.	**Lesson 10 over 2 days: Rounding Numbers**	**Lesson 11 over 2 days: Rounding Numbers to the Nearest 100 000** To round numbers to the nearest 100 000 using number lines & bar graphs. *NB: follow up/embed with factual fluency*	**Lesson 11 over 2 days: Rounding Numbers**
4 Chapter 1: Numbers to 1 000 000			**Ch. 2: Whole Numbers: Addition & Subtraction**	
Lesson 12: Rounding Numbers To round numbers to the nearest 100, 1000, 10 000 and 100 000 using number lines.	**Consolidation day:** To be used if lessons take longer than expected or a topic needs to be revisited. *(NB: Model expectations for deepening tasks)*	**Chapter 1 review and consolidation:** To practise various concepts covered in the chapter.	**Lesson 1: Counting On to Add** To add using the 'counting on' strategy with concrete materials and number lines.	**Lesson 2: Adding within 1 000 000** To add numbers within 1 000 000 using rounding.
5 Chapter 2: Whole Numbers: Addition and Subtraction *(FF: include x/÷ by 10, 100, 1000)*				
Lesson 3: Adding within 1 000 000 To add numbers within 1 000 000 using the column method of addition.	**Lesson 4: Adding within 1 000 000** To consolidate and refine addition skills and place-value knowledge to solve addition problems.	**Lesson 5: Counting Backwards to Subtract** To subtract using the 'counting backwards' strategy with concrete materials.	**Lesson 6: Subtracting within 1 000 000** To subtract using the column method and number discs using numbers to 1 000 000.	**Lesson 7: Subtracting within 1 000 000** To subtract using the column method and number discs using numbers to 1 000 000.
6 Chapter 2: Whole Numbers: Addition and Subtraction *(FF: include inverse operations)*				

What can you do?



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Supporting your children – keep it real!

- Take real-life situations and look for patterns, connections and things that can be matched.
- Find opportunities to solve maths problems everywhere – shopping, jobs, weighing, estimating costs, looking at height, length, shape.
- Play games that involve numbers/counting.
- Show them that maths is fun and isn't only reserved for the classroom.

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Rulers 60p
Pens 85p
Paper £3.50
Notebooks £1.75
Emma buys 5 notebooks and 7 pens.
How much change would Emma get from a £20 note?

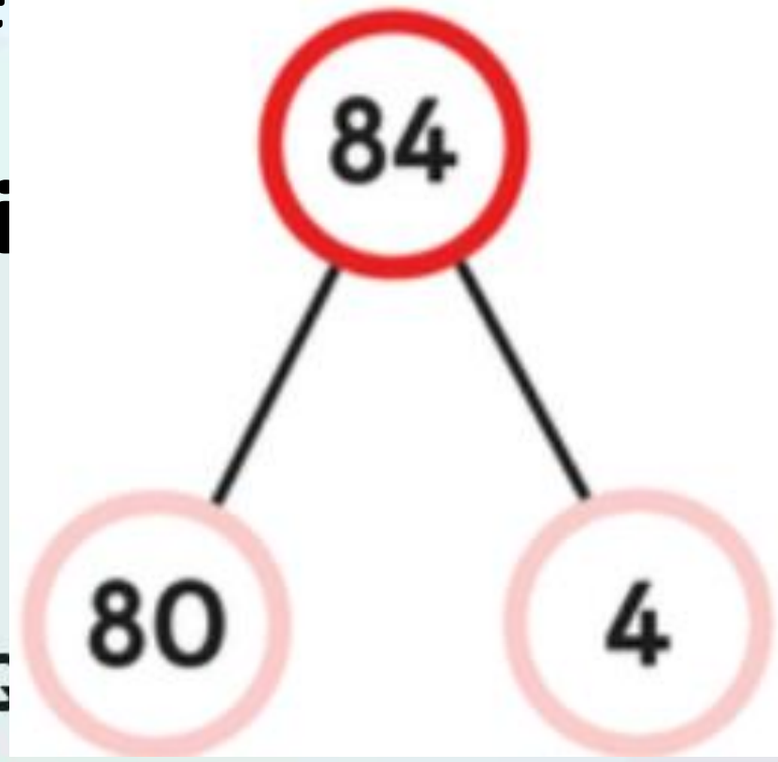
Linking maths at home and school

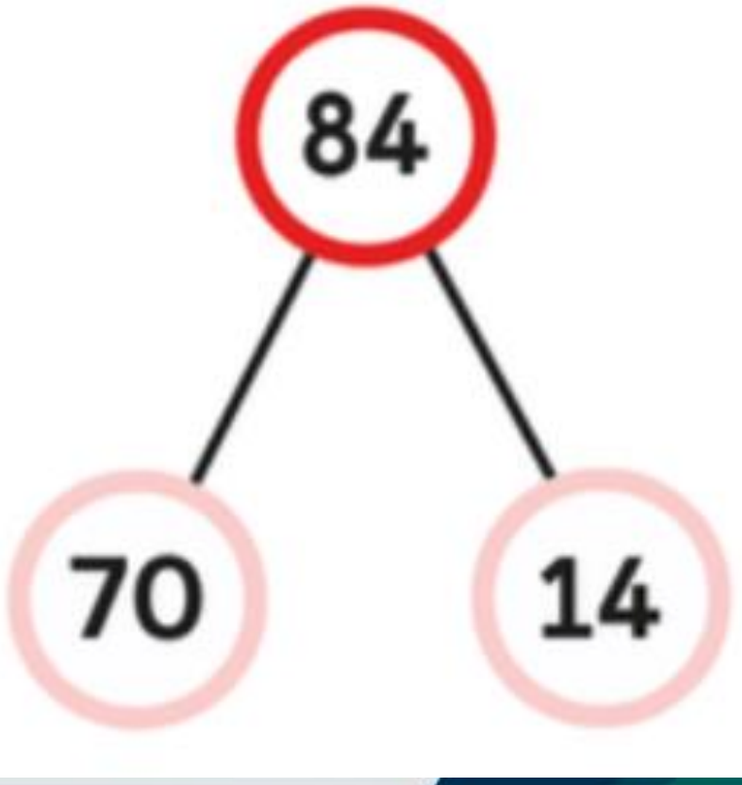
In school: How many ways can we partition the number 674?

- 674 is made of 6 hundreds, 7 tens and 4 ones
- 674 is also made of 67 tens and 4 ones
- 674 is also made of 6 hundreds and 74 ones
- 674 is also made

AT HOME: What di

- **867**
- **7104**
- **10003**

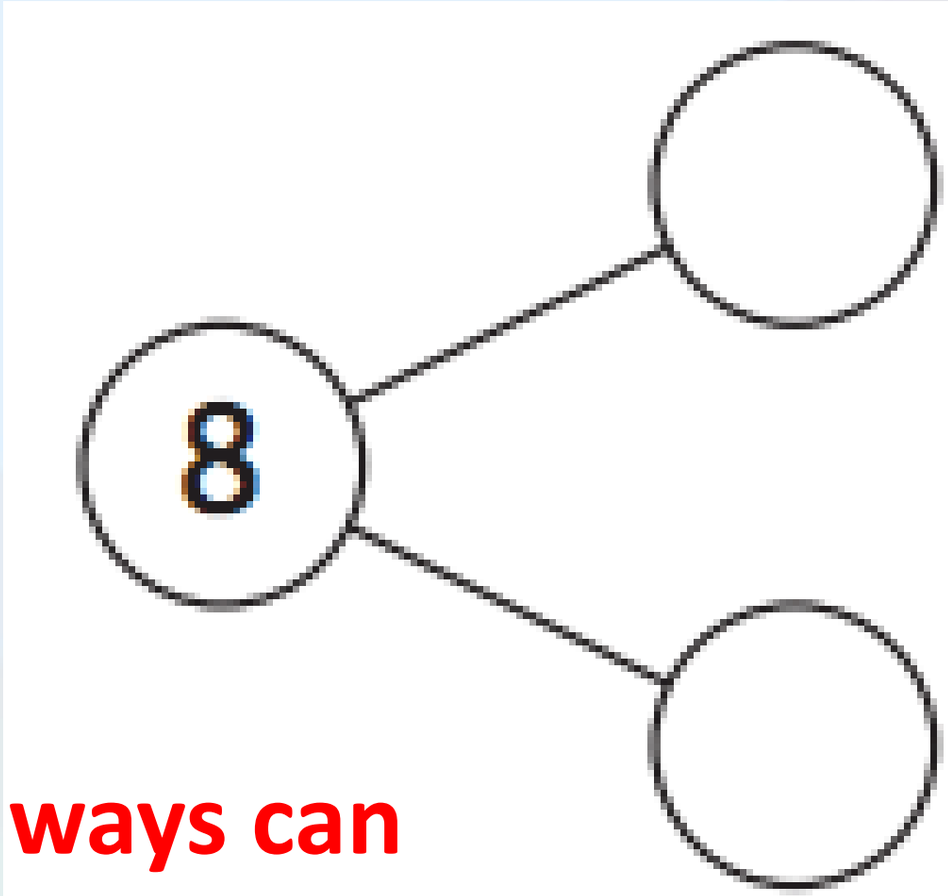




Language – talk about numbers!

<u>Part-whole model</u> – from Reception to Year 6

Whole



Part

Part

How many ways can you make 3, 5, 8,…?

8 is 1 and 7
8 is 2 and 6
8 is 3 and 5
8 is …

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Linking maths at home and school

AT HOME:

Can you show how to make …p?

How many ways can you make 10p, 15p, 13p?

How do you know?

Which would you rather have, 3 × 50p coins or 7 × 20p coins?

<u>Explain why</u>.

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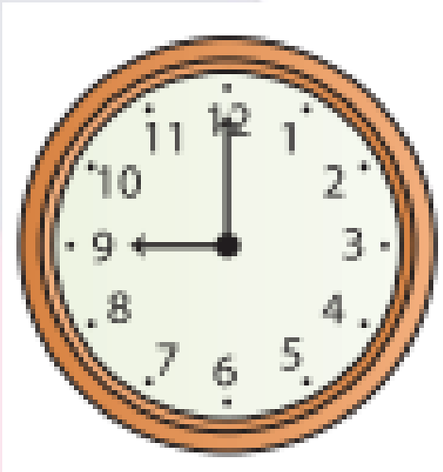
Linking maths at home and school

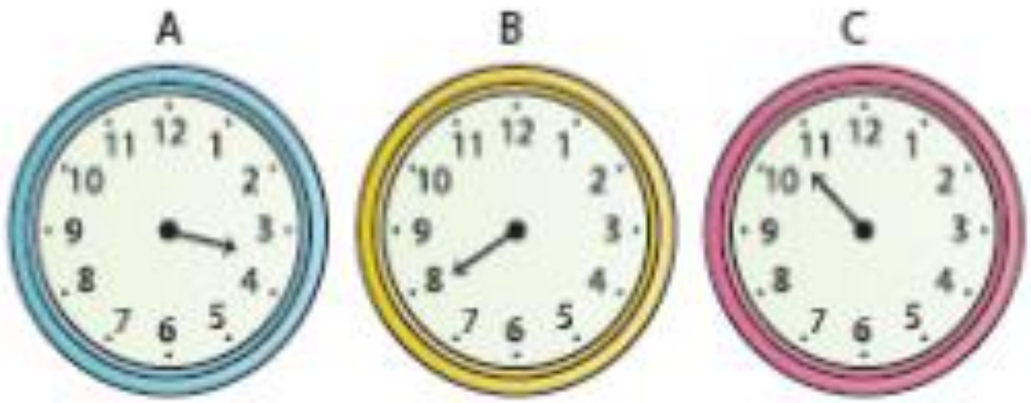
Wake up at…

School starts at…

Bedtime at…



Can you tell the time with only the hour hand?
Estimate the time.



Linking maths at home and school

- At school: Explain your reasoning. ‘When I count in tens from any number the ones digit stays the same.’ Do you agree?

- **AT HOME: <u>Prove it!</u> If I count backwards in twos from 20. How many steps will it take to reach 0?**
- **If I count back in fives will I take more steps or less? Why? How do you know? Prove it!**

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Linking maths at home and school

Ratio and Money (look at the prices together):

We can buy three pots of yoghurt for £2·40 .

How much will it cost to buy six pots of yoghurt? How much for 12 pots?

A child's ticket costs £4·70 and an adult's costs three times as much. How much does an adult's ticket cost?

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Linking maths at home and school

We use:

grams/kilograms; mm/cm/m/km; millilitres/litres

<u>Use a variety of measures at home:</u>

Sarah is **0·2m** taller than mum.

Mum is **one and a quarter metres**.

Your brother is **15 cm** taller than Sarah.

- Who is the tallest person?
- What is the difference in height between the tallest and the shortest person?

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Linking maths at home and school

<u>Fraction & Percentage (don't be afraid to ask how your child COULD solve it)</u>

Last month your sister saved a quarter of her £10 pocket money. She also saved 50% of her £20 birthday money.

How much did she save altogether?

Dad ate half the pizza and your brother ate half of what was left.

What fraction is left for us?

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Linking maths at home and school

AT HOME:

- Baking
- Food items
- Laying the table

- Skip counting 4, 8, 12, mm-mm 20, 24
- How many different ways can you calculate 7 × 6? 7 x 6, 6 x 7, 5 x 6 + 1 x 7, double 3 x 7
- If you know 2 x 3, what else can you work out from that fact?

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Linking maths at home and school

- Year 1 = counting in 2s, 5s & 10s from different multiples
- Year 2 = <u>fluent</u> in multiplication tables for 2s, 5s & 10s
- Year 3 = <u>recall</u> & use multiplication & division facts for 3s, 4s & 8s multiplication tables
- Year 4 = <u>recall</u> multiplication & division facts for multiplication tables to 12 × 12 (0, 6, 7, 9, 11, 12)

National test: Year 4 Multiplication Tables Check (MTC)
In June, statutory testing for all year 4 children

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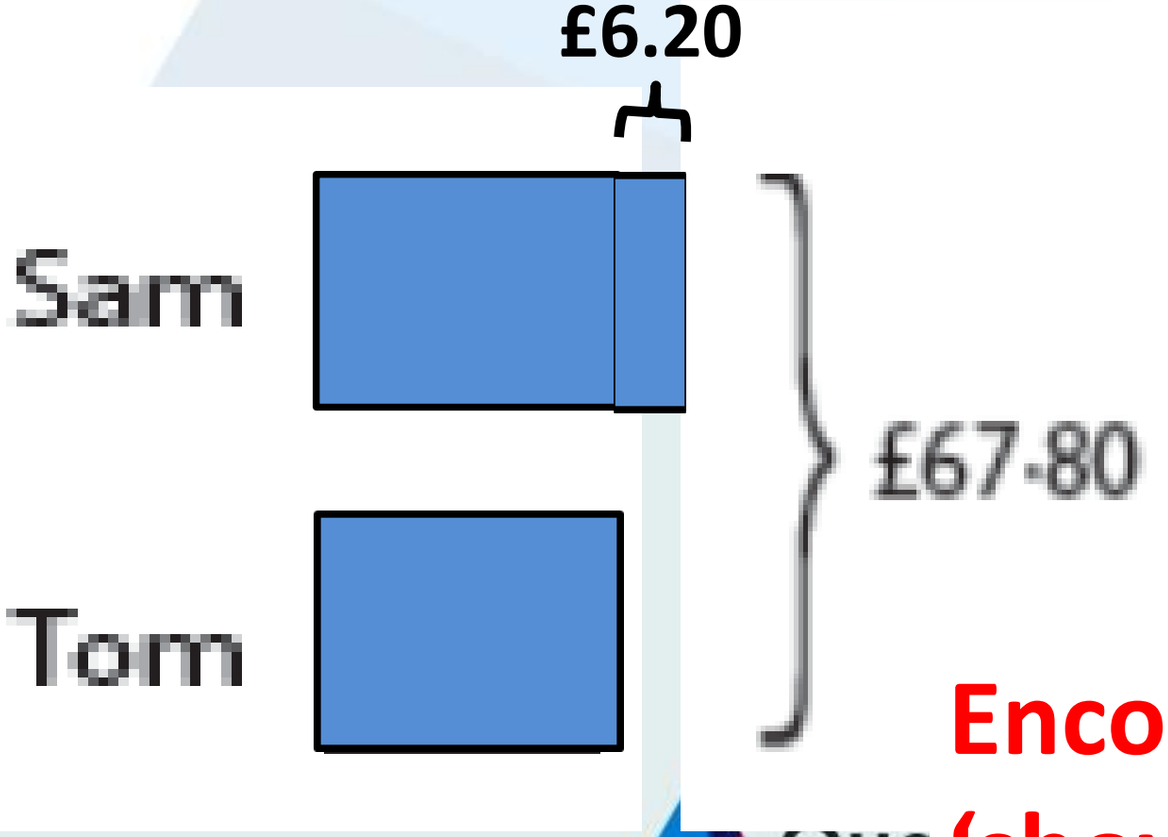
Tools to problem solving

Bar Models

Sam and Tom have £67·80 between them.
If Sam has £6·20 more than Tom, how much does Tom have?



£67·80 – £6·20 = £61·60

£61·60 ÷ 2 = £30·80

Tom has £30.80

Encourage children to ‘show you with a bar model’.

Try using bar models

Solving Word Problems

Lesson 3

Explore

Hannah carried out a traffic survey.
In one hour, she counted 46 cars and 12 fewer motorbikes than cars.
How many vehicles did Hannah count in total?

Supporting your children – link classroom learning

- Ask your child to show/teach **you** and explain how they solve the problem.
- If they get stuck, don't rush them.
- Praise effort/hard work and reassure them that they'll get it with practice.
- Ask them if they can think of more ways to solve the problem.
- 'Show your thinking in other ways.'

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Finding Prime Numbers

Lesson 4

Explore

Lulu is setting up a game by placing round carpet tiles on the playground.
She has 9 tiles.

How can she use some or all of the tiles to make rectangular or square arrangements?

Master

1 Lulu can use 5 tiles to make 1 row of 5.

$5 = 1 \times 5$

factor

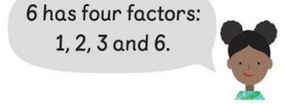
$5 = 1 \times 5$

multiple

2 Lulu can use 6 tiles to make two different arrangements.

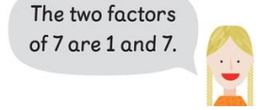
$6 = 1 \times 6$

$6 = 2 \times 3$



3 Lulu can use 7 tiles.

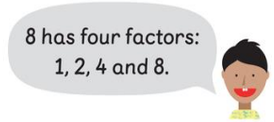
$7 = 1 \times 7$



4 Lulu can use 8 tiles.

$8 = 1 \times 8$

$8 = 2 \times 4$



5 Lulu can use 9 tiles.

$9 = 1 \times 9$

$9 = 3 \times 3$