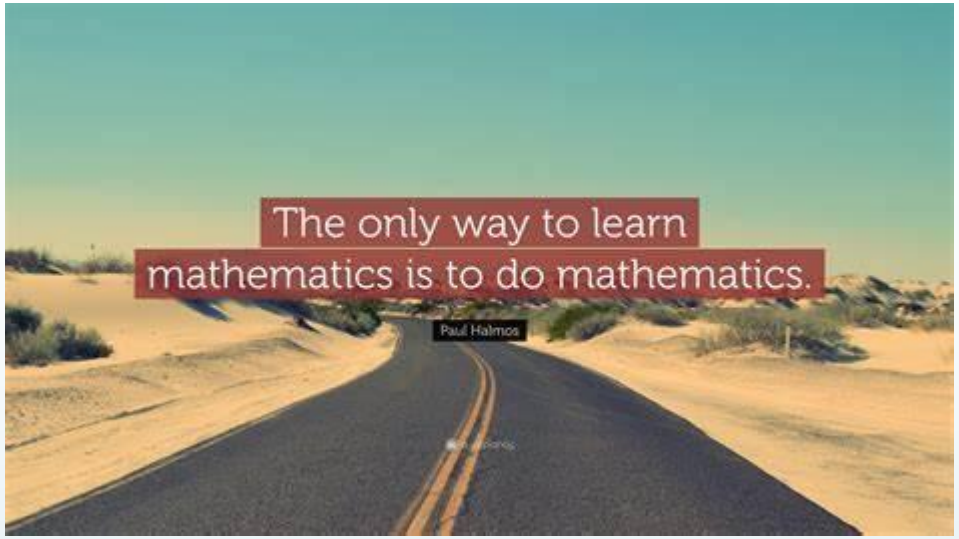


Maths at IHJS

Stay and Learn Morning

Maths at IHJS Vision statement

- Through our Mathematics curriculum at Iver Heath Junior School we wish for **every child to *enjoy their Maths lessons***, **to experience success**; **to become happy, reflective and confident individuals in this subject**, and to **develop their fluency, reasoning and problem solving skills both in class and the wider world**.

- We teach our children that having a **growth mind-set** will help them to persevere when they find tasks challenging, and that **we learn through taking risks with trial and improvement; regardless of our start point.**

- We aim to ensure that all children understand that **Mathematics is more than just being in the classroom,** and instead is an **important part of their everyday lives now, and in the future**.

Maths in 2025! It looks a little different these days.

- Teachers follow a clear progression map which builds on the National Curriculum end points for each year group and mastery development.
- Through our WRH lessons, children are exposed to arithmetic, fluency, reasoning and problem solving skills across a range of topics, in a range of ways.
- Just 'knowing' the answer is no longer the secret to being an able mathematician.
- Some of our more 'able' mathematicians find this hard as they just want to give answers – however, they are not a master until they can reason as to how they got their answer, and show the different ways of their understanding.
- Children who 'struggle' with Maths find using resources and pictures beneficial.
- However, the mastery curriculum means everyone achieves! There is no celling.

Tackling Maths Anxiety

Many adults and children feel worried or stressed when faced with maths. Some of us also have physical symptoms too, such as a racing heartbeat, feeling hot and flustered, or sweating.

According to **research by the University of Cambridge**, "*Many children and adults experience feelings of anxiety, apprehension, tension or discomfort when confronted by a maths problem.*"

Maths anxiety or a fear of maths is common, and although it can limit performance in certain situations and contexts, it's not linked to intelligence or ability. In **one study** involving children, most of those with high maths anxiety scored normal to high results on curriculum maths tests.

Anyone can experience maths anxiety. In fact, **according to psychologist Dr Thomas Hunt** of the University of Derby, most adults will experience it at some point, although girls and women are more commonly affected.

(National Numeracy.org.uk)

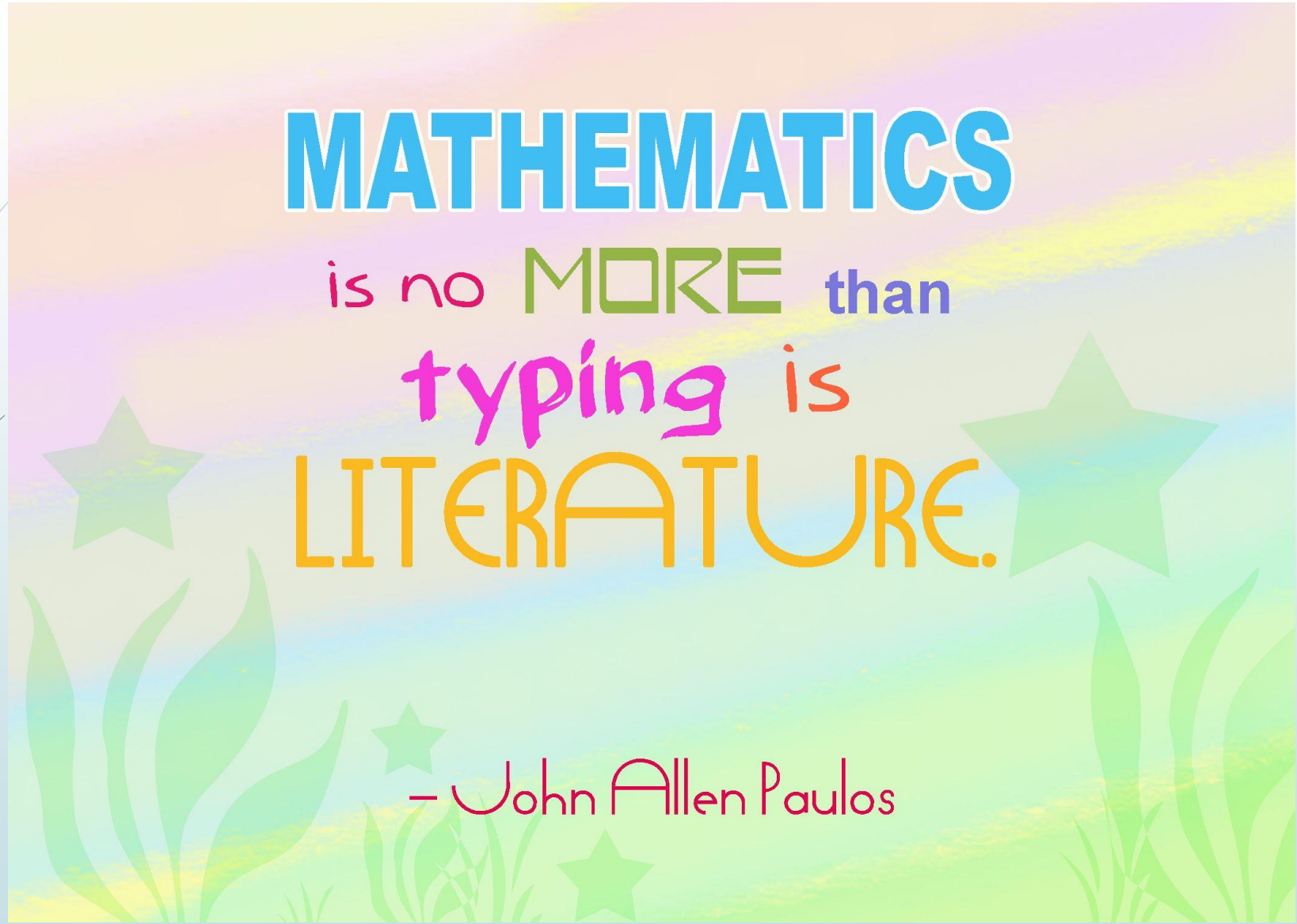
Although maths anxiety is often **not** a product or indicator of academic achievement, the stress associated with the condition can affect performance in some situations and tests. This can worsen the anxiety, leaving the individual caught in a cycle.

This can create or amplify a belief that maths ability is "fixed" and cannot be improved, therefore blocking any motivation to practise in order to learn and progress.

For some people a phobia of maths can lead to avoiding everyday situations involving maths at work or at home, such as helping children with homework. It has also been found to prevent some adults from applying for courses, jobs and promotions.

(National Numeracy.org.uk)

Here at IHJS we are building a culture that shows a positive relationship with Maths. No one is better than anyone and everyone is working towards one goal of mastering a lesson objective.


MATHEMATICS
is no MORE than
typing is
LITERATURE.
– John Allen Paulos

Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- add and subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Notes and guidance (non-statutory)

Pupils practise solving varied addition and subtraction questions. For mental calculations

Addition and Subtraction - Number			
Year 3	Year 4	Year 5	Year 6
• Add and subtract numbers mentally, including: - a 3-digit number and ones - a 3-digit number and tens - a 3-digit number and hundreds • Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction • Estimate the answer to a calculation and use inverse operations to check answers	• Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why • Estimate and use inverse operations to check answers to a calculation	• Add and subtract numbers mentally with increasingly large numbers • Add and subtract whole numbers with more than four digits, including using formal written methods (columnar addition and subtraction) • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Use rounding to check answers to calculations and determine, in the context of	• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • Perform mental calculations, including with mixed operations and large numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Solve problems involving

Long-Term Curriculum Map

Year 3 – Maths		
Autumn	Spring	Summer
Place Value Represent numbers to 100 Partition numbers to 100 Number line to 100 Hundreds Represent numbers to 1,000 Partition numbers to 1000 Flexible partitioning of numbers to 1000 100s, 10s and 1s Find 1, 10 or 100 more or less Number line to 1000 Estimate on a number line to 1000 Compare numbers to 1000 Order numbers to 1000 Count in 50's **Addition and Subtraction** Apply number bonds within 10 Add and subtract 1s Add and subtract 10s Add and subtract 100s Spot the pattern Add 1s across a 10 Add 10s across a 100 Subtract 1s across a 10 Subtract 10s across a 100 Make connections Add two numbers (no exchange)	**Multiplication and division B** Multiples of 10 Related calculations Reasoning about multiplication Multiply a 2-digit by a 1-digit (no exchange) Multiply a 2-digit by a 1-digit (with exchange) Link multiplication and division Divide a 2-digit by a 1-digit (no exchange) Divide a 2 digit by a 1-digit (flexible partitioning) Divide a 2-digit by a 1 –digit (with remainders) Scaling How many ways? **Measurement (Length and Perimeter)** Measure in m and cm Measure in mm Measure in cm and mm Meters, centimeters and millimeters Equivalent lengths (m and cm) Equivalent lengths (cm and mm) Compare lengths Add lengths Subtract lengths What is perimeter? Measure perimeter Calculate perimeter	**Fractions B** Add fractions Subtraction fractions Partition the whole Unit fractions of a set of objects Non-unit fractions of a set of objects Reasoning with fractions of amounts **Money** Pounds and pence Convert pounds and pence Add money Subtract money Find change **Time** Roman numerals to 12 Tell the time to 5 minutes Tell the time to the minute Read time on a digital clock Use am and pm Years, months and days Days and hours Hours and minutes –use start and end times Hours and minutes – use durations Minutes and seconds Units of time

We are ACHIEVERS! We are a COMMUNITY! We are PROUD! We are INCLUSIVE!

Year 3 | Autumn term | Block 2 – Addition and subtraction | Step 1

Apply number bonds within 10

Notes and guidance

In Year 2, children learnt to add and subtract two 2-digit numbers, including with exchanges. Throughout this block children build on that knowledge, working towards adding and subtracting 2-digit and 3-digit numbers with exchanges. To be successful with this, it is essential that children are confident in both using and applying their number bonds to and within 10 and this small step provides opportunity to consolidate this.

By the end of this small step, children should be more confident at recalling all the number bonds up to 10 in a variety of contexts. They will then apply this knowledge to number bonds to 100, for example: 3 + 2 = 5, so 30 + 20 = 50

Children use a variety of representations, including base 10, place value counters, double-sided counters, number lines, part-whole models and bar models.

Things to look out for

- Instead of recalling number facts, children may continue to rely on using fingers or manipulatives to add two numbers together.
- When using related facts of bonds to 10 to find bonds to 100, children may not increase all three numbers by a factor of 10

Key questions

- Which is the whole and which are the parts?
- What needs to be added to this part to make the whole?
- If you take this part from the whole, what will be left?
- Where would this number go in the part-whole model?
- What other number facts do you know if you know this?
- If you multiply both parts by 10 then add them together, what happens to the whole?

Possible sentence stems

- If the whole is _____ and one part is _____, then the other part is _____
- _____ + _____ = 10, so _____ + _____ = 100
- If I know that _____ + _____ = _____, then I also know ...

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

White Rose – A typical Maths lesson

- **Daily starter** – Every child will complete a starter which contains objectives from previous lessons, weeks, terms or year groups. Staff tailor these to the needs and gaps of the children/use WRH starters. Children also have a weekly arithmetic TTRS lesson.
- **Fluency**– Teachers will teach, through the WRH Powerpoint, the fluency part of the lesson. This will involve a clear, step by step breakdown of how to achieve the objective through pictures, bar models and numbers. Children/teachers will practise these skills through resources, pair work, modelling etc. Children will then start their activity.
- **Reasoning and Problem Solving**– After completing the fluency part of the worksheet, teachers will model the next part of the lesson through the Powerpoint or through their own way. This may be for all children together or be introduced stage by stage so all can feel confident. The next part of the worksheet will be completed.
- **Mastery challenges**– Teachers will use other resources to extend the children's learning in a mastery way. We are focusing on 'Show, It, Draw it , Explain it, Prove it.'

Mastery – What does it mean?

- Mastery means a learner has expert knowledge, skills and ability in a subject (or an aspect of that subject) – and they can use and apply it to show a high level of understanding and creativity to reach their end points.
- Teaching mastery is about achieving deep, secure learning for all pupils.
- It also involves extending the learning of students by teaching more things on the same topic, rather than accelerating their learning by rapidly moving on to new content and having them just be 'mechanical.'
- Inspired by teaching approaches developed in Singapore and Shanghai, mastery is an inclusive way of teaching that is grounded in the belief that all pupils can achieve in maths.
- A concept is deemed mastered when learners can represent it in multiple ways, can communicate solutions using mathematical language and can independently apply the concept to new problems.
- Teaching for mastery supports National Curriculum objectives, but spends more time reinforcing number before progressing to more difficult areas of mathematics.
- You wouldn't build a house and not address the gaps or train the tradespeople fully!

What is Reasoning and Problem Solving?

- Fluency in maths works through intelligent practice (rather than just mechanical repetition). Once a child has grasped a mathematical concept, the idea is that they are exposed to varied fluency activities and then R&PS.
- These activities then require them to use verbal reasoning to justify and explain their thinking in order to solve word problems/problems in an unfamiliar context.
- Children are expected to use the correct mathematical vocabulary and stem sentence starters to really help them explain their understanding when reasoning.
- A problem solving task is all about breaking things down bit by bit – it requires working out – one of the biggest problems when children are faced with these!

Example Reasoning and Problem Solving Tasks

Complete the set of equivalent fractions.

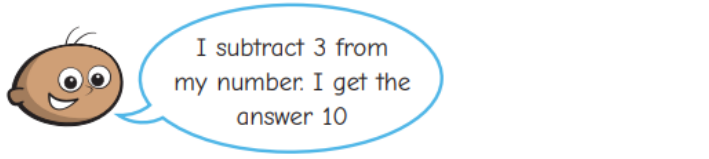
$$\frac{1}{6} = \frac{\square}{12} = \frac{\square}{18} = \frac{4}{\square} = \frac{\square}{30} = \frac{6}{\square} = \frac{7}{\square}$$

7 Tommy and Rosie are each thinking of a number.

Write an equation to represent each problem.

Call Tommy's number p and Rosie's number m.

a)



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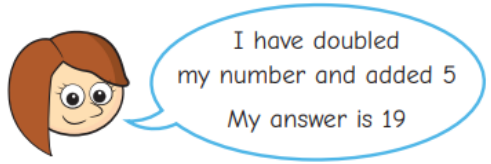
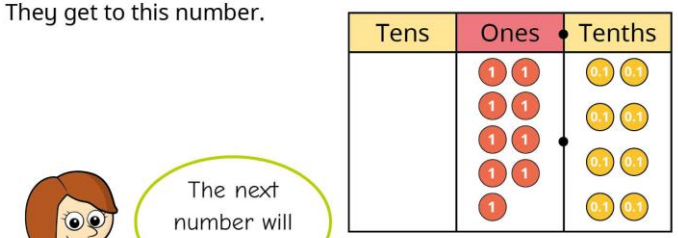
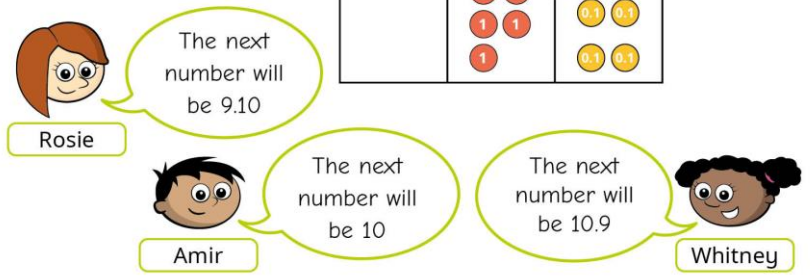


Rosie, Whitney and Amir are counting up in 0.1s.
They get to this number.





Who do you agree with?

Explain your answer.

Tenths on a place value chart

Balloons come in bags of 10

Rosie has 300 balloons.

How many bags does she have?

Eva receives some money for her birthday.

She saves $\frac{5}{7}$ of the money.

She spends the rest on a video game.

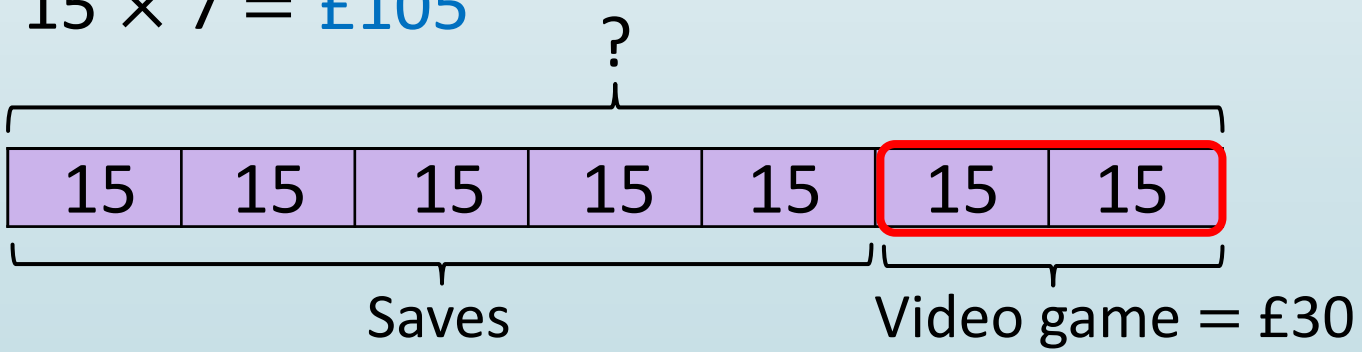
The video game costs £30

How much money does Eva receive for her birthday?

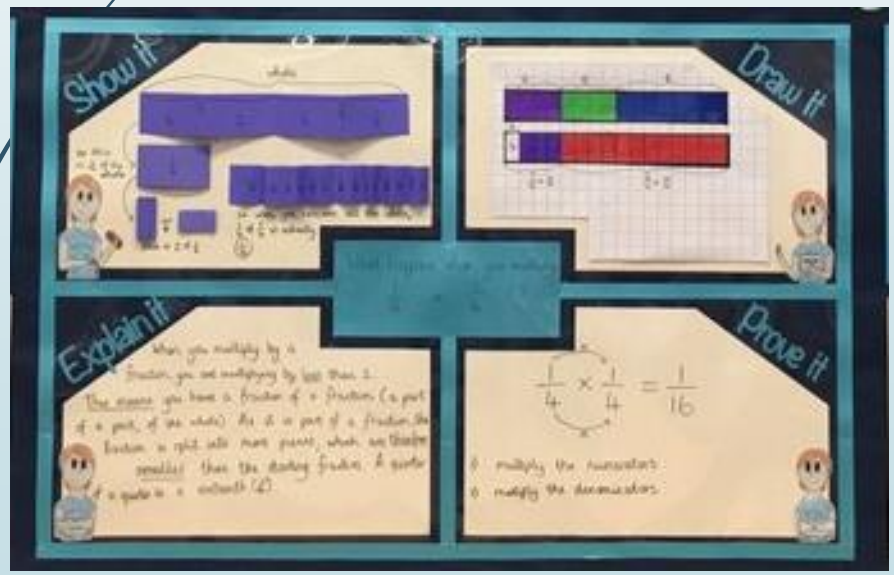
Have a think

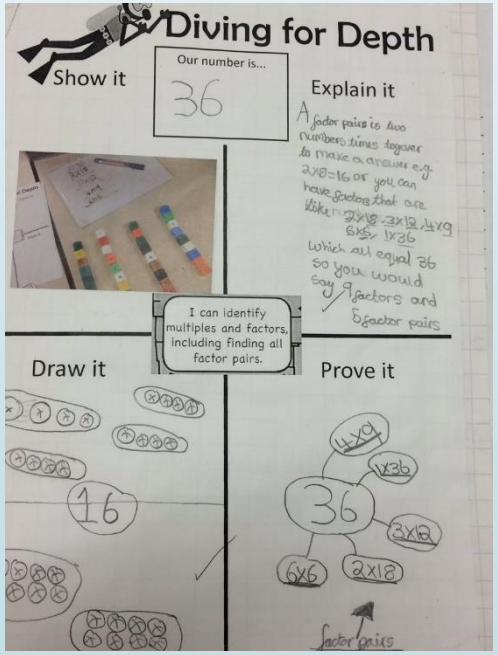
$30 \div 2 = £15$

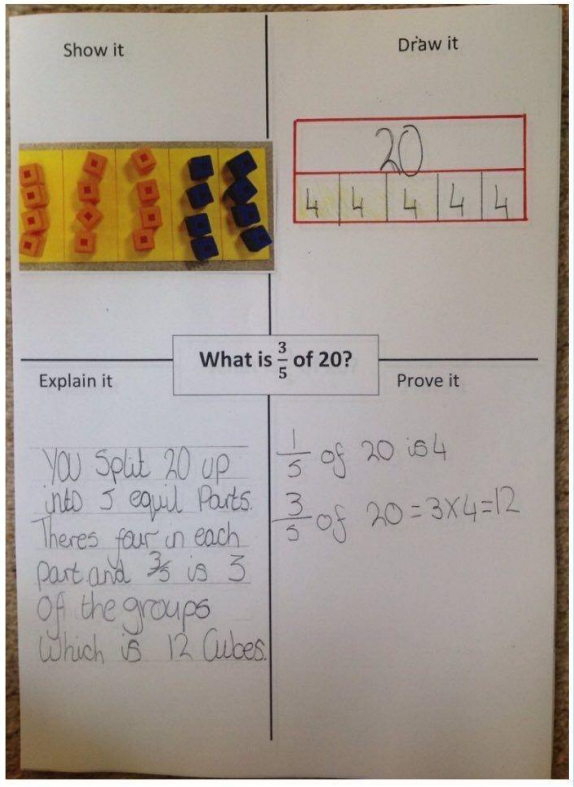
$15 \times 7 = £105$



- Previous Stay and Learn Mornings have looked a lot at Bar Models and how they help break worded problems down.
- Today, we are going to focus more on how children can show an answer in more than one way using our: 'Show it, Draw it, Explain it, Prove it' system.
- This is what you will be seeing in class, alongside our general lessons.
- This shows a child has 'mastered' an answer regardless of their start point or how open ended the questions may be.







Show it

Draw it

7 A farmer is working out the number of sheep on her farm.

She has 6 fields.

Each field has 35 sheep.

Use a written method to work out how many sheep there are altogether.

Explain it

Prove it

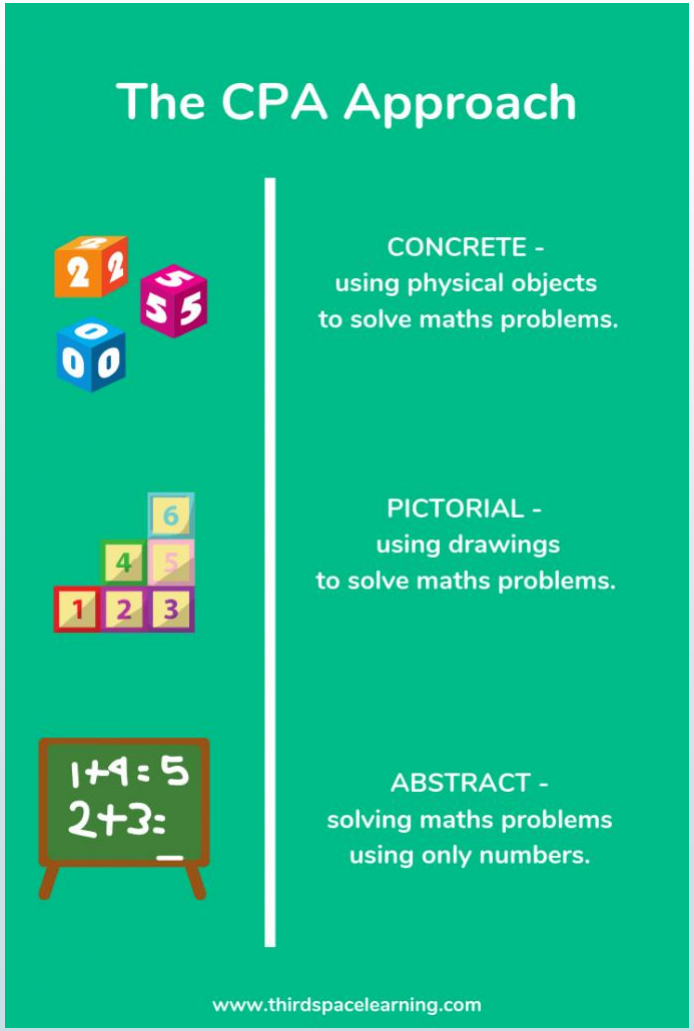
CPA – Concrete -Pictorial - Abstract

- Throughout our lessons, children will be shown Maths through interactive resources and modelling of:
- **Concrete Maths** – using objects and physical resources
- **Pictorial Maths** – drawings to help solve problems
- **Abstract Maths** – using digits and numbers

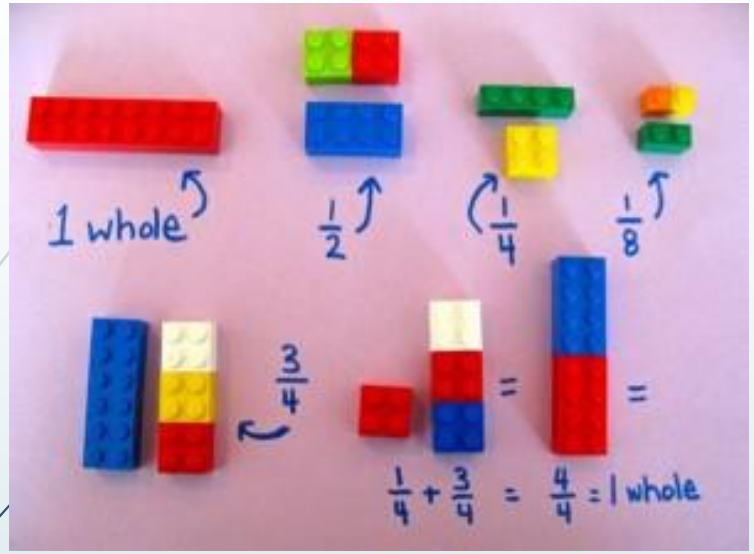
- Children will also be expected to use elements of all of the above in their lessons – although maybe not all on the same day.

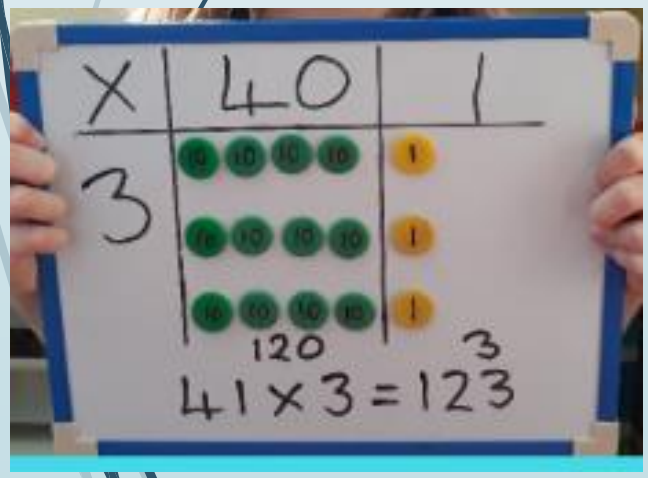
- This CPA is the backbone to 'Show it, Draw it, Explain it, Prove it.'

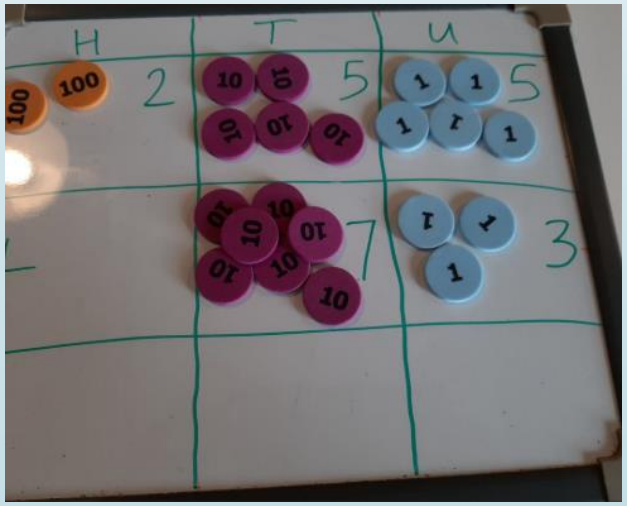
We are going to take a look at this now. ☺

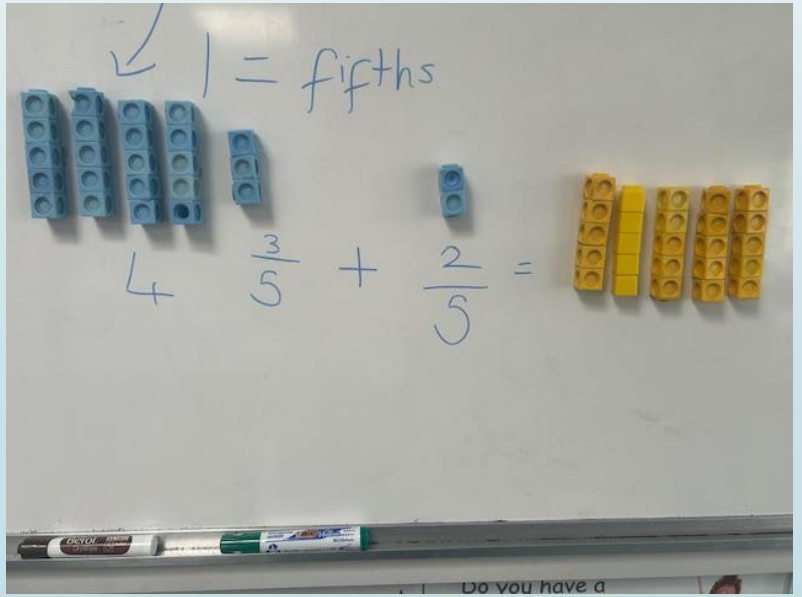


Concrete – Show it!

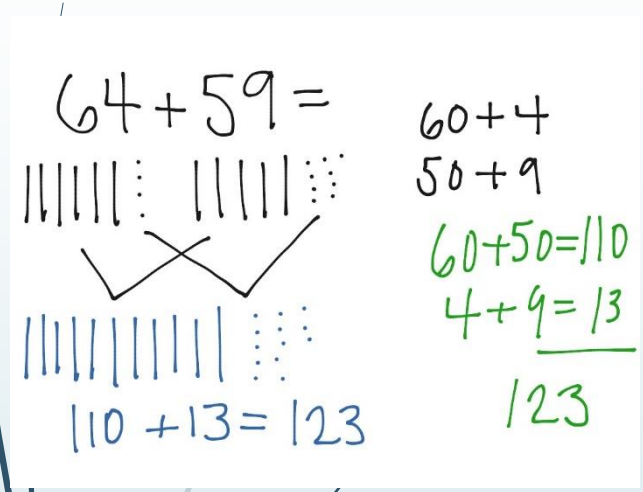


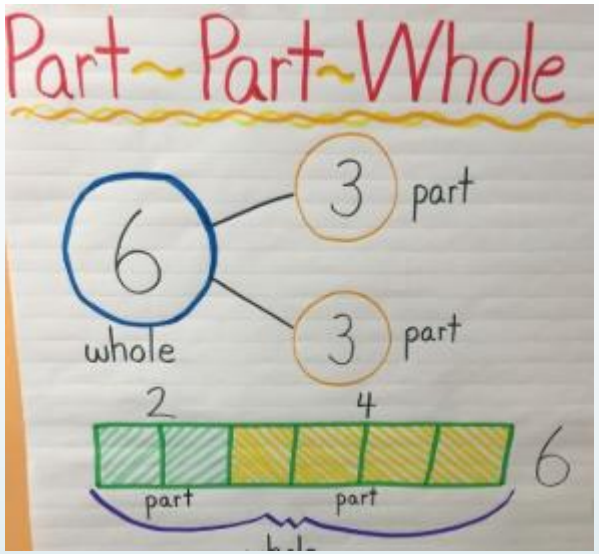


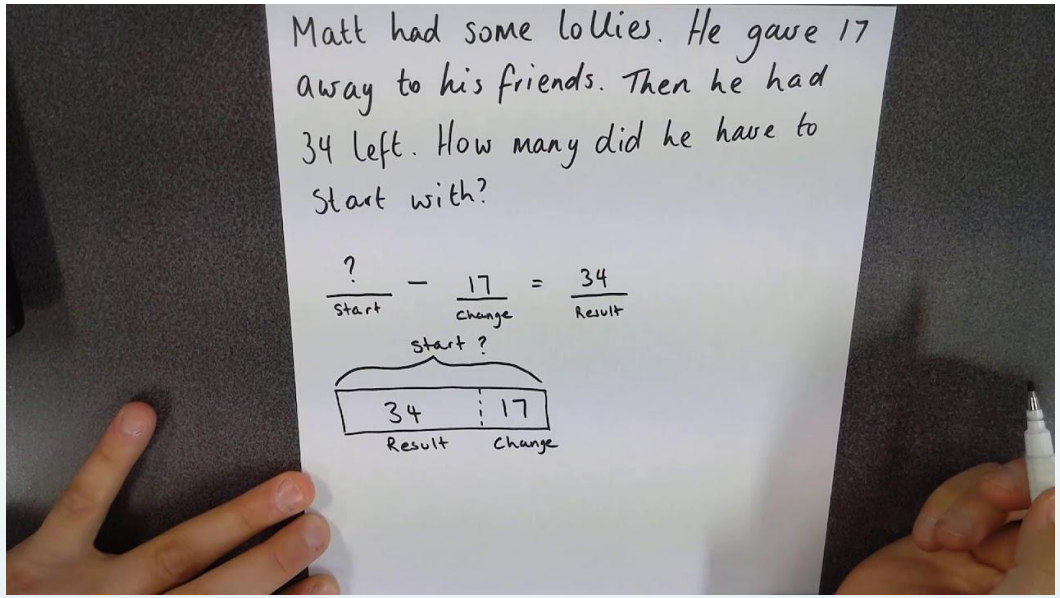




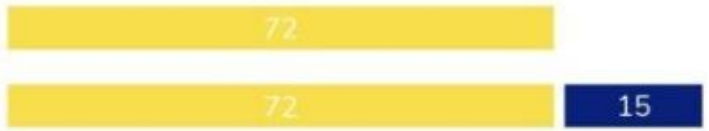
Pictorial – Draw it!

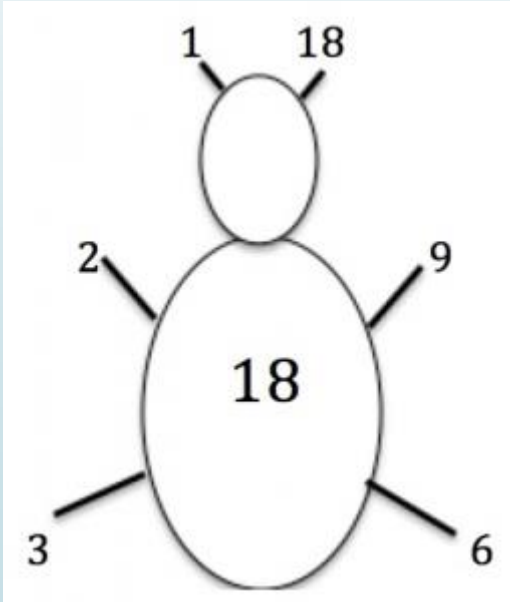






On Monday Lisa sold 72 chocolate bars. On Tuesday she sold 15 more than she sold on Monday. How many chocolate bars did she sell all together?





Explain it – mathematical vocabulary!

I notice that the **product** of 16 has 5 factors but a lower product of 12, has 6 **factors**. 16 has less factors even thought the **value** is higher.

Factors

I

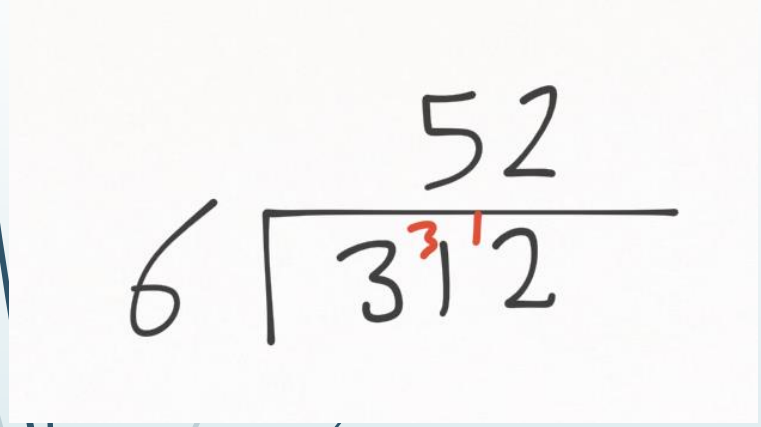
139 + 321
Starting with your **ones** you add 1 and 9 to make 10. You place the **zero** into the ones column and **regroup** the 1 ten underneath the **tens column.**
Now you add 30 + 20 + the extra 10, which makes 60.
Lastly, you add your **hundreds** which is 300 + 100 which makes 400.
You final answer is 460

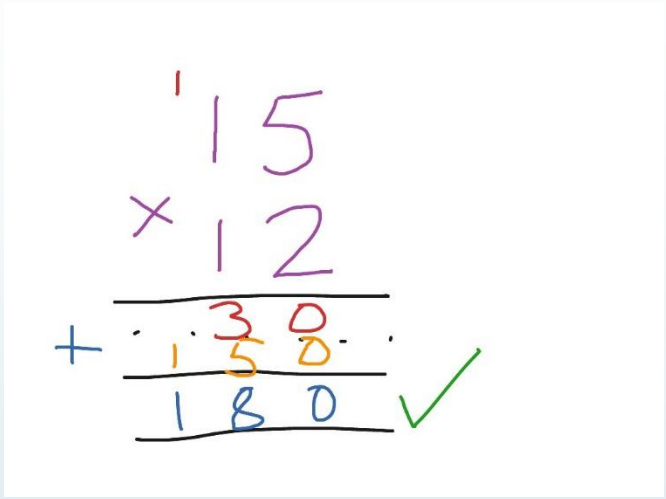
Addition with exchanging/renaming

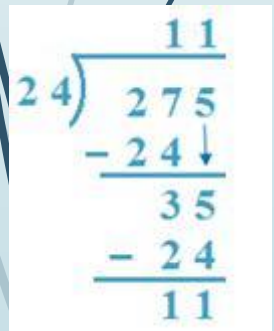
When working out 3 fifths of 20, first you must draw a **bar model** which is spilt into 5 **parts** as that is what our **denominator (whole)** shows.
You then **divide** 20 by 5 to find out one part, which is 4, and then place that digit into each box.
After, you can **multiply** 4 by 3, as you are finding 3 parts **(numerator)** or you can count on 3 boxes on your bar model as **repeated addition**. 3 + 3 + 3

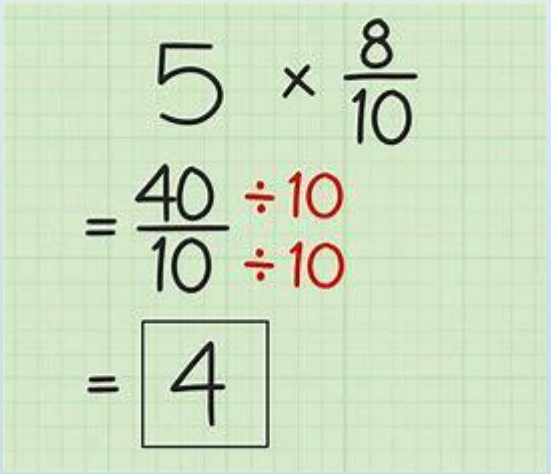
Fractions

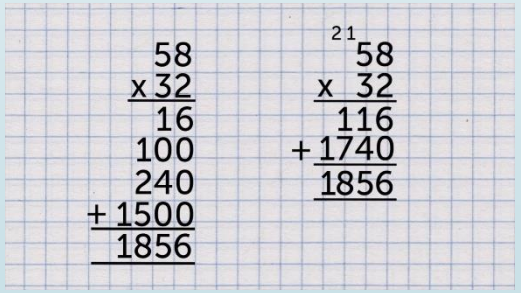
Abstract – Prove it!

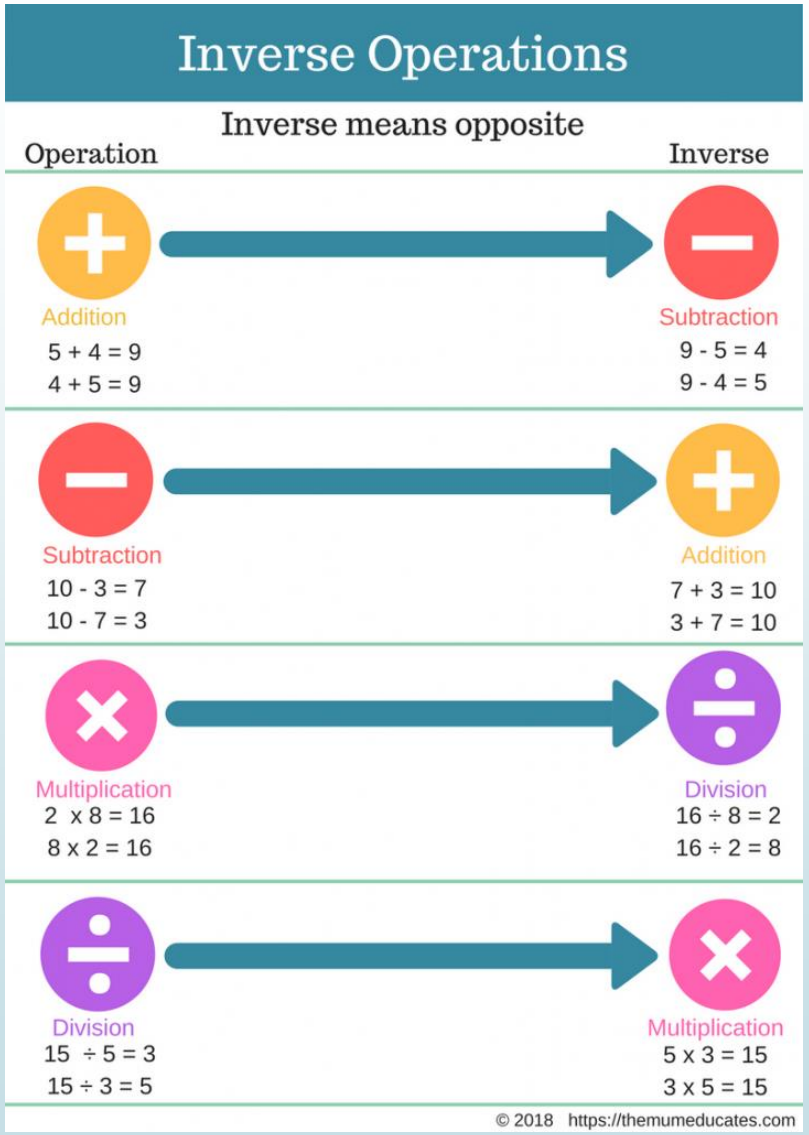








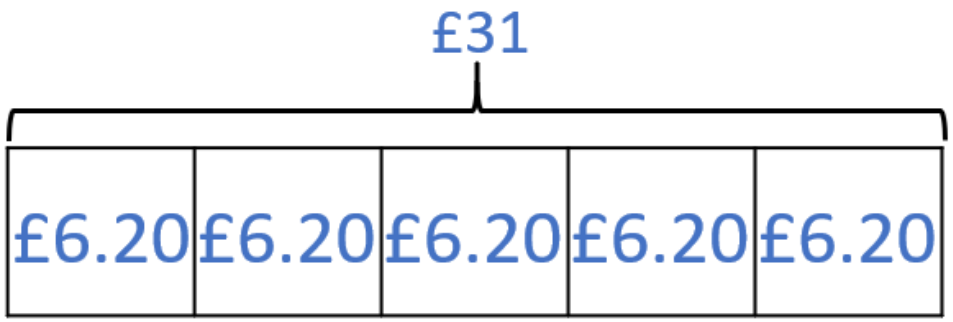




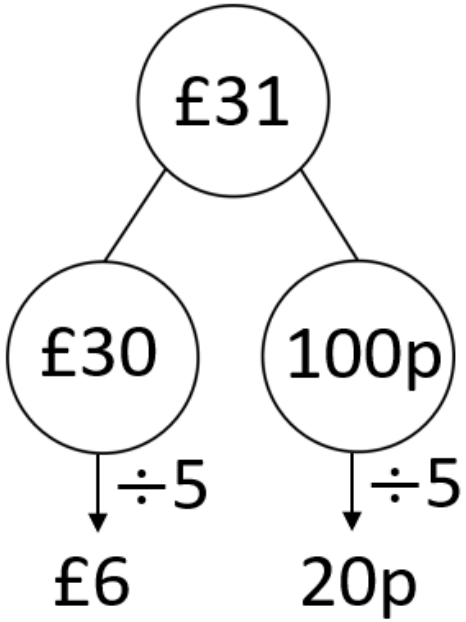
Five children buy two computer games.
They share the cost equally between them.
How much does each child pay?

Show your working out with a Draw it and Prove it.
You must include a bar model and an abstract calculation!

Five children buy two computer games.
They share the cost equally between them.
How much does each child pay?



£31 ÷ 5 = £6.20



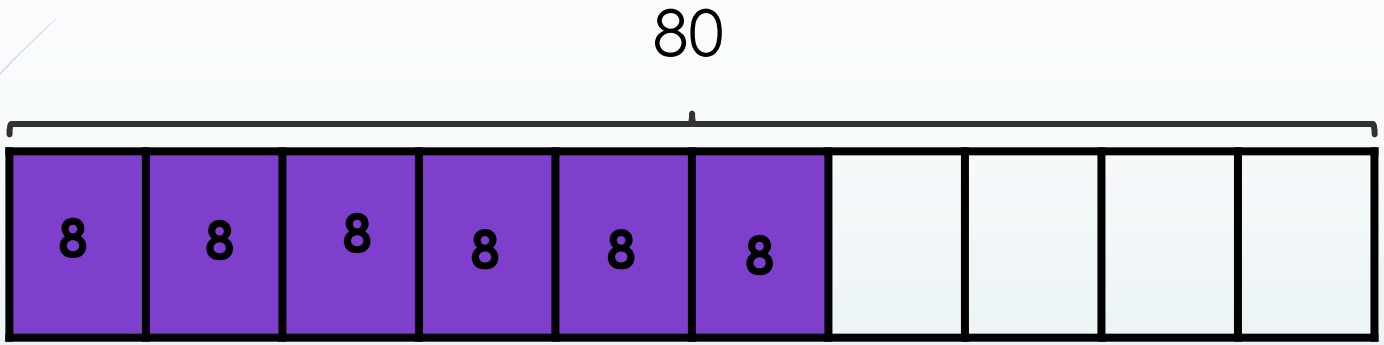
£14.48
+ £16.52
£31.00
1 1 1

Show these % in a Draw it bar model!

60% of 80

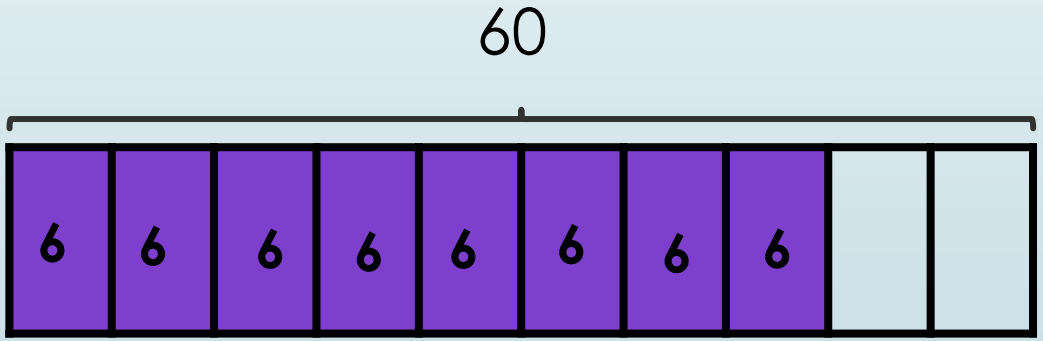
80% of 60

60% of 80



$80 \div 10 = 8$ $8 \times 6 = 48$

80% of 60



$60 \div 10 = 6$ $6 \times 8 = 48$

How can you help at home?

- Times tables practise – SO important! They are the foundation to everything in Maths. TTRS is part of our home-learning.
- Encourage your children to use working out – CPA when they are struggling – not always just numbers and digits.
- Create a positive mindset around Maths. If they hear *'I was rubbish at Maths'* they may adopt this mindset and begin to think they cannot reach their potential.
- Encourage children when they have made a mistake to have a look another way.
- Ask your children what they are learning and use real life Maths to go over these skills such as in the supermarket, telling the time, cutting up pizzas!
- Use resources such as TTRS, BBC bitesize and Numbots at home.

Using a variety of effective questioning strategies, underpinned by their secure subject knowledge, teachers, for the most part, skilfully elicit what pupils already know and understand, and prompt deeper thinking. Using terms such as 'mastery' and 'greater depth', teachers help pupils reflect maturely on their learning. Discussing their work in mathematics, pupils in Year 6 explained, 'We are encouraged to use different methods. We move from mainly arithmetic to solving problems. It's not just doing the sums, it's about applying what you know.'