Session Aims

- Reflecting on the KS2 SATs
- What is fluency and how can we improve it?
- What does maths look like in KS2?
- How is maths taught at Grange Park?
- How can children be supported at home?

What maths skills would you require to answer this question?

21 There are 25 classes in a school.

Each class has 34 pupils.

62% of all the pupils play a sport after school.

What number of pupils do not play a sport?

What maths skills would you require to answer this question other than trying to solve an impossible problem?!!!!

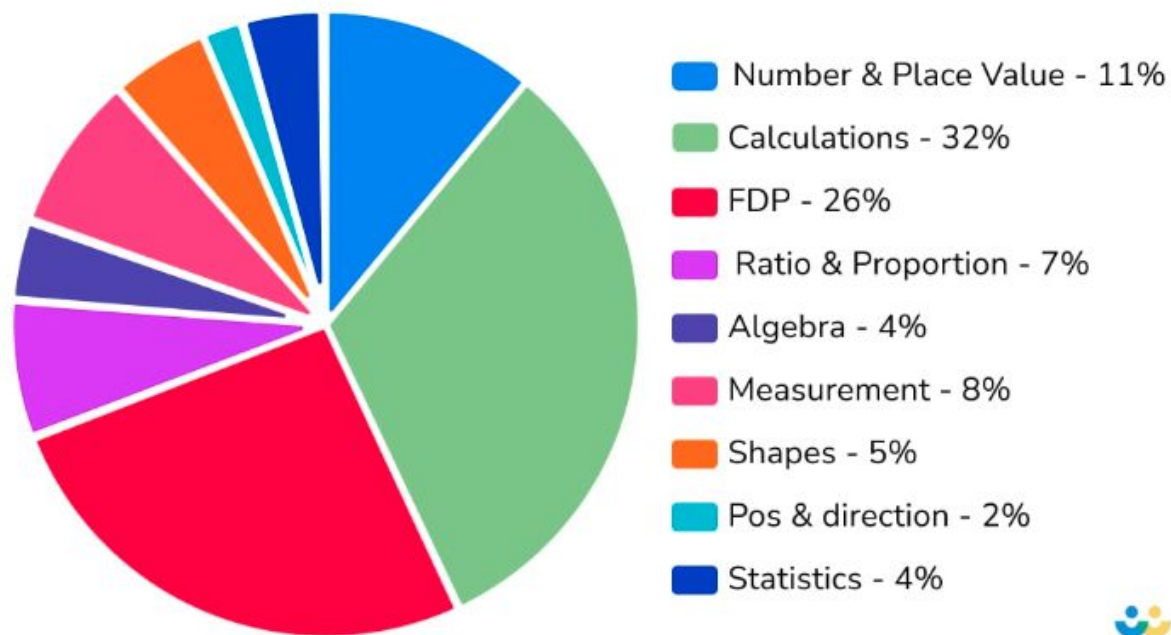**10** Write the missing square number to make this addition correct.

$$8^2 + \underline{\qquad}^2 = 73$$

SATs Analysis

KS2 Maths SATS papers analysis
Percentage of questions from each year group curriculum across Arithmetic and Reasoning

Year	2017	2018	2019	2022	2023
Year 3	7	9	10	8	12%
Year 4	26	18	21	23	20%
Year 5	25	26	21	32	32%
Year 6	41	47	47	37	36%

SATs Analysis

KS2 Maths SATs papers analysis (2023)
Percentage of questions by content domain

- Number & Place Value - 11%
- Calculations - 32%
- FDP - 26%
- Ratio & Proportion - 7%
- Algebra - 4%
- Measurement - 8%
- Shapes - 5%
- Pos & direction - 2%
- Statistics - 4%

THIRD SPACE LEARNING

Content coverage across all 3 papers for the 2023 SATs Papers

KS2 Maths SATS papers analysis
Percentage of questions by content domain

Content domain	2017	2018	2019	2022	2023
Number & PV	9	10	9	9	11
Calculations	22	29	30	38	32
FDP	14	14	24	25	26
Ratio & prop	9	6	8	6	7
Algebra	9	9	6	3	4
Measurement	14	13	9	7	8
Shapes	9	10	7	6	5
Pos & direction	3	4	3	2	2
Statistics	11	6	4	3	4

Reflection

- Be secure with place value
- Be able to quickly recall times tables and related division facts
- Be confident with the four operations (+, -, x and ÷) with…
  - Whole numbers
  - Fractions
  - Decimals
- Find percentages of amounts
- Use the correct language
- Be able to explain how they know

What is fluency in maths?

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.

How do you know when a learner is fluent?

You can identify a fluent learner when they have a secure understanding of what they're doing and why they're doing it. Researcher Dr Susan Jo Russell thinks fluency is made up of three key parts: efficiency, accuracy, and flexibility.

- Efficiency: learners choose efficient strategies and don't get bogged down in too many steps
- Accuracy: learners are accurate in their workings, have great recall of facts and double check their answers
- Flexibility: learners understand that there are many ways to solve a problem

Three stages of fluency

1. Simple strategies

Initially, as a child gets to grips with a new skill, they can work out an answer using concrete resources or counting strategies. This will probably help them solve a problem accurately, but it's not the most efficient strategy.

2. Mental calculations

As learners become more proficient with new learning, they reach the second stage of fluency. Learners at this stage can work out an answer in their head. It still requires some thinking and effort as they develop reasoning strategies, but they're well on their way to becoming more efficient.

3. Achieving fluency

Finally, children reach the stage of 'I just knew it'. They can reliably produce accurate answers in an efficient way. This stage often involves using their knowledge flexibly; making connections so that the known can be used to work out the unknown.

In the words of Mark McCourt, "we consider someone to be fluent in a technique, procedure, idea, concept or fact at the point at which they no longer need to give attention".

How do we achieve fluency at Grange Park?
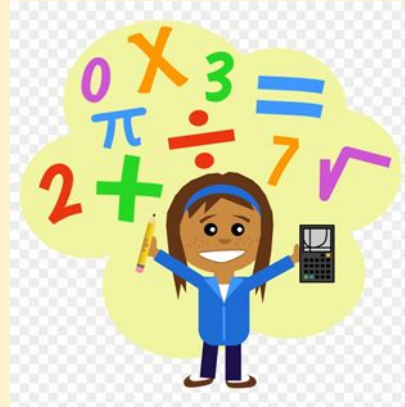
Our curriculum is based on the national curriculum and White Rose Maths and other materials that support the delivery of the curriculum.

White Rose allows children to be exposed to a variety of different types of learning and to ensure coverage of fluency, problem solving and reasoning in different formats to ensure that our maths curriculum is rich and varied.

What does maths learning look like in KS2?

Here are examples of children's work
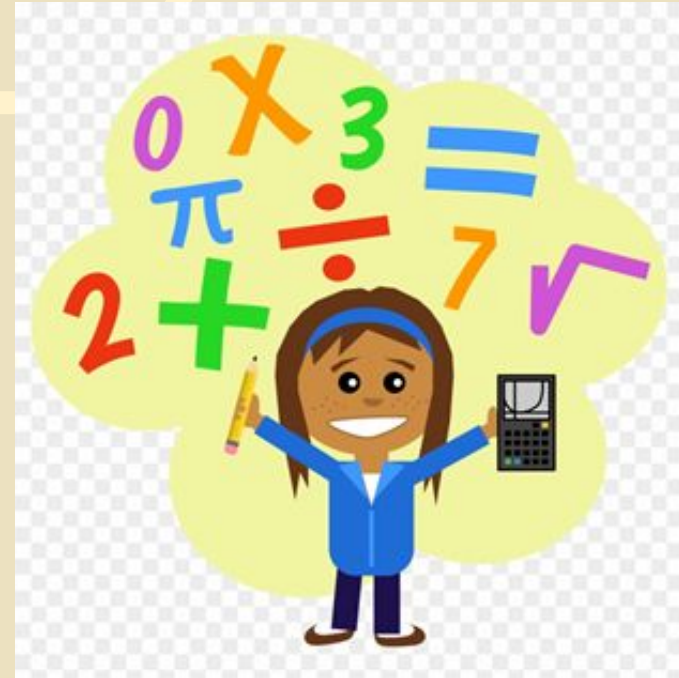
What does Maths look like in Year 3?

Consistently use the correct number formation (0-9).

To recognise the place value of each digit in a three-digit number (hundreds, tens and ones).

To read and write numbers up to 1,000

To add and subtract mentally and scaling these by 10 e.g. 6 + 3 = 9, 60 + 30 = 90.

To understand the inverse relationship between add and subtract

To solve number and practical problems, including reasoning using my number knowledge.

To choose strategies to help me answer questions such as partitioning, number lines, counting on, counting back, bar models and eventually formal methods such as the column method.

To identify angles greater than or less than a right angle

To recall my 2, 5, 10s, 3, 4 and 8 times tables and related division facts.

What does Maths look like in Year 4?

Find the perimeter of regular and irregular polygons

Begin to use expanded formal methods for addition and subtraction.

Have a secure understanding of number: confidently identifying the value of each digit in a 4 digit number E.g. 2378 the 3 represents 300.

To solve practical and number problems using reasoning to justify answers.

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Convert mixed numbers to improper fractions and vice versa

Solve addition and subtraction two-step problems deciding which operations and methods to use and why

Recognise common groups of equivalent fractions and finding the corresponding decimal.

To confidently and securely know times tables facts, including the inverse up to 12x12

What does Maths look like in Year 5?

Recognise the place value of each digit in numbers with up to 2 decimal places

To use the formal written methods for all four operations (addition, subtraction, division and multiplication)

Rapid and accurate recall of **ALL** times tables and related division facts

Draw upon a variety of mental maths strategies to support arithmetic skills
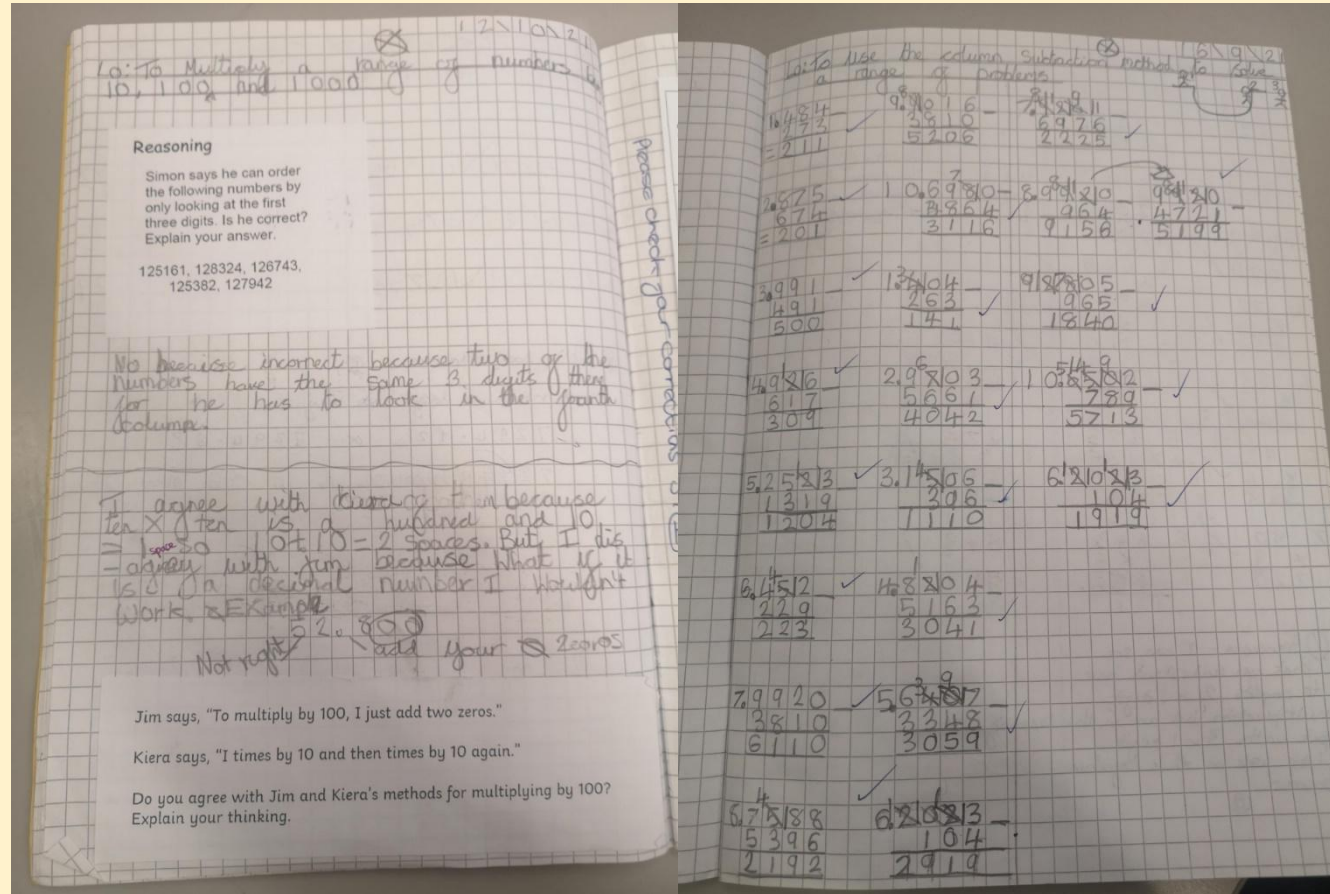
To solve number problems using reasoning to justify my answers and to prove and disprove.

Measure angles in degrees (°) and draw angles of a given size.

Secure understanding of fractions including simplifying, equivalent fractions and calculating with fractions (+ − and x by integers)

Convert between units of measure e.g. grams to kilograms

Find non-unit fractions of quantities.

What does Maths look like in Year 6?

Rapid and accurate recall of ALL times tables

Draw, compose and decompose shapes according to given properties, including dimensions, angles and area

Find equivalent fractions, decimals and percentages

Solve problems involving ratio relationships

Recognise the place value of each digit in numbers up to 10 million, including decimal fractions
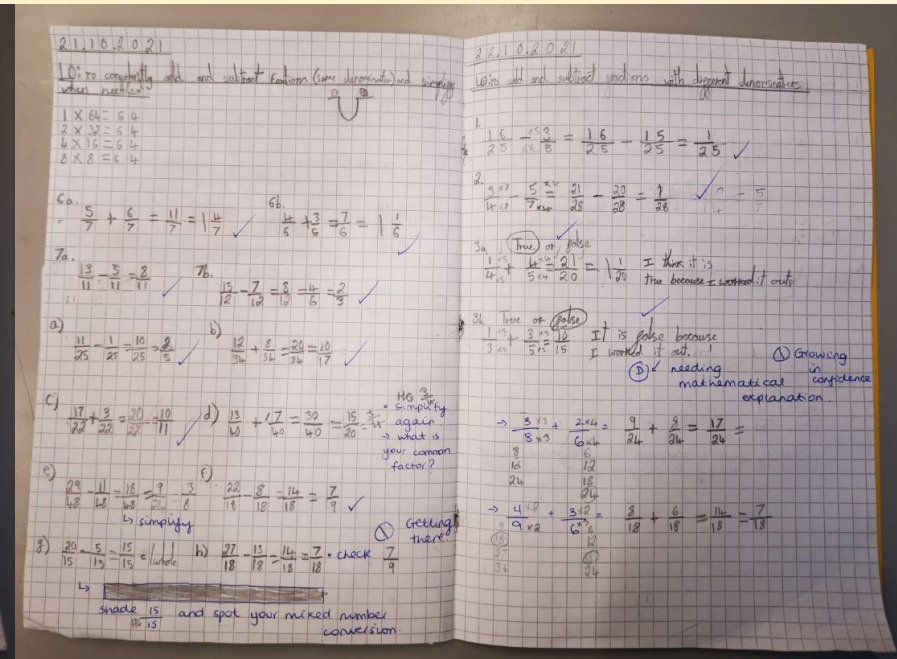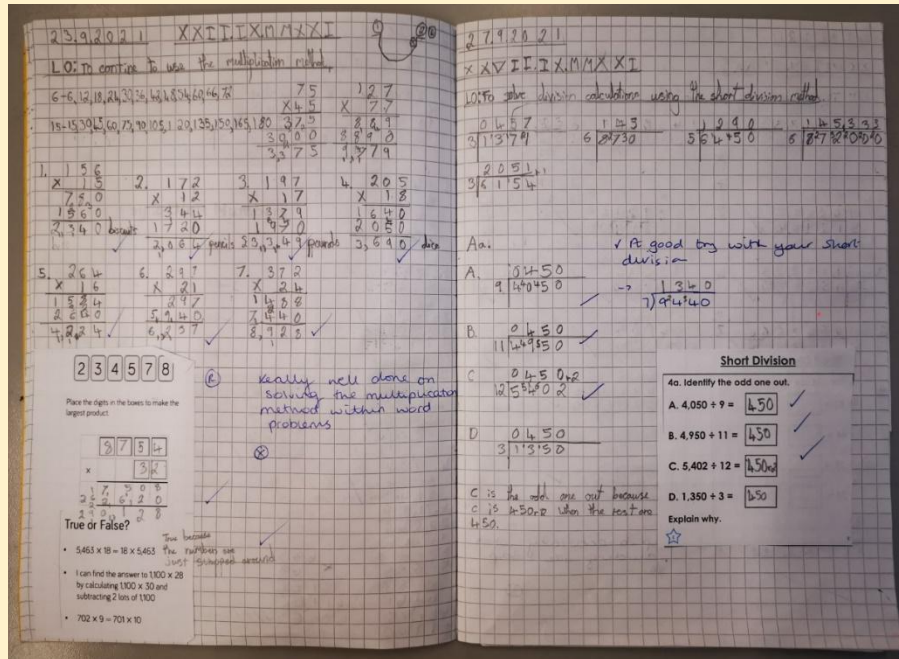
Solve multi-step word problems

Algebra

To consolidate the formal written methods and use alongside efficient mental strategies

Working with numbers beyond 6 and 7 digits

Systematic and methodical workings

Draw upon a variety of mental maths strategies to support arithmetic skills

Use common factors and multiples to simplify fractions. To securely use all four operations when calculating with fractions (+ – x ÷)

Calculation Policy

Our calculation policy is in line with the programmes of study taken from the National Curriculum for Mathematics (2014). It is designed to be challenging, focussing on essential core subject knowledge and skills. This document guides you through the appropriate calculation methods within each year group and the progression of skills throughout the school.

The content of this document is set out in year group blocks under the following headings: addition, subtraction, multiplication and division.

Developing Fluency and reasoning skills

Working with the person next to you can you write a number sentence to go with the dotted formation?

www.stevewyborney.com
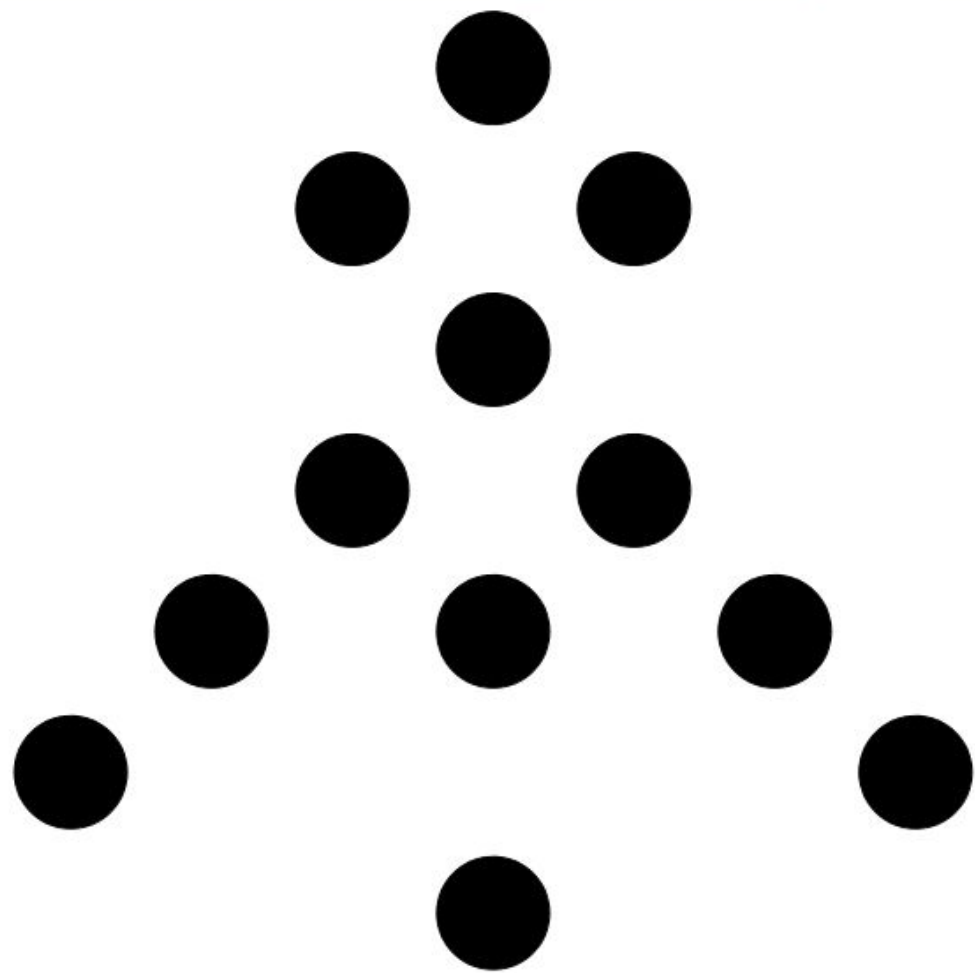
Number Talks
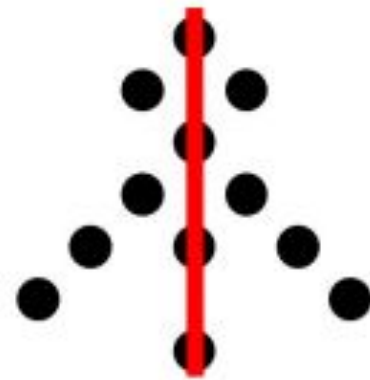
How many ways …?
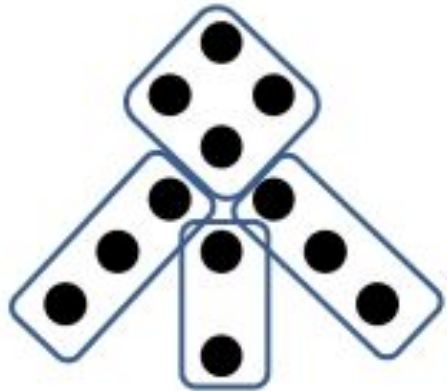
$4 + 3 + 3 + 2 = 12$
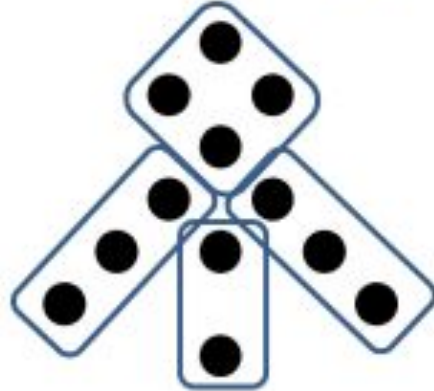
$4 + 3 + 2 + 3 = 12$
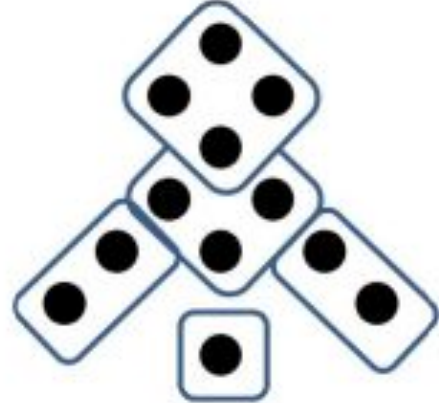
$4 + 3 + 2 + 2 + 1 = 12$
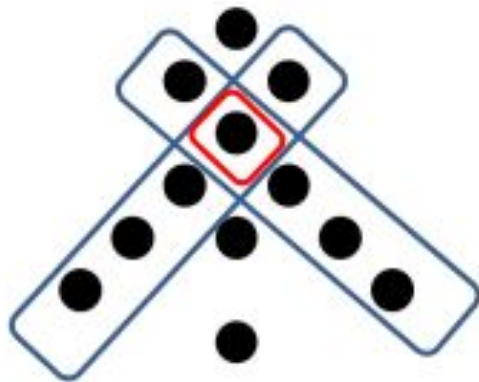
$5 + 5 + 3 - 1 = 12$

$1 + 5 + 2 + 2 + 2 = 12$

$6 + 6 = 12$
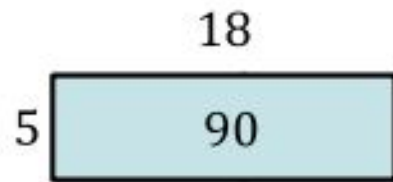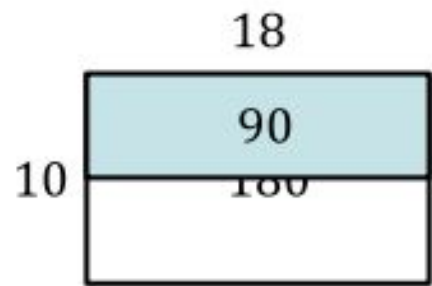
Calculate mentally:

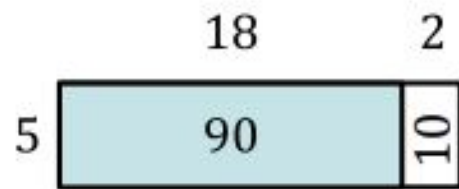18 × 5

How did you do it?

18

5 | 90

$10 \times 5 = 50$
$8 \times 5 = 40$
$50 + 40 = 90$

9

10 | 45
    | 45

18

10 | 90
   | 180

$18 \times 10 = 180$
$180 \div 2 = 90$

18   2

5 | 90 | 10

$20 \times 5 = 100$
$2 \times 5 = 10$
$100 - 10 = 90$

18

5 | 90

$9 \times 10 = 90$
$45 \times 2 = 90$

18

5 | 90
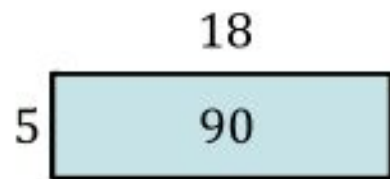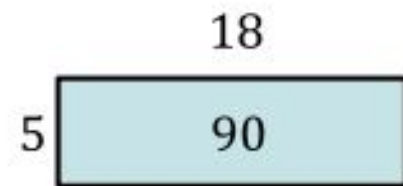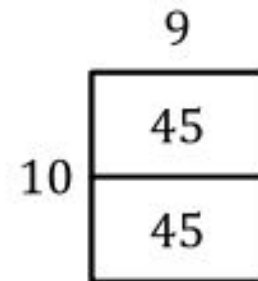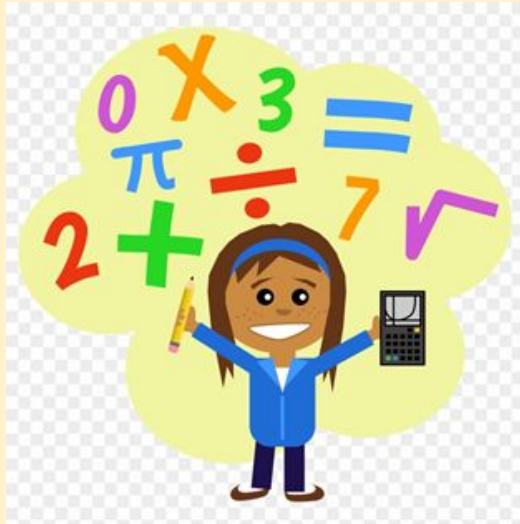
$9 \times 5 = 45$
$45 \times 2 = 90$

Discuss…

What is reasoning?

Reasoning is...

...the action of thinking about something in a logical, sensible way

Progression in reasoning

Describing	Simply tells what they did
Explaining	Offers some reasons for what they did (may or may not be correct)
Convincing	Confident that their chain for reasoning is right (inductive reasoning)
Justifying	A correct logical argument that has a complete chain of reasoning
Proving	A watertight argument that is mathematically sound (deductive reasoning)

NRICH (2014)

| 240 | 42 | 60 | 45 |

- All of the numbers…
- Some of the numbers…
- None of the numbers…

How can you help your child with Maths at home?

- Take away their fear.
- Reassure and praise whenever possible. Positive mindset...
- Let them see you using maths in your everyday routines - portioning meals between the family, chopping vegetables into halves and quarters etc.
- Play with numbers and shapes through games.
- Seeing mistakes as an opportunity to learn and using them as a discussion point.
- Recognising the **importance** and value of Maths in our everyday lives e.g. managing money and telling the time.
- Ask them how they know or is there another way?

A quick guide to everyday Maths opportunities for your child

- Practise spotting and recognising numbers in the **environment**. Add/multiply/subtract/divide door numbers, numbers on car registration plates, road signs and at the shop.
- Flicking through the **TV guide**? Ask your child to calculate the length of their favourite programmes. How long is it until the next programme?
- Use **food packaging to discuss 2D and 3D shapes**. What are the properties of these shapes e.g. how many faces, sides, vertices? Flatten the packaging out to find the net of the 3D shape too.
- **Measuring** up for new furniture? Want to make sure the Christmas tree will fit in your living room? These are really good opportunities to encourage your child to see the value of careful measuring skills in everyday life.
- Practise **telling the time** with your child. Can they read both the digital and analogue clock? Can they readily convert between the two and use the 24 hour clock? Can they also recognise Roman Numeral representations of the time too?
- **Board Games** supply endless opportunities for Maths – Snakes and Ladders, Monopoly, Bingo, Connect Four, Battle Ships etc

Websites to support children's Maths skills

- [Times Table Rock Stars](#)
- [CBeebies](#) have lots of fun and interactive games and activities to help get our younger children excited about Maths
- [I See Maths](#) – a useful site with a plethora of ideas for fun games that all the family
- [Primary Games Arena](#) – It is a free website that encourages children to play online maths games linked to their home learning. It breaks the games down into concepts which is really helpful.
- [Hit the Button](#) – children love this game as it helps to increase confidence through practising times tables and number bonds.
- [Maths Zone](#) – this site is jam-packed with fun ways to learn more about maths.
- [BBC Bitesize](#) – lots of information alongside short videos help to make the learning enjoyable and accessible for all children.
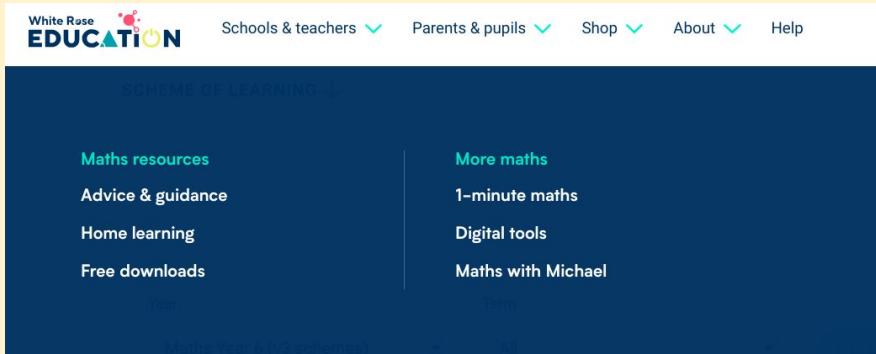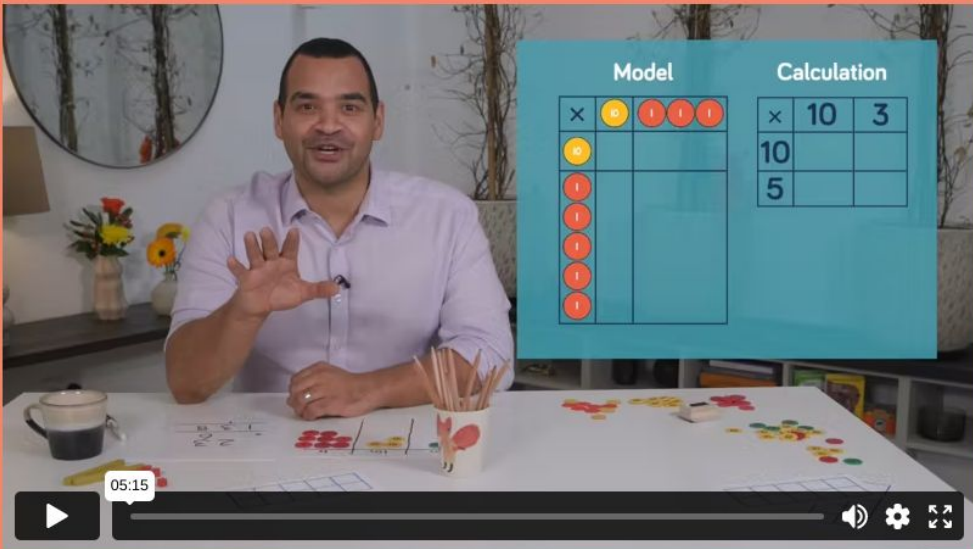
Videos

Home Learning Videos

White Rose - Helpful Videos
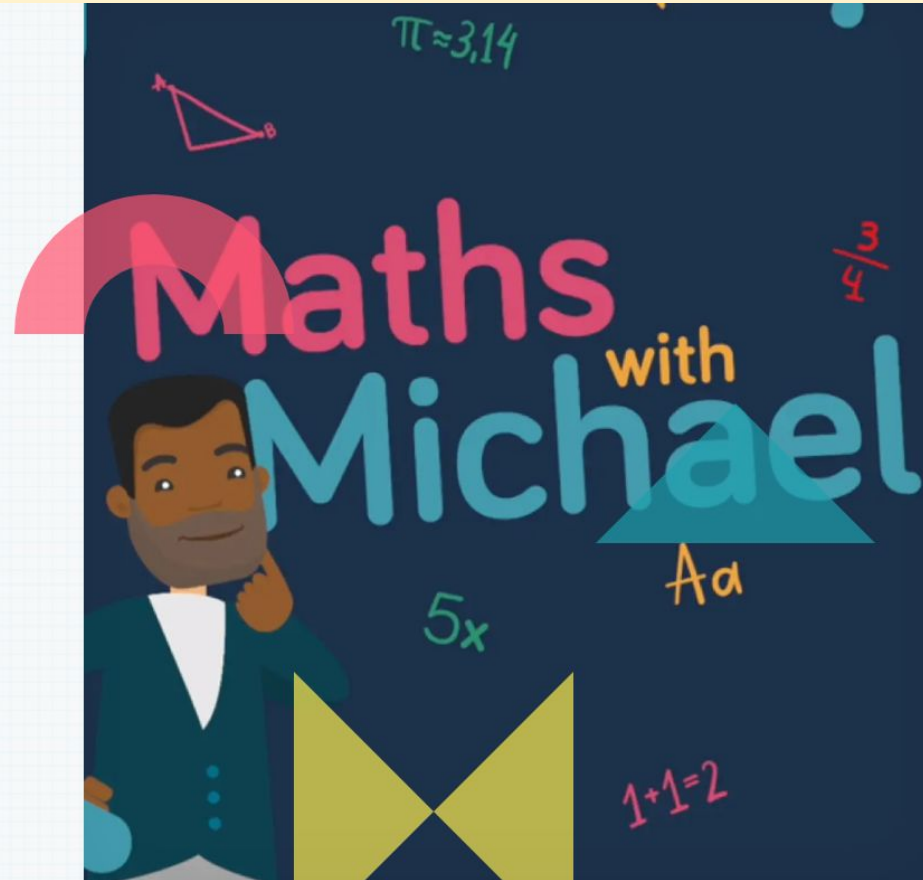
Maths with Michael - parent guides

Each of the six sections has a useful guide with <u>resources</u> that can be printed.

White Rose – workbooks

On the website there are links to free workbooks that you can use to support your child's learning at home.

Parent link
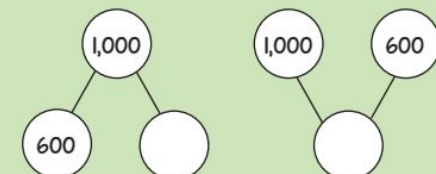
Get the free workbooks

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn Block 1	Autumn Block 2	Autumn Block 3	Autumn Block 4	Spring Block 1	
Place value (within 10)	Addition and subtraction (within 10)	Shape	Place value (within 20)	Addition and subtraction (within 20)	

3 ADDITION AND SUBTRACTION White Rose Maths

From White Rose Maths schemes for Year 3 Autumn Term
BLOCK 2 – ADDITION AND SUBTRACTION

1. Complete the part-whole models.

1,000 ... 600

1,000 ... 600

2. Alex has 262 stickers.
She buys 12 more.
How many stickers does she have now?

3. Find the missing number.

$361 = 9 + \boxed{}$

MATH:
YOU SHOULD NOT only
KNOW WHAT YOU
ARE DOING. YOU
SHOULD ALSO KNOW
WHY & HOW

HARRY WONG