Introduction to Maths: Key Stage 3

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Assistant Head and CL ACL Maths Teacher

Course content:

1. An overview of the Maths Curriculum in KS3
2. The transition from Year 6 to Year 7
3. The importance of ‘Declarative knowledge’ at KS3
4. Mathematical language (Reasoning & Problem solving)
5. Homework
6. Resources and activities which can support Maths in the home setting
7. Helpful tips for parents/Carers

NOTE: Please have a pen and paper or mini whiteboard to hand to participate in some maths throughout this session 😂

- Mathematics, a **universal language** that enables **understanding of the world**, is an integral part of the curriculum. Beyond the study of numbers, shapes and patterns, it also provides important tools for work in fields such as engineering, physics, architecture, medicine and business.

- It **nurtures** the development of a **logical and methodical mindset**, as well helping to inculcate **focus** and the ability to **solve** all manner of **problems**. Attainment in the subject is also the key to **opening new doors** to further study and employment.

1. Overview of KS3 Maths Curriculum

5 Main Strands

1. Number
2. Algebra
3. Geometry
4. Data/Statistics
5. Probability

1. Overview of KS3 Maths Curriculum

Curriculum overview: Knowledge

	Year 7	Year 8	Year 9
Working Mathematically	Being able to demonstrate the skills associated with working mathematically is critical in learners developing an understanding of how they can build from being fluent in mathematics to developing reasoning and problem-solving abilities in maths. We aim to provide all learners with regular opportunities to demonstrate their burgeoning skills in working mathematically to help them solve problems. This work is not done in isolation, so we also ensure that teachers are supported in being able to help students to develop problem-solving strategies that will stay with them throughout their maths journey.		
Literacy	Support for the correct use of mathematical language and terminology is embedded throughout the course. Key terms are identified and defined in the relevant context and frameworks are provided for students to use when developing the fundamental tools needed to communicate their reasoning, thinking and ideas accurately.		
Self-regulation and metacognition	Encouraging students to develop their metacognitive skills and their ability to self-regulate their learning can help them to become more confident and accomplished in their mathematical understanding. We have ensured that we have provided regular opportunities for learners to develop their skills and learn the strategies needed to do this, and have provided scaffolding and frameworks that will help them to follow the strategies regularly and systematically as they become increasingly familiar with them.		

Year 7

	Autumn term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Place Value		Properties of numbers				Arithmetic					Expressions and equations

	Spring term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Expressions and equations cont.		Coordinates				Perimeter and area					Fractions

	Summer term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Fractions cont.		Fractions and ratio				Transformations					

Year 8

	Autumn term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Estimation and rounding			Solving Linear equations				Sequences			Linear Graphs	

	Spring term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Linear Graphs cont.		Percentages and proportionality				Statistics					

	Summer term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Perimeter, area and volume					Polygons				Constructions		

Year 9

	Autumn term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Similarity and congruence			Pythagoras' theorem				Probability				

	Spring term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Non-linear sequences				Expressions and formulae				Trigonometry			

	Summer term											
Week	1	2	3	4	5	6	7	8	9	10	11	12
Chapter	Standard form			Linear and non-linear graphs								

2. The Transition from KS2 to KS3

- SATS

- Paper 1: arithmetic (40 marks)
- Paper 2: reasoning (35 marks)
- Paper 3: reasoning (35 marks).

- **120** – This is the highest score a child can get in the KS2 SATs.
- **101-119** – Any score above 100 (including 120) means that a child has exceeded the expected standard in the test.
- **100** – This is the expected standard for children (and essentially means a ‘pass’).
- **80-99** – Any child that is awarded a scaled score of 99 or below has not met the expected standard in their KS2 SATs.

Key Stage 2

What do secondary schools do with SATs results?

- As a secondary school we are told the scaled SATs scores of the incoming pupils, and in maths we use them to stream children coming into Year 7. This happens at most schools

- We then use a combination of SATs scores and our own internal tests at various points throughout the year to ensure our sets are correct and move students to the most appropriate group.

What Secondary schools have noticed…

- Students starting Year 7 are generally stronger with Number & Geometry
- Students are less familiar with Algebra
- Limited Knowledge of Probability & Statistics
- Varies between schools
- It is the role of Secondary KS3 Teams to ‘level the playing field’
- Students are taught how to use a calculator effectively - *these can be purchased from the school at cost price.*

Year 6
SATs

A bit of Maths…

36	$60 - 42 \div 6 =$	1 mark

Answer = 53

B	(brackets)
I	indices ^{2}
D	÷ division
M	multiplication x
A	+ addition
S	subtraction –

Year 6
SATs

A bit of Maths…

9 Jack chose a number.

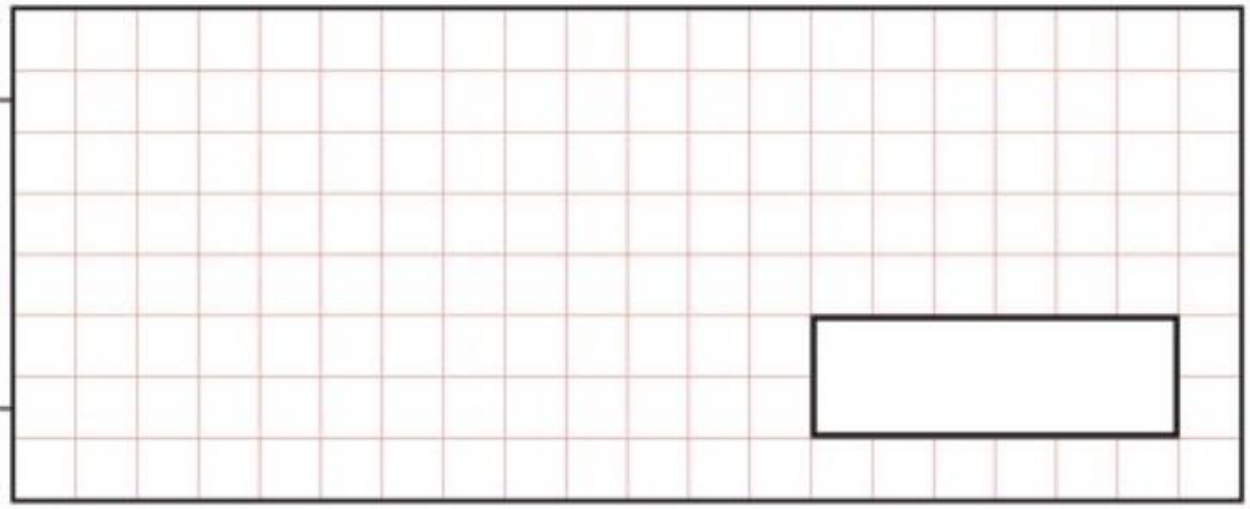
He multiplied the number by 7

Then he added 85

His answer was 953

What number did Jack choose?

Show your method



2 marks

Answer = 124

Work backwards

953 – 85 = 868

868 ÷ 7 = 124

Key Stage 3

- Ambitious for ALL.
- Oxford Mosaic smart curriculum
- Year 7 will contain some form of ‘Baseline Test’ within the first few week
- Design for Mastery in maths
- Preparing for GCSE
- Leveling the playing field
- Assessments and performance at this Key Stage will inform tier of entry decision, Foundation or Higher GCSE

Any Questions…

3. Importance of Declarative Knowledge

- **Declarative knowledge** is static in nature and consists of facts, formulae, concepts, principles and rules.

- All content in this category can be prefaced with the sentence stem ‘I know that’.

- Many pupils start school with some mathematical knowledge. This is not necessarily the outcome of natural ability or a different developmental pathway. Rather, it can be an indication of **parental input** and **early exposure to the basics in mathematics in the home.**

- Pupils who are not able to quickly and easily recall **maths facts** struggle with calculations due to their **working memory being overloaded.**

3. Importance of Declarative Knowledge

- Pupils need to systematically acquire core mathematical **facts**, concepts, methods and strategies to be able to experience success when problem-solving and in order to become proficient mathematicians.

The Multiplication Tables Check (MTC)

- Introduced 2020/21
- **Purpose**: to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics.
- There is an emphasis on the 6, 7, 8, 9 and 12 multiplication tables because these have been determined to be the most difficult multiplication tables.

3. Continued…

Category	Type 1	Type 2
Declarative 'I know that'	Facts and formulae	Relationship between facts (conceptual understanding)
Procedural 'I know how'	Methods	Relationship between facts, procedures and missing facts (principles/mechanisms)
Conditional 'I know when'	Strategies	Relationship between information, strategies and missing information (reasoning)

A bit of Maths…

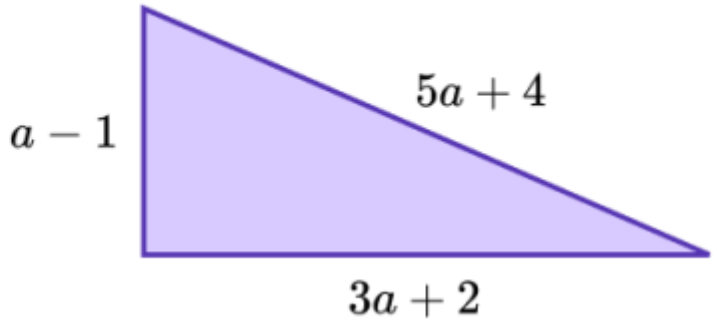
(a) Simplify: $5x + 6y - 2xy + 2x - 8y + 7xy$

(a) 7x - 2y + 5xy

(b) Simplify: $2a - 4b + 3ab - 2a + 7b - 5ab$

(b) 3b – 2ab

Write an expression for the perimeter and simplify it.



Perimeter is distance around the shape

9a + 5

4. Homework

- Consolidation (based on current learning)
- Interleaving (based on previous unit/term of work)
- Spaced (Spread out over time, opposite of ‘cramming’)

- Consistent (Regular, Set & Due dates)
- Accessible – not too hard and not too easy!
- Independent (Ideally it should not require your help!)
- Approximately 1 hour per week
- Progress booklet or online
- Feedback & Marked - (self and teacher) once a fortnight

4. Homework…

Common Question

“The way I done it at school was different, what should I do?”

If you remember your method and are confident in explaining it. Then what’s the harm in showing them?

There are lots of methods in Maths! At GCSE all methods are acceptable. As long as the student can ‘show’ what they’ve done.

5. Mathematical Language in KS3

NUMBER

- Sum means ‘add’
- Product means ‘multiply’
- Quotient means ‘divide’
- Prime number has exactly two factors
- Factor is an integer that divides exactly into a selected whole number with no remainder
- Integer means ‘whole number’

GEOMETRY

- Volume means ‘Capacity’
- Area means ‘Space inside shape’
- Perimeter means ‘distance around shape’
- Enlargement means shape gets bigger or smaller

DATA/STATISTICS

- Mode means ‘most common’
- Median – order numbers, then the find the middle
- Range means ‘biggest – smallest’
- ‘Mean’ means add values and divide by how many there are.

ALGEBRA

- Expand means ‘multiply out’
- Simplify means ‘make smaller’
- Substitute means ‘exchange for’
- Equation means two things are equal

5. Mathematical Language

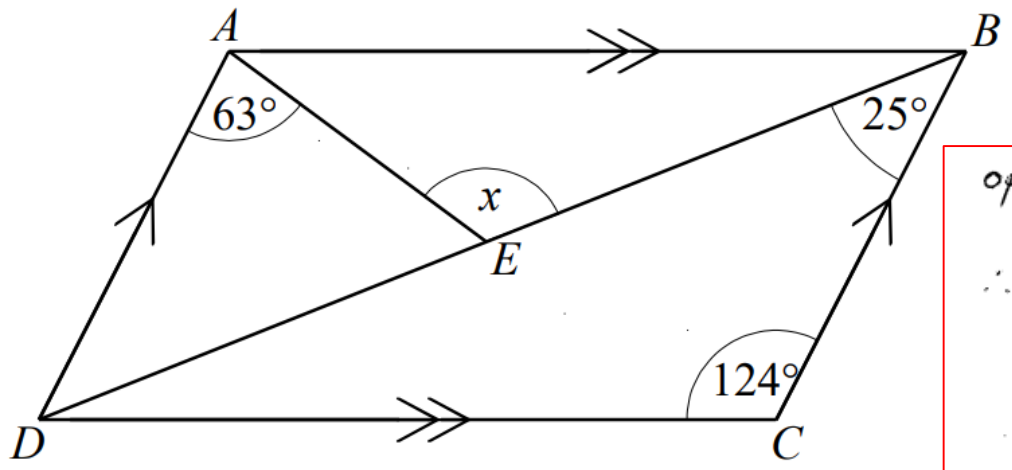
- Students typically struggle most with Reasoning
- At GCSE this is called AO2 Questions
- Problem Solving also challenges all students
- At GCSE this is called AO3 Questions

- Students with SEN can find this even more difficult.
- Particularly due to processing, dyslexia, dyscalculia, ADHD etc.
- Reading/Literacy proficiency

Reasoning...

Year 8 / Grade 4

8



ABCD is a parallelogram.

Angle *DAE* = 63°
Angle *BCD* = 124°
Angle *CBD* = 25°

Calculate the size of angle *x*.
Give reasons for each stage of your answer.

(Total for question 8 is 3 marks)

opposite angles in a parallelogram are equal

$\therefore$ BAD = 124°

BAE = 124 − 63 = 61°

ABC = 180 − 124 = 56° Co interior angles add to 180°

ABE = 56 − 25 = 31°

180 − 61 − 31 = 88° Angles in a triangle add to 180°

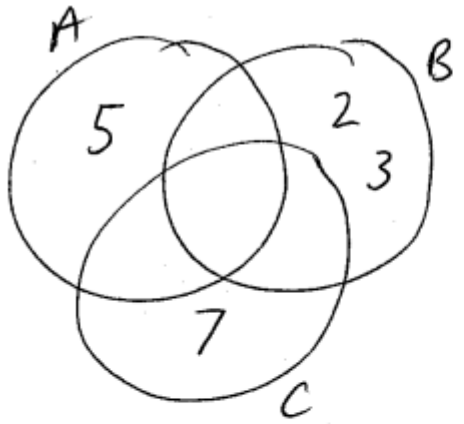
Problem Solving…

Year 8 / Grade 4

14 Light **A** flashes every 5 seconds.
Light **B** flashes every 6 seconds.
Light **C** flashes every 7 seconds.

All three lights flash at the same time.

Work out how long it will take for all three lights to flash at the same time again.



7 x 5 x 6

35 x 6 = 210

210 ..... seconds

Problem Solving…

Year 9 / Grade 5

10 Matt wants to invest £8000 for three years. He can choose between Bank A and Bank B.

Bank A	**Bank B**
1.2% compound interest per annum	2% compound interest in the first year 1% compound interest for each extra year

Which bank will give Matt the most interest after three years.
You must show your working.

(Total for question 10 is 4 marks)

Bank A

$£8000 \times 1.012^3 = £8291.47$

Bank B

$£8000 \times 1.02 \times\times 1.01^2 = £8324.02$

Banks B is better

A bit of Maths…

Year 7 - Algebra

Expand $7(2x + 7)$

$= 14x + 49$

Year 8 - Algebra

Expand and Simplify $7(t - 4) + 5(t - 2)$

$= 7t - 28 + 5t - 10$

$= 12t - 38$

Year 9 - Algebra

Expand and simplify $(7x + 1)(x + 5)$

$= 7x^2 + 35x + 1x + 5$

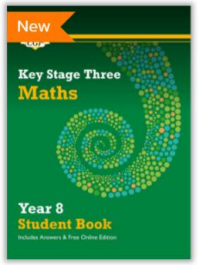
$= 7x^2 + 36x + 5$

Any Questions…

Your turn….

6. Resources & Websites

CGP Books



Quick View

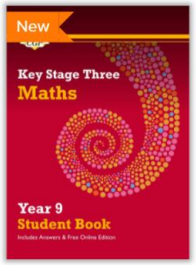
New KS3 Maths Year 8 Student Book - with answers & Online Edition

M8TB31
In stock

★★★★★ (3)

Retail Price: £14.99

School Price: **£7.50**



Quick View

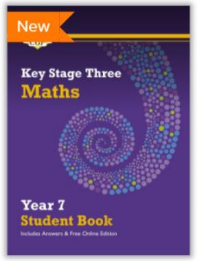
New KS3 Maths Year 9 Student Book - with answers & Online Edition

M9TB31
In stock

★★★★★ (2)

Retail Price: £14.99

School Price: **£7.50**



Quick View

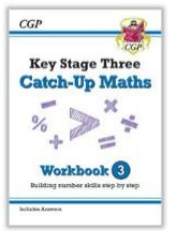
New KS3 Maths Year 7 Student Book - with answers & Online Edition

M7TB31
In stock

★★★★★ (6)

Retail Price: £14.99

School Price: **£7.50**



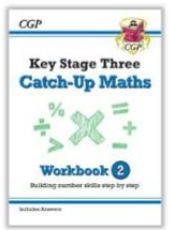
KS3 Maths Catch-Up Workbook 3 (with Answers)

MBNW331
In stock

★★★★★ (34)

Retail Price: £4.95

School Price: **£2.25**



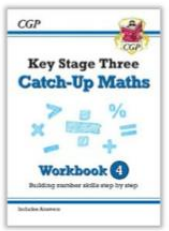
KS3 Maths Catch-Up Workbook 2 (with Answers)

MBNW231
In stock

★★★★★ (33)

Retail Price: £4.95

School Price: **£2.25**



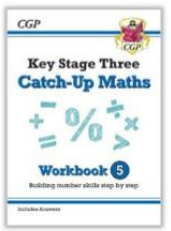
KS3 Maths Catch-Up Workbook 4 (with Answers)

MBNW431
In stock

★★★★★ (34)

Retail Price: £5.50

School Price: **£2.25**



KS3 Maths Catch-Up Workbook 5 (with Answers)

MBNW531
In stock

★★★★★ (36)

Retail Price: £4.95

School Price: **£2.25**

Helpful Websites:

https://uk.ixl.com/maths/year-7

https://uk.ixl.com/maths/year-8

https://uk.ixl.com/maths/year-9

https://www.thenational.academy/

https://mathsmadeeasy.co.uk/ks3-revision/ks3-maths/

https://app.senecalearning.com/dashboard/courses/add?Price=Free

https://www.drfrostmaths.com/explorer.php#

https://www.kerboodle.com/users/login?user_return_to=%2Fapp

Some primary schools subscribe to:

https://ttrockstars.com/

https://sparxmaths.com/

We subscribe to:

https://www.mathswatch.co.uk/

https://senecalearning.com/en-GB/

https://www.sumdog.com/user/sign_in

7. Helpful Tips

- Growth Mindset (Not fixed)
- It's all about **practice** and **self-belief**.
- Avoid saying things like:

"I'm not good at Maths.."

"I was really bad at Maths in school"

"I've never been able to do Maths"

"Don't ask me because I don't know…"

- Instead, be encouraging and positive about Maths.

"I will try my best to help you"

"It's been a long time since I done this, but I'll have a go…"

"If you're unsure, we will inform your teacher that you're struggling with this topic"

"You will get there eventually, keep going!"

"I know you're capable, be resilient, don't give up, persevere!"

Advice

1. Checkout the student Scheme of Learning (SoW) -

1. Print a copy of the knowledge organiser

1. Invest in a Scientific Calculator (Casio FX-85GTX or equivalent) - Available via school on Parent Pay

1. Create routines for homework – set time and day to complete. Space. Consistency.

1. Find out about Assessments/Tests – when are they? What are they assessing? What can they be revising?
2. Talk to your child about what they are learning.

A typical conversation afterschool…

Parent/Carer: How was school today?

Child: Good, thanks.

End of conversation.

An ideal conversation afterschool…

- Parent: How was school today?
- Child: Good, thanks.
- Parent: Did you have Maths today?
- Child: Yes
- Parent: What did you learn about?
- Child: Fractions
- Parent: Tell me more…was it adding/subtracting, Multiplying/Dividing?
- Child: It was adding and subtracting.
- Parent: Wicked, what do you understand about that then?
- Child: Well, you have to have a common denominator when adding/subtracting fractions
- Parent: So, how do you find that? Etc…

Frequently Asked Questions

1. “My child is really good at Maths, how can I ensure that they’re being stretched and challenged?”

Opportunities to participate in The Junior Maths Challenge (UKMT). Access to problem solving questions.

2. “My child struggles with maths and doesn’t enjoy it, how can I help them?”
Empathise. Explain its importance. Pinpoint what exactly they don’t like. Small Steps! “Let’s look at this together”

3. “I don’t know how to do the Maths my son/daughter is learning, how can I help them with homework?”

Work with them. If there’s a video - watch it. Check their book. Use recommended websites. If still stuck, child to contact teacher, not you.

4. “My child isn’t fluent with their Timetables yet, how can I help with that?”
Daily practice. 10 minutes. Focus on one at a time. Master the ‘easier ones’ (2, 3, 5, 10 and 11). Repetition. Ask 3 times. Repeat.

Thank you 😊

Any final questions?