“Building stronger foundations, together for everyone”.

Maths Workshop

Years 5 and 6

Wednesday 16th October 2024

8:30 -10:30 am

Mrs Taplin
Year 4 Teacher
Yr 3 & 4 Assistant Headteacher
Mastery Specialist

MATHSHUBS
MÖBIUS

18 x 35

Easy or tricky calculation? Explain your reasoning.

“The answer is only the beginning.”

(Chinese Proverb)

Housekeeping

- Please sit four to a table, as we will bring in your children a little later
- We are staying in here – no fire drill planned
- There are activities on paper for the children to complete
- There will be opportunities to do some of the activities mentioned
- Please fill in the feedback form at the end of the session
- When your children they can go on the devices with you or tackle some questions.

Aims

- Explain what a mastery approach to teaching mathematics is
- Understand the importance of fluency
- Share how we teach formal methods
- Suggest ways to support your child at home.

National Curriculum

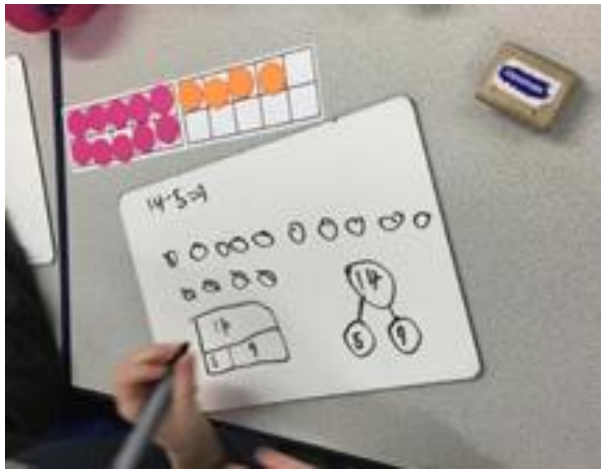
Aims

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
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

What does it mean to have mastered something in maths?

A mathematical concept or skill has been mastered when, through **exploration**, **clarification**, **practice** and **application** over time, a person can **represent** it in multiple ways, has the **mathematical language** to be able to communicate related ideas, and can **think mathematically** with the concept so that they can independently apply it to a totally new problem in an unfamiliar situation.

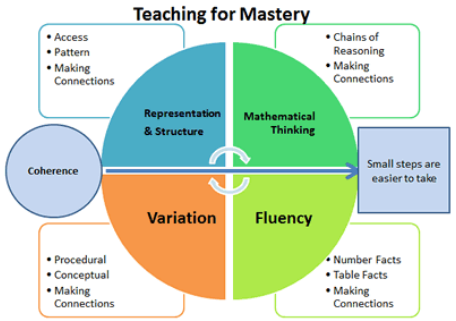


Drury, 2018, p.1

https://www.ncetm.org.uk/teaching-for-mastery/mastery-explained/

‘Every child a Mathematician’

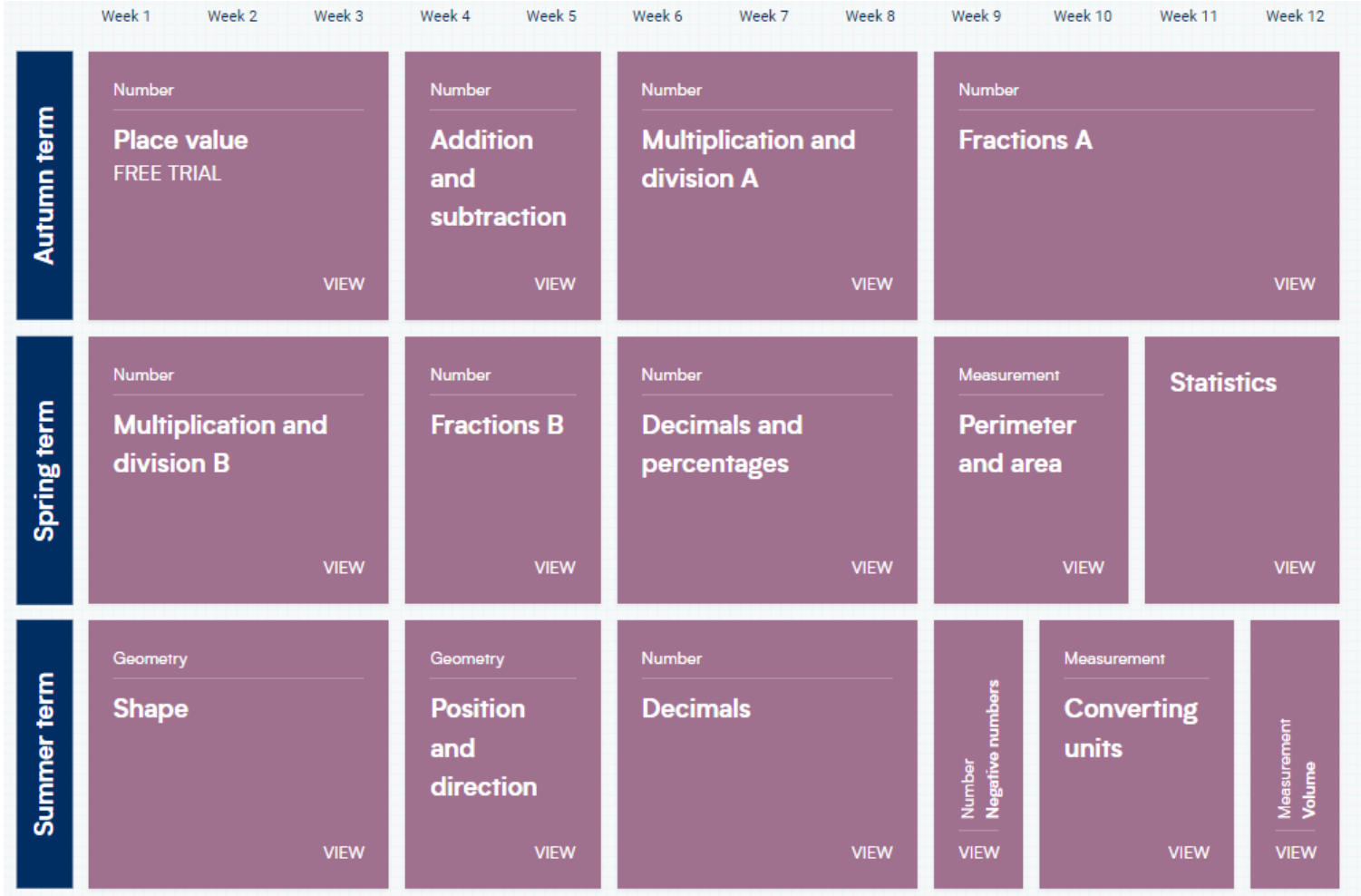
During their time at Binfield C.E. Primary School (V.A.) we aim for all pupils to develop the characteristics needed to be Mathematician.



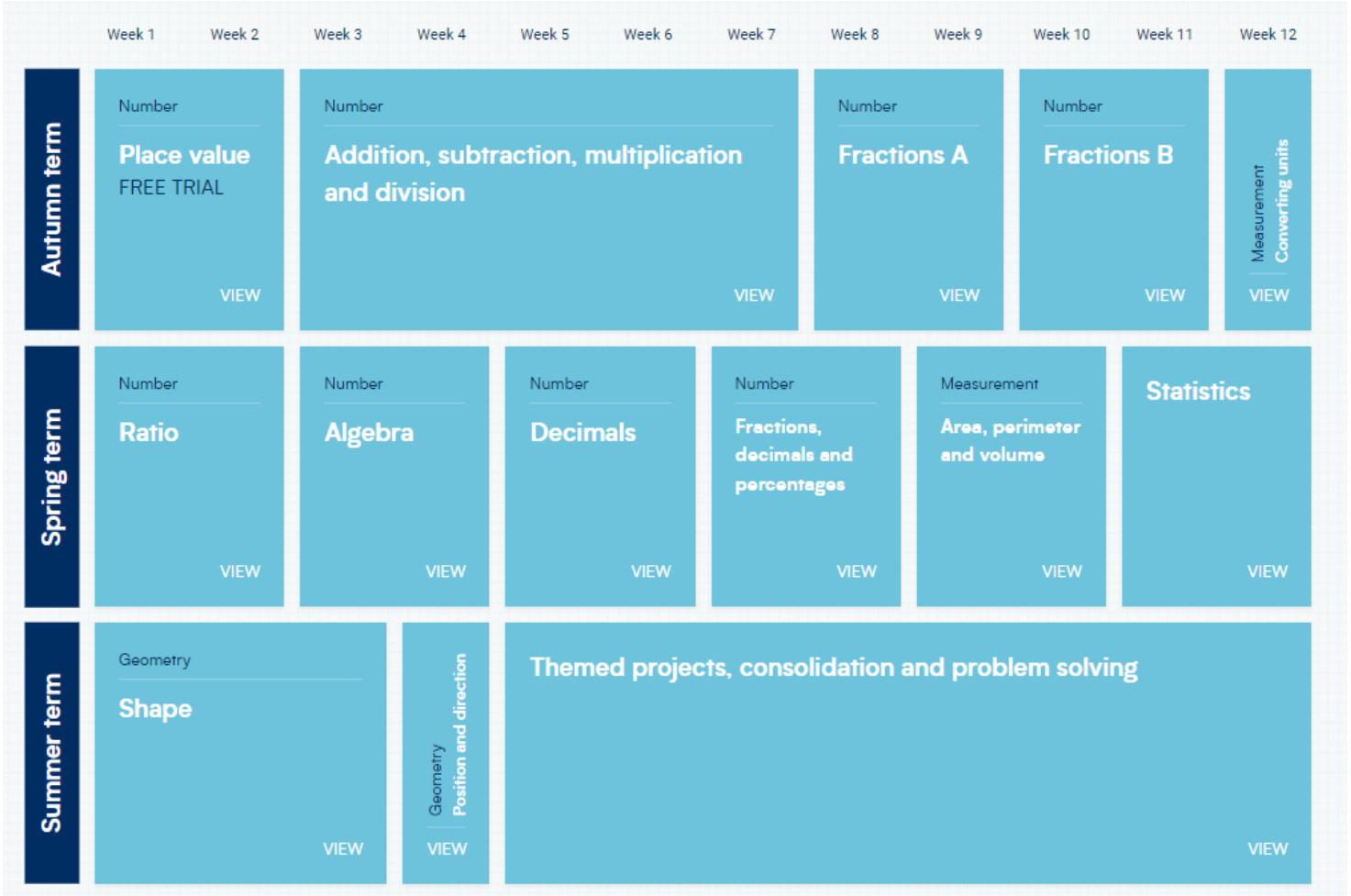
We believe that the ‘Essential Characteristics’ of a Mathematician are:

- A commitment to and passion for the subject.
- An understanding of the important concepts and an ability to make connections within mathematics.
- A broad range of skills in using and applying mathematics.
- Fluent knowledge and recall of number facts and the number system.
- The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.
- The ability to reason, generalise and make sense of solutions.
- The ability to think independently and to persevere when faced with challenges, showing confidence in their potential for success.
- The ability to embrace the value of learning from mistakes and false starts.
- Fluency in performing written and mental calculations and mathematical techniques.
- A wide range of mathematical vocabulary

Year 5 Curriculum



Year 6 Curriculum



Fluency

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

https://www.ncetm.org.uk/teaching-for-mastery/masteryexplained/five-big-ideas-in-teaching-for-mastery/

Rekenreks

How would you show double 6?

(5 x 2) + (1 x 2)

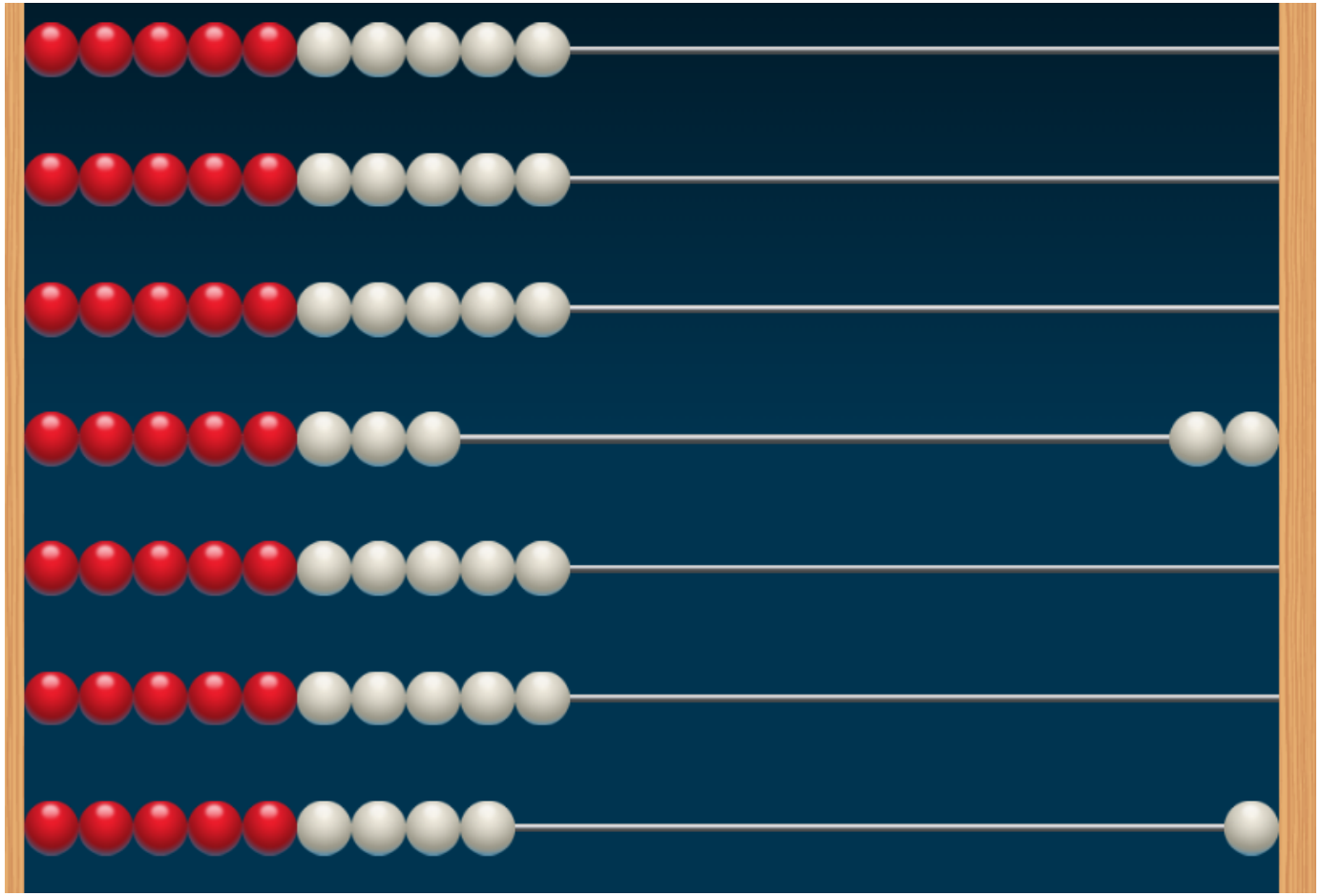
I see 5 and 1 twice!

What do you see?

Rekenreks

38 + 29 = ?

What do you Notice?



Number bonds

6 can be made of
5 and 1, 1 and 5

https://numbersensemaths.com/media/1841/achieving-fluency-in-addition-and-subtraction-facts-article.pdf

Adding 1 and 2 | Bonds to 10 | Adding 10 | Bridging/ compensating

Doubles | Adding 0 | Near doubles

Y1 facts

Y2 facts

+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6	4 + 7	4 + 8	4 + 9	4 + 10
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5	5 + 6	5 + 7	5 + 8	5 + 9	5 + 10
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4	6 + 5	6 + 6	6 + 7	6 + 8	6 + 9	6 + 10
7	7 + 0	7 + 1	7 + 2	7 + 3	7 + 4	7 + 5	7 + 6	7 + 7	7 + 8	7 + 9	7 + 10
8	8 + 0	8 + 1	8 + 2	8 + 3	8 + 4	8 + 5	8 + 6	8 + 7	8 + 8	8 + 9	8 + 10
9	9 + 0	9 + 1	9 + 2	9 + 3	9 + 4	9 + 5	9 + 6	9 + 7	9 + 8	9 + 9	9 + 10
10	10 + 0	10 + 1	10 + 2	10 + 3	10 + 4	10 + 5	10 + 6	10 + 7	10 + 8	10 + 9	10 + 10

Developing Automaticity

*'Automaticity is the ability to produce answers in a few seconds by relying on thinking of the **relationships among the operations**.*

Fosnot and Dolk (2001)

Representations

A core set of representations have been selected to **expose** important **mathematical structures** and ideas, and make them accessible to pupils.

Consistent use of the same representations across year groups help to connect prior learning to new learning.

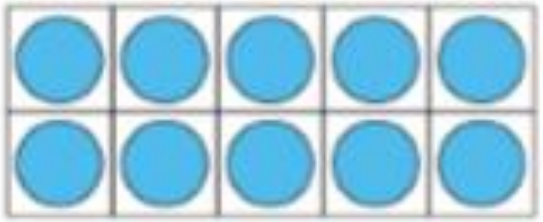
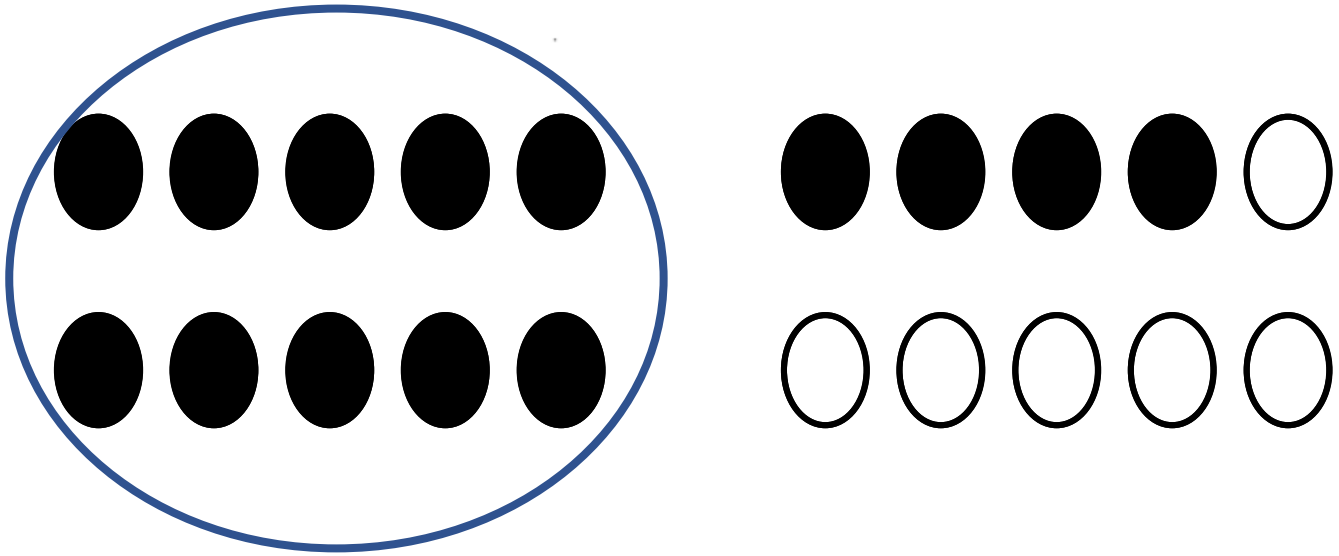


Figure 1: using a tens frame and counters

Figure 2: using a tens frame and counters

Ten frames

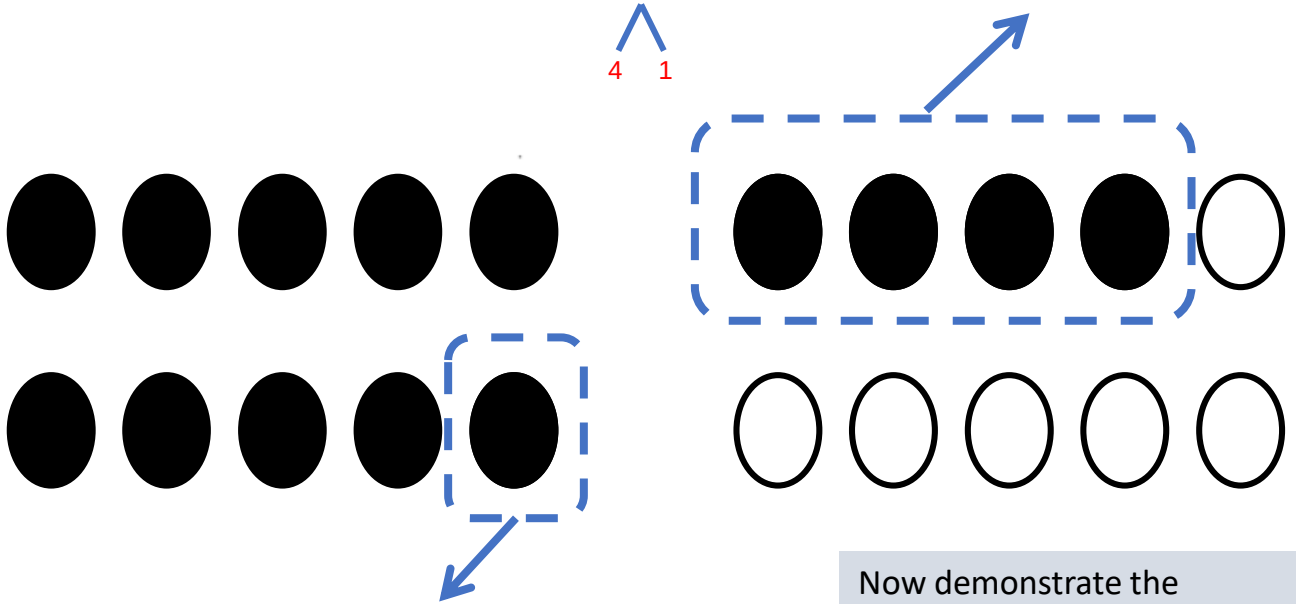
14 - 5



Ten frames

14-5

4 1



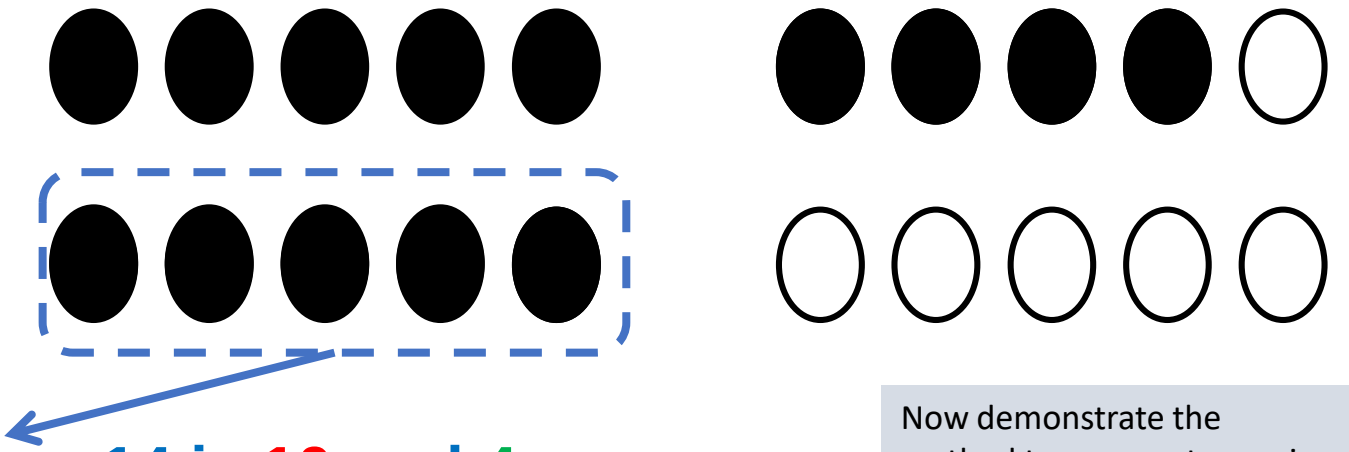
14 is 10 and 4.
Partition 5 into 4 and 1.
Take away 4 and then take away 1.

Now demonstrate the method to your partner using the counters and tens frames

Ten frames

14-5

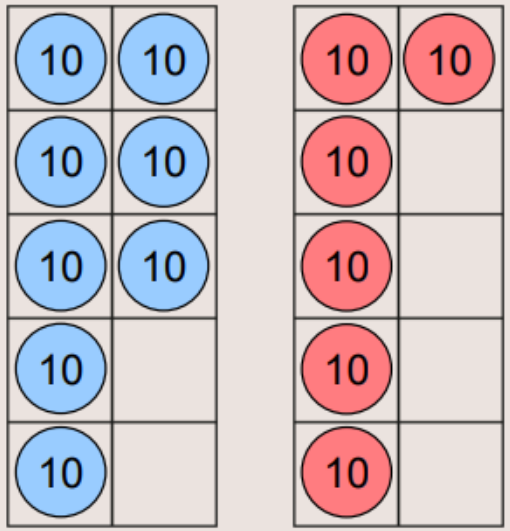
10 4



14 is 10 and 4.
Take away 5 from 10,
then put 5 and 4 together.

Now demonstrate the method to your partner using the counters and tens frames

Ten frames



8 + 6

8 tens + 6 tens

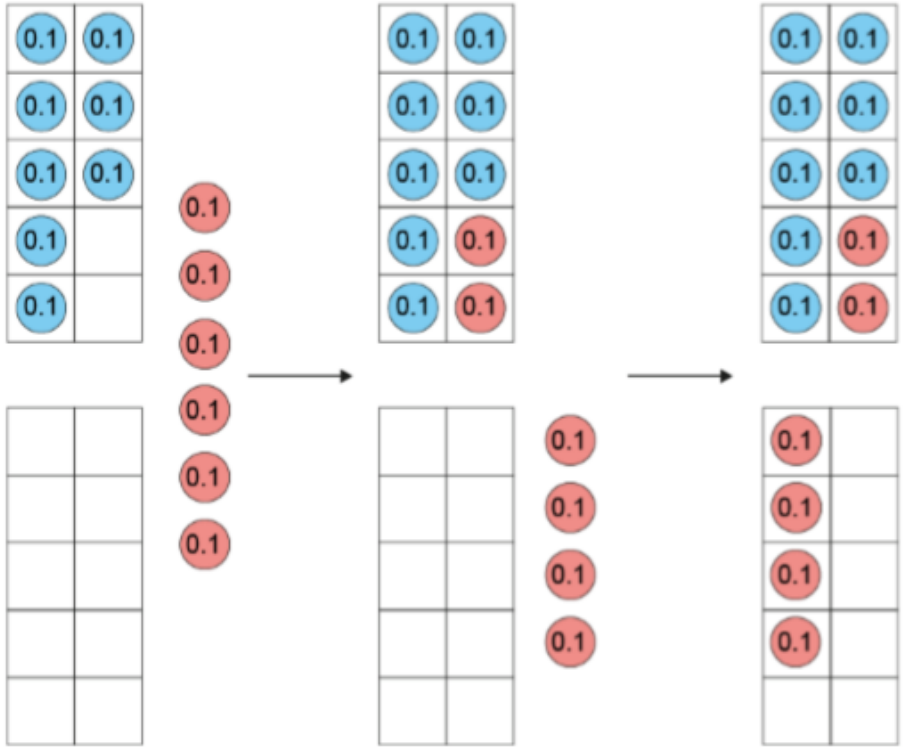
80 + 60 = 140

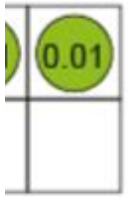
“10 tens are equivalent to 100”

Ten frames

- 18 hundre
- 18 tenths i

s written as 0.18
1.8





Figu

tens frames

Figure 172: tens frames with 0.1-value counters showing 0.8 + 0.6 = 1.4

8 + 6 = 14	14 – 6 = 8	14 – 8 = 6
0.8 + 0.6 = 1.4	1.4 – 0.6 = 0.8	1.4 – 0.8 = 0.6

Developing depth, simplicity and clarity

7	
2	5

7	
1.9	5.1

7.4	
1.7	5.7

c	
a	b

www.ncetm.org.uk/resources/29331

Fluency and Understanding

- Sally knows all her tables up to 12 x 12
- When asked what is 12 x 13 she looks blank.
- Does she have fluency and understanding?

Making Connections

$\square + 17 = 15 + 24$

Jimmy has £5.00 to spend at Creams. He buys an ice cream for £2.99. How much change does he get?

Times Tables

7 x 8 = 56

- Seven eights are 56
- Seven eights make 56
- Seven times eight is 56
- Seven multiplied by 8 is 56
- Seven lots of eight are 56
- Seven groups of eight are 56
- Seven eight times is 56

Times Tables

Times table sound bites grid

1 1 is 1	2 1s are 2	3 1s are 3	4 1s are 4	5 1s are 5	6 1s are 6	7 1s are 7	8 1s are 8	9 1s are 9	10 1s are 10
1 2 is 2	2 2s are 4	3 2s are 6	4 2s are 8	5 2s are 10	6 2s are 12	7 2s are 14	8 2s are 16	9 2s are 18	10 2s are 20
1 3 is 3	2 3s are 6	3 3s are 9	4 3s are 12	5 3s are 15	6 3s are 18	7 3s are 21	8 3s are 24	9 3s are 27	10 3s are 30
1 4 is 4	2 4s are 8	3 4s are 12	4 4s are 16	5 4s are 20	6 4s are 24	7 4s are 28	8 4s are 32	9 4s are 36	10 4s are 40
1 5 is 5	2 5s are 10	3 5s are 15	4 5s are 20	5 5s are 25	6 5s are 30	7 5s are 35	8 5s are 40	9 5s are 45	10 5s are 50
1 6 is 6	2 6s are 12	3 6s are 18	4 6s are 24	5 6s are 30	6 6s are 36	7 6s are 42	8 6s are 48	9 6s are 54	10 6s are 60
1 7 is 7	2 7s are 14	3 7s are 21	4 7s are 24	5 7s are 30	6 7s are 42	7 7s are 49	8 7s are 56	9 7s are 63	10 7s are 70
1 8 is 8	2 8s are 16	3 8s are 24	4 8s are 32	5 8s are 40	6 8s are 48	7 8s are 56	8 8s are 64	9 8s are 72	10 8s are 80
1 9 is 9	2 9s are 18	3 9s are 27	4 9s are 36	5 9s are 45	6 9s are 54	7 9s are 63	8 9s are 72	9 9s are 81	10 9s are 90
1 10 is 10	2 10s are 20	3 10s are 30	4 10s are 40	5 10s are 50	6 10s are 60	7 10s are 70	8 10s are 80	9 10s are 90	10 10s are 100

Target 45 facts

	3	4	5	6	7	8	9	10	11	12	
3	9	12	15	18	21	24	27		33	36	3
	4	16	20	24	28	32	36		44	48	4
		5	25	30	35	40	45		55	60	5
			6	36	42	48	54		66	72	6
				7	49	56	63		77	84	7
					8	64	72		88	96	8
						9	81		99	108	9
							10				10
								11	121	132	11
									12	144	12

Formal Methods

Primary maths

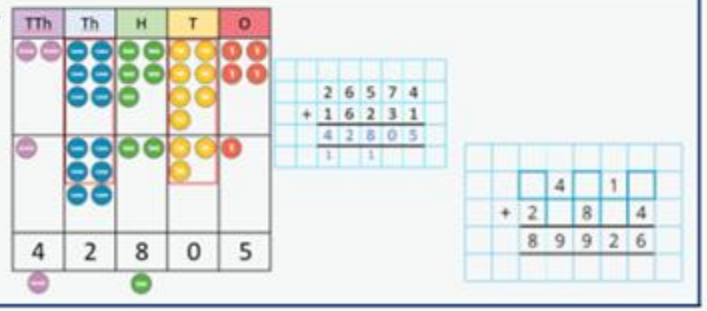
Calculation policy

Updated September 2024

White Rose MATHS

Addition

White Rose MATHS

Year 5	• Add whole numbers with more than 4 digits, including using formal written methods. • Add numbers mentally with increasingly large numbers. • Add decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 • Add fractions with the same denominator, and denominators that are multiples of the same number.
Progression of skills	**Key representations**
Add using mental strategies Add 1s, 10s, 100s, etc. to any number. Use number bonds and related facts.	 48,650 + 300 = 48,650 + 30,000 = 48,650 + 30 =
	To add ..., I can add ... then subtract ... 
Add whole numbers with more than 4 digits Encourage children to estimate and use inverse operations to check answers to calculations.	I can exchange 10 ... for 1 ... 

Addition

TTh	Th	H	T	O
10.000 10.000	1.000 1.000 1.000 1.000 1.000 1.000	100 100 100 100 100	10 10 10 10 10 10 10 10	1 1 1 1
10.000	1.000 1.000 1.000	100 100		1
3	9	7	8	5

		2	6	5	8	4	
	+	1	3	2	0	1	
		3	9	7	8	5	

In column addition we start with the place value column that has the smallest value.

Year 5

Addition

TTh	Th	H	T	O
10.000 10.000	1.000 1.000 1.000 1.000 1.000 1.000	100 100 100 100 100	10 10 10 10 10 10 10 10	1 1 1 1
10.000	1.000 1.000 1.000	100 100	10 10 10	1
3	9	8	1	5

100

		2	6	5	8	4	
	+	1	3	2	3	1	
		3	9	8	1	5	
				1			

If there are 10 or more counters in a column we can make an exchange

Year 6

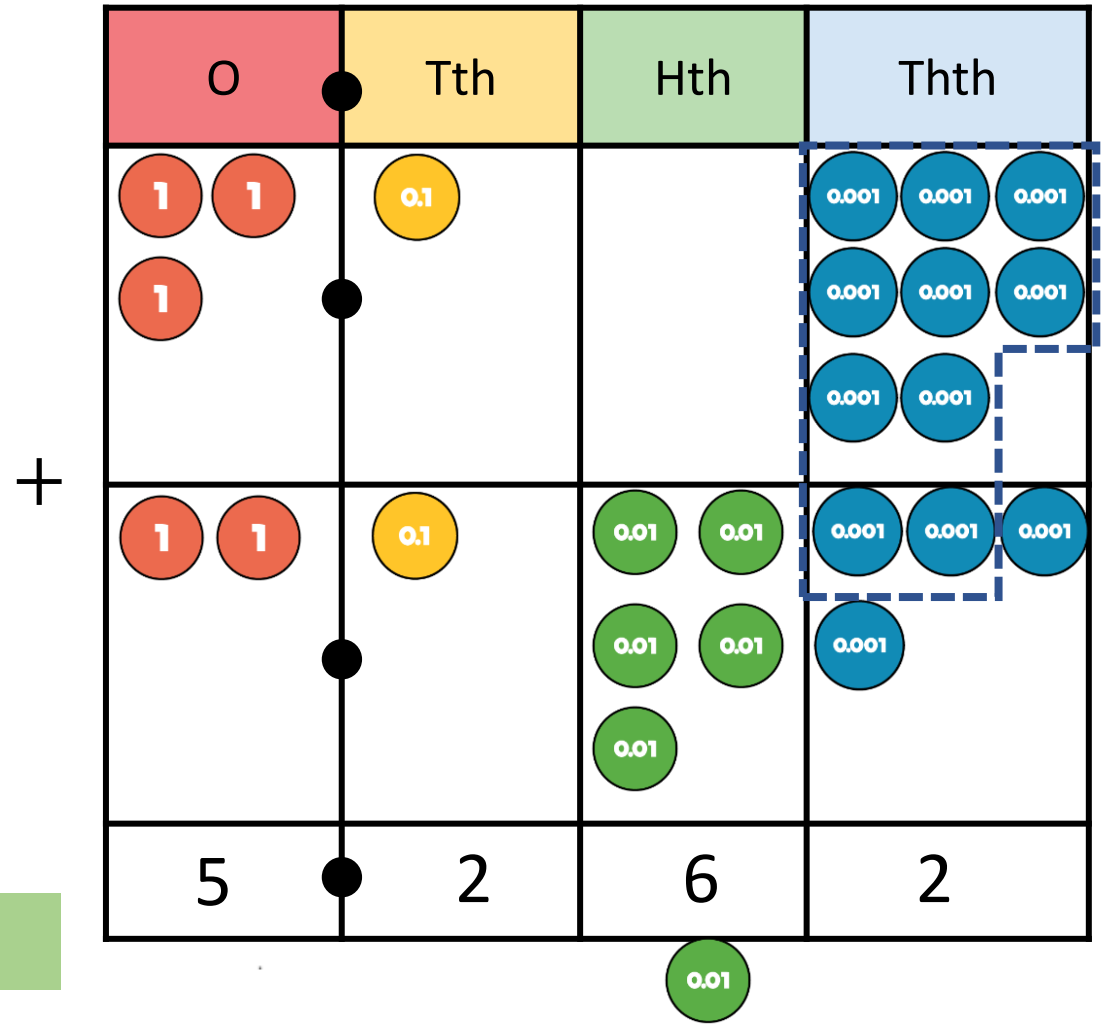
Addition 3.108 + 2.154 = 5.262

Which columns will involve an exchange?

	O	·	Tth	Hth	Thth
	3	·	1	0	8
+	2	·	1	5	4
	5	·	2	6	2
			1		

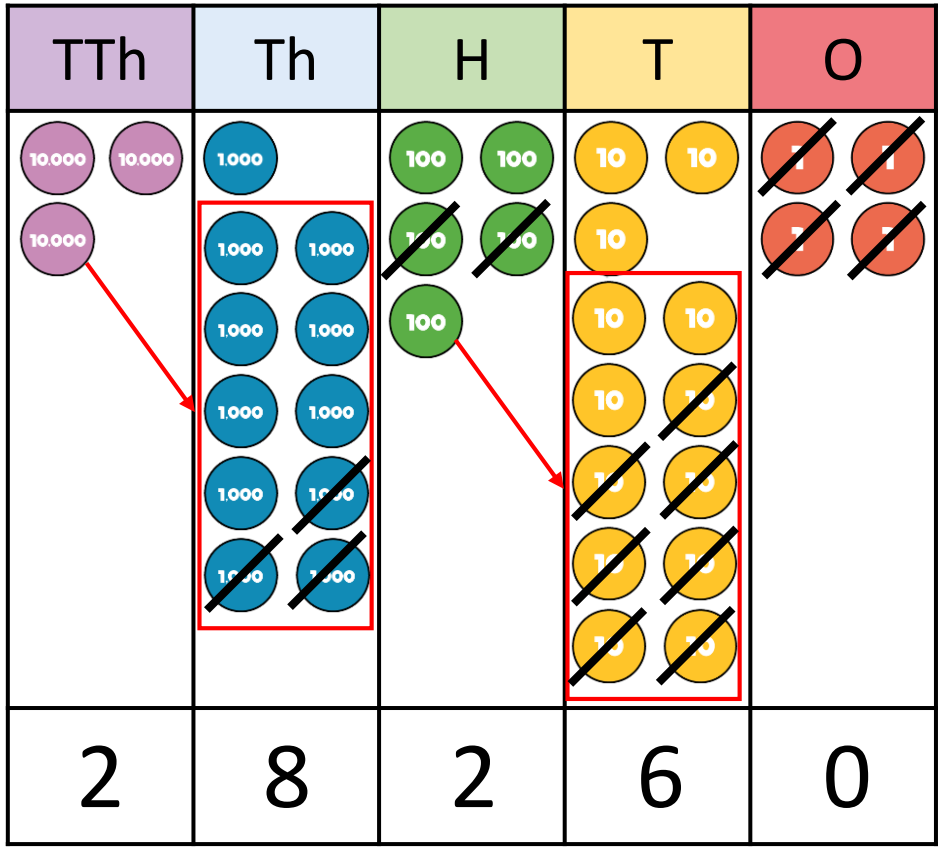
Year 6 (spring term)

I can exchange 10 thousandths for 1 hundredth



Subtraction

Year 5 (spring term)



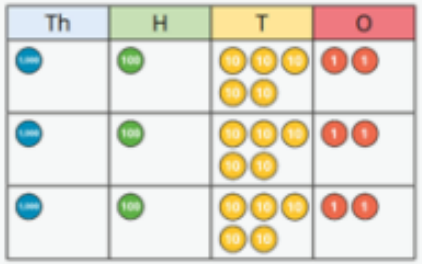
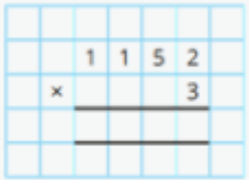
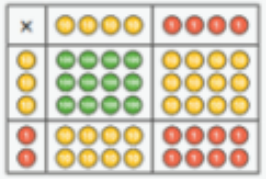
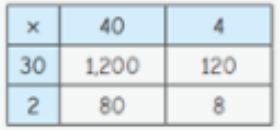
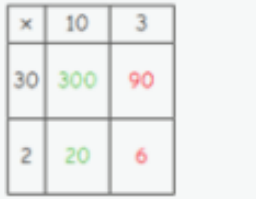
		2		4			
		~~3~~	1 1	~~5~~	1 3	4	
	–		3	2	7	4	
		2	8	2	6	0	

There are not enough ten thousands / thousands, so I need to exchange 1 ten thousand / thousand for 10 thousands / ten thousands

Multiplication

Multiplication

White Rose MATHS

Progression of skills	Key representations
Multiply numbers up to 4 digits by a 1-digit number This builds on the short multiplication method introduced in Y4	To multiply a 4-digit number by … , I multiply the ones by … , the tens by … , the hundreds by … and the thousands by …  
Multiply numbers up to 4 digits by a 2-digit number Numbers are first partitioned using an area model then long multiplication is introduced for the first time.	I can partition … into … and …   $32 \times 44 = 1{,}200 + 80 + 120 + 8$ $32 \times 44 = 1{,}408$
	First, I multiply by the … Then I multiply by the …  300 + 90 + 20 + 6 = 416 

2,114 × 3

There are 2,114 seats in a theatre. The theatre is fully booked for 3 shows. How many people attend overall?

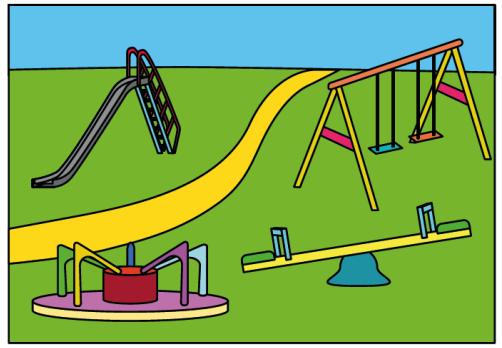
Thousands	Hundreds	Tens	Ones
1000 1000	100	10	1 1 1 1
1000 1000	100	10	1 1 1 1
1000 1000	100	10	1 1 1 1

	2	1	1	4	
×				3	
	6	3	4	2	
			1		

Do you need to make an exchange?

6,342 people attend.

A playground is 128 m by 73 m.
Work out the area of the playground.



		1	2	8	
×			7	3	
		3	8_{2}	4	
	8_{1}	9_{5}	6	0	
	9	3	4	4	
	1	1			

(128 × 3)

(128 × 70)

9,344 m^2

Could these calculations be correct?

Explain how you know.

$214 \times 5 = 1{,}071$ $\quad\quad$ $2 \times 293 = 576$

$3 \times 431 = 1{,}292$

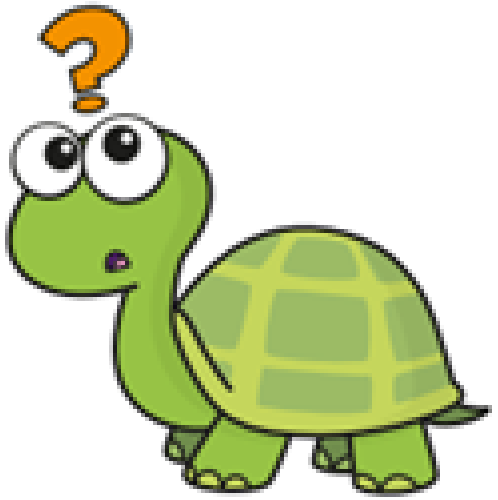
Could be correct	Definitely incorrect

Misconceptions

Tiny has multiplied 47 by 36.

What mistake has Tiny made?

			4	7	
	×		3	6	
		2	8_4	2	
		1	4_2	1	
		4	2	3	
		1			



The Bar Model

3 pineapples cost the same as 2 mangoes.

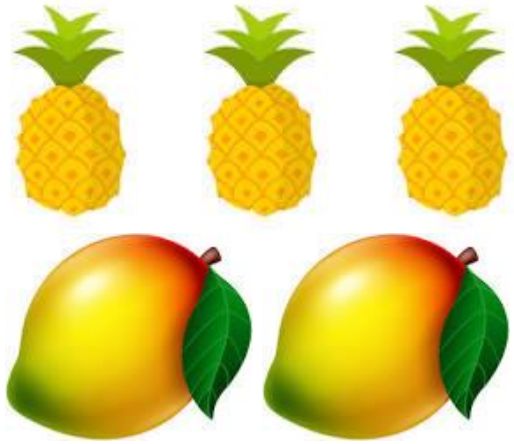
One mango costs £1.35

How much does **one** pineapple cost?

£

2 marks

The Bar Model



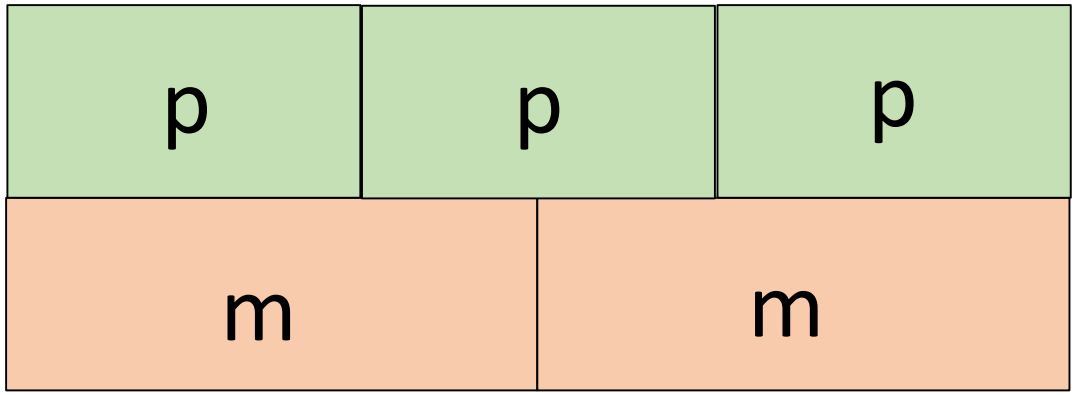
3 pineapples cost the same as
2 mangoes.

Draw a bar model to represent

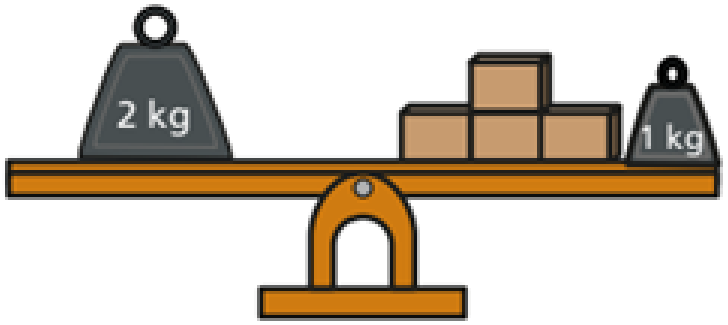
- One mango costs £1.35

How much does 1 pineapple cost?

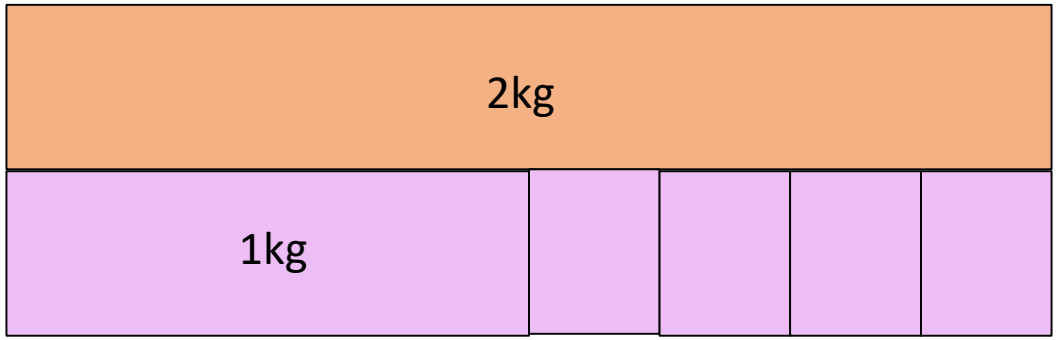
What knowledge do you have to help you?



Represent what you can see with a bar model.



What knowledge do you have to help you?



There are _____g in a ____kg

What is the mass of one of the boxes?

Ralph posts 40 letters, some of which are first class, and some are second.

He posts four times as many second class letters as first.

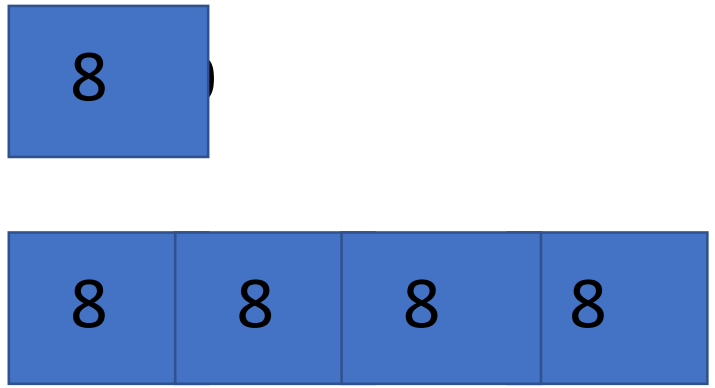
How many parts has the whole been divided into?

How many of each class of letter does he post?

He posts four times as many second class letters as first. How many of each class of letter does he post?

1st

2nd Class



40 ÷ 5 = 8

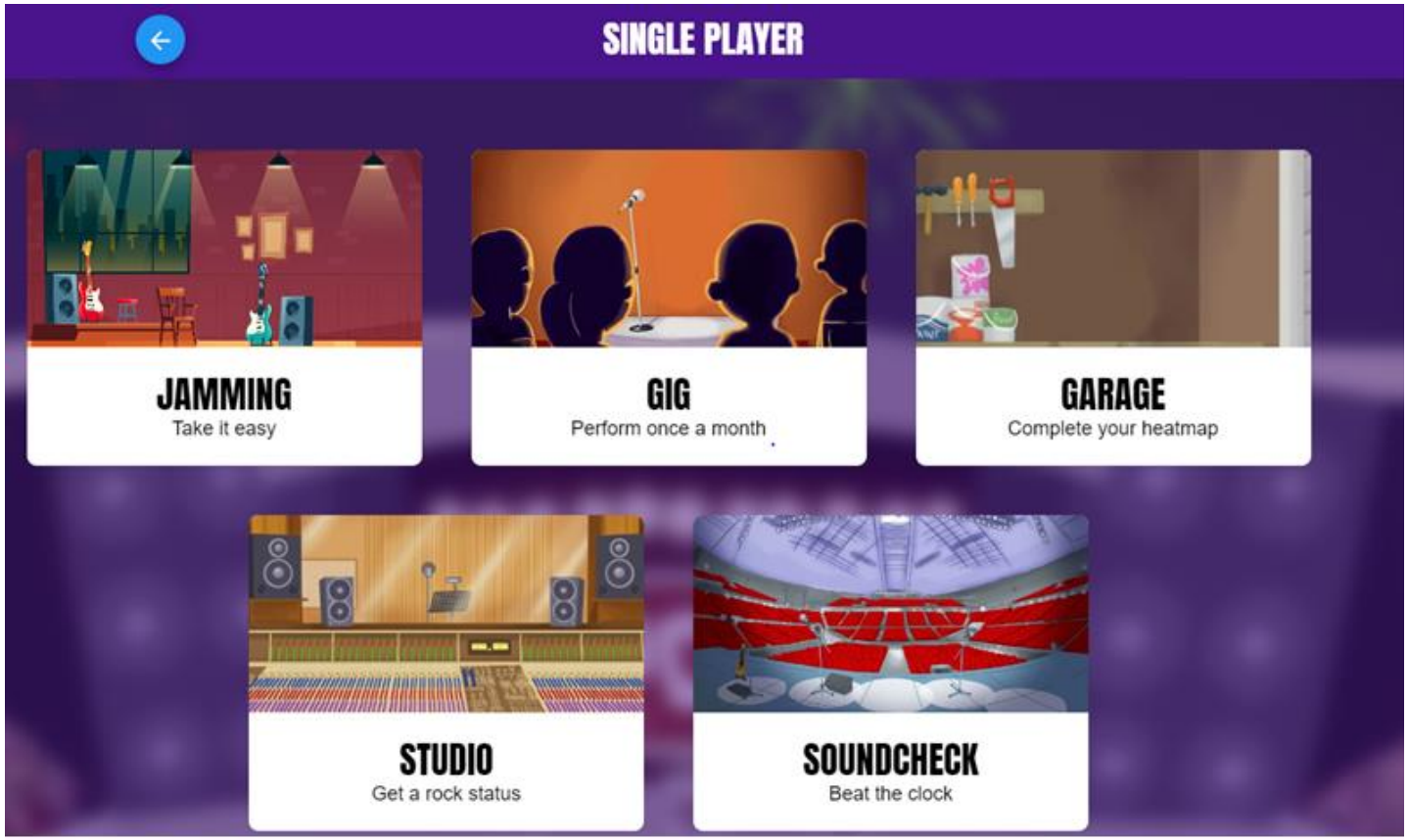
8 x 4 = 32

1st Class 8 letters

2nd Class 32 letters

Times Tables

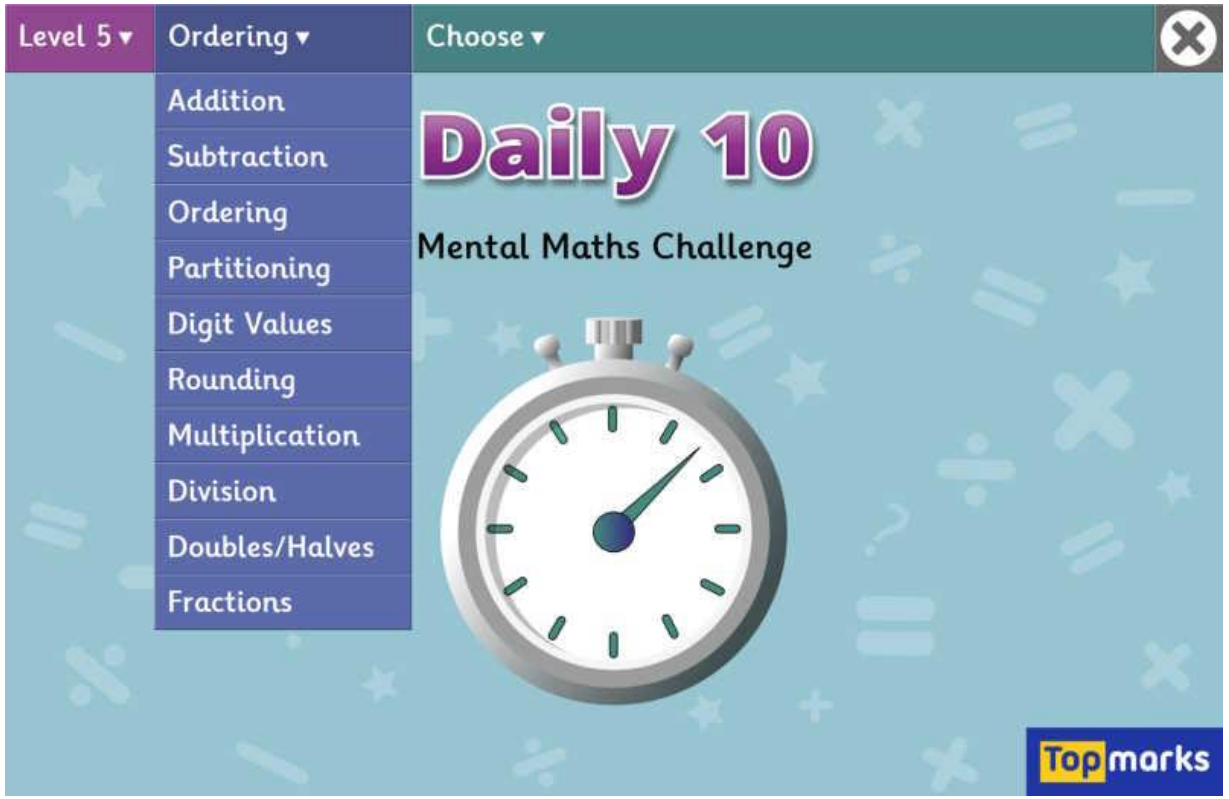
Jamming: game choice
Gig: baseline assessment
Garage: focussed
Studio: all tables
Soundcheck: 25 questions



Hit the Button

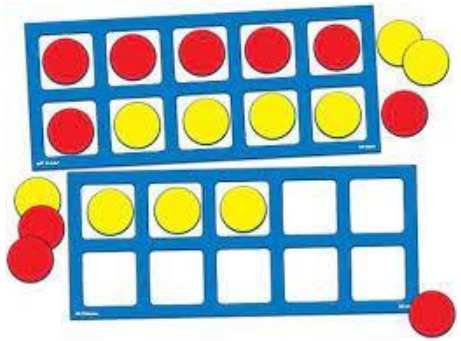
https://www.topmarks.co.uk/maths-games/hit-the-button

Daily 10



https://www.topmarks.co.uk/maths-games/daily10

Things to have a go with now:



Hit the button

TTRS & NumBots

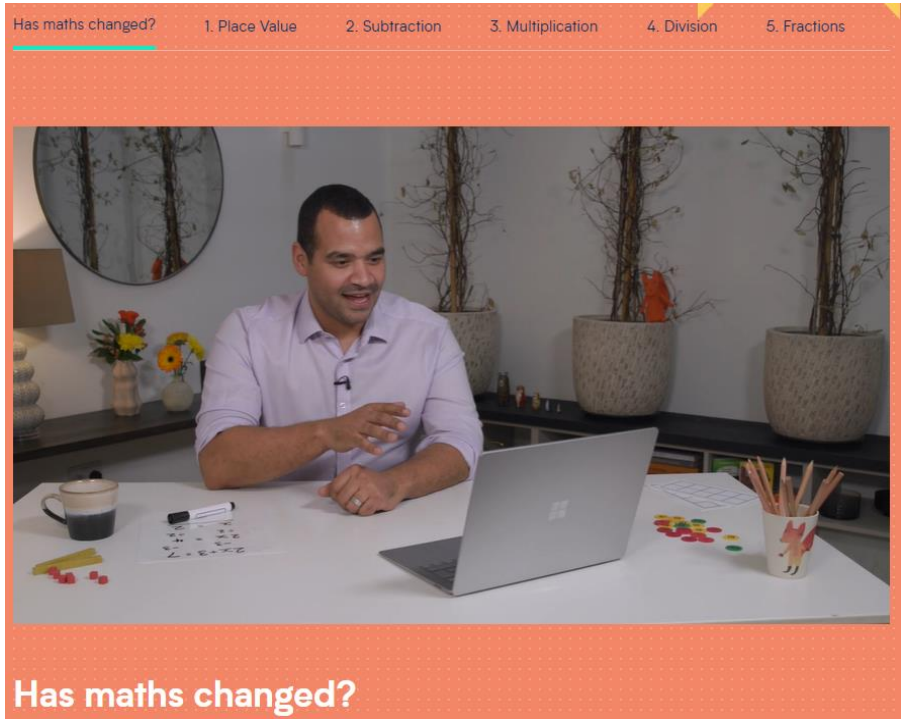
Maths Bot

Daily 10

How do you know?

Prove it

Maths with Mike



Videos, parent guides and printable resources.

https://whiteroseeducation.com/parent-pupil-resources/maths/maths-with-michael#watch

White Rose Resources

Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6

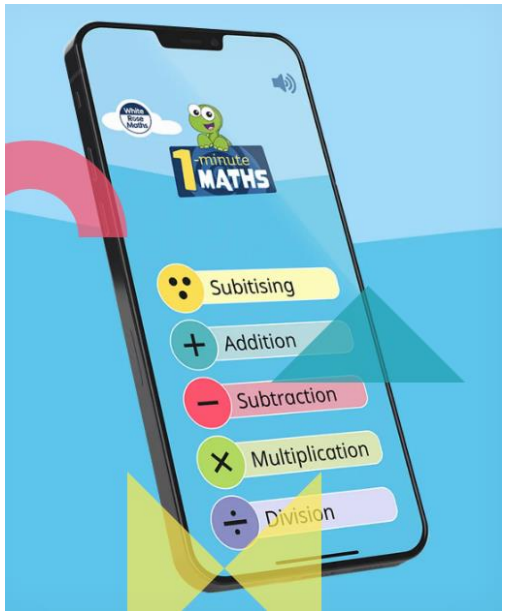
Autumn Block 1
Place value

Autumn Block 2
Addition and subtraction

Autumn Block 3
Length and perimeter

Autumn Block 4
Multiplication and division

Spring Block 1a
Multiplication and division (a)



https://whiterosemaths.com/parent-resources

Funkey Times Tables

A multi-faceted resource which helps children develop conceptual understanding of multiplication and division and fluency in times table recall up to 12 x 12 through fun games and activities.

https://www.funkeymaths.com/product/times-tables-maths-cards/

How can I help my child?

- Talk
- Encourage them to draw pictures and representations such as the part whole and bar models.
- Question them to deepen understanding- how do you know? Can you prove that? Check your answer, show me.
- Be mindful of any negative word choices around mathematics.
- Look at the school website for curriculum and representations-if any questions arise, pop and see your child's class teacher.

Any questions?