



“Building stronger foundations, together for everyone”.



Mrs Taplin  
Assistant Headteacher  
Mastery Specialist

# Maths Workshop

## Years 3 and 4

Wednesday 23<sup>rd</sup> October 2024

8:30 -10:30 am

$$18 \times 35$$

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 multiple opportunities to do some of the activities mentioned
- Please fill in the feedback form at the end of the session
- When your children arrive we will play some games



# Aims

- Explain what a mastery approach to teaching mathematics is
- Share how fluency is taught at Binfield
- Develop our understanding of 'number sense'
- Identify ways to develop and support mathematics at home



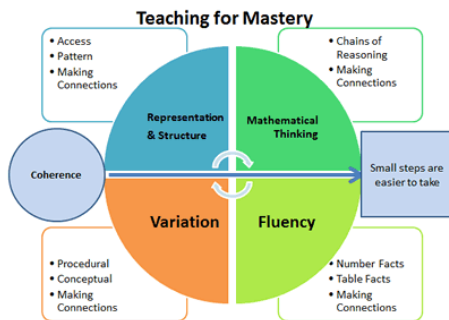


# 'Every child a Mathematician'

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





# 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/>



Think of three levels of learning:

**Shallow learning:** surface, temporary, often lost

**Deep learning:** it sticks and can be recalled and used

**Deepest learning:** it can be transferred and applied in different contexts

The deep and deepest levels are what we are aiming for by teaching maths using the Mastery approach.

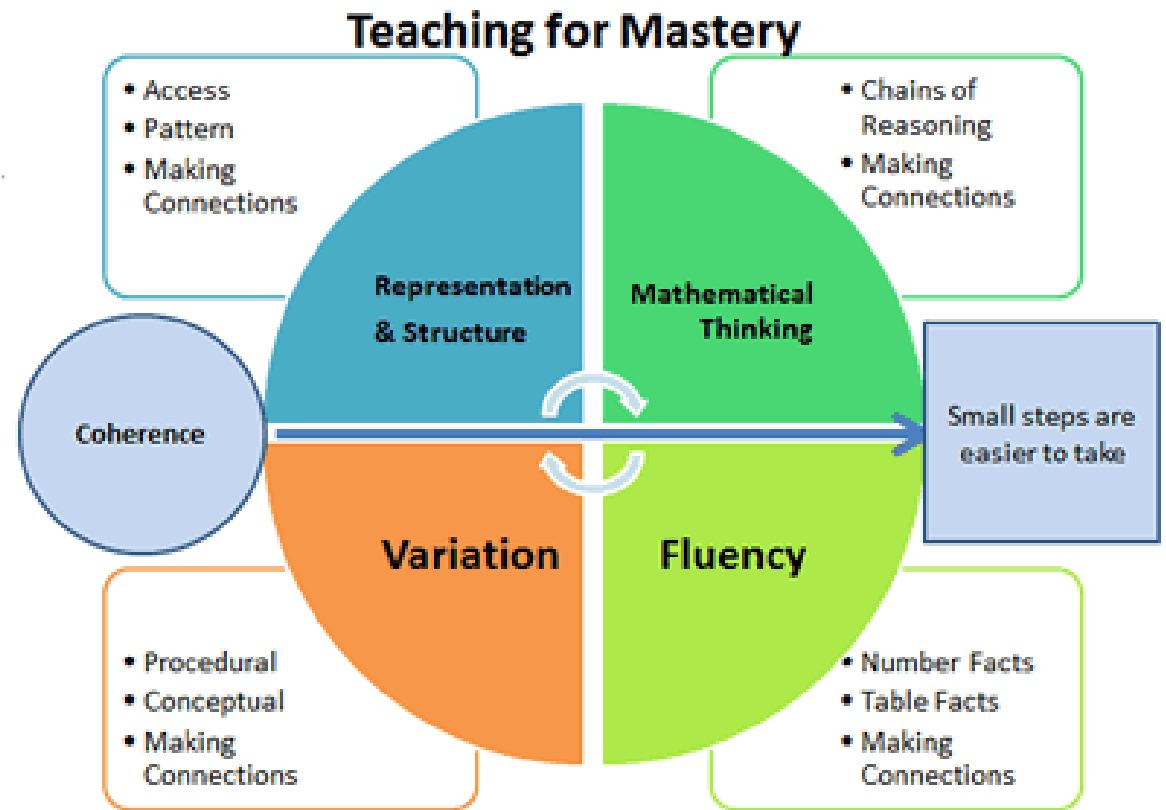
A mathematical concept or skill has been *mastered* when a child can show it in different ways, use mathematical language to explain their ideas and independently apply the concept to new problems in unfamiliar situations.

**Challenge is provided by going deeper not accelerating**

For those children that have mastered the skill, concept or procedure they will be presented with higher order thinking activities, rather than accelerating through the curriculum.



# White Rose Mathematics





# Year 3 Curriculum

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> <a href="#">VIEW</a>			Number <b>Addition and subtraction</b> <a href="#">VIEW</a>				Number <b>Multiplication and division A</b> <a href="#">VIEW</a>				
Spring term	Number <b>Multiplication and division B</b> <a href="#">VIEW</a>			Measurement <b>Length and perimeter</b> <a href="#">VIEW</a>		Number <b>Fractions A</b> <a href="#">VIEW</a>		Measurement <b>Mass and capacity</b> <a href="#">VIEW</a>				
Summer term	Number <b>Fractions B</b> <a href="#">VIEW</a>		Measurement <b>Money</b> <a href="#">VIEW</a>		Measurement <b>Time</b> <a href="#">VIEW</a>			Geometry <b>Shape</b> <a href="#">VIEW</a>		Statistics <a href="#">VIEW</a>		Consolidation



# Year 4 Curriculum

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	
Autumn term				Number <b>Place value</b>  <a href="#">VIEW</a>	Number <b>Addition and subtraction</b>  <a href="#">VIEW</a>			Measurement <b>Area</b>  <a href="#">VIEW</a>	Number <b>Multiplication and division A</b>  <a href="#">VIEW</a>				Consolidation
Spring term	Number <b>Multiplication and division B</b>  <a href="#">VIEW</a>			Measurement <b>Length and perimeter</b>  <a href="#">VIEW</a>	Number <b>Fractions</b>  <a href="#">VIEW</a>			Number <b>Decimals A</b>  <a href="#">VIEW</a>					
Summer term	Number <b>Decimals B</b>  <a href="#">VIEW</a>	Measurement <b>Money</b>  <a href="#">VIEW</a>	Measurement <b>Time</b>  <a href="#">VIEW</a>	Consolidation		Geometry <b>Shape</b>  <a href="#">VIEW</a>	Statistics  <a href="#">VIEW</a>	Geometry <b>Position and direction</b>  <a href="#">VIEW</a>					



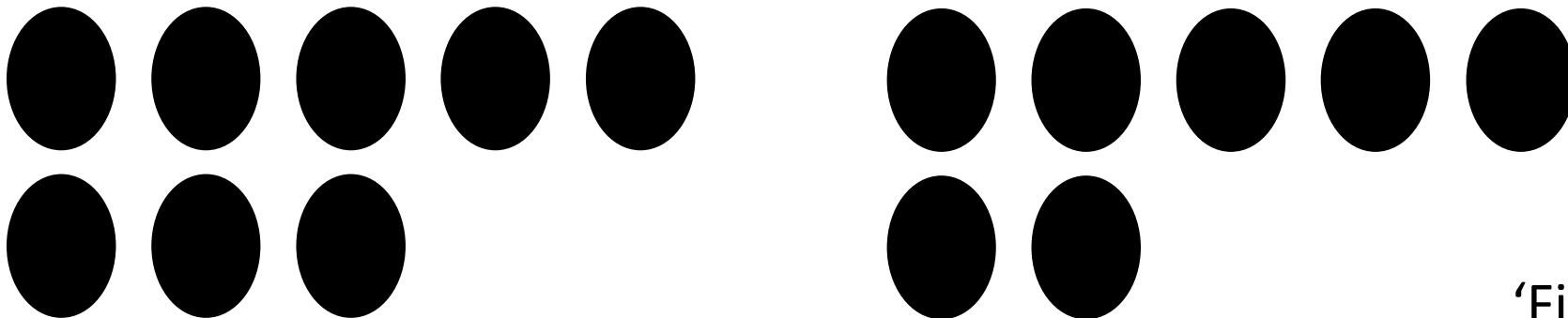
# Fluency

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



# Let's do some maths

$$8 + 7 =$$



'Fiveness of ten'

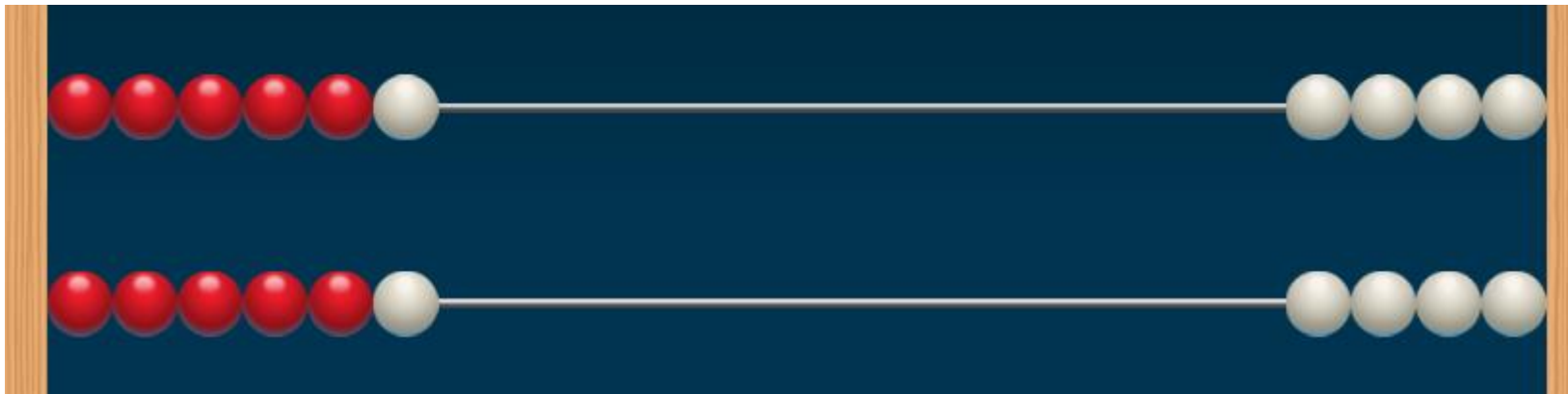
How many different ways can you come up with?



# Rekenreks

What is double 6?

How do you know?



$$(5 \times 2) + (1 \times 2)$$

I see 5 and 1  
twice!

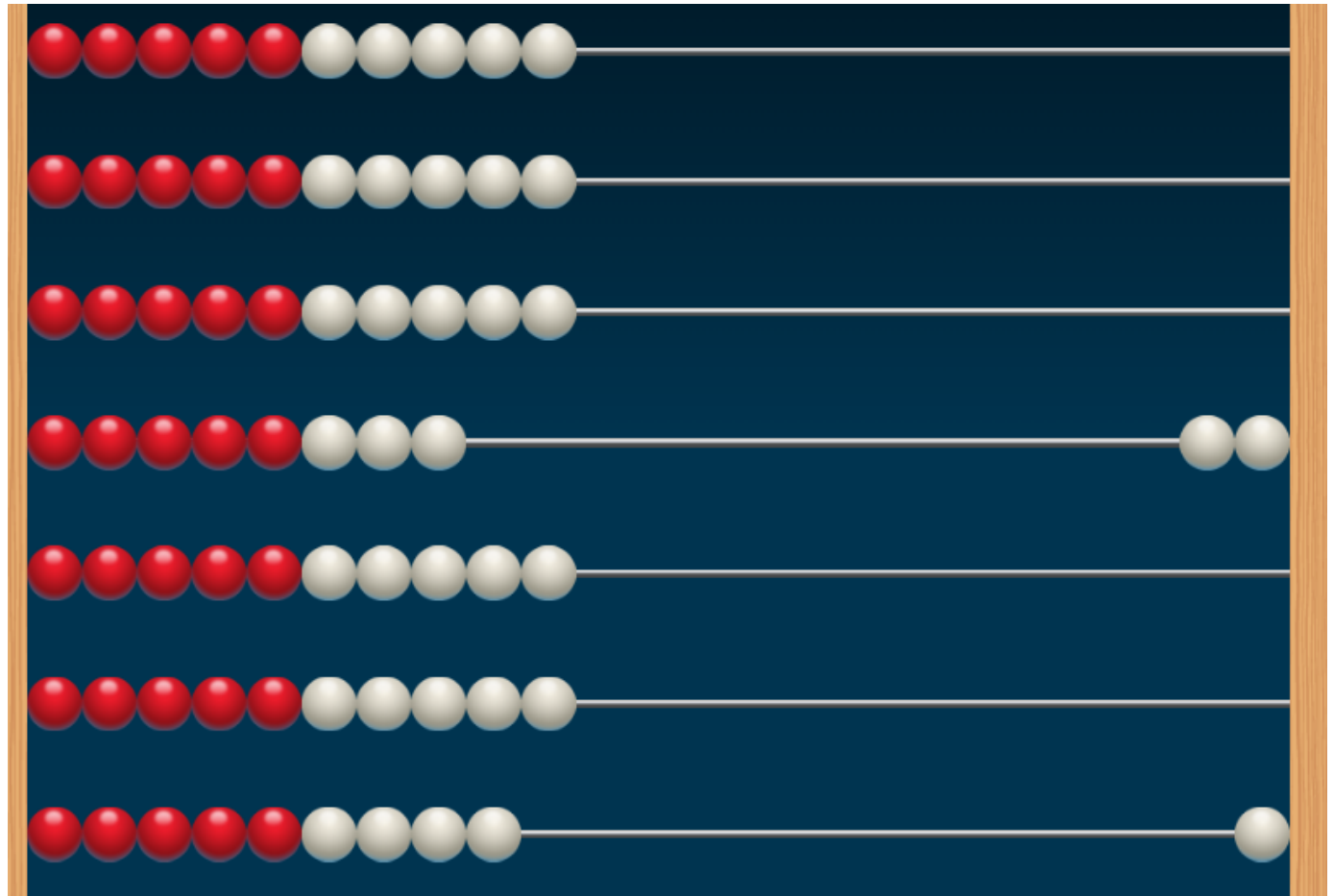
What do you see?



# Rekenreks

$$38 + 29 = ?$$

What do you  
Notice?





# Number bonds

Adding 1 and 2
Bonds to 10
Adding 10
Bridging/compensating
Y1 facts
Doubles
Adding 0
Near doubles
Y2 facts

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

+	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

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



# 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.

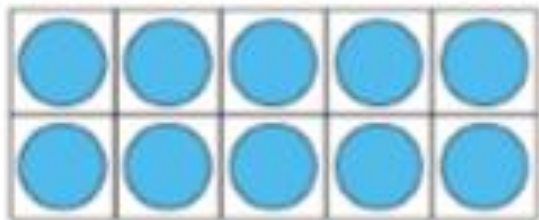


Figure 1: using a tens frame and counters

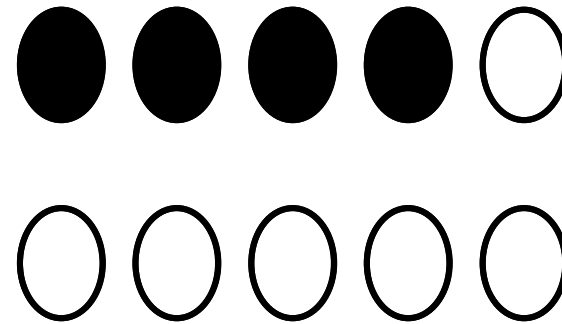
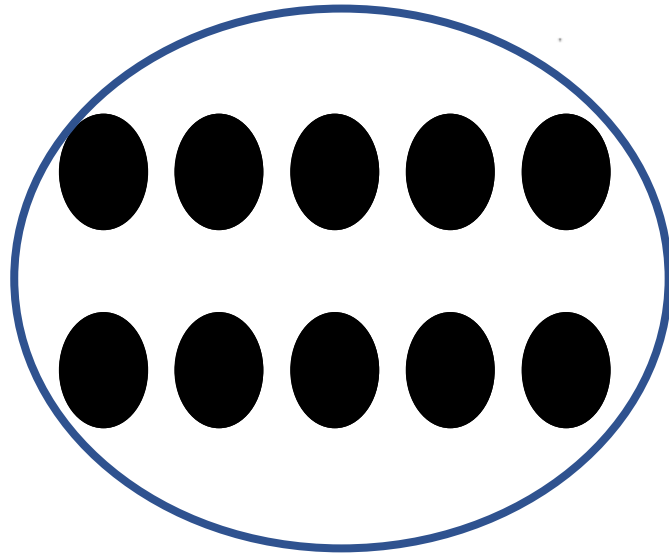


Figure 2: using a tens frame and counters



# Ten frames

$$14 - 5$$

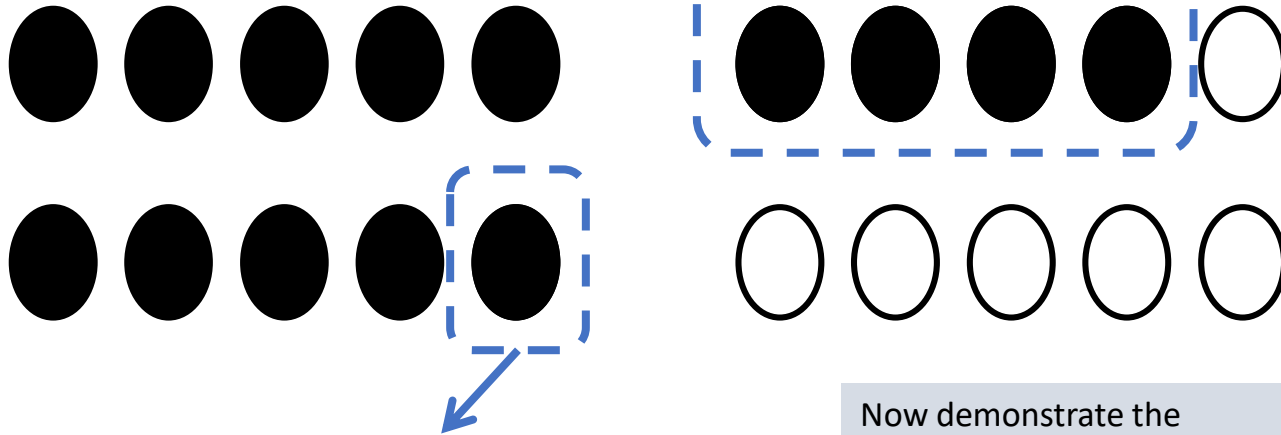




# Ten frames

$$14-5$$

4 1



14 is 10 and 4.

Partition 5 into 4 and 1.

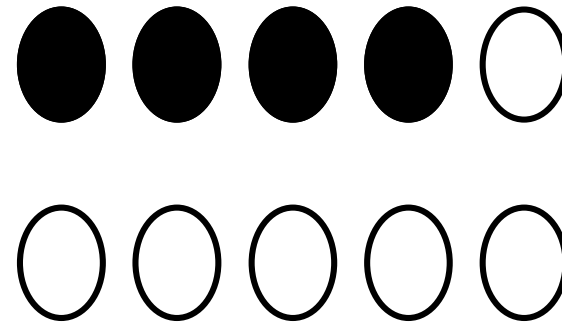
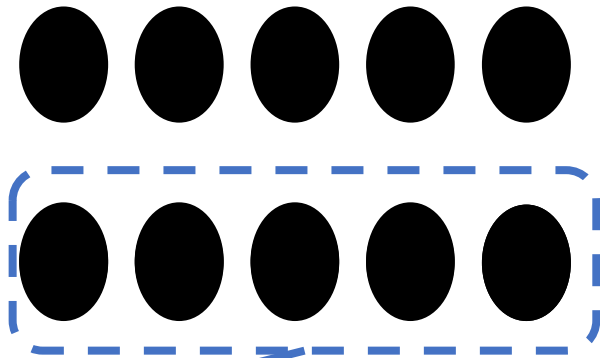
Take away 4 and then take away 1.

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



# Ten frames

$$\begin{array}{r} 14-5 \\ \wedge \\ 10 \quad 4 \end{array}$$



14 is 10 and 4.

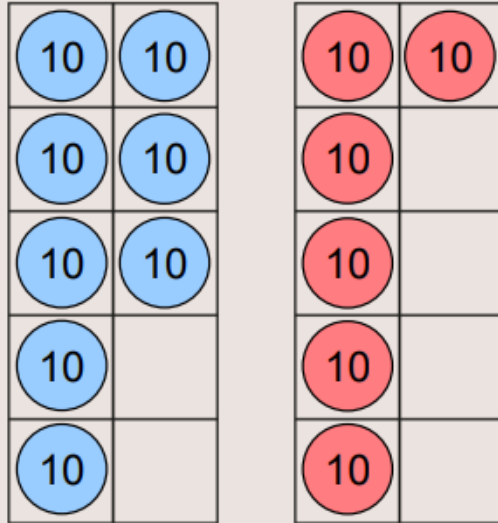
Take away 5 from 10,

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 hundred
- 18 tenths

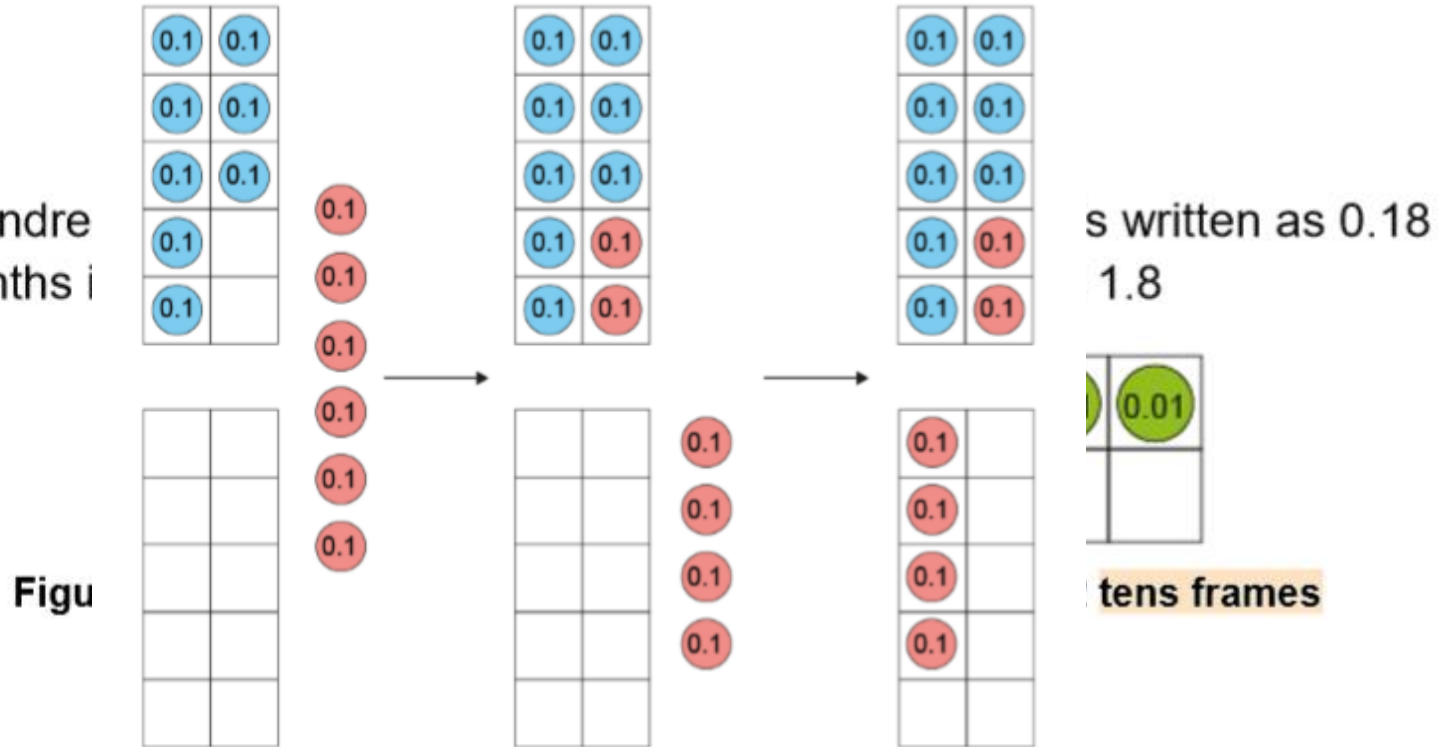


Figure 172: **tens frames** with 0.1-value counters showing  $0.8 + 0.6 = 1.4$

$$8 + 6 = 14$$

$$0.8 + 0.6 = 1.4$$

$$14 - 6 = 8$$

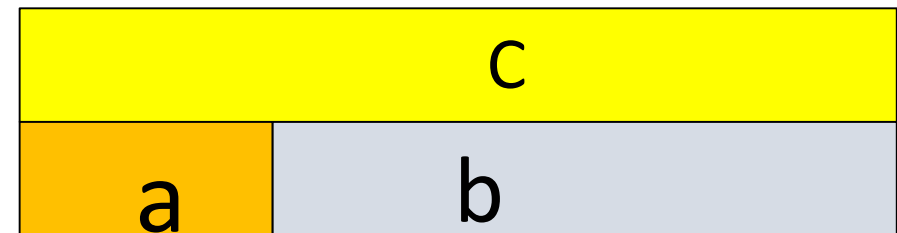
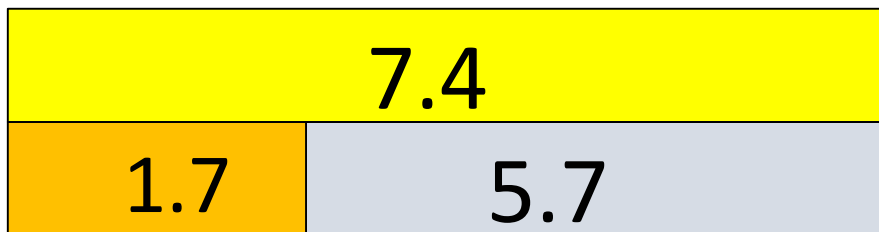
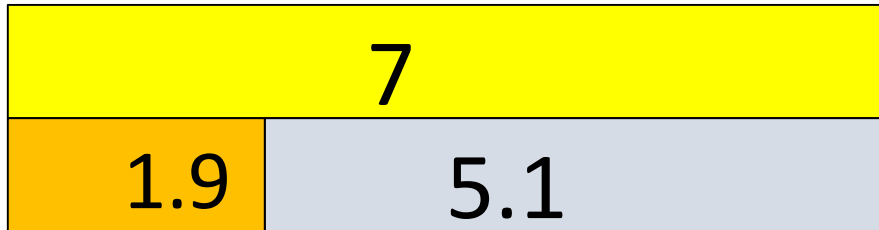
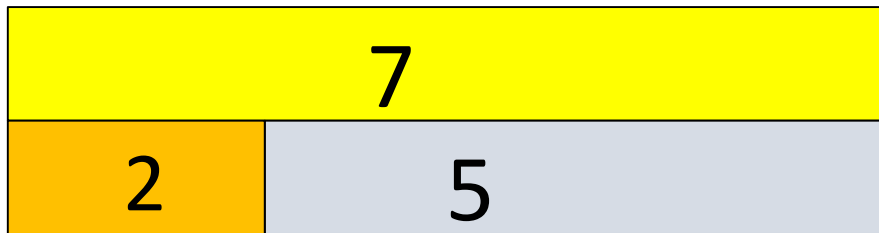
$$1.4 - 0.6 = 0.8$$

$$14 - 8 = 6$$

$$1.4 - 0.8 = 0.6$$



# Developing depth, simplicity and clarity





# Fluency and Understanding

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



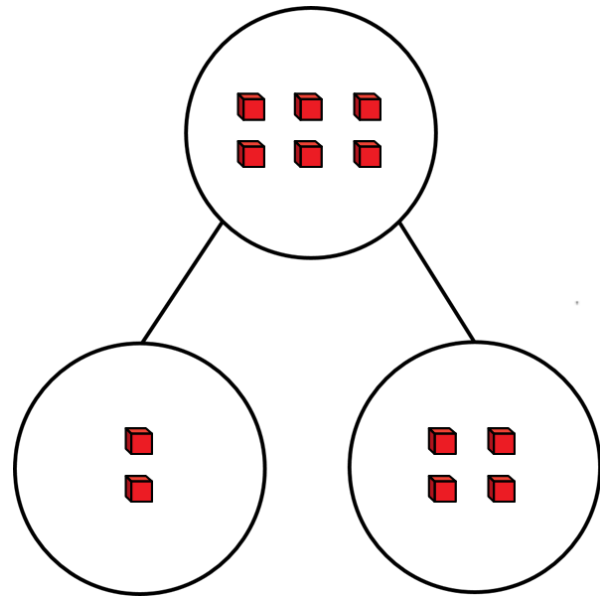
# Making Connections

$$\square + 17 = 15 + 24$$

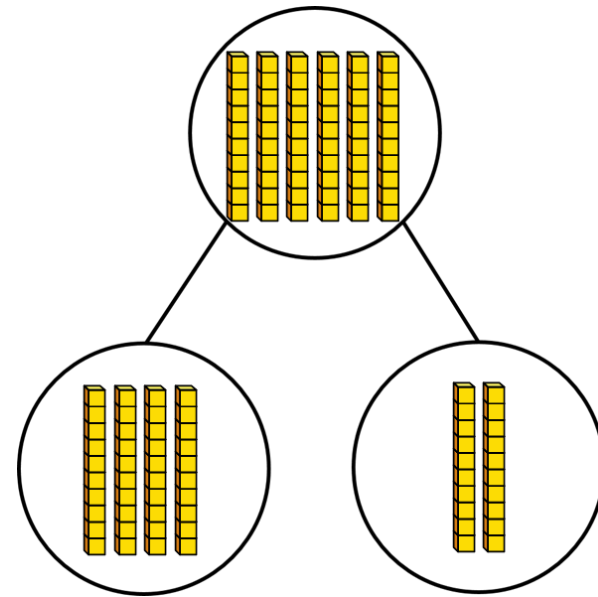
Jimmy has £5.00 to spend at Creams. He buys an ice cream for £2.99. How much change does he get?



# Year 3 Curriculum



$$2 \text{ ones} + 4 \text{ ones} = 6 \text{ ones}$$
$$2 + 4 = 6$$



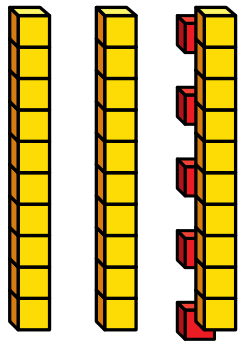
$$2 \text{ tens} + 4 \text{ tens} = 6 \text{ tens}$$
$$20 + 40 = 60$$

$$200 + 400 = \boxed{600}$$

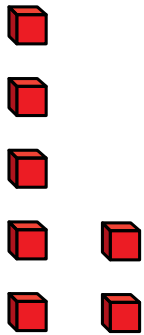
$$2 \text{ hundreds} + 4 \text{ hundreds} = 6 \text{ hundreds}$$



# Year 3 Curriculum

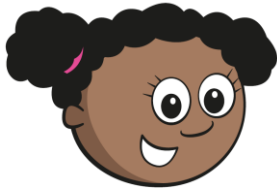


+



$$25 + 7 = 32$$

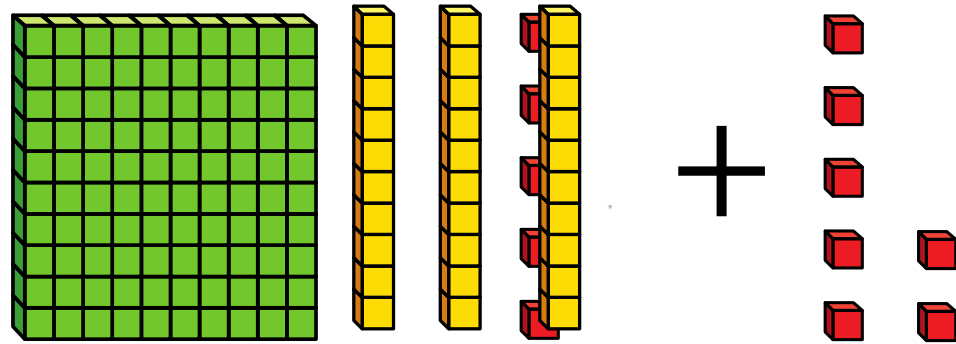
$$30 + 2 = 32$$



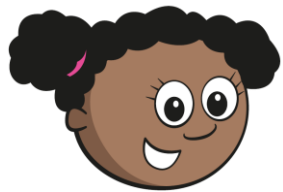
I need to add 5 to get to the next 10, then add another 2



# What do you notice?



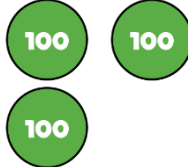

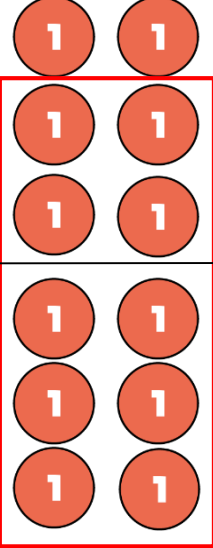

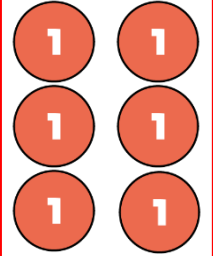
$$125 + 7 = 132$$



$$130 + 2 = 132$$



+

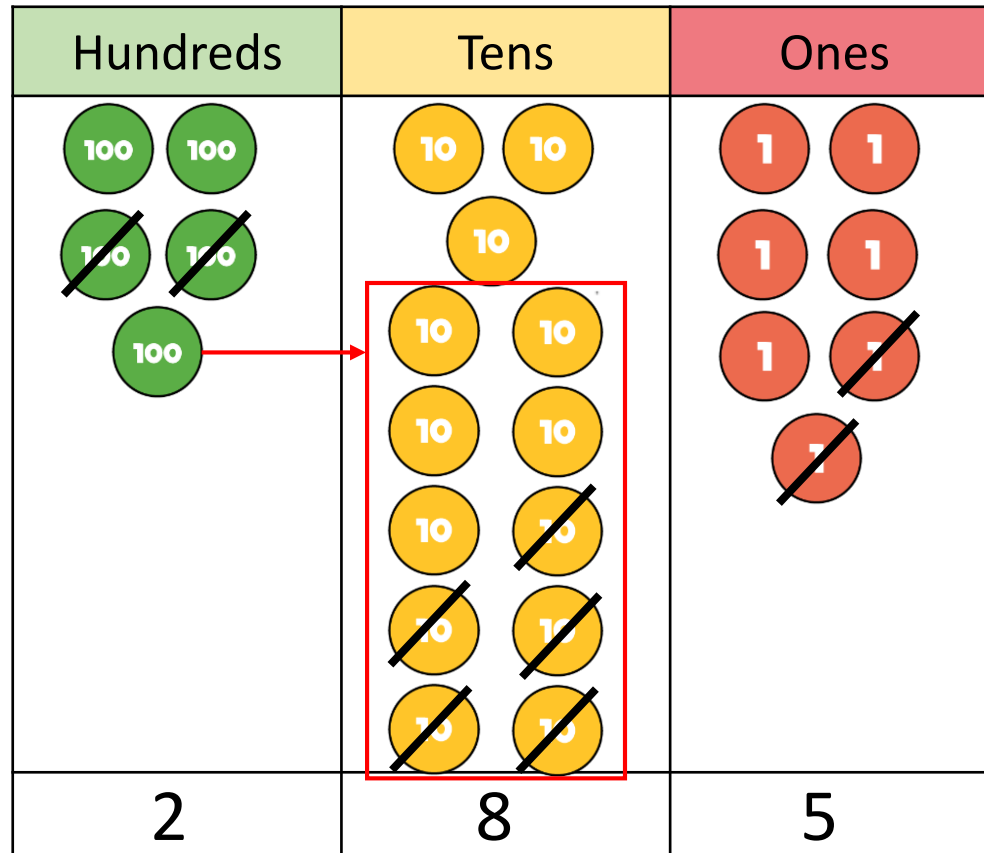
Hundreds	Tens	Ones
		
		



$$316 + 6 = 322$$



$$537 - 252 = 285$$



	H	T	O
	4	13	7
-	2	5	2
	2	8	5

I will exchange 1 hundred to make 10 tens.

2 hundreds.



# Yr 4 - Efficiency

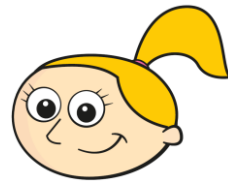
$$3,008 - 2,990 = 18$$

	<sup>2</sup> <del>3</del>	<sup>1</sup> <del>0</del>	<sup>9</sup> 0	8	
-	2	9	9	0	
	0	0	1	8	

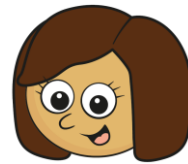


# Compensation

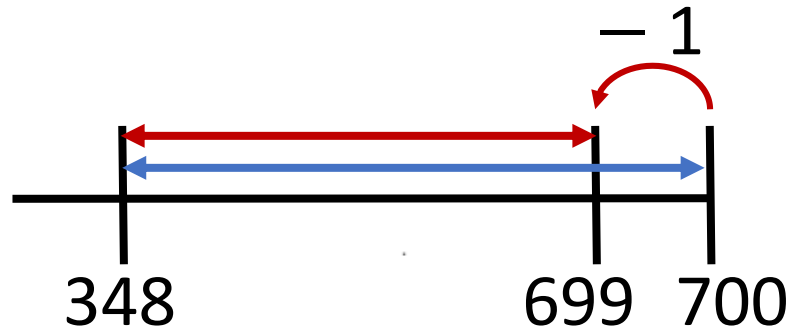
	<del>6</del> <sup>6</sup>	<del>7</del> <sup>4</sup>	<del>0</del> <sup>9</sup>	<sup>1</sup> 0	
-	3	4	8		
	3	5	2		



	6	9	9	
-	3	4	8	
	3	5	1	

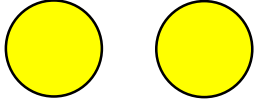
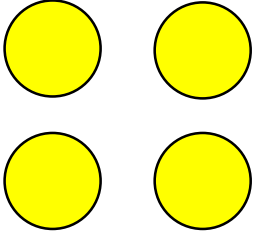


$$351 + 1 = 352$$





# Yr 4- Multiplying a number by 10 and 100.

Thousands	Hundreds	Tens	Ones
			



100 times  
the size

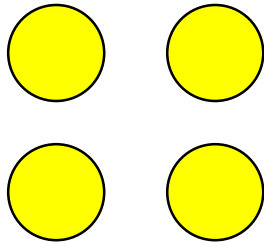
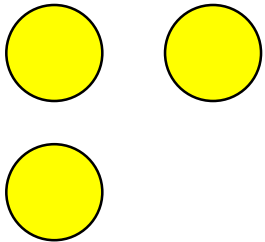
100 times  
the size

$$24 \times 100 = 2,400$$

2,400 is 100 times the size of 24



# Yr 4- Multiplying a number by 10 and 100.

Thousands	Hundreds	Tens	Ones
			

$$4,300 \div 100 = 43$$



## Yr 4- Multiplying a number by 10 and 100.

Thousands	Hundreds	Tens	Ones
		3	8

$$38 \times 100 = 3,800$$

What do you notice?

What you multiply a number by 10 digit moves \_\_\_\_ place to the \_\_\_\_\_



# Question design

Complete the calculations.

$$70 \div 10 = \boxed{7}$$

$$700 \div 100 = \boxed{7}$$

$$7,000 \div 10 = \boxed{700}$$

$$7,000 \div 100 = \boxed{70}$$

What patterns do you notice?



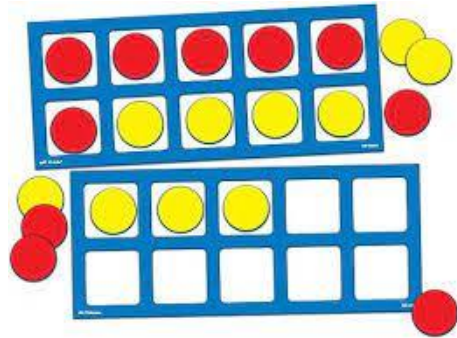
# Things to have a go with now:



Hit the button



TTRS & NumBots



Maths Bot



Daily 10

**How do you know?**

**Prove it**



# Times Tables



$$7 \times 8 = 56$$

- 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



"Building strong foundations, together, for everyone."

# 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 28	5 7s are 35	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



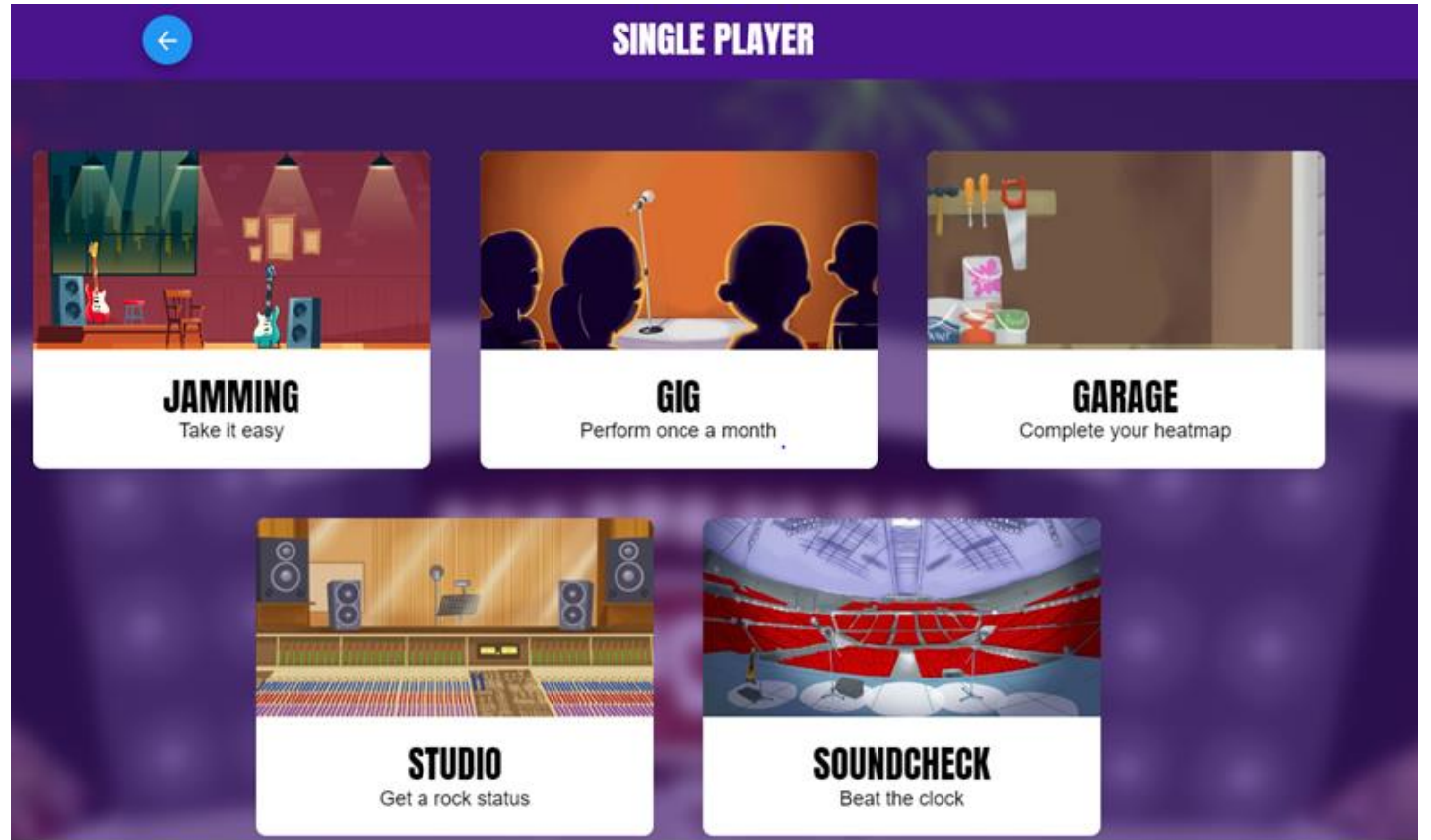
# My target 45 facts

	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



# 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>



# NumBots



NumBots is all about every child achieving the “triple win” of understanding, recall and fluency in mental addition and subtraction, so that they move from counting to calculating.

Q: How many cogs are there?



Q: Practising number bonds to 10



Q: Add 10 and subtract 1

									0
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



# Daily 10



Level 5 ▾ Ordering ▾ Choose ▾ ✕

- Addition
- Subtraction
- Ordering
- Partitioning
- Digit Values
- Rounding
- Multiplication
- Division
- Doubles/Halves
- Fractions

## Daily 10

Mental Maths Challenge

**Top**marks



# Times Tables

Let's share some tips!

What do you do with your children to help with their times table knowledge?

What have you done in the past that has worked?

$1 \times 1 = 1$

$2 \times 2 = 4$

$3 \times 3 = 9$

$4 \times 4 = 16$

$5 \times 5 = 25$

$6 \times 6 = 36$

$7 \times 7 = 49$

$8 \times 8 = 64$

$9 \times 9 = 81$

$10 \times 10 = 100$

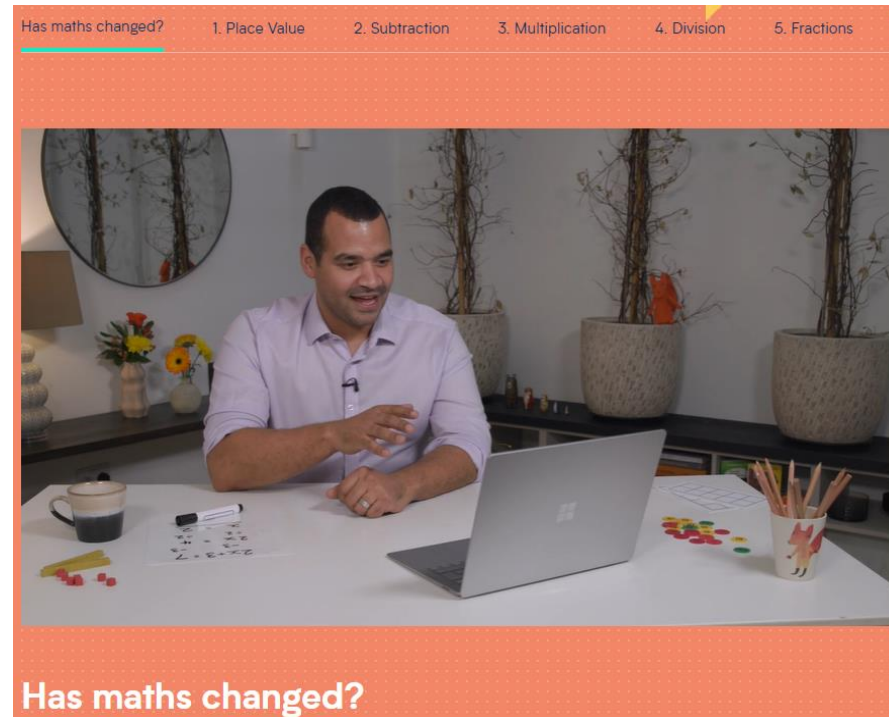
$11 \times 11 = 121$

$12 \times 12 = 144$

Remembering Squares Can Help



# Maths with Mike



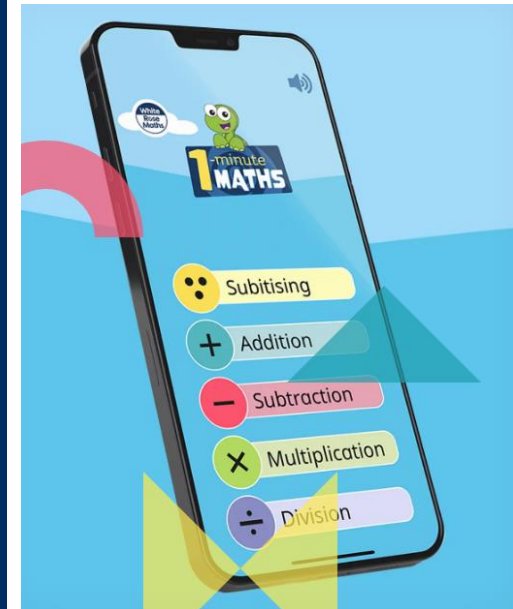
Videos, parent guides and printable resources.

<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)	





# 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?

Thank you for taking the time to be here today. Please can you complete the feedback form.



<https://forms.office.com/e/USXYQiYvyC>