

# Arithmetic Workshop

Let us have a play with numbers!

Can you complete the puzzle below?

In the multiplication table on the right, the row and column headings are all missing, and only some of the products in the table are filled in.

All the numbers in the table are positive integers.

What is the value of  $A + B + C + D + E$ ?

x					
	A	10		20	
	15	B	40		
	18		C	60	
		20		D	24
			56		E

# Itinerary



RULES FOR THE  
SESSION



INTRO – MATHS  
ANXIETY



ARITHMETIC –  
FEEDBACK FROM YOU.



MULTIPLICATION AND  
DIVISION

# Rules for the session

Help yourself to snacks.

This is a safe space – you are allowed/encouraged to try things and get them wrong.

This is a confidential space.

Be honest – thumbs up, middle, down.

Feel free to interrupt with a question at any point.

No such thing as a stupid question.

Tell me if I am going too fast - I can go over something repeatedly until you are happy.

If we don't get through everything, that is ok.

# Maths Anxiety – affects the whole spectrum of ability

Having a positive role model to teach maths

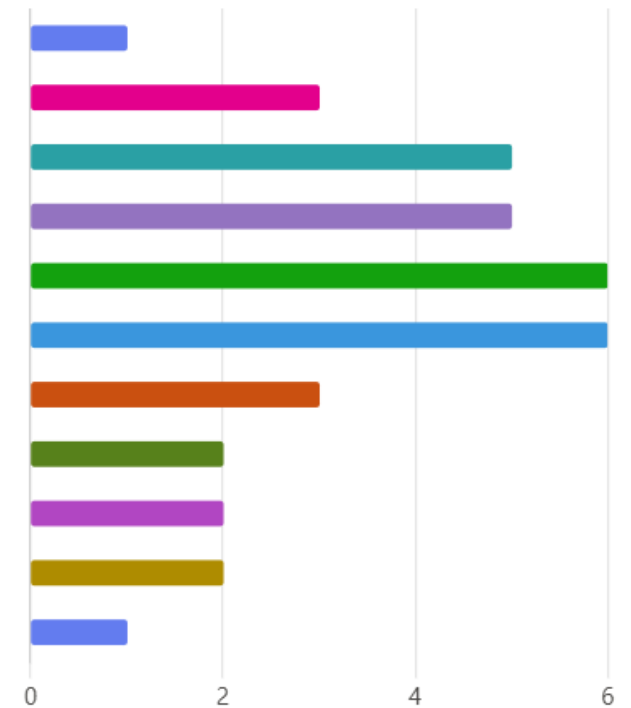
Parental experience/attitude towards maths

General Self-esteem/Confidence

# Arithmetic Feedback

4. I would like to cover the following topics (please note that you are able to select more than one) (0 point)

● Formal Addition and subtraction	1
● Multiplication	3
● Short and Long Division	5
● Fractions of a number	5
● Adding and subtracting Fractions	6
● Multiplying and Dividing Fractions	6
● Percentages	3
● Adding and subtraction with decimals	2
● Missing Box problems.	2
● BODMAS	2
● Other	1



Today:



Multiplication



Division


# Multiplication – Y3

- Times Tables – 3,4,8
- Times Tables Bingo!

3 times table	4 times table	8 times table
$1 \times 3 = 3$	$1 \times 4 = 4$	$1 \times 8 = 8$
$2 \times 3 = 6$	$2 \times 4 = 8$	$2 \times 8 = 16$
$3 \times 3 = 9$	$3 \times 4 = 12$	$3 \times 8 = 24$
$4 \times 3 = 12$	$4 \times 4 = 16$	$4 \times 8 = 32$
$5 \times 3 = 15$	$5 \times 4 = 20$	$5 \times 8 = 40$
$6 \times 3 = 18$	$6 \times 4 = 24$	$6 \times 8 = 48$
$7 \times 3 = 21$	$7 \times 4 = 28$	$7 \times 8 = 56$
$8 \times 3 = 24$	$8 \times 4 = 32$	$8 \times 8 = 64$
$9 \times 3 = 27$	$9 \times 4 = 36$	$9 \times 8 = 72$
$10 \times 3 = 30$	$10 \times 4 = 40$	$10 \times 8 = 80$
$11 \times 3 = 33$	$11 \times 4 = 44$	$11 \times 8 = 88$
$12 \times 3 = 36$	$12 \times 4 = 48$	$12 \times 8 = 96$

# Multiplication – Y3

- Related facts.



The image shows base ten blocks arranged in three columns. The first column contains 12 red blocks, each labeled '1', arranged in a 3x4 grid. The second column contains 12 yellow blocks, each labeled '10', arranged in a 3x4 grid. The third column contains two equations:  $3 \times 4 = 12$  and  $3 \times 40 = 120$ .

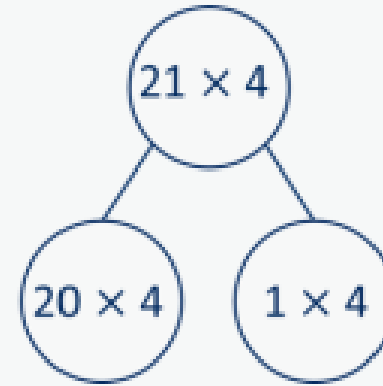
- Multiplication of 1 digit by 2-digit number.




Tens	Ones
	
	

$$30 \times 2 = 60$$

$$2 \times 2 = 4$$

$$32 \times 2 = 64$$



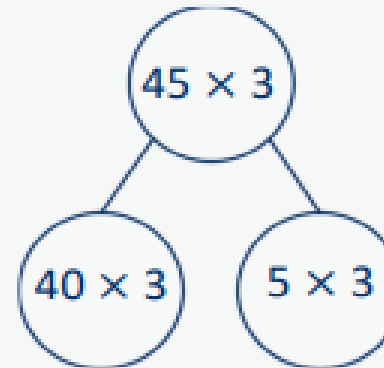
Tens	Ones
	
	
	
	







Tens	Ones
	
	
	
	

$$20 \times 4 = 80$$

$$4 \times 4 = 16$$

$$24 \times 4 = 96$$



Tens	Ones
	
	
	

## Multiplication – Y3

Multiplication of 1 digit by 2-digit number.

# Year 4

- Times Tables – recall all multiplication facts up to 12 x 12.
- Multiply by 1 and 0.
- Multiply 3 numbers.


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



$$4 \times 2 \times 3 = 8 \times 3 = 24$$
$$2 \times 3 \times 4 = 6 \times 4 = 24$$
$$3 \times 4 \times 2 = 12 \times 2 = 24$$

# Do not 'add a zero'!

## You are putting a 'place holding zero' in.



The image shows three columns of base ten blocks. The first column has 3 red blocks labeled '1'. The second column has 3 yellow blocks labeled '10'. The third column has 3 green blocks labeled '100'. To the right of the blocks are three rows of multiplication equations:

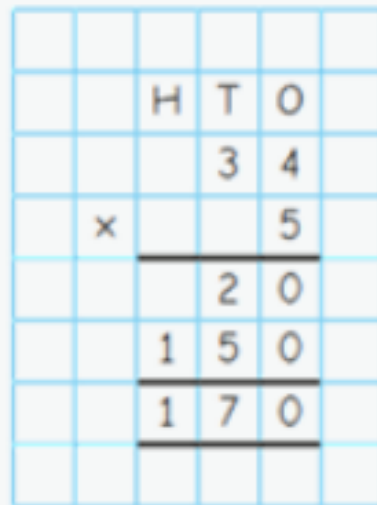
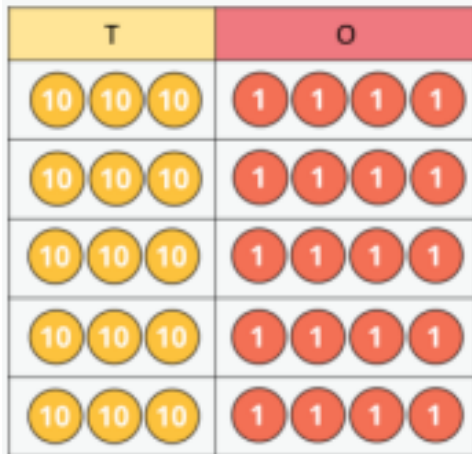
$3 \times 7 = 21$	$7 \times 3 = 21$
$3 \times 70 = 210$	$7 \times 30 = 210$
$3 \times 700 = 2,100$	$7 \times 300 = 2,100$

Year 4 - Multiplying by 10 and 100.

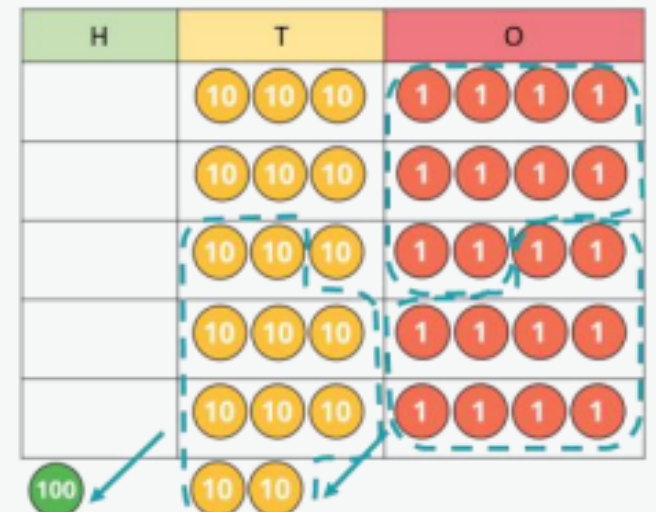
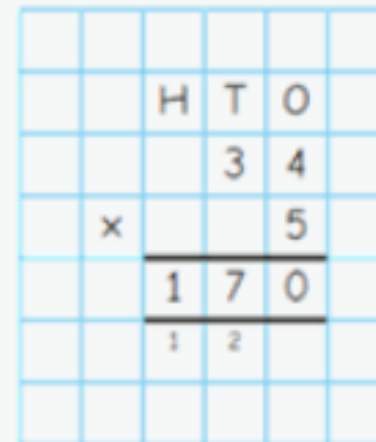
# Year 4 – Multiply a 2 digit or 3-digit number by a 1-digit number.

To multiply a 2-digit number by ... , I multiply the ones by ... and the tens by ...

To multiply a 3-digit number by ... , I multiply the ones by ... , the tens by ... and the hundreds by ...



(4 × 5)  
(30 × 5)



# Multiplication

## – Year 5

- Square and Cubed Numbers  $2 \times 2 = 4$   $2 \times 2 \times 2 = 8$
- Multiply by 10, 100 and 1000.

To multiply by 10/100/1,000, I move all the digits ... places to the left.  
... is 10/100/1,000 times the size of ...

M	HTh	TTh	Th	H	T	O
				● ●	● ● ●	● ● ● ●

Th	H	T	O	Tth	Hth
			● ●	● ● ●	● ● ● ●

$$234 \times 10 = 2,340$$

$$234 \times 100 = 23,400$$

$$234 \times 1,000 = 234,000$$

$$2.34 \times 10 = 23.4$$

$$2.34 \times 100 = 234$$

$$2.34 \times 1,000 = 2,340$$

# Year 5 – Multiply numbers up to 4 digits by a 2-digit number

First, I multiply by the ... Then I multiply by the ...

×	10	3
30	300	90
2	20	6

$$300 + 90 + 20 + 6 = 416$$

		3	2
×		1	3
		9	6
	3	2	0
	4	1	6
	1		

$$(32 \times 3)$$

$$(32 \times 10)$$

To multiply a 4-digit number by ... , I multiply the ones by ... , the tens by ... , the hundreds by ... and the thousands by ...

Th	H	T	O
1	1	5	2
×			3

		1	1	5
		1	1	5
		3		

# Multiplication – Year 6 (Not much new at all!)

		1	2	0	7	
	×			3	6	
<hr/>						
+		7	2	4	2	
		3	6	2	1	0
<hr/>						
		4	3	4	5	2
<hr/>						
		1				

(1,207 × 6)  
(1,207 × 30)

The top diagram illustrates the multiplication of 1,207 by 36 using base ten blocks. The number 1,207 is represented by 1 thousand block, 2 hundred blocks, 0 ten blocks, and 7 one blocks. These are multiplied by 36 (3 tens and 6 ones). The resulting products are shown in a grid with columns labeled O (Ones), Tth (Tenths), and Hth (Hundredths). A small grid to the right shows the standard multiplication:  $1207 \times 36 = 43452$ .

The bottom diagram shows two place value charts illustrating the multiplication of 213 by 4. The first chart shows  $213 \times 4 = 852$  using whole number blocks. The second chart shows  $2.13 \times 4 = 8.52$  using decimal blocks, demonstrating how the decimal point moves.

# Division – Year 3 3,4,8's

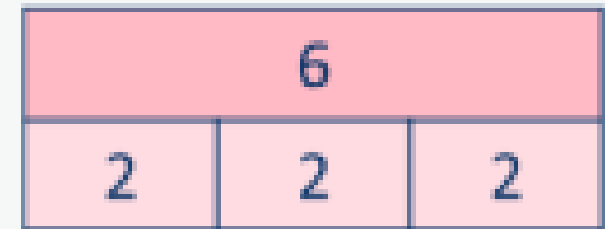
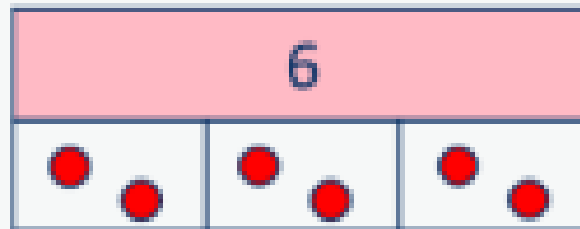
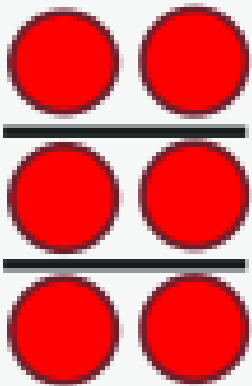
... has been shared equally into 3 equal groups.

$$\dots \div 3 =$$

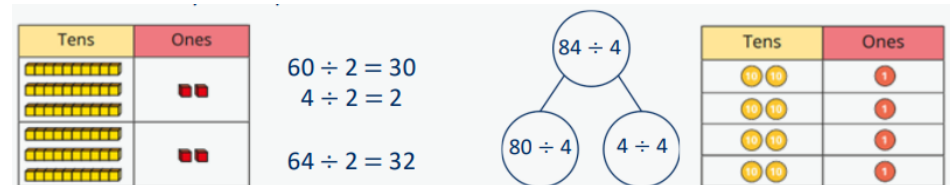
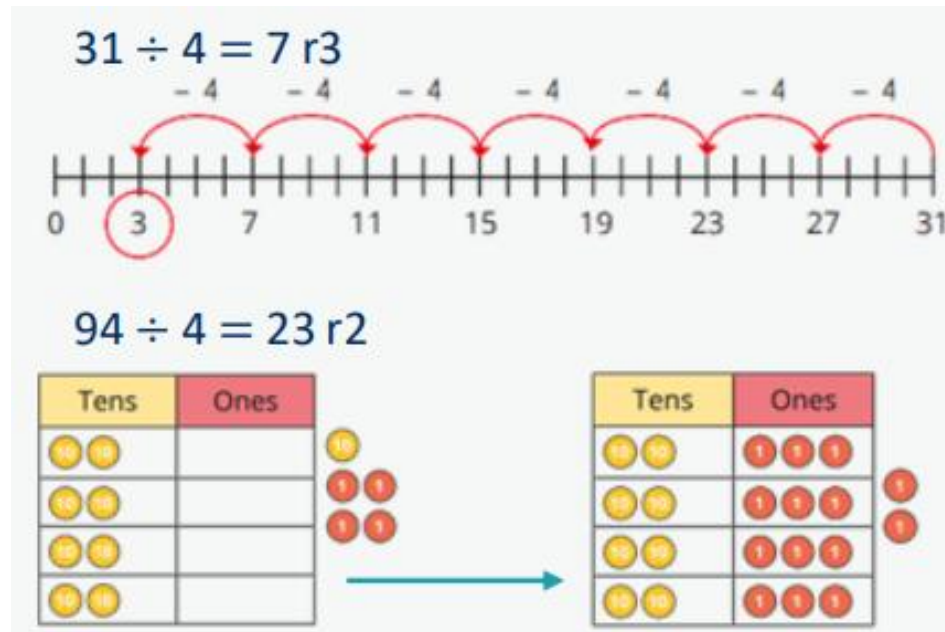


$$2 \times 3 = 6$$

$$6 \div 3 = 2$$



# Year 3 – Divide by a 2-digit number by a 1-digit number with/without remainders



# Division – Year 4

- Division facts to 12 x 12 .
- Divide a number by 1 and itself.
- Divide by 10 and 100.

O	Tth	Hth
● ●		

O	Tth	Hth
	● ●	

$2 \div 10 = 0.2$

T	O	Tth	Hth
●	● ●		

T	O	Tth	Hth
	●	● ●	

$12 \div 10 = 1.2$

Year 4 – Divide by a 2 or 3-digit number by a 1-digit number.

$84 \div 4$

$80 \div 4$        $4 \div 4$

$80 \div 4 = 20$   
 $4 \div 4 = 1$   
 $84 \div 4 = 21$

Tens	Ones
10 10	1
10 10	1
10 10	1
10 10	1

$435 \div 3$

$300 \div 3$        $120 \div 3$        $15 \div 3$

$300 \div 3 = 100$   
 $120 \div 3 = 40$   
 $15 \div 3 = 5$   
 $435 \div 3 = 145$

Hundreds	Tens	Ones
100	10 10 10 10	1 1 1 1 1
100	10 10 10 10	1 1 1 1 1
100	10 10 10 10	1 1 1 1 1
100	10	

# Division – Year 5

- Divide by 10, 100, 1000

Th	H	T	O	•	Tth	Hth
	●	●●		•		

$120 \div 10 = 12$

Th	H	T	O	•	Tth	Hth
		●	●●	•		

$120 \div 100 = 1.2$

Th	H	T	O	•	Tth	Hth
			●	•	●●	

$120 \div 1,000 = 0.12$

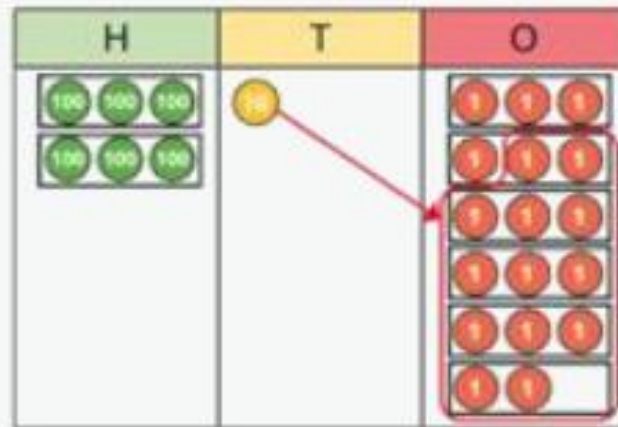
Th	H	T	O	•	Tth	Hth
				•	●	●●

# Year 5 – Divide numbers up to 4 digit by a 1-digit number.

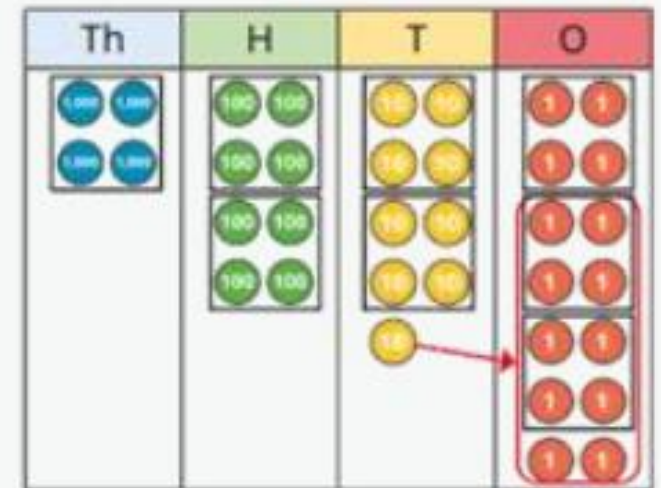
There are ... groups of ... hundreds/tens/ones/ in ...  
 I can exchange 1 ... for 10 ...

	1	3	
3	3	9	

	2	0	5	r2
3	6	1	7	



		1	2	2	3	r2
4	4	8	9	4		



# Division – Year 6

		0	3	6	
12		4	3	2	
		3	6		
			7	2	
			7	2	
				0	

		0	1	0	9	r	9
13		1	4	2	6		
		1	3	0			
			1	2	6		
			1	1	7		
							9

Th	H	T	O
1,000 1,000	100 100	10 10	1 1
1,000 1,000	100 100	10 10	1 1
1,000 1,000	100	10 10	
1,000 1,000		10 10	
		10 10	
		10 10	

		2	1	3	1
4		8	5	2	4

# Percentages Bonus Slide

Progression of skills	Key representations																																	
<p><b>Calculate percentages</b></p> <p>Children first learn how to find 1%, 10%, 20%, 25% and 50% before using multiples of these amounts to find any percentage.</p>	<p>There are ... lots of ... % in 100%</p> <p>To find ... %, I need to divide by ...</p> <table border="1" data-bbox="744 863 1350 999"> <tr> <td colspan="4">100%</td> </tr> <tr> <td colspan="2">50%</td> <td colspan="2">50%</td> </tr> <tr> <td>25%</td> <td>25%</td> <td>25%</td> <td>25%</td> </tr> </table> <p>50% of ... = ... ÷ 2</p> <p>25% of ... = ... ÷ 4</p>	100%				50%		50%		25%	25%	25%	25%	<p>... % is made up of ... %, and ... %</p> <table border="1" data-bbox="1421 849 2331 956"> <tr> <td colspan="10">100%</td> </tr> <tr> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> <td>10%</td> </tr> </table> <p>To find 30%, I can find 10% and then multiply it by 3</p> <p>To find 23%, I can use 10% × 2 and 1% × 3</p> <p>To find 99%, I can find 1%, then subtract from 100%</p>	100%										10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
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