

YR3 MULTIPLICATION AND DIVISION KNOWLEDGE ORGANISER

Key Concepts

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers using mental and progressing to formal written methods.
- Solve problems, including missing number problems.

Key Vocabulary

- multiply
- times
- groups of
- lots of
- array
- divide
- share
- divide
- commutativity



Multiplication Facts

Pupils continue to practice their mental recall of multiplication tables.

3x Table	4x Table	8x Table
$0 \times 3 = 0$	$0 \times 4 = 0$	$0 \times 8 = 0$
$1 \times 3 = 3$	$1 \times 4 = 4$	$1 \times 8 = 8$
$2 \times 3 = 6$	$2 \times 4 = 8$	$2 \times 8 = 16$
$3 \times 3 = 9$	$3 \times 4 = 12$	$3 \times 8 = 24$
$4 \times 3 = 12$	$4 \times 4 = 16$	$4 \times 8 = 32$
$5 \times 3 = 15$	$5 \times 4 = 20$	$5 \times 8 = 40$
$6 \times 3 = 18$	$6 \times 4 = 24$	$6 \times 8 = 48$
$7 \times 3 = 21$	$7 \times 4 = 28$	$7 \times 8 = 56$
$8 \times 3 = 24$	$8 \times 4 = 32$	$8 \times 8 = 64$
$9 \times 3 = 27$	$9 \times 4 = 36$	$9 \times 8 = 72$
$10 \times 3 = 30$	$10 \times 4 = 40$	$10 \times 8 = 80$
$11 \times 3 = 33$	$11 \times 4 = 44$	$11 \times 8 = 88$
$12 \times 3 = 36$	$12 \times 4 = 48$	$12 \times 8 = 96$

Doubling

$$2 \times 4 = 8$$

$$4 \times 4 = 16$$

$$8 \times 4 = 32$$

$$2 \times 6 = 12$$

$$4 \times 6 = 24$$

$$8 \times 6 = 48$$

Pupils use their understanding of doubling to connect the 2, 4 and 8 multiplication tables.



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Two by One-Digit Multiplication

Pupils build on their knowledge of arrays from YR2 and apply this to multiplying larger numbers.



"To multiply 18×4 , I first I partition **18** into **10** and **8** then multiply both numbers by **4**. Finally, I find the total of both arrays, **72**."

T	O
10×4	8×4

$$10 \times 4 = 40$$

$$8 \times 4 = 32$$

Written Methods

Pupils then move towards a written method using a grid to set out the calculation.

$$14 \times 8 = 112$$

\times	10	4
8	80	32

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Formal Written Methods

Pupils progress onto formal written method:

	3	7
×		5
1	8	5
	3	

Multiply both digits from the 2-digit number by the 1 digit number, starting with the ones. $5 \times 7 = 35$. 35 ones cannot go in the ones column so exchange 30 ones for 3 tens. Keep the 5 ones in the ones column. Then, multiply the tens digit by 5. When you add the 3 tens from the previous calculation, there are 18 tens. 10 tens are exchanged for 1 hundred and the 8 tens remain in the tens column. The answer is 185.

Efficient Methods

Pupils understand that multiplication is commutative (can be performed in any order) and use this to calculate efficiently.



$4 \times 12 \times 5$
can be rearranged into
 $4 \times 5 \times 12$
 $4 \times 5 = 20$.

Then, calculate $20 \times 12 = 240$

Division Facts

Pupils continue to practice their mental recall of division facts linked to multiplication tables.

3x Table	4x Table	8x Table
$0 \div 3 = 0$	$0 \div 4 = 0$	$0 \div 8 = 0$
$3 \div 3 = 1$	$4 \div 4 = 1$	$8 \div 8 = 1$
$6 \div 3 = 2$	$8 \div 4 = 2$	$16 \div 8 = 2$
$9 \div 3 = 3$	$12 \div 4 = 3$	$24 \div 8 = 3$
$12 \div 3 = 4$	$16 \div 4 = 4$	$32 \div 8 = 4$
$15 \div 3 = 5$	$20 \div 4 = 5$	$40 \div 8 = 5$
$18 \div 3 = 6$	$24 \div 4 = 6$	$48 \div 8 = 6$
$21 \div 3 = 7$	$28 \div 4 = 7$	$56 \div 8 = 7$
$24 \div 3 = 8$	$32 \div 4 = 8$	$64 \div 8 = 8$
$27 \div 3 = 9$	$36 \div 4 = 9$	$72 \div 8 = 9$
$30 \div 3 = 10$	$40 \div 4 = 10$	$80 \div 8 = 10$
$33 \div 3 = 11$	$44 \div 4 = 11$	$88 \div 8 = 11$
$36 \div 3 = 12$	$48 \div 4 = 12$	$96 \div 8 = 12$

Known Facts and Missing Digits

Sometimes, you need to use your known table facts and manipulation to find missing values.

$$? \times 3 = 21$$

The missing value equals $21 \div 3$. The answer is 7.

$$8 = ? \div 4$$

The missing value equals 8×4 . The answer is 32.



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Written Methods (Division)

Pupils use place value counters to calculate larger division statements.

When calculating $93 \div 3 = 31$, the tens and ones are divided into groups of 3.

T	O
$90 \div 3 = 30$	$3 \div 3 = 1$

Formal Written Methods (Division)

Pupils progress onto formal written method:

	2	4
4	9	¹ 6

Start by looking at the tens digit (9). If you split 9 tens into four equal groups, how many will be in each group? There will be 2 tens, which makes 20 so a 2 goes in the tens column. However, there is a remainder of 1 ten. This gets exchanged for 10 ones. Now, look at the new ones value (16). If you split 16 ones into four equal groups, how many will be in each group? There will be 4 ones in each group so write this as the ones digit. The answer is 24.