

YEAR 5

M3b: Can multiply and divide mentally using known number facts.



= Teacher's Notes

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Teacher's notes



Ask pupils to complete mental multiplication and division questions in timed conditions to assess speed of recall and ability to retrieve facts under pressure.

Include questions that require children to draw on knowledge about numbers that are ten/hundred times bigger and smaller and relating them to the key facts they already know. There are some examples on the following two pages.

Assessing understanding

Can you complete any of these mental multiplication and division questions?

$1000 \div 10 =$

$20 \times 3 =$

$50 \times 40 =$

$560 \div 70 =$

$480 \div 6 =$

$900 \times 3 =$

$75 \div 3 =$

$92 \div 4 =$

$13 \times 9 =$



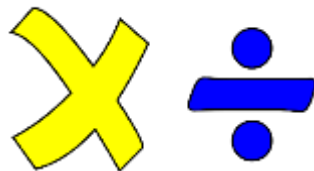
Can you give me a **different calculation** that has the **same answer**? How did you do it?

Assessing understanding

- Describe some connections between 60, 8 and 480, using the words 'multiple' and 'factor'. What other facts can you work out?
- Write three multiplications with a product of 420.
- Write three different divisions with a quotient of 2.4
- If you multiply me by 3, you will get 150. What number am I?
- Which of these calculations can you do without writing anything down? Is it sensible to work this out mentally? What clues did you look for?

Key vocabulary

multiplication, multiply, multiplied by, multiple of, times, groups of, equal groups, lots of, repeated addition, division, divide, divided by, divisible by, share, share equally, one each, two each, repeated subtraction, array, factor, product, inverse, quotient, inverse, ten times larger/smaller, hundred times larger/smaller, related facts, jottings, written method



Using known number facts

We need to remember our **multiplication** and **division** facts!

Here are some examples of facts we should know:

$$4 \times 8 = 32$$

$$48 \div 6 = 8$$

$$6 \times 3 = 18$$

$$35 \div 7 = 5$$

$$60 \div 12 = 5$$

$$9 \times 7 = 63$$

$$11 \times 5 = 55$$



Larger numbers



We can use what we know to help us **multiply** and **divide** using **larger numbers** that are **multiples of 10 or 100**.

For example, if $4 \times 8 = 32$, what is 4×80 ?

Let's see how we can use a **place value chart** to help us...



Larger numbers

If $4 \times 8 = 32$, what is 4×80 ?

H	T	O	.	10th	100th
	8	0			

An arrow points from the 8 in the Tens column to the 8 in the Ones column.

80 is ten times larger than 8. Therefore, our answer will also be ten times larger.

H	T	O	.	10th	100th
3	2	0			

Arrows point from the 3 in the Tens column to the 3 in the Hundreds column, and from the 2 in the Ones column to the 2 in the Tens column.

320 is ten times larger than 32, so $4 \times 80 = 320$

Larger numbers

Let's look at another example.
 If $5 \times 3 = 15$, what is 50×3 ?

H	T	O	.	10th	100th
	1	5			
1	5	0			

Arrows indicate the relationship between the digits: one arrow points from the '1' in the Tens column to the '1' in the Hundreds column, and another arrow points from the '5' in the Tens column to the '5' in the Ones column.

50 is ten times larger than 5.
 Therefore, our answer will
 also be ten times larger

$$5 \times 3 = 15$$

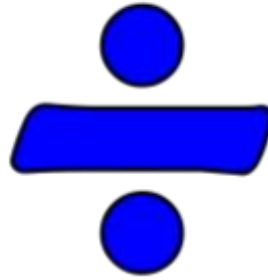
so

$$50 \times 3 = 150$$

Problem solving and reasoning

Explain why 300×5 and 30×50 give the same answer.





The same rules apply for **division**.
Let's take a look...

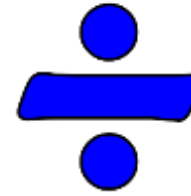
T	O	.	10th	100th

Problem solving and reasoning

The answer to a division calculation is 56.
What could the calculation be?



Larger numbers



If $42 \div 6 = 7$, what is $420 \div 6$?

H	T	O	.	10th	100th
	4	2			
4	2	0			

Arrows indicate the shift of digits from the tens and ones places to the hundreds and tens places.

420 is 10 times larger than 42 so when we **divide by 6**, our answer will also be 10 times larger.

$42 \div 6 = 7$
 so
 So $420 \div 6 = 70$

H	T	O	.	10th	100th
		7			
	7	0			

An arrow indicates the shift of the digit 7 from the tens place to the hundreds place.

Larger numbers



The same rules apply for multiples of 100.

If $9 \times 6 = 54$, what is 9×600 ?

H	T	O	.	10th	100th
6	0	0			

Arrows point from the 6 in the T column to the 6 in the H column, and from the 6 in the O column to the 0 in the T column.

600 is 100 times larger than 6 so our answer will also be 100 times larger.

Th	H	T	O	.	10th	100th
5	4	0	0			

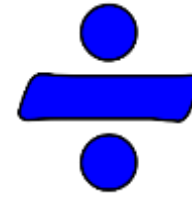
Arrows point from the 5 in the T column to the 5 in the Th column, from the 4 in the O column to the 4 in the H column, and from the 0 in the T column to the 0 in the O column.

$$9 \times 6 = 54$$

so

$$9 \times 600 = 5,400$$

Larger numbers



The same rules apply for division.

If $28 \div 7 = 4$, what is $2800 \div 7$?

Th	H	T	O	.	10th	100th
		2	8			
2	8	0	0			

Arrows indicate the relationship between the digits: from 2 in the T column to 2 in the Th column, from 8 in the O column to 8 in the H column, and from 0 in the T column to 0 in the O column.

2800 is 100 times larger than 28 so our answer will also be 100 times larger.

Th	H	T	O	.	10th	100th
			4			
	4	0	0			

An arrow indicates the relationship between the digits: from 4 in the O column to 4 in the H column.

$28 \div 7 = 4$

 so

 $2800 \div 7 = 400$

Problem solving and reasoning

I divide a three digit number by 100. The answer is between 40 and 50. What could the question have been?



M3b: Activities

- Use the counting stick to count our multiplication facts in multiples of 10.

E.g. $1 \times 60 = 60$, $2 \times 60 = 120$ etc.

- On the counting stick also include the corresponding division facts.
- Play 'Beat the Calculator'.
- Use a 'human function machine' to generate answers to multiplication and division facts including multiples of 10 and 100. Also ask children 'What is the rule?' of the machine.
- The answer is 360. What is the question? Is there more than one possibility?

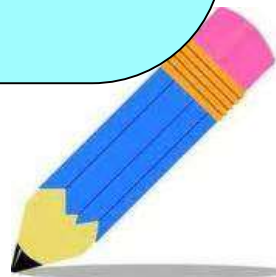
M3b. Your Turn

Test 1

1. A factory has 40 sets of shelves. Each shelf can hold 60 boxes. How many boxes in total can the factory shelves hold?

2. $30 \times 40 =$

3. $560 \div 7 =$



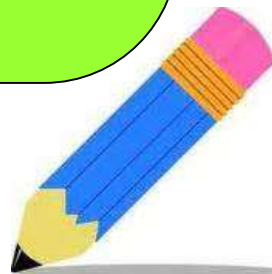
M3b. Your Turn

Test 2

1. $900 \div \underline{\hspace{2cm}} = 300$

2. On Wednesday, 8 people bought two sausage rolls each from the bakery. On Friday 20 times as many people bought two sausage rolls each. How many sausage rolls were bought on Friday?

3. $70 \times 60 =$



M3b. Your Turn

Test 3

1. _____ x 90 = 6300

2. 6400 ÷ 80 =

3. A farmer planted 6 rows of 8 pumpkins in month one. In the second month, he managed to plant ten times more pumpkins. How many pumpkins did he plant in month two?

