Multiplying by Powers of 10
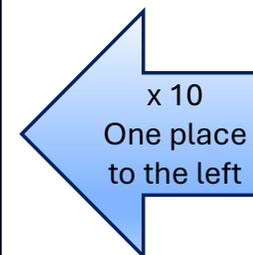
Multiplying by 10 (Whole Numbers)

You can use base-10 blocks, decimal squares and a place value chart when multiplying by 10. This method shows you how the digits increase in value.

To multiply by 10:

- **Build the number** on a place value chart using base-10 blocks.

- **Write the digits** underneath the blocks to show their value.

- **Multiply each block by 10** – each one becomes 10 times bigger.

- **Shift each block one place to the left** on the chart.

- **Write the new digits** underneath the shifted blocks.

- **Read the new number** and state the final answer.

- **Repeat** with different whole numbers.

Example: 2 x 10

Thousands			Ones		
Hundreds	**Tens**	**Units**	**Hundreds**	**Tens**	**Units**
100 x	10 x				
				2	2 0

x 10
One place
to the left

2 x 10 = 20

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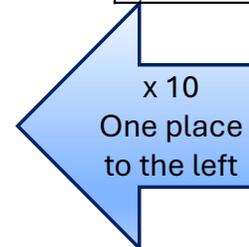ADVICE TUITION ASSESSMENT

Multiplying by 10 (Decimal Numbers)

You can use base-10 blocks, decimal squares and a place value chart when multiplying by 10. This method shows you how the digits increase in value.

To multiply by 10:

- **Build the number** on a place value chart using decimal squares to represent each part.
  - Ones: Use full squares to represent whole units
  - Tenths: Use squares divided into 10 equal parts
  - Hundredths: Use squares divided into 100 parts
  - Thousandths: Use squares divided into 1000 parts
- **Write the digits** underneath the shaded squares to show their value.
- **Multiply each square by 10** – each square becomes 10 times bigger.
- **Shift each square one place to the left** on the chart.
- **Write the new digits** underneath the shifted squares.
- **Read the new number** and state the final answer.
- **Repeat** with different decimal numbers.

Example: 0.1 x 10

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
		0 • 1	1		
		1			

x 10
One place to the left

0.1 x 10 = 1

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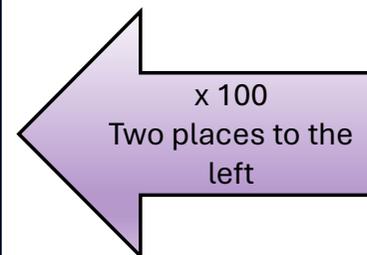
Multiplying by 100 (Whole Numbers)

You can use base-10 blocks, decimal squares and a place value chart when multiplying by 100. This method shows you how the digits increase in value.

To multiply by 100:

- **Build the number** on a place value chart using base-10 blocks.

- **Write the digits** underneath the blocks to show their value.

- **Multiply each block by 100** – each digit becomes 100 times bigger.

- **Shift each block two places to the left** on the chart.

- **Write the new digits** underneath the shifted blocks.

- **Read the new number** and state the final answer.

- **Repeat** with different whole numbers.

Example: 2 x 100

Thousands			Ones		
Hundreds	**Tens**	**Units**	**Hundreds**	**Tens**	**Units**
100 x	10 x				
					2
			2	0	0

x 100
Two places to the left

2 x 100 = 200

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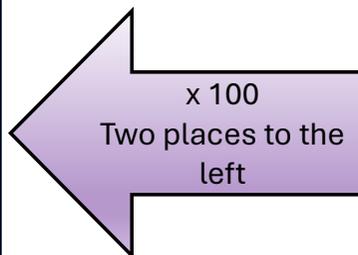ADVICE TUITION ASSESSMENT

Multiplying by 100 (Decimal Numbers)

You can use base-10 blocks, decimal squares and a place value chart when multiplying by 10. This method shows you how the digits increase in value.

To multiply by 100:

- **Build the number** on a place value chart using decimal squares to represent each part.
    - Ones: Use full squares to represent whole units
    - Tenths: Use squares divided into 10 equal parts
    - Hundredths: Use squares divided into 100 parts
    - Thousandths: Use squares divided into 1000 parts
- **Write the digits** underneath the shaded squares to show their value.
- **Multiply each square by 100** – each square becomes 100 times bigger.
- **Shift each square two places to the left** on the chart.
- **Write the new digits** underneath the shifted squares.
- **Read the new number** and state the final answer.
- **Repeat** with different decimal numbers.

Example: 0.1 x 100

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
		0 $\bullet$	1		
	1	0			

x 100
Two places to the left

0.1 x 100 = 10

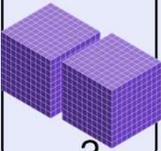THE MATHS HUB
ADVICE TUITION ASSESSMENT

Multiplying by 1000 (Whole Numbers)

You can use base-10 blocks, decimal squares and a place value chart when multiplying by 1000. This method shows you how the digits increase in value.

To multiply by 1000:

- **Build the number** on a place value chart using base-10 blocks.

- **Write the digits** underneath the blocks to show their value.

- **Multiply each block by 1000 –** each digit becomes 1000 times bigger.

- **Shift each block three places to the left** on the chart.

- **Write the new digits** underneath the shifted blocks.

- **Read the new number** and state the final answer.

- **Repeat** with different whole numbers.

Example: 2 x 1000

Thousands			Ones		
Hundreds	**Tens**	**Units**	**Hundreds**	**Tens**	**Units**
100 x	10 x				
		2	0	0	2
					0

2 x 1000 = 2000

x 1000
Three places to the left

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Multiplying by 1000 (Decimal Numbers)

You can use base-10 blocks, decimal squares and a place value chart when multiplying by 10. This method shows you how the digits increase in value.

To multiply by 1000:

- **Build the number** on a place value chart using decimal squares to represent each part.
    - Ones: Use full squares to represent whole units
    - Tenths: Use squares divided into 10 equal parts
    - Hundredths: Use squares divided into 100 parts
    - Thousandths: Use squares divided into 1000 parts
- **Write the digits** underneath the shaded squares to show their value.
- **Multiply each square by 1000** – each square becomes 1000 times bigger.
- **Shift each square three places to the left** on the chart.
- **Write the new digits** underneath the shifted squares.
- **Read the new number** and state the final answer.
- **Repeat** with different decimal numbers.

Example: 0.1 x 1000

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
		0 •	1		
1	0	0			

0.1 x 1000 = 100

x 1000
Three places to the left

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Dividing by Powers of 10
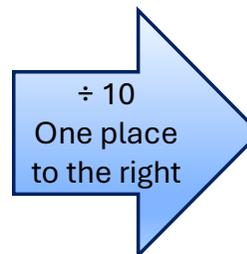
Dividing by 10 (Whole Numbers)

You can use base-10 blocks, decimal squares and a place value chart when dividing by 10. This method shows you how the digits decrease in value.

To divide by 10:

- **Build the number** on a place value chart using base-10 blocks.

- **Write the digits** underneath the blocks to show their value.

- **Divide each block by 10** – each one becomes 10 times small.

- **Shift each block one place to the right** on the chart.

- **Write the new digits** underneath the shifted blocks.

- **Read the new number** and state the final answer.

- **Repeat** with different whole numbers.

Example: 20 ÷ 10

Thousands			Ones		
Hundreds	**Tens**	**Units**	**Hundreds**	**Tens**	**Units**
100 x	10 x				
				2	0
					2

÷ 10
One place to the right

20 ÷ 10 = 2

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Dividing by 10 (Decimal Numbers)

You can use base-10 blocks, decimal squares and a place value chart when dividing by 10. This method shows you how the digits decrease in value.

To divide by 10:

- **Build the number** on a place value chart using decimal squares to represent each part.
  - Ones: Use full squares to represent whole units
  - Tenths: Use squares divided into 10 equal parts
  - Hundredths: Use squares divided into 100 parts
  - Thousandths: Use squares divided into 1000 parts
- **Write the digits** underneath the shaded squares to show their value.
- **Divide each square by 10** – each square becomes 10 times smaller.
- **Shift each square one place to the right** on the chart.
- **Write the new digits** underneath the shifted squares.
- **Read the new number** and state the final answer.
- **Repeat** with different decimal numbers.

Example: $1 \div 10$

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
		1	.		
		0	1		

÷ 10
One place to the right

$1 \div 10 = 0.1$

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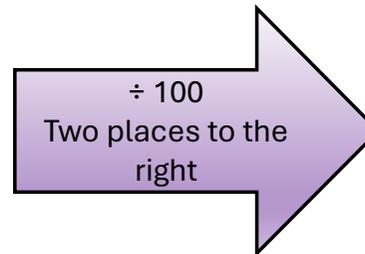# Dividing by 100 (Whole Numbers)

You can use base-10 blocks, decimal squares and a place value chart when Dividing by 100. This method shows you how the digits decrease in value.

To divide by 100:

- **Build the number** on a place value chart using base-10 blocks.

- **Write the digits** underneath the blocks to show their value.

- **Divide each block by 100** – each digit becomes 100 times smaller.

- **Shift each block two places to the right** on the chart.

- **Write the new digits** underneath the shifted blocks.

- **Read the new number** and state the final answer.

- **Repeat** with different whole numbers.

Example: 200 ÷ 100

Thousands			Ones		
Hundreds	Tens	Units	Hundreds	Tens	Units
100 x	10 x		■	│	.
			■■ 2	0	0
					.
					2

÷ 100
Two places to the right

200 ÷ 100 = 2

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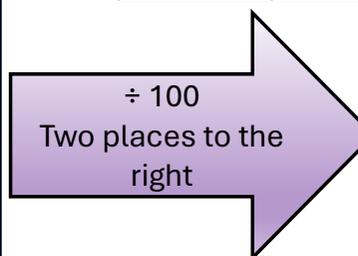
Dividing by 100 (Decimal Numbers)

You can use base-10 blocks, decimal squares and a place value chart when Dividing by 100. This method shows you how the digits decrease in value.

To divide by 100:

- **Build the number** on a place value chart using decimal squares to represent each part.
  - Ones: Use full squares to represent whole units
  - Tenths: Use squares divided into 10 equal parts
  - Hundredths: Use squares divided into 100 parts
  - Thousandths: Use squares divided into 1000 parts
- **Write the digits** underneath the shaded squares to show their value.
- **Divide each square by 100** – each square becomes 100 times smaller.
- **Shift each square two places to the right** on the chart.
- **Write the new digits** underneath the shifted squares.
- **Read the new number** and state the final answer.
- **Repeat** with different decimal numbers.

Example: 0.1 ÷ 10

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
		0 •	1		
		1			

÷ 100
Two places to the right

0.1 ÷ 10 = 1

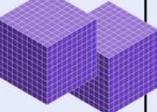THE MATHS HUB
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Dividing by 1000 (Whole Numbers)

You can use base-10 blocks, decimal squares and a place value chart when Dividing by 1000. This method shows you how the digits increase in value.

To divide by 1000:

- **Build the number** on a place value chart using base-10 blocks.

- **Write the digits** underneath the blocks to show their value.

- **Divide each block by 1000** – each digit becomes 1000 times smaller.

- **Shift each block three places to the right** on the chart.

- **Write the new digits** underneath the shifted blocks.

- **Read the new number** and state the final answer.

- **Repeat** with different whole numbers.

Example: 2000 ÷ 1000

Thousands			Ones		
Hundreds	**Tens**	**Units**	**Hundreds**	**Tens**	**Units**
100 x	10 x				
		2	0	0	0
					2

2000 ÷ 1000 = 2

÷ 1000
Three places to the right

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Dividing by 1000 (Decimal Numbers)

You can use base-10 blocks, decimal squares and a place value chart when Dividing by 10. This method shows you how the digits decrease in value.

To divide by 1000:

- **W the number** on a place value chart using decimal squares to represent each part.
  - Ones: Use full squares to represent whole units
  - Tenths: Use squares divided into 10 equal parts
  - Hundredths: Use squares divided into 100 parts
  - Thousandths: Use squares divided into 1000 parts
  - Ten thousandths: Use squares divided into 10000 parts
- **Write the digits** underneath the shaded squares to show their value.
- **Divide each square by 1000** – each square becomes 1000 times smaller.
- **Shift each square three places to the right** on the chart.
- **Write the new digits** underneath the shifted squares.
- **Read the new number** and state the final answer.
- **Repeat** with different decimal numbers.

Example: 0.1 ÷ 1000

Ones			Decimals			
Hundreds	Tens	Units	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$	Ten thousandths $\frac{1}{10000}$
		0 . 1				
		0 . 0	0	0	1	

0.1 ÷ 1000 = 0.0001

÷ 1000
Three places to the right

Acknowledgements

- Images were created using free virtual manipulatives available at Mathsbot.com
- Images are not to scale