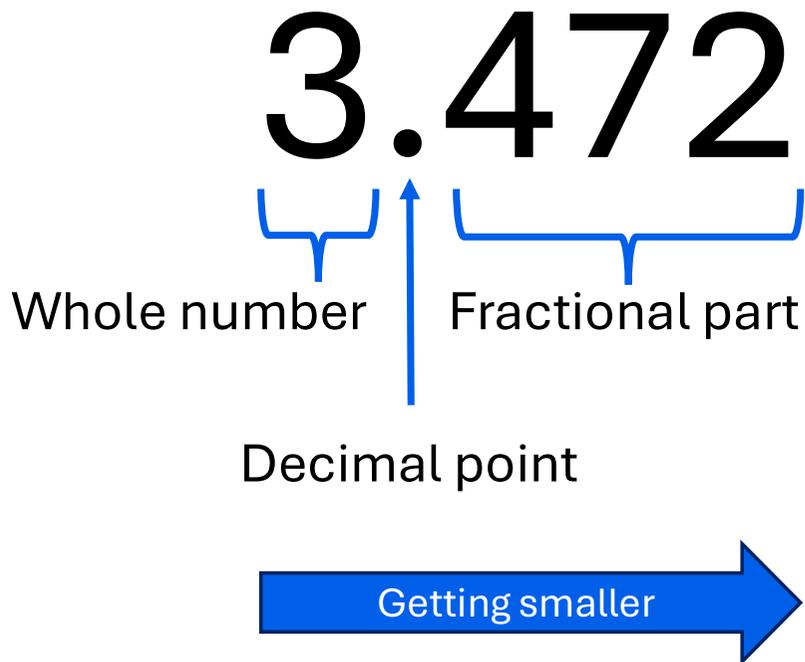# Understanding Decimal Place Value

What is Decimal Place Value?

Decimal place value refers to the value of each digit in a decimal number based on its position relative to the decimal point. Digits to the right of the decimal point represent parts of a whole, decreasing in size as you move further right.

3.472

Whole number | Fractional part

Decimal point

Getting smaller

Digit	Place	Value
3	Units	3 units
4	Tenths	$\frac{4}{10}$ or 4 tenths
7	Hundredths	$\frac{7}{100}$ or 7 hundredths
2	Thousandths	$\frac{2}{1000}$ or 2 thousandths

Understanding Decimal Place Value

To understand decimal place value, we can use a decimal square or a square piece of paper that you have folded or cut into strips.
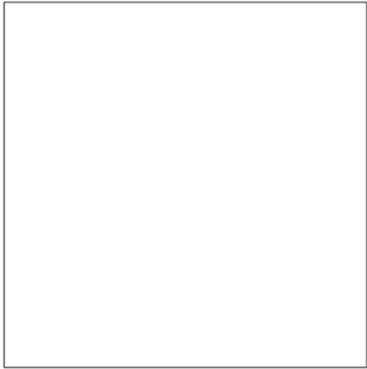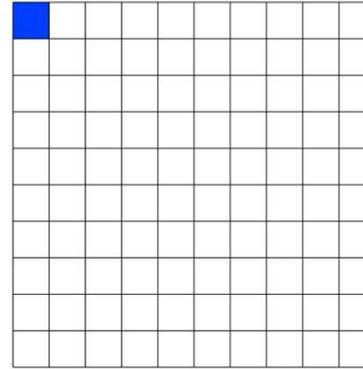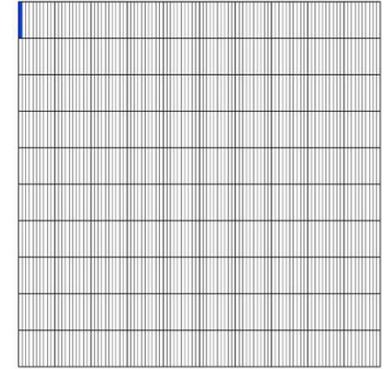
1 whole square = 1
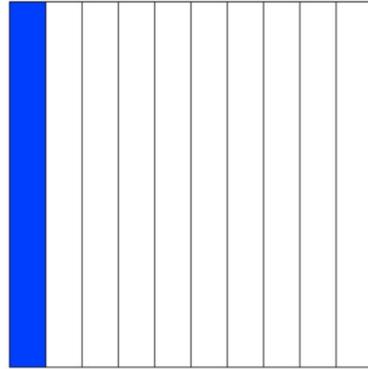
1 whole square **divided into 10 equal strips**

Each strip = $\frac{1}{10}$ or $1 \div 10$ or 0.1

1 whole square **divided into 100 equal strips**

Each strip = $\frac{1}{100}$ or $1 \div 100$ or 0.01

1 whole square **divided into 1000 equal strips**

Each strip = $\frac{1}{1000}$ or $1 \div 1000$ or 0.001

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Decimal Place Grid

A decimal place value grid is a visual tool that can help you understand the value of digits in decimal numbers by showing how each digit fits into a specific place (e.g., tenths, hundredths, or thousandths.)

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$ or 0.1	Hundredths $\frac{1}{100}$ or 0.01	Thousandths $\frac{1}{1000}$ or 0.001

Using strips of paper to represent decimals can be hard. Instead, we can use place value discs. Note, the size of the disc does not reflect the value.

1   0.1   0.01   0.001

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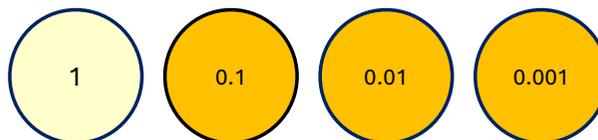
Decimal Number Line

A decimal number line is a horizontal line marked with numbers that include decimal values.

A **number line** from 0 to 1
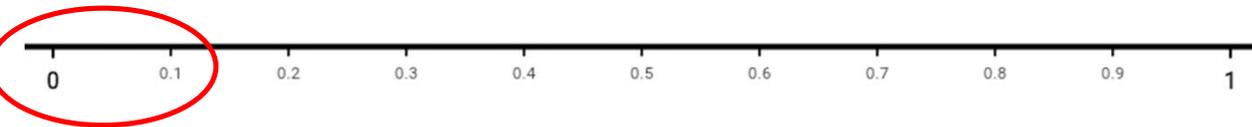
Let's divide the **same number line** into 10 equal parts and magnify it so we can read the numbers. Each part = 0.1 or $\frac{1}{10}$

Let's divide the **same number line** into 100 equal parts and magnify a section of the number line, from 0 to 0.1. On this number line, each part = 0.01 or $\frac{1}{100}$

It is a good idea to practice counting in decimals, on a number line or a number square.

Identify the Place Value of Decimal Numbers

To **identify the value of decimal numbers**, we can use a place value chart.

How to find the value of a digit in a decimal:

- **Build the number** using a place value chart and discs. Write the digits below the discs. No discs? Draw or picture them instead.

- **Look at the column the digit is in.** Is it tenths? Hundredths? Thousandths?

- **Say the digit's value** based on its place.

  For example: 5 in the thousandths place = 0.005

- **State your final answer** clearly.

Example: It takes a typical teenager 12.345 seconds to sprint 100m. What is the value of the 5 in this number?

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$ or 0.1	Hundredths $\frac{1}{100}$ or 0.01	Thousandths $\frac{1}{1000}$ or 0.001
	10	1 1	0.1 0.1 0.1	0.01 0.01 0.01 0.01	0.001 0.001 0.001 0.001 0.001
	1	2	3	4	5

Answer: 5 thousandths, $\frac{5}{1000}$ or 0.005

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Comparing Decimal Numbers

To **compare decimal numbers**, we need to understand their place value. One way to do this is to use a place value chart.

To compare decimal numbers:

- **Build the number:** Using a place value chart and discs, make the number. Write the digits below the discs. No discs? Draw or imagine them instead.

- **Compare the numbers:** Start with the leftmost (largest) place value (⬆). The number with the **biggest** digit in this column will be the largest number.

- **Digits the same?** If two or more numbers have the same digit in a column, move right to the next place value (⬆) and compare the digits. Continue until you find a difference.

- **State your final answer.** Decide which number is greater, smaller, or if they are equal.

Example: Which brand of yoghurt is cheaper?
Brand A: £1.15 for 500g
Brand B: £1.25 for 500g

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$ or 0.1	Hundredths $\frac{1}{100}$ or 0.01	Thousandths $\frac{1}{1000}$ or 0.001
		1	1	5	
		1	2	5	

Answer: Brand A

Ordering Decimal Numbers

To **put decimal numbers in order of size,** we need to understand their place value. One way to do this is to use a place value chart.

To order decimal numbers:

- **Represent the numbers:** Write each number in a place value chart ensuring that the digits are aligned correctly. If it helps, use place value discus to show each number, or draw or imagine them instead. If the numbers are different lengths, insert a zeros as a **placeholders** to keep columns aligned.

- **Compare from left to right:** To compare the numbers, begin with the leftmost (largest) place value (↑). The number with the **biggest** digit in this column will be the largest number. The next biggest digit will be the second largest number, and so on. Continue until all numbers have been placed in order of size.

- **Digits the same?** If two or more numbers have the same digit in a column, move right to the next place value (↑). Compare again until you find a difference.

- **Arrange the numbers:** Place the numbers from smallest to largest (ascending) or largest to smallest (descending), depending on the task.

- **State your final answer.**

Example: Put these flight times in order from longest to shortest.

Route A: 3.75 hours

Route B: 3.5 hours

Route C: 3.8 hours

Ones			Decimals		
Hundreds	Tens	Units	Tenths $\frac{1}{10}$ or 0.1	Hundredths $\frac{1}{100}$ or 0.01	Thousandths $\frac{1}{1000}$ or 0.001
		3	7	5	
		3	5	0	
		3	8	0	

Answer: C, A, B

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Acknowledgements

- Decimal square created using free virtual manipulatives available at Mathsbot.com

- Number line created using free virtual manipulatives available at https://numberline.school/

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