• We represent a unit by a block to understand the parts of one whole. If one block is divided into 10 equal parts, then it means that each part is $\left(\frac{1}{10}\right)$ (one-tenth) of a unit. It can be written as 0.1 in decimal notation. Similarly, 8 equal parts out of 10 equal parts is written as 0.8 (read as zero point eight). The dot represents the decimal point and it comes between the units place and the tenths place.

For example: The place value table of 295.3 can be compiled as:

Hundreds (100)	Tens (10)	Ones (1)	Tenths $\left(\frac{1}{10}\right)$	
				We can write 295.3 in expanded form as $2 \times 100 + 9$
2	9	5	3	$\times 10 + 5 \times 1 + 3 \times \left(\frac{1}{10}\right).$

• We can represent the number 295.3 by using blocks.

295.3

 $= 2 \times 100 + 9 \times 10 + 5 \times 1 + 3 \times \left(\frac{1}{10}\right).$

= 2 hundreds, 9 tens, 5 ones, and 3 tenths

Therefore, 295.3 contains 2 hundreds, 9 tens, 5 ones, and 3 tenths. Thus, 295.3 can be represented by blocks as follows.

(Here, 1 block represents 1 unit.)



• The decimal point always comes between ones place and tenths place. If we move to the left of the decimal point, then we find ones, tens, hundreds, thousands place, etc. Similarly, if we move to the right of the decimal point, then we find tenths, hundredths, thousandths place, etc.



Example: The place value table of the number 8570.216 can be compiled as:

Thousands (1000)	8
Hundreds (100)	5
Tens (10)	7
Ones (1)	0
Tenths $\left(\frac{1}{10}\right)$	2
Hundredths $\left(\frac{1}{100}\right)$	1
Thousandths $\left(\frac{1}{1000}\right)$	6

Using this table, we can expand 8570.216 according to its place value as

$$8570.216 = 8 \times 1000 + 5 \times 100 + 7 \times 10 + 2 \times \frac{1}{10} + 1 \times \frac{1}{100} + 6 \times \frac{1}{100}$$

• We can represent a decimal number (upto hundredth place) using blocks.

Example: To express 129.56 by blocks, the blocks have to be arranged as follows.



• We can represent a decimal (of tenths place) on a number line also. For this, we have to divide each unit length into 10 equal parts. Each of the equal parts represents 0.1.

To represent 3.6 on the number line, we have to divide the distance between 3 and 4 into 10 equal parts. The 6^{th} part after 3 represents 3.6.



• Every decimal can be written as a fraction.

Example:

$$2.96 = 2 + \frac{96}{100} = 2 + \frac{96 \div 4}{100 \div 4} = 2 + \frac{24}{25} = 2\frac{24}{25} = \frac{74}{25}$$
$$8.8 = 8 + 0.8 = 8 + \frac{8}{10} = 8 + \frac{8 \div 2}{10 \div 2} = 8 + \frac{4}{5} = 8\frac{4}{5} = \frac{44}{5}$$

• Every fraction with denominator 10 or 100 can be converted into decimal form easily.

Example:

$$\frac{56}{10} = \frac{50+6}{10} = 5 + \frac{6}{10} = 5.6$$
$$\frac{291}{100} = \frac{200+91}{100} = 2 + \frac{91}{100} = 2.91$$

• A fraction whose denominator is 10 or 100 can be converted into decimal form by multiplying the numerator and denominator by the same number such that the denominator is 10 or 100.

Example:

$$\frac{41}{20} = \frac{41 \times 5}{20 \times 5} = \frac{205}{100} = \frac{200 + 5}{100} = \frac{5}{100} = 2.05$$

$$\frac{9}{5} = \frac{9 \times 2}{5 \times 2} = \frac{18}{10} = \frac{10 + 8}{10} = 1 + \frac{8}{10} = 1.8$$

• We use decimals in our day to day lives in many ways, for example, in representing units of money, weight, length, volume, etc.

Example: If we want to represent 6 kg 5g into kg, then we may proceed as follows.

$$6 \text{kg } 5 \text{ g} = 6 \text{kg} + 5 \times \frac{1}{1000} \text{kg} = \left(6 + \frac{5}{1000}\right) \text{kg} = 6.005 \text{ kg}$$
$$\left(1 \text{g} = \frac{1}{1000} \text{kg}\right)$$

• Any two decimal numbers can be compared among themselves. The comparison can start with the whole part. If the whole parts are equal, then the tenth part is compared and so on.

Example:

Arrange the numbers, 291.56, 291.561, and 291.559, in ascending order.

Solution:

It can be observed that the whole parts and the digits in tenths place are equal.

The digit in hundredth place of 291.559 is less than that of the other two numbers.

Therefore, 291.559 is the smallest among all.

In the remaining numbers, 291.56 and 291.561, the digits in hundredths place are same. The digit in thousandths place in the number 291.56 is 0 whereas that in 291.561 is 1.

As 0 < 1 therefore, 291.56 < 291.561

Thus, 291.559 < 291.56 < 291.561

• If the whole part and decimal part of a decimal number are same as the whole part and decimal part of another decimal number respectively then both numbers are called **equivalent decimal numbers**.

For example, 2.045 and 2.0450.

• We can add or subtract decimals in the same way as whole numbers by placing decimal points one above the other.

Example:

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 $_{\circ}$ If 9.56 and 17.15 are to be added, then we proceed as:

Tens	Ones	Tenths	Hundredths
	9	5	6
+ 1	7	1	5
2	6	7	1

$$\therefore 9.56 + 17.15 = 26.71$$

 $_{\circ}$ $\,$ If 72.18 has to be subtracted from 92, then we proceed as:

Tens	Ones	Tenths	Hundredths
9	2	0	0
- 7	2	1	8
1	9	8	2

:.92 - 72.18 = 19.82