

We shall learn in this chapter

- ◆ Money and Currency
- ◆ Expressing Money in Words and Figures
- ◆ Conversion of Rupee into Paise and Vice-versa
- ◆ Conversion of an Amount in Decimal Form into Paise
- ◆ Conversion of Paise into Rupees and Paise using Decimal Form
- ◆ Addition and Subtraction of Money
- ◆ Multiplication of Money by a Whole Number
- ◆ Division of Money by a Whole Number

# CHAPTER 3

## Units of Measurements

We have studied some units of measurements in the previous class. Here, we will be learning some more units of measurements which constitute the metric system of measurement.

The units along with their abbreviation are given below:

**LENGTH** Kangaroo's Hopping down Don't care Much

Unit	Abbreviation	Number of Metres
Kilometre	km	1000
Hectometre	hm	100
Decametre	dam	10
Metre	m	1
Decimetre	dm	$\frac{1}{10}$
Centimetre	cm	$\frac{1}{100}$
Millimetre	mm	$\frac{1}{1000}$

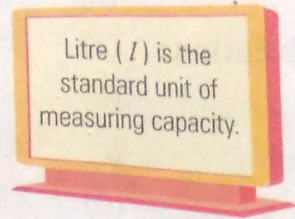
Metre (m) is the standard unit of measuring length.

### MASS

Unit	Abbreviation	Number of Grams
Kilogram	kg	1000
Hectogram	hg	100
Decagram	dag	10
Gram	g	1
Decigram	dg	$\frac{1}{10}$
Centigram	cg	$\frac{1}{100}$
Milligram	mg	$\frac{1}{1000}$

Gram (g) is the standard unit of measuring mass.

Unit	Abbreviation	Number of Litres
Kilolitre	kl	1000
Hectolitre	hl	100
Decalitre	dal	10
Litre	l	1
Decilitre	dl	$\frac{1}{10}$
Centilitre	cl	$\frac{1}{100}$
Millilitre	ml	$\frac{1}{1000}$



Here is given a table of units for each measure :

Length	Mass	Capacity
10 <u>millimetres</u> = 1 centimetre (10 mm = 1 cm)	10 <u>milligrams</u> = 1 centigram (10 mg = 1 cg)	10 <u>millilitres</u> = 1 centilitre (10 ml = 1 cl)
10 <u>centimetres</u> = 1 decimetre (10 cm = 1 dm)	10 <u>centigrams</u> = 1 decigram (10 cg = 1 dg)	10 <u>centilitres</u> = 1 decilitre (10 cl = 1 dl)
10 <u>decimetres</u> = 1 metre (10 dm = 1 m)	10 <u>decigrams</u> = 1 gram (10 dg = 1 g)	10 <u>decilitres</u> = 1 litre (10 dl = 1 l)
10 <u>metres</u> = 1 decametre (10 m = 1 dam)	10 <u>grams</u> = 1 decagram (10 g = 1 dag)	10 <u>litres</u> = 1 decalitre (10 l = 1 dal)
10 <u>decametres</u> = 1 hectometre (10 dam = 1 hm)	10 <u>decagrams</u> = 1 hectogram (10 dag = 1 hg)	10 <u>decalitres</u> = 1 hectolitre (10 dal = 1 hl)
10 <u>hectometres</u> = 1 kilometre (10 hm = 1 km)	10 <u>hectograms</u> = 1 kilogram (10 hg = 1 kg)	10 <u>hectolitres</u> = 1 kilolitre (10 hl = 1 kl)

### RULES OF CONVERSION OF UNITS

- Rule 1.** When a higher unit is converted into a lower unit, then we multiply the higher unit by the number which relates the two units.
- Rule 2.** When a lower unit is converted into a higher unit, then we divide the lower unit by the number which relates the two units.
- Rule 3.** For converting the mixed units (km and m into m, kg and g into g, kl and l into l or vice-versa) we follow the rules 1 and 2 and add the figures of two units obtained after table conversion.

## Solved Examples

**Example 1:** Convert:

- (a) 15 km to m                      (b) 2 m to cm                      (c) 80 mm to cm  
(d) 7 km 105 m to m              (e) 60 dm to m                      (f) 6 m 700 cm to m

**Solution:** (a)  $15 \text{ km} = (15 \times 1000) \text{ m} = 15000 \text{ m}$   
(b)  $2 \text{ m} = (2 \times 100) \text{ cm} = 200 \text{ cm}$   
(c)  $80 \text{ mm} = (80 \div 10) \text{ cm} = 8 \text{ cm}$   
(d)  $7 \text{ km } 105 \text{ m} = (7 \times 1000) \text{ m} + 105 \text{ m} = 7000 \text{ m} + 105 \text{ m} = 7105 \text{ m}$   
(e)  $60 \text{ dm} = (60 \div 10) \text{ m} = 6 \text{ m}$   
(f)  $6 \text{ m } 700 \text{ cm} = 6 \text{ m} + (700 \div 100) \text{ m} = 6 \text{ m} + 7 \text{ m} = 13 \text{ m}$

**Example 2:** Convert:

- (a) 13 g to mg                      (b) 2000 g to kg                      (c) 120 dg 15 g to g  
(d) 1500 dag to g                      (e) 5 g 30 mg to mg                      (f) 4 kg 2000 g to g

**Solution:** (a)  $13 \text{ g} = (13 \times 1000) \text{ mg} = 13000 \text{ mg}$   
(b)  $2000 \text{ g} = (2000 \div 1000) \text{ kg} = 2 \text{ kg}$   
(c)  $120 \text{ dg } 15 \text{ g} = (120 \div 10) \text{ g} + 15 \text{ g} = 12 \text{ g} + 15 \text{ g} = 27 \text{ g}$   
(d)  $1500 \text{ dag to g} = (1500 \times 10) \text{ g} = 15000 \text{ g}$   
(e)  $5 \text{ g } 30 \text{ mg} = (5 \times 1000) \text{ mg} + 30 \text{ mg} = 5000 \text{ mg} + 30 \text{ mg} = 5030 \text{ mg}$   
(f)  $4 \text{ kg } 2000 \text{ g} = (4 \times 1000) \text{ g} + 2000 \text{ g} = 4000 \text{ g} + 2000 \text{ g} = 6000 \text{ g}$

## EXERCISE A

A1 A3

1. Convert:

- (a) 50 m to cm                      (b) 6 km to m                      (c) 3 hm to m  
(d) 150 dm to m                      (e) 60 dam to m                      (f) 15 m to mm  
(g) 15 km 182 m to m              (h) 50 m 300 cm to m              (i) 6 m 18 cm to cm  
(j) 4 dam 5 m to m                      (k) 2 cm 50 mm to cm              (l) 5 km 12 hm to hm

2. Convert:

- (a) 8 g to cg                      (b) 12 kg to g                      (c) 50 dag to g  
(d) 60 dg to g                      (e) 15 hg to g                      (f) 4000 mg to g  
(g) 12 kg 112 g to g                      (h) 15 g 18 mg to mg                      (i) 15 dag 19 g to g  
(j) 8 kg 12 g to g                      (k) 15 dag 10 g to dag                      (l) 21 hg 150 dag to hg

3. Convert:

- (a) 18 kl to l                      (b) 500 cl to l                      (c) 22 l to ml

(d) 22 hl to l

(g) 15 kl 708 l to l

(j) 16 l 15 cl to cl

(e) 12 dal to l

(h) 74 l 2000 ml to l

(k) 32 hl 15 l to l

(f) 160 dl to l

(i) 15 dal 18 l to l

(l) 19 kl 6000 l to kl

### ADDITION AND SUBTRACTION OF METRIC UNITS

Metric units are added and subtracted like addition and subtraction of whole numbers. Remember, we can always add and subtract measurements in similar units. For adding and subtracting with two or more units, we make separate columns for different units.

#### Solved Examples

**Example 1:** Add:

(a) 2 km 167 m, 5 km 8 m, 17 km 915 m

(b) 13 kg 315 g, 10 kg 12 g and 5 kg 732 g

(c) 18 l 15 ml, 16 l 108 ml and 37 l 918 ml

**Solution:**

(a)

km	m
2	1 6 7
5	0 0 8
+ 1 7	9 1 5
2 5	0 9 0

Here,  $167\text{ m} + 8\text{ m} + 915\text{ m}$   
 $= 1090\text{ m}$   
 $= 1000\text{ m}$  and  $90\text{ m}$   
 $= 1\text{ km}$  and  $90\text{ m}$   
 So, we carry 1 km to the ones place in 'km' column and write 90 in 'm' column.

(b)

kg	g
1 3	3 1 5
1 0	0 1 2
+ 5	7 3 2
2 9	0 5 9

Here,  $315\text{ g} + 12\text{ g} + 732\text{ g}$   
 $= 1059\text{ g}$   
 $= 1000\text{ g}$  and  $59\text{ g}$   
 $= 1\text{ kg}$  and  $59\text{ g}$   
 So, we carry 1 kg to the ones place in 'kg' column and write 59 under 'g' column.

(c)

l	ml
1 8	1 5
1 6	1 0 8
+ 3 7	9 1 8
7 2	4 1

Here,  $15\text{ ml} + 108\text{ ml} + 918\text{ ml}$   
 $= 1041\text{ ml}$   
 $= 1000\text{ ml}$  and  $41\text{ ml}$   
 $= 1\text{ l}$  and  $41\text{ ml}$   
 So, we carry 1 'l' to the ones place in 'l' column and write 41 in 'ml' column.

**Example 2:** Subtract:

(a) 126 l 429 ml from 800 l 516 ml

(b) 41 km 29 m from 165 km 805 m

(c) 206 g 515 mg from 640 g 18 mg

Solution: (a)

$$\begin{array}{r} \text{l} \quad \text{ml} \\ 800 \quad 516 \\ - 126 \quad 429 \\ \hline 674 \quad 87 \end{array}$$

$$\begin{array}{r} \text{km} \quad \text{m} \\ 165 \quad 805 \\ - 41 \quad 29 \\ \hline 124 \quad 776 \end{array}$$

$$\begin{array}{r} \text{g} \quad \text{mg} \\ 640 \quad 78 \\ - 206 \quad 515 \\ \hline 433 \quad 503 \end{array}$$

Here, 18 mg < 515 mg. So, 18 mg - 515 mg is not possible.  
So, we borrow 1 g (1000 mg) from 'g' column and make 18 mg as 1018 mg.  
Now, 1018 mg > 515 mg. So, 1018 mg - 515 mg = 503 mg

## EXERCISE B

1. Add the following:

$$\begin{array}{r} \text{km} \quad \text{m} \\ 21 \quad 132 \\ + 39 \quad 518 \\ \hline 60 \text{ km } 650 \text{ m} \end{array}$$

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 87 \quad 15 \\ + 10 \quad 97 \\ \hline 97 \text{ m } 112 \text{ cm} \end{array}$$

$$\begin{array}{r} \text{kg} \quad \text{g} \\ 12 \quad 215 \\ + 37 \quad 211 \\ \hline 49 \text{ kg } 426 \text{ g} \end{array}$$

$$\begin{array}{r} \text{kl} \quad \text{l} \\ 111 \quad 217 \\ + 312 \quad 309 \\ \hline 423 \text{ kl } 526 \text{ l} \end{array}$$

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 395 \quad 582 \\ + 18 \quad 729 \\ \hline 413 \text{ m } 311 \text{ cm} \end{array}$$

$$\begin{array}{r} \text{kl} \quad \text{l} \\ 751 \quad 268 \\ + 518 \quad 970 \\ \hline 1269 \text{ kl } 238 \text{ l} \end{array}$$

- (g) 5 kg 7 dag 9 g and 13 kg 9 dag 4 g  
 (h) 70 g 30 cg, 9 g 9 cg and 18 g 7 cg  
 (i) 150 km 7 hm 19 dam, 15 hm 5 dam and 15 km 17 hm 9 m  
 (j) 9 hm 2 m 5 cm, 2 dam 8 dm and 5 dam 9 m 9 cm

2. Subtract:

$$\begin{array}{r} \text{kg} \quad \text{g} \\ 627 \quad 329 \\ - 92 \quad 115 \\ \hline 535 \text{ kg } 214 \text{ g} \end{array}$$

$$\begin{array}{r} \text{g} \quad \text{mg} \\ 516 \quad 410 \\ - 182 \quad 725 \\ \hline 333 \text{ g } 685 \text{ mg} \end{array}$$

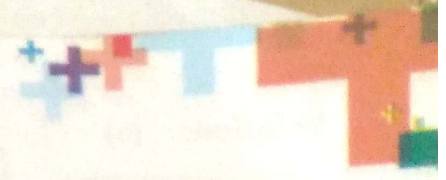
$$\begin{array}{r} \text{km} \quad \text{m} \\ 92 \quad 107 \\ - 802 \quad 705 \\ \hline 12 \text{ km } 402 \text{ m} \end{array}$$

$$\begin{array}{r} \text{m} \quad \text{mm} \\ 628 \quad 182 \\ - 679 \quad 245 \\ \hline 035 \text{ m } 757 \text{ mm} \end{array}$$

$$\begin{array}{r} \text{ml} \\ 111 \quad 10 \\ 228 \quad 288 \\ - 198 \quad 719 \\ \hline 016 \text{ l } 395 \text{ ml} \end{array}$$

$$\begin{array}{r} \text{kl} \quad \text{l} \\ 628 \quad 10 \\ - 565 \quad 729 \\ \hline 63 \text{ kl } 371 \text{ l} \end{array}$$

- (g) 3 m 4 dm 9 cm 8 mm from 8 m 8 dm 2 cm 5 mm  
 (h) 3 g 9 dg 7 cg 8 mg from 6 g 5 dg 9 cg 9 mg  
 (i) 5 kg 3 hg 7 dag 7 g from 9 kg 3 hg 8 dag 7 g  
 (j) 8 kl 550 l 215 ml from 10 kl



### MULTIPLICATION OF METRIC UNITS

We multiply measurements like we multiply whole numbers. We write different units in separate columns and then start multiplying.

#### Solved Example

**Example:** Multiply:

(a) 2 m 10 cm by 6

(c) 16 kl 115 l by 3

(b) 12 kg 45 g by 9

(d) 14 km 31 m by 8

**Solution:**

(a)

	m	cm
	2	10
×		6
	12	60

(b)

	kg	g
	12	45
×		9
	108	405

(c)

	kl	l
	16	115
×		3
	48	345

(d)

	km	m
	14	31
×		8
	112	248

### DIVISION OF METRIC UNITS

Like multiplication, we divide different units separately. The remainder after dividing the bigger unit is converted into the next smaller unit and added to it and then we divide the smaller unit.

#### Solved Example

**Example:** Divide:

(a) 8 km 12 m by 4

(c) 1054 kg 5 g by 15

(b) 27 kg 40 g by 13

(d) 312 l 156 ml by 18

Solution: (a)

$$\begin{array}{r}
 \text{2 km 3 m} \\
 \hline
 \begin{array}{r}
 \text{km} \quad \text{m} \\
 4 \overline{) 8 \quad 12} \\
 \underline{- 8} \phantom{0} \\
 \phantom{0} \times 12 \\
 \phantom{0} \underline{- 12} \\
 \phantom{0} \phantom{0} \times
 \end{array}
 \end{array}$$

∴ Quotient = 2 km 3 m

(b)

$$\begin{array}{r}
 \text{2 kg 80 g} \\
 \hline
 \begin{array}{r}
 \text{kg} \quad \text{g} \\
 13 \overline{) 27 \quad 40} \\
 \underline{- 26} \phantom{0} \\
 \phantom{0} 1
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 1 \xrightarrow{1000 \text{ g}} 1040 \\
 \underline{- 1040} \\
 0 \\
 \underline{- 0} \\
 \phantom{0} \times
 \end{array}$$

∴ Quotient = 2 kg 80 g

(c)

$$\begin{array}{r}
 \text{70 kg 267 g} \\
 \hline
 \begin{array}{r}
 \text{kg} \quad \text{g} \\
 15 \overline{) 1054 \quad 5} \\
 \underline{- 1050} \phantom{0} \\
 \phantom{0} 4
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 4 \xrightarrow{4000 \text{ g}} 4005 \\
 \underline{- 30} \\
 100 \\
 \underline{- 90} \\
 105 \\
 \underline{- 105} \\
 \phantom{0} \times
 \end{array}$$

∴ Quotient = 70 kg 267 g

(d)

$$\begin{array}{r}
 \text{17 l 342 ml} \\
 \hline
 \begin{array}{r}
 \text{l} \quad \text{ml} \\
 18 \overline{) 312 \quad 156} \\
 \underline{- 18} \phantom{0} \\
 \phantom{0} 132 \\
 \underline{- 126} \\
 \phantom{0} 6
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 6 \xrightarrow{6000 \text{ ml}} 6156 \\
 \underline{- 54} \\
 75 \\
 \underline{- 72} \\
 36 \\
 \underline{- 36} \\
 \phantom{0} \times
 \end{array}$$

∴ Quotient = 17 l 342 ml

## EXERCISE C

1. Multiply:

(a) 3 kg 205 g by 7

(b) 14 km 105 m by 8

(c) 18 l 15 ml by 6

(d) 49 m 25 cm by 4

(e) 28 kg 756 g by 9

(f) 64 g 15 cg by 5

(g) 65 kg 251 g by 7

(h) 89 kl 825 ml by 7

(i) 26 l 592 ml by 9

2. Divide:

(a) 147 l 12 ml by 6

(b) 270 l 60 cl by 15

(c) 329 kg 119 g by 7

(d) 880 km 290 m by 9

(e) 414 kl 216 l by 6

(f) 1930 kg 550 g by 5

(g) 2958 dag 8 g by 13

(h) 9935 dl 8 cl by 14

(i) 1507 m 55 cm by 5



Find:

(a)

km	m
12	867
× 8	
102 752	

(b)

kg	g
455	912
515 642	
× 9	
4640 740	

(c)

kg	g
340	54
458 288	
× 6	
2744 728	

Divide and find the quotient:

(a) 458 k l 400 l by 30

(b) 856 kg 455 g by 15

**Example 1:** Sheena brought 5 kg 208 g tomatoes, 2 kg 133 g potatoes and 6 kg onions. What is the total weight did she buy?

**Solution:**

Weight of tomatoes	=	5kg 208g
Weight of potatoes	=	2kg 133g
Weight of onions	=	6kg 000g
∴ Total weight	=	13kg 341g

kg	g
5	208
2	133
+6	000
13	341

**Example 2:** A tank of water has a capacity of 1450 l. If it is 897 l 146 ml filled, how much more water it can hold?

**Solution:**

Capacity of tank	=	1450 l
Water in tank	=	897 l 146 ml
More water tank can hold	=	552 l 854 ml

Thus, the tank can hold 552 l 854 ml water more.

l	ml
1450	000
-897	146
552	854

## EXERCISE D

A1 A3

- Ethan lives at one end of Park Avenue. Brain lives at the other end of the Avenue. It is 5.8 kilometres from one end of Park Avenue to the other. If Ethan walks 2.79 kilometres towards Brain's house, how much more distance does he need to walk to reach Brain's house?
- Aaron's and Noah's paper aeroplanes could fly 4 m and 302 cm respectively. How much further did Aaron's aeroplane fly?
- Cameron drinks 2 litres of water every day. If he continues to drink 2 litres of water each day, how many litres will he drink in one week?
- The tank of car A is 14 l 23 ml filled with petrol. If the tank of the car B is 16 l 654 ml filled, how much more petrol is there in tank of B than in tank of A?
- The boundary between two houses is 1 km 567 m. Find the boundary between 9 such houses?
- Sydney's box of candy weighs 790 grams and Elizabeth's box weighs 683 grams. What is the total weight of the boxes?

7. 8 friends are going on a trip by car and they need to cover a distance of 456 km 336 m by each driving for equal distances. How much does each of them need to drive for?
8. 827 l 40 cl of oil in tank is to be poured in 7 small cans. How much oil will be poured in each can?
9. The distance between two cities is 440 km. Reshma has covered 220 km 85 m. What distance is yet to be covered?
10. A train covers a distance of 50 km 250 m per hour. Find the distance travelled by it in 15 hours.
11. Find the weight of one ball, if a packet of 10 balls weighs 68 g 40 mg.
12. A water tank of 1000 kl capacity has to be filled with water. If in 3 hours the tank gets filled with 99 kl 240 l of water, then how much water will the tank get in 30 hours?

### MORE TO DO 1

Tick (✓) the correct answer:

1. 1000 m = 1 km  
 (a) 10 (b) 100 (c) 1000 (d) ✓ 1
2. 10 l = 1 dal  
 (a) (b) 100 (c) ✓ 10 (d) none of these  
*10 l = 1 decalitre*
3. 'dg' stands for- decigram  
 (a) centigram (b) decagram (c) ✓ decigram (d) milligram
4. litre is the standard unit of measuring capacity.  
 (a) millilitre (b) ✓ litre (c) kilolitre (d) metre
5. gram is the standard unit of measuring mass.  
 (a) ✓ gram (b) kilogram (c) centigram (d) none of these
6. 15 kg = 15000 grams  
 (a) 1500 (b) ✓ 15000 = 15 × 1000 (c) 150 (d) none of these  
*1 kg = 1000 g  
 15 kg = 15 × 1000  
 15000 = 15000 g*
7. 9876 m is equal to- 9 km 876 m  
 (a) 987 km 6 m (b) 98 km 76 m (c) ✓ 9 km 876 m (d) none of these  
*9876 ÷ 1000 = 9*
8. 80150 cl = 8050 l  
 (a) 8500 (b) ✓ 8050 (c) 5800 (d) none of these  
*8000 cl + 150 cl = 8050 l*
9. 41 hg 15 g = 4115 g  
 (a) ✓ 4115 g = 4100 + 15 (b) 4015 g (c) 4105 g (d) none of these  
*4100 + 15 = 4115 g*

10.

523 m = 52300 cm

1 m = 100 cm  
 523 m = 52300 cm

(a) 523000

(b) 5230

(c) 52300

(d) none of these

**MORE TO DO 2**

1. Fill in the blanks:

(a) 1 m = 100 cm

(b) 1 kg + 4 = 250 g

(c) 250 m × 4 = 1 km

(d) 15 cm 8 mm × 4 = 62 cm 2 mm

(e) 8 kl 400 l + 12 = 200 l

(f) 82000 ml = 82 l

(g) 1 kl = 1000 l

(h) 2 kg = 2000 g

(i) 16 hl 35 l = 1635 l

(j) 7156 g = 7 kg 156 g

Handwritten calculations for conversion problems:

- 1)  $16.73561005$  with various decimal operations.
- d)  $15.8 \times 4 = 63.2$
- f)  $82000 \div 1000 = 82$
- Long division:  $82000 \div 1000 = 82$

Handwritten calculations for decimal operations:

- e)  $8.700 - 8.410 = 0.290$
- Long division:  $8.700 - 8.410 = 0.290$

2.

Write True or False:

(a) When we convert lower unit into higher unit, we need to divide. True

(b) When we convert higher unit into lower unit, we need to multiply. True

(c) 1 dal = 10 l  $1 \text{ cm} = \frac{10}{100} \text{ m}$  True

(d) 1 dl = 10 l  $5 \text{ cm} = \frac{5}{100} \text{ m}$  False

(e) 2 cg = 200 mg True

(f) 50 km = 5 hm  $= 0.05 \text{ m}$  False

(g) There are 10 litres in 100 millilitres. False

(h) There are 50 m in 5 cm. False

(i) 12 mg = 1 cg 2 mg True

(j) 1 kilogram = 1000 g True

Handwritten note:  $\frac{1}{2}$  m/12

True  
 True  
 True  
 False  
 True  
 False  
 False  
 False  
 True  
 True



Puzzle Time

1. How many decagrams and grams can you take out from 4153 decigrams?

2. Mehul was asked to convert 45.67 cm to the standard unit of length. He converted it to km. Is he correct? If not, what is the correct unit for conversion?