

The Metric System, Part 2

In the last lesson, we looked at conversions between some common metric units, such as kilograms and grams, basing those conversions on simple fractional relationships. For example, since $1 \text{ kg} = 1000 \text{ g}$, then 1 g is one-thousandth of a kilogram, and 3 grams is $3/1000$ or 0.003 kg .

In this lesson, we will look at another method for converting between metric units: we will use a **chart** that is very similar to the place value chart.

Metric units work just like place value. Let's write the quantity 6734 cm into the metric unit chart. We place a decimal point after the "ones place," which currently is at centimetres.

		6	7	3	4.	
km	hm	dam	m	dm	cm	mm

To convert 6734 cm to any other unit in the chart, simply write the decimal point right after that unit. Don't move the numbers! For example, to change 6734 cm to metres, we write the decimal point right after the metres place, and read it as 67.34 m .

		6	7.	3	4	
km	hm	dam	m	dm	cm	mm

To convert this measurement to hectometres, we write the decimal point just after hectometres. We also need to place a zero for hectometres. We get 0.6734 hm .

	0.	6	7	3	4	
km	hm	dam	m	dm	cm	mm

Note: in this method, the numbers are *not moving*, which means the actual VALUE of the measurement does not change. We are not increasing or decreasing the actual measurement. We are just reading the measurement in different ways, such as reading it as so many centimetres, or reading it as so many hectometres.

This is *not* the same idea as when multiplying decimals by powers of ten, and moving the decimal point. When we solve problems such as 100×0.291 or $39.2 \div 1000$, we are either making a quantity bigger or smaller (by multiplying or dividing it). Here, we are not changing the actual length, weight, or volume (the actual quantity). We are *converting* it to a different unit.

Example 1. Convert 46.7 dm to kilometres.

			4	6.	7	
km	hm	dam	m	dm	cm	mm

→

0.	0	0	4	6	7	
km	hm	dam	m	dm	cm	mm

Write 46.7 in the chart so that "6", which is in the ones place, is placed in the decimetres place.

Now write the decimal point right after the kilometres place. Add necessary zeros. Answer: 0.00467 km .

Example 2. Convert 0.48 kg to decigrams.

0.	4	8				
kg	hg	dag	g	dg	cg	mg

→

	4	8	0	0.		
kg	hg	dag	g	dg	cg	mg

Notice that the digits 4 and 8 do not move. We get $0.48 \text{ kg} = 4800 \text{ dg}$.

1. Write the measurements in the metric unit charts.

a. 75.4 m

km	hm	dam	m	dm	cm	mm

c. 4.6 km

km	hm	dam	m	dm	cm	mm

b. 843 mm

km	hm	dam	m	dm	cm	mm

d. 35.49 dam

km	hm	dam	m	dm	cm	mm

2. Convert the measurements to the given units, using the charts above.

	to m	to dm	to cm	to mm
a. 75.4 m				
b. 843 mm				

3. Convert the measurements to the given units, using the charts above.

	to hm	to dam	to m	to dm
a. 4.6 km				
b. 35.49 dam				

4. Write the measurement given on the right as

a. decilitres

b. litres

4 5 0 0
 ↑ ↑ ↑ ↑
 hl dal L dl

c. dekalitres

d. hectolitres

5. Convert.

a. 789 L = _____ kL	d. 483 dl = _____ L	g. 5.042 kg = _____ dag
b. 0.56 dag = _____ g	e. 29 cl = _____ hL	h. 56 cg = _____ g
c. 34 cm = _____ km	f. 0.04 kl = _____ dl	i. 43 200 ml = _____ dal

km	hm	dam	m	dm	cm	mm

kl	hl	dal	L	dl	cl	ml

kg	hg	dag	g	dg	cg	mg

km	hm	dam	m	dm	cm	mm

kl	hl	dal	L	dl	cl	ml

kg	hg	dag	g	dg	cg	mg