Exercises on metric length unit conversions

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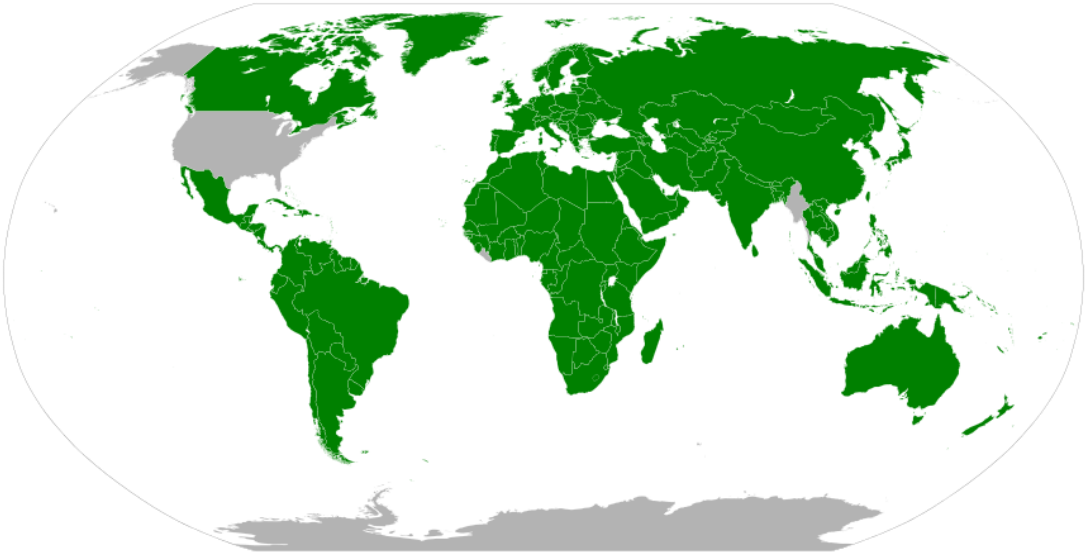
Contents

What is the metric system?

We often hear about the '*metric system*', but what exactly is it? And why do we use it?

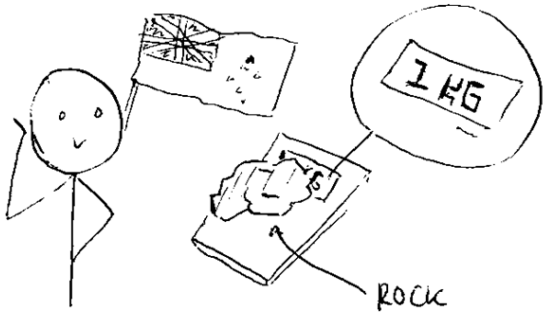
The metric system is simply a *way of measuring the length, mass, and volume* of things in our world, in a way that *majority* of the world agrees on!

In fact, around 95% of the world uses the metric system:



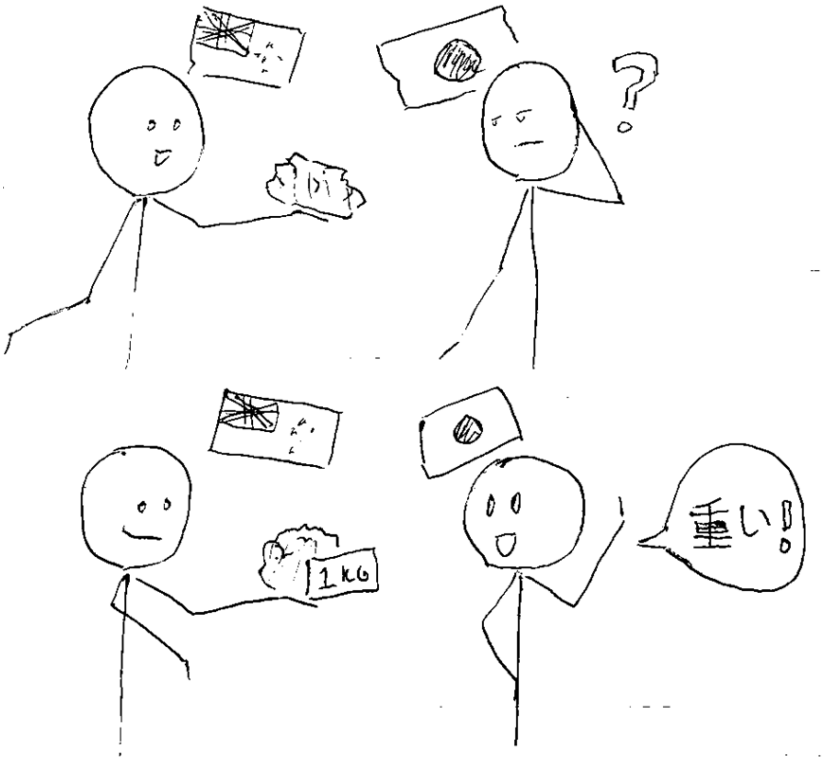
But why is it so important for *majority* of societies in the world to measure things in the same way?

Well, say I that I'm from Australia, and I have a rock, which I know weighs about 1 *kilogram*, because I use the metric system...



If I decided to go on a holiday to Japan, if I could somehow communicate to a complete stranger that my rock weighs 1 *kilogram*, they would probably have an idea about how heavy my rock is, even though we do not speak the same language!

Because Japan also uses the metric system – isn't that cool?



Metric length conversions

The main measure of how *long* something is, or *length* in the metric system is the *meter*.

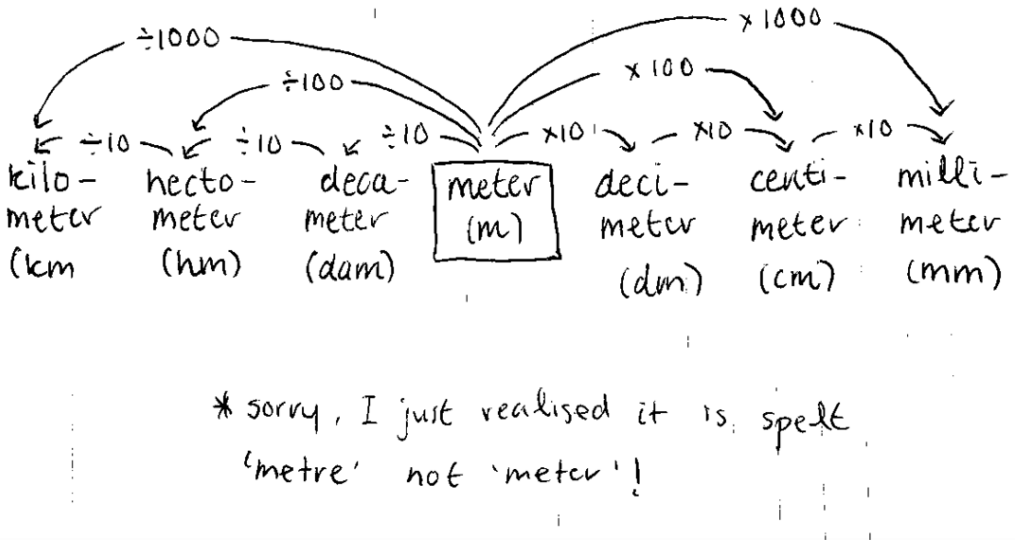
$$meter\ (m)$$

Now, because some things are *longer* or *shorter* than others, we don't express *everything* in meters, otherwise we may end up having to do calculations with *ridiculously* big or small numbers:

$$The\ radius\ of\ the\ Earth\ is\ \sim 6{,}371{,}000\ meters$$

$$A\ bacterium\ might\ be\ \sim 0.000001\ meters\ long$$

This is why we have different ways of expressing the *meter* in the *metric system*, which involve either *dividing* or *multiplying* the meter by 10 some number of times:



Prefixes

Now, it may be difficult to remember all seven of these units:

*big to small

1. Kilometre (km)
2. Hectometre (hm)
3. Decametre (dam) [think 'decA metre -> dAm]
4. Metre (m)
5. Decimetre (dm)
6. Centimetre (cm)
7. Millimetre (mm)

But we can make it easier by thinking about the units of length as two separate parts:

$$Kilo - metre$$

This first part, or the $prefix$, tells us what we must $divide$ or $multiply$ 1 metre by.

$'Kilo'$	Means 'one thousand'	So, we multiply 1 metre by 1000 to get a km
$'Hecto'$	Means 'one hundred'	So, we multiply 1 metre by 100 to get a hm
$'Deca'$	Means 'ten'	So, we multiply 1 metre by 10 to get a dam
$'Deci'$	Means 'tenth'	So, we divide 1 metre by 10 to get a dm
$'Centi'$	Means 'one hundredth'	So, we divide 1 metre by 100 to get a cm
$'Milli'$	Means 'one thousandth'	So, we divide 1 metre by 1000 to get a mm

Exercise 1

1. Please fill in the below table (without looking at the previous page!)

$Prefix$	What does it mean?	Do I multiply or divide the $metre$?	By what amount do I multiply or divide the $metre$ by?	Therefore, $1\ meter =$
$Deca$				
$Kilo$				
$Milli$				
$Deci$				
$Centi$				
$Hecto$				

2. Challenge

We can also express the metre in terms of a:

1. Micrometre (measuring how wide red blood cells are)
2. Nanometre (measuring how long a strand of DNA is)
3. Picometre (measuring how wide an atom is)
4. Femtometre (measuring how wide a proton inside the nucleus of an atom is)

Can you fill in the below table?

$Prefix$	Meaning	Multiply or divide the $metre$?	By what amount?	Therefore, 1 $meter =$
$Mirco$	'One millionth'			
$Nano$	'One billionth'			
$Pico$	'One trillionth'			
$Femto$	'One quadrillionth'			

Exercise 2

1. Please complete the following *metric length conversions*

1	97956	m	=		km
2	3.1360	dm	=		mm
3	66.156	cm	=		hm
4	7913.9	km	=		dam
5	119.84	dam	=		cm
6	16.355	hm	=		m
7	4.7504	m	=		mm
8	57270	dm	=		hm
9	3.2943	cm	=		dam
10	23.525	km	=		cm
11	877.66	dam	=		hm
12	6384.4	hm	=		dam

2. <u>Challenge</u>

   Can you complete the following *metric length conversions*?

   Note:

$$\mu m = 1\ micrometre$$
$$nm = 1\ nanometre$$
$$pm = 1\ picometre$$
$$fm = 1\ femtometre$$

1	952197	cm	=		μm
2	76157.5	m	=		nm
3	2851.19	dam	=		pm
4	812.903	μm	=		fm
5	24.9881	km	=		nm
6	3.30701	nm	=		pm