

***How to Learn  
Basic Metric Measurement and Practices  
In Less Than 5 Minutes!***

**COLOR KEYED for EASY UNDERSTANDING.**



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***FREE Web Links with Videos  
for Hands-On Learning***



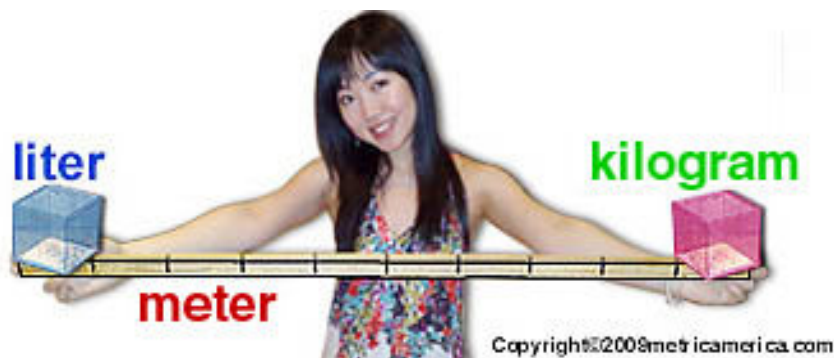
**Instant Metric Conversion®  
with Tables to Compare**

**ENTERTAINING  
METRIC REFERENCE MANUAL  
FOR LEADERS, TEACHERS and STUDENTS  
of ALL AGES from AROUND the WORLD**

***How to Understand  
Basic Metric Measurement  
for TRAVEL and ENJOYMENT!***  
**COLOR KEYED for EASY LEARNING.**

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***INSTANT METRIC  
eBook***



***FREE Web Support with Videos and Exams  
Handy Reference Guide for  
DECADES, CENTURIES and Into The MILLENNIUM***

•  
***A Lot of Fun Too!***

**DETAILS PAGE 39**

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***Powerful Metric Compendium for  
Learning Through Functional Association.***

**People's Guide to  
Personal Growth and Achievement  
with Guaranteed Understanding.**

**\*Required Fee US\$12.95**



## Preface

# ***INSTANT METRIC eBook***

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It has been said that the unique simplicity of measuring in metric dimensions is found in the properties of Length, Volume and Mass and to each, a close relationship to the Length of a meter (also spelled metre).

Successful understanding by definition is likely in the way we use metric measurement and how benefits can be derived from its' application. **INSTANT METRIC eBook** is a printed, web based and digitized publication with web support that is not necessarily a prepared instruction for rocket-science. However, it is equally as valuable a combined asset in measuring for everyday use as it is in science, aerospace, industry, medicine, chemistry and anywhere else that precision and accuracy are required for measurement.

**Metric dimensions  
in military applications and space exploration  
are universal and well known.  
The internet, an American invention  
does not exist without it.**



**Useful VIDEO Link** <http://metricamerica.com/ametricanman.htm>

Whether in space, on the Moon, Mars or Earth, metric measurements of Length, Volume and Mass remain constant in the absence of gravity.

Understandably, where “mass” is referred to herein, one may associate it with the “*weight*” of something naturally because of how it feels to them personally.

But “*weight*” is really gravitational force attracted to Earth, whereas, the “mass” of something doesn't rely on gravity and is constant in metric measurement regardless of where it is used. The same may apply to feeling the “volume or capacity” of something in metric dimensions when it might be associated with aspects of “*liquid*” values.

**EVERYDAY METRIC MEASUREMENT  
RULES, PRACTICES and PRONUNCIATION GUIDE  
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# EVOLUTION of ARCHAIC MEASUREMENT

Useful VIDEO Link <http://metricamerica.com/evolutionof.htm>

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Many years ago there was very little trade and measurement was crude and subject to confusion.

Apparently, the yard was supposed to be half the span from finger-tip to finger-tip of a King's outstretched arms.

And the pound was the *"weight of 7,000 grains of barley chosen from the middle ear"*.

Rough and inaccurate measurement was good enough for barter between friends and relatives but trouble arose when commercial trade began.

Relationships evolving out of haphazard methods of measurement were anything but simple.

And as merchants adopted a form of measurement that would be met with more acceptance by the general public of that era

the outcome resulted in having

2 pints to the quart, 4 quarts to the gallon,

22 yards to a chain, 16 ounces to the pound

*(is that ounces of nuts or ounces in a can of juice?)*

12 inches to a foot

*(a foot isn't anywhere close to a human foot)*

3 feet in a yard, 5,280 feet in a mile,

firkens and knogenheads and *on and on and on*.

A pound even had five varied weights and meanings used throughout the Middle Ages and in Britain weight was measured as *14 pounds to the "stone"*.

It was an outdated and archaic method of measurement seemingly reserved for British colonies in America's past.

The irony in this, is that after the British were historically defeated in the United States, an American gallon remained the outdated measurement adopted from what was known as the *Queen Ann's Wine Gallon*".



***And still remains somewhat today.***

Useful VIDEO Link <http://metricamerica.com/evolutionof.htm>

# INCH-POUND Non- System

Useful VIDEO Link <http://metricamerica.com/images/metric%20I%20Believe.wmv>

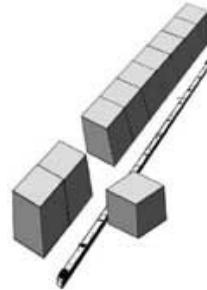
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## PLEASE NOTE:

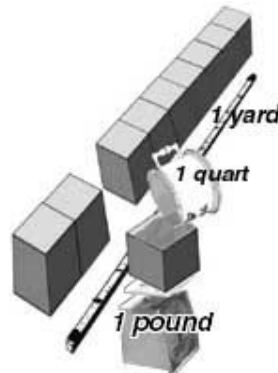
NONE OF THIS EXAMPLE BELOW IS POSSIBLE.  
WE JUST IMAGINE IT TO ILLUSTRATE  
HOW NOTHING WITH INCH-POUND MEASUREMENT  
IS RELATED TO ANYTHING.

Let's IMAGINE a person from another  
archaic country or planet that wanted to know  
how you could possibly make the old  
"inch-pound non-system"  
easy to understand by demonstrating how  
LENGTH, LIQUID and WEIGHT  
might somehow relate to each other  
with inch-pound measurement.

**IMAGINE... IF**  
you could take the length of a  
yard and divide it by exactly  
ten equal parts so we can  
make a cube container with  
those same equal sides  
to hold water.



Then by some strange course  
of events **IMAGINE** again **IF** we  
could fill that cube container  
with water.  
**AND** that cube contained the  
liquid of exactly 1 quart which,  
when placed on a scale  
**MIGHT** weigh  
exactly 1 pound.



**LENGTH, LIQUID and**  
**WEIGHT ALL**  
**RELATED?**

•

**Let's go party!**



***Stop the Party!***  
***THERE'S A BIG PROBLEM HERE***  
***and HAS BEEN FOR***  
***A LONG TIME!***

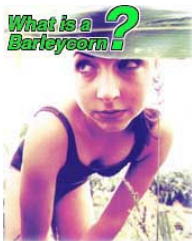


Useful VIDEO Link <http://metricamerica.com/inchpound.htm>

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## **NOTHING RELATES**

in such an outdated non-system of  
inches, pounds, gallons, firkins, knoginheads



or even ***barleycorns!***

Lifetimes have been consumed trying to memorize  
complicated figures and fractions.  
And writing silly things like "oz." for ounce or "lb." for pound.  
***Is the solid of 16 oz. in a bag of nuts***  
***the same as 16 oz. of liquid in a can of juice?***

**OR**

***Try to add up in your head, the total of  $2/3 + 3/8 + 3/5$  of an inch.***

**OR**

Go shopping and try to  
determine which is the better buy...  
***1-17 oz. can of a product for 63 cents,***  
***or 2-14.5 oz. cans for \$1.10***  
***or maybe 3-16 oz. cans for \$1.49?***

**THEN THERE IS**

***3 feet in a yard... 12 inches in a foot...***  
The length of a foot is nowhere near the size  
of an average person's foot and *blah, blah, blah.*

•

But when measuring in metric dimensions  
**LENGTH**, **VOLUME** and **MASS** are All Simply Related in 10.

Useful VIDEO Link

<http://metricamerica.com/images/metric%20I%20Believe.wmv>

# **SI** RELATES IN 10

*The System of International Measurement called "SI"  
is the metric measurement used in America  
and around the World.*

An international system of measurement evolved that was assisted in it's development as a result of for-sighted American Fathers like Thomas Jefferson who gave us an American dollar with 100 cents and Dr Benjamin Franklin who, along with other devoted attendees of the Academy of Sciences in Paris, contributed significantly to the simple design and development of measuring in metric dimensions.

Useful VIDEO Link <http://metricamerica.com/ametricanman.htm>

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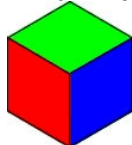
## **HERE'S HOW IT WORKS!**



Simply divide the Length of  
**1 m (meter)**  
in exactly 10 equal parts,  
each of which measures  
**10 cm (centimeters)**.  
Make a cube container  
with it that is  
**10 cm x 10 cm x 10 cm**  
**(1000 cm<sup>3</sup>)**  
and fill with water.

(Technically, it is supposed to be  
*distilled water at sea level*)

Like magic,  
when you fill this cube  
container with water,  
it has the  
**Volume** of exactly  
**1 L (liter)**.



Useful VIDEO Link <http://metricamerica.com/ametricanman.htm>

**RULES, PRACTICES and USES GUIDE Pages 78-79.**



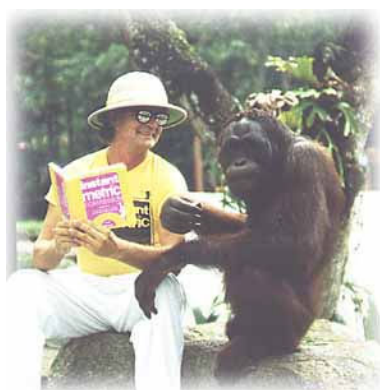


Then, when you place this  
(1000 **cm<sup>3</sup>**) cube filled  
with water  
on a scale it has the  
**Mass** of exactly  
1 **kg** (**kilogram**).

ALL SIMPLY  
RELATED  
in  
**10!**

## **LENGTH, VOLUME and MASS.**

Useful VIDEO Link <http://metricamerica.com/ametricanman.htm>



Regardless of political or  
religious persuasion, ethnic or  
educational background, race,  
age, sex or wherever  
people think they are from,  
**decimal measurement**

**works**

in harmony with life itself.  
**AND IT'S ALL SIMPLY  
RELATED IN 10!**

## **Creation... Evolution, 10 digit hands and 10 digit toes. Right?**

Useful VIDEO Link <http://metricamerica.com/monkey.htm>

**Do This Again.**

Divide 1 **meter** by exactly 10 equal parts.  
Then, make a cube (10 **cm** x 10 **cm** x 10 **cm**)  
to fill with (1000 **cm<sup>3</sup>**) water,  
and you will find that it contains exactly  
1 **L** (1 **liter**) (1000 **mL**) of water.

Now, when this cube filled with water is placed on a scale  
it is has the mass of exactly 1 **kg** (1 **kilogram**).

(Both spellings meter and liter as well as metre and litre are correct.)

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

# The Metric System

**WORKS IN HARMONY  
WITH LIFE ITSELF!**



First you take 10 of whatever you have handy.

**10! IT'S ALL SIMPLY RELATED IN 10!**



Convenient **Prefix** attached in front of  
**Base** or **Derived Unit** of **Measure**  
shows *Quantity, Size* or *Value* by 10, 100 and 1000.

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Useful VIDEO Link <http://metricamerica.com/themetricsystem.htm>

## **WRITING IS EASY!**

**Symbols** identify **Prefix** and **Base** or **Derived Unit** of **Measure** together.

**Symbols** like **cm** (centimeter) or **mL** (milliliter)  
or **kg** (kilogram) *for example*.

For most *everyday purposes* useful **Prefixes** are  
**milli** - 1 one thousandth (0.001)  
from the **Base** or **Derived Unit** of **Measure**.

•

**centi** - 1 one hundredth (0.01)  
from the **Base** or **Derived Unit** of **Measure**.

•

**kilo** - 1000 times as much  
as the **Base** or **Derived Unit** of **Measure**.

Useful VIDEO Link <http://metricamerica.com/themetricsystem.htm>

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

## Prefixes and Symbols *Together*

### **PREFIXES**

Convenient **Prefix** attached in front of  
**Base or Derived Unit of Measure**  
shows *Quantity, Size or Value* in 10, 100 and 1000.

Useful VIDEO Link <http://metricamerica.com/prefixes.htm>

For most everyday experience Prefixes we use are

**milli** • **centi** • **kilo**

## *Writing is Easy!*

### **SYMBOLS**

Identify **Prefix** and  
**Base or Derived Unit of Measure**  
**TOGETHER**

Useful VIDEO Link <http://metricamerica.com/symbols.htm>  
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For most everyday experience we use

**BASE UNIT** **meter** - **m** for **LENGTH**

**Derived UNIT** **liter** - **L** for **VOLUME**

**BASE UNIT** **kilogram** - **kg** for **MASS**

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

# **PREFIXES**

Convenient **Prefix** attached in front of  
**Base** or **Derived Unit** of **Measure**  
shows *Quantity, Size or Value*  
in 10, 100 and 1000.

For most everyday experience  
Prefixes we use are

**milli** • **centi** • **kilo**

Useful VIDEO Link <http://metricamerica.com/prefixes.htm>

<b>PREFIX SYMBOL for EVERYDAY USE</b>	<b>BASE and Derived UNIT SYMBOL</b>
<b>m</b> <i>milli</i> is 1 one thousandth (0.001) <b>c</b> <i>centi</i> is 1 one hundredth (0.01) <b>k</b> <i>kilo</i> is 1000 times as much	meter - <b>m</b> liter - <b>L</b> kilogram - <b>kg</b>

## **WRITING IS EASY**

**Symbols** like **mL** or **mg** or **mm** or **kg** or **cm**  
TOGETHER identify **Prefix**  
and **Base** or **Derived Unit** of **Measure**.

Useful VIDEO Link <http://metricamerica.com/prefixes.htm>

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The International Bureau of Weights and Measures notes:  
*Unit symbols are mathematical entities and not abbreviations.  
Among other things, they are not followed by a period except  
at the end of a sentence and they are not made plural.*

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

# SYMBOLS

Symbols Identify **Prefix** and  
**Base** or **Derived Unit** of **Measure** **TOGETHER**

Useful VIDEO Link <http://metricamerica.com/symbols.htm>

<b>BASE and Derived UNIT SYMBOL</b> meter <b>m</b> liter <b>L</b> kilogram <b>kg</b>	<b>PREFIX SYMBOL for EVERYDAY USE</b> <b>m</b> <i>milli</i> is 1 one thousandth (0.001) <b>c</b> <i>centi</i> is 1 one hundredth (0.01) <b>k</b> <i>kilo</i> is 1000 times as much
---	---

## WRITING IS EASY

Simply place the **Prefix** in front of the  
**Base** or **Derived Unit** of **Measure**  
like **mm** (**millimeter**), **cm** (**centimeter**), **km** (**kilometer**)  
or **mg** (**milligram**), **kg** (**kilogram**) or **mL** (**milliliter**) for example.

The Size or Quantity is indicated by the  
**first letter** or **Prefix Symbol** and the **second letter** or **Symbol**  
identifies the **Prefix** and **Base** or **Derived Unit** of **Measure**.

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Useful VIDEO Link <http://metricamerica.com/symbols.htm>

Note: Where **symbols** are used convention has it that they **are always lower case letters** except where the Base Unit is named after a person like Celsius (°C), Pascal (P) or Newton (N) and 16 other scientists in the world. Then the symbol is noted by a CAPITAL LETTER.

***So, what's with a capital letter "L" for liter  
when the capital letter is supposed to be for a persons name?***

As technology came along it became apparent that typewriters did not have the script "ℓ", so attempts were made to use the lower case "l" (el).

Then it became further confusing to write "1l" (lower case "el") as the "1" and "l" (el) looked too similar, as did the capital "I" (eye).

**Thus, the capital "L" was chosen as the **Symbol**  
for the Derived Base Unit "liter".**

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

# EVERYDAY BASE UNITS

**meter • liter • kilogram**

*Both spellings, meter and metre,  
as well as liter and litre are acceptable.*

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Useful VIDEO Link <http://metricamerica.com/everyday%20units.htm>

BASE UNIT **meter** - **m** for **LENGTH**

Derived UNIT **liter** - **L** for **VOLUME**

BASE UNIT **kilogram** - **kg** for **MASS**

Symbols like **mL** or **mg** or **mm** or **kg** or **cm**

**TOGETHER**

identify **Prefix** and **Base** or **Derived Unit** of **Measure**.

<b>meter</b> - use the symbol - <b>m</b>	
1000 mm = 1 <b>m</b>	millimeter - <b>mm</b>
100 cm = 1 <b>m</b>	centimeter - <b>cm</b>
1000 m = 1 <b>km</b>	kilometer - <b>km</b>

<b>liter</b> - use the symbol - <b>L</b>	
1000 <b>mL</b> = 1 <b>L</b>	milliliter - <b>mL</b>

Useful VIDEO Link <http://metricamerica.com/everyday%20units.htm>

<b>kilogram</b> - use the symbol - <b>kg</b>	
1000 mg = 1 <b>g</b>	milligram - <b>mg</b>
1000 g = 1 <b>kg</b>	kilogram - <b>kg</b>
1000 kg = 1 <b>t</b>	tonne - <b>t</b>

**SEE PAGE 37**

**"7 Base Units" used in Science, Industry and Commerce.**  
**RULES, PRACTICES and USES GUIDE Pages 78-79.**



The Base Unit for  
**LENGTH**  
is  
**meter (m)**

also spelled **metre**

Use the symbol **m**

Useful VIDEO Link <http://metricamerica.com/metre.htm>

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*Unit symbols are mathematical entities and not abbreviations.  
Among other things, they are not followed by a period except  
at the end of a sentence and they are not made plural.*

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

**millimeter (mm)**

•

**centimeter (cm)**

•

**meter (m)**

•

**kilometer (km)**

**millimeter, centimeter, meter and kilometer**

*also spelled*

**millimetre, centimetre, metre and kilometre**

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The Base Unit for LENGTH is

**meter (m)**

*also spelled metre*

Useful VIDEO Link <http://metricamerica.com/metre.htm>

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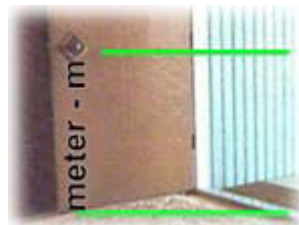
Use the symbol **m**

A **meter** is about as  
long as a  
baseball bat.



A **meter** can be the length of  
an average persons  
*long step.*

The height of the  
handle  
on a standard door is  
about 1 **meter**  
from the floor.



If a dime is about  
1 **millimeter**  
thick...



then 1000  
dimes placed  
side by side  
would be  
about  
1 **meter** long.



*To measure any length, a meter stick or tape  
measures accurately without complicated fractions.*

Useful VIDEO Link <http://metricamerica.com/metre.htm>



*This diving board  
is 10 meters tall.  
An Olympic  
sized pool is  
50 meters long.*



**Useful VIDEO Link** <http://metricamerica.com/metre.htm>

*Longer distances like the height of a mountain  
can be measured in meters.  
The length of a bridge can be measured in meters  
and so can the height of a waterfall.*



**Useful VIDEO Link** <http://metricamerica.com/metre.htm>

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### **Smaller Measurements from a meter**

**1 centimeter**  
(1 **cm**)

Remember, **centi** is the Prefix meaning  
1 one hundredth of the Base Unit **meter**.  
So, 1 one hundredth from a  
**meter** (0.01 **m**)  
is simply written 1 **cm**.

### **Smaller Measurements from a centimeter**

**1 millimeter**  
(1 **mm**)

Remember, **milli** is the Prefix meaning  
1 one thousandth (0.001).  
So, 1 one thousandth from the  
Base Unit **meter** being 1 **millimeter**  
is simply written 1 **mm**.

### **Larger Measurement from a meter**

**1 kilometer**  
(1 **km**)

Remember, **kilo** is the Prefix meaning  
1000 times as much.  
So, one thousand meters (1000 **m**)  
being the length of 1 **kilometer**  
is simply written 1 **km**.  
*Pronounced*  
“KILL-oh-meet-ur” **NOT** “kill-AH-mit-ur”

# centimeter (cm)

also spelled **centimetre**

1 one hundredth from a **meter** (0.01 **m**).  
There are exactly 100 **cm** (**centimeters**)  
in the Base Unit **meter**.

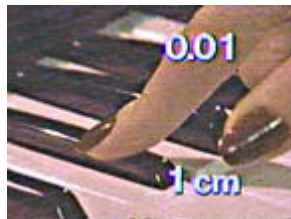
Use the **symbol cm**

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Useful VIDEO Link <http://metricamerica.com/centimetre.htm>



1 **cm** is about the width  
of an average blouse  
or shirt button.



1 **cm** is about the width  
of black keys on a  
standard piano.



1 **cm** is about  
the width  
of your little fingernail.

*Snowfall is measured in **centimeters** (**cm**)*

.

*Rainfall is measured in **millimeters** (**mm**)*

Useful VIDEO Link <http://metricamerica.com/centimetre.htm>

*The International System of Units called "SI"  
is the Metric Measurement used in America  
and around the World.*



Like a dollar has 100 cents, a **meter** in length also has 100 **cm**. (100 **centimeters**)



Useful VIDEO Link <http://metricamerica.com/centimetre.htm>

Centimeters are precise for measuring sewing patterns, your height, your waist and for altering clothes.



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Useful VIDEO Link <http://metricamerica.com/centimetre.htm>

### ***Smaller Measurement from a centimeter***

1 **millimeter**  
(1 **mm**)

Remember, **milli** is the Prefix meaning 1 one thousandth (0.001). So, 1 one thousandth from the Base Unit **meter**, being 1 **millimeter** is simply written 1 **mm**.

### ***Larger Measurement from a centimeter***

1 **meter**  
(1 **m**)

Remember, **meter** is the Base Unit for Length and all other Units are derived from it. There are exactly 100 **cm** (**centimeters**) in 1 **m** (**meter**) and there are exactly 1000 **mm** (**millimeters**) in 1 **m** (**meter**).

### ***Larger Measurement from a meter***

1 **kilometer**  
(1 **km**)

Remember, kilo is the Prefix meaning 1000 times as much. So, one thousand **meters** (1000 **m**) being the length of 1 **kilometer** is simply written 1 **km** which is pronounced "KILL-oh-meet-ur" **NOT** "kill-AH-mit-ur".

# millimeter (mm)

*also spelled millimetre*

1 one thousandth from a **meter** (0.001 **m**).

There are exactly 1 000 **mm** (**millimeters**)  
in the Length of Base Unit **meter**.

Use the symbol **mm**

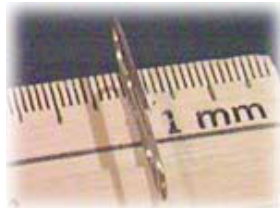
Useful VIDEO Link <http://metricamerica.com/millimetre.htm>



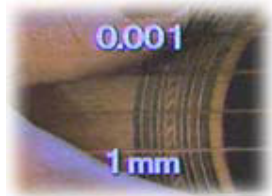
1 **millimeter**  
(1 **mm**)

Remember, **milli** is the Prefix meaning  
1 one thousandth (0.001).

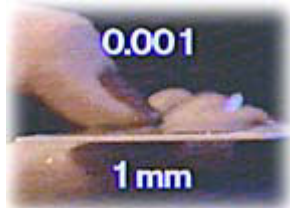
So, 1 one thousandth from the  
Base Unit **meter** being 1 **millimeter**  
is simply written 1 **mm**.



1 **mm** (1 **millimeter**)  
is about the thickness  
of an  
ordinary paper clip.



A guitar string can be  
about 1 **mm** thick.

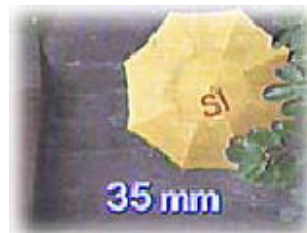


The thickness of a  
credit card is  
about 1 **mm**.

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3 **mm** of rain wouldn't keep you  
from a pleasant day of golf.



35 **mm** of rain is a  
torrential downpour.

Useful VIDEO Link <http://metricamerica.com/millimetre.htm>



**1 000 mm (millimeters) = 1 meter**



If a “*dime*” is about  
1 **mm** (**millimeter**) thick,  
then 1000 dimes placed  
side by side would be  
about 1 **meter** long.

Useful VIDEO Link <http://metricamerica.com/millimetre.htm>

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### **Larger Measurement from a millimeter**

Remember, **centi** is the Prefix meaning  
1 one hundredth of the Base Unit **meter**.  
So, 1 one hundredth from  
a **meter** (0.01 **m**)  
is simply written 1 **cm**.

**1 centimeter**  
(1 **cm**)

### **Larger Measurement from a centimeter**

Remember, **meter** is the  
Base Unit for Length and all other Units  
are derived from it.  
There are exactly 1000 **millimeters**  
(1000 **mm**) in 1 **meter** (1 **m**).

**1 meter**  
(1 **m**)

### **Larger Measurement from a meter**

Remember, kilo is the Prefix meaning  
1000 times as much.  
So, one thousand **meters** (1000 **m**)  
being the length of 1 **kilometer**  
is simply written 1 **km**  
and pronounced  
“KILL-oh-meet-ur”  
***NOT***  
“kill-AH-mit-ur”.

**1 kilometer**  
(1 **km**)

Useful VIDEO Link <http://metricamerica.com/millimetre.htm>

# kilometer (km)

also spelled **kilometre**

Use the symbol **km**

**kilo** is the Prefix meaning 1000 times as much.

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Useful VIDEO Link <http://metricamerica.com/kilometre.htm>

There are exactly 1000 **m** (**meters**)  
in 1 **km** (1 **kilometer**).

pronounced

“KILL-oh-meet-ur” **NOT** “kill-AH-mit-ur”.

•

*Longer distances are measured in **kilometers**.*

•

Longer distances like lakes, rivers and roads  
are measured in **kilometers**.

•

*A trip across North America is the distance of  
approximately 7600 **kilometers**.*

Going to work or  
holiday, distance  
is measured in  
**kilometers**.



A jog around the park  
can be measured in  
**kilometers**.



1 **kilometer** is about  
the length of  
60 train cars.



Useful VIDEO Link <http://metricamerica.com/kilometre.htm>

**ROAD TRIP TIP TO CONVERT SPEED:**

When you see a road sign that is shown as 90 km/h  
(*“90” kilometers per hour*)  
and you want a quick conversion to mph  
(*miles per hour*)  
while you’re driving, simply multiply 6 times “9”  
in your head and you are traveling  
approximately *54 miles per hour*.

*1 kilometer per hour (km/h) is equal to 0.6214 miles per hour.*

©db2011

Useful VIDEO Link <http://metricamerica.com/kilometre.htm>



A car traveling at 90 **km/h**  
is moving at  
90 **kilometers** per hour.

**THAT'S EASY!**

Useful VIDEO Link <http://metricamerica.com/kilometre.htm>

**Smaller from a kilometer**

1 **meter**  
(1 **m**)

Remember, **kilo** is the Prefix  
meaning 1000 times as much.  
So, one thousand **meters** (1 000 **m**)  
being the length of 1 **kilometer**  
is simply written 1 **km**.

**Smaller Measurement from meter**

1 **centimeter**  
(1 **cm**)

Remember, **centi** is the Prefix meaning  
1 one hundredth of the Base Unit **meter**.  
So, 1 one hundredth from a **meter** (0.01 **m**)  
is simply written 1 **cm**.

**Smaller Measurement from a centimeter**

1 **millimeter**  
(1 **mm**)

Remember, **milli** is the Prefix meaning  
1 one thousandth (0.001).  
So, 1 one thousandth from the  
Base Unit **meter**  
being 1 **millimeter** is simply written 1 **mm**.

The Derived Unit for  
***VOLUME***  
(*LIQUID*)

*See Page 3 for description of “Volume/Capacity and Liquid”.*

is

**liter**

Use the symbol **L**

(*See Page 13 for Symbol **L** Explained*)

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Useful VIDEO Link <http://metricamerica.com/litre.htm>

**milliliter (mL)**

•

**liter (L)**

**milliliter and liter**

*also spelled*

**millilitre and litre**



©©db2011

Useful VIDEO Link <http://metricamerica.com/litre.htm>

*Unit symbols are mathematical entities and not abbreviations.  
Among other things, they are not followed by a period except  
at the end of a sentence and they are not made plural.*

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

# liter

is the Derived Unit for VOLUME

Use the symbol **L**

Useful VIDEO Link <http://metricamerica.com/litre.htm>

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Measure Volume of gasoline or most any refreshing beverage.



Volume is the **amount of space** in a contained substance like water in a swimming pool being measured in **liters**.

Which has more...  
750 **mL (milliliters)** or  
1 **L (liter)**?



**Right!**

There are exactly  
1000 **mL** in 1 **L**  
(1 **liter**).

## TO CALCULATE FUEL CONSUMPTION

Make a note of how many **liters** it takes to fill up each time... note distance traveled... and find how many **liters** it takes to travel **100 kilometers (km)**.

**Liters per 100 kilometers is written L/100 km.**

**Economy on the road means LESS FUEL is BETTER!**

8.8 L/100 km is about average for a compact vehicle  
while the average larger vehicle might be 12.2 L/100 km.

Useful VIDEO Link <http://metricamerica.com/litre.htm>

The capital “**L**” was chosen as the **Symbol** for **liter** – see page 13.

# milliliter (mL)

*also spelled* millilitre

Use the symbol **mL**

1 one thousandths from a **liter** (0.001 **L**).

There are exactly 1000 **mL** (**milliliters**)  
in the Derived Unit of Measure **liter**.

Useful VIDEO Link <http://metricamerica.com/millilitre.htm>

We trust the accuracy in science and medicine  
because  
there are exactly 1000 **mL** (**milliliters**) in 1 **L** (**liter**).



**milliliter**

**1 milliliter**  
(**1 mL**)  
1 **milliliter** is simply  
written 1 **mL**

Remember, **milli** is the  
prefix meaning  
1 one thousandth (0.001 **L**)  
from the Derived Unit **liter**.



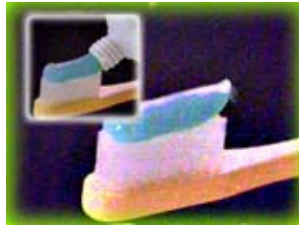
**milliliters**  
are useful  
in the garden...

©db2011

Useful VIDEO Link <http://metricamerica.com/millilitre.htm>



We use **milliliters** for measuring medicine...



and when we brush our teeth the amount of toothpaste in a tube is in **milliliters**.

In comparison  
5 mL (**milliliters**)  
is  
a Teaspoon.

©db2011



15 mL (**milliliters**)  
is  
a Tablespoon.



And a Cup is 250 mL (**milliliters**)  
*to make a little person smile.*



Useful VIDEO Link <http://metricamerica.com/millilitre.htm>

**Larger Measurement from a milliliter**

**1 liter (L)**

There are exactly 1000 mL (**milliliters**) in 1 liter (L).

Useful VIDEO Link <http://metricamerica.com/millilitre.htm>

## The Base Unit for

# MASS

(weight)

See Page 3 for description of "Mass and Weight"

is

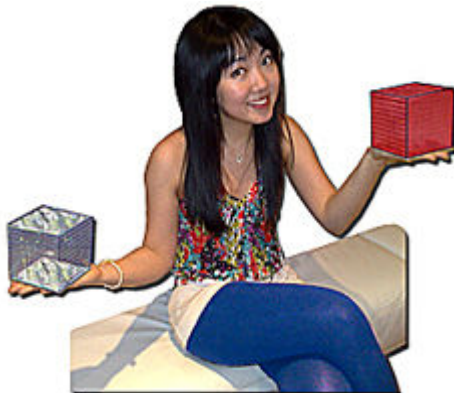
## kilogram (kg)

Use the symbol kg

*So, Why Weight?*

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Useful VIDEO Link <http://metricamerica.com/kilogram.htm>



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milligram (mg)

•

gram (g)

•

kilogram (kg)

•

tonne (t)

*Unit symbols are mathematical entities and not abbreviations.  
Among other things, they are not followed by a period except  
at the end of a sentence and they are not made plural.*

**RULES, PRACTICES and USES GUIDE Pages 78-79.**

The Base Unit for *MASS* is

# kilogram (kg)

Use the symbol **kg**

Remember, **kilo** is the prefix for 1000 times as much.  
So, one thousand grams (1000 g)  
is simply written 1 **kg** (1 **kilogram**).

©db2011

Useful VIDEO Link <http://metricamerica.com/kilogram.htm>



This package of  
ground meat is  
about 1 **kg**  
(1 **kilogram**).

A new born baby can be  
about the mass of 3 **kg**.  
And a six week old  
puppy can be  
as heavy as 1 **kg**.



A 5 **kg** roast can  
easily serve  
over 10 or 12  
people.

This 22 **kilogram**  
salmon is about  
1 **meter** long.



Useful VIDEO Link <http://metricamerica.com/kilogram.htm>



A 10 **kg** turkey should  
easily serve  
about 20 happy appetites.

A 40 **kg** bag of  
concrete mix  
requires a strong  
back to carry.



Useful VIDEO Link <http://metricamerica.com/kilogram.htm>

©db2011

### *Smaller Measurements from a **kilogram***

1 **gram**  
(1 **g**)

Remember, **kilo** is the Prefix  
meaning 1000 times as much.  
So, 1000 **g** (**grams**) is the mass of  
1 **kg** (**kilogram**).  
Pronounced "KILL-oh-gram"  
**NOT** "kill-AH-gram".

### *Smaller Measurements from a **gram***

1 **milligram**  
(1 **mg**)

Remember, **milli** is the Prefix meaning  
1 one thousandth (0.001).  
So, 1 one thousandth from the  
Unit of Measure **gram** being  
1 **milligram**  
is simply written 1 **mg**.

### *Larger Measurement from a **kilogram***

1 **tonne**  
(1 **t**)

There are exactly  
1000 **kg** (1000 **kilograms**)  
in 1 **t** (spelled **tonne**).  
*Pronounce it however you wish.*

Useful VIDEO Link <http://metricamerica.com/kilogram.htm>

# gram (g)

Use the Symbol **g**

A Unit of Measure that is 1 one thousandths  
from the Base Unit **kilogram** (0.001 **kg**)  
because there are exactly  
1000 **g** (**grams**) in 1 **kg** (**kilogram**).

*(Singular or plural the Symbol is **g**)*

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Useful VIDEO Link <http://metricamerica.com/gram.htm>

The mass of 1 **g** (**gram**) *is a unit of mass*  
*that you can hardly feel on the end of your finger.*

A **gram** can feel about as heavy as a raisin,  
paper clip or a dime.



A table-tennis  
(ping-pong) ball  
is the mass  
of about 5 **g**.



A golf ball is about 50 **g**  
and so is a medium sized egg.



*What's More?*  
2 scoops of  
ice cream is the mass  
of about 100 **grams**.

Useful VIDEO Link <http://metricamerica.com/gram.htm>



A handful of nuts is the mass of about 100 **grams**.

*(Singular or plural the Symbol is **g**)*

A medium sized apple or tomato is about 100 **grams**.



Useful VIDEO Link <http://metricamerica.com/gram.htm>

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### ***Smaller Measurement from a gram***

1 **milligram**  
(1 **mg**)

Remember, **milli** is the Prefix meaning  
1 one thousandth (0.001).  
So, 1 one thousandth from the Unit of Measure **gram** being  
1 **milligram**  
is simply written 1 **mg**.

### ***Larger Measurement from a gram***

1 **kilogram**  
(1 **kg**)

Remember, **kilo** is the Prefix meaning  
1000 times as much.  
So, 1 000 **g (grams)** is the mass of  
1 **kg (kilogram)**.

### ***Larger Measurement from a kilogram***

1 **tonne**  
(1 **t**)

There are exactly  
1000 **kg (1000 kilograms)**  
in 1 **t (spelled tonne)**.  
*Pronounce it however you wish.*

Useful VIDEO Link <http://metricamerica.com/gram.htm>

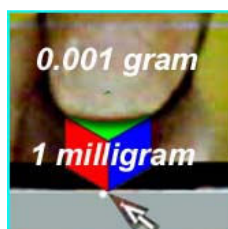


# milligram (mg)

Use the symbol **mg**  
1 one thousandths from a **gram** (0.001 g)

Useful VIDEO Link <http://metricamerica.com/milligram.htm>

*We trust the accuracy in science and medicine  
because there are exactly 1000 milligrams in 1 gram.*



**milligram**

**NOTE:** Originally, convention had it that the **gram** was to be the Base Unit for MASS but familiarity and convenience seemed to determine that the **kilogram** be the Base Unit for MASS.

©db2011

Useful VIDEO Link <http://metricamerica.com/milligram.htm>

## Larger Measurement from a milligram

1 **gram**  
(1 **g**)

Remember, **milli** is the Prefix meaning 1 one thousandth (0.001).  
So, there are exactly 1 000 **milligrams** in the Unit of Measure **gram** and 1 **gram** is simply written 1 **g**.

## Larger Measurement from a gram

1 **kilogram**  
(1 **kg**)

Remember, **kilo** is the Prefix meaning 1000 times as much.  
So, 1 000 **g (grams)** is the mass of 1 **kg (kilogram)**.

## Larger Measurement from a kilogram

1 **tonne**  
(1 **t**)

There are exactly 1000 **kg (kilograms)** in 1 **t (spelled tonne)**.

# tonne (t)

(spelled **tonne**)

Use the Symbol **t**

There are exactly 1000 **kg** (kilograms)  
in 1 metric **tonne** (t).

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Useful VIDEO Link <http://metricamerica.com/tonne.htm>



Whales can be the  
mass of 1 **t**.

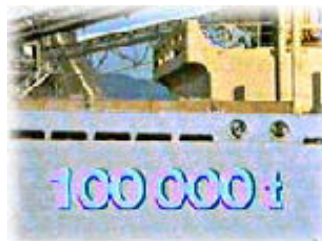
(spelled 1 **tonne**)



Each railcar can carry  
about 42 **t**.

(spelled 42 **tonnes**)

A large ship can occupy the  
mass of 100 000 **t**  
when filled to capacity.



Useful VIDEO Link <http://metricamerica.com/tonne.htm>

Useful VIDEO Link <http://metricamerica.com/tonne.htm>

### *Smaller Measurement from a tonne*

1 thousand **grams** (1000 g)  
is the mass of 1 **kg**  
(1 **kilogram**).  
And 1 **kilogram**  
is simply written 1 **kg**.

•  
Pronounced "KILL-oh-gram"  
**NOT** "kill-AH-gram".

### *Smaller Measurement from a kilogram*

Remember, **kilo** is the Prefix  
meaning  
1000 times as much,  
which only says that there  
are 1000 **g** (**grams**) in  
1 **kg** (**kilogram**).  
And we simply write 1 **g**  
to represent  
the mass of 1 **gram**.

### *Smaller Measurement from a gram*

Remember, **milli** is the  
Prefix meaning  
1 one thousandth (0.001).  
So, 1 one thousandth from the  
Unit of Measurement **gram**  
being 1 **milligram**,  
is simply written 1 **mg**.

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Useful VIDEO Link <http://metricamerica.com/tonne.htm>

# TEMPERATURE

**Say Good-Night  
to Fahrenheit!**



Useful VIDEO Link <http://metricamerica.com/temperature.htm>

## Sing Along!

*"Make a cube, one tenth the Unit **meter**..*

*It's the Volume of exactly one **liter**..*

*It's the Mass of exactly one **kilogram***

*to please us*

*Water Boils at 100 and at Zero it Freezes!"*

Copyright©1981 B.DYCK

Useful VIDEO Link

<http://metricamerica.com/images/instant%20metric%20funny%20man.wmv>

<p><b>Body Temperature 37 °C</b></p>	A woman holding a large thermometer.	A person in a snowy environment with a thermometer showing 0 °C.
<p><b>Water Boils at 100 °C</b> <small>©db2011</small></p>	A woman holding a large thermometer.	<p><b>Water Freezes at 0 °C</b></p>

**(Room Temperature is 20 °C)**

*Here is a Quick Temperature Conversion in Reverse.*

**16 °Celsius is about 61 °Fahrenheit  
and 28 °Celsius is about 82 °Fahrenheit**

## 7 BASE "SI" UNITS<sub>e.&o.e.</sub>

Established by international agreement  
The International System of Units (SI) is a  
modernized version of the metric system that  
provides a logical and interconnected framework  
for all decimal measurements in everyday use  
science, chemistry, industry and commerce.

***The internet, an American invention  
does not exist without it.***

Useful Link <http://metricamerica.com/7%20base%20units.htm>

This Metric System is built on a foundation of  
Seven Base Units  
and all other Units are Derived from them.  
According to the US Department of Commerce,  
National Bureau of Standards  
use of metric measurement was legalized  
in the United States in 1856  
and customary BASE UNITS of measurement  
for everyday use are defined in terms of the  
**meter** for length and **kilogram** for mass.

**All other Units are Derived  
from the Base Unit meter.**

Useful Link <http://metricamerica.com/7%20base%20units.htm>

®©db2011

•

**meter** • second • **kilogram** Kelvin  
ampere • candela • mole

•

## 7 BASE "SI" UNITS

Useful Link <http://metricamerica.com/7%20base%20units.htm>

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**BASE UNIT - meter (m) - LENGTH.**

Up until 1983 the meter was defined as 1,650,763.73 wavelengths in a vacuum of the orange-red line of the spectrum of krypton-86.

Since then it is determined to be the distance traveled by light in a vacuum in 1/299,792,45 of a second.

**BASE UNIT - second (s) - TIME**

The second is defined as the duration of 9,192,631,770 cycles of the radiation associated with a specified transition of the cesium-133 atom.

**BASE UNIT - kilogram (kg) - MASS**

The standard for the kilogram is a cylinder of platinum-iridium alloy kept by the International Bureau of Weights and Measures in Paris.

A duplicate at the National Bureau of Standards serves as the mass standard for the United States.

The kilogram is the only base unit defined by a physical object.

**BASE UNIT - Kelvin (K) and °Celsius (°C) - TEMPERATURE**

The Kelvin is defined as the fraction 1/273.16 of the thermodynamic temperature of the triple point of water; that is, the point at which water forms an interface of solid, liquid and vapor. This is defined as 0.01 °C on the Celsius scale and 32.02 °F on the Fahrenheit scale.

The temperature zero K (Kelvin) is called "absolute zero".

**BASE UNIT - ampere (A) - ELECTRIC CURRENT**

The ampere is defined as that current that, if maintained in each of two long parallel wires separated by one meter in free space, would produce a force between the two wires (due to their magnetic fields) of  $2 \times 10^{-7}$  N (Newton) for each meter of length.

(The Newton is the unit of force that when applied to one kilogram mass would experience an acceleration of one meter per second, per second).

**BASE UNIT - candela (cd) - LUMINOUS INTENSITY**

The candela is defined as the luminous intensity of 1/600,000 of a square meter of a cavity at the temperature of freezing platinum (2,042 K).

**BASE UNIT - mole - (mol) AMOUNT OF SUBSTANCE**

The mole is the amount of substance of a system that contains as many elementary entities as there are atoms in 0.012 kilogram of carbon-12.

Useful Link <http://metricamerica.com/7%20base%20units.htm>

# How The Metric System Works!

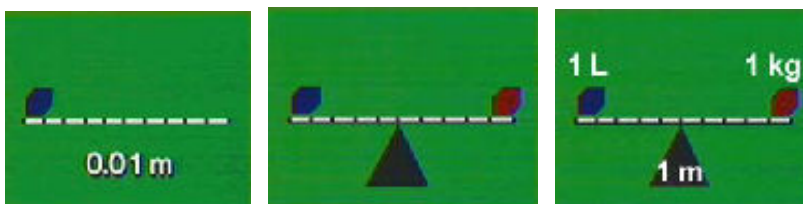
Useful VIDEO Link <http://metricamerica.com/themetricsystem.htm>

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## DID YOU KNOW

that you can divide the LENGTH of 1 meter  
by exactly 10 equal parts?

Now, make a cube (10 cm x 10 cm x 10 cm)  
to fill with (1000 cm<sup>3</sup>) of water and  
it contains the VOLUME of exactly 1 L (1 liter)  
which, is the MASS of exactly 1 kg (1 kilogram).  
(Technically, it is supposed to be distilled water at sea level.)



FROM PAGE 2

## Here is the Fun Part!

1 cm<sup>3</sup>  
(1 cubic centimeter)



filled with water  
contains exactly  
1 mL (1 milliliter)



and is the mass  
of exactly 1 g  
(1 gram)



**ALL SIMPLY RELATED IN 10.**

**EVERYDAY METRIC MEASUREMENT  
RULES, PRACTICES and PRONUNCIATION GUIDE**

**SEE PAGES 78 to 79**

Useful Link with Videos <http://metricamerica.com/themetricsystem.htm>



## PAGE 40

### USEFUL VIDEO LINKS for LEARNING

FREE METRIC EXAMS – TEST YOUR METRIC SKILLS – AMAZE YOUR FRIENDS!

<http://metricamerica.com/metricEXAMS/index.htm>

BACKGROUND OF HOW MEASUREMENT HAS EVOLVED AND WHERE IT IS GOING

<http://metricamerica.com/images/AMERICAN%20METRIC2.wmv>

SHOWS HOW NOTHING RELATES WITH INCHPOUND NON-SYSTEM MEASUREMENT

<http://metricamerica.com/images/metricamerica.wmv>

HOW THE METRIC SYSTEM WORKS IN HARMONY WITH LIFE ITSELF

<http://metricamerica.com/images/international%20system.wmv>

**PREFIX** IS ATTACHED IN FRONT OF BASE OR DERIVED UNIT

<http://metricamerica.com/Sl-Metric/Prefixes&Symbols.wmv>

**SYMBOLS** IDENTIFY PREFIX AND BASE OR DERIVED UNIT OF MEASURE TOGETHER

<http://metricamerica.com/Sl-Metric/Prefixes&Symbols.wmv>

UNDERSTANDING **EVERYDAY METRIC BASE UNITS** IN AMERICA

<http://metricamerica.com/images/metricamerica.wmv>

**meter** IS THE BASE UNIT FOR **LENGTH** - ALL OTHER MEASUREMENT RELATES TO IT

<http://metricamerica.com/Sl-Metric/meter.wmv>

**centimeter** (1 cm) IS 1 ONE HUNDREDTH FROM **meter** (0.01 m)

<http://metricamerica.com/Sl-Metric/centimeter.wmv>

**millimeter** (1 mm) IS 1 ONE THOUSANDTH FROM **meter** (0.001 m)

<http://metricamerica.com/Sl-Metric/millimeter.wmv>

**kilometer** (1 km) IS EXACTLY 1000 **meters** (1000 m) LONG

<http://metricamerica.com/Sl-Metric/meters%20and%20kilometers.wmv>

**liter** (1 L) IS THE DERIVED UNIT FOR **VOLUME**

<http://metricamerica.com/Sl-Metric/liter.wmv>

**milliliter** (1 mL) IS 1 ONE THOUSANDTHS FROM A **liter** (0.001 mL)

<http://metricamerica.com/Sl-Metric/milliliter.wmv>

**kilogram** IS THE BASE UNIT FOR **MASS**

<http://metricamerica.com/Sl-Metric/kilogram.wmv>

**gram** IS 1 ONE THOUSANDTHS FROM A **kilogram** (0.001 kg)

<http://metricamerica.com/Sl-Metric/gram.wmv>

**milligram** IS 1 ONE THOUSANDTHS FROM A **gram** (0.001 g)

<http://metricamerica.com/Sl-Metric/milligram.wmv>

THE MASS OF ONE THOUSAND **kilograms** IS ONE METRIC **tonne**

<http://metricamerica.com/Sl-Metric/tonne.wmv>

HOW WATER BOILS AT 100 DEGREES CELSIUS and ZERO IT FREEZES!

<http://metricamerica.com/images/instant%20metric%20funny%20man.wmv>

SYSTEM OF INTERNATIONAL UNITS FOR MEASUREMENT IN AMERICA CALLED "SI"

<http://metricamerica.com/images/international%20system.wmv>

**CENTIMETER, MILLILITER, MILLIGRAM**

<http://metricamerica.com/Sl-Metric/centimeter,gram,milliliter.wmv>

©db2011 **10x10x10 All Around**

<http://metricamerica.com/images/10x10x10around.wmv>

[www.metricamerica.com](http://www.metricamerica.com)



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Reference Comparisons  
for Pleasure**

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Convert <i>FLUID OUNCES to MILLILITERS (mL)</i>	Page 52
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Convert <i>GRAMS (g) to POUNDS<sup>®</sup>db2011</i>	Page 60
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Convert <i>SQUARE CENTIMETERS (cm<sup>2</sup>) to SQUARE FEET</i>	Page 66
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Convert <i>SQUARE METERS (m<sup>2</sup>) to SQUARE FEET</i>	Page 68
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Convert <i>HECTARES (ha) to ACRES</i>	Page 71
Convert <i>SQUARE METERS (m<sup>2</sup>) &amp; HECTARES (ha) to ACRES</i>	Page 72
Convert <i>SQUARE MILES to SQUARE KILOMETERS (km<sup>2</sup>)</i>	Page 73
Convert <i>SQUARE KILOMETERS (km<sup>2</sup>) to SQUARE MILES</i>	Page 74
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<b>Everyday Metric Measurement RULES and PRACTICES GUIDE</b>	Page 78-79

# **INSTANT METRIC CONVERSION<sup>®</sup> TABLES for LENGTH**

CONVERT FROM	TO	MULTIPLY BY
<b>centimeters</b>	<b>inches</b>	<b>0.3937</b>
<b>meters</b>	<b>feet</b>	<b>3.2808</b>
<b>kilometers</b>	<b>miles</b>	<b>0.6214</b>
<b>inches</b>	<b>centimeters</b>	<b>2.54</b>
<b>feet</b>	<b>meters</b>	<b>0.3048</b>
<b>miles</b>	<b>kilometers</b>	<b>1.609</b>

**FRACTIONS of an INCH  
to CENTIMETERS (cm)**

**INCHES to CENTIMETERS (cm)**

**CENTIMETERS (cm) to INCHES**

**FEET to METERS (m)**

**METERS (m) to FEET**

**KILOMETERS (km)  
to MILES and FEET**

**MILES to KILOMETERS (km)**

**millimeter, centimeter, meter and kilometer  
also spelled**

**millimetre, centimetre, metre and kilometre**

©db2011



# Convert ***FRACTIONS of an INCH to CENTIMETERS (cm)***

*also spelled **centimetre***

1 one hundredth from a **meter** (0.01 **m**).  
There are exactly 100 **cm** (**centimeters**)  
in the Base Unit **meter**.  
Use the **symbol cm**

©db2011

Useful VIDEO Link

<http://metricamerica.com/convert%20fractions%20to%20centimeters.htm>

<b>fractions of an inches</b>	<b>centimeters (cm)</b>	<b>fractions of an inches</b>	<b>centimeters (cm)</b>
<b>1/32 = 0.031 25</b>	<b>0.079 4</b>	<b>17/32 = 0.531 25</b>	<b>1.349 4</b>
<b>1/16 = 0.062 5</b>	<b>0.158 8</b>	<b>9/16 = 0.562 5</b>	<b>1.428 8</b>
<b>3/32 = 0.093 75</b>	<b>0.238 1</b>	<b>19/32 = 0.593 75</b>	<b>1.508 1</b>
<b>1/8 = 0.125</b>	<b>0.317 5</b>	<b>5/8 = 0.625</b>	<b>1.587 5</b>
<b>5/32 = 0.156 25</b>	<b>0.396 9</b>	<b>21/32 = 0.656 25</b>	<b>1.666 9</b>
<b>3/16 = 0.187 5</b>	<b>0.476 3</b>	<b>11/16 = 0.687 5</b>	<b>1.746 3</b>
<b>7/32 = 0.218 75</b>	<b>0.555 6</b>	<b>23/32 = 0.718 75</b>	<b>1.825 6</b>
<b>1/4 = 0.25</b>	<b>0.635 0</b>	<b>3/4 = 0.75</b>	<b>1.905 0</b>
<b>9/32 = 0.281 25</b>	<b>0.714 4</b>	<b>25/32 = 0.781 25</b>	<b>1.984 4</b>
<b>5/16 = 0.312 5</b>	<b>0.793 8</b>	<b>13/16 = 0.812 5</b>	<b>2.063 8</b>
<b>11/32 = 0.343 75</b>	<b>0.873 1</b>	<b>27/32 = 0.843 75</b>	<b>2.143 1</b>
<b>3/8 = 0.375</b>	<b>0.952 5</b>	<b>7/8 = 0.875</b>	<b>2.222 5</b>
<b>13/32 = 0.406 25</b>	<b>1.031 9</b>	<b>29/32 = 0.906 25</b>	<b>2.301 9</b>
<b>7/16 = 0.437 5</b>	<b>1.111 3</b>	<b>15/16 = 0.937 5</b>	<b>2.381 3</b>
<b>15/32 = 0.468 75</b>	<b>1.190 6</b>	<b>31/32 = 0.968 75</b>	<b>2.460 6</b>
<b>1/2 = 0.5</b>	<b>1.270 0</b>	<b>1 = 1.0</b>	<b>2.540 0</b>

# Convert

## ***INCHES to CENTIMETERS (cm)***

*also spelled **centimetre***

1 one hundredth from a **meter** (0.01 **m**).  
 There are exactly 100 **cm** (**centimeters**)  
 in the Base Unit **meter**.  
 Use the **symbol cm**

•

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20inches%20to%20centimeters.htm>

inches	centimeters (cm)
0.1	0.254 0
0.2	0.508 0
0.3	0.762 0
0.4	1.016 0
0.5	1.270 0
0.6	1.524 0
0.7	1.778 0
0.8	2.032 0
0.9	2.286 0
1.0	2.540 0

inches	centimeters (cm)
1	2.540
2	5.080
3	7.620
4	10.160
5	12.700
6	15.240
7	17.780
8	20.320
9	22.860
10	25.400
11	27.940
12	30.480

# Convert **CENTIMETERS (cm) to INCHES**

also spelled **centimetre**

1 one hundredth from a **meter** (0.01 **m**).

There are exactly 100 **cm** (**centimeters**)

in the Base Unit **meter**.

Use the **symbol cm**

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20centimeters%20to%20inches.htm>

centimeters (cm)	inches
0.1	0.039 4
0.2	0.078 7
0.3	0.118 1
0.4	0.157 5
0.5	0.196 9
0.6	0.236 2
0.7	0.275 6
0.8	0.315 0
0.9	0.354 3
1.0	0.393 7
1.0	0.394
2.0	0.787
3.0	1.181
4.0	1.575
5.0	1.969
6.0	2.362
7.0	2.756
8.0	3.150
9.0	3.543
10.0	3.937

centimeters (cm)	feet	inches
10		3.94
20		7.87
30		11.81
40	1	3.75
50	1	7.68
60	1	11.62
70	2	3.56
80	2	7.50
90	2	11.43
100	3	3.37



# Convert **FEET** to **METERS** (m)

also spelled **metre**

the Base Unit for LENGTH

1 foot = 0.3048 **meters**

1 yard = 0.914 **meter**

1 mile = 1.609 **kilometers**

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Useful VIDEO Link

<http://metricamerica.com/convert%20feet%20to%20meters.htm>

feet	meters (m)
10	3.048
20	6.096
30	9.144
40	12.192
50	15.240
60	18.288
70	21.336
80	24.384
90	27.432
100	30.480
100	30.48
200	60.96
300	91.44
400	121.92
500	152.40
600	182.88
700	213.36
800	243.84
900	274.32
1,000	304.80

feet	meters (m)
1,000	304.8
2,000	609.6
3,000	914.4
4,000	1 219.2
5,000	1 524.0
6,000	1 828.8
7,000	2 133.6
8,000	2 438.4
9,000	2 743.2
10,000	3 048.0
10,000	3 048
20,000	6 096
30,000	9 144
40,000	12 192
50,000	15 240
60,000	18 288
70,000	21 336
80,000	24 384
90,000	27 432
100,000	30 480

# Convert **METERS (m)** to **FEET**

also spelled **metre**

the Base Unit for LENGTH

1 foot = 0.3048 **meters**

1 yard = 0.914 **meter**

1 mile = 1.609 **kilometers**

©db2011

Useful VIDEO Link

<http://metricamerica.com/convert%20feet%20to%20meters.htm>

meters	feet	inches
1	3	3.37
2	6	6.74
3	9	10.11
4	13	1.48
5	16	4.85
6	19	8.22
7	22	11.59
8	26	2.96
9	29	6.33
10	32	9.70

meters	feet
10	32.81
20	65.62
30	98.43
40	131.23
50	164.04
60	196.85
70	229.66
80	262.47
90	295.28
100	328.08
100	328.1
200	656.2
300	984.3
400	1,312.3
500	1,640.4
600	1,968.5
700	2,296.6
800	2,624.7
900	2,952.8
1 000	3,280.8

# Convert KILOMETERS (km) to MILES and FEET

also spelled **kilometre**

There are exactly 1000 m (meters) in 1 km (1 kilometer)

which is pronounced

"KILL-oh-meet-ur" NOT "kill-AH-mit-ur".

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Useful VIDEO Link

<http://metricamerica.com/convert%20kilometers%20to%20miles.htm>

kilometers (km)	miles	feet
1		3,281
2	1	1,282
3	1	4,563
4	2	2,563
5	3	564
6	3	3,845
7	4	1,846
8	4	5,127
9	5	3,128
10	6	1,128
20	12	2,257
30	18	3,385
40	24	4,514
50	31	362
60	37	1,490
70	43	2,619
80	49	3,747
90	55	4,876
100	62	724

kilometers (km)	miles
100	62.14
200	124.27
300	186.41
400	248.55
500	310.69
600	372.82
700	434.96
800	497.10
900	559.23
1 000	621.3 7
1 000	621.4
2 000	1,242.7
3 000	1,864.1
4 000	2,485.5
5 000	3,106.9
6 000	3,728.2
7 000	4,349.6
8 000	4,971.0
9 000	5,592.3
10 000	6,213.7

# Convert **MILES to KILOMETERS (km)**

*also spelled kilometer*

There are exactly 1000 **m (meters)** in 1 **km (1 kilometer)**

which is pronounced

"KILL-oh-meet-ur" NOT "kill-AH-mit-ur".

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20miles%20to%20kilometers.htm>

miles	kilometers
1	1.609
2	3.219
3	4.828
4	6.437
5	8.047
6	9.656
7	11.265
8	12.875
9	14.484
10	16.093
10	16.09
20	32.19
30	48.28
40	64.37
50	80.47
60	96.56
70	112.65
80	128.75
90	144.84
100	160.93

miles	kilometers
100	160.9
200	321.9
300	482.8
400	643.7
500	804.7
600	965.6
700	1 126.5
800	1 287.5
900	1 448.4
1,000	1 609.3
1,000	1 609
2,000	3 219
3,000	4 828
4,000	6 437
5,000	8 047
6,000	9 656
7,000	11 265
8,000	12 875
9,000	14 484
10,000	16 093

# **INSTANT METRIC** **CONVERSION<sup>®</sup> TABLES** for **AMERICAN or FOREIGN** **VOLUME** **(LIQUID)**

©db2011

See Page 3 for description of "Volume/Capacity and Liquid"

CONVERT FROM (US)	TO FOREIGN	MULTIPLY BY
milliliters	fluid ounces	0.0338
liters	gallons	0.2642
fluid ounces	milliliters	29.575
gallons	liters	3.785

**FLUID OUNCES**  
to **MILLILITERS (mL)**

•

**MILLILITERS (mL)**  
to **FLUID OUNCES**

•

**PINTS to LITERS (L)**

•

**MILLILITERS (mL)**  
to **PINTS and**  
**FLUID OUNCES**

•

**GALLONS to LITERS (L)**

•

**LITERS (L) to GALLONS**  
**PINTS and FLUID OUNCES**



**milliliter and liter**

*also spelled*

**millilitre and litre**

# Convert **FLUID OUNCES** **to MILLILITERS (mL)**

also spelled **millilitre**

1 US fluid ounce = 29.5735296 mL

©db2011

Useful VIDEO Link

<http://metricamerica.com/convert%20fluid%20ounces%20to%20milliliters.htm>

## AMERICAN CONVERSIONS

fluid ounces	milliliters – (mL)
1	29.57
2	59.14
3	88.71
4	118.28
5	147.85
6	177.42
7	206.99
8	236.56
9	266.13
10	295.70
11	325.27
12	354.84
13	384.41
14	413.98
15	443.55
16	473.12
17	502.69
18	532.26
19	561.83
20	591.40

## FOREIGN CONVERSIONS

fluid ounces	milliliters – (mL)
1	28.41
2	56.83
3	85.24
4	113.65
5	142.07
6	170.48
7	198.89
8	227.30
9	255.72
10	284.13
11	312.54
12	340.96
13	369.37
14	397.78
15	426.20
16	454.61
17	483.02
18	511.43
19	539.85
20	568.26

**Convert**  
**MILLILITERS (mL)**  
**to FLUID OUNCES**  
*also spelled millilitre*

1 one thousandths from a liter (0.001 L).  
There are exactly 1000 mL (milliliters)  
in the Derived Unit of Measure liter.

©db2011

Useful VIDEO Link

<http://metricamerica.com/convert%20milliliters%20to%20fluid%20ounces.htm>

**AMERICAN CONVERSIONS**

milliliters (mL)	fluid ounces
10	0.338
20	0.676
30	1.014
40	1.352
50	1.690
60	2.028
70	2.366
80	2.704
90	3.042
100	3.381

**FOREIGN CONVERSIONS**

milliliters (mL)	fluid ounces
10	0.352
20	0.704
30	1.056
40	1.408
50	1.760
60	2.112
70	2.464
80	2.816
90	3.168
100	3.520



# Convert **PINTS** to **LITERS (L)**

*also spelled litre*

**1 liter (L)**

There are exactly 1000 mL (milliliters) in 1 liter (L).

**1 pint = 0.473 2 liters (US)**

**1 pint = 0.568 3 liters (Foreign)**

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20pints%20to%20liters.htm>

## **AMERICAN CONVERSIONS**

pints	liters (L)
1	0.473 2
2	0.946 3
3	1.419 5
4	1.892 7
5	2.365 8
6	2.839 0
7	3.312 1
8	3.785 3
9	4.258 5
10	4.732

## **FOREIGN CONVERSIONS**

pints	liters (L)
1	0.568 3
2	1.136 5
3	1.704 8
4	2.273 0
5	2.841 3
6	3.409 6
7	3.977 8
8	4.546 1
9	5.114 4
10	5.682 7

# Convert **MILLILITERS** (mL)

*also spelled millilitre*

## to PINTS and FLUID OUNCES

**1 liter (L)**

There are exactly 1000 mL (milliliters) in 1 liter (L).

©db2011

Useful VIDEO Link

<http://metricamerica.com/convert%20milliliters%20to%20pints%20and%20fluid%20ounces.htm>

### **AMERICAN** CONVERSIONS

milliliters (mL)	pints	fluid ounces
100		3.38
200		6.76
300		10.14
400		13.52
500	1	1.00
600	1	4.28
700	1	7.66
800	1	11.04
900	1	14.42
1 000	2	1.80

### **FOREIGN** CONVERSIONS

milliliters (mL)	pints	fluid ounces
100		3.52
200		7.04
300		10.56
400		14.08
500	1	17.60
600	1	1.12
700	1	4.64
800	1	8.16
900	1	11.68
1 000	1	15.20

# Convert **GALLONS** to **LITERS**

*also spelled litre*

**1 liter (L)**

There are exactly 1000 mL (milliliters) in 1 liter (L).

©db2011

**Useful VIDEO Link**

<http://www.metricamerica.com/convert%20gallons%20to%20liters.htm>

## **AMERICAN** CONVERSIONS

gallons	liters (L)
1	3.785
2	7.571
3	11.356
4	15.141
5	18.927
6	22.712
7	26.497
8	30.282
9	34.068
10	37.853

## **FOREIGN** CONVERSIONS

gallons	liters (L)
1	4.546
2	9.092
3	13.638
4	18.184
5	22.730
6	27.277
7	31.823
8	33.369
9	40.915
10	45.461

# Convert **LITERS (L)** to **GALLONS** **PINTS** and **FLUID OUNCES**

also spelled litre

**1 liter (L)**

There are exactly 1000 mL (milliliters) in 1 liter (L).

©db2011

**Useful VIDEO Link**

<http://www.metricamerica.com/convert%20liters%20to%20gallons.%20pints.%20fluid%20ounces.htm>

## **AMERICAN** CONVERSIONS

liters (L)	gallons	pints	fluid ounces
1		2	1.840
2		4	3.628
3		6	5.442
4	1	0	7.256
5	1	2	9.070
6	1	4	10.884
7	1	6	12.698
8	2	0	14.512
9	2	3	0.326
10	2	5	2.140
20	5	2	4.280
30	7	7	6.420
40	10	4	8.560
50	13	1	10.700
60	15	6	12.840
70	18	3	14.980
80	21	1	1.120
90	23	6	3.260
100	26	3	5.400

## **FOREIGN** CONVERSIONS

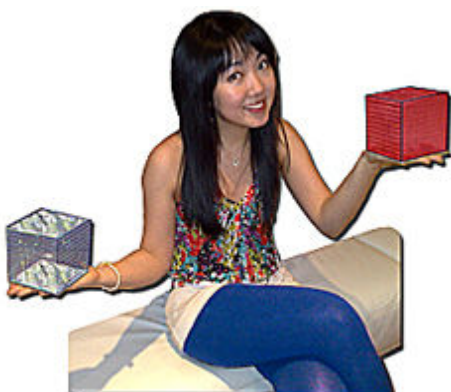
liters (L)	gallons	pints	fluid ounces
1		1	15.2
2		3	10.4
3		5	5.6
4		7	0.8
5	1	0	16.0
6	1	2	11.2
7	1	4	6.4
8	1	6	1.6
9	1	7	16.8
10	2	1	12.0
20	4	3	4
30	6	4	16
40	8	6	8
50	11	0	0
60	13	1	12
70	15	3	4
80	17	4	16
90	19	6	8
100	22	0	0

# **INSTANT METRIC** **CONVERSION<sup>®</sup> TABLES** *for* **MASS** *(weight)*

©db2011

*See Page 3 for description of "Mass and Weight"*

CONVERT FROM	TO	MULTIPLY BY
grams	fluid ounces	0.0353
kilograms	pounds	2.2046
fluid ounces	grams	28.35
pounds	kilograms	0.4536



**GRAMS (g) to OUNCES**

•

**GRAMS (g) to POUNDS**

•

**OUNCES to GRAMS (g)**

•

**KILOGRAMS (kg) to  
POUNDS and OUNCES**

•

**POUNDS to KILOGRAMS  
(kg)**

# Convert GRAMS (g) to OUNCES

A gram is the Unit of Measure that is  
1 one thousandths (0.001 kg) from the Base Unit  
kilogram because there are exactly  
1000 g (grams) in 1 kg (kilogram).

©db2011

Useful VIDEO Link

<http://www.metricamerica.com/convert%20grams%20to%20ounces.htm>

grams (g)	ounces
1	0.0353
2	0.0706
3	0.1059
4	0.1412
5	0.1765
6	0.2118
7	0.2471
8	0.2824
9	0.3179
10	0.3530
10	0.353
20	0.706
30	1.059
40	1.412
50	1.765
60	2.118
70	2.471
80	2.824
90	3.179
100	3.530

## Convert **GRAMS (g) to POUNDS**

A gram is the Unit of Measure that is  
1 one thousandths (0.001 **kg**) from the Base Unit  
**kilogram** because there are exactly  
1000 **g (grams)** in 1 **kg (kilogram)**.

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20grams%20to%20pounds.htm>

grams (g)	pounds	ounces
100		3.53
200		7.06
300		10.59
400		14.12
500	1	1.65
600	1	5.18
700	1	8.21
800	1	12.24
900	1	15.77
1 000	2	3.3



## Convert *OUNCES* to *GRAMS* (g)

A gram is the Unit of Measure that is  
1 one thousandths (0.001 **kg**) from the Base Unit  
**kilogram** because there are exactly  
1000 **g (grams)** in 1 **kg (kilogram)**.

©Cdb2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20ounces%20to%20grams.htm>

ounces	grams (g)
1	28.35
2	56.70
3	85.05
4	113.40
5	141.75
6	170.10
7	198.45
8	226.80
9	255.15
10	283.50
11	311.84
12	340.19
13	368.54
14	396.89
15	425.24
16	453.59

# Convert ***KILOGRAMS (kg)*** to ***POUNDS and OUNCES***

The Base Unit **kilogram** (0.001 **kg**)  
has exactly  
1000 **g (grams)** in 1 **kg (kilogram)**.

©©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20pounds%20to%20kilograms.htm>

kilograms (kg)	pounds	ounces
1	2	3.3
2	4	6.6
3	6	9.9
4	8	13.1
5	11	0.4
6	13	3.6
7	15	6.9
8	17	10.2
9	19	13.5
10	22	0.7

# Convert ***POUNDS*** to ***KILOGRAMS*** (kg)

The Base Unit **kilogram**  
has exactly  
1000 **g (grams)** (0.001 **kg**) in 1 **kg (kilogram)**.

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Useful VIDEO Link

<http://metricamerica.com/convert%20pounds%20to%20kilograms.htm>

pounds	kilograms (kg)
1	0.453 6
2	0.907 2
3	1.360 8
4	1.814 4
5	2.268 0
6	2.721 6
7	3.175 1
8	3.628 7
9	4.082 3
10	4.535 9

pounds	kilograms (kg)
10	4.536
20	9.072
30	13.608
40	18.144
50	22.680
60	27.216
70	31.751
80	36.287
90	40.823
100	45.359

# **INSTANT METRIC CONVERSION<sub>©</sub> TABLES for**



3000 m HALEAKALA VOLCANO, MAUI, HAWAII

**meter, millimeter, centimeter and kilometer**  
**also spelled**  
**metre, millimetre, centimetre and kilometre**

**SQUARE INCHES to  
SQUARE CENTIMETERS (cm<sup>2</sup>)**

**SQUARE CENTIMETERS (cm<sup>2</sup>)  
to SQUARE FEET**

**SQUARE FEET  
to SQUARE METERS (m<sup>2</sup>)**

**Convert SQUARE METERS (m<sup>2</sup>)  
to SQUARE FEET**

©©db2011

**SQUARE YARDS  
to SQUARE METERS (m<sup>2</sup>)**

**ACRES to HECTARES (ha)**

**HECTARES (ha) to ACRES**

**SQUARE METERS (m<sup>2</sup>)  
with HECTARES (ha) to  
ACRES**

**SQUARE MILES to  
SQUARE KILOMETERS (km<sup>2</sup>)**

**SQUARE KILOMETERS (km<sup>2</sup>)  
to SQUARE MILES**

# Convert SQUARE INCHES to SQUARE CENTIMETERS (cm<sup>2</sup>)

*also spelled* **centimetre**

1 one hundredth from a **meter** (0.01 **m**).  
There are exactly 100 **cm** (**centimeters**)  
in the Base Unit **meter**.

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20square%20inches%20to%20square%20centimeters.htm>

square inches	square centimeters (cm <sup>2</sup> )
1	6.452
2	12.903
3	19.355
4	25.806
5	32.258
6	38.710
7	45.161
8	51.613
9	58.064
10	64.516

**Convert**  
**SQUARE CENTIMETERS (cm<sup>2</sup>)**  
**to SQUARE FEET**  
*also spelled **centimetre***

1 one hundredth from a **meter** (0.01 **m**).  
There are exactly 100 **cm** (**centimeters**) in the Base Unit **meter**.

©db2011

**Useful VIDEO Link**

<http://metricamerica.com/convert%20square%20centimeters%20to%20square%20feet.htm>

square centimeters (cm <sup>2</sup> )	square Feet
100	0.107 6
200	0.215 3
300	0.322 9
400	0.430 6
500	0.538 2
600	0.645 8
700	0.753 5
800	0.861 1
900	0.968 8
1 000	1.076 4
1 000	1.076
2 000	2.153
3 000	3.229
4 000	4.306
5 000	5.382
6 000	6.458
7 000	7.535
8 000	8.611
9 000	9.688
10 000	10.764

**Convert**  
**SQUARE FEET**  
**to SQUARE METERS (m<sup>2</sup>)**  
*also spelled metre*

The Base Unit for LENGTH is **meter**.

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**Useful VIDEO Link**

<http://metricamerica.com/convert%20square%20feet%20to%20square%20meters.htm>

square feet	square meters (m <sup>2</sup> )
1	0.092 90
2	0.18581
3	0.27871
4	0.37161
5	0.464 52
6	0.557 42
7	0.650 32
8	0.743 22
9	0.836 13
10	0.929 03
10	0.929 0
20	1.858 1
30	2.787 1
40	3.716 1
50	4.645 2
60	5.574 2
70	6.503 2
80	7.432 2
90	8.361 3
100	9.290 3

# Convert **SQUARE METERS** (m<sup>2</sup>) to **SQUARE FEET**

also spelled **metre**

The Base Unit for LENGTH is **meter**.

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Useful VIDEO Link

<http://metricamerica.com/convert%20square%20meters%20to%20square%20feet.htm>

square meters (m <sup>2</sup> )	square feet
1	10.76
2	21.53
3	32.29
4	43.06
5	53.82
6	64.58
7	75.35
8	86.11
9	96.88
10	107.64
10	107.6
20	215.3
30	322.9
40	430.6
50	538.2
60	645.8
70	753.5
80	861.1
90	968.8
100	1,076.4



# Convert **SQUARE YARDS** to **SQUARE METERS (m<sup>2</sup>)**

*also spelled* **metre**

The Base Unit for LENGTH is **meter**.

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**Useful VIDEO Link**

<http://metricamerica.com/convert%20square%20yards%20to%20square%20meters.htm>

square yards	square meters (m <sup>2</sup> )
1	0.836 1
2	1.672 3
3	2.508 4
4	3.344 5
5	4.180 6
6	5.016 8
7	5.852 9
8	6.689 0
9	7.525 1
10	8.361 3

**Useful VIDEO Link**

<http://metricamerica.com/convert%20square%20yards%20to%20square%20meters.htm>

# Convert ACRES to HECTARES (ha)

There are exactly 10 000 square meters (m<sup>2</sup>) in 1 hectare.

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Useful VIDEO Link

<http://metricamerica.com/convert%20acres%20to%20hectares.htm>

acres	hectares (ha)
1	0.404 7
2	0.809 4
3	1.214 1
4	1.618 7
5	2.023 4
6	2.428 1
7	2.832 8
8	3.237 5
9	3.642 2
10	4.046 8
10	4.047
20	8.094
30	12.141
40	16.187
50	20.234
60	24.281
70	28.328
80	32.375
90	36.422
100	40.468

acres	hectares (ha)
100	40.47
200	80.94
300	121.41
400	161.87
500	202.34
600	242.81
700	283.28
800	323.75
900	364.22
1,000	404.68
1,000	404.7
2,000	809.4
3,000	1 214.1
4,000	1 618.7
5,000	2 023.4
6,000	2 428.1
7,000	2 832.8
8,000	3 237.5
9,000	3 642.2
10,000	4 046.8

# **Convert HECTARES (ha) to ACRES**

There are exactly 10 000 **square meters** (m<sup>2</sup>) in 1 **hectare**.

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**Useful VIDEO Link**

<http://metricamerica.com/convert%20hectares%20to%20acres.htm>

hectares (ha)	acres
1	2.47
2	4.94
3	7.41
4	9.88
5	12.35
6	14.82
7	17.29
8	19.76
9	22.23
10	24.7
10	24.71
20	49.42
30	74.13
40	98.84
50	123.55
60	148.26
70	172.97
80	197.68
90	222.39
100	247.11

# Convert SQUARE METERS (m<sup>2</sup>) with HECTARES (ha) to ACRES

There are exactly 10 000 square meters (m<sup>2</sup>) in 1 hectare.

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Useful VIDEO Link

<http://metricamerica.com/convert%20square%20meters%20to%20acres.htm>

square meters (m <sup>2</sup> )	acres
5 000	1.24
6 000	1.48
7 000	1.73
8 000	1.98
9 000	2.22
10 000	2.47

hectares (ha)	acres
1	2.47
2	4.94
3	7.41
4	9.88
5	12.35
6	14.82
7	17.29
8	19.76
9	22.23
10	24.7
10	24.71
20	49.42
30	74.13
40	98.84
50	123.55
60	148.26
70	172.97
80	197.68
90	222.39
100	247.11

# Convert SQUARE MILES to SQUARE KILOMETERS (km<sup>2</sup>)

also spelled **kilometre**

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Useful VIDEO Link

<http://metricamerica.com/convert%20square%20miles%20to%20square%20kilometers.htm>

square miles	square kilometre (km <sup>2</sup> )	square miles	square kilometers (km <sup>2</sup> )
1	2.590	100	259.0
2	5.180	200	518.0
3	7.770	300	777.0
4	10.360	400	1 036.0
5	12.950	500	1 295.0
6	15.540	600	1 554.0
7	18.130	700	1 813.0
8	20.720	800	2 072.0
9	23.310	900	2 331.0
10	25.900	1,000	2 590.0
10	25.90	1,000	2 590
20	51.80	2,000	5 180
30	77.70	3,000	7 770
40	103.60	4,000	10 360
50	129.50	5,000	12 950
60	155.40	6,000	15 540
70	181.30	7,000	18 130
80	207.20	8,000	20 720
90	233.10	9,000	23 310
100	259.00	10,000	25 900

# **Convert** **SQUARE KILOMETERS (km<sup>2</sup>)** **to SQUARE MILES**

*also spelled kilometre*

**There are exactly 10 000 square meters (m<sup>2</sup>) in 1 hectare.**

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**Useful VIDEO Link**

<http://metricamerica.com/convert%20square%20kilometers%20to%20square%20miles.htm>

square kilometers (km <sup>2</sup> )	square miles
10	3.861
20	7.722
30	11.583
40	15.444
50	19.305
60	23.166
70	27.027
80	30.888
90	34.749
100	38.610
100	38.61
200	77.22
300	115.83
400	154.44
500	193.05
600	231.66
700	270.27
800	308.88
900	347.49
1 000	386.10

**INSTANT METRIC  
CONVERSION<sup>®</sup> TABLES  
for  
TEMPERATURE**

Useful VIDEO Link <http://metricamerica.com/temperature.htm>



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**Convert °Celsius to °Fahrenheit**

**Convert °Fahrenheit to °Celsius**

Useful VIDEO Link

<http://metricamerica.com/images/instant%20metric%20funny%20man.wmv>

## Convert °Celsius to °Fahrenheit

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To Convert °Celsius into °Fahrenheit Formula: - °C x 9/5 + 32 = °F

OR

Multiply Celsius by 9, then divide by 5, then add 32

22 °C = 71.6 °F

Useful VIDEO Links

<http://metricamerica.com/Instant%20Metric%20Conversion.htm>

<http://www.metricamerica.com/index.htm>

**EXAMPLE: 22 °C = 71.6 °Fahrenheit**

	0	1	2	3	4	5	6	7	8	9
0	32.0	33.8	35.6	37.4	39.2	41.0	42.8	44.6	46.4	48.2
10	50.0	51.8	53.6	55.4	57.2	59.0	60.8	62.6	64.4	66.2
20	68.0	69.8	71.6 °C	73.4	75.2	77.0	78.8	80.5	82.4	84.2
30	86.0	81.8	89.6	91.4	93.2	95.0	98.6	98.6	100..	102.2
40	104.0	105.8	107.6	109.4	111.2	113.0	114.8	116.6	118.4	120.2
20	122.0	123.8	125.6	127.4	129.2	131.0	132.8	134.6	136.4	138.2
60	140.0	141.8	143.6	145.4	147.2	149.0	150.8	152.6	154.4	156.2
70	158.0	159.8	161.6	163.4	165.2	161.0	168.8	110.6	172.4	174.2
80	116.0	177.8	179.6	181.4	183.2	185.0	186.8	188.6	190.4	192.2
90	194.0	195.8	197.6	199.4	201.2	203.0	204.8	206.6	208.4	210.2
100	212.0	213.8	215.6	217.4	219.2	221.0	222.8	223.6	226.4	228.2
110	230.0	231.8	233.6	235.4	237.2	239.0	240.8	242.6	244.4	246.2
120	248.0	249.8	251.6	253.4	255.2	257.0	258.8	260.6	262.4	264.2
130	266.0	267.8	269.6	271.4	273.2	275.0	276.8	278.6	280.4	282.2
140	284.0	285.8	287.6	289.4	291.2	293.0	294.8	296.6	298.4	300.2
150	302.0	303.8	305.6	307.4	309.2	311.0	312.8	314.6	316.4	318.2
160	320.0	321.8	323.6	325.4	327.2	329.0	330.8	332.6	334.4	336.2
170	338.0	339.8	341.6	343.4	345.2	347.0	348.8	350.6	352.4	354.2
180	356.0	357.8	359.6	361.4	363.2	365.0	366.8	368.6	370.4	372.2
190	374.0	375.8	377.6	379.4	381.2	383.0	384.8	386.6	388.4	390.2
200	392.0	393.8	395.6	397.4	399.2	401.0	402.8	404.6	406.4	408.2



## Convert °Fahrenheit to °Celsius

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**To Convert °Fahrenheit into °Celsius Formula: - °F-32 x 5/9 = °C**  
**OR Subtract 32 from Fahrenheit and multiply by 5 then divide by 9**

**EXAMPLE 68 °Fahrenheit = 20 °C**

	0	1	2	3	4	5	6	7	8	9
0	-17.8	-17.2	-16.7	-16.1	-15.6	-15.0	-14.4	-13.9	-13.3	-12.8
10	-12.2	-11.1	-11.1	-10.6	-10.0	- 9.4	- 8.9	- 8.3	-7.8	-1.2
20	- 6.7	- 6.1	- 5.6	- 5.0	-4.4	-3.9	-3.3	- 2.8	- 2.2	-1.7
30	- 1.1	- 0.6	0.0	0.6	1.1	1.7	2.2	2.8	3.3	3.9
40	4.4	5.0	5.6	6.1	6.7	7.2	7.8	8.3	8.9	9.4
50	10.0	10.6	11.1	11.7	12.2	12.8	13.3	13.9	14.4	15.0
60	15.0	16.1	16.7	17.2	11.8	18.3	18.9	19.4	20°C	20.6
70	21.1	21.7	22.2	22.8	23.3	23.9	24.4	25.0	25.6	26.1
80	26.7	27.2	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7
90	32.2	32.8	33.3	33.9	34.4	35.0	35.6	36.1	36.7	37.2
100	37.8	38.3	38.9	39.4	40.0	40.6	41.1	41.7	42.2	42.8
110	43.3	43.9	44.4	45.0	45.6	46.1	46.1	41.2	47.8	48.3
120	48.9	49.4	50.0	50.6	51.1	51.7	52.2	52.8	53.3	53.9
130	54.4	55.0	55.6	56.1	56.7	51.2	57.8	58.3	58.9	59.4
140	60.0	60.6	61.1	61.7	62.2	62.8	63.3	63.9	64.4	65.0
150	65.6	66.1	66.7	67.2	67.8	68.3	68.9	69.4	70.0	70.6
160	71.1	71.7	72.2	12.8	73.3	73.9	74.4	75.0	75.6	76.1
170	76.7	17.2	77.8	18.3	78.9	79.4	80.0	80.6	81.1	81.7
180	82.2	82.8	83.3	83.9	84.4	85.0	85.6	86.1	86.7	87.2
190	87.8	88.9	88.9	89.4	90.0	90.6	91.1	91.7	92.2	92.8
200	93.3	9'9	94.4	95.0	95.6	96.1	96.1	91.2	97.8	98.3
210	98.9	99.4	100.0	100.6	101.1	101.7	102.2	102.8	103.3	103.9
220	104.4	105.0	105.6	106.1	106.7	107.2	107.8	108.3	108.9	109.4

# ***Everyday Metric Measurement RULES, PRACTICES and PRONUNCIATION GUIDE***

Useful Link <http://www.metricamerica.com/index.htm>

## **RULES FOR NAMES**

**CAPITALIZATION** - Note: Where **symbols** are used convention has it that they **are always lower case letters** except where the Base Unit is named after a person like Celsius (°C), Pascal (P) or Newton (N) and 16 other scientists in the world. Then the symbol is noted by a CAPITAL LETTER.

**PREFIXES** - Prefixes can only be used in combination with unit names.

*For Example:* 6 kilograms **NOT** 6 kilos.

**MULTIPLE UNITS** – Multiple or submultiple unit names are spelled as one word with no space hyphen.

*For Example:* millimeter **NOT** milli-meter.

**COMPOUND UNITS** - Compound unit names which are rates or quotients use the word per.

*For Example:* kilometers per hour **USE** km/h. **Certainly NOT** k.p.hr.

Or liters per 100 kilometers – **USE** L/100 km.

**PLURALS** – Unit symbols are mathematical entities and not abbreviations. Among other things, they are not followed by a period except at the end of a sentence and they are not made plural. Unit names written are followed by a plural “s”.

**PRONUNCIATION** – All prefixes are accented on the first syllable.

*For Example:*

“kilometer” is pronounced “**KILL**-oh-meet-ur” **NOT** “kill-AH-mit-ur”

or “kilogram” is pronounced “**KILL**-oh-gram” **NOT** “kill-AH-gram”.

## **RELATED PRACTICES**

**DECIMAL MARKER** – A “point” or “dot” on the line is preferred in North America and other Western nations as the decimal marker. Some other countries use a “comma”, but either is acceptable. *i.e:* 0.58 m *or* 0,10 kg.

**NUMBER GROUPING**– Numbers should be divided into groups of three, counting to the left or right of the decimal position: and these groups should be separated by a space with no punctuation. *Example:* 763 078.21 m.

A group of four digits need not be separated unless it is in a tabular column with larger numbers. *Example:* 3 750 m *in a column of numbers* or 3750 m *alone in a sentence. The exception is for legal documents like money checks where the groups are separated by a comma.*

# ***Everyday Metric Measurement RULES, PRACTICES and USES GUIDE***

Useful Link <http://www.metricamerica.com/index.htm>

## **RULES FOR SYMBOLS**

**LETTER CASE** – Each unit symbol must be printed in the prescribed letter case in upright type. This is lowercase type, except when the symbol represents a unit named after a person like C for Celsius and 19 others.

*See page 13 and 14 for examples.*

**Prefix symbols** are lower-case letters except those for “mega” and higher valued prefixes.

*For Example: m for “milli” • k for “kilo” • or M for “mega” • T for “tera”.*

*See page 13 and 14 for examples.*

**PLURALS** – Symbols are the same for singular and plural amounts. A plural “s” is never used with symbols.

*For Example: 1 kg **NOT** 1 kgs. OR 14 m **NOT** 14 ms OR 3 L **NOT** 3 Ls.*

**SPACING** – A space separates a symbol for the numerical value.

*For Example: 14 cm or 20 km or 33 °C.*

**PERIODS** – An “SI” metric symbol is not followed by a period unless the symbol is at the end of a sentence.

**AREA and VOLUME** – Symbols used for Area and Volume units are made with superscripts <sup>2</sup> to indicate squares and <sup>3</sup> to indicate cubes.

*Example: 24 m<sup>2</sup> (24 square meters) or 125 cm<sup>3</sup> (125 cubic centimeters).*

**SYMBOL for liter** – “L” (*both spellings, liter and litre are acceptable*). Historically, typewriters were not equipped with the traditional written script “ℓ”, so attempts were made to use the lower case “l” (el).

Then it became further confusing to write “1l” (lower case “el”) as the “1”, and “l” (el) looked too similar, as did the capital “I” (eye). So, the capital “L” was chosen as the **Symbol** for the Derived Base Unit “**liter**”.

**LIMITS on USE** – Symbols should be preceded by a numerical value or refer to a numerical column of numbers. And for the sake of brevity in all applications, the use of symbols with a space between is preferred to spelling out the unit names in full when numerical values are given.

*For Example: 28 kg rather than 28 kilograms.*

# **INSTANT METRIC CONVERSION<sup>®</sup> eBook with TABLES<sup>e.&o.e.</sup>**

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## ***May 20, 2019 - REDEFINITION of the KILOGRAM as a CONSTANT MATHEMATICAL EQUATION***

For more than a century the world's fundamental unit of mass has been based on a single, cylindrical piece of metal. And authorized copies of it stored in secured chambers around the world including the United States, over the years in infinitesimal ways, are shedding or accumulating atoms here and there, thus throwing off the accuracy of the objects meant to be the world standard for measurements of mass.

The 4 cm tall ingot of platinum and iridium, known as the International Prototype Kilogram, offered the world a standardized way of measuring what earlier scientists defined as 1 kilogram being the mass of 1 liter of distilled water (at sea level).

But to ensure greater accuracy there is a method of nano-measurement using "Watt Balance" housed at the U.S. National Institute for Standards and Technology (NIST) near Washington, DC, which is a bid to recast the kilogram as a mathematical equation, unerring, immutable and ultimately easy for experts to reproduce.

And it is expected to yield groundbreaking calculations.

The ultimate purpose of the "Watt Balance" is to help scientists generate a reliable calculation of Planck's Constant. A universal value that quantifies the relationship between energy, light and an object's mass, which in turn will produce a new, more accurate basis for defining the kilogram worldwide.

The race to reinvent the unit of measurement was considered important, partly because the kilogram is the only holdout in the metric system still based on a physical object rather than a formula derived from a universal constant.

The meter, once pegged to the length of a bar of platinum, was redefined in 1983 by a formula using the speed of light as the distance light travels in a vacuum over 1/299,792,458 of a second. Which means that the length of a meter will never change.

***The kilogram however is redefined as "JUST A BUNDLE OF ENERGY"***

While the ampere, kelvin and mole will be tied to the elementary electrical charge, the Boltzmann constant and the Avogadro constant, respectively, the kilogram will now be defined by the Planck Constant. A physical constant that is the quantum of action, which relates the energy carried by a photon to its frequency.

A photon's energy is equal to the Planck constant times its frequency. Which is to say, **Planck's constant**, symbolized ***h***, relates the energy in one quantum (photon) of electromagnetic radiation to the frequency of that radiation. In the International System of units (SI), the **constant** is equal to approximately  $6.626176 \times 10^{-34}$  joule-seconds.

The equation reveals that mass can be understood and even quantified in terms of energy.

Planck's equation shows that energy, in turn, can be calculated in terms of the frequency ***v*** of some entity such as a photon (a particle of light), or alternatively, with some mathematical substitutions, a mass- times a multiple of ***h***. The multiple must be a positive integer- such as 1, 2 or 3. The integer aspect is what makes the relationship "quantised" — matter releases energy in discrete chunks, known as "quanta,"

which can be imagined as individual packets or bundles of energy.

Thus, the ultimate purpose of the "*Watt Balance*" is to help scientists generate a reliable calculation of Planck's Constant. A universal value that quantifies the relationship between energy, light and an object's mass,

which in turn will produce a new, more accurate basis for defining the kilogram worldwide.

Just as the meter, once defined as the length of a bar of platinum, was redefined in 1983 by a formula using the speed of light

as the distance light travels in a vacuum over 1/299,792,458 of a second. Which means that the length of a meter, like the kilogram now will never change.