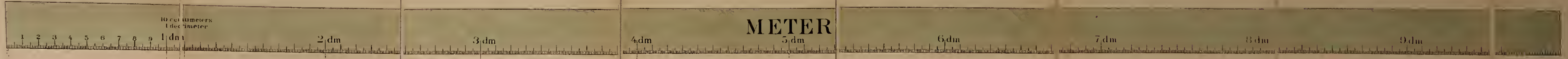
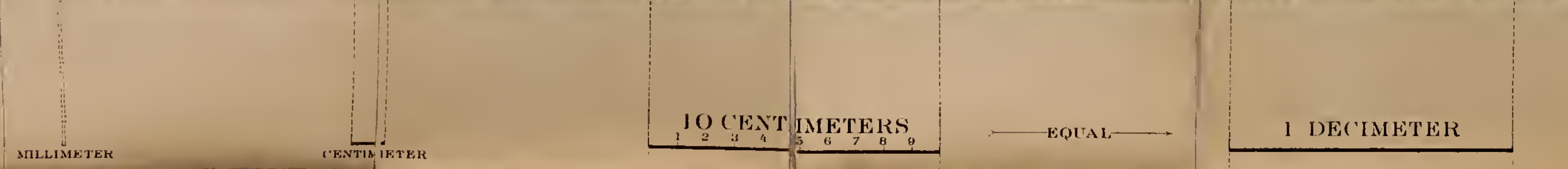
DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
S. W. Stratton Director

INTERNATIONAL METRIC SYSTEM





THE METRIC SYSTEM

The fundamental unit of the metric system is the **METER** *(the unit of length). From this the units of mass* (**GRAM**) *and capacity* (**LITER**) *are derived. All other units are the decimal subdivisions or multiples of these. These three units are simply related, so that for all practical purposes the volume of one kilogram of water (one liter) is equal to one cubic decimeter.*

PREFIXES	MEANING		
MILLI-	= *one thousandth*	$\frac{1}{1000}$	.001
CENTI-	= *one hundredth*	$\frac{1}{100}$	.01
DECI-	= *one tenth*	$\frac{1}{10}$	.1
unit	= *one*		1.
DEKA-	= *ten*	$\frac{10}{1}$	10.
HECTO-	= *one hundred*	$\frac{100}{1}$	100.
KILO-	= *one thousand*	$\frac{1000}{1}$	1000

UNITS

METER *for length*
GRAM *for mass*
LITER *for capacity*

The metric terms are formed by combining the words "METER," "GRAM," and "LITER" with the six numerical prefixes.

LENGTH

10 milli-meters mm = 1 centi-meter cm
10 centi-meters = 1 deci-meter dm
10 deci-meters = 1 **METER** *(about 40 inches)* m
10 **meters** = 1 deka-meter dkm
10 deka-meters = 1 hecto-meter hm
10 hecto-meters = 1 kilo-meter *(about ⅝ mile)* km

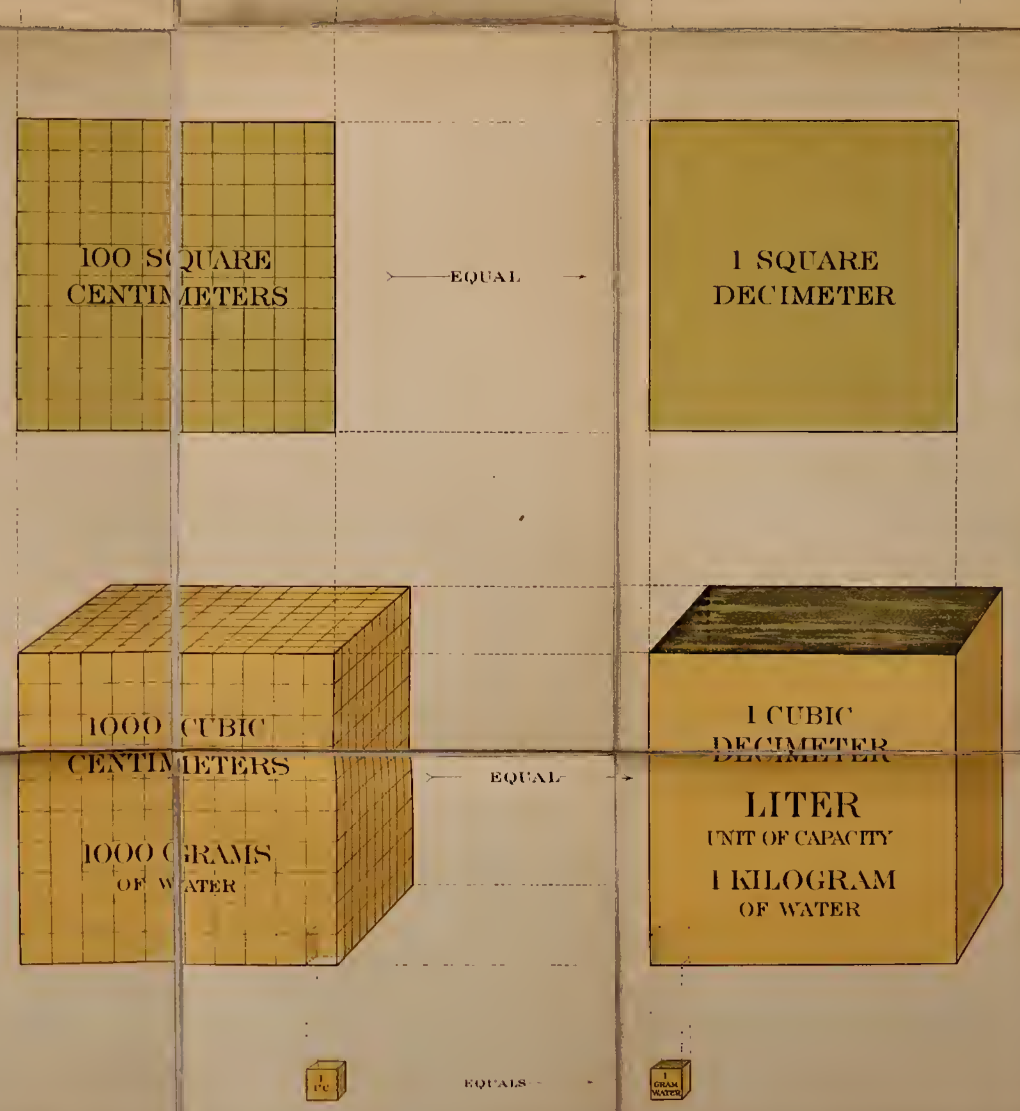
MASS

10 milli-grams mg = 1 centi-gram cg
10 centi-grams = 1 deci-gram dg
10 deci-grams = 1 **GRAM** *(about 15 grains)* g
10 **grams** = 1 deka-gram dkg
10 deka-grams = 1 hecto-gram hg
10 hecto-grams = 1 kilo-gram *(about 2 pounds)* kg

CAPACITY

10 milli-liters ml = 1 centi-liter cl
10 centi-liters = 1 deci-liter dl
10 deci-liters = 1 **LITER** *(about 1 quart)* l
10 **liters** = 1 deka-liter dkl
10 deka-liters = 1 hecto-liter *(about a barrel)* hl
10 hecto-liters = 1 kilo-liter kl

The square and cubic units are the squares and cubes of the linear units. The ordinary unit of land area is the HECTARE (about 2½ acres).



EQUIVALENTS

1 METER = 39.37 INCHES
LEGAL EQUIVALENT ADOPTED BY ACT OF CONGRESS, JULY 28, 1866

LENGTH

Centimeter	=	0.3937	inch
Meter	=	3.28	feet
Meter	=	1.094	yards
Kilometer	=	0.621	statute mile
Kilometer	=	0.5389	nautical mile
Inch	=	2.540	centimeters
Foot	=	0.305	meter
Yard	=	0.914	meter
Statute mile	=	1.61	kilometers
Nautical mile	=	1.853	kilometers

AREA

Sq. centimeter	=	0.155	sq. inch
Sq. meter	=	10.76	sq. feet
Sq. meter	=	1.196	sq. yards
Hectare	=	2.47	acres
Sq. kilometer	=	0.386	sq. mile
Sq. inch	=	6.45	sq. centimeters
Sq. foot	=	0.0929	sq. meter
Sq. yard	=	0.836	sq. meter
Acre	=	0.405	hectare
Sq. mile	=	2.59	sq. kilometers

VOLUME

Cu. centimeter	=	0.0610	cu. inch
Cu. meter	=	35.3	cu. feet
Cu. meter	=	1.308	cu. yards
Cu. inch	=	16.39	cu. centimeters
Cu. foot	=	0.0283	cu. meter
Cu. yard	=	0.765	cu. meter

CAPACITY

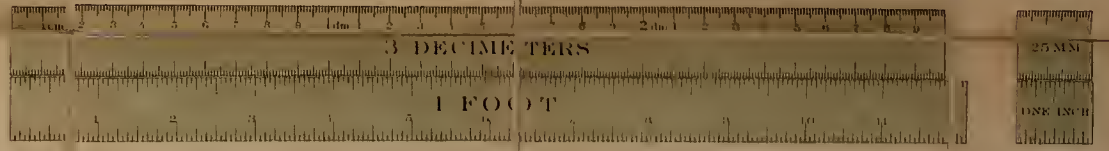
Milliliter	=	0.0338	U. S. liq. ounce
Milliliter	=	0.2705	U. S. apoth. dram
Liter	=	1.057	U. S. liq. quarts
Liter	=	0.2642	U. S. liq. gallon
Liter	=	0.908	U. S. dry quart
Dekaliter	=	1.135	U. S. pecks
Hectoliter	=	2.838	U. S. bushels
U. S. liq. ounce	=	29.57	milliliters
U. S. apoth. dram	=	3.70	milliliters
U. S. liq. quart	=	0.946	liter
U. S. dry quart		1.101	liters
U. S. liq. gallon		3.785	liters
U. S. peck	=	0.881	dekaliter
U. S. bushel	=	0.3524	hectoliter

WEIGHT

Gram	=	15.43	grains
Gram	=	0.772	U. S. apoth. scruple
Gram	=	0.2572	U. S. apoth. dram
Gram	=	0.0353	avoir. ounce
Gram	=	0.03215	troy ounce
Kilogram	=	2.205	avoir. pounds
Kilogram	=	2.679	troy pounds
Metric ton	=	0.984	gross or long ton
Metric ton	=	1.102	short or net tons
Grain	=	0.0648	grams
U. S. apoth. scruple	=	1.296	grams
U. S. apoth dram	=	3.89	grams
Avoir. ounce	=	28.35	grams
Troy ounce	=	31.10	grams
Avoir. pound	=	0.4536	kilogram
Troy pound	=	0.373	kilogram
Gross or long ton	=	1.016	metric tons
Short or net ton	=	0.907	metric ton

GRAPHIC COMPARISONS

For ordinary mental comparison it is convenient to know the approximate relations, e. g. 1 meter = 40 inches; 3 decimeters = 1 foot; 1 decimeter = 4 inches; 1 liter = 1 liquid quart; 1 kilogram = 2¼ pounds; 30 grams = 1 avoirdupois ounce; 1 metric ton = 1 gross ton. (See tables.)



IN THE FOLLOWING ILLUSTRATIONS THE UNITS IN EACH GROUP HAVE EQUAL BASES SO THAT THE HEIGHTS SHOW DIRECTLY THE RELATIVE VALUES OF THE UNITS

Slight changes in the paper due to humidity will alter the absolute but not the relative dimensions shown

A. Hoen & Co. Baltimore