

Advanced Metric Flashcards

Revision 5.2

1. The lower-left corner of each card indicates “dual” or “question/answer”:
 - a. “Dual” sided: both sides pose a question answered by the other side. When using for study, mix these up both in order and front-to-back.
 - b. “Answer/Question” have a question on one side, the answer on the other. Do not let these become mixed front-to-back.
2. The lower-right corner indicates the difficulty level:
 - a. “CAMS, CMS” are suitable for studying for either of USMA’s certifications.
 - b. “CAMS” are the hardest, used only for study for the CAMS certification.
 - c. The USMA has not reviewed or approved of the “split” between the CAMS and CMS cards. I made the split after reading the descriptions of the certifications, so it may not be entirely accurate.
3. If you print these on a duplex printer, be sure to specify binding on the left edge, which is the short edge for these landscape pages. Some printers call this “side binding,” others call it “top binding.”
4. You will find some eccentricities unique to me; feel free to modify or throw away cards you do not like. These fall into two areas:
 - a. Conversions from colloquial units. Some experienced metric instructors eschew memorization of conversions. They believe that it is best to get a “feel” for the size of each unit. While this is no doubt true, the United States is going to be in transition for many years, so I feel that learning some basic conversions is necessary.
 - b. Style. Although metric style is well defined when compared to colloquial style, there are still some areas not specifically addressed by the standards. You will see some of my employer’s in-house style guide in a few cards, such as “spell out integers less than 100 when used with unit names.”
5. These are NOT copyrighted in any way. You may reproduce, print, copy, distribute, and even sell them as you desire, with no attribution to me.

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Useful Metric Web Pages

<http://www.metric.org>

U. S. Metric Association, premier advocate of metrication in the USA, a non-profit institution

<http://www.metric1.org>

SI Navigator™, a web site offering a wealth of metric information and links to other metric web sites

<http://www.metricmethods.com>

Metrication consultation services, including training and other services for metricating your business.

<http://physics.nist.gov/Pubs/SP811/contents.html>

Publication SP811, from the National Institute of Standards and Technology. You can download this PDF file for free, and have a definitive reference for the use of metric in the United States.

**What number does this
prefix and symbol represent:**

yotta Y

Dual

USMA: www.metric.org

CAMS

**What number does this
prefix and symbol represent:**

zetta Z

Dual

USMA: www.metric.org

CAMS

**What number does this
prefix and symbol represent:**

exa E

Dual

USMA: www.metric.org

CAMS

**What number does this
prefix and symbol represent:**

peta P

Dual

USMA: www.metric.org

CAMS

**What number does this
prefix and symbol represent:**

tera T

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

giga G

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

mega M

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

kilo k

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

hecto h

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

10^{18}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

10^{21}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

10^{24}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

10^9

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

10^{12}

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

10^{15}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

**10^2 or
100**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

**10^3 or
1 000**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

**10^6 or
1 000 000**

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

deka da

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

deci d

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

centi c

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

milli m

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

micro μ (mu)

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

nano n

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

pico p

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

femto f

Dual

USMA: www.metric.org

CAMS

**What number does this
prefix and symbol represent:**

atto a

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

**10^{-2} or 0.01
or 1/100th**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

**10^{-1} or 0.1
or 1/10th**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

**10^1 or
10**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

10^{-9}

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

**10^{-6} or
1/1 000 000th**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

**10^{-3} or 0.001
1/1000th**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

10^{-18}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

10^{-15}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

10^{-12}

Dual

USMA: www.metric.org

CAMS, CMS

**What number does this
prefix and symbol represent:**

zepto z

Dual

USMA: www.metric.org

CAMS

**What number does this
prefix and symbol represent:**

yocto y

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

mass

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

length

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

time

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical current

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

temperature

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

luminous intensity

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

amount of substance

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

kilogram kg

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the prefix meaning:**

10^{-24}

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the prefix meaning:**

10^{-21}

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

ampere A

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

second s

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

meter m

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

mole mol

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

candela cd

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

kelvin K

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

temperature (common)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

energy, work or quantity of heat

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

force or tension

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

pressure or stress

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

power or radiant flux

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical charge

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical capacitance

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical inductance

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

frequency

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

newton N

Also: $(\text{kg} \cdot \text{m})/\text{s}^2$

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

joule J

Also: $\text{N} \cdot \text{m}$ or $\text{W} \cdot \text{s}$

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

degree Celsius °C

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

coulomb C

Also: $\text{A} \cdot \text{s}$

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

watt W

Also: J/s

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

pascal Pa

Also: N/m^2

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

hertz Hz

Also: $1/\text{s}$

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

henry H

Also: Wb/A

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

farad F

Also: C/V

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical resistance

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

plane angle

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical conductance

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

solid angle

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

electrical potential

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

luminous flux

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

illuminance

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

magnetic flux density

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

magnetic flux

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

siemens S

Also: A/V

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

radian rad

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

ohm Ω (omega)

Also: V/A

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

lumen lm

Also: cd•sr

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

volt V

Also: W/A

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

steradian sr

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

weber Wb

Also: V•s or J/A or (W•s)/A

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

tesla T

Also: Wb/m²

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

lux lx

Also: lm/m² or (cd•sr)/m²

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

radionuclide activity

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:
absorbed dose or
specific energy imparted**

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

dose equivalent

In terms of other units?

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

volume (technical)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

speed (common)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

speed (technical)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

area (technical)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

acceleration

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

angular momentum

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

sievert Sv

Also: J/kg

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

gray Gy

Also: J/kg

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

becquerel Bq

Also: 1/s

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

meter per second m/s

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

kilometer per hour km/h

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

cubic meter m³

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

**kilogram-meter squared per
second kg • m²/s**

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

**meter per second squared
m/s²**

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

square meter m²

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

**moment of force
(torque)**

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

moment of inertia

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

power density

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

thermal conductivity

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

area (large)

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What is the names and symbols
for the units of measures for:**

mass (large)

Dual

USMA: www.metric.org

CAMS, CMS

**What are the names and symbols
for the unit of measures for:**

time (common)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

volume (common)

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

**What are the names and symbols
for the units of measures for:**

**plane angle
(astronomy, cartography)**

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

**watt per square meter
 W/m^2**

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

**kilogram-meter squared
 $kg \cdot m^2$**

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

**newton-meter
 $N \cdot m$**

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

**metric ton or tonne
or megagram Mg**

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

hectare ha

Also: square hectometer hm^2

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

**watt per meter-kelvin
 $W/(m \cdot K)$**

Dual

USMA: www.metric.org

CAMS

**What are these units
used to measure:**

**degree, minute, second
 $^{\circ}, ', ''$**

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

liter L

Also: cubic decimeter dm^3

Dual

USMA: www.metric.org

CAMS, CMS

**What are these units
used to measure:**

**hour, minute second
 h, min, s**

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

energy of subatomic particles

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

mass of carbon-12 atom

Dual

USMA: www.metric.org

CAMS

**What is the name and symbol
for the SI unit of:**

length or distance (large)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

length (small)

Dual

USMA: www.metric.org

CAMS, CMS

**What is the name and symbol
for the SI unit of:**

volume (small)

In terms of other units?

Dual

USMA: www.metric.org

CAMS, CMS

dual - a

Dual

USMA: www.metric.org

CAMS, CMS

dual - a

Dual

USMA: www.metric.org

CAMS, CMS

dual - a

Dual

USMA: www.metric.org

CAMS, CMS

dual - a

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

kilometer km

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

atomic mass unit u

Dual

USMA: www.metric.org

CAMS

**What physical property does
this name and symbol represent?**

electronvolt eV

Dual

USMA: www.metric.org

CAMS

dual - b

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

milliliter mL

Also: cubic centimeter cm³

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property does
this name and symbol represent?**

millimeter mm

Dual

USMA: www.metric.org

CAMS, CMS

dual - b

Dual

USMA: www.metric.org

CAMS, CMS

dual - b

Dual

USMA: www.metric.org

CAMS, CMS

dual - b

Dual

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**inches
to
millimeters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**feet
to
meters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**yards
to
meters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**miles
to
kilometers?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**square feet
to
square meters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**square yards
to
square meters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**acres
to
hectares?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**teaspoons
to
milliliters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**tablespoons
to
milliliters?**

Question

USMA: www.metric.org

CAMS, CMS

Property: length or distance

**yards \times 1 \rightarrow meters (m)
or yards = meters (m)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: length or distance

**feet / 3 \rightarrow meters (m)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: length or distance

**inches \times 25 \rightarrow millimeters (mm)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: area

**square yards / 1.2 \rightarrow
square meters (m²)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: area

**square feet / 11 \rightarrow
square meters (m²)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: length or distance

**miles \times 1.6 \rightarrow kilometers (km)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

**tablespoons \times 15 \rightarrow
milliliters (mL)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

**teaspoons \times 5 \rightarrow
milliliters (mL)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: area

**acres / 2.5 \rightarrow hectares (ha)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**cups
to
liters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**quarts
to
liters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**gallons
to
liters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**ounces
to
grams?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**pounds
to
kilograms?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**tons
to
megagrams?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**ounces
to
newtons?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**pounds
to
newtons?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**degrees Fahrenheit
to
degrees Celsius?**

Question

USMA: www.metric.org

CAMS, CMS

Property: volume

gallons $\times 4 \rightarrow$ liters (L)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

quarts $\times 1 \rightarrow$ liters (L)
or quarts = liters (L)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

cups / 4 \rightarrow liters (L)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: mass

tons / 1.1 \rightarrow megagrams (Mg)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: mass

pounds / 2.2 \rightarrow kilograms (kg)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: mass

ounces $\times 28 \rightarrow$ grams (g)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: temperature

($^{\circ}\text{F} - 32$) $\times 5 / 9 \rightarrow$ $^{\circ}\text{C}$
(exact conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: force

pounds $\times 4.4 \rightarrow$ newtons (N)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

Property: force

ounces / 3.6 \rightarrow newtons (N)
(approximate conversion)

Answer

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**calories (food)
to
kilojoules?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**kilowatthours
to
megajoules?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**horsepower
to
watts?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**miles per hour
to
kilometers per hour?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**PSI
to
kilopascals?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**cubic inches
to
milliliters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**cubic feet
to
liters?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**BTUs
to
kilojoules?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**dekatherms
to
gigajoules?**

Question

USMA: www.metric.org

CAMS, CMS

Property: power

**horsepower $\times 750 \rightarrow$ watts (W)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: energy

**kilowatthours $\times 3.6 \rightarrow$
megajoules (MJ)
(exact conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: energy

**calories (food) $\times 4 \rightarrow$
kilojoules (kJ)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

**cubic inches $\times 16 \rightarrow$
milliliters (mL)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: pressure

**PSI $\times 7 \rightarrow$ kilopascals (kPa)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: speed

**MPH $\times 1.6 \rightarrow$
kilometers per hour (km/h)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: energy

**dekatherms $\times 1 \rightarrow$ gigajoules (GJ)
or dekatherms = gigajoules (GJ)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: energy

**BTUs $\times 1 \rightarrow$ kilojoules (kJ)
or BTUs = kilojoules (kJ)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

**cubic feet $\times 28 \rightarrow$ liters (L)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**knots
to
meters per second?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**inches Hg
to
pascals?**

Question

USMA: www.metric.org

CAMS, CMS

**When measuring temperature
differences, how are a degree
Celsius ($^{\circ}\text{C}$) and a
kelvin (K) related?**

Question

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**angular degrees
to
radians?**

Question

USMA: www.metric.org

CAMS

**What are we measuring, and what
are the conversion between:**

**liters
to/from
cubic meters?**

Question

USMA: www.metric.org

CAMS, CMS

**What are we measuring, and what
are the conversions between:**

**kilometers per hour
to/from
meters per second?**

Question

USMA: www.metric.org

CAMS, CMS

**What are we measuring, and what
are the conversions between:**

**millimeters to/from
centimeters to/from
meters to/from
kilometers?**

Question

USMA: www.metric.org

CAMS, CMS

**What are we measuring, and what
are the conversions between:**

**metric tons to/from
tonnes to/from
megagrams?**

Question

USMA: www.metric.org

CAMS, CMS

**What are we measuring, and what
are the conversions between:**

**square meters to/from
hectares to/from
square kilometers?**

Question

USMA: www.metric.org

CAMS, CMS

They are the same interval or span of temperature. A change of one degree Celsius (1 °C) is the same as a change of one kelvin (1 K).

Answer

USMA: www.metric.org

CAMS, CMS

Property: pressure

**inches Hg \times 3.4 \rightarrow
kilopascals (kPa)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: speed

**knots / 2 \rightarrow
meters per second (m/s)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: speed

**km/h / 3.6 \rightarrow m/s
m/s \times 3.6 \rightarrow km/h
(exact conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: volume

**liters / 1 000 \rightarrow m³
m³ \times 1 000 \rightarrow liters (L)
(exact conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: plane angle

**angular degrees / 57 \rightarrow
radians (rad)
(approximate conversion)**

Answer

USMA: www.metric.org

CAMS

Property: area

**square kilometer \times 100 \rightarrow hectare
hectare \times 10 000 \rightarrow square meter
km² \times 1 000 000 \rightarrow m²
(exact conversions)**

Answer

USMA: www.metric.org

CAMS, CMS

Property: mass

metric ton = tonne = megagram

Answer

USMA: www.metric.org

CAMS, CMS

Property: length or distance

**kilometer \times 1 000 \rightarrow meter
meter \times 100 \rightarrow centimeter
meter \times 1 000 \rightarrow millimeter
centimeter \times 10 \rightarrow millimeter**

Answer

USMA: www.metric.org

CAMS, CMS

**What physical property is involved,
and what is the conversion from:**

**degrees Celsius
to
kelvin?**

Question

USMA: www.metric.org

CAMS, CMS

**How is area shown
with a symbol?**

With a name?

Question

USMA: www.metric.org

CAMS, CMS

**How is volume shown
with a symbol?**

With a name?

Question

USMA: www.metric.org

CAMS, CMS

**What is the
capitalization rule
for names?**

For symbols?

Question

USMA: www.metric.org

CAMS, CMS

**Describe the
difference between
a “name” and
a “symbol”?**

Question

USMA: www.metric.org

CAMS, CMS

**When do you show
a number as a
fraction, such as $\frac{1}{2}$ or $\frac{3}{8}$?**

Question

USMA: www.metric.org

CAMS, CMS

**How do we group
digits in a long
number in the
metric system?**

Question

USMA: www.metric.org

CAMS, CMS

**When are periods used
with names?**

With symbols?

Question

USMA: www.metric.org

CAMS, CMS

**When do you make
a symbol plural?**

A name?

Question

USMA: www.metric.org

CAMS, CMS

With symbols use superscript 3:

m^3 , mm^3

**With names use "cubic":
cubic meter, cubic millimeter**

Answer

USMA: www.metric.org

CAMS, CMS

With symbols use superscript 2:

m^2 , mm^2

**With names use "square":
square meter, square millimeter**

Answer

USMA: www.metric.org

CAMS, CMS

Property: temperature

**degree Celsius - 273.15 → Kelvin
(exact conversion)**

Answer

USMA: www.metric.org

CAMS, CMS

**Never use fractions in the
metric system.**

Answer

USMA: www.metric.org

CAMS, CMS

**Name: where the unit name is
spelled out in the language and
alphabet of the user.**

**Symbol: internationally-accepted
symbol that does not vary with
different languages.**

Answer

USMA: www.metric.org

CAMS, CMS

**Names: capitalize at the start of
sentences, except always capitalize
Celsius.**

**Symbols: always use the
prescribed case; no exceptions.**

Answer

USMA: www.metric.org

CAMS, CMS

**Symbols: never make a unit
symbol plural.**

**Names: when the associated number
is greater than one (> 1).**

Answer

USMA: www.metric.org

CAMS, CMS

**For both names and symbols
use a period only at the end
of a sentence.**

Answer

USMA: www.metric.org

CAMS, CMS

**Group five or more digits into
groups of three with a space
(optionally group four or more digits)**

12 235.678 901

1234.567 89

Answer

USMA: www.metric.org

CAMS, CMS

What four prefixes should not be used in technical work?

Question

USMA: www.metric.org

CAMS, CMS

With compound units, where do you add a necessary prefix?

Question

USMA: www.metric.org

CAMS, CMS

How do you select which prefix to use?

Question

USMA: www.metric.org

CAMS, CMS

How do you show a product (multiplication) with a unit name?

A symbol?

Question

USMA: www.metric.org

CAMS, CMS

How do you show a quotient (division) with a unit symbol?

A name?

Question

USMA: www.metric.org

CAMS, CMS

What is the rule for spaces between a number and its unit name?

Its symbol?

Question

USMA: www.metric.org

CAMS, CMS

When do you spell out a number used with a unit name?

Used with a symbol?

Question

USMA: www.metric.org

CAMS, CMS

What three units of measure should not be used in technical work?

Question

USMA: www.metric.org

CAMS, CMS

What units of measure have identical names in the singular and plural?

Identical symbols?

Question

USMA: www.metric.org

CAMS, CMS

Select a prefix to keep the number ≥ 0.1 and < 1000 .

(Not necessary in intermediate calculations, and sometimes ignored in non-technical work.)

Answer

USMA: www.metric.org

CAMS, CMS

Add the prefix to the first unit name or symbol.

(Except kilogram (kg) can appear after the first name or symbol.)

Answer

USMA: www.metric.org

CAMS, CMS

hecto (100)	h
deka (10)	da
deci (0.1)	d
centi (0.01)	c

Answer

USMA: www.metric.org

CAMS, CMS

**For both names and symbols:
one space between the number
and the name or symbol:
27 mm, 18 °C**

Answer

USMA: www.metric.org

CAMS, CMS

**Symbols: use a solidus (slash):
m/s**

**Names: use "per":
meter per second**

Answer

USMA: www.metric.org

CAMS, CMS

**Names: use a hyphen or space:
newton-meter**

**Symbols: use a raised dot or space:
N • m**

Answer

USMA: www.metric.org

CAMS, CMS

**Names:
lux, hertz, siemens**

**Symbols:
all of them!**

Answer

USMA: www.metric.org

CAMS, CMS

**hectare (use m^2 or km^2)
kilometer per hour (use m/s)
metric ton or tonne (use Mg)**

Answer

USMA: www.metric.org

CAMS, CMS

**Names: integers < 100
(integer means no fractional part)**

Symbols: never

Answer

USMA: www.metric.org

CAMS, CMS

Converting from a larger to a smaller unit makes the number larger or smaller?

Question

USMA: www.metric.org

CAMS, CMS

Converting from a smaller to a larger unit makes the number larger or smaller?

Question

USMA: www.metric.org

CAMS, CMS

What does the symbol “SI” represent?

Question

USMA: www.metric.org

CAMS, CMS

Estimate the diameter of a:
marble
golf ball
baseball
basketball

Question

USMA: www.metric.org

CAMS, CMS

Estimate the mass of a:
nickel (coin)
tennis shoe
hardback book
dining room chair

Question

USMA: www.metric.org

CAMS, CMS

What are the seven “base” units in SI?

Question

USMA: www.metric.org

CAMS, CMS

What is the difference between:
base units
derived units with names
derived units w/o names
allowed units
temporary units
deprecated units

Question

USMA: www.metric.org

CAMS

Give two examples of each:
base units
derived units with names
derived units w/o names
allowed units
temporary units
deprecated units

Question

USMA: www.metric.org

CAMS

In SI units, what are each of these (approximately) for water:
density
freezing temperature
boiling temperature

Question

USMA: www.metric.org

CAMS

**The symbol for the modern
metric system, from the French
Système International d'Unités,
(International System of Units)**

Answer

USMA: www.metric.org

CAMS, CMS

Smaller

Answer

USMA: www.metric.org

CAMS, CMS

Larger

Answer

USMA: www.metric.org

CAMS, CMS

**kilogram (kg), mass
meter (m), length
second (s), time
ampere (A), electrical current
kelvin (K), temperature
candela (cd), luminous intensity
mole (mol), amount of substance**

Answer

USMA: www.metric.org

CAMS, CMS

**nickel: 5 g
tennis shoe: 200 g
hardback book: 800 g
chair: 3 kg**

Answer

USMA: www.metric.org

CAMS, CMS

**marble: 10 mm
golf ball: 40 mm
baseball: 70 mm
basketball: 300 mm**

Answer

USMA: www.metric.org

CAMS, CMS

**Density: 1 g per mL or
1 kg per L
Freezing: 0 °C
Boiling: 100 °C**

Answer

USMA: www.metric.org

CAMS

**base: kg, m
derived w/names: W, J
w/o names: m/s, N•m
allowed: liter, minute
temporary: hectare, knot
deprecated: calorie, micron**

Answer

USMA: www.metric.org

CAMS

**base: seven fundamental unit
derived w/names: have special names
w/o names: use base or derived units
allowed: others that can be used
temporary: use for the time being
deprecated: should not be used**

Answer

USMA: www.metric.org

CAMS