

Name: _____

Section: _____

Practice with the Metric System

The chart below highlights the prefixes that may precede a variety of units in the metric system. The prefixes, along with the accompanying information show how the metric system is based on multiples of ten.

<u>Symbol</u>	<u>Prefix</u>	<u>Numerical Expression</u>	<u>Factor</u>
T	tera-	1 000 000 000 000	10^{12}
G	giga-	1 000 000 000	10^9
M	mega-	1 000 000	10^6
k	kilo-	1 000	10^3
h	hecto-	100	10^2
da	dek(c)a	10	10^1
NO PREFIX (UNIT)		1	10^0
d	deci-	0.1	10^{-1}
c	centi-	0.01	10^{-2}
m	milli-	0.001	10^{-3}
μ	micro-	0.000001	10^{-6}
n	nano-	0.000000001	10^{-9}

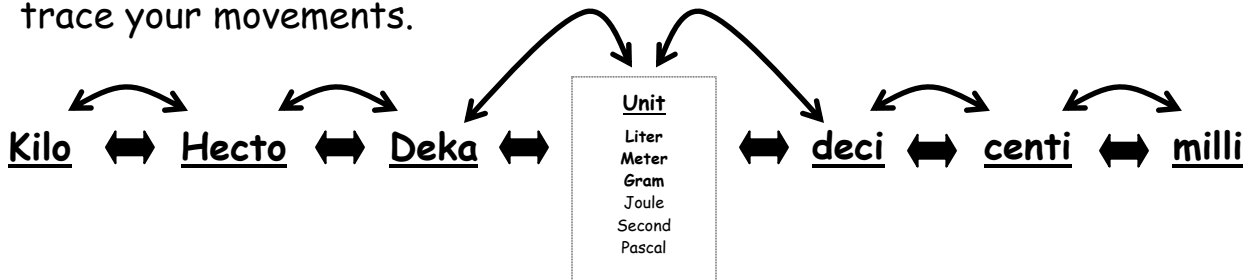
The chart below lists common base units used in the metric system. These units typically follow the prefixes highlighted above.

<u>Units</u>	<u>Symbol</u>	<u>Used to Measure:</u>
liter	L	volume
meter	m	distance/length
gram	g	mass (weight)
Joule	J	energy
second	s	time
Pascal	Pa	pressure

Part 1 - Directions: Look at the symbol/abbreviation in the first column and list the prefix and unit that compose it.

Symbol	Prefix	Unit
mm		
kg		
hs		
cm		
mL		
g		
μm		
kJ		
L		
hm		
dL		
kPa		
ng		
m		
daL		
Mg		
J		
Tm		
s		
GJ		

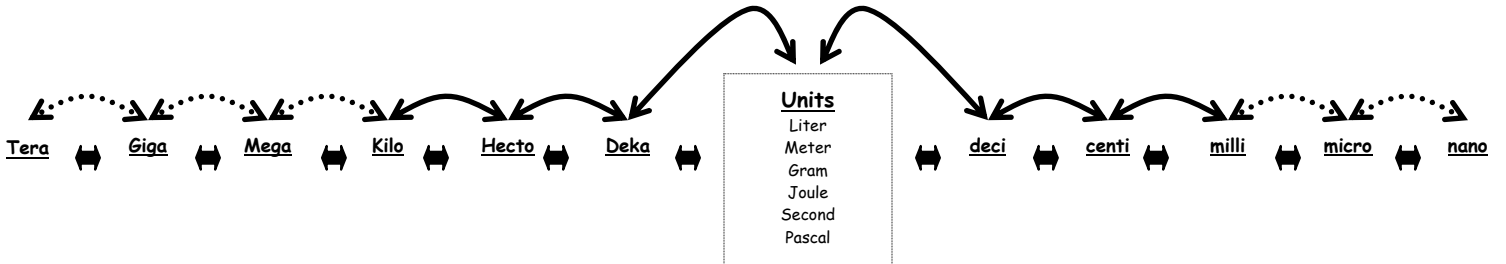
Part 2 - Directions: Use the "metric map" below to complete the table below. It is recommended that you write on the map to trace your movements.



indicates that there is a difference of only one step/decimal place to get from one prefix to the next.

Starting Symbol	Ending Symbol	Direction (right or left)	# of Steps
cm	km		
ms	s		
KJ	J		
g	kg		
hm	km		
dag	dg		
mL	L		
kPa	Pa		
kg	dg		
L	cL		
J	mJ		
KL	hL		
mg	kg		
m	dm		
ks	ms		

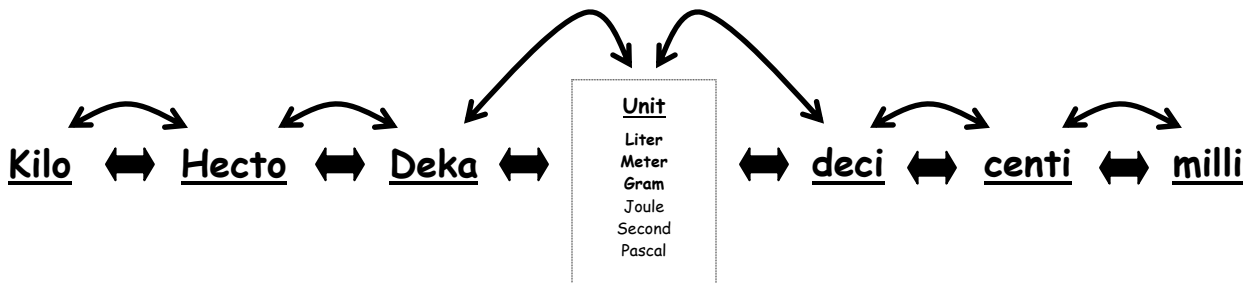
Part 3 - Directions: - Use the extended "metric map" to complete the table below. It is recommended that you write on the map to trace your movements. Be sure to take into account the difference between the arrows with solid lines versus those with dotted ones.



indicates that there is a difference of three steps/decimal places to get from one prefix to the next.
 indicates that there is a difference of only one step/decimal place to get from one prefix to the next.

Starting Symbol	Ending Symbol	Direction (right or left)	# of Steps
Mg	g		
Ts	ns		
GJ	J		
g	μg		
km	Mm		
kPa	nPa		
μg	ng		
ns	ms		
hL	μL		
Tm	m		
g	Gg		
daJ	MJ		
μs	ds		

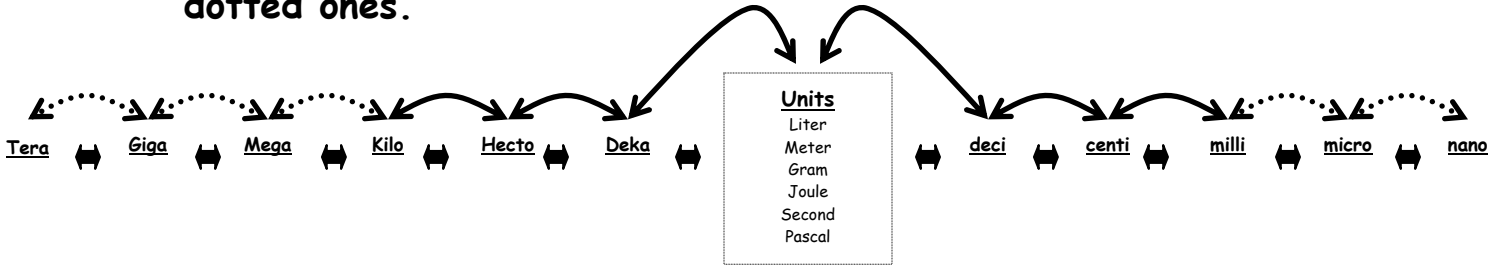
Part 4 - Directions: Use the "metric map" to make the necessary conversions below.



indicates that there is a difference of only one step/decimal place to get from one prefix to the next.

Starting Value	Converted Value
6.0 mm	cm
576,999 ms	s
0.0075 kg	mg
1,855 cL	hL
435 kPa	Pa
0.0000035 hs	ms
350,000,000 mJ	kJ
12 dag	g
72.5 km	m
3,123.67 L	mL
0.632 ks	s
0.09543 dg	hg
1.5 Pa	mPa
1,600 m	km
0.7654 kJ	J

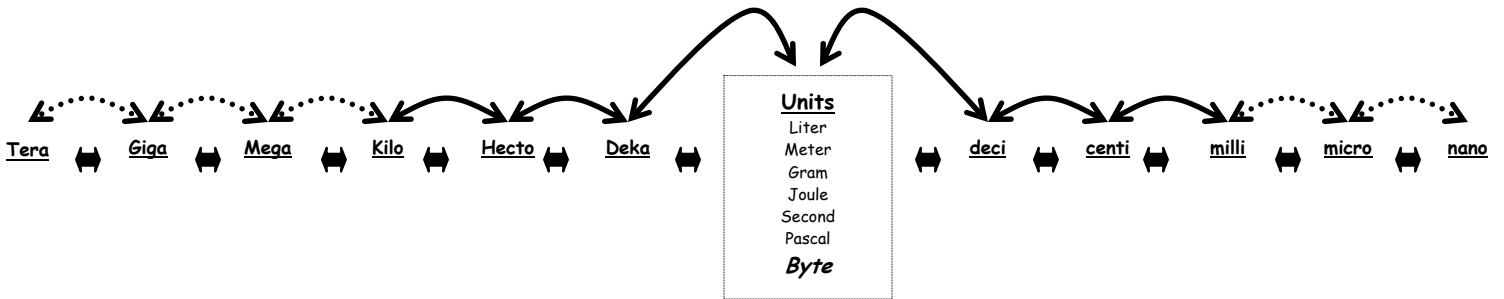
Part 5 - Directions: - Use the extended "metric map" to make the necessary conversions below. Be sure to take into account the difference between the arrows with solid lines versus those with dotted ones.



indicates that there is a difference of three steps/decimal places to get from one prefix to the next.
 indicates that there is a difference of only one step/decimal place to get from one prefix to the next.

Starting Value	Converted Value
500,000,000 ns	s
761.35 μ L	mL
0.098 Gg	g
0.00032 hm	nm
1.6 MJ	J
987,123.54 m	Tm
0.004 kg	Mg
69.78 nL	dL
5.496 hs	μ s
0.00000056 TJ	cJ
3,838.1 GPa	TPa
9.9 L	nL
849,000 Dag	Mg
571.78 ns	Ts

Part 6 - Directions: - Use the extended "metric map" to make the necessary conversions for the challenging problems below.



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1. Kristen has 7.5 mL of water and her lab partner Rebecca has 2.3 L. **How many total microliters do they have?**

2. Bobby, Tim, and Jesse were trying to figure out the volume of a rectangular block. Since they were working in a group, they wanted to share the measurement responsibilities; so, Bobby decided to measure the length, while Tim would measure the height, and Jesse the width. Since the rectangular block was large they used a meter stick to make the length measurements. Unfortunately, they all did not use the same units. Their measurements are:
 - Bobby - 0.93 m
 - Tim - 15 mm
 - Jesse - 7.5 cm

What would be the volume of the rectangular block in cm^3 ?

3. Which of the following is less than 527 m?

- a. 0.000699 Mm
- b. 914,879,808,710 nm
- c. 51,723 cm

4. A byte is not an official SI unit, but it is often used to describe digital information as if it were a metric unit. For example, you may have an iPod that can accommodate 8 gigabytes of music. If you and your friends combine the information capacity of all of your iPods and an external hard drive, **how many songs would you have if the average file size is 4,000 kb?** The capacity of the iPods and the external hard drive is listed below.

- iPod Nano - 8 gigabytes
- iPod Nano - 16 gigabytes
- iPod Shuffle - 2 gigabytes
- iPod Classic - 160 gigabytes
- iPod Touch - 64 gigabytes
- External Hard drive - 1 terabyte