



# Dimensional Analysis/Metric System Mini Lesson

Physics/Chemistry Essentials



# Money

- Have you ever been to a foreign country?
- One of the most important things to do when visiting another country is to exchange currency.
- For example, one United States dollar equals 1535.10 Lebanese Pounds.



State the same measurement in two different units

length



10.0 in.



25.4 cm



# What is Dimensional Analysis?

- We can express length in inches and centimeters
- We can express money in American dollars or Lebanese pounds

**In dimensional analysis we are converting between one unit and another using conversion factors.**

# Conversion Factors

10 in = 25.4 cm

\$1 = 1535.1 Lebanese Pounds

Can you think of any others?

# Conversion Factors

Should always be written as fractions...

60 minutes = 1 hour

60 minutes

**OR**

1 hour

1 hour

60 minutes

# Using Conversion Factors

**You spend 7 hours in school. How many minutes do you spend in school?**

- 1) Circle what you starting with.
- 2) Underline what you are converting to.
- 3) Write down your conversion factor you will use.
- 4) Set up your problem. "Starting with" first, then conversion factor. (Bridge)
- 5) Make sure your units cancel.
- 6) Circle your final unit.
- 7) Solve!

**You just did Dimensional Analysis!**

# Practice Makes Perfect!

**I run 5 miles. How many km did I run?**

- 1) Circle what you starting with.
- 2) Underline what you are converting to.
- 3) Write down your conversion factor you will use.
- 4) Set up your problem. Starting with x conversion factor.
- 5) Make sure your units cancel.
- 6) Circle your final unit.
- 7) Solve!



# Practice Makes Perfect

**Write your age in years: \_\_\_\_\_ How old are you in days?**

- 1) Circle what you starting with.
- 2) Underline what you are converting to.
- 3) Write down your conversion factor you will use.
- 4) Set up your problem. Starting with x conversion factor.
- 5) Make sure your units cancel.
- 6) Circle your final unit.
- 7) Solve!

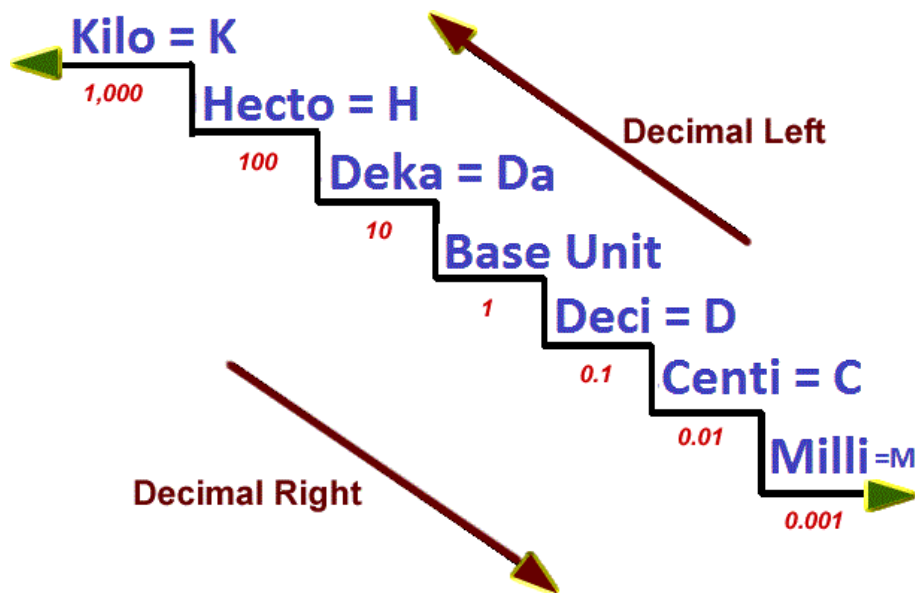
# Practice on your own

- 1) You walk 5.5 miles in one day. How many km did you walk? (1 mile = 1.61 km)
- 2) You buy 10 packages of gum. There are 12 pieces in each package. How many pieces of gum do you have?
- 3) I have 24 ounces of water in coffee cup. How many grams of water do I have? (0.0353 ounce = 1 gram)

## **Multi Step...**

- 4) Write your age in years: \_\_\_\_\_ How old are you in minutes? (Hint: convert to days, convert to minutes)

# Base of Tens



# Metric System Prefixes

Prefix	Symbol	Multiplier	
tera	T	$10^{12}$	1,000,000,000,000
giga	G	$10^9$	1,000,000,000
mega	M	$10^6$	1,000,000
kilo	k	$10^3$	1,000
hecto	h	$10^2$	100
deka	da	$10^1$	10
deci	d	$10^{-1}$	0.1
centi	c	$10^{-2}$	0.01
milli	m	$10^{-3}$	0.001
micro	$\mu$	$10^{-6}$	0.000,001
nano	n	$10^{-9}$	0.000,000,001
pico micro micro	p $\mu\mu$	$10^{-12}$	0.000,000,000,001

# How to Convert

- 1) Show the decimal. Add zeros if you need to.
- 2) Find the unit you are starting with on the stairs.
- 3) Count the number of spaces to the unit you are converting to.
- 4) Determine what way you are moving the decimal.
- 5) Create your new number and unit.

1000 meters = \_\_\_\_\_ km

0.0006 kg = \_\_\_\_\_ g

100 cL = \_\_\_\_\_ L