Welcome to all the new pre-AICE biology freshman. This will be a very busy learning year. You will now be competing on a worldwide level. Since all scientists use SI measurements { the United States is the only country using "British pound/foot" system}, we must be able to work with the metric prefixes.

If you have questions you may contact me: portiawc@leeschools.net I will be happy to help.

Pre-AICE biology students are to ***study*** and be able to convert using metric prefixes. The **FIRST GRADE** for the year will be a **quiz** on this information, possibly the first week of school. **This is not homework and will not be collected. It is for your practice only.** You must learn it well enough to use it on quizzes and tests throughout the year.

You will **never** be asked to convert between the 2 systems.

****Each student must have:** the 3" binder with a biology section divided to notes, and returned papers and tests. These will be checked each Friday for a grade throughout the year, also homework will only count if, it is in, its proper place in the binder. Lehigh Cambridge does **NOT** allow late work so helping students to keep all work, in one place, is the goal.

There are no chapter tests in Cambridge biology the information accumulates through the year. The Florida EOC is required for this class also.

AND a ***graph paper*** composition lab record book (used in Cambridge science classes 4 years) NOT SPIRAL OR TEAR OUT

The essence of metric to metric conversions is recognizing the abbreviated **base units**.
Base Units: m (meter), L (liter), g (gram), s (seconds)

These are not all of the base units, but are the most common that you will encounter. Each base unit can have any of the prefixes listed in the chart below. As with any other prefix, the prefix means the same thing regardless of the abbreviated base unit it is attached to.

Giga (G)---------- it takes 10^9 (billion) base units = 1 G
Mega (M)--------- it takes 10^6 (million) base units = 1 M
Kilo (K)---------- it takes 1000 base units = 1 K these are larger than the base units
Hecto (H)--------- it takes 100 base units = 1 H
Decka (Da)------- it takes 10 base units = 1 Da
Base Units: m, L, g, s (meter~length, Liter~volume, gram~weight, second~time)
Deci (d)---------- it takes 1 base unit = 10 deci
Centi (c)---------- it takes 1 base unit = 100 centi
these are smaller than base
Milli (m)---------- it takes 1 base unit = 1000 milli units
Micro (μ)--------- it takes 1 base unit = 10^6 (million) micro
Nano (n)------ it takes 1 base unit = 10^9 (billion) nano

There are two ways to work metric to metric conversions. The first way is to do the math by using the numerical conversion relationships listed in the chart above.

Ex: Convert 35 μg to g. $= 35\ \mu g \times \frac{1\ g}{1{,}000\ \mu g} = 0.000035\ g$

The other way is to count the lines in the chart (steps up or down) (every line except the one you start on), start from your given information and counting **each line** until you get to what you want to convert. ***YOU WILL NOT HAVE THE CHART FOR TESTS AND QUIZZES!!***
Ex: Convert 35 μg to g.
Begin at prefix μ (micro) and count UP to g (gram). You counted UP six places, therefore you move the decimal to the LEFT six places. If your decimal is not shown, it is *understood* to be at the end of the number.
35. μg = 0.000035 g

Ex: Convert 0.26 ML to mL
Begin at prefix M (mega) and count DOWN to prefix m (milli). You counted DOWN nine places, therefore, you move the decimal to the RIGHT nine places. So, you will add seven zeros.
0.26 ML = 260,000,000. mL

Make the following conversions:

1) 170.4 m =_____ cm

2) 564 Dag =_____ g
3) 58 dg =_____ mg
4) 600 L =_____ KL
5) 0.0923 Km =_____ mm
6) 49 Hg =_____ g

7) 210 cL =_____ dL
8) 4510 μL =_____ mL
9) 45700 cg =_____ Kg
10) 24.6 KL =_____ μL

Metric Units of Measure: below are some examples of what you will be expected to do. They are for practice purposes only and will not be collected

1 centimeter (cm)	=	10 millimeters (mm)
1 decimeter (dm)	=	100 millimeters
or	=	10 centimeters
1 meter (m)	=	1,000 millimeters
or	=	100 centimeters
Or	=	10 decimeters
1 dekameter (dam)	=	10,000 millimeters
Or	=	1,000 centimeters
Or	=	100 decimeters
Or	=	10 meters
1 hectometer (hm)	=	100,000 millimeters
Or	=	10,000 centimeters
Or	=	1,000 decimeters
Or	=	100 meters
Or	=	10 dekameters
1 kilometer (km)	=	1,000,000 millimeters
Or	=	100,000 centimeters
Or	=	10,000 decimeters
or	=	1,000 meters
or	=	100 dekameters
or	=	10 hectometers

Area

1 square centimeter (cm2)	=	100 square millimeters (mm2)
1 square decimeter (dm2)	=	100 square centimeter (cm2)
1 square meter (m2)	=	10,000 square centimeters
	=	100 square decimeters

Volume

1 cubic centimeter (cm3)	=	1,000 cubic millimeters (mm3)
1 cubic decimeter (dm3)	=	1,000 cubic decimeters

Capacity

1 liter (L)	=	1,000 milliliters (mL)
	=	1 cubic decimeter (dm3)

Mass

1 gram (g)	=	1,000 milligrams
1 kilogram (kg)	=	1,000 grams
1 metric ton (t)	=	1,000 kilograms
1 cubic centimeter (cm3)	=	holds 1 milliliter of water that has a mass of 1 gram

The prefixes are used with any unit (meter, liter, gram) these are designated as 1, and the others are some multiple of 10

Metrics eliminates fractions! **Go Metrics**

There are many helpful web sites like: http://learner.org/interactives/metric/metric.html

Students should ***memorize*** the prefixes given, and should be able to calculate equivalencies from nanometers to kilometers with the decimal differences. You will not be doing pounds/foot to metric.

THIS IS NOT TO BE TURNED IN IT IS JUST PRACTICE. CAN YOU DO THIS **WITHOUT** A CHART?

Example:
30 m = ____ cm 30 m = 3,000 cm ____ m = 250 dm 25 m = 250 dm

1.	40 ml = _____ L	2.		5000 L = _____ kl	3.		8 g = _____ kg
4.	12000 L = _____ kl	5.		50 mg = _____ g	6.		6000 m = _____ km
7.	200 kg = _____ g	8.		10000 g = _____ kg	9.		500 ml = _____ L
10.	1 L = _____ ml	11.		4000 L = _____ kl	12.		400 cm = _____ m
13.	20 ml = _____ kl	14.		7000 ml = _____ L	15.		7 cm = _____ mm
16.	9000 L = _____ ml	17.		6 m = _____ mm	18.		1000 cm = _____ m

INDICATE GREATER THAN OR LESS THAN copy each set and indicate with < or >

12.	4 L	_____	517 cl	13.	566 kg	_____	5366 g
14.	795 cg	_____	17 g	15.	17 kl	_____	88 L
16.	42205 cm	_____	4566 km	17.	889 g	_____	49 kg
18.	10 L	_____	101 kl	19.	57 cm	_____	29 m
9.	8 g	_____	30 cg	10.	107 km	_____	557 m
20.	3493 g	_____	507 kg	21.	22 g	_____	224 cg
22.	349 kl	_____	3271 L	23.	13 m	_____	100 mm
24.	2494 m	_____	837 km	25.	40826 cg	_____	3488 kg
26.	38 ml	_____	7 cl	27.	70 mg	_____	12 kg
28.	5 cm	_____	31 mm	29.	515 km	_____	895 m
30.	2362 L	_____	669 kl	31.	15 kg	_____	114 g

Scientific notation:

32. 10^1 = **35.** 10^2 = **38.** 10^3 =

33. 10^4 =

39. 10^{-2} =

37. 10^{-4} =

36. 10^{-1} =

34. 10^{-3} =

40. 10^{5} =

45. Ethan lives at one end of Park Avenue. Brian lives at the other end of the avenue. It is 5.8 kilometers from one end of Park Avenue to the other. If Ethan walks 2.79 kilometers toward Brian's house, how many meters does he have to walk to get there?

46. We are driving to Las Vegas. The sign says that it is one hundred forty-five kilometers to Las Vegas. How many meters is it to Las Vegas?

47. The miller wants to bake a loaf of bread, but he didn't have any flour. He decided he would grind just enough for eighteen loaves. If it takes one and three-fourths kilograms of flour for two loafs, how much flour will he need?

48. Aaron and Noah wanted to have a contest to see which of their paper airplanes could fly the longest distance. Aaron's plane flew four meters. Noah's plane only flew seventy-nine centimeters. How much further did Aaron's plane fly?

49. A young child has a mass of 40 kg. What is the mass of the child in grams

50. A big movie has a running time of 96 minutes. What is the movie's running time in seconds?

The syllabus for this class IGCSE Biology is available on the Cambridge website. CIE.UK

I LOOK FORWARD TO MEETING YOU ALL IN AUGUST!