**Student’s Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** BIOLOGY: METRIC CONVERSION HOMEWORK

**Instructions:**

These equations are designed to give students practice converting within the metric system and between the metric and English systems. Many equations use units that cell biologists use in the laboratory.

Complete the mathematical conversions below. ***Be sure to show all steps in your mathematics.* You must show detailed math calculations for ALL your answers, even simple ones and not just the formulas. *\*\*\* A significant deduction of points will be made in your score if you do not include clear calculations*.**

Use and cite outside scientific references to find conversion factors you may not already have. ***Write your references at the bottom of the last page. \*\*\* A deduction will be made if your references are missing*.**

**\*\*\* Assignments submitted with handwriting are not acceptable.** – ***Any changes to the instructions for an assignment must be consulted with your instructor and approved by your instructor before submitting your assignment***. Handwriting in your assignments is not acceptable for important reasons. All lab assignments must be submitted exactly in their original format, which is **“Word”** and this means using the word processor and its tools to type your assignment. Typing simple math calculations is not as difficult as it may seem. If we allow a student to do an assignment in handwriting, we must do it for all students, as any exceptions to the policies or requirements must be made available to all students. This may bring an inconvenient situation since not everybody has clear, easy to read handwriting, photographed or scanned documents may not be as clear as a typed, Word document, and it would make grading more time-consuming and difficult. Please remember that instructors frequently have multiple classes with many students as well as other responsibilities and we want to grade the work of all students on a timely manner. We need the cooperation of the students in following instructions and submitting work that is completely clear in order to be able to grade their work within a reasonable time frame. – Thank you!

Use this chart as a starting point.



Source: Creative Commons: [http://rushartsbiology.wikispaces.com/Visuals+-+Unit+1](http://rushartsbiology.wikispaces.com/Visuals%2B-%2BUnit%2B1)

1. **Length \*\*\* Remember to show your calculations clearly next to your answers, even the simplest calculations must be shown, not just the formulas!**
2. 1 meter = 100 cm 1=x/100=1x100=100cm
3. 100 mm = 100,000μm 100mm=x/1000=100x1000=100,000
4. 5.4 μm =.0000054m 5.4 μm = m/1e-06=5.4x5.4e-6=.0000054
5. 3.2 inches = 81.28mm in x 25.4mm=3.2inx 25.4mm= 81.28
6. 435 mm = 1.4271feet mm x .0032808 = 435 x .0032808 = 1.4271
7. 100 mm = 3.9370inches mm x .039370 = 3.9370
8. 20 μm = .000787402inches μm x 3.9370079e-05 = 20 x 3.9370079e-05= .000787402
9. 5.5 in = 13.97cm in x 2.54 = 5.5 x 2.54 = 13.97
10. **Weight \*\*\* Remember to show your calculations clearly next to your answers!**
11. 1 kg = 1000g g=kg/.001 = 1kg= 1,000
12. 300 ng = .0003mg mg= ng/.000001= .0003
13. 55 μg = .000055g μg=g/1e-06= 55 μg= .000055
14. 600 ng = 600,000μg ng= 1000 x μg = 600,000 μg
15. 7 ½ pounds = 3.4kg kg= lb/2.2046= 7.5/2.2046 = 3.4
16. 8 oz = 226796.2mg mg= oz/3.527392e-05= 8/3.5273962e-05= 226796.2
17. 0.5 oz = 1.417476e+7μg μg= 2.834952e+7= .5 x 2.834952e+7= 1.417476e+7
18. 535 μg = \_\_\_\_\_\_\_\_\_\_\_ fg
19. **Volume \*\*\* Remember to show your calculations clearly next to your answers!**
20. 100 mL = \_\_\_\_\_\_\_\_\_\_\_ Liters
21. 0.3 L = \_\_\_\_\_\_\_\_\_\_\_\_\_ mL
22. 450 μL = \_\_\_\_\_\_\_\_\_\_\_\_ mL
23. 3.0 Tbsp = \_\_\_\_\_\_\_\_\_\_\_ tsp
24. 2.5 gallon = \_\_\_\_\_\_\_\_\_\_ L
25. 0.75 L = \_\_\_\_\_\_\_\_\_\_\_\_\_ Tbsp
26. 1750 μL = \_\_\_\_\_\_\_\_\_\_\_ tsp
27. 0.450 mL = \_\_\_\_\_\_\_\_\_\_ μL
28. 2 tsp = \_\_\_\_\_\_\_\_\_\_\_\_\_ mL
29. **Temperature \*\*\* Remember to show your calculations clearly next to your answers!**
30. 75 °F = \_\_\_\_\_\_\_\_\_\_\_\_\_ °C
31. 37 °C = \_\_\_\_\_\_\_\_\_\_\_\_\_ °F
32. 37 °C = \_\_\_\_\_\_\_\_\_\_\_\_\_ °K
33. 2 °C = \_\_\_\_\_\_\_\_\_\_\_\_\_ °F
34. **-**30 °F =\_\_\_\_\_\_\_\_\_\_\_\_ °C
35. 300 °K = \_\_\_\_\_\_\_\_\_\_\_\_\_°F
36. 212 °F \_\_\_\_\_\_\_\_\_\_\_\_\_\_ °C
37. 96 °C = \_\_\_\_\_\_\_\_\_\_\_\_\_ °F
38. 162 °F = \_\_\_\_\_\_\_\_\_\_\_\_\_ °C
39. 17.7 °C = \_\_\_\_\_\_\_\_\_\_\_\_ °F

**LIST OF REFERENCES – Write at least three scientific references below in APA format.**

***Example*:** Science Made Simple, Inc. (n.d.) *Metric conversions & US customary unit conversion calculator*. Retrieved from <http://www.sciencemadesimple.com/conversions.html>

**EXAMPLES OF MEASUREMENT CONVERSIONS**

1. **Note that in some cases when it is convenient, your calculations and answers can be expressed in scientific notation.**
2. **\*\*\* Your calculations should be completely clear and look similar to these examples.**

**EXAMPLE 1 – Length**

**Problem:** **33 mm = \_\_\_\_?\_\_\_\_ inches**

# Conversion factors or units: 1 mm = 0.0393701 inch

**Calculation: 33 mm** × **0.0393701 inch = 1.2992 inches**

**ANSWER: 33 mm = \_\_\_1.2992\_\_\_ inches – Note that we can round the result to 1.30 inches.**

**EXAMPLE 2 – Weight**

**Problem:** **500 ng = \_\_\_\_?\_\_\_\_ mg**

# Conversion factors or units: nano = 10—9; milli = 10--3; 1 ng = 1 × 10--6 mg, or 0.000001 mg

**Calculation: (500 ng) × 0.000001 mg = 0.0005 mg = 5 × 10--4 mg**

 **1 ng**

**ANSWER: 500 ng = \_\_\_0.0005\_\_\_ mg = 5 × 10--4 mg**

**EXAMPLE 3 – Temperature**

**Problem:** **25 °C = \_\_\_\_?\_\_\_\_ °F**

**Conversion factors or units: °F = (°C × 9/5) + 32 (Note: 9/5 is equal to 1.8)**

**Calculation: °F = (25°C × 9/5) + 32**

**ANSWER: 25 °C = \_\_\_77 \_\_\_ °F**