

Name: _____

Date: _____

Block: _____

UNIT CONVERSIONS TUTORIAL (LIFE SCIENCES 11)

1. Determine a conversion factor between your units.

Examples: ____ mm = ____ cm

____ μm = ____ nm

____ km = _____ cm

Multiplication Factor	Prefix	Symbol
1,000,000,000 = 10^9	giga	G
1,000,000 = 10^6	mega	M
1,000 = 10^3	kilo	k
100 = 10^2	hecto	h
1 = 1		
0.01 = 10^{-2}	centi	c
0.001 = 10^{-3}	milli	m
0.000001 = 10^{-6}	micro	μ
0.000000001 = 10^{-9}	nano	n

2. Write your conversion factor as a fraction, with the desired unit on top and old unit on bottom.

3. Multiply by the top part of the fraction and divide by the bottom part of the fraction. Express your answer with the new unit.

Example 1: Convert 79 mm to cm.

Example 2: Convert 540 nm to μm.

Practice:

a) 22 cm to mm

b) 1580 cm to m

c) 58,960,000 nm to mm

d) 0.0065 μm to nm

e) 28 μm to mm

f) 0.00003 m to nm

g) 600 nm to μm

h) 22,451 mm to μm

i) 890 mm to m

TOTAL MAGNIFICATION

- Default magnifications (memorize!):
 - Eyepiece = 10x
 - Low objective = 4x
 - Medium objective = 10x
 - High objective = 40x
 - Oil immersion = 100x
- Compound microscopes have two lenses working together.
- To calculate the **total magnification** of a compound microscope, you must **multiply** the eyepiece magnification with the objective magnification.

Example 1: Calculate the total magnification of a compound microscope with a 15x eyepiece and a 40x objective.

Example 2: Calculate the total magnification of a compound microscope on medium power.

Example 3: Calculate the total magnification of a compound microscope on high power.

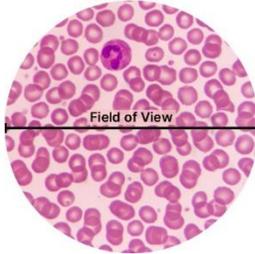
EYEPIECE

Every eyepiece has two values:

Magnification (of eyepiece lens only)

Field number:

- The *actual* diameter of the circle being viewed
- In millimeters (mm)

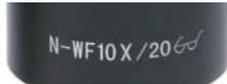


FIELD OF VIEW CALCULATIONS

Field of View: diameter of observable area when looking through a compound microscope

$$\text{field of view} = \frac{\text{field number}}{\text{objective magnification}}$$

Example 1: Calculate the field of view on high power objective.



Example 2: Calculate the field of view on low power objective.



Example 3: Calculate the field of view using an oil immersion lens (100x magnification). Convert your answer to micrometers.



Specimen Size: Daphnia

This is a water flea (*Daphnia magna*) on low power. If the eyepiece field number is 16mm, determine the length of the flea.



Specimen Size: Euglena

Euglena is a unicellular, eukaryotic, photosynthetic organism. It moves by rotating its whiplike flagellum.

This image was taken using a 10x objective lens and the eyepiece shown. Calculate the length of the labelled individual. Express your answer in micrometers.