Key

Microscope Worksheet:

Calculating Magnification. Converting Measurements, Estimating cell size, Calculating Field of View & Magnification Problems

1. Calculate total magnification: Ocular x Objective

Ocular	Objective	Total Magnification
10X	4X	40X
15X	10X	150X
5X	12X	60X
10X	10X	100X
10X	40X	400X

2. What are the possible magnifications of a microscope with an ocular marked 10X and objectives marked 5X, 15X, 30X and 60X?

50X, 150X, 300X, 600X

3. Convert the following measurements:
   a. 9.2 mm = ___9200___ µm
   b. 5900 µm = ___5.9___ mm
   c. 0.083 mm = ___83___ µm
   d. 61000 µm= ___61___ mm

4. Estimating cell size: Divide the field of view by the number of cells that occupy the diameter.
   a. The field of view is 2500um. If a cell takes up 1/5 of the field of view, how long is the cell?
      Estimated size = 2500um/5 cells = 500um
   b. A student counts 50 cells across the diameter of the field of view, and there are 70 rows of cells. If the diameter of the field of view is 3500 µm, what is the length and width of the cells?

      Length = 3500um/50 = 70um

5. Calculate the field of view (Field Diameter):

   a. Low power: 4X = 4500 µm = ___4.5___ mm
   b. Medium power: 10X = ___1800___ µm = ___1.8___ mm
   c. High Power: 40X = ___450___ µm = ___0.45___ mm

8. The diagrams below represent what can be seen through an imaginary microscope. You have been given information along with the diagrams. Using the information provided, calculate the size of the objects viewed.

a) This triangicium is being viewed under medium power.

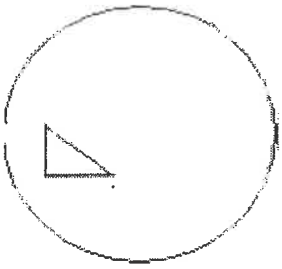
low power objective = 4X

medium power objective = 10X

high power objective = 40X

eyepiece = 5X

low power FOV = 4.2 mm = 4200um



a) Calculate Size of Medium F. of V.

$\frac{\text{L.R Mag}}{\text{M.P. Mag}} \times \frac{\text{L.P. Field of View}}{1} = \frac{4}{10} \times \frac{4200}{1} = \frac{16800}{10}$

$= 1680\text{um}$

b) Calculate Size of Object (Longest Way)

$\text{Size} = \frac{\text{F of V}}{\#\text{across}}$

If you think 3 fit → $\frac{1680\text{um}}{3}$

$= 560\text{um}$

If you think 4 fit → $\frac{1680\text{um}}{4}$

← Anything Between → $= 420\text{um}$

b) This diamondogram is being viewed under high power.

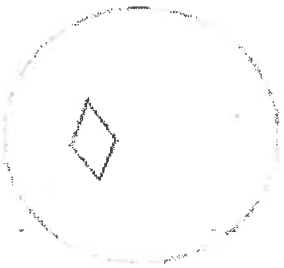
low power objective = 5X

medium power objective = 40X

high power objective = 100X

eyepiece = 10X

low power FOV = 3.5mm



Size = 58.3um ↔ 43.8um