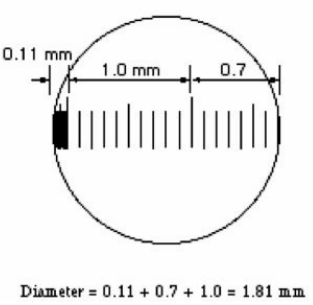
Microscope Lab 5: Measurements



Micron (µ)
1000µm = 1 mm

Diameter of field of view:

Use a clear ruler to determine the width diameter of the viewing field under the scanning objective lens.

1. Position the ruler so that the millimeter marks are visible in your scanning power viewing field.
2. Record the number of millimeter marks visible and any fraction of a millimeter that remains.
3. Estimate the length (diameter) of your viewing field in micrometers. (Remember that there are 1000 micrometers in a millimeter.)

   ie: if your field of view was 12mm: Show your work here:

# of micrometers = field of view in mm(1000)
# of micrometers = 12 mm (1000)
# of micrometers = 12000 µm

4. Complete steps 1-3 again for low power.

Determining the Diameter of the high power field of view:

1. You cannot use the above method to determine the diameter under high power. Why?(try switching objectives).

2. Instead you can use a mathematical proportion to determine the diameter under high power.

$$\text{High power field diameter} = \text{scanning power field diameter in micrometers} \times \frac{\text{scanning power objective}}{\text{high power objective}}$$

if we again use our 12 mm or 12000 µm example,

$$\text{High power field diameter} = \text{scanning power field diameter} \times \frac{\text{scanning power objective}}{\text{high power objective}}$$

$$\text{High power field diameter} = 12000\ \mu\text{m} \times \frac{4X}{40X}$$

$$\text{High power field diameter} = 1200\ \mu\text{m}$$

What is the diameter (in micrometers) of your high power field of view?

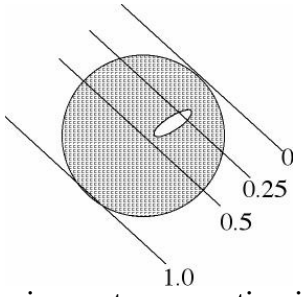
To find the size of a specimen:

Once you have identified the size of your fields of view, you can figure out the size of any specimen you are viewing.

You can do this one of two ways:

1. Determine what portion of the field of view it covers. It may help you to imagine dividing the field into half, then dividing a half into two quarters, then dividing a quarter into two eighths, until you get to the size of the organism. That fraction times the field of view diameter in micrometers is the approximate length of the organism in micrometers.

If we use our 12000µm field of view, and the procedure from above, the organism's length in the diagram is about 1/4 of a field of view so…



approximate length of the organism in micrometers = portion if the field of view (size of field of view)
approximate length of the organism in micrometers = 0.25 X 12000µm
approximate length of the organism in micrometers = 3000µm

2. A second way is to estimate the number of the specimen that would fit across the diameter of the field of view and divide the field of view diameter in micrometers by your estimate.

ie: if you estimate that 5 cells would fit across the diameter of your field of view, and your field of view was 12000µm:

$$\text{approximate length of the organism in micrometers} = \frac{\text{field of view diameter in micrometers}}{\text{estimate of \# of specimen that would fit}}$$

$$\text{approximate length of the organism in micrometers} = \frac{12000 \text{ micrometers}}{5}$$

$$\text{approximate length of the organism in micrometers} = 2400\mu m$$

3. Determine the size (in micrometers) of the spores shown in the microscope photograph below if it was taken on a microscope which had a ruler placed on it. The ruler is measuring in millimeters.

4. Determine the length of the fruit fly's eye (large red structures) shown in the microscope photograph below in micrometers if the field of view is 2000µm.