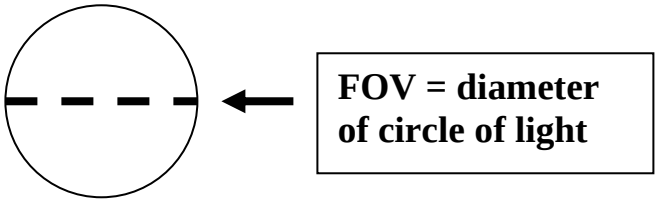
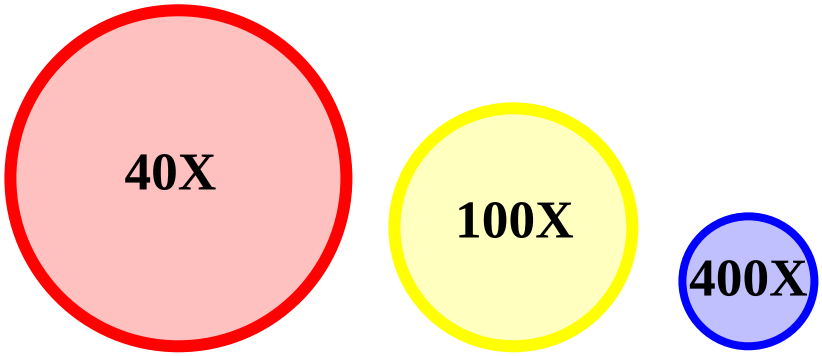
Field of View

- In a microscope, the ***field of view*** ***(FOV)*** is the diameter of the circle of light that you see when looking through a microscope



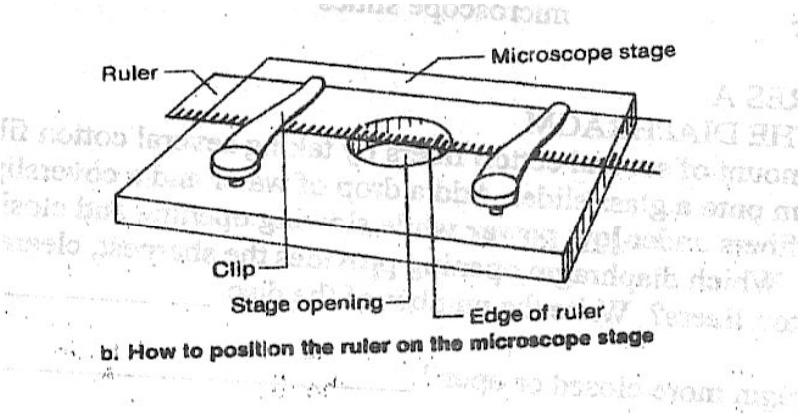
- As the magnification power gets ***greater***, the FOV gets ***smaller***



- We can measure the FOV of our microscope using a transparent ruler. To accurately do this, however, we need to take the measurement at the ***lowest power*** of our microscope.

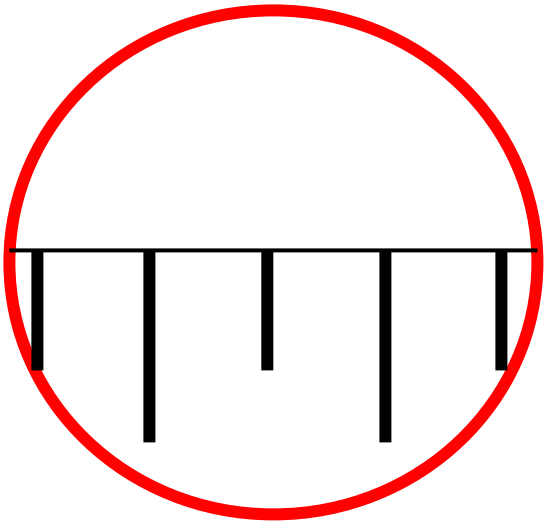
Finding FOV under low power:

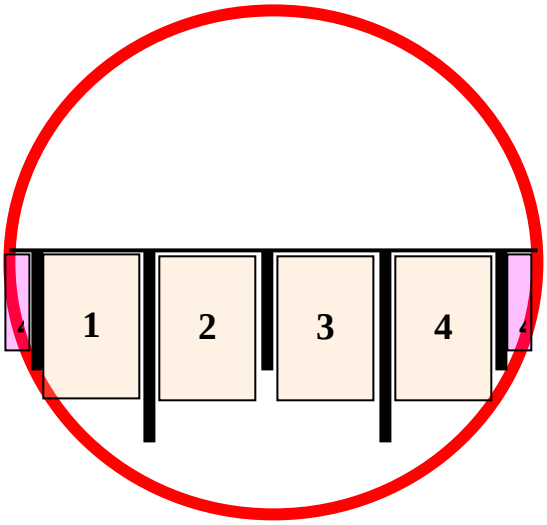
1. Place the transparent plastic ruler on the stage so that the ruler's edge is centered in your field of view under low power:



b. How to position the ruler on the microscope stage

2. Position the ruler so one of the ***millimeter*** markings is just visible to the left side of your circle in your field of view





2. Count the number of whole millimeters that you see, and estimate the fractions of millimeters that you see. In the above diagram, we see 4 whole millimeters, and about ½ of a millimeter

➔ So in the above example, our FOV is approximately 4.5 mm.

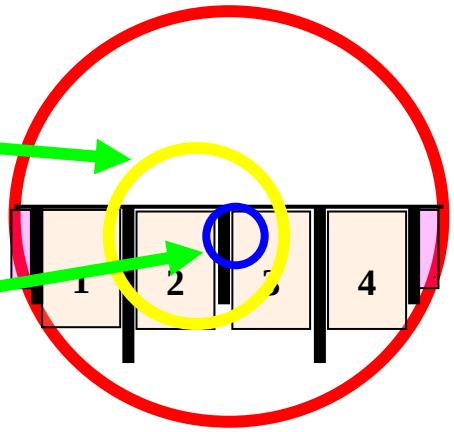
➔ So how many MICROMETERS (microns) would our FOV be in the previous example??? (HINT: Remember that 1000 micrometers equals 1 millimeter)

4.5 mm = _____?_____ micrometers

4.5 mm = _____4500_____micrometers (um)

➔ If we switch to the medium power objective (yellow circle), we see that our FOV becomes **smaller**

➔ And if we switch to the high power objective (blue circle), we see that our FOV becomes **even smaller**



➔ It becomes very difficult to accurately estimate the diameter of the FOV when we switch to higher power. Therefore we can perform a simple calculation to determine the FOV under high power:

$$\frac{\text{High power magnification}}{\text{Low power magnification}} = \frac{\text{Low power FOV}}{\text{High power FOV}}$$

$$\frac{400X}{40X} = \frac{4.5mm}{x}$$

Now all you have to do is cross multiply and divide to solve for x:

40 x 4.5mm = 180mm

180mm/400 = 0.45mm

➔ So "x", or your ***high power FOV*** equals 0.45mm which equals ***450 micrometers (um)***

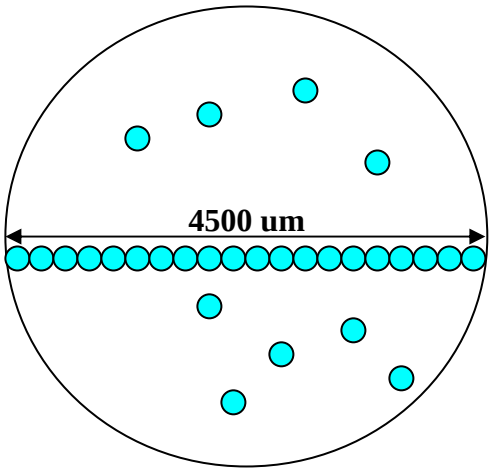
THAT'S SMALL!!

☺

WHY DO YOU THINK KNOWING THE FOV IS IMPORTANT?

When you know the diameter of your FOV under both low and high power, you can use this information to **ESTIMATE** the ***size of objects*** you examine under the compound microscope!

Let's look at an example:

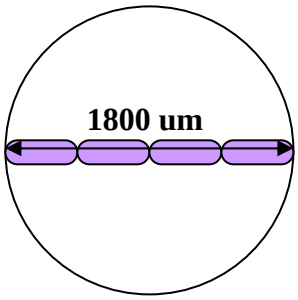


Look at the diagram to the left. Let's say that the FOV is 4.5mm, or ***4500 um*** in diameter. Twenty circular objects fit across the FOV. Since each object takes up $1/20^{th}$ of the diameter (FOV), the size of each object is **225 um**:

$$\frac{4500}{20} = 225$$

Now YOU try one!

If 4 organisms fit across a FOV that has a diameter of 1800 um, how large is each organism?



$$\frac{1800}{4} = 450 \text{ um}$$

ALWAYS REMEMBER TO INCLUDE YOUR UNITS!!!!!