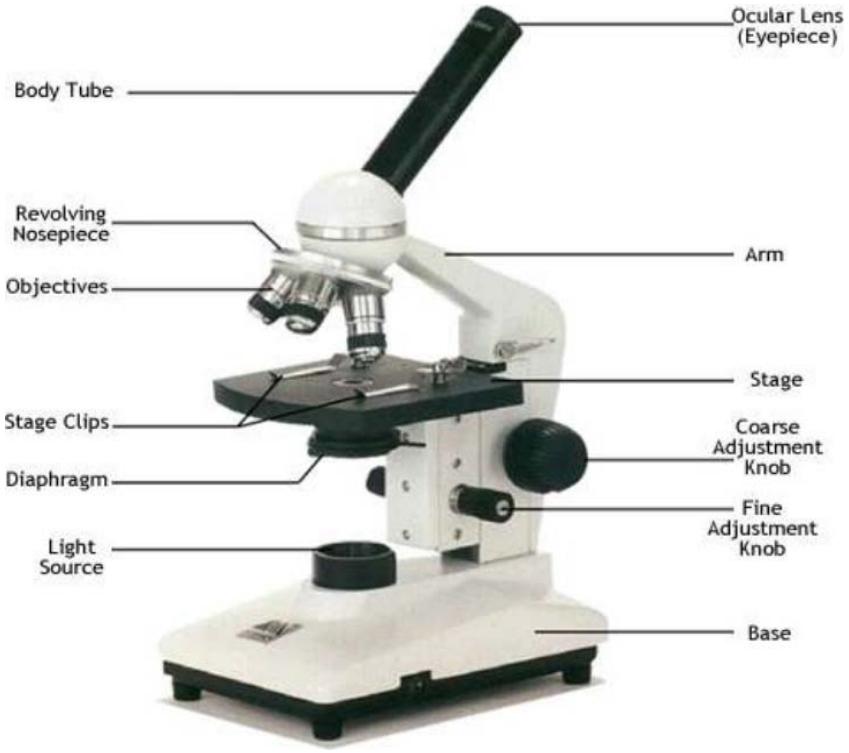
Name: _____

Using a Light Microscope



Guidelines for microscope use:

- Always carry the microscope with 2 hands; one on the arm, one on the base.
- Plug in the microscope right by your workstation, you do not want the cord spanning any gaps.
- When first viewing a slide, use the lowest power objective to find the object, then move to higher power.
- When moving to a higher-powered lens, position the object in the center of the field of view, this will make it easier to find.
- When viewing a specimen, you want to see as much detail as possible, while still viewing the entire object. So, use the highest power lens that still allows you to view the entire specimen.
- DO NOT use the coarse adjustment knob when using the high-power lens - it is easy to crack a slide!

Determining Magnification:

In microscopy, measurements are given in micrometres (μm) rather than millimetres. Micro means one-millionth, while Milli means one-thousandth; there are one million micrometres in a metre, and one thousand millimetres in a metre. This means **there are** _____.

Try the following conversions:

1.) $3000\ \mu m = \_\_\_\_\_ mm$

2.) $100\ \mu m = \_\_\_\_\_ mm$

3.) $1.0\ mm = \_\_\_\_\_ \mu m$

4.) $0.03\ mm = \_\_\_\_\_ \mu m$

5.) $2.5\ mm = \_\_\_\_\_ \mu m$

6.) $0.75\ mm = \_\_\_\_\_ m$

7.) $2.5\ \mu m = \_\_\_\_\_ mm$

8.) $220\ \mu m = \_\_\_\_\_ mm$

Fill in the table below to indicate that you know the power of magnification of each lens combination.

LENS	**OCULAR LENS**	**OBJECTIVE LENS**	**TOTAL MAGNIFICATION**
Low			
Medium			
High			

In order to estimate the size of a specimen under the microscope we must how big the area we are viewing is. The circle of light you see when looking through the microscope is called the Field of View (FOV). The FOV is different for each power of lens.

1. To determine the FOV for each power of lens you will use a special micrometre slide to measure your fields of view. Each slide has a mini measuring tape in it. The measuring tape is only $2\ mm$ in length, therefore it is $2000\ \mu m$ long. Use a microscope and a micrometre slide to fill in the table below.

Power	Field of View (mm)	$\times 1000$	= Field of View (μm)
Low Power		$\times 1000$	
Medium Power		$\times 1000$	
High Power		$\times 1000$	

Viewing objects using a microscope:

3a. Use a "letter e slide" to investigate what happens to an image when it passes through a microscope. Other than looking bigger, how does the image of the letter "e" differ when looking through the scope?

_____

b. When viewing the "letter e" on low power use the mechanical stage to move the slide to the right of your stage. Which direction does the "e" move in your field of view? _____

c. When viewing the "letter e" on low power use the mechanical stage to move the slide upward to the front of your stage. Which direction does the "e" move in your field of view? _____

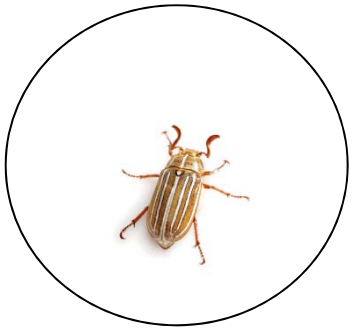
The next step is to estimate the size of the object relative to the FOV.

For example, if you are viewing a cell on medium power ($FOV = 1800\ \mu m$) and 3.5 of them could fit across the diameter of your field of view then you use the following equation:

$$Estimated\ Size = \frac{FOV}{number\ that\ fit\ across} = \frac{1800\ \mu m}{3.5} = 514.3\ \mu m$$

4. Use the diagrams below and the stated FOV's to estimate the length of each specimen. Show your calculation beside each.

a.)

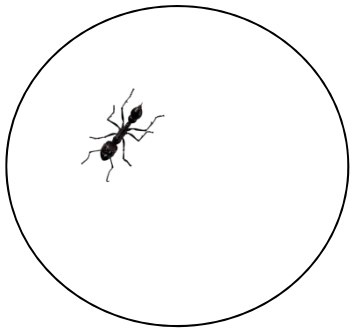


Viewed on medium power

Calculation:

Approximate Size = _____

b.)

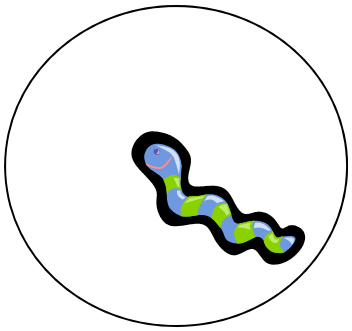


Viewed on high power

Calculation:

Approximate Size = _____

c.)

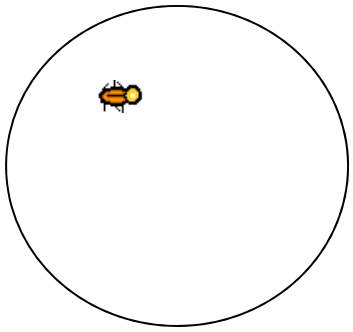


Viewed on low power

Calculation:

Approximate Size = _____

d.)

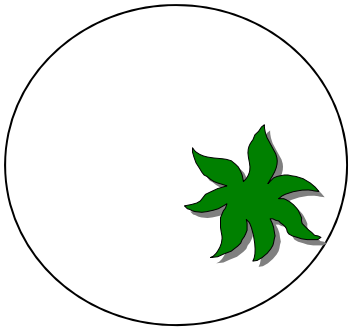


Viewed on medium power

Calculation:

Approximate Size = _____

e.)



Viewed on high power

Calculation:

Approximate Size = _____

5. If an object is $600\ \mu m$ what power lens is the best to view it under? Why?

6. If an object is $2900\ \mu m$ what power lens is the best to view it under? Why?