

Microscope Lab

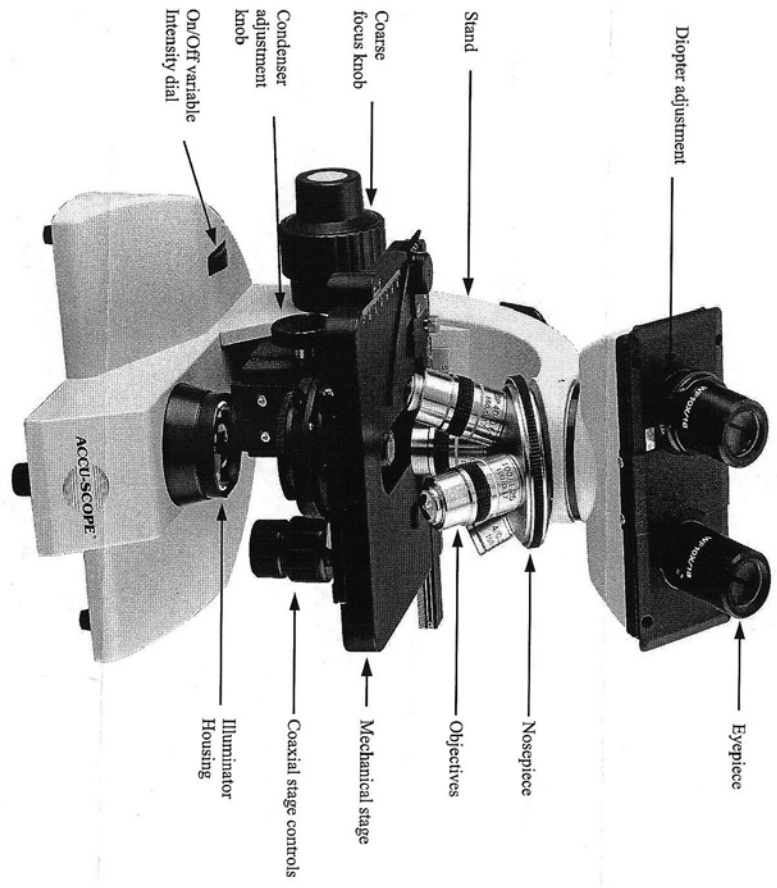
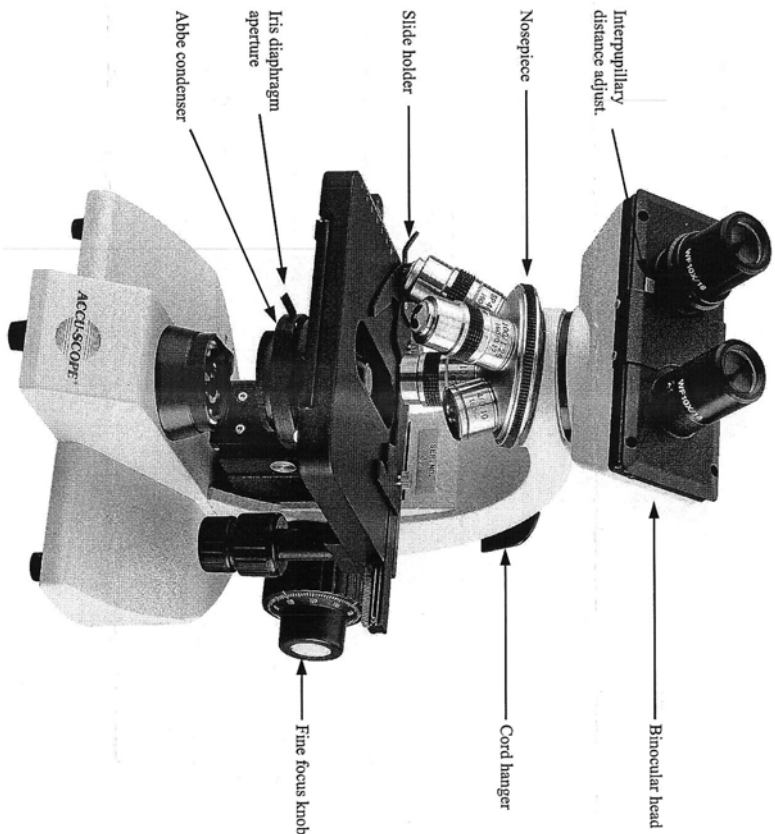
Dr. J. Lim

* To properly observe any specimen slide under the microscope, the following steps must be taken in sequence. Do not skip any steps!

* Only use the fine focus knob when viewing a slide utilizing the 40X objective lens

- Use of the coarse focus knob with the long objective can result in damage to the slide and/or objective lens

1. Rotate the **4X** scanning power objective lens so that it clicks into place over the stage
2. Gently secure the specimen slide into the slide holder on the mechanical stage
3. Center the specimen slide above the condenser lens with the coaxial stage controls
4. Turn on the microscope light and adjust the illumination with the on/off variable intensity dial for comfortable viewing
5. Set the interpupillary distance by moving the eyepiece tubes together or apart using both hands until a full field of view is visible by both eyes
 - Proper adjustment results in a single image fully viewable with both eyes together or either eye individually to allow for better viewing comfort
6. Focus the specimen using the coarse focus knob (larger ring)
 - Adjust the iris diaphragm aperture in the condenser to the smallest size allowable for a clear, sharp image of the specimen
 - NOTE: a narrower aperture decreases brightness and resolution, but increases contrast and range of focus
7. To bring the specimen into best focus, employ the fine focus knob
8. To observe the specimen with a higher magnification beyond the scanning (4X) objective, rotate the **10X** objective into place and adjust the focus as in steps 6 and 7
 - Since your microscope is **parfocal**, once the object is in focus with scanning power, it should also be almost in focus with higher power
 - Viewing at higher magnification may be enhanced by increasing illumination via widening the iris diaphragm aperture or adjusting the variable intensity dial
9. To observe the specimen with the highest magnification, rotate the **40X** objective into place and **ONLY** use the fine focus knob (smaller ring) to fine tune the image
 - Since your microscope is parfocal, once the object is in focus with scanning power, it should also be almost in focus with higher power
 - Viewing at higher magnification may be enhanced by increasing illumination via widening the iris diaphragm aperture or adjusting the variable intensity dial
10. After viewing the specimen slide, return it whence it came unless otherwise directed by your instructor
11. Upon completion of your observations, rotate the lowest power objective until it clicks into place and then remove the slide
12. Clean the microscope lens with lens paper and Windex only. Do not use Kimwipes, paper towels or Kleenex to clean the microscope lens. If the microscope stage needs cleaning, gently wipe with Windex and Kimwipes.



Inversion

Inversion refers to the fact that a microscopic image is upside down and reversed.

- Obtain a *letter e* slide and view it with the scanning (4X) objective.
In the Space 1 below, draw the letter e as it appears on the slide (look from the side, not through the eyepiece).

Space 1	Space 2
---------	---------

- Next, draw the letter e in Space 2 above as it appears when you look through the eyepiece.
- What differences do you notice? _____
- Inversion refers to the image being upside down and reversed. Move the slide to the right. Which way does the image appear to move? _____
- Rotate the 10X objective lens until it clicks into place. Adjust the focus with the coarse and/or fine focus knobs. Adjust the illumination with the iris diaphragm and on/off variable intensity dial to observe their effects.
- Rotate the 40X objective lens until it snaps into place. Employ **ONLY** the fine focus knob with the high power objective.
 - In Space 2 above, draw a circle around the portion of the letter that you are now seeing in high magnification

Total Magnification

Total Magnification is calculated by multiplying the magnification of the ocular lens (eyepiece) by the magnification of the objective lens (ocular X objective = total magnification)

Calculate total magnification figures for your microscope and record the table below:

Objective	Ocular lens	X	Objective lens	=	Total Magnification
Scanning power					
Lower power					
High power					

Human Cheek Cells

Preparation of a Wet Mount Slide

- Obtain a clean blank slide, coverslip, toothpick and a bottle of Lugol's iodine.
- Gently scrape the inside of your cheek with a toothpick and carefully smear it into the middle of your glass slide
- Add one drop of Lugol's iodine onto the smear
 - Do not touch the bottle tip to the slide
- Hold the coverslip by the sides so that you do not get fingerprints on it.
 - Place the edge of the coverslip on the edge of the drop of iodine, lean it toward the liquid and let go



- Coverslip should drop like a door slamming shut on the liquid containing your cells
 - This technique is to minimize the presence of air bubbles under the coverslip
- Blot any excess iodine that may ooze out from the edge of the coverslip with a paper towel
- Using the procedure you followed with the letter e slide, find your cheek cells first with the scanning lens, move on to low power and finally to high power. Adjust the illumination as needed.
 - NOTE: Your cheek cells will probably look like magnified, pale-yellow sawdust under low power. Larger objects often mistaken for the cells under low power are usually air bubbles or dirt/food particles.
- Once you have focused on the cells with maximum available magnification and proper illumination, compare your findings to Figure 1. Next draw one or two of your cells in the Space 3.

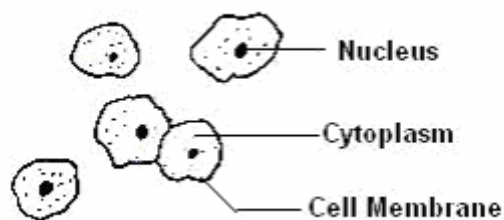


Figure 1: Cheek epithelial cells

Space 3