

## Simple Microscopy

### Introduction

The microscope is perhaps the single most important “tool” that any student of the health sciences has available to them. It is used to study microscopic structures of the body as well as in the study of micro-organisms which wreak havoc upon the body.

The illustration, below, shows a simple microscope with the most important features labeled.



The most important aspects of the microscope include the eyepieces (1), objective lenses (8), coarse focus knob (9), fine focus knob (10), stage (3), nose piece (2), brightness adjustment (6), arm (7), stage adjustment knobs (11), iris (4) and light supply (5).

The eye pieces are at the beginning of the magnification apparatus and typically have 10X magnification. They are what you look through. The objective lenses are attached to the nose piece which rotates and “clicks into” position for use. There are three objectives, which are the “working” end of the magnification apparatus. Those of the greatest importance include: the low power objective which has a typical magnification of 10X; the high, dry objective which has a typical magnification of 40X; the oil immersion objective which has a typical magnification of 100X. The total magnification of each combination of eye piece and objective is the product of each, that is to say, the total magnification for the low power (eyepiece magnification times objective magnification) is 100X; for the high, dry objective, it is 400X; for the oil immersion lens, it is 1000X. You will receive instruction later on regarding the oil immersion objective.

Suffice it to say that the oil immersion objective is the ONLY objective that one uses oil with.

When beginning to use a microscope, it is important to remember that you always begin focusing with the stage in the completely down position, using the 10X objective and then focus with the COARSE focus knob until the specimen is in focus. Once the sample is in focus and you advance to the 40X and/or the 100X objective, the coarse knob is NEVER touched, again. (The microscopes are par-focal, i.e., once they have been focused on low power you need only FINELY adjust the focus after moving to a higher powered objective to visualize the sample.) The FINE focus is then used for the remainder of the study.

**NOTE: If you are doing multiple microscopic examinations, once a slide has been removed from the stage, you need only insert the next slide into the same spot and fine focus carefully and you'll be in focus within 3-6 "finger-flips" on the fine adjust knob.**

The stage holds the specimen which is on the microscope slide. In order to study the specimen which is on the stage, you must turn on and adjust the light supply. This is done by turning on the switch and adjusting the iris by its lever to receive the optimal amount of light.

An additional note: if you wear glasses normally, wear them while you are using the microscope – makes it MUCH easier.

Experimental: Materials

Microscope	"e" from newsprint	Microscope slide
Toothpick	Methylene blue stain	Microscope slide slip cover
Disposable pipet	Sharps container	

Experimental: Methods

*Part 1*

Place the "e" from the newsprint (that is mounted on a microscope slide) under your microscope. Draw in the space below what it looks like to your naked eye, then draw what it looks like when you examine it under the microscope:

"e" by eye	"e" by microscope

What do you conclude from the above drawings?

*Part 2*

Scrape the inside of your cheek with the toothpick. Place one drop of methylene blue onto your microscope slide – more or less in the center of the slide. Mix the two together, i.e., the cheek scrapings and the stain. Throw the tooth pick away in the trash. Place the slip cover onto your mixture and examine under the microscope (remember to remove the paper from the slip cover, first). You should see square to oblong cells singly or in clumps under the microscope. These are simple squamous epithelial cells. The dark blue “dot” in the center of the cell is the nucleus of the cell. Draw what you see in the boxes provided, below:

10X View	40X View

Questions

- 1) Based upon your observations with the “e”, what do you conclude about what happens to the image as it is transmitted from slide to your eye?