**Biology 3A Laboratory**

# Lab 3: Microscopes and Cells

## OBJECTIVE

- To learn the proper use and care of compound microscopes.
- To learn staining techniques used in microscopy.
- Prepare a wet mount, determine the magnification and size of the field of view, and determine the depth of field.
- To be able to differentiate between prokaryotic and eukaryotic cells.
- To learn the similarities and differences between plant and animal cells.
- To be able to identify cellular structures.

## INTRODUCTION

The ability to magnify specimens has been around since 1000 B.C. The first simple compound microscope that utilized two lenses was not invented until the late 16$^{th}$ Century. It was the invention and modification of this microscope that changed the way scientists studied living organisms. It allowed scientists to study the structure of a living organism and to discover numerous species that were not visible to the unaided eye.

Today there are numerous types of microscopes available to scientists that provide greater **magnification** and superior detail (**resolution**). Besides magnifying and resolving an object, the microscope also provides the contrast that is needed to distinguish detail between adjacent objects. Microscopes used in most biology laboratories magnify up to 1000X with a resolving power of 0.2 μm. The microscopes in this laboratory are compound, light microscopes. The light is transmitted through the specimen on the stage and through two lenses before it reaches the user.

**Please handle these expensive pieces of equipment carefully as they are made of intricate pieces.**

### A. USING THE MICROSCOPE

There are some basic rules that you need to adhere to when using microscopes. These are:

1. Always use two hands when moving your microscope. Use one hand to hold the arm and the other hand should support the base. **NOTE:** The scopes are heavy!
2. Use only **LENS PAPER** to clean the lenses. Do not use tissues, paper towels, kimwipes, your shirt, etc. to clean the scope. Even though these items may feel soft, they can scratch the lenses.
3. The microscope must be on the lowest power objective lens:
    a. when starting to use the microscope.
    b. when you finish using the microscope. Before you return the microscope to its numbered slot: 1) make sure the objective lens is on the lowest power, 2) the power is off, 3) there is no slide on the stage and 4) the dust cover is in place.
4. **NEVER** use the course focus knob on high power; use **ONLY** the fine focus knob. These microscopes are **parfocal**. This means that when the image is in focus on one objective, the image will be in focus with the other objectives. You may need to fine focus the image for sharpness.