Microscope Lesson and Lab
Lesson Objectives

- List the contributions of 5 scientists to the development of the microscope
- Explain the different types of microscopes
- Identify parts of a compound microscope
- Be able to correctly use a microscope
- Understand the difference between magnification and resolution
- Be able to calculate magnification
Important Cell Scientists

- Van Leewenhoek (late 1700s, early 1800s)
- Hooke (1665)
- Schleiden (1838)
- Schwann (1839)
- Virchow (1858)

- Lenses & Microscopes
- Cellular nature of cork
- Plant cells
- Animal cells
- All cells from preexisting cells
Cell Theory

- All living things are made up of cells
- Cells are the units of structure and function
- All cells arise from preexisting cells
"In the year of 1657 I discovered very small living creatures in rain water."
Early Cell Scientists

Anton van Leeuwenhoek
Matthias Schleiden
Theodor Schwann
Early Microscope

Cork Cells

Robert Hooke
Microscopes

One or more lenses that makes an enlarged image of an object.
Types of Microscopes

- Simple
- Compound
- Stereoscopic
- Electron
Simple Microscopes

Similar to a magnifying glass and has only one lens.
Compound Microscopes

Let's light pass through an object and then through two or more lenses.
Binocular (Stereoscopic) Microscopes

Gives a three dimensional view of an object. (Examples: insects and leaves)
The Electron Microscope
Electron Micrographs
3.1 Parts of a Microscope

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.
Microscope Parts

- Body Tube
- Revolving Nosepiece
- Objectives
- Stage Clips
- Diaphragm
- Light Source
- Ocular Lens (Eyepiece)
- Arm
- Stage
- Coarse Adjustment Knob
- Fine Adjustment Knob
- Base
**Parts of the Light Microscope**

A. **EYEPiece**
   Contains the **OCULAR** lens

B. **NOSEPiece**
   Holds the **HIGH-** and **LOW-** power objective **LENSES**; can be rotated to change **MAGNIFICATION**.

C. **OBJECTIVE LENSES**
   Magnification ranges from 10 X to 40 X

D. **STAGE CLIPS**
   Hold the slide in place

E. **STAGE**
   Supports the **SLIDE** being viewed

F. **LIGHT SOURCE**
   Projects light **UPWARDS** through the diaphragm, the **SPECIMEN**, and the **LENSES**

G. **BASE**
   Supports the **MICROSCOPE**

H. **DIAPHRAGM**
   Regulates the amount of **LIGHT** on the specimen

I. **FINE ADJUStMENT KNOB**
   Moves the stage slightly to **SHARPEN** the image

J. **COARSE ADJUStMENT KNOB**
   Moves the stage up and down for **FOCUSING**

K. **ARM**
   Used to **SUPPORT** the microscope when carried
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Lab Objectives

- Review parts of the microscope
- Find specimens under low and high power
- Make a wet mount
- Be able to correctly use a microscope
- View cheek cells under the microscope
- View Volvox under the microscope
- Observe Pond water under the microscope and carefully draw what is observed
Lab Directions (30 minutes)

• Unsafe behavior = immediate loss of lab privilege
• Assigned partners and stations
• Drawings and answers to questions on a separate sheet !!!
• Letter “e”
• Cheek cells
• Elodea leaf- No ! (Skip)
• Sketch Prepared Slide of Volvox
• Pond Samples- Read over directions on making a wet mount; Put drawings on handout and include the magnification used (ocular X objective = total magnification)
Seat Work 30 minutes

• Complete Microscope Handout
• Work on Microscope Unit Review
• Review parts of microscope- Vocabulary Challenge Cards (Cut out)
• Quiz on Tuesday of next week!
Laboratory Clean up

- You will be graded on the completeness of your answers to the analysis questions and on the careful and detailed drawings you make.
- I will be quizzing you on the parts of the microscope.
- Your grade is also dependent on you returning all supplies to the tray and cleaning up your lab space. I will give you a 5 minute reminder.
- All slides need to be cleaned and put back on the tray. You may throw away cover slips.
Basic Microscope Technique

- **Working Distance:** distance between the specimen and the objective lens

- **Depth of Field:** thickness of the specimen that may be seen in focus at one time
Basic Microscope Technique

- Calculating Total Magnification:

- Multiply the magnification of the ocular lens by the magnification of the objective lens
**Magnification vs. Resolving Power**

- **Magnification:**
  - the ratio of an object’s image to its real size

- **Resolving Power:**
  - measure of image clarity. The minimum distance two points can be separated and still be distinguished as two separate points
Letter “E”
Cheek Cells

NEVER take cells from anyone's cheek but your own.

Animal Cells
Prepared Slide of Volvox
Microscope Lab

• Observe the structure of an *Elodea* leaf at increasing magnification

Botanical Society of America
Marsh Sundberg
Pond Sample
Virtual Microscope SIMULATION