

# BIOLOGY 1100

VANCOUVER COMMUNITY COLLEGE

Instructor: Maria Morlin

September 2021 – hybrid course

Lab #1: Microscopes, cells and bacteria

# Outline

- Microscopes, cells and bacteria lab summary of demonstrations
- Objectives
- Student submissions of cellfies
- Notes on cells and observations
- Notes on measurements
- Vancouver Community College microscope lab video resources

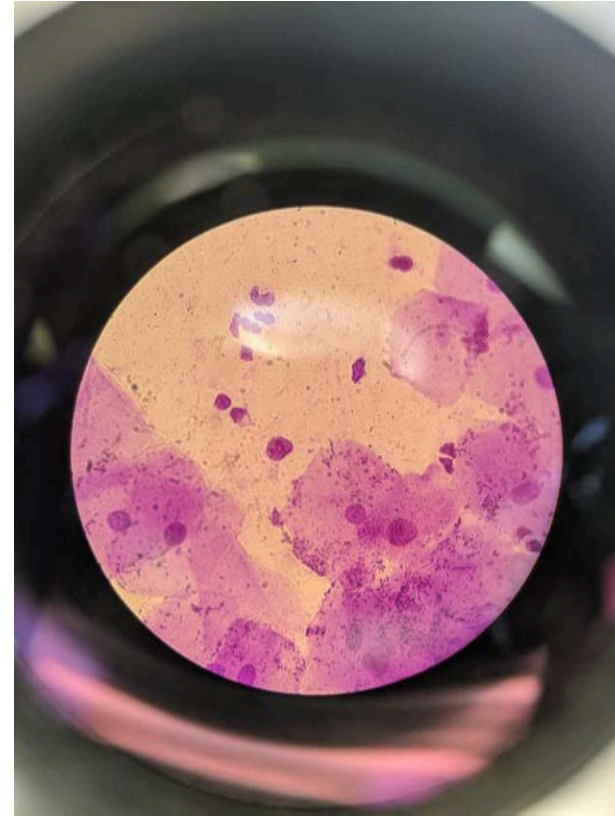
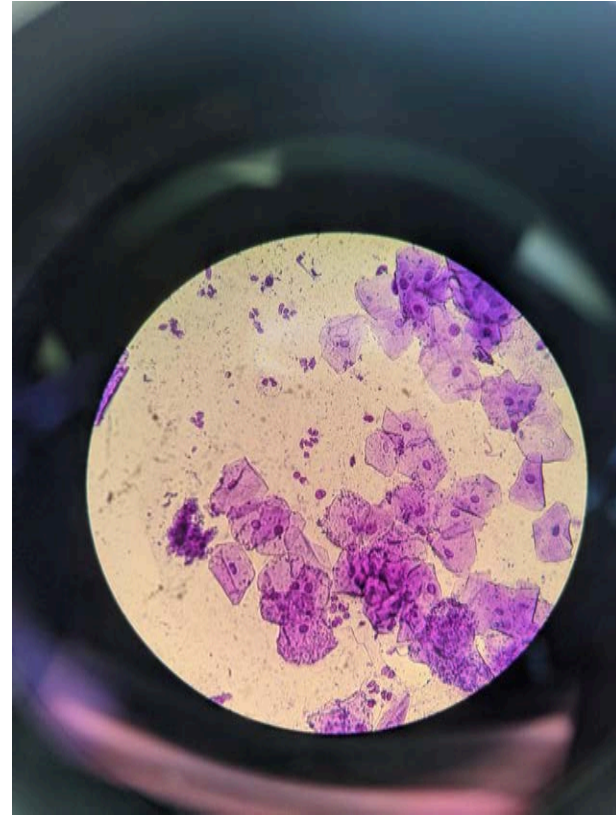
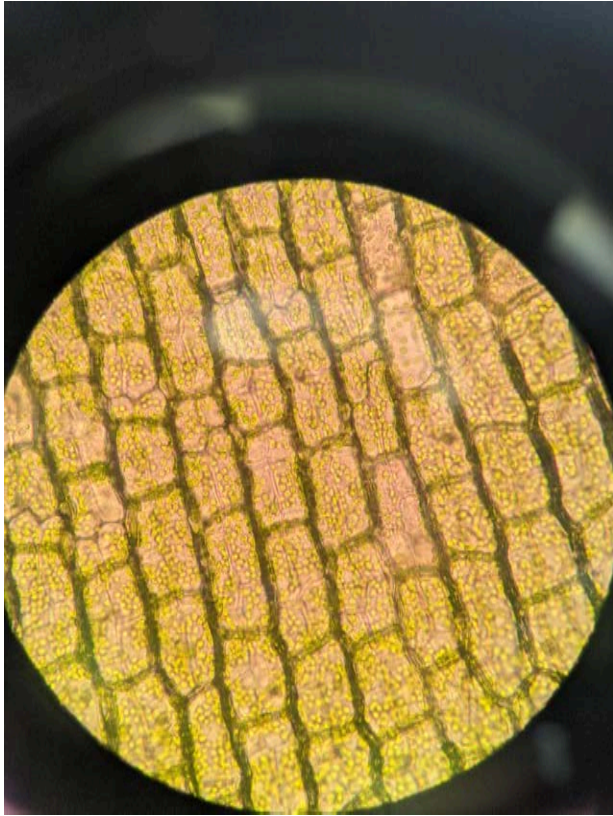
# Microscopes and bacteria lab summary

1. Hilary demonstrated the following:
  1. use of the compound microscope – parts, how to set up and focus.
  2. Preparation of a Elodea, a water plant.
  3. How to measure specimens under the microscope.
  4. Collection and observation of cheek epithelial cells, and oil immersion techniques
  5. Environmental bacterial samples to be analyzed at the next lab.
2. Each student had a separate station.

# Objectives

1. Learn parts and use of the Zeiss compound light microscope:
  - Oculars, nosepiece, objective lenses, stage, focus knobs, on/off switch, light intensity switch, condenser & condenser knob, phase contrast turret, diaphragm.
2. Prepare slide of an elodea sample
3. Prepare slide of a buccal sample, identify epithelial cell
4. Measure specimen diameter.
5. Use oil immersion to view bacteria under 100 power lens. Note the size and shape of bacteria cells compared with plant and animal cells.

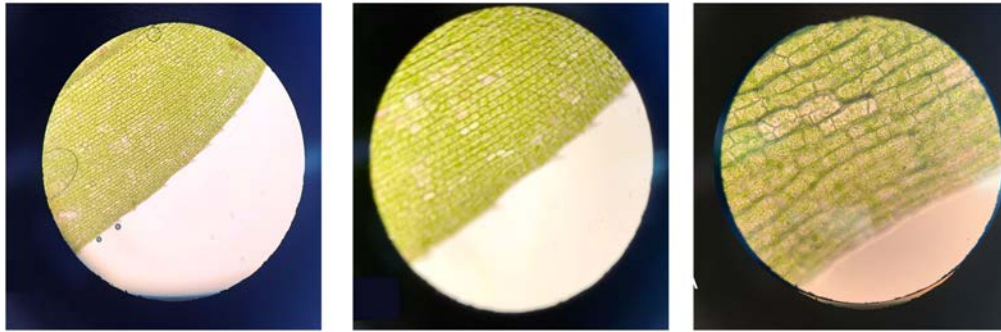
# Student submissions of cellfies



These were taken by Adrian through the ocular lens. See if you can identify various cells and structures. Which are plant cells, and which are animal cells? Where is the bacteria? What is the relative size of bacteria to cells? In cells, can you identify chloroplasts, cell membranes, and nuclei?

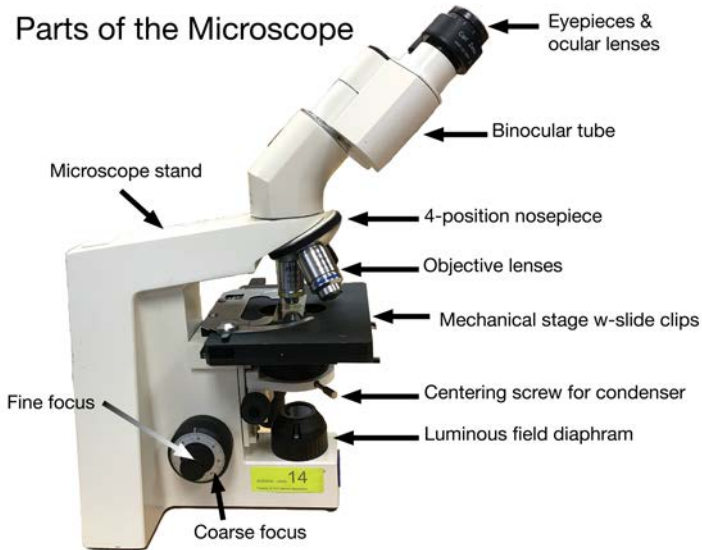
# VCC biology lab slide images

Elodea under the microscope at increasing magnifications

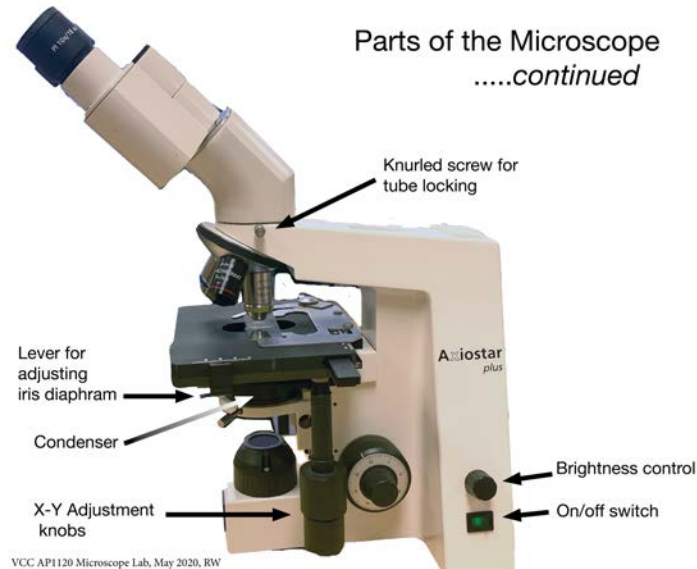


50X → 100X → 400X

Parts of the Microscope



Parts of the Microscope  
.....continued



Field of View Measurements  
Zeiss Axiostar Plus

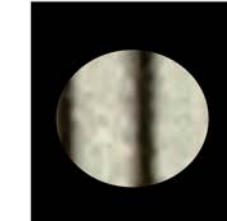
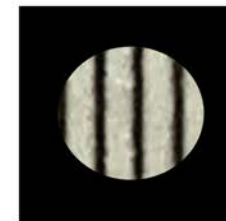
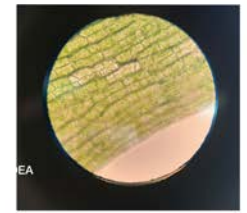
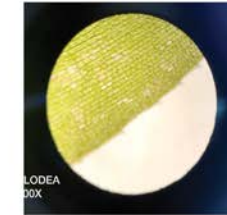
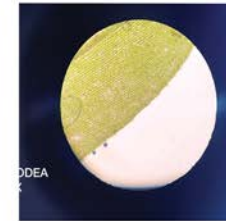
50X



100X



400X



50 X Magnification

Field of View (mm): 3.5

Field of View (microns): 3500

100 X Magnification

Field of View (mm): 1.75

Field of View (microns): 1800

400 X Magnification

Field of View (mm): 0.44

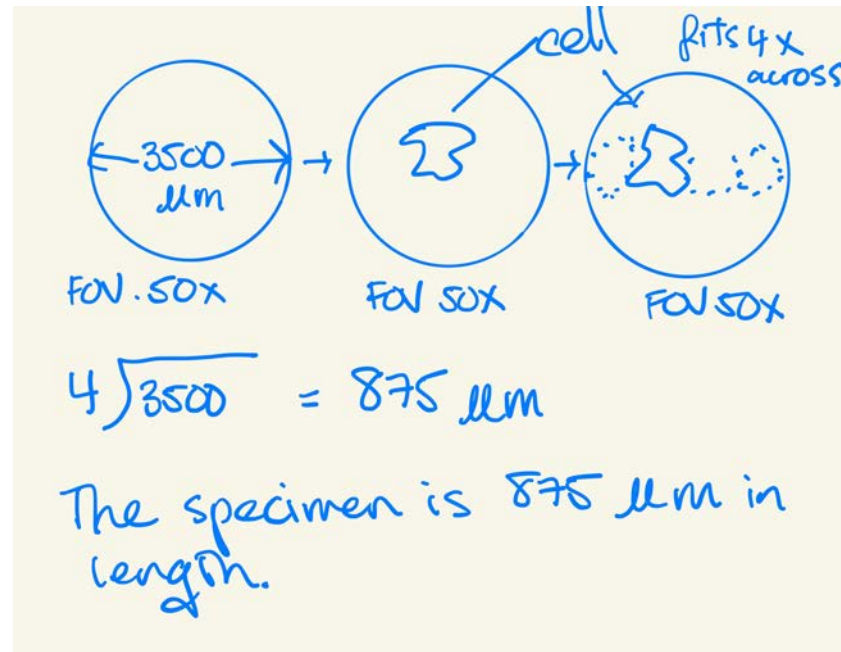
Field of View (microns): 440

# Notes on different cells & observations

- Make sure to read the introductions in the manual handout about eukaryotes and prokaryotes and become familiar with their differences. There are hundreds of prokaryote (bacteria) species in the mouth of a human, and more individual bacterial cells than there are humans on the planet! Indeed bacterial cells in your body are 10:1 to human cells. Most of them of course are beneficial.
- Review parts and use of the microscope, relation between magnification and size of field of view (FOV) (at a higher magnification, the area viewed is smaller)
- Review slides from the lab, and compare the animal cells (epithelial cheek cells) to those of the plant cells. These are both eukaryotes, but have some differences, such as a plant cell wall not present in an animal cell.

# Notes on measurements

- If you know the diameter of your field of view, you can measure the length of a specimen such as a cell.
- For example, at the Zeiss microscope's low power (50x), the FOV diameter is 3.5 mm, or 3500 micrometers ( $\mu\text{m}$ ). If you are measuring a cell, estimate how many cells could fit across the FOV diameter. Then divide that number into the diameter to get the length of one cell.





Vancouver Community College microscope lab videos  
- produced by Robyn Wood, Hilary Brown and Klaudia Jurkemik

- Part 1. Introduction to the use of the Zeiss compound microscope:
  - <https://www.youtube.com/watch?v=cDVJIHpiGNo>
- Part 2. Overview of microscope and preparation of a specimen.
  - [https://www.youtube.com/watch?v=s\\_FU-CMi-EU](https://www.youtube.com/watch?v=s_FU-CMi-EU)
- Part 3. Kohler illumination.
  - <https://www.youtube.com/watch?v=i2TEYyF4duA>
- Part 4. Drawing specimens at different magnifications.
  - <https://www.youtube.com/watch?v=UZ38GzzIVSs>
- Part 5. Measuring specimens.
  - <https://www.youtube.com/watch?v=WTkR7J3Vwts>