BIOLOGY 1200

VANCOUVER COMMUNITY COLLEGE

Instructor: Maria Morlin

January 2021– hybrid course

Lab #1: Microscopes and Cells

Outline

- Microscopes and cell lab summary of demonstrations
- Objectives
- Lab setting pictures
- Student submissions of cellfies
- VCC biology lab slide images and objective lens/field of view
- Notes on cells and observations
- Some terms to review in the manual
- Measuring specimens
- Vancouver Community College microscope lab video resources

Microscopes and cell lab demonstrations

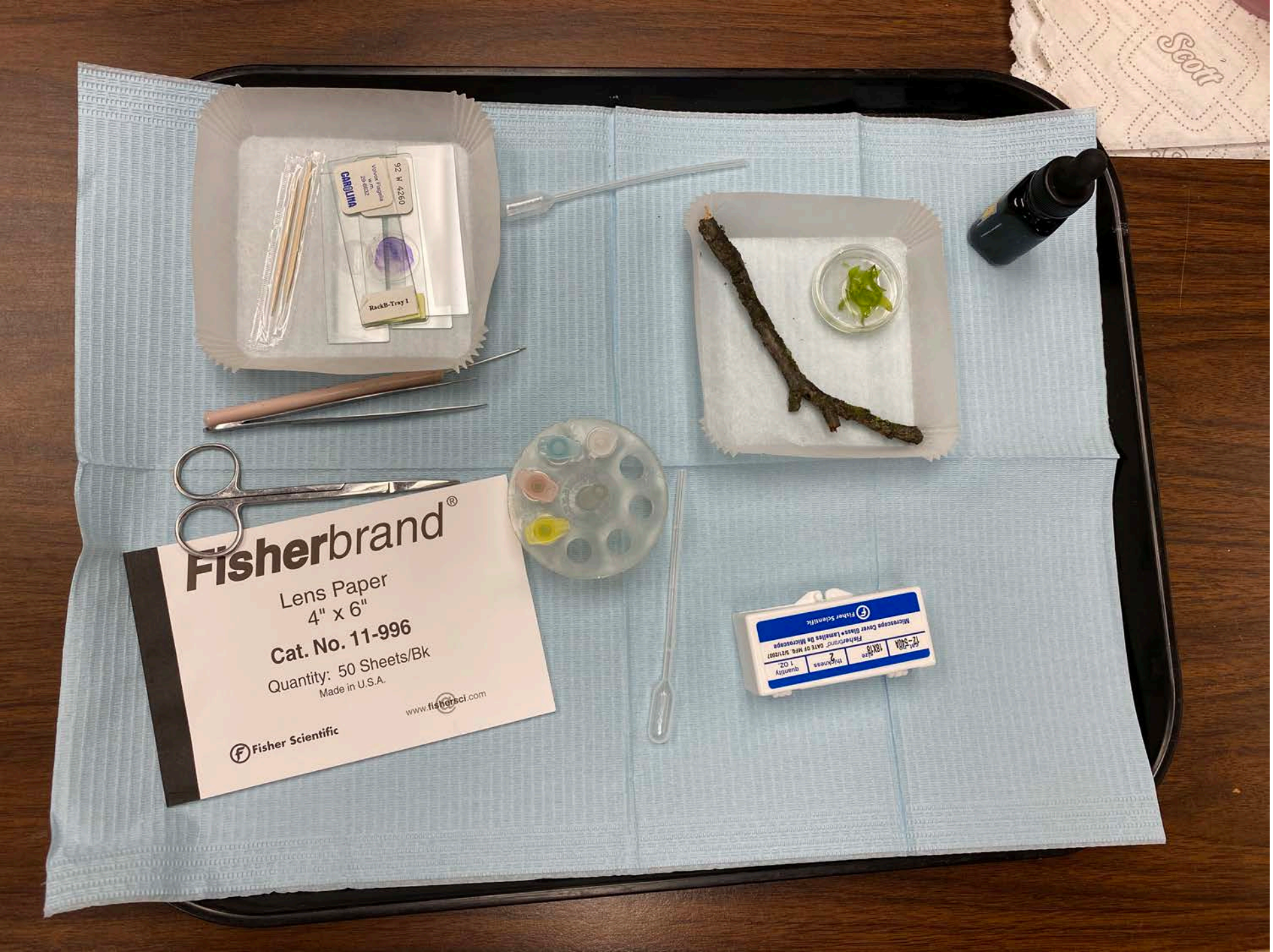
1. Robyn demonstrated the use of the compound microscope – parts, how to set up and focus, and the dissecting microscope.
2. Robyn demonstrated how to make slides of live organisms and cheek cells.
3. Each student had a separate station including:
    a) Prepared slides
    b) Live samples
    c) Both microscopes
    d) Slides and cover slips
    e) Pipettes

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. Learn parts and use of the dissecting microscope.
3. Prepare slides of cells in the lab manual handout, draw and label.
4. Prepare slide of a buccal sample, identify epithelial cell, draw and label.
5. Distinguish between unicellular, aggregate, colonial and multicellular organisms

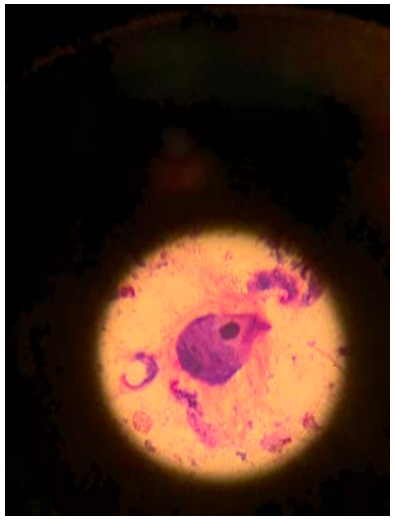
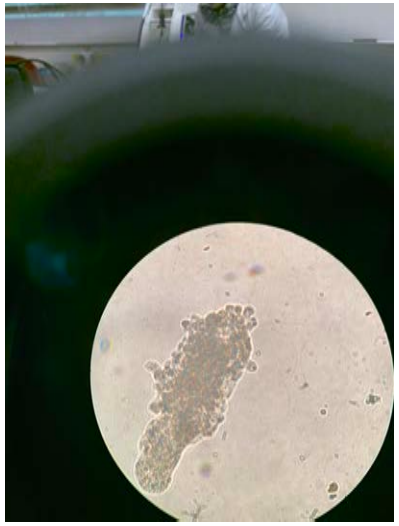
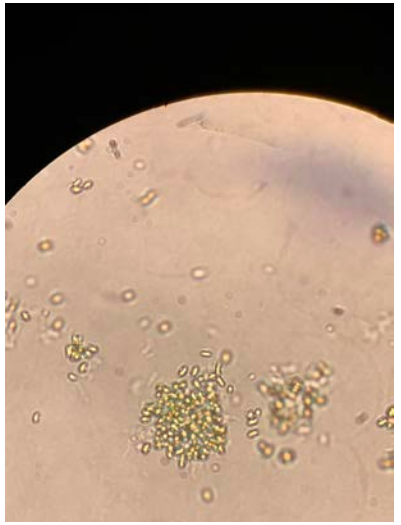
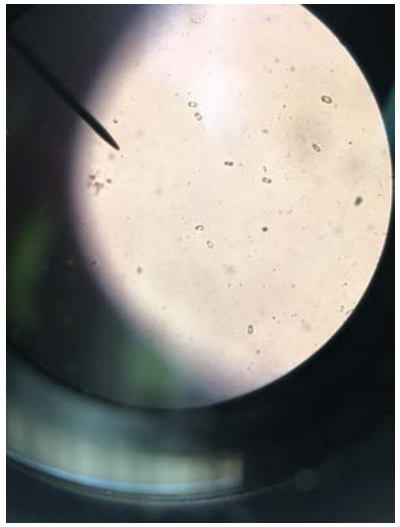
In the classroom – Robyn demonstrating use of the microscope

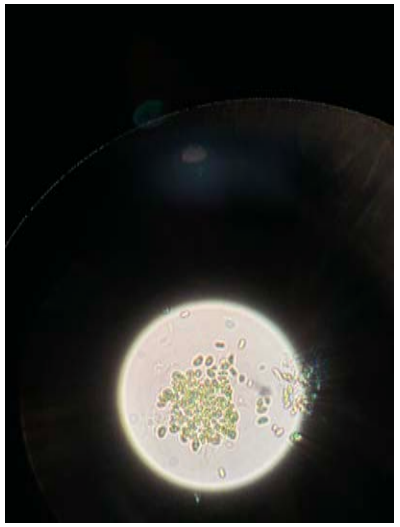
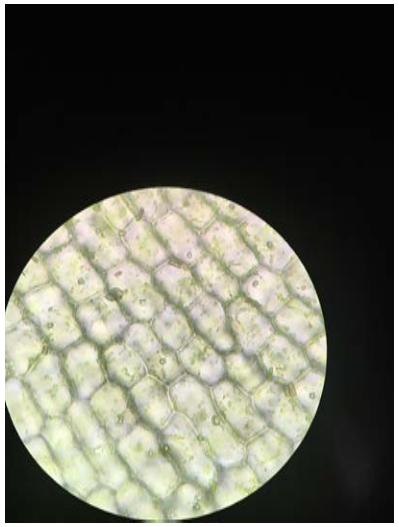
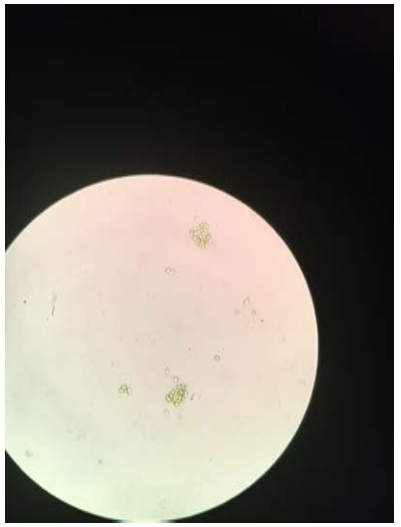
Goldfish tank at the back of the classroom



Each student's tray set up with specimens in colour-coded tubes, a stick for the protococcus algae, elodea in the small petri dish, prepared slides, toothpicks to do the cheek cell extraction.

Student submissions of cellfies

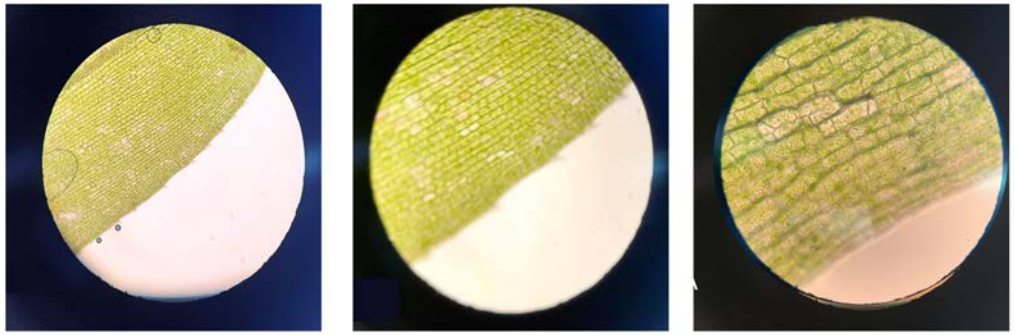






These were taken through the ocular lenses. See if you can identify various cells and structures.

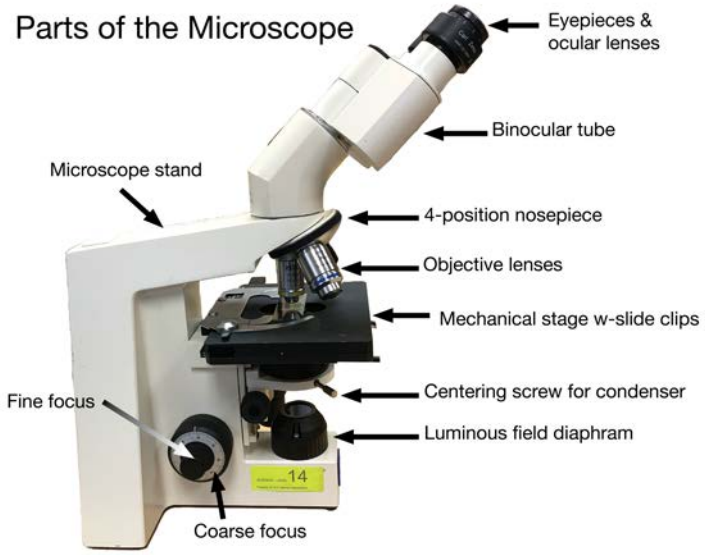
VCC biology lab slide images

Elodea under the microscope at increasing magnifications



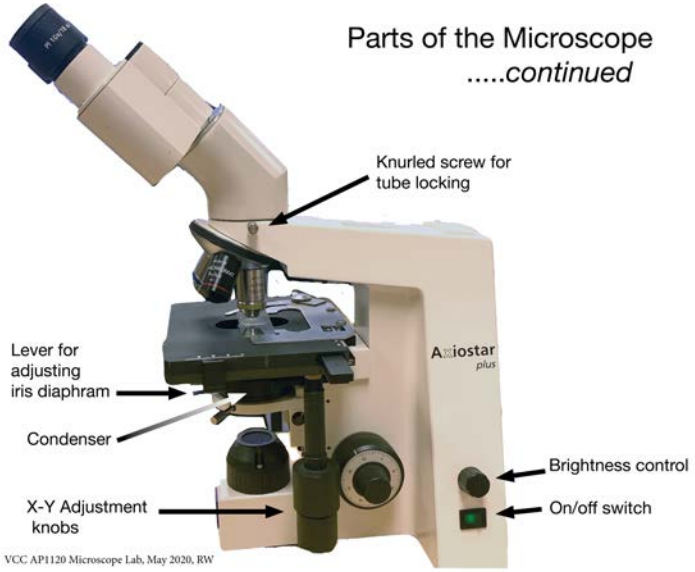
50X → 100X → 400X

Parts of the Microscope



VCC AP1120 Microscope Lab, May 2020, RW

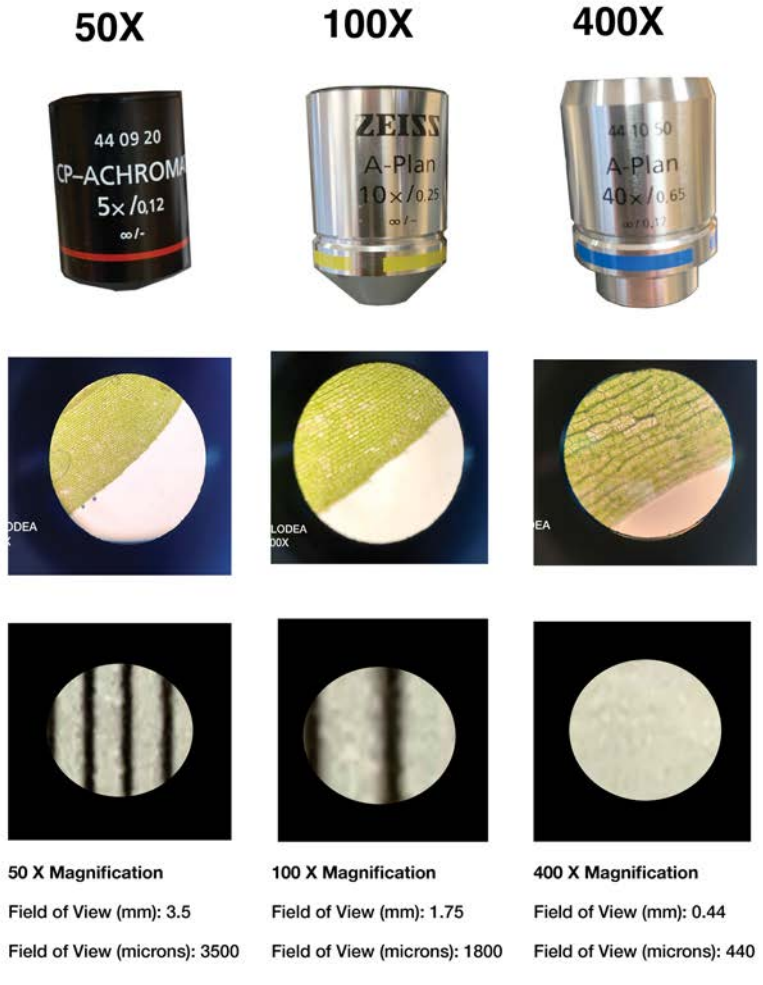
Parts of the Microscope *.....continued*



VCC AP1120 Microscope Lab, May 2020, RW

Field of View Measurements

Zeiss Axiostar Plus



50 X Magnification	100 X Magnification	400 X Magnification
Field of View (mm): 3.5	Field of View (mm): 1.75	Field of View (mm): 0.44
Field of View (microns): 3500	Field of View (microns): 1800	Field of View (microns): 440

VCC Science, RW, May 2020

Images: Robyn Wood, Klaudia Jurkemik, Hilary Brown - Vancouver Community College

Notes on different cells & observations

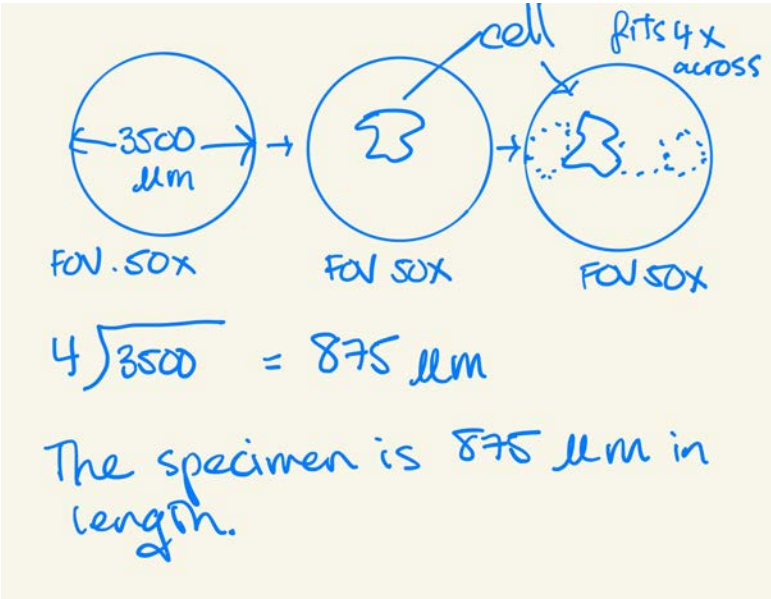
- Make sure to read the introductions in the manual handout about the organization of cells. Some are unicellular, like the amoeba, some are loose aggregates so they can live on their own if necessary, some are colonial and some multicellular. It's usually agreed that if cells must live in a group with other cells, and are more or less organized into tissues, they are multicellular. But there is a gray area between colonies and multicellularity.
- Review parts and use of the microscope, and the 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 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.

Some terms to review in the manual

- Autotrophic
- Heterotrophic
- Cell membrane
- Ectoplasm
- Endoplasm
- Contractile vacuoles
- Food vacuoles
- Pseudopodia
- phagocytosis
- Unicellular
- Aggregate
- Colonial
- Multicellular
- Flagella
- Cell wall
- Central vacuole
- Chloroplasts
- Nucleus

Measuring specimens (we did not do in this lab, but useful to know)

- 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 (µm). 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=cDVJlHpiGNo
- Part 2. Overview of microscope and preparation of a specimen.
  - 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

Videos: Robyn Wood, Klaudia Jurkemik, Hilary Brown - Vancouver Community College