

Vancouver Community College
Biology 1120
Instructor Maria Morlin

September 2021 – hybrid course

Lab: Microscopy

Outline

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- Methods
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- VCC biology lab images
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- Notes on Köhler illumination
- Notes on measurements
- Vancouver Community College lab video resources

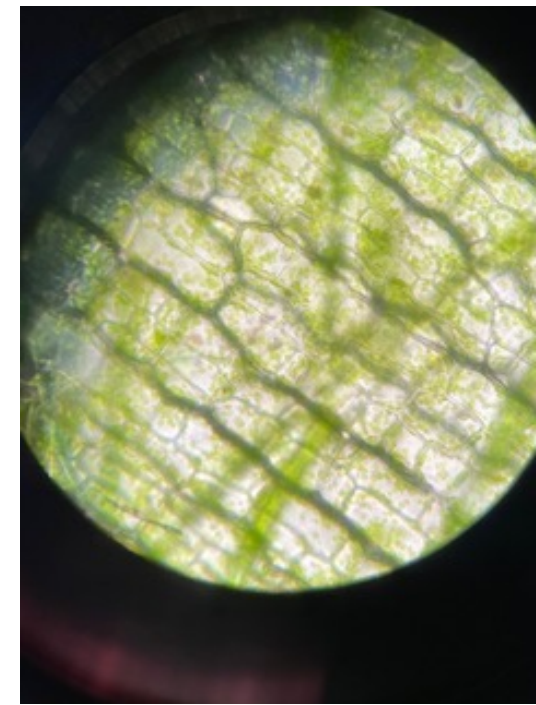
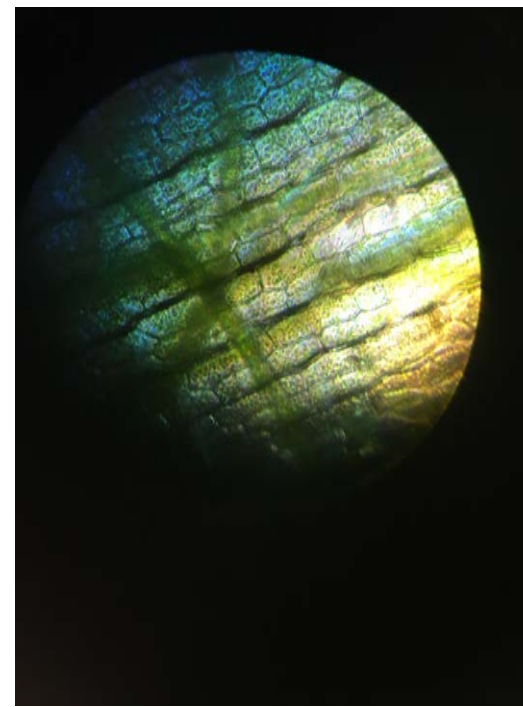
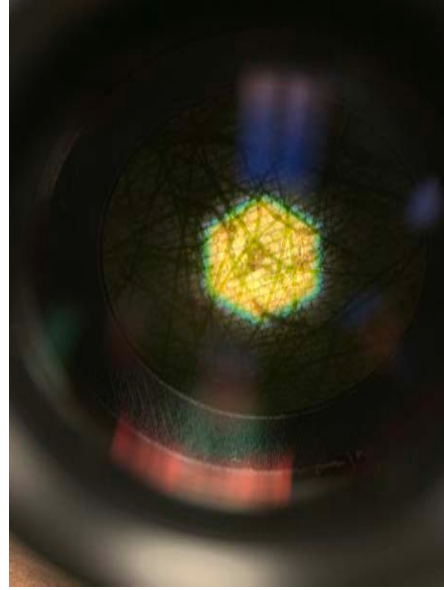
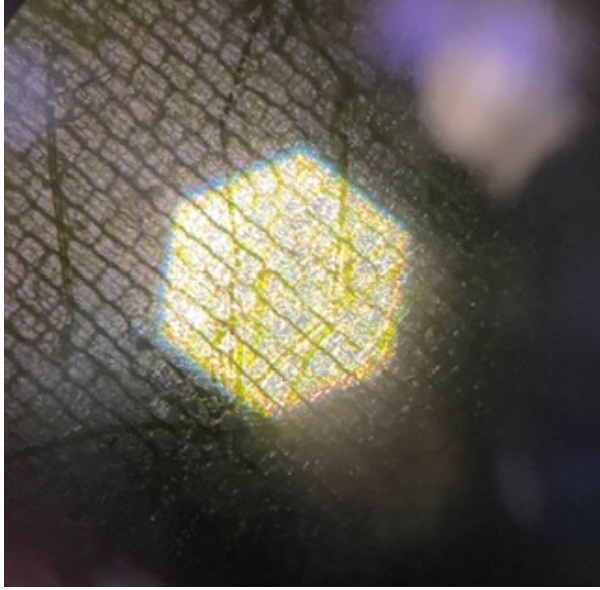
Objectives

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. Identify a slide of an elodea (plant) sample.
3. Identify a buccal epithelial cell, draw and label.
4. Explain Köhler illumination
5. Measure specimen diameter.
6. Measure the size of a drawing.

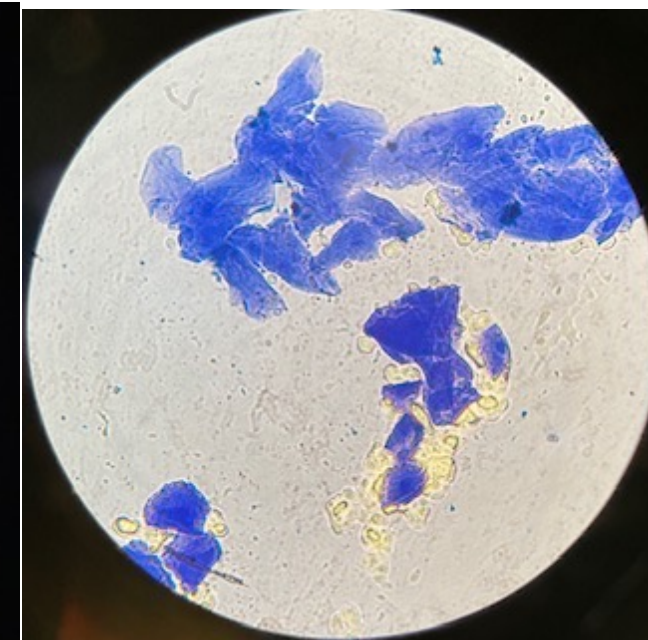
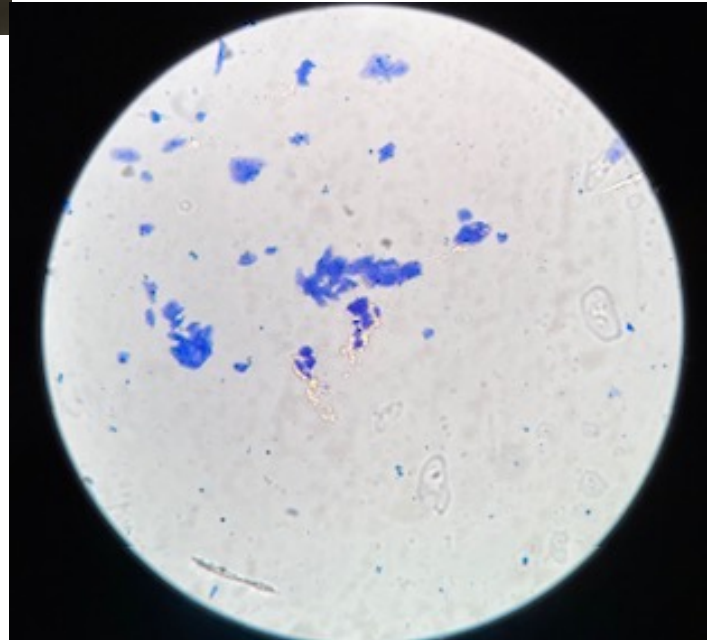
Methods

- The lab demonstrator will show you how to prepare the slides.
- Draw your specimen in a circle representing the field of view. Draw it to scale. That way you can find the size of your specimen in future.
- It's important to be careful with the microscopes
 - Carry them with both hands
 - Always start your observations with the lowest magnification
- Take your time finding the right structures. Only go to a higher magnification if you have the specimen focused. Once you go higher, only use the fine focus.
- Make sure the glass slide is secure in the clips on the stage.

Student submission of cellfies 2021



These were taken through the ocular lenses. The green structures are plant cells. The blue-stained structures are cheek epithelial cells. The hexagons show a closed diaphragm, placing the hexagon in the middle of the field of view (FOV) with a blue light around sharp edges. Well done.



Students cellfies continued

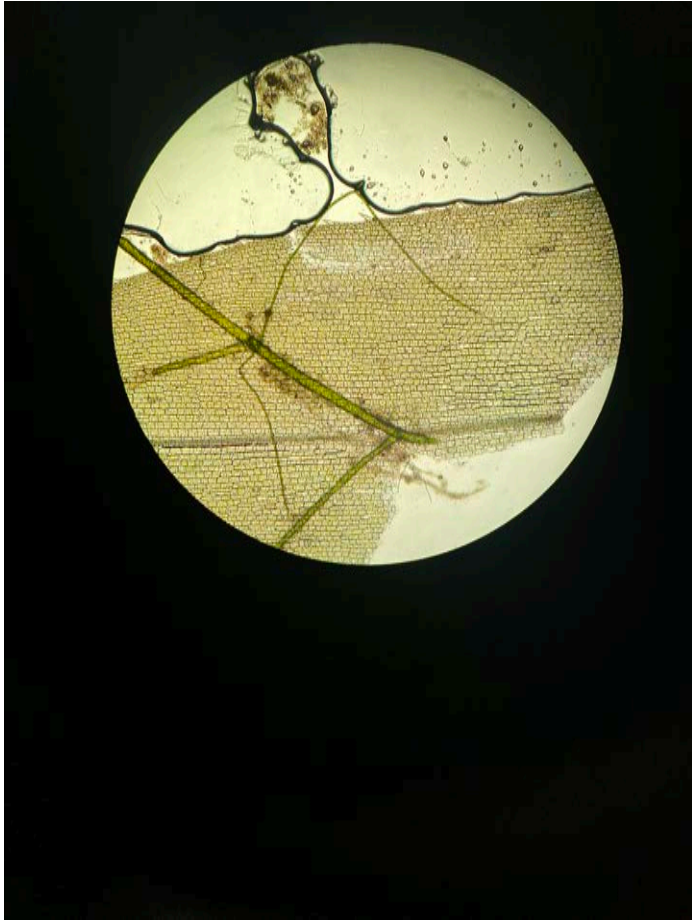


Photo A. Submitted by Victoria Elodea. Magnification 50x

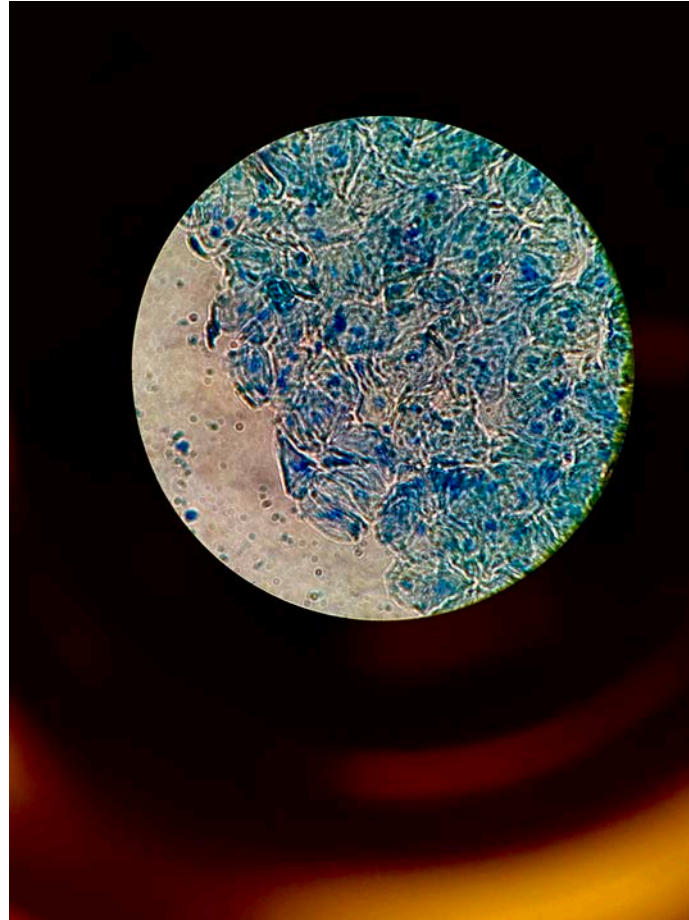
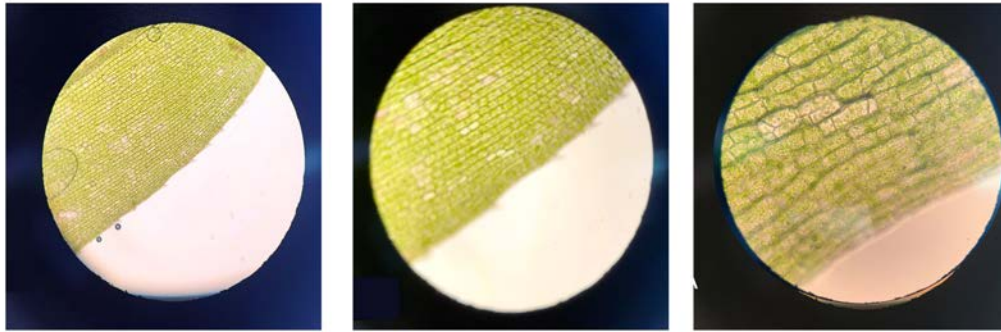


Photo B. Submitted by Victoria Cheek cells. Magnification 100x

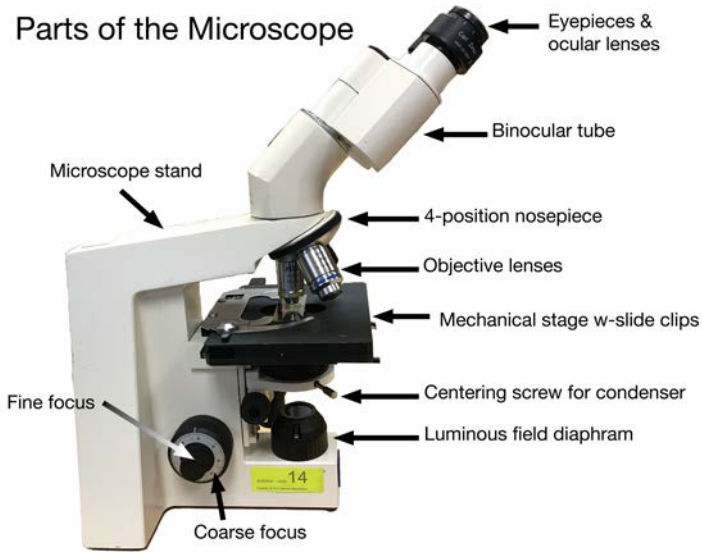
VCC biology lab slide images

Elodea under the microscope at increasing magnifications

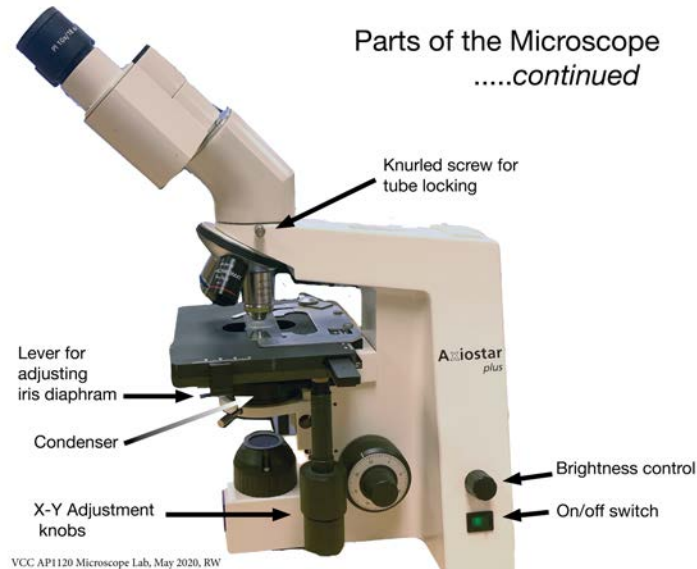


50X → 100X → 400X

Parts of the Microscope



Parts of the Microscope
.....continued



Field of View Measurements
Zeiss Axiostar Plus

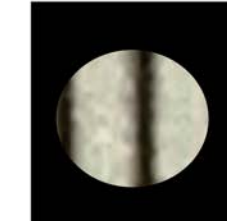
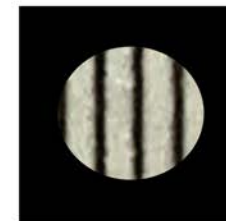
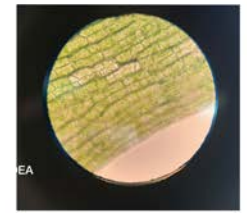
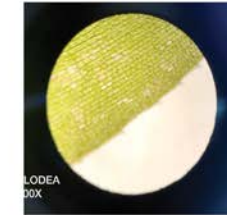
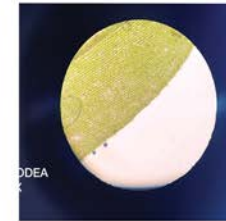
50X



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

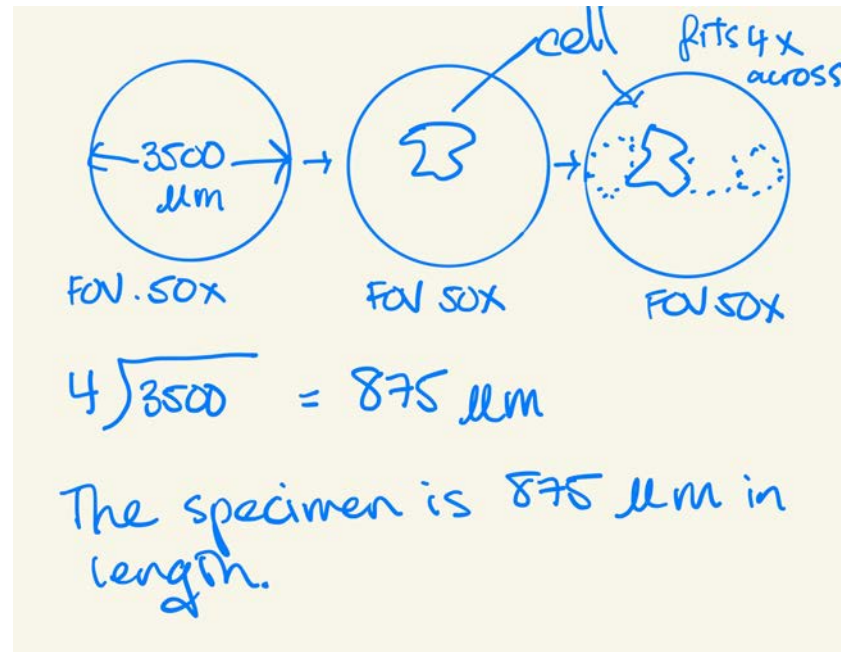
Field of View (microns): 440

Notes on microscopes and observations, Köhler illumination

- Make sure to read the lab handout and answer the questions. 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 specimens from the lab (previous slides) 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.

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 (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=cDVJIHpiGNo>
- 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>