

Microscope Lab – Prokaryotes and Eukaryotes

Objectives:

1. Explain the difference between prokaryotic and eukaryotic cells and distinguish each type under the microscope.
2. Compare animal and plant cells and distinguish each type under the microscope.
3. Identify the following structures on prepared slides and explain the functions of each: plasma membrane, cytoplasm, nucleus and cell wall.
4. Examine the diversity in cell size and shape.
5. Properly use a microscope.

USE A PENCIL to draw specimens!

Introduction:

All cells have certain common features, including a fluid-filled cytoplasm surrounded by a plasma (cell) membrane, DNA and ribosomes. Some cells, including prokaryotes, plants and fungi have cell walls surrounding their plasma membrane for protection and support.

Biologists recognize two major categories of cells – prokaryotes and eukaryotes. Prokaryotes lack membrane-bound organelles including the nucleus. They are much smaller than eukaryotes. Prokaryotes are bacteria. Eukaryotes are all other living organisms and contain membrane-bound organelles such as the nucleus. Note the size difference between these two types of cells as you complete the lab.

You will be working on your own and rotating to different stations as you work through the lab. Make sure you are working on the correct part of your lab sheet at each station and follow the instructions for each station. *You can identify the cells due to the fact they were stained. Look for the colored structures on the slides.* **Take TIME on your drawings! You don't have to be an artist to draw an accurate representation of what you see. But you do need to take your time and draw carefully! Points WILL be deducted if sloppy, incorrect or lack of effort is shown.**

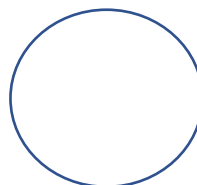
Station ONE: Microscope Practice - e (all students will do this station together)

Follow along on the microscope instruction sheet with your teacher. Use the microscope instruction sheet provided to practice finding the “e” in your view finder. NOTE: DO NOT USE COURSE ADJUSTMENT KNOB ON HIGH POWER (40X)!

1. Place your “e” slide on the stage using low power (4X). Locate the “e” through the eyepiece. How does the position of the “e” in the view finder match the position of the “e” on the slide?

2. As you look through the eye piece at the “e”, move the slide to the left. Which way did the “e” in the view finder move? _____
3. As you look through the eye piece at the “e”, move the slide up. Which way did the “e” in the view finder move? _____
4. Following the step by step instructions on the Microscope Instruction sheet to view your “e” using the high power (40X) lens. Look through your eyepiece and draw what you see in the view finder in the circle below. It should be to scale (draw it exactly as you see it in relationship with the view finder).

Remember: Take TIME on your drawing! You don't have to be an artist to draw an accurate representation of what you see. But you do need to take your time and draw carefully! Points WILL be deducted if sloppy, incorrect or lack of effort is shown.



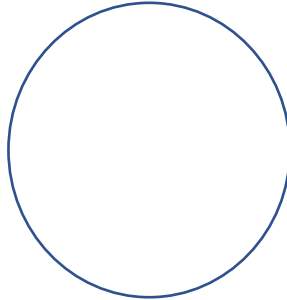
USE A PENCIL to draw specimens!

Station TWO: Prokaryotes/Bacteria

Follow the microscope instructions. Make sure your objective lens is on lowest power (4X) before you begin. Focus, place image in center of view finder and turn objective lens to next higher power (10X). Repeat for 40X. Do NOT use course adjustment on 40X! Only use the fine adjustment knob.

Draw a prokaryotic (bacterial) cell at 40X below. Label the cytoplasm and the cell membrane/wall (you won't be able to distinguish between the two).

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USE A PENCIL to draw specimens!

1. Where is DNA located in this cell?
2. What is the outermost structure surrounding a prokaryotic cell?
3. What structure makes proteins in prokaryotes?

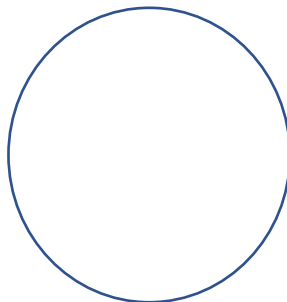
Return your objective lens to 4X before moving to next station.

Station THREE: Unicellular Eukaryote - Amoeba

Follow the microscope instructions. Make sure your objective lens is on lowest power (4X) before you begin. Focus, place image in center of view finder and turn objective lens to next higher power (10X). Repeat for 40X. Do NOT use course adjustment on 40X! Only use the fine adjustment knob.

Draw an amoeba cell at 40X below. Label the cytoplasm, the cell membrane, and the nucleus.

Remember: Take TIME on your drawing! You don't have to be an artist to draw an accurate representation of what you see. But you do need to take your time and draw carefully! Points WILL be deducted if sloppy, incorrect or lack of effort is shown.



USE A PENCIL to draw specimens!

1. Where is DNA located in this cell?
2. How many cells make up this amoeba?
3. What structure makes proteins in prokaryotes?
4. What is the outermost structure surrounding this eukaryote?

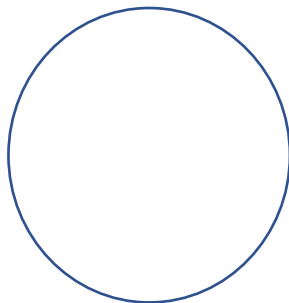
Return your objective lens to 4X before moving to next station.

Station FOUR: Unicellular Eukaryote - Paramecium

Follow the microscope instructions. Make sure your objective lens is on lowest power (4X) before you begin. Focus, place image in center of view finder and turn objective lens to next higher power (10X). Repeat for 40X. Do NOT use course adjustment on 40X! Only use the fine adjustment knob.

Draw a paramecium cell at 40X below. Label the cytoplasm, the cell membrane, and the nucleus.

Remember: Take TIME on your drawing! You don't have to be an artist to draw an accurate representation of what you see. But you do need to take your time and draw carefully! Points WILL be deducted if sloppy, incorrect or lack of effort is shown.



1. How does the DNA in this cell compare to the DNA in the cells of all other living things?
2. What is cytoplasm?
3. What is found inside the nucleus of the paramecium?

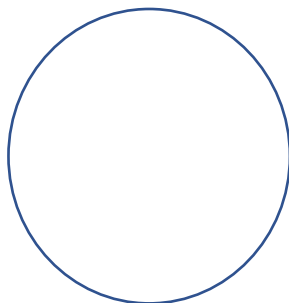
Return your objective lens to 4X before moving to next station.

Station FIVE: Multicellular Eukaryote – Animal Cell

Follow the microscope instructions. Make sure your objective lens is on lowest power (4X) before you begin. Focus, place image in center of view finder and turn objective lens to next higher power (10X). Repeat for 40X. Do NOT use course adjustment on 40X! Only use the fine adjustment knob.

Draw an animal cell at 40X below. Label the cytoplasm, the cell membrane, and the nucleus.

Remember: Take TIME on your drawing! You don't have to be an artist to draw an accurate representation of what you see. But you do need to take your time and draw carefully! Points WILL be deducted if sloppy, incorrect or lack of effort is shown.



USE A PENCIL to draw specimens!

1. What does multicellular mean?
2. Why are cells found in each multicellular organism different shapes and sizes?
3. Does this cell contain ribosomes? Why or why not?
4. What is the outermost structure surrounding this eukaryote?

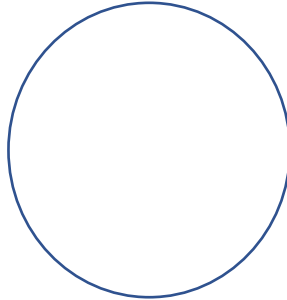
Return your objective lens to 4X before moving to next station.

Station SIX: Multicellular Eukaryote – Plant Cell

Follow the microscope instructions. Make sure your objective lens is on lowest power (4X) before you begin. Focus, place image in center of view finder and turn objective lens to next higher power (10X). Repeat for 40X. Do NOT use course adjustment on 40X! Only use the fine adjustment knob.

Draw a plant cell at 40X below. Draw one that has a nucleus visible. Label the cytoplasm, the cell wall and the nucleus.

Remember: Take TIME on your drawing! You don't have to be an artist to draw an accurate representation of what you see. But you do need to take your time and draw carefully! Points WILL be deducted if sloppy, incorrect or lack of effort is shown.



USE A PENCIL to draw specimens!

1. What two organelles make energy inside plant cells?
2. Why do plant cells have cell walls?
3. Does this cell contain ribosomes? Why or why not?
4. What is the outermost structure surrounding this eukaryote?

Return your objective lens to 4X before moving to next station.

Once you have completed all stations do the following:

1. Stay at your final station and look through your lab to see if you need to complete any portion. If so, do this now.
2. Remove the slide from the microscope you are currently using and place it on the table next to the microscope.
3. Return the objective lens to 4X and raise the stage up as far as it will go.
4. Turn the microscope light off or unplug the microscope (wrapping the cord carefully around it).
5. Look around your area and make sure all is clean.
6. If you borrowed a pencil, return it now.
7. Return to your seat and complete the CER on the last page then turn this paper in to the tray.
8. Wait for further instructions from your teacher.

CER

Question: What is the main difference in structure between a prokaryotic and eukaryotic cell?

Claim <i>An answer to the question based on the data. Complete the sentence below.</i>
The difference between a prokaryotic and eukaryotic cell is that prokaryotes . . .
Evidence <i>Summary of the data or observations (<i>l</i>²). What data supports your claim?</i>
What did you see on your slides that supports your claim above?
Reasoning <i>Explanation based on the evidence to support your claim. Explain each piece of evidence with a reason.</i>
Why are prokaryotes different from eukaryotes?