Name _____ **Period** _____

Regents Biology **Date** _____

LAB _____. CELL STUDIES

The Cell Theory states that all living organisms are made of cells. It was only after microscopes were developed and we were able to view the universality of cells that this theory was accepted. Although cells are the building block of all living organisms, different types of organisms have different types of cells. In this lab, you will be examining and comparing plant, animal, and bacterial cells.

A. Animal Cells: Human Cheek Cells

1. Place a drop of water on a new, clean slide.
2. Take a toothpick and gently rub it against the inside of your cheek. Do **NOT** use force, you are dislodging loose cells, not gouging a hole in your cheek.
3. Stir the water on your slide with the end of the toothpick that you rubbed in your mouth. This will transfer the cells onto the slide.
4. Place one drop of **methylene blue** stain in the drop of water on your slide. Be careful, methylene blue will stain your hands and clothing.
5. Let this stain stay on the slide for one minute and then place a cover slip on the slide.
6. Observe under low power in the microscope and scan the slide. Once you find a good specimen of single cells then turn to higher power and observe further.
7. Make a nice, clear drawing of the cells in the space below and label any identifiable structures. Be sure to find the **cell membrane**, **cytoplasm**, and **nucleus**. Use a colored pencil to complete you drawing.

Size Estimate (Remember, the medium power field of view is 1500µm, the high power field of view is 500µm.)	**Magnification:**

B. Plant Cells: Onion Cells

1. Obtain a new, clean slide.

2. Using forceps remove the thin inner lining from a section of onion bulb. If you need to make the specimen smaller, use a scalpel to cut a small square section of the onion lining to fit on your slide.

3. Place the sample on a slide and place a drop of **iodine solution** on it to stain. Be careful, iodine will stain your hands and clothing. Cover with a cover slip.

4. Observe under low power in the microscope and scan the slide. Once you find a good specimen of cells then turn to higher power and observe further.

5. Make a nice, clear drawing of the cells in the space below and label any identifiable structures. Be sure to find the **cell wall**, **cell membrane**, **cytoplasm**, and **nucleus**. Use a colored pencil to complete you drawing.

Size Estimate (Remember, the medium power field of view is 1500µm, the high power field of view is 500µm.)	**Magnification:**

C. PLANT CELLS: ELODEA CELLS

1. Place a drop of water on a new, clean slide.
2. Using forceps remove a bright green leaf from an *Elodea* plant.
3. Place the leaf in the drop of water on your slide.
4. **Do not stain**. Cover the leaf with a cover slip.
5. Observe under low power in the microscope and scan the slide. Once you find a good specimen of cells then turn to higher power and observe further.
6. Make a nice, clear drawing of the cells in the space below and label any identifiable structures. Be sure to find the **cell wall**, **cell membrane**, **cytoplasm**, **chloroplasts**, and **central vacuole**. Use a colored pencil to complete you drawing.
7. Now focus on one or two cells and watch the cells carefully to see if you see movement within the cells.

Size Estimate (Remember, the medium power field of view is 1500µm, the high power field of view is 500µm.)	**Magnification:**

D. BACTERIAL CELLS

1. Obtain a prepared slide of bacteria. If it needs it, clean it with a piece of lens paper.
2. Observe under low power in the microscope and scan the slide. Once you find a good specimen of cells then turn to higher power and observe further.
3. Your teacher will project a view of the slide using the oil immersion lens (1000x). Observe this view.
4. Make a nice, clear drawing of the cells in the space below and label any identifiable structures. Be sure to find the **cell wall**, **cell membrane**, and **cytoplasm**.

Size Estimate (Remember, the medium power field of view is 1500µm, the high power field of view is 500µm.)	**Magnification:**

SUMMARY QUESTIONS

1. Look back at your drawings and size estimates and complete the chart below.

Cell	Estimated Size
Animal	
Plant (onion)	
Plant (*Elodea*)	
Bacteria	

2. What cell structures or organelles were **visible** in the plant or animal cells?

   animal: _____

   plant: _____

3. List four more cell structures which must be in those cells even though you could not see them:

   animal: _____ _____

   _____ _____

   plant: _____ _____

   _____ _____

4. Of the cell structures *that you saw*, which two cell structures occurred only in plants?

   _____ _____

5. (a) Do all the plant cells that you viewed have chloroplasts? Give evidence from your observations in this lab.

   _____

   _____

   (b) Why would some plant cells not have chloroplasts?

   _____

   _____

6. (a) What is the function of chloroplasts?

_____

_____

(b) What color are chloroplasts? _____

7. (a) What is the general shape of plant cells? _____

(b) Explain which cell structure causes this shape. _____

8. What is the function of the cell wall.

_____

_____

9. (a) Do plant cells have a cell membrane? _____

(b) Was the cell membrane easy to see on the plant cells? _____

(c) Where is the cell membrane of a plant cell?

_____

_____

10. What shape were the bacteria cells? _____

11. Compare the size of the bacteria cells to the plant and animal cells.

_____

_____

_____

12. Why didn't you see any organelles in the bacterial cells?

_____

_____

_____

13. What stain did you use to better see the animal cell? _____

14. What stain did you use to better see the onion root cell? _____

15. Why are stains, like methylene blue and iodine, used when viewing cells?

_____

_____

16. Why didn't we stain the Elodea leaf?

_____

_____

17. Why are the structures within plant and animal cells called organelles?

_____

_____

_____

18. Which life processes do cell organelles perform?

_____

_____

19. Why is it important to study cells?

_____

_____

_____

20. The microorganisms that we viewed earlier were one-celled organisms. Did they have organelles in them? Could you see the organelles? If not, how do you know they had organelles in them?

_____

_____

_____

_____

21. You are given an unknown cell to identify as plant, animal, or bacteria cell. In a paragraph, describe how you would be able to use a compound microscope to identify what type of cell it is.

_____

_____

_____

_____

_____

22. Neatly draw a generalized **plant cell**. Label the organelles.

23. Neatly draw a generalized **animal cell**. Label the organelles.