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Comparing Plant Cells

You have already observed a common plant and animal cell to see how they are alike and different, but are all plant cells alike? How about all animal cells? During this investigation, you will compare plant cells from different parts of the plant. While you are making your observations ask yourself, "Is there a relationship between structure of a particular cell (meaning how it looks and the parts it has) and its function (the job it does for the plant)?"

Materials:

compound light microscope
cover slip
microscope slide
colored pencils
ruler
Elodea sprig
prepared slide—root tip
prepared slide—lilac leaf

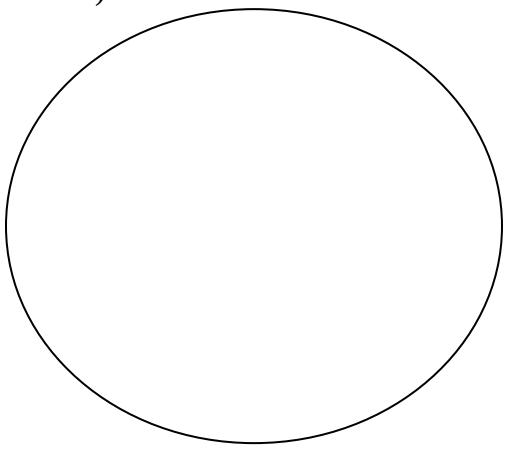
You will use "proper microscope use" as your guide for set up, viewing your specimen, and clean up for this entire lab. Be sure the teacher sees you using it!

Part 1: Form Fits Function

Directions:

Step 1 Get a prepared slide of a <u>root tip</u> and place it on the stage for viewing. Following all the proper procedures, get the root tip cells focused in high power.

Step 2 Draw <u>6 or 7</u> adjoining cells to show how they fit together and the parts they contain (do not fill the entire circle below).



_____, _____X

Step 3 Label these parts (use p. C22 in your textbook to help you): **cell wall, cell membrane, cytoplasm, nucleus, nucleolus** (not in text/ask teacher), and **vacuole** (may not be seen). (When drawing scientifically, use a ruler to draw the line to identify the part, do not use any arrows at the end of the line, and only label one of the parts even though you may see it many times.) **cytoplasm is found on C20*

(a) What cell parts can you see and identify that you have seen before (in the onion skin)?

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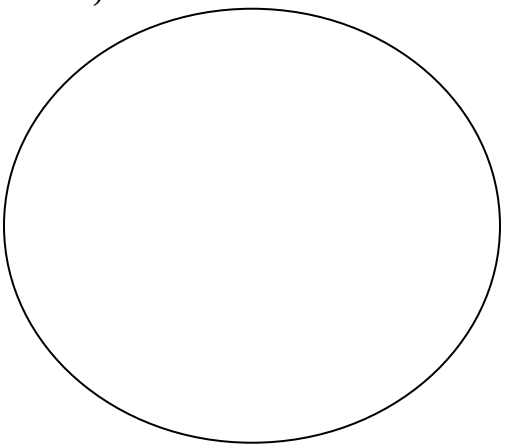
Step 4 Obtain a clean microscope slide, cover slip, and *Elodea* leaf as your teacher directs. Make an **unstained** wet mount prep of the *Elodea* leaf. Try to avoid air bubbles when adding the cover slip and make sure the leaf is not folded over.

Step 5 Following all the proper procedures, get the *Elodea* leaf cells focused in high power. Draw 6 or 7 adjoining cells to show how they fit together and the parts they contain (do not fill the entire circle below).



_____, _____X

Step 6 Label these parts (use p. C22 in your textbook to help you): **cell wall, cell membrane, cytoplasm, vacuole** (may not be seen), and **chloroplasts**. (When drawing scientifically, use a ruler to draw the line to identify the part, do not use any arrows at the end of the line, and only label one of the parts even though you may see it many times.)

(a) What cell parts can you see and identify that you have seen before (in the onion skin or root tip)?

(b) Do you see any new structures that you haven't seen before? If so, what are they and what do they do for the plant (see p. C23 in text)?

(c) Every plant cell has a nucleus, even the *Elodea* cells above…why can't you see it?

Step 7 Clean up as your teacher directs.

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Part 2: How Organisms Are Organized

Directions:

Step 1 Examine a prepared slide of a lilac leaf. Following all the proper procedures, get the lilac leaf focused in medium power. This slide was made by slicing a leaf from edge to edge (width-wise…as if a loaf of bread was being sliced). The slices, called cross-sections, are extremely thin and stained with special dye, so you can better see their parts.

(a) How many different kinds of cell shapes do you see? Describe them and draw an example of each.

(b) Describe how each of the different kind of cells are arranged (i.e., bricklike, tightly packed). Make an inference as to why they are arranged the way they are.

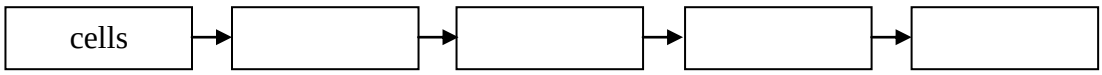
Step 2 Read p. C29-31 in your textbook and briefly summarize what it says in your own words about the **hierarchy** of the organization of a multi-cellular organism. Pay close attention to the picture on p. C30.

Step 3 After reading this passage and examining the cross-section of the leaf, indicate whether it is a tissue or an organ? How do you know?

Summary

1) Why are chloroplasts found in *Elodea* cells and not in the cells of a root tip?

2) Multi-celled organisms are highly organized. Fill in the boxes below to demonstrate the levels of organization (**hierarchy**) in a multi-cellular organism from simple (smallest) to complex (biggest).



3) Would you expect to find the same kind of tissues in a root as in a leaf? Explain your reasoning.

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Application

1) Put a check (✓) by each item that you would expect to find chloroplasts:

oak leaf	skin on your arm
grass roots	skin of a cucumber
potato	lime Jell-O
rose flower petal	parsley

2) Part 1 of this lab was titled, "Form Fits Function." Based on your investigation of these cells and their parts, how exactly does "form" (shape and parts) fit "function" (job or role)? Use specific examples from this lab as evidence.

3) Circle true or false below. If the statement is false, explain why it is false.

   a) All plant cells have a nucleus. true/false

   b) All plant cells have one large vacuole. true/false

   c) Chloroplasts are found in every plant cell. true/false

   d) All plant cell parts can be seen without a stain. true/false

   e) All plant cells do the same job. true/false

   f) All plant cells have a rigid cell wall. true/false

4) Every living thing carries out important life processes which help an organism/cell stay alive. You will learn more about these life processes later, but read the scenario below and identify which organelle is responsible for helping to carry out the life process described.

   a) Transporting materials from place to the other—

   b) Storing waste until it can be excreted—

   c) Reproduction…splitting into two new cells—

   d) Respiration…breaking down glucose to release energy—

   e) Photosynthesis--