

Cells

He who can no longer pause to wonder and stand rapt in awe is as good as dead; his eyes are closed.
-Albert Einstein

Studying Cell Variety


Objectives:

When we have our quiz, you need to be able to do the following:

1. Name the parts of plant cells.
2. Name the parts of animal cells.
3. Tell what each part of a plant cell does.
4. Tell what each part of an animal cell does.
5. Tell why a plant cell is like an animal cell.
6. Tell why a plant cell is not alike or different from an animal cell.
7. Use a microscope to prepare a slide with a plant or animal cell.

Introduction:

Cell Theory - Scientists believe that cells help to build all living things. If this is true, then all living things have cells. Another belief is that there will be times when cells of living things have parts that are the same. Other times, these features will **not** be the same.

What you will be doing is using a microscope to look at plant and animal cells. You will write down how these two cells are alike or the same. Then I will have you draw a picture to show how they look the same. **When you see this symbol**  have the teacher check what you are looking at.

You will also write down how plant and animal cells are different from each other. Like before, you will draw another picture, which will show how they look different, or not the same from each other. Later on we will study other cells that cannot be seen using microscopes.

PLANT CELLS:

Work by yourself when you look at the first slide. When you are working you should try to come up with your own answer. Next, talk to someone else if you are still having difficulty. Do you have the same answer(s)? If you do not, try to figure out why before asking the teacher.


Elodea or Anacharis leaf:

This green water plant will be found in a culture dish on your tray. Keep the water there at all times unless you are taking away a leaf. Look at the plant. Make sure you have a drop of water on the slide for this one leaf. (Having this water on the slide is called a **wet mount**.)

Step One: Put one (1) or two (2) drops of water on your slide. You do not want the leaf to become too dry.

Step Two: Take one very green leaf and put it in the water. Be sure its top is facing up towards the ceiling. Look at the picture below to make sure you have it facing the right way.

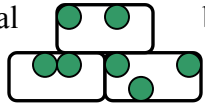


Step Three: Place the thin glass square, also known as a **cover slip**, over the leaf. Look at the cells in the leaf on **4X**.  Then move to **10X**.

Step Four: Look again in the microscope. Can you clearly see the leaf cells? Now move the dial to **40X**. Make sure you have another clear picture of the cells.

This leaf is made up of two (2) layers of cells. You only want to see a layer of large cells.

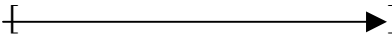
Step Five: You should be able to see the following features or parts:

- **Cell Wall** - This is the thick outer covering of each cell.(the dark lines below)
- **Chloroplasts** - These are the green oval  bodies you see when you look at the cell.
- **Cytoplasm** - This is the clear watery material upon which the green oval bodies stay on top or float.
- **Cell membrane** – A membrane is a thin, soft layer that covers an organ. It is pushed against the inside of the cell wall. You will **not** see it.
- **Vacuole** - this is a large, clear sac or pouch that is filled with water. It can be found in the middle of the green oval bodies or **chloroplasts**. It fills up a lot of the cell. It can only be seen when you move your eyes up and down to find a point where the image is clear. By “clear” I mean that that you can see oval green bodies appearing only around the edge of the cell- the rest is the vacuole.

Try to find this large, clear sac or **vacuole**.
If you cannot, go on.

Step Six: Look at some cells near the vein of the leaf (See picture) on **10X**. Now move the dial to **40X**. In this area, you will see the movement of the green oval bodies.

Step Seven: It's time to share what you saw. To begin your lab report, you will now answer the questions that you see below. **Use the Cell Lab Report Paper.**

1. If you saw any green oval bodies move, tell what you saw. If you did not see any movement, soak up a bit of the water on the slide with a bit of paper towel- then look again. Record what you saw.
2. Make a picture of two cells that you see on your green water plant's leaf. Each cell you draw needs to be about two inches long or:  this long.

In one of these cell pictures, name the parts of the cell that you can see. (The parts you may write down are **cell wall, chloroplasts, cytoplasm, and vacuole.**)

3. Your picture should **only have those parts of the cell that you were able to see**. Using the words which are boldfaced above, write down the cell parts you were **not** able to find.

Using the green pencil in your tray, color the green cell parts you found.

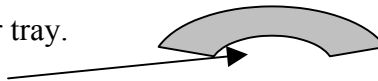
4. These oval green bodies, also known as **chloroplasts**, cannot move on their own. Write down a reason or **hypothesis** to explain what causes the **chloroplasts** or oval green bodies to move in the clear watery material of the plant's cell.

NOTE: THIS SLIDE CAN NOW BE CLEANED AND REUSED.

Onion Skin Cells:

You will find parts of an **onion** in water on your tray.

Step One: Remove one thin layer of the onion.



Step Two: Put the rest of the onion on the tray filled with water.

Step Three: Hold this onion layer so that the curved or **concave** side is facing you. See picture.



Step Four: Tear the layer into two parts. You should see a clear, **paper thin** layer.

Step Five: Put two (2) drops of water on your slide.



Step Six: Now take away a **paper thin** layer from the onion by pulling it off the curved side of the onion. (This is like removing dead skin after a sunburn.)

Step Seven: **THROW AWAY ANYTHING THAT IS LEFT BEHIND. DO NOT PLACE ANYTHING ELSE IN THE BOWL WITH THE OTHER ONION LAYERS.**

Step Eight: With a razor blade or scissors, cut the layer of the onion. Make it smaller than the thin glass square, also known as the **cover slip**. Be careful not to let it dry out. Check to be sure that you have a drop of water on the slide for this layer of onion. (Earlier we called it the **wet mount** when we discussed the Elodea Plant.)

Step Nine: Look at the slide on **4X**. Now move to **10X**.

Step Ten: Write down the cell parts that you see on **10X**.

Step Eleven: Some parts of the cell can be seen better when you stain it. To stain your onion cells, do this:

- a) Take your slide from the platform or **microscope stage** upon which it sits.
- b) Slowly lift the thin glass square.
- c) Add one (1) drop of either iodine, which is reddish in color, or methylene blue stain. **(See me to be sure you are using the right bottle.)**
- d) Put back the glass square or **cover slip**.
- e) Return the slide to the microscope.



In the onion cells, you should be able to see centers or **nuclei**. They should appear as round dark-stained objects. You will see them either in the center of the cell or at the edge of the cell. The center or **nucleus** is the control center for the cell. This means that the center can control everything that a cell does. This control center has **chromosomes** where **genes** are found.

Step Twelve: Look at the many cells on **4X** first. Now move to **10X** to find a regular or normal cell.

Step Thirteen: Find 2-3 regular cells and look at them on **40X**. Now try to locate each of the following:

- **Cell wall** – This is the thick outer covering of each cell.

- **Nucleus** – This is the center of the cell.
- **Cytoplasm** - This is the clear watery material, and it will appear like the dots in the diagram below. You should be able to see that it has a grainy look to it.



- **Vacuole** – This was described earlier as a large, clear sac or pouch filled with water. This area will not be seen right away. (See diagram above.)
- **Cell membrane** – A membrane is a thin, soft layer that covers an organ. In this case the cell membrane will be pushed against the inside of the cell wall. You will **not** see it.

Step Fourteen: Make a picture of three (3) regular onion cells. Name the parts of the onion cells that you see. (The answers you may write down are **cell wall, nucleus, cytoplasm, vacuole, and cell membrane.**) Be sure that each cell is about two inches long (the size of your thumb to your palm).

Step Fifteen: When an onion is grown in the ground, the part of the “whole” onion plant that the onion bulb comes from is only a part of what you see. Now write down a reason why the onion cells we are using do not contain any green oval bodies, also known as **chloroplasts**. (Remember that the reason for these bodies is to help in **photosynthesis when the plant receives sunlight**. Photosynthesis is when the green oval bodies in plant cells take or drink in light and energy. This method is used to make more plant cells.) **Write your reasoning on the Cell Lab report paper.**



ANIMAL CELLS:

Human skin cells

It is easy to get skin cells from inside the cheek of your mouth. **It does not hurt.**

Step One: Put a drop of water on a **clean** glass slide.

Step Two: Take a clean toothpick and scrape the inside of your cheek to get some skin cells. You will see them on the end of the toothpick as a white mass.

Step Three: Put these mouth skin cells into the water on the slide.

Step Four: Hit the toothpick against the slide until the cells fall into the water.

Step Five: Now with the toothpick, move the water around. You will see that the water is cloudy or not clear. This is all right.

Step Six: Next, add one (1) small drop of **methylene blue** stain.

Step Seven: Place the thin glass square coverslip on top.

Step Eight: Look at what you have. Use **4X** first. Now use **10X** to look at your cheek cells. These cells will look like they do not have any shapes. You will also find them in groups. The center or **nucleus** of the cheek cells will be the darkest spot in the cell.

Step Nine: Look at them again. Move the dial to **40X**. Do you see the cell parts listed below?



- **Cell membrane** – This is the outside part in animal cells. Animal cells **DO NOT HAVE A CELL WALL**. You should find that the outside part is thinner. It is thinner than the cell wall of plant cells. The cell membrane can have power over how molecules move in and out of the cells. Remember this.
- **Nucleus** – This is the center or middle of a cell.
- **Cytoplasm** – This is clear watery material. This will fill the cell in most animal cells.

Step Eleven: Draw three (3) cheek cells. Be sure that each cheek cell is two inches long.

Step Twelve: Tell what each part is. (The answers you may write down are **cell membrane, nucleus and cytoplasm**.)

Amoeba Cells (A prepared slide and drawing from the book)

In your tray you will see a slide that already has something on it. I have marked it “Amoeba proteus.”

This Amoeba cell is a big single-celled animal. This means that is only **one cell**. This Amoeba animal lives in ponds and lakes. Its shape is not always the same. Also, you will see that these cells are not colored the same as the others. These look like large **pink** “splats”, or so I’m told. This color is so that you could see them better.

Step One: Tell me if there is anything wrong with your slide before we begin.

Step Two: You will need to look at this slide first on **4X**. Now move the dial to **10X**.

Do you see the different colored Amoeba cells? As you look at these cells, do not pay attention to anything else you may see on the slide that does not look like the large pink “splats”.

Step Three: Look at three (3) different Amoeba cells on the slide, using **40X**.

Step Four: Draw two (2) cells. (Two inches please.)

Step Five: Write what each part is. (The answers you may write down are **cell membrane, cytoplasm, nucleus, and vacuole**, which you may or may not see in some of your cells.) To see everything in this cell, keep moving the dial to higher numbers.

Step Six: Go over **Steps Two through Step Five** again. Have you done everything?

SUMMARY COMPARISON OF PLANT AND ANIMAL CELLS

The rest of this work can be done **outside of this class**. To finish, be sure that you have these drawings on your **Cell lab report paper: elodea cells, onion cells, cheek cells, and Amoeba cells**. Check with me to see if there are any others you need.

Plant and animal cells look a lot like onion and elodea cells. Animal cells will look more like cheek and Amoeba cells. Answer these questions. You may use your drawings to help you.

- 1. Look at the shapes of the plant cells. Now look at the shapes of the animal cells. How are they not alike?**
- 2. What cell parts can be found in only green plant cells? (Use the elodea cell as an example.)**
- 3. What parts are seen in every plant and animal cells?**

On a piece of paper, draw a generalized green plant cell and a generalized animal cell. This means that these drawings will not look like any certain green or animal cell that you saw in our lab. You may refer to drawings of cells in either the textbook or the Kids Discover:Cells.



Now give a name to each drawing (Green Plant Cell) and (Animal Cell). Once again, **name the parts in each cell**.

In this class we will see other cell types and structures. Because they cannot be seen with the microscopes in our room, we will look at pictures of these cells. You will learn about their different cell parts. This needs to be done before you take the quiz over cells. Use your drawings and notes will help you review for the plant and animal cell parts quiz.

- 4. In your own words, write down what you think cell theory is.** Look at Page 1 of this packet, or the book section on Cell theory. It will help you with your answer.