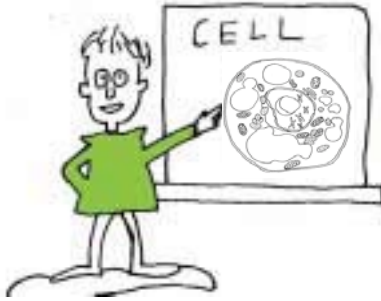


# What are cells?

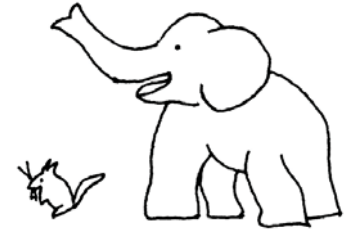
Hello, everyone. Today, I am going to talk about cells.



Wherever you look, there are living things, such as trees, birds, and flowers.



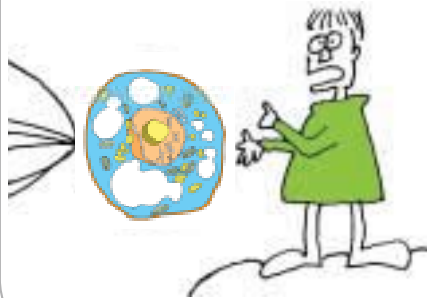
All living things have different sizes, shapes, and characteristics, but...



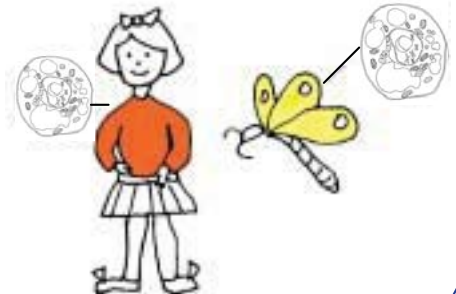
... they have one thing in common.



The commonality is that they are all made of cells.



Cells are basic units of all living things including human beings, like...



... a building brick of this Lego castle, or a brick of this house.

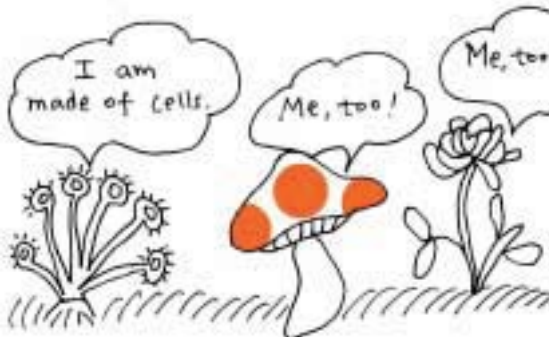


For example, dogs are made of cells and ...

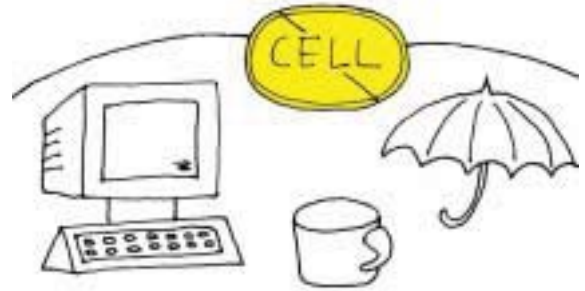


# What are cells?

... so are all plants.



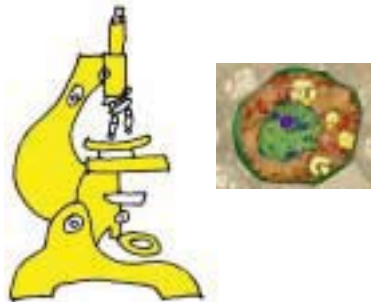
But nonliving things do not have cells.



Do you think you can see cells with your eyes? No. Cells are so tiny that you cannot see them with naked eyes.



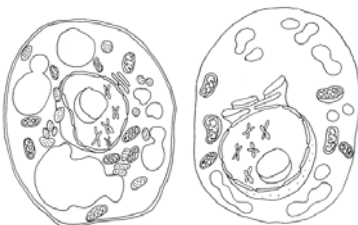
You have to use a microscope to see cells.



As you can see, cells are not exactly the same in their shapes and structure.



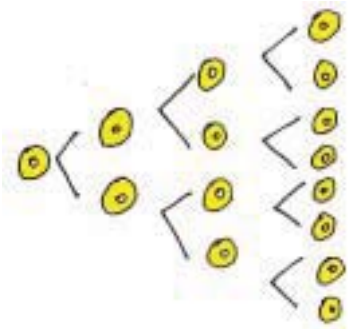
But they are remarkably similar, as in these drawings.



There is one more thing you have to remember about cells.



New cells are produced from existing cells.

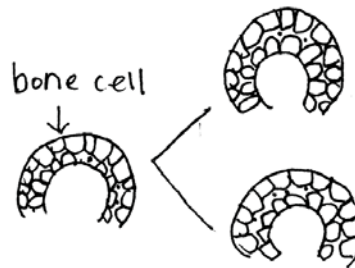


# What are cells?

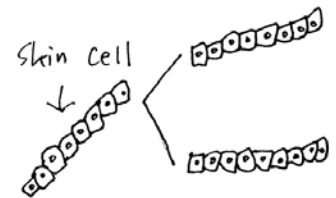
So when you grow,



it's because your bone cells are making more bone cells, and ...



... your skin cells are making more skin cells.



Can you understand? Ok. Now, I am going to ask you some questions.



Read what I've said once again and ...



... read "Things to Remember!" in the next page and then complete practices.



Answer key is provided on the next page of the practices.



See you in the next lesson.

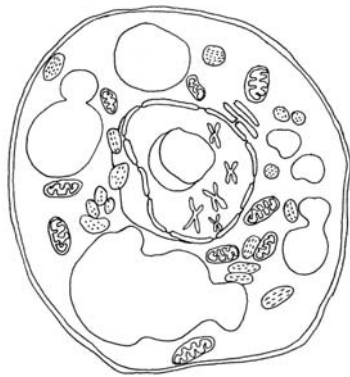


# What are cells?

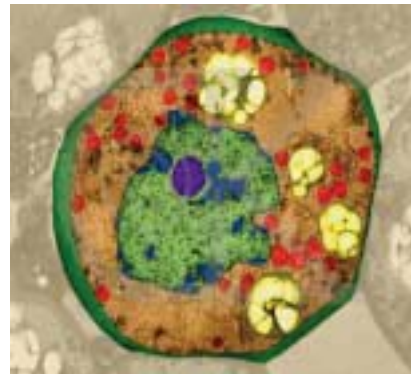


## Things to Remember!

1. Cells are basic units of all living things including human beings.
2. Cells are not exactly same in their shape and structure, but remarkably similar.
3. New cells are produced from existing cells.



Line drawing of a cell

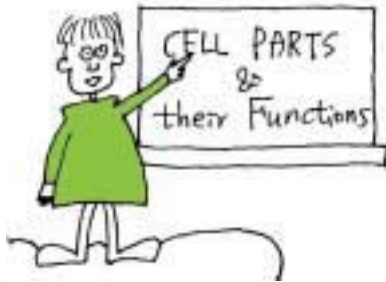


Real image of a cell



# What are cell parts and their functions?

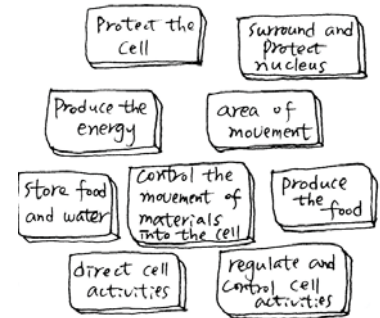
Now is the time to see what cell parts are and what function each part has.



Even if cells are very tiny, they are made of smaller parts.



And the parts do different jobs.



Let's get aboard a ship to make a journey into the cell parts. Ready?



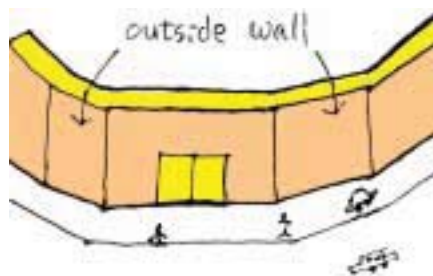
We have reached the first cell part. Can you say hello to him?



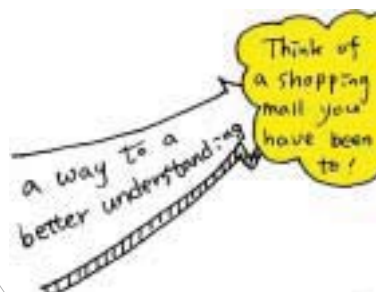
Welcome to the land of a cell. My name is cell wall. I am only in plant cells. I surround and protect the cell, and make it strong and stiff, like...



... the outside wall of a shopping mall, which provides shape and protection for it.



Have you ever been to a shopping mall before? Good! Then you can understand us more easily.



My nickname is the "Supporter and Protector". Have a nice trip!

**CELL WALL**  
" SUPPORTER & PROTECTOR

# What are cell parts and their functions?



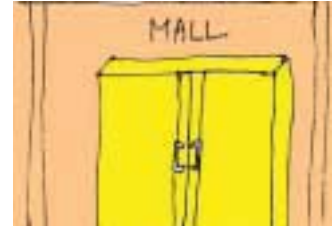
Thank you. After we pass through the cell wall, we can see something similar to the cell wall. There it is. Hi!



Hi, I am cell membrane. I hold and protect the cell.



Well, I also control what substances come into and out of the cell, like an entrance you have to pass to get into the shopping mall.



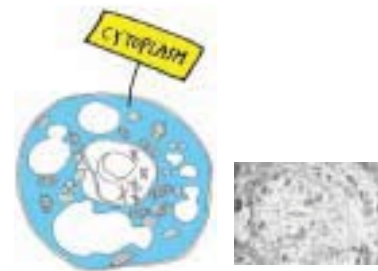
I am the "Gate of the cell".

**CELL  
MEMBRANE  
||  
GATE  
OF THE  
CELL**

Thanks. As we pass through the cell membrane, we are in quite a spacious place. His name is cytoplasm. Hi!



Hello! My name is cytoplasm. I am a watery, gel-like material in which cell parts move and cell activities take place, like ...



... the hallways of the mall where people move.



I am the "Area of Movement".

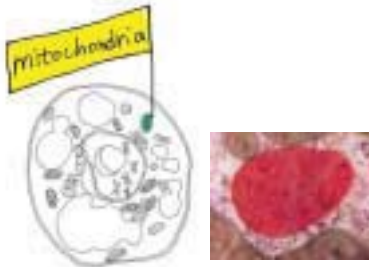
**CYTOPLASM  
||  
AREA OF  
MOVEMENT**

Thank you, cytoplasm. Now, we can meet mitochondria inside the cytoplasm.

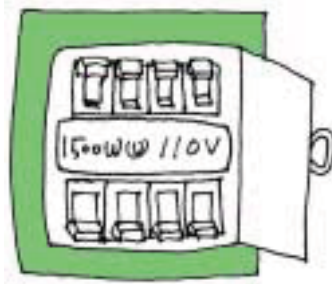


# What are cell parts and their functions?

Hi, my name is mitochondria. I produce most of the energy for the cell, like ...



... an electrical system of the shopping mall, which supplies electrical energy.



I am the "Powerhouse of the Cell".

**MITOCHONDRIA  
II  
POWERHOUSE  
OF THE  
CELL**

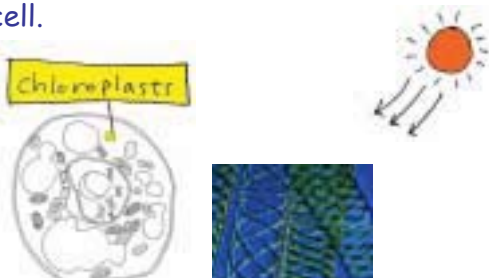
Are you understanding the parts well? You may more easily understand them when you are trying to match the cell parts with what you already know, like the shopping mall you have been to.



Ok. Let's start again. In the cytoplasm, we can also meet chloroplasts. Hi.



Hi! I am chloroplasts. I am only in plant cells, like the cell wall. I contain chlorophyll, which captures energy from sunlight and uses it to produce food for the cell.



I am like a pizza shop in the mall that makes food.



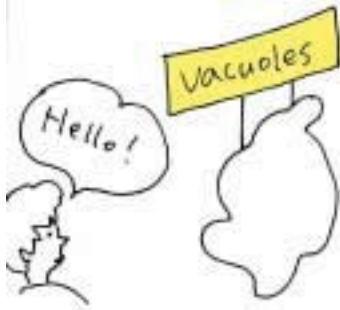
So my nickname is "Food Producers".

**CHLOROPLASTS  
II  
FOOD  
PRODUCERS**

# What are cell parts and their functions?



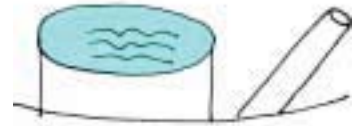
Thanks, chloroplasts.  
Near chloroplasts, we can  
easily find vacuoles. Say  
Hello!



Hello! My name is vacuoles.  
I store food, water, and  
chemicals, like ...



... water tank and pipes of  
the mall, which store water.



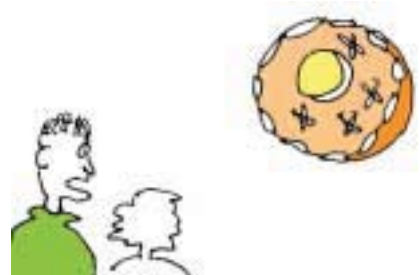
My nickname is  
"Storage Tanks".  
Enjoy the rest of your  
trip!

VACUOLES  
" "  
STORAGE  
TANKS

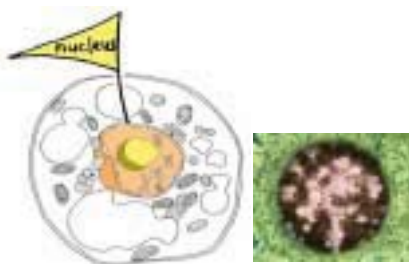
Not yet. We have 3 more  
parts to visit.



Now, a large oval structure  
inside the cell catches our  
attention. Hi!



Hi! My name is nucleus. I  
regulate and control cell  
activities, acting like the  
"brain" of the cell, like ...



... the mall office, which  
regulates and controls  
activities of the shopping  
mall.



My nickname is "Control  
Center".

NUCLEUS  
" "  
CONTROL  
CENTER

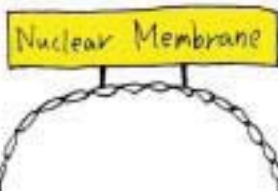




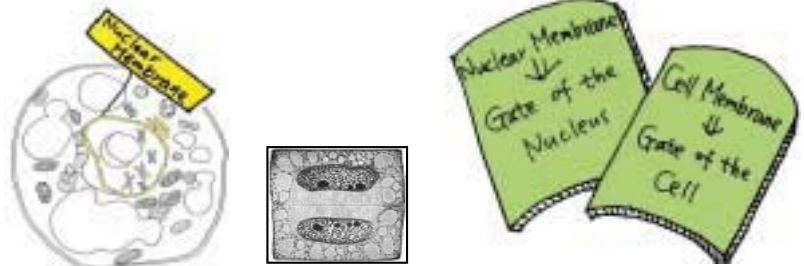
# What are cell parts and their functions?



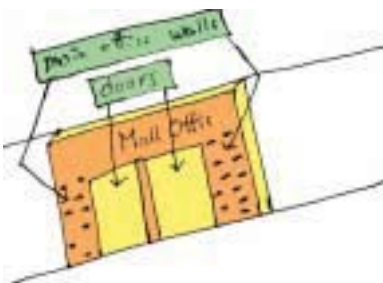
Now, we will meet the nuclear membrane. Do you remember we passed through cell membrane to come inside of the cell? The nuclear membrane is just like the cell membrane.



Yes, you are right. I, the nuclear membrane, protect the nucleus and also allow substances to pass in and out of the nucleus, as the cell membrane does the same for the cell.



I am like the main office walls of the mall and its entrance, which protect the office and let workers in and out.



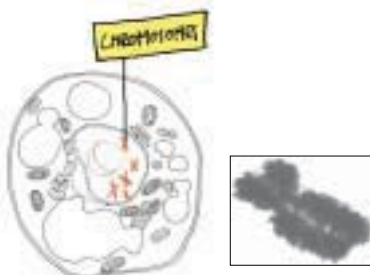
My nickname is the "Gate of the Nucleus".

**NUCLEAR  
MEMBRANE  
||  
GATE  
OF THE  
NUCLEUS**

Thanks. Now, we are almost at the end of the journey. Be careful not to avoid the delicate chromosomes. Hi!



Hi. I am chromosomes, which direct the activities of cells, like ...



... a mall office director who works in the office and directs all the activities of the shopping mall.



You can remember me as the "Director of the Cell".

**CHROMOSOMES  
||  
DIRECTOR  
OF THE  
CELL**



# What are cell parts and their functions?



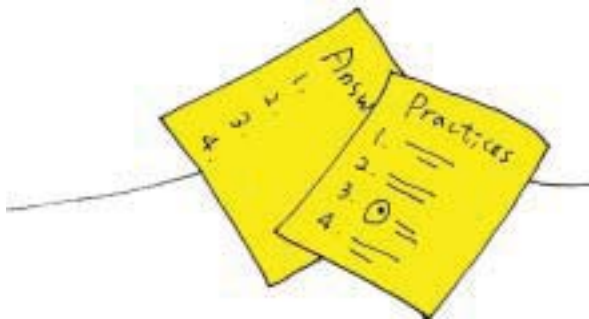
Thank you, chromosomes.  
We have finally  
completed our long  
journey into the cell  
parts. Was it fun?



Good. Now, we are home. Take a breath and read  
"Things to Remember!!" in the next page to summarize  
what you have heard from cell parts.



Then, a couple of practices and the answer key  
are waiting for you.



See you soon. Bye!



# What are cell parts and their functions?

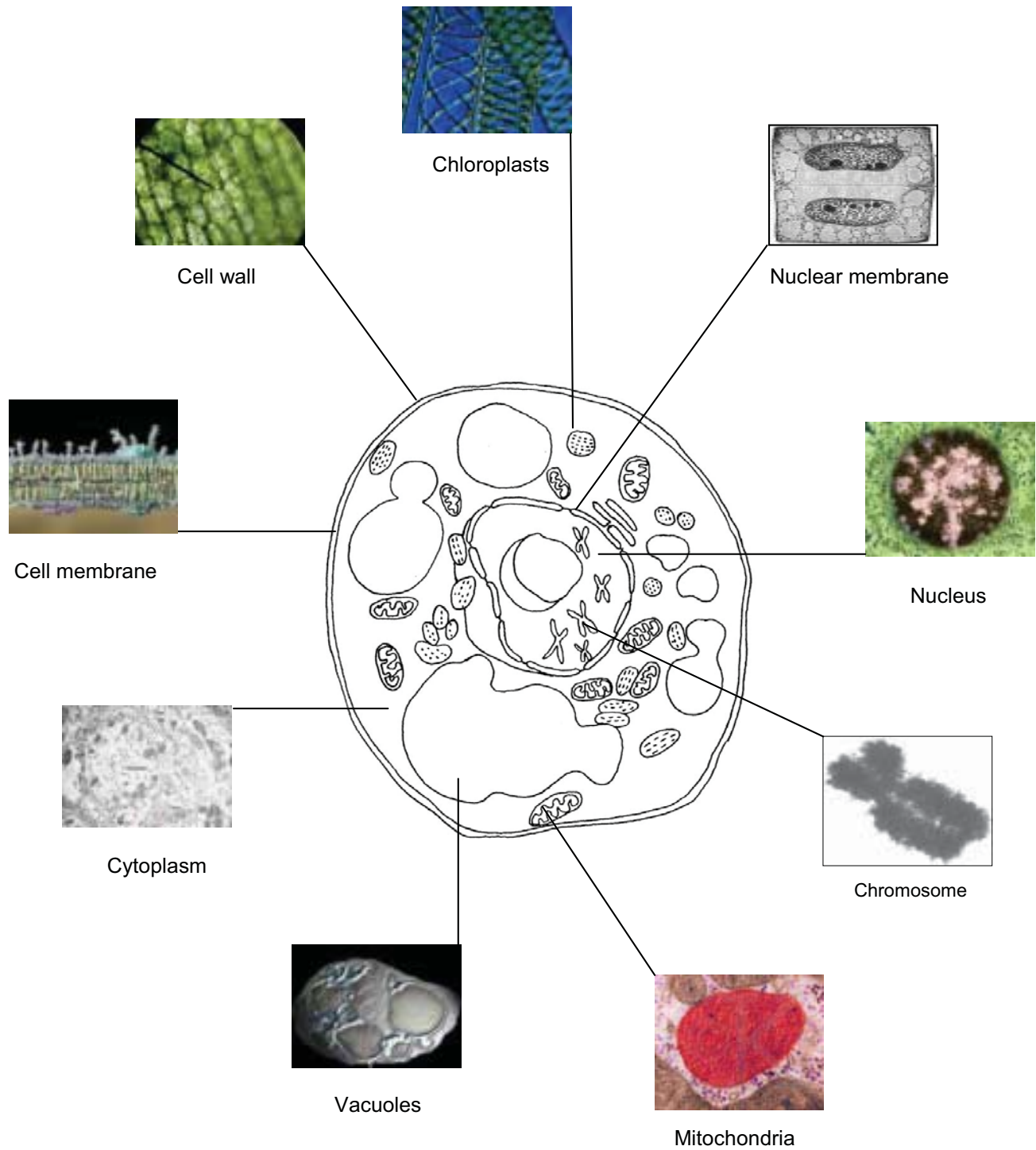


## Things to Remember!!

	Cell Parts	Main Functions	Nick Name
1	Cell wall	<ul style="list-style-type: none"> <li>• Surround and protect the cell</li> <li>• Make the cell stiff and strong</li> </ul>	Supporter and protector
2	Cell membrane	<ul style="list-style-type: none"> <li>• Hold and protect the cell</li> <li>• Control the movement of materials into and out of the cell</li> </ul>	Gate of the cell
3	Cytoplasm	<ul style="list-style-type: none"> <li>• A watery, gel-like material in which cell parts move</li> </ul>	Area of movement
4	Mitochondria	<ul style="list-style-type: none"> <li>• Produce and supply most of the energy for the cell</li> </ul>	Powerhouse of the cell
5	Chloroplasts	<ul style="list-style-type: none"> <li>• Contain chlorophyll</li> <li>• Capture the energy of sunlight and use it to produce food for the cell</li> </ul>	Food producers for the cell
6	Vacuoles	<ul style="list-style-type: none"> <li>• Store food, water, and chemicals</li> </ul>	Storage tanks
7	Nucleus	<ul style="list-style-type: none"> <li>• Act as the 'brain' of the cell</li> <li>• Regulate and control all cell activities</li> </ul>	Control center
8	Nuclear membrane	<ul style="list-style-type: none"> <li>• Surround and protect the nucleus</li> <li>• Control the movement of materials into and out of the nucleus</li> <li>• Exist in the nucleus</li> </ul>	Gate of the nucleus
9	Chromosomes	<ul style="list-style-type: none"> <li>• Direct cell activities</li> <li>• Exist in the nucleus</li> </ul>	Director of the cell



# What are cell parts and their functions?



Line drawings and real images of cells

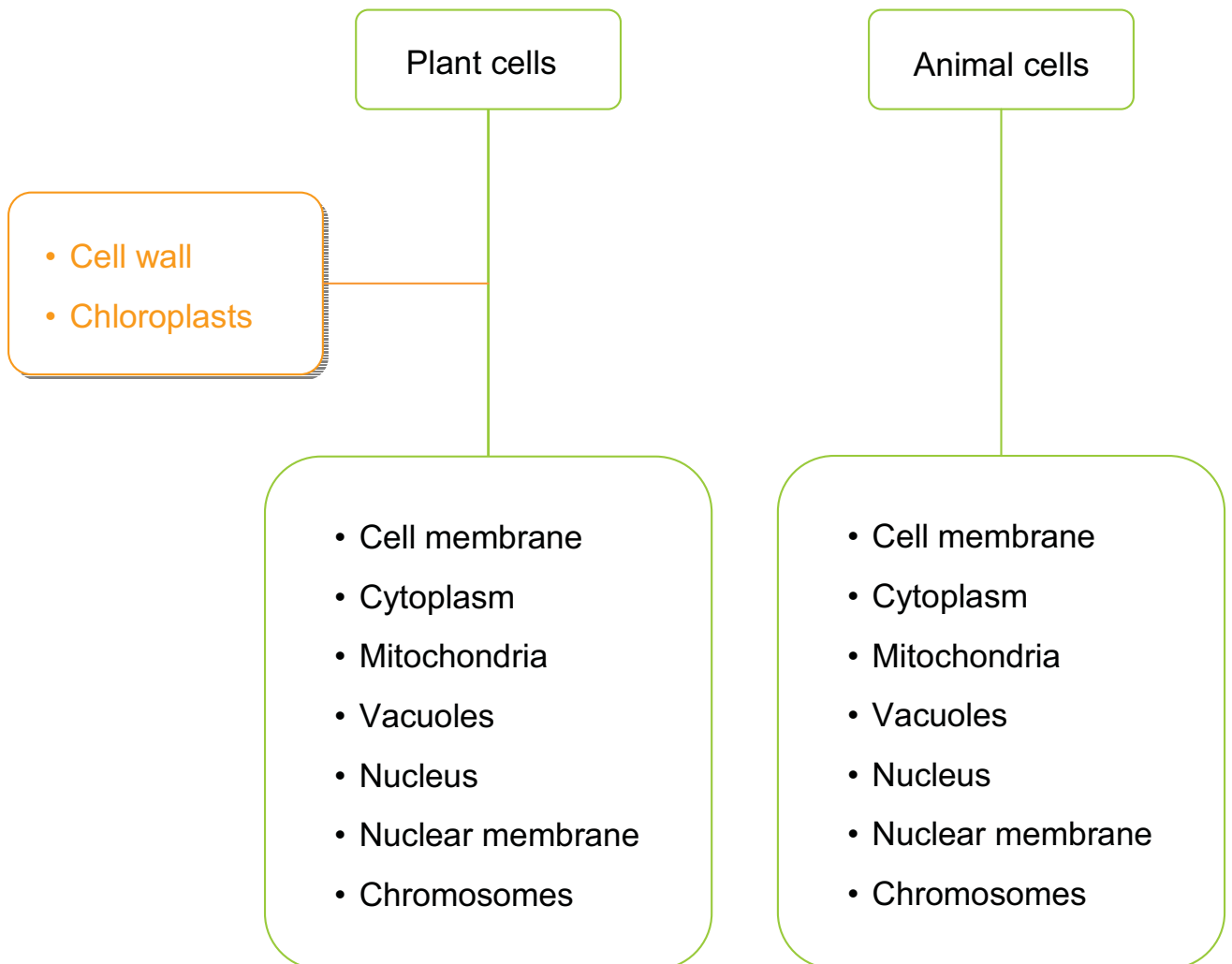


# Are plant and animal cells the same or different?

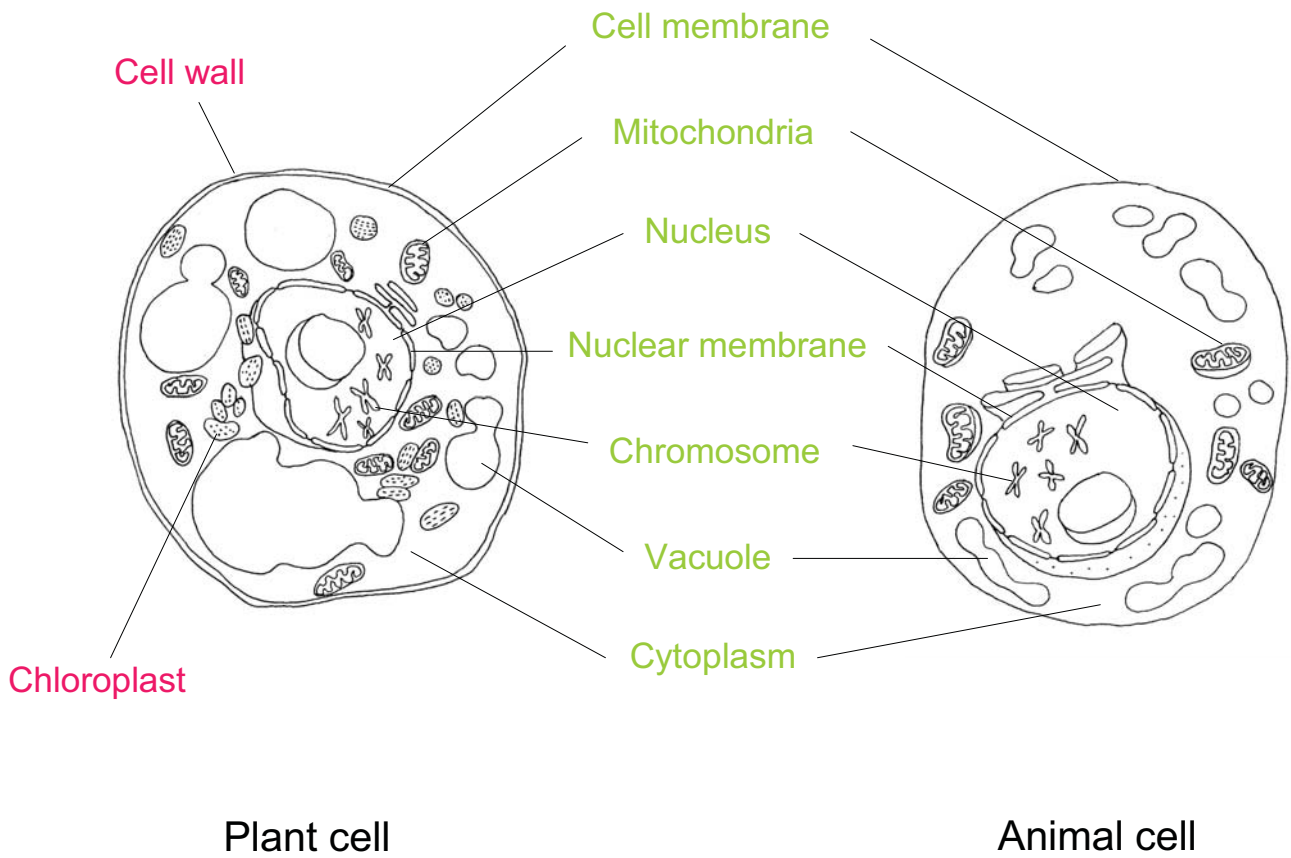
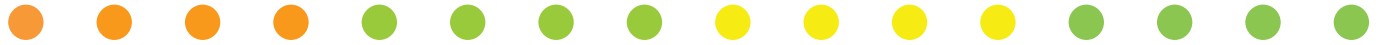


## Things to Remember!!!

1. Both plant cells and animal cells have 7 cell parts: **cell membrane, cytoplasm, mitochondria, vacuoles, nucleus, nuclear membrane, and chromosomes.**
2. In addition to the 7 parts, plant cells have 2 more parts: **cell wall** and **chloroplasts.**



# Are plant and animal cells the same or different?



# Are plant and animal cells the same or different?



We have learned about cells and their parts so far. You are almost at the end.



Most living things can be divided into two. Do you know what they are?



Yes!! Plants and ...



... animals.



Then, are plant cells and animal cells the same or different?



For example, do you think apple cells are different from frog cells?



To answer this question, look at these two pictures. Left is a picture of a plant cell and right is of an animal cell.



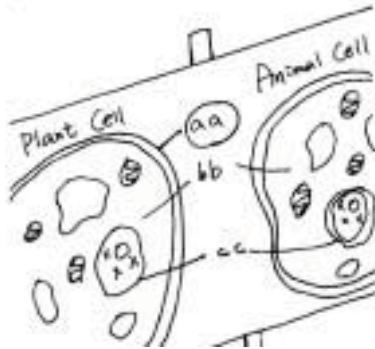
Can you tell any differences?



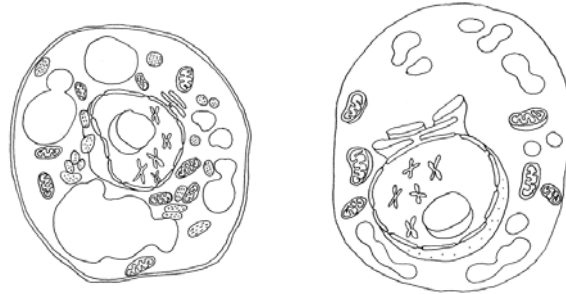
# Are plant and animal cells the same or different?



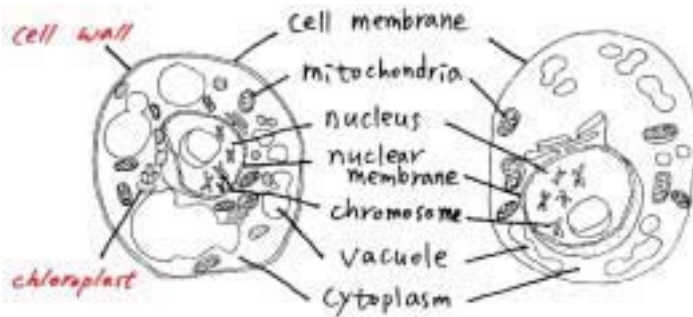
Circle any differences you identified.



Difficult? Look at the pictures. They are very much alike, but...



... plant cells have two more parts, *cell wall* and *chloroplasts*, in addition to all the seven cells parts in animal cells.



Now read "Things to Remember!!!" in the next page and complete practices.



Then, turn on the computer for more practices.



You have done a very good job so far. I am proud of you!

