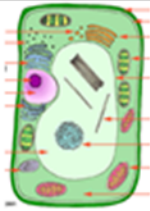
Cellular Design

Written Response #4

- Draw and Complete the Chart.

There are 3 examples of cells that you MUST KNOW!!! Let's figure out how to categorize them!

Name	Bacteria 	Plants 	Animals 
Characteristics	NO nucleus DNA	Nucleus DNA Internal Structures	Nucleus DNA Internal Structures
Cell type			
Justification			

Written Response

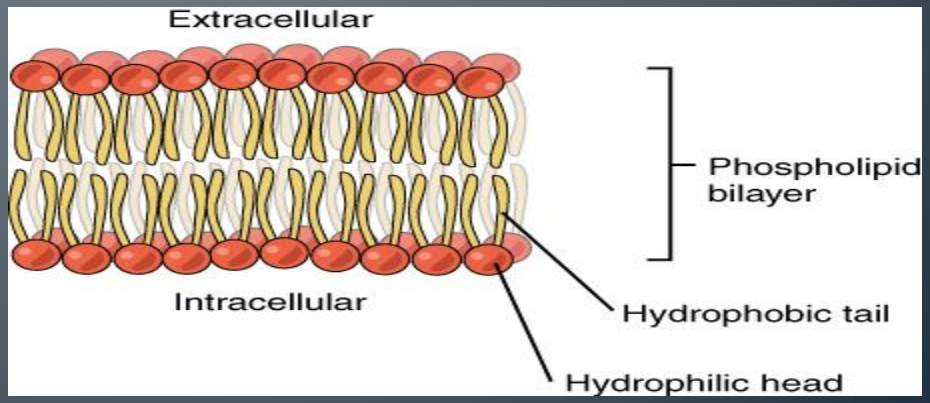
- In this True/False Activity; you and your partner will discuss the question, record your response (both), and share your answer with the class. Be prepared to justify your answer.
- You are allowed to search answers.
- You will be limited to 20 seconds per question.

Written Response 5-16

-TRUE/FALSE – Explain why you said your answer is true. If the answer is false record why you think it is false.

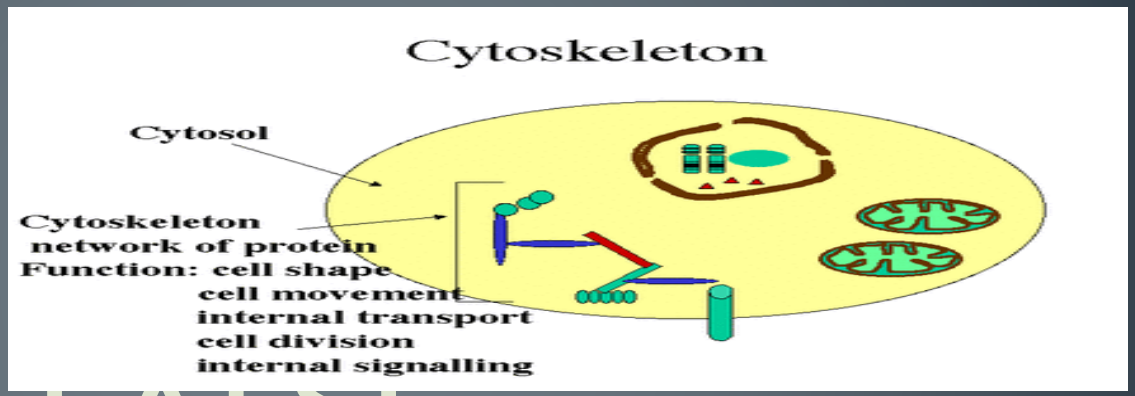
- The water-hating hydrophobic tails of the phospholipid bilayer face the outside of the cell membrane.

FALSE – THE TAILS FACE TOWARD EACH OTHER INSIDE OF THE BI-LAYER



TRUE/FALSE

The cytoplasm essentially acts as a “skeleton” inside the cell.



FALSE - CYTOSKELETON

TRUE/FALSE

Plant cells have special structures that are not found in animal cells, including a cell wall, a large central vacuole, and plastids.

TRUE

TRUE/FALSE

Centrioles help organize chromosomes before cell division.

TRUE

TRUE/FALSE

Ribosomes can be found attached to the endoplasmic reticulum.

TRUE

TRUE/FALSE

ATP is made in the mitochondria.

TRUE

TRUE/FALSE

Many of the biochemical reactions of the cell occur in the cytoplasm.

TRUE

TRUE/FALSE

Animal cells have chloroplasts, organelles that capture light energy from the sun and use it to make food.

FALSE – PLANT CELLS

TRUE/FALSE

Small hydrophobic molecules can easily pass through the plasma membrane.

TRUE

TRUE/FALSE

In cell-level organization, cells are not specialized for different functions.

FALSE – CELLS HAVE MANY DIFFERENT FUNCTIONS IN THE BODY AT THE CELLULAR LEVEL SUCH AS LUNG CELLS COMPARED TO SKIN CELLS.

TRUE/FALSE

Mitochondria contains its own DNA.

TRUE

TRUE/FALSE

The plasma membrane is a single phospholipid layer that supports and protects a cell and controls what enters and leaves it.

False

TRUE/FALSE

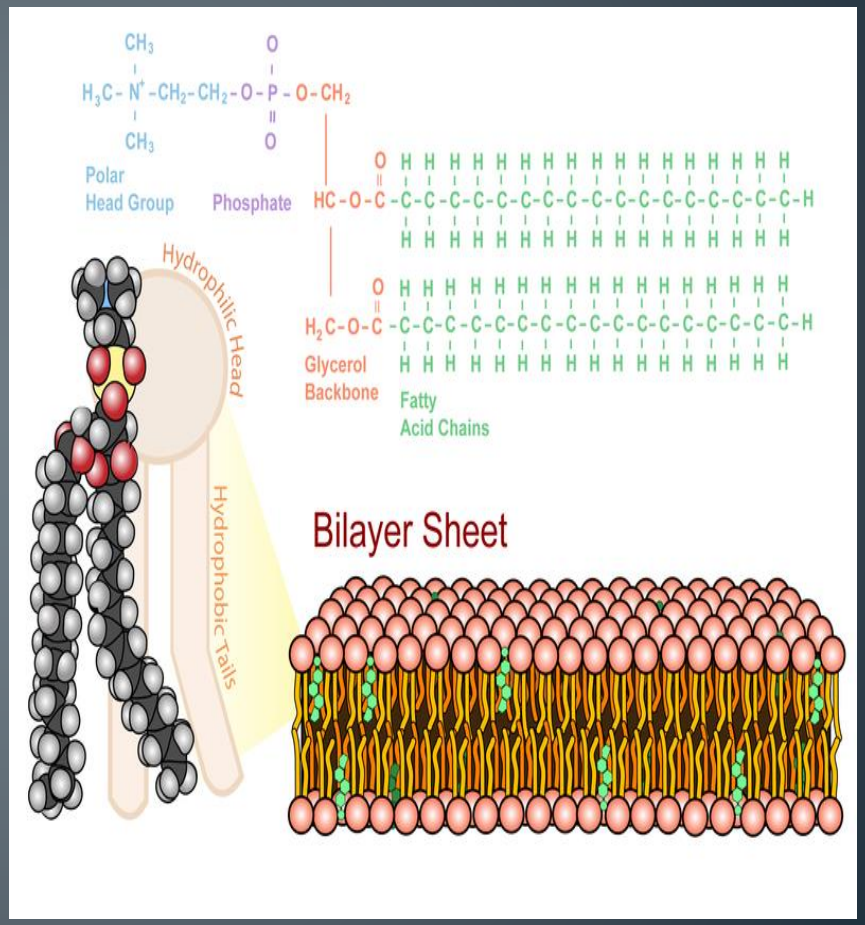
The cytoskeleton is made from thread-like filaments and tubules.

TRUE

CELL MEMBRANE READING

Cell Membrane Structure - ALL

- Composed of a **phospholipid bilayer** with embedded proteins.
- Fluid mosaic model describes the structure of the cell membrane:
  - Fluid – Individual phsopholipids and proteins can move past each other; they are not fixed in one position.
  - Mosaic – The membrane has more than one type of molecule (phospholipids and proteins)



Written Response #8

- *Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.*

- **Discuss the properties of the plasma membrane that allow it to act as a barrier around the cell. Include the specifics of the phospholipid bilayer.**

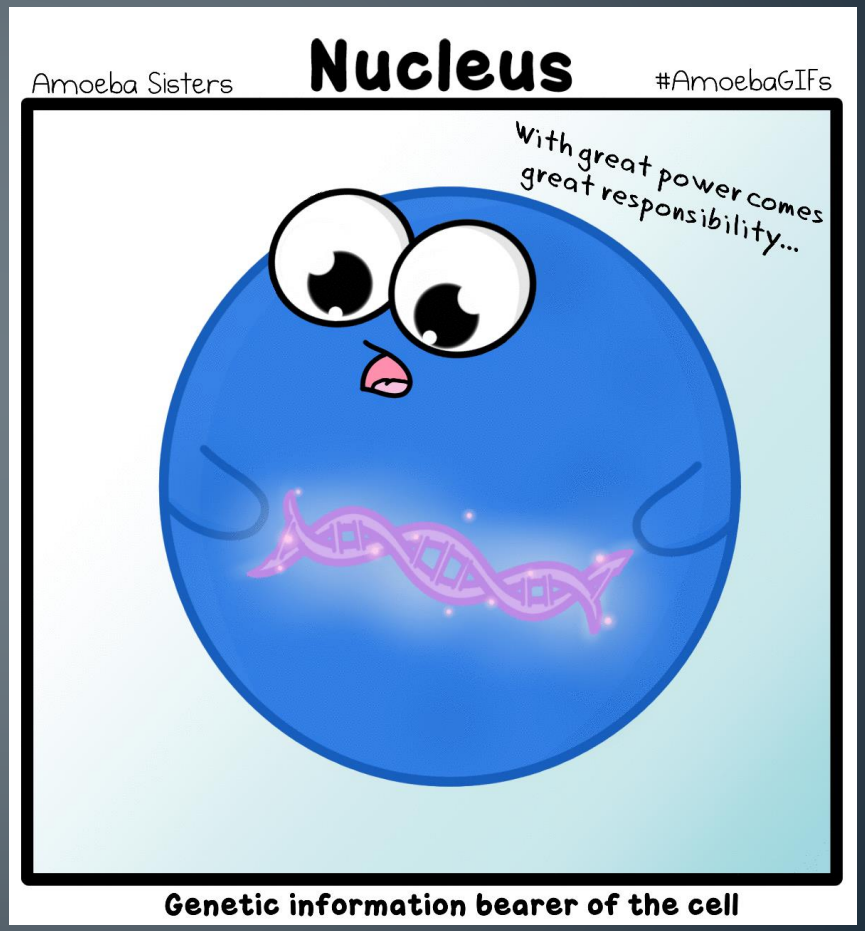
Plant/ Animal or BOTH

- We are going to discuss the following organelles and what type of cells they are present in.

- Add to chart…
- Nucleolus
- DNA
- Chromosomes
- Peroxisomes
- Cilia/ Flagella
- Centrioles
- Centrosomes
- vesicles

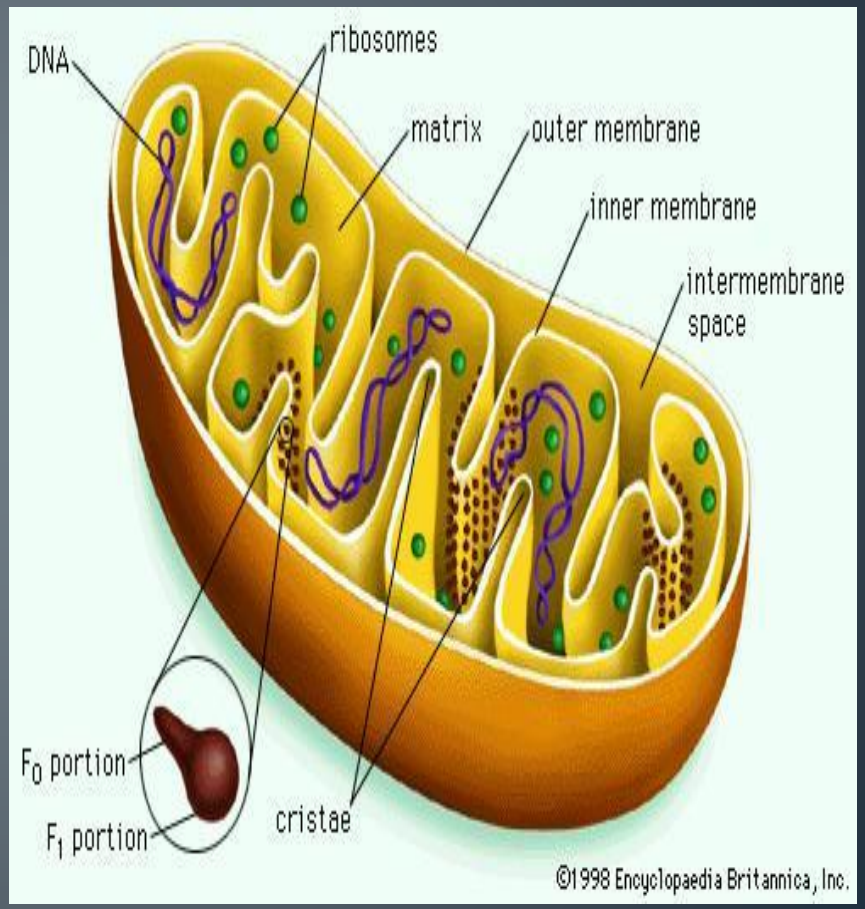
Nucleus - Both

- Surrounds the chromosome for additional protection.
- Made of a phospholipid bilayer.
- What are the benefits of the nucleus being made up of a phospholipid bilayer?



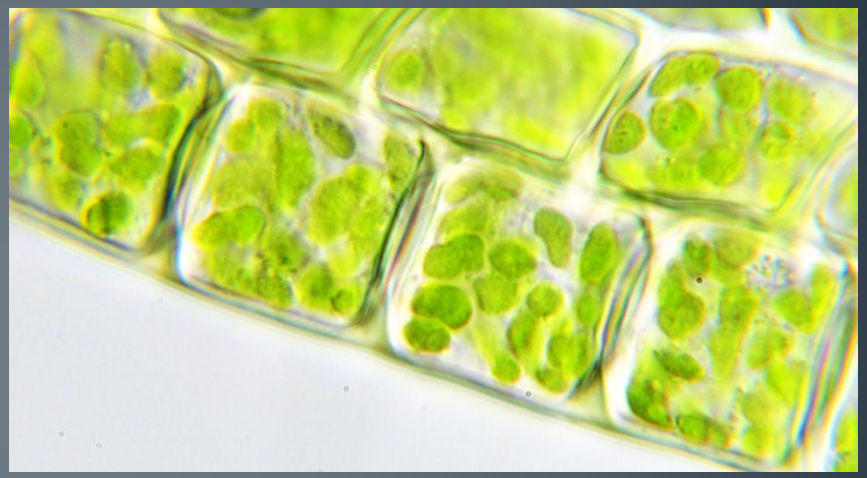
Mitochondria - Both

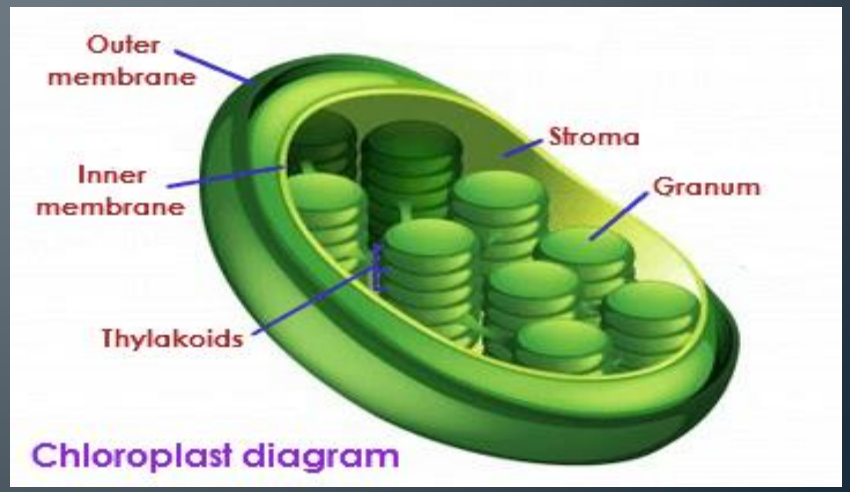
- Site of cellular respiration which produces cell energy (ATP).
- Structure contains folded membranes which increases surface area allowing more space for reactions.



Chloroplast – Plants Only

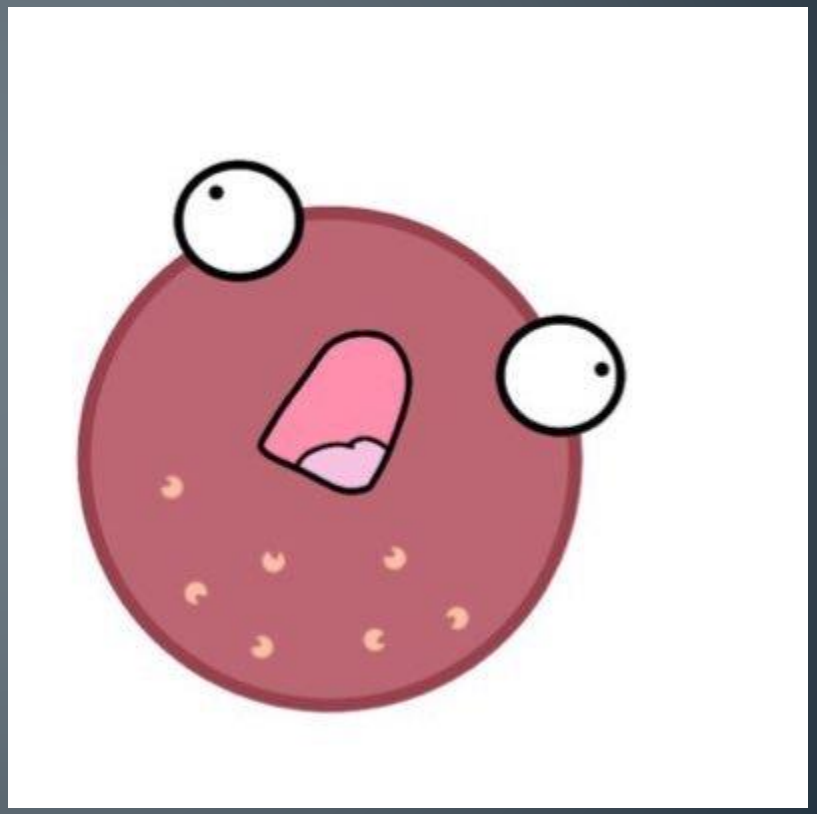
- Organelles full of chlorophyll that are the site of photosynthesis which produces sugars. ($C_6H_{12}O_6$)
- Thylakoid responds to solar radiation to produce sugar.
- Composed of folded membranes for more surface area.





Lysosomes- Both

- Specialized Vesicles
- Little Enzyme Packages
- Purpose: Digestion-food or even the cell when it dies
- Made by: Golgi

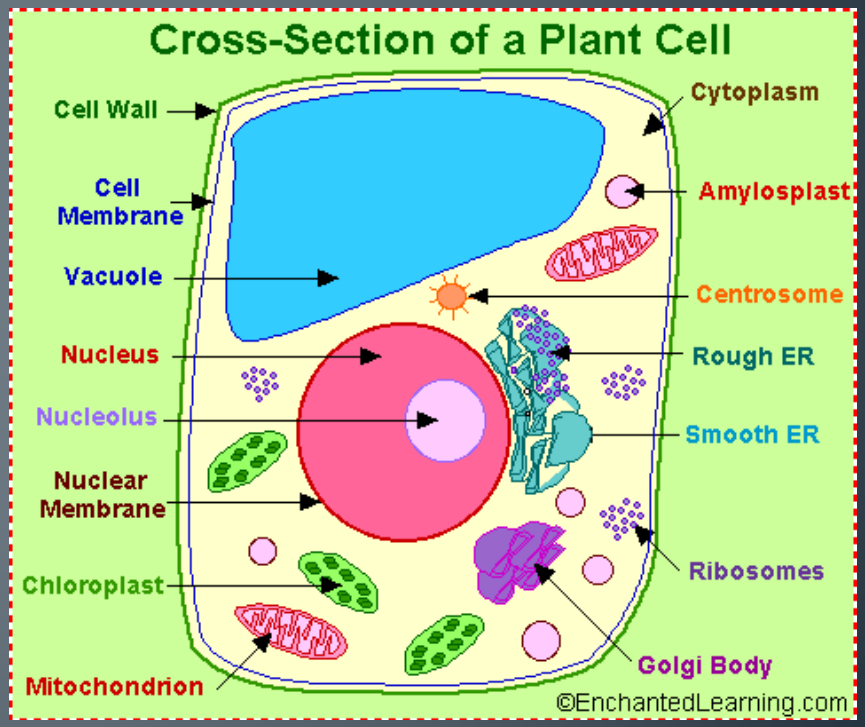


Cell Wall – Plants Only

Provides extra support, protection, and shape for the cell.

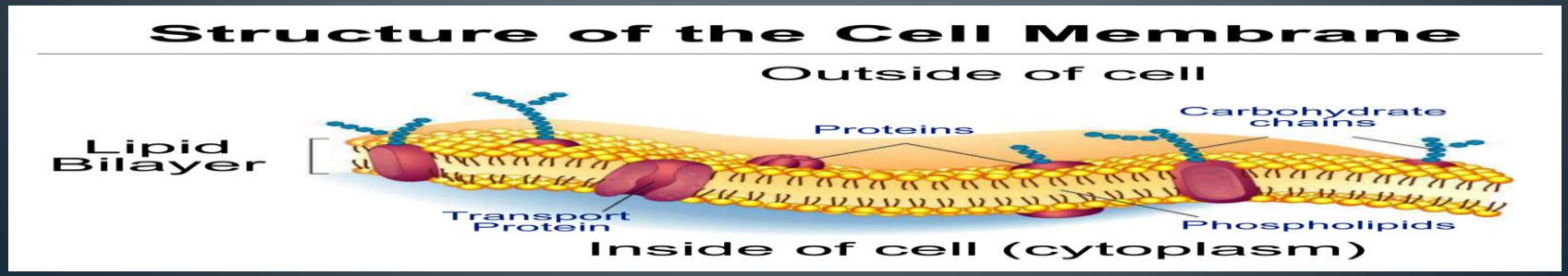
Found outside the cell membrane

Made of cellulose



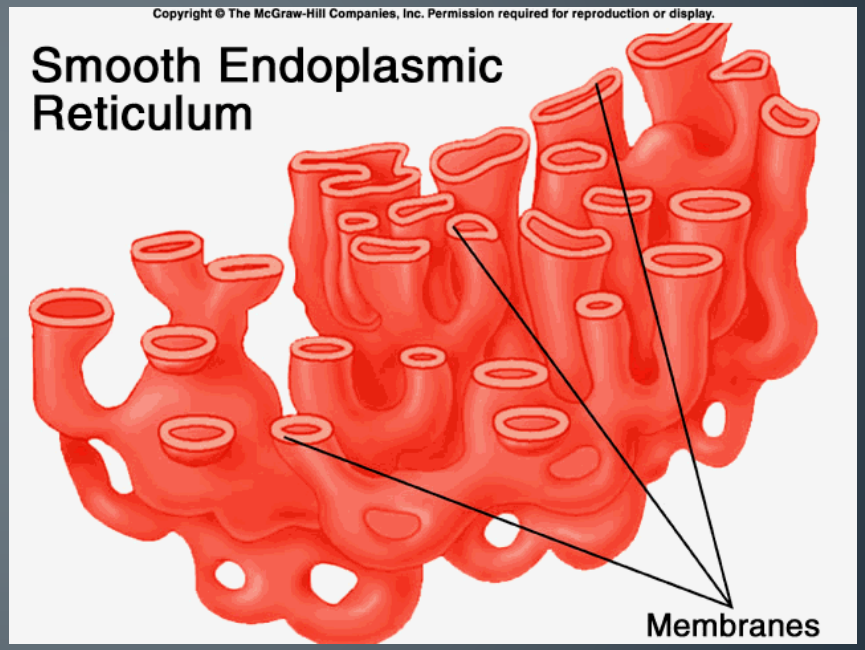
Cell Membrane Function - Both

- **Selectively permeable:** regulates what enters and leaves the cell.
  - This helps maintain homeostasis.
- Gives the cell (cytoplasm) shape.
- Explain why hydrophobic ("water-hating") molecules can easily cross the plasma membrane, while hydrophilic ("water-loving") molecules cannot.



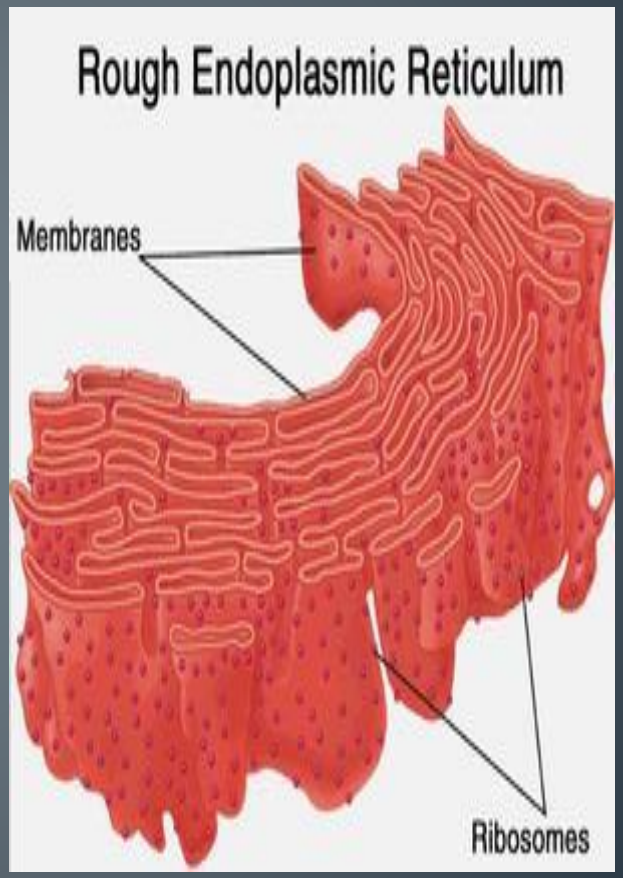
Smooth Endoplasmic Reticulum "Smooth ER" - Both

- Extension of the nuclear envelope.
- Plays important role in cellular maintenance of lipids.



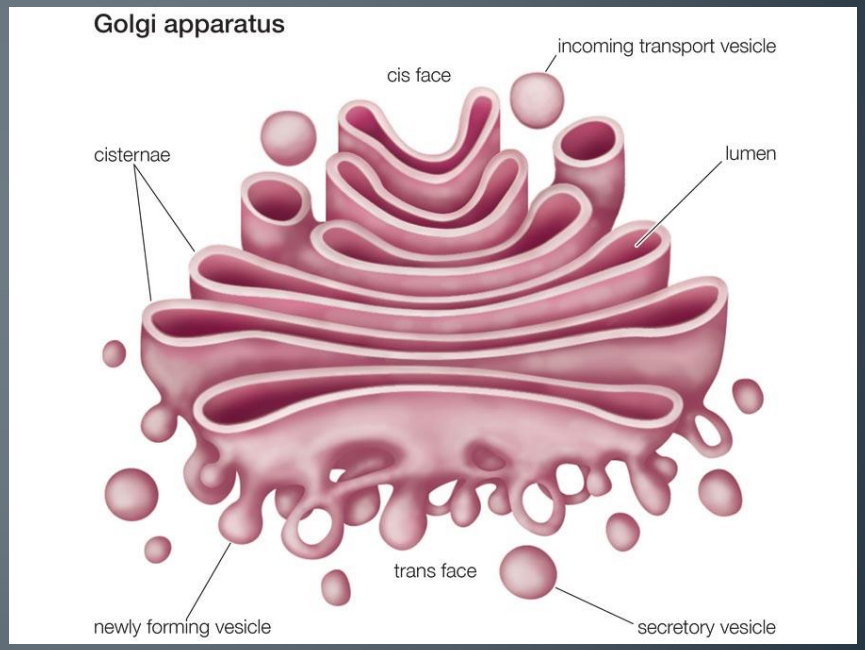
Rough Endoplasmic Reticulum
Rough ER - Both

- "Rough" because of the ribosomes attached to the membrane.
- Aids in protein production.



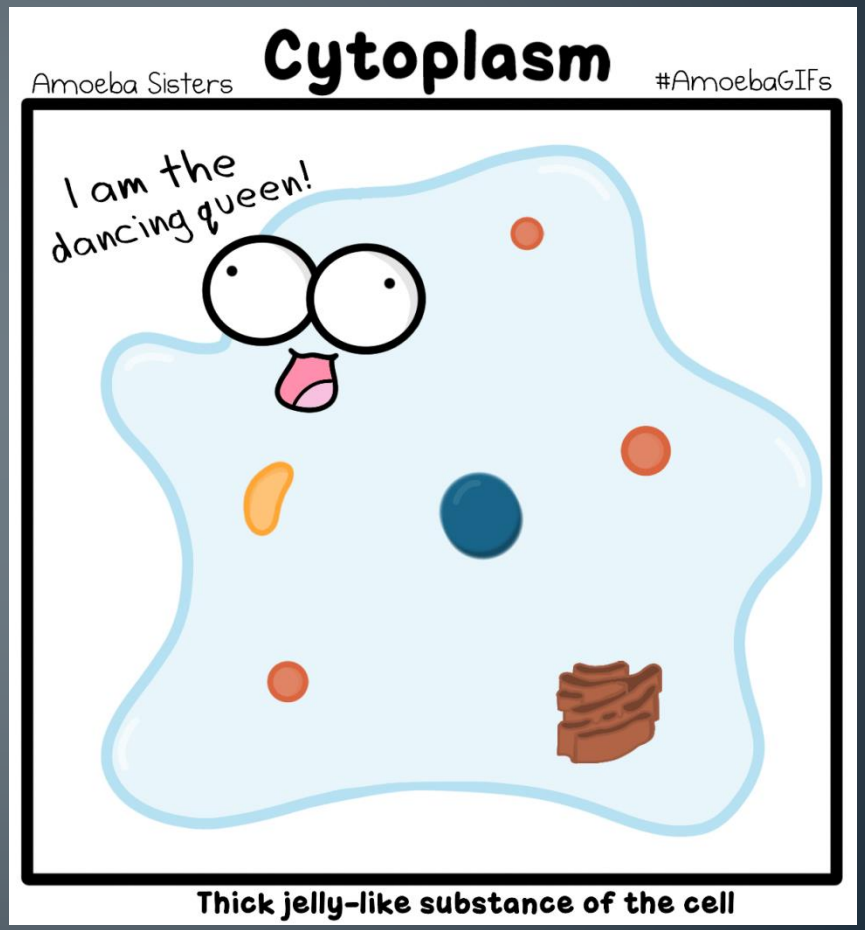
Golgi Apparatus - Both

- Packages materials for export from cells or transport within the cell.
  - Cellular "Post Office"



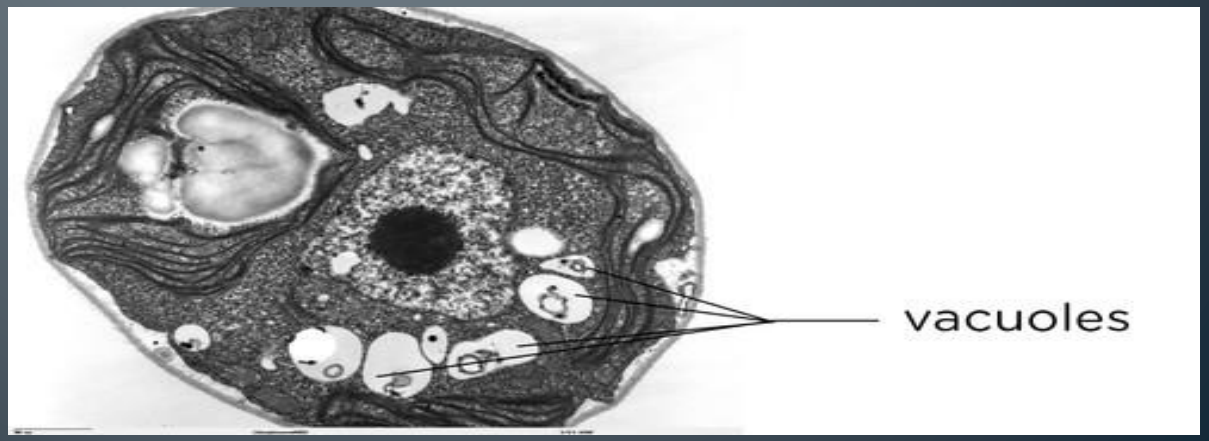
Cytoplasm - Both

- The “filling” of the cell and is made of up to 90% water.
- Water provides the necessary environment for all the chemical reactions the cell needs.



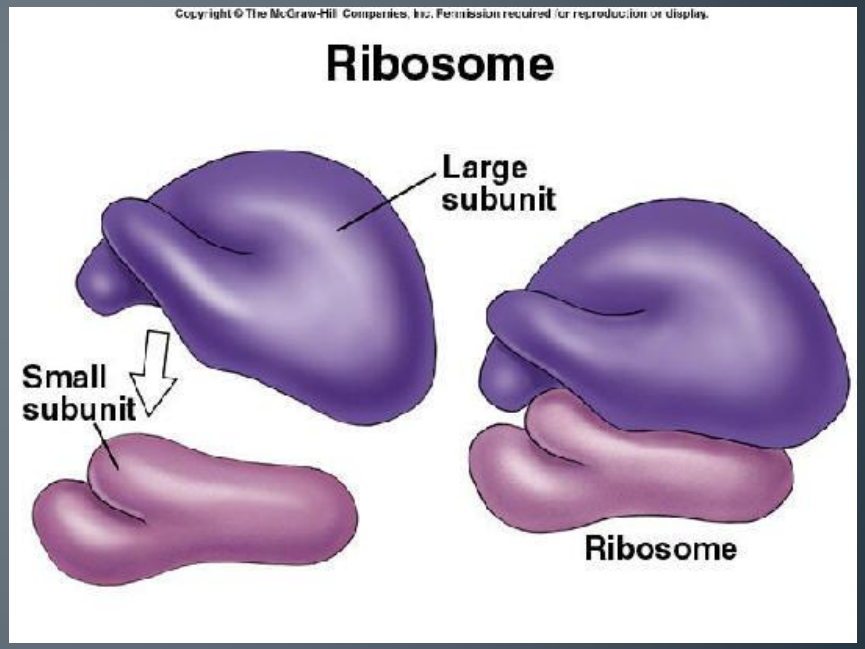
Vacuoles - Both

- Store food, waste or water to be used inside the cell or excreted from the cell.
  - Vacuoles are larger in plants than animal cells.



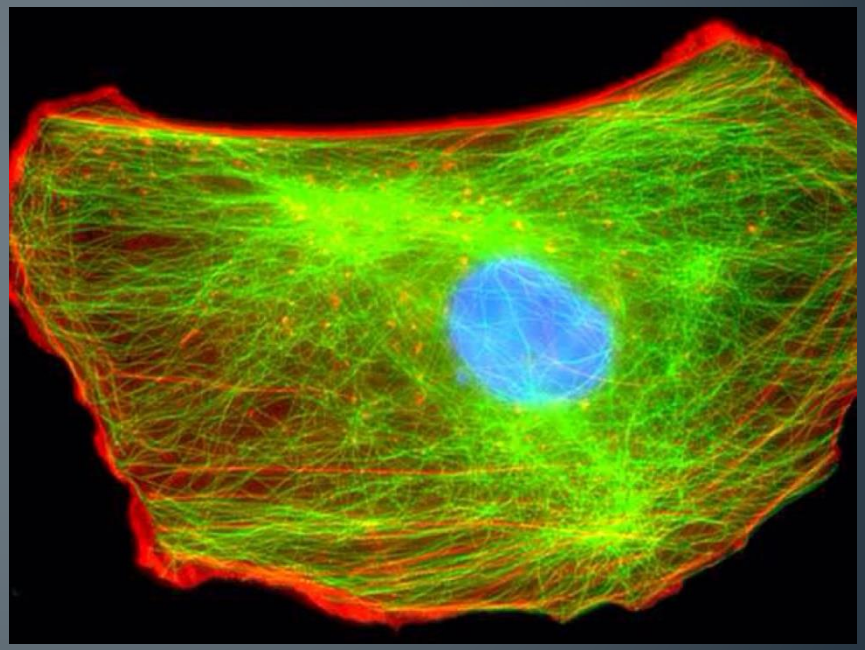
Ribosomes - Both

- Organelles that are the site of protein synthesis.
- Proteins are essential for enzymes, structure, and communication.



Cytoskeleton - Both

- Made of microtubules and microfilaments that provide structure and shape for the cell.

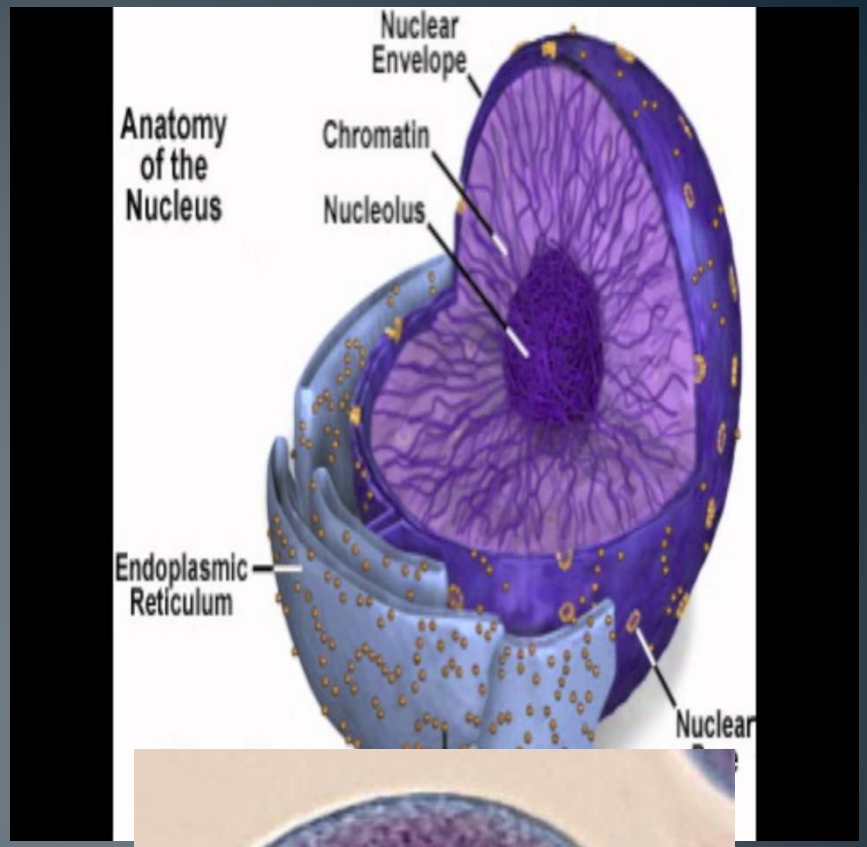


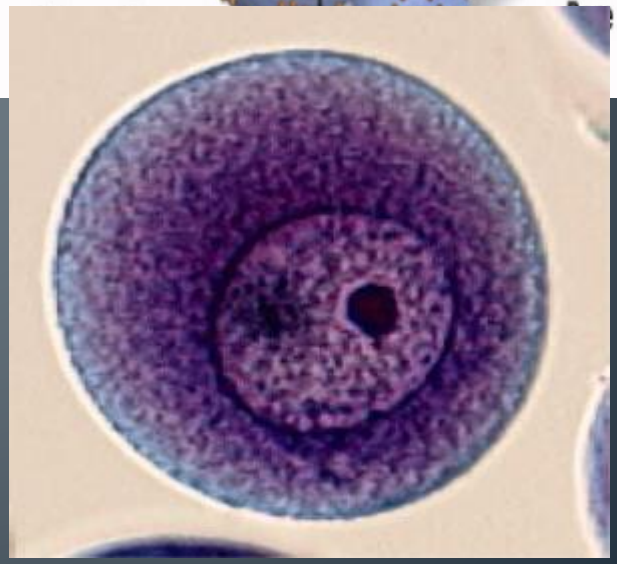
Written Response 18

- Which organic molecule is used to produce microtubules and microfilaments?

Nucleolus - Both

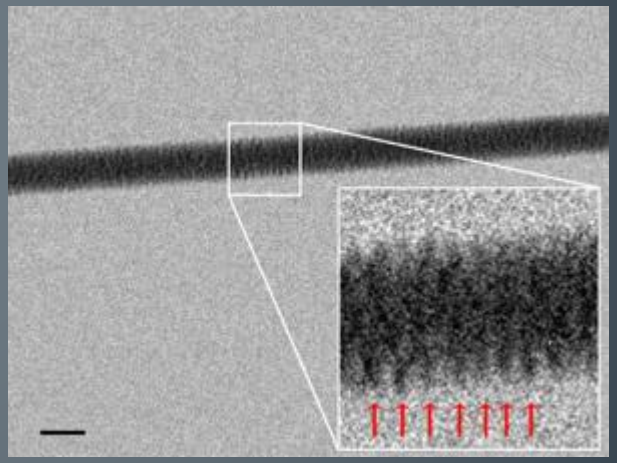
- A dense region located in the nucleus.
- Manufactures ribosomes aka rewrites rRNA.
- **WR #?**
- **Why would this organelle be the cause of human disease?**

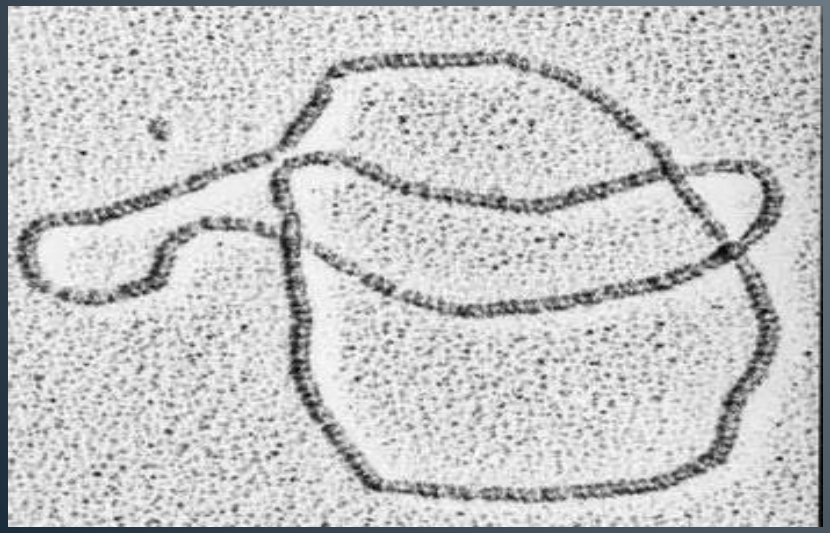




DNA - Both

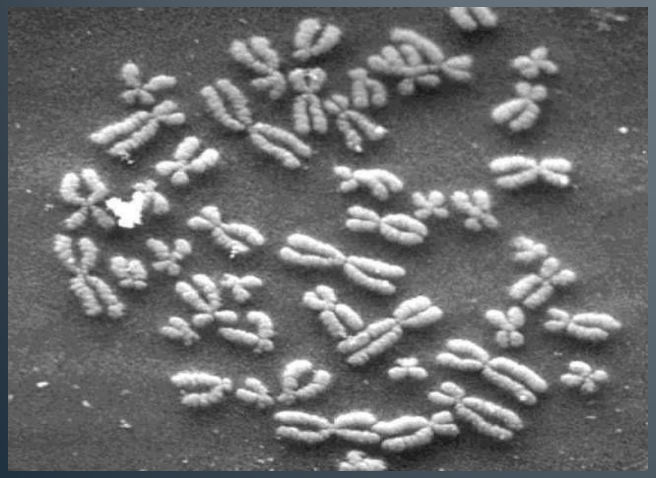
- Directs cell activity.
- Organized as chromosomes.
- Double helix in shape.

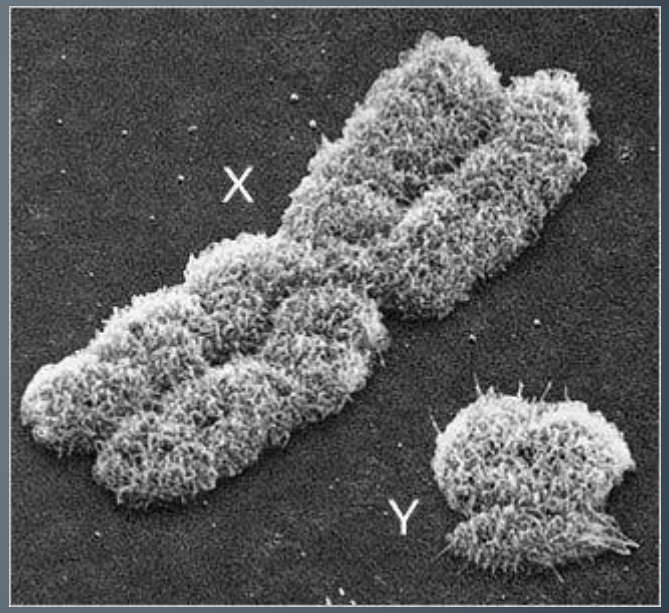




Chromosomes - Both

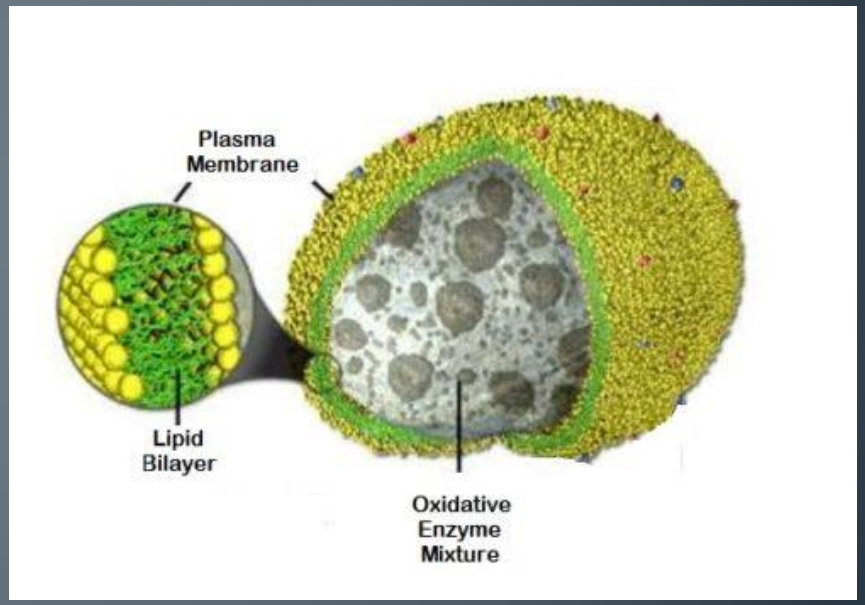
- Tightly packed coils of DNA and proteins that form during cell division. (Mitosis)
- Human have 46.





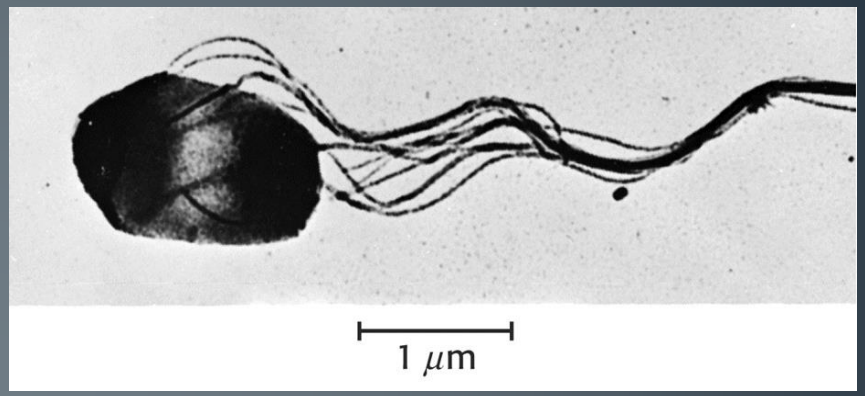
Peroxisomes-BOTH

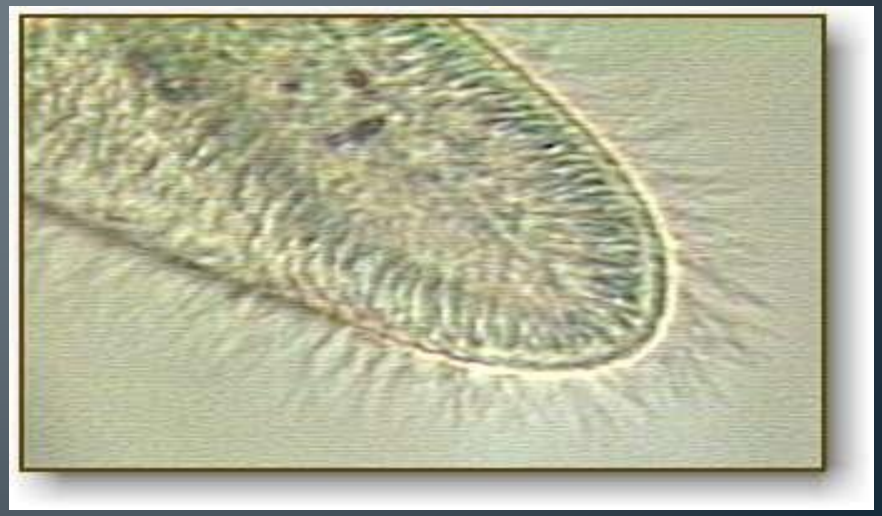
- Similar to ribosomes
- They are also used for digestion
- Known for digesting fatty acids and alcohol
- **<u>WR #?</u>**
- Which organ in your body would you suspect cells to have many peroxisomes?



Cilia/Flagella - Both

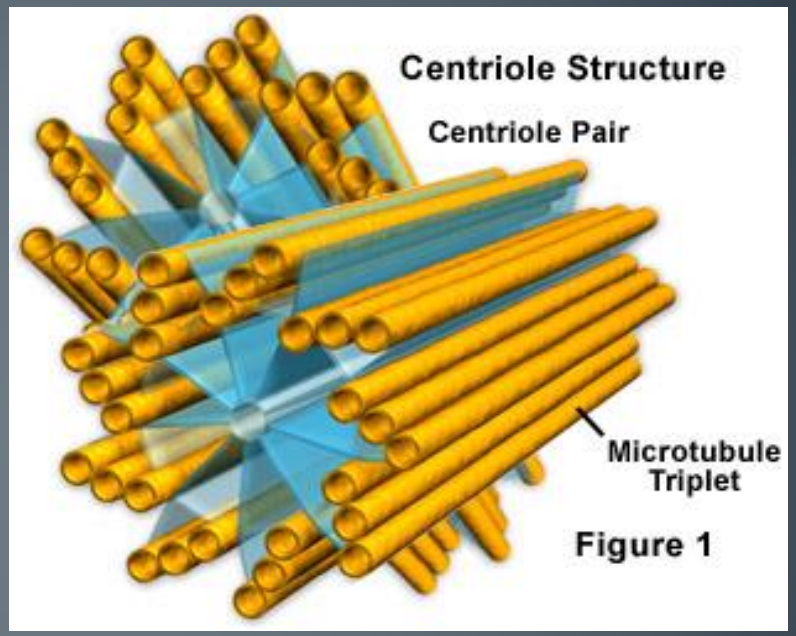
- External cell organelles that aid in movement.
- Flagella are long and whip like.
- Cilia are short and hair like.

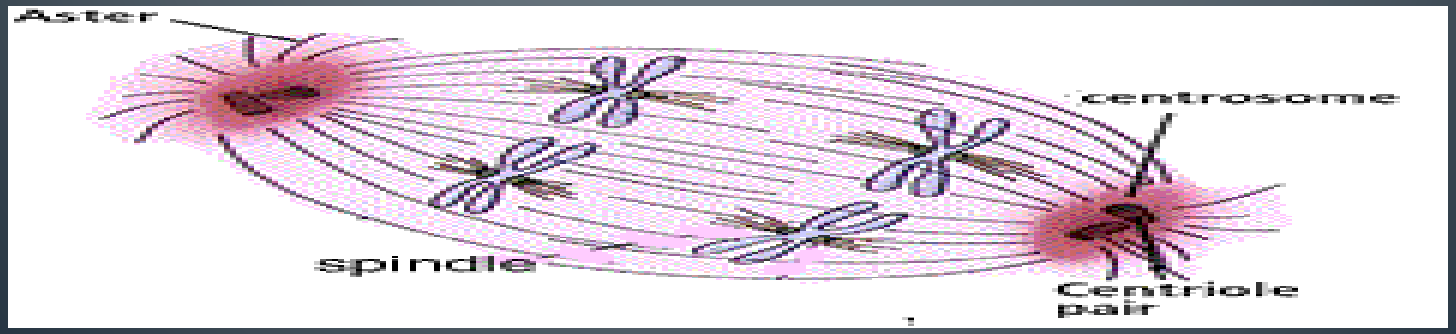




Centrioles – Animal Only

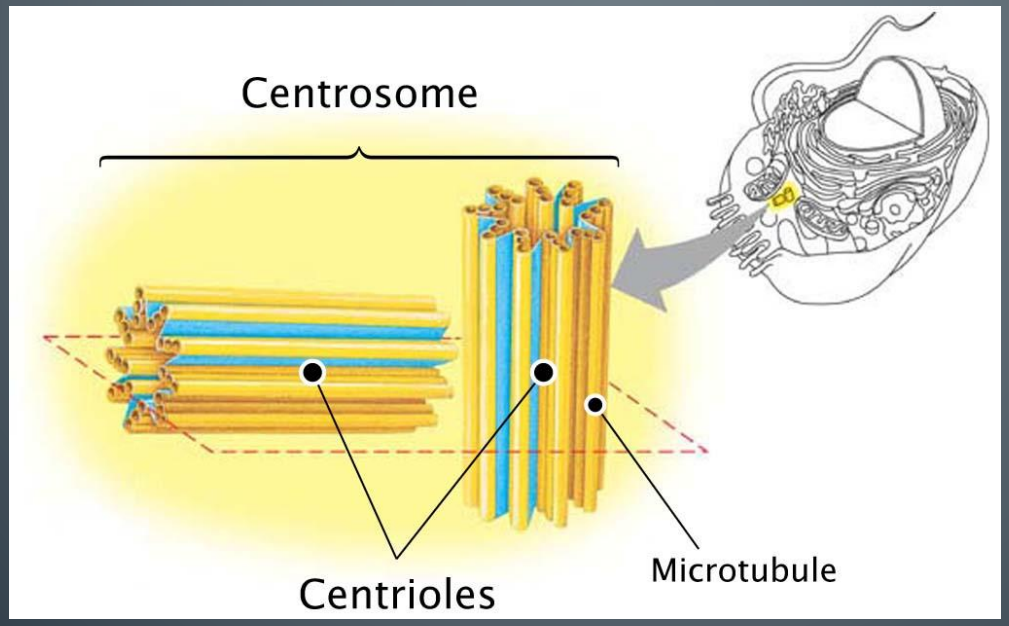
- Organelle that helps with cell division.
- Ensure daughter cells have the correct number of chromosomes.
  - Found only in animal cells.





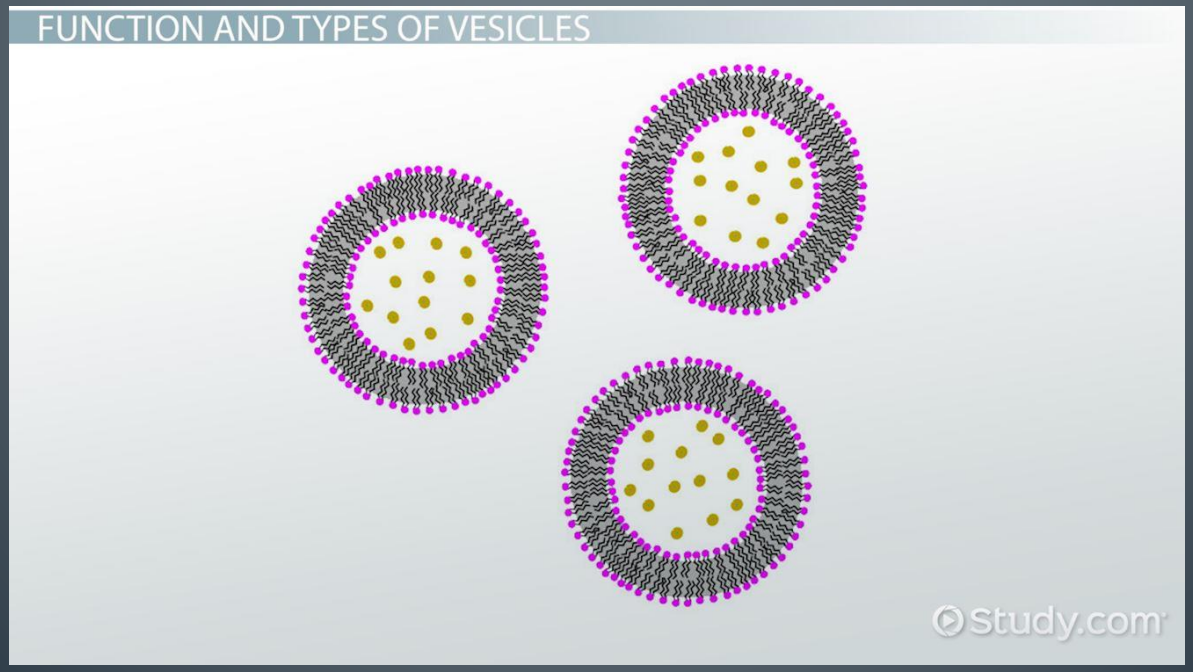
Centrosomes-BOTH

- Two or more centrioles together
- Important in cell division



Vesicles

- Packaged proteins



Written Response #19

- Explain how the following organelles ensure that a cell has the proteins it needs: nucleus, rough and smooth ER, vesicles, and Golgi apparatus.

- Nucleus codes for the production of proteins.
- Rough and Smooth ER synthesize the peptide bonds and make the proteins.
- Golgi Apparatus packages the protein for use in and out of the cell.
- Vesicles are the packaged proteins.

Written Response #20

CELL ADAPTATIONS Activity – Draw and complete the following chart in your notebook.

Adaptations	Description
Cilia/Flagella	
Contractile/Vacuoles	
Chemotaxis/Phototaxis	
Eyespots	
Pseudopods	
Pili	
Increased Mitochondria	

- Once you have completed the written response you and your partner will create a poster to represent your cellular adaptations.
- **Your task is to draw made up cell that has all of these features, label the features, and give a brief description on the function of this adaptation.**

Written Response #21

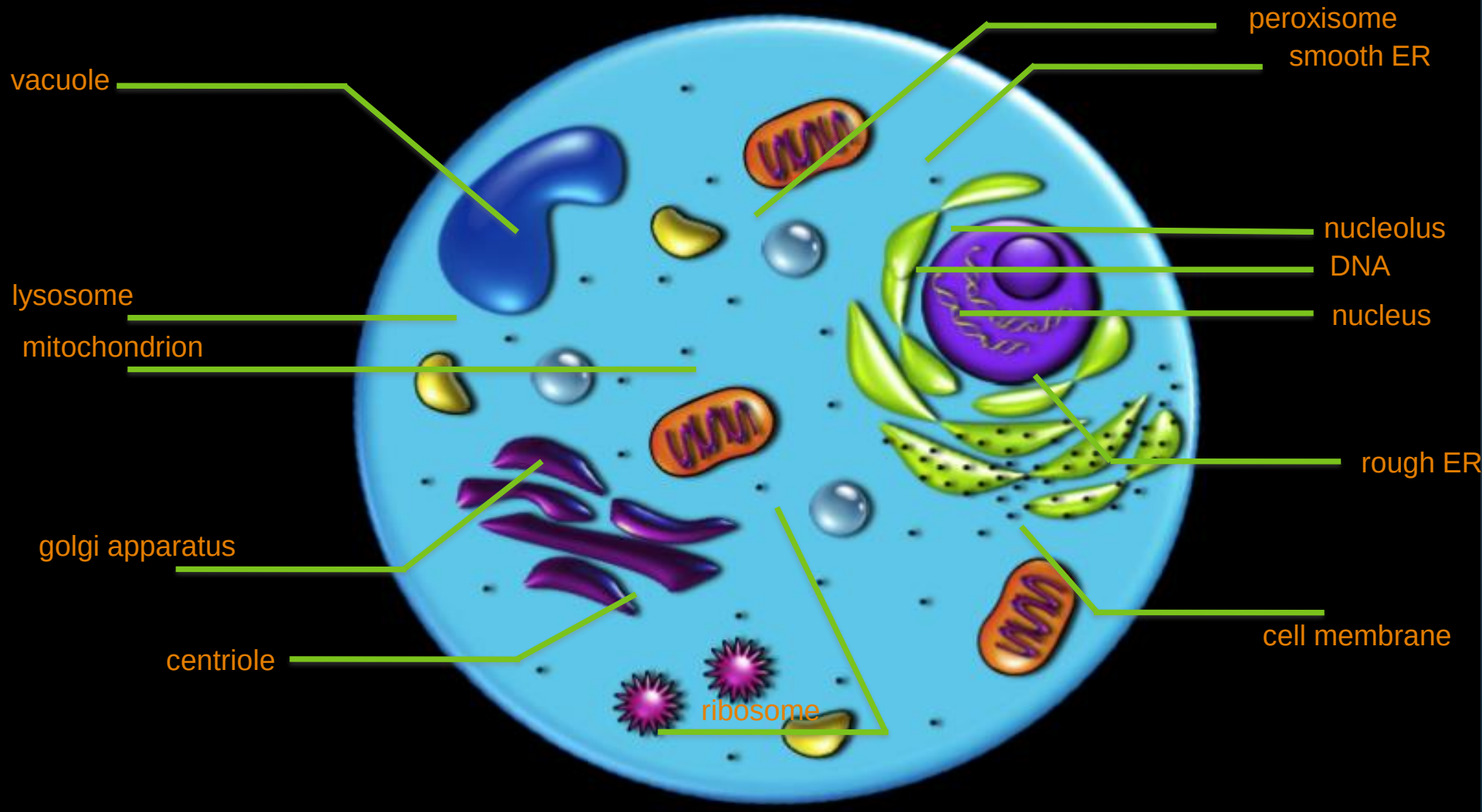
- What is endosymbiotic theory? How does it explain the presence of certain organelles in eukaryotic cells?
- Theory of the evolution of Eukaryotic organelles. Specifically organelles that contain DNA.

Plant	Both	Animal
cell wall	mitochondrion	no cell wall
	Golgi apparatus	
large vacuole	rough and smooth endoplasmic reticulum	small or no vacuole
chloroplasts		no chloroplasts
	nucleus	
flagella only in gametes	cytoplasm	flagella
	ribosomes	

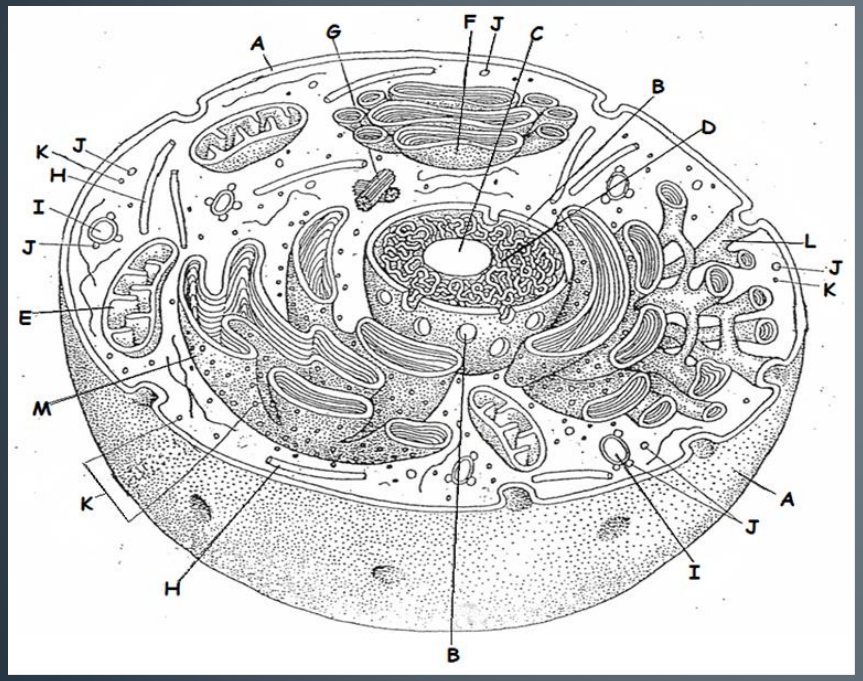
Cell Compare - Handout

- Once finished, raise your hand so that I may check you off.
- Once you have been stamped, glue the drawing into your notebook.

Animal Cell

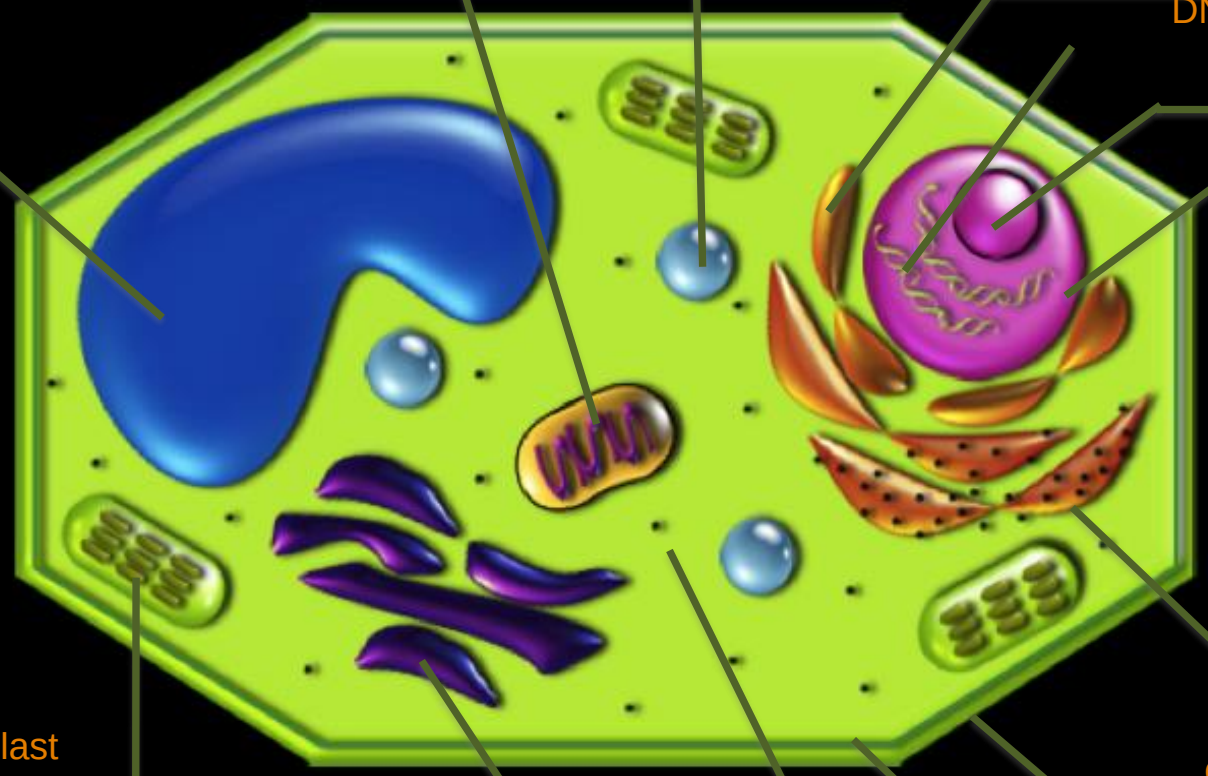

peroxisome
smooth ER
vacuole
nucleolus
DNA
lysosome
nucleus
mitochondrion
rough ER
golgi apparatus
cell membrane
centriole
ribosome

Animal Cell Art - Handout

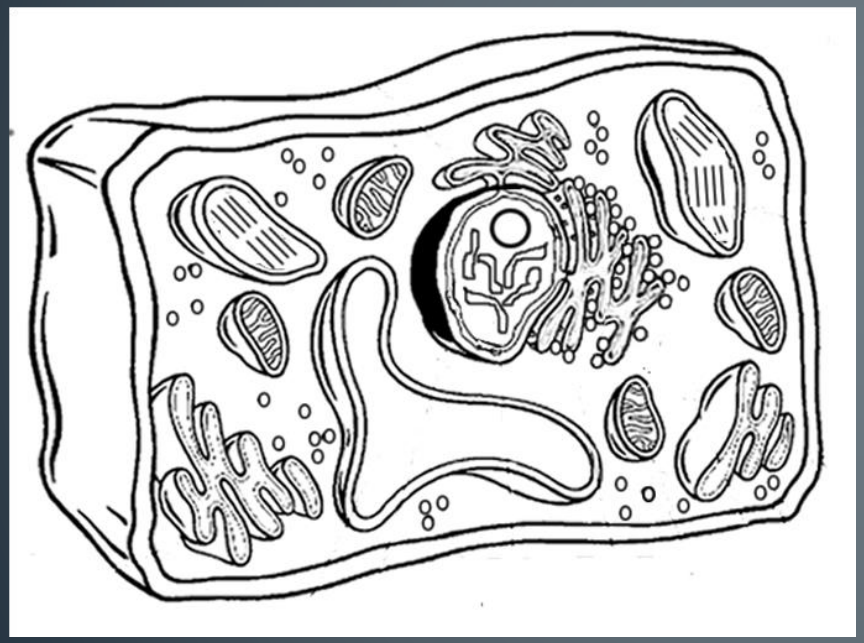


- Color, label, and complete chart.
- Once finished, raise your hand so that I may check you off.
- Once you have been stamped, glue the drawing into your notebook.

Plant Cell


peroxisome
mitochondrion
smooth ER
DNA
vacuole
nucleolus
nucleus
rough ER
chloroplast
cell wall
golgi apparatus
cell membrane
ribosome

Plant Cell Art - Handout



- Color, label, and complete chart.
- Once finished, raise your hand so that I may check you off.
- Once you have been stamped, glue the drawing into your notebook.

Edible Cells Chart

Organelle	Candy	Why did you chose this candy?	Function
Ex Nucleus	Cup Cake	The cup cake is large, houses all of the sugar and is the point of focus just like the nucleus of a cell.	Protects the DNA of the cell and controls what enters and leaves the cell.

Edible Cell/Cell Analogy Project

Part I - Instructions

- You and your lab group will decide on a cell type (Plant or Animal) and **select 12** organelles that will be represented by the different type of candy.
- Draw and complete the chart as you are making your cell.
- I must check you off prior to you eating any part of your cell.

Organelle	Candy	Why did you chose this candy?
Ex Nucleus	Cup Cake	The cup cake is large, houses all of the sugar and is the point of focus just like the nucleus of a cell.
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Edible Cell Part II – Cell Metaphor

- Create a metaphorical poster that includes the following organelles. You will do the same type of cell you choose to do when you completed your candy cell: Cell Membrane, Cell Wall, Cytoplasm, Endoplasmic Reticulum, Ribosomes, Golgi Bodies, Chloroplasts, Nuclear Membrane, Mitochondria, Nucleus, RNA, DNA, Nucleolus, Lysosomes, Vacuole, Chromosomes, Centrioles, and Peroxisomes.
- On, the back of your poster you will include your metaphors which should be worded as the following and follow a common theme such as a cell is like a city (Can't use this one it is over used and played out):

- The Nucleus is like City Hall because just like City Hall makes the rules/laws the town must follow the Nucleus makes the rules that the cell must follow through it's DNA coding.