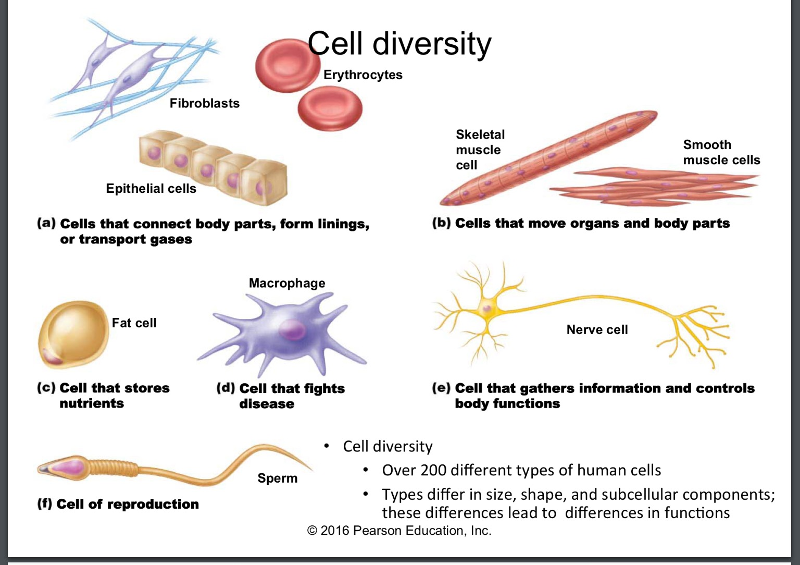
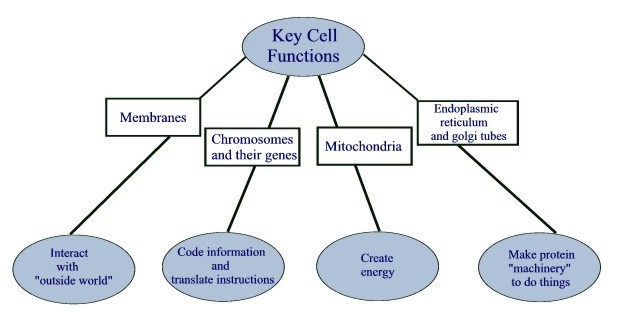
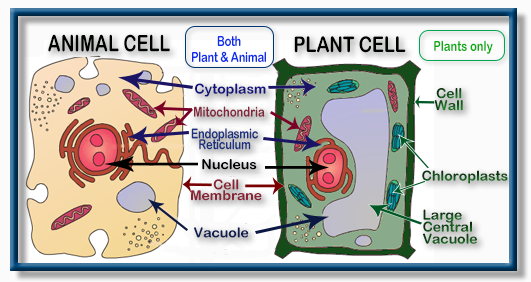
SECTION 2

CELLS: DIVERSITY & FUNCTIONS



**All Cells do something different**

**Diversity (differences) helps cells to survive and reproduce (make more of itself)**



**Animal Cells are just for animals and not plants, vice versa**

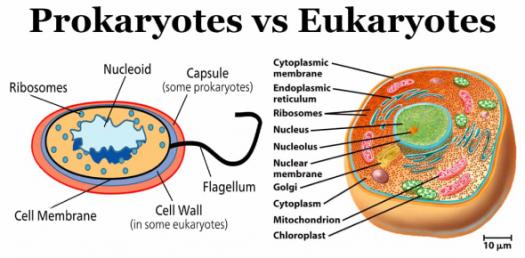
|  |
| --- |
| KEY CONCEPTS ABOUT CELLS: DIVERSITY & FUNCTIONS |
|  |
| MS-CCR Standard(s):  Bio. 1C. Students will relate the diversity of organelles to a variety of specialized cellular functions.  BIO. 1C. 1. Develop and use models to explore how specialized structures within cells (e.g., nucleus, cytoskeleton, endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, mitochondria, chloroplast, centrosomes, and vacuoles) interact to carry out the functions necessary for organism’s survival.  BIO. 1C. 2. Investigate to compare and contrast prokaryotic cells and eukaryotic cells, and plant, animal, and fungal cells.  BIO. 1C. 3. Contrast the structure of viruses with that of cells and explain why viruses must use living cells to reproduce.  Bio. 1D. Students will describe the structure of the cell membrane and analyze how the structure is related to its primary function of regulating transport in and out of cells to maintain homeostasis  BIO. 1D. 1. Plan and conduct investigations to prove that the cell membrane is a semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes.  BIO. 1D. 2. Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump). |

**BIO. 1C. 2**

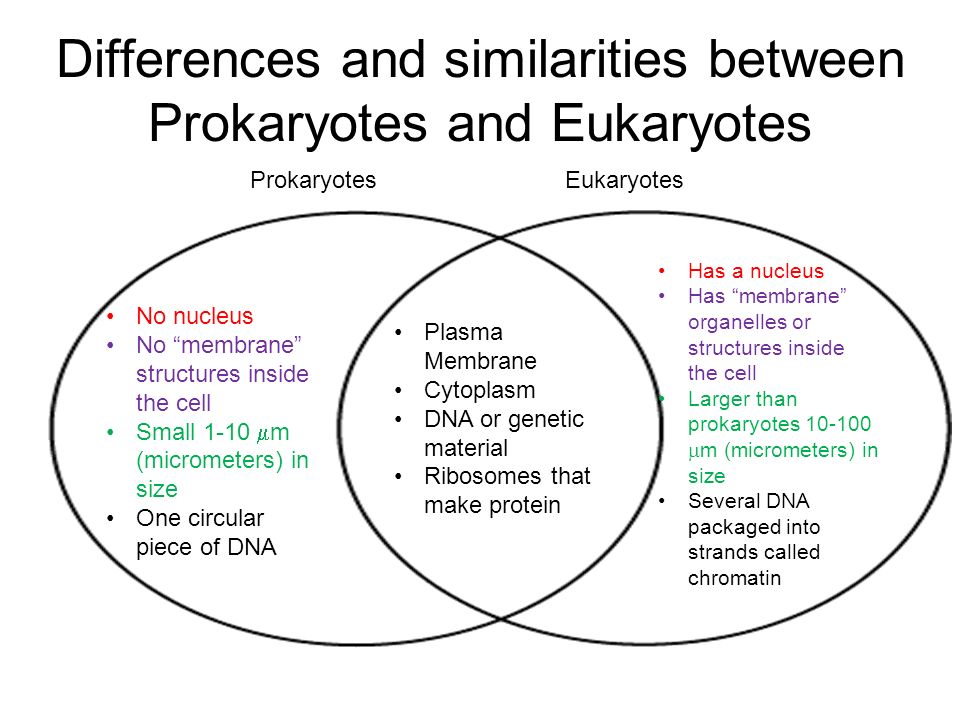
**Compare/Contrast Prokaryotic Cells & Eukaryotic Cells=plant, animal, and fungal cells.**

**Uni-cellular (bacteria)**

**Multi-cellular (animal/plants)**



**ALL CELLS ARE EITHER PROKARYOTIC OR EUKARYOTIC**



**Review by drawing out this Venn diagram**

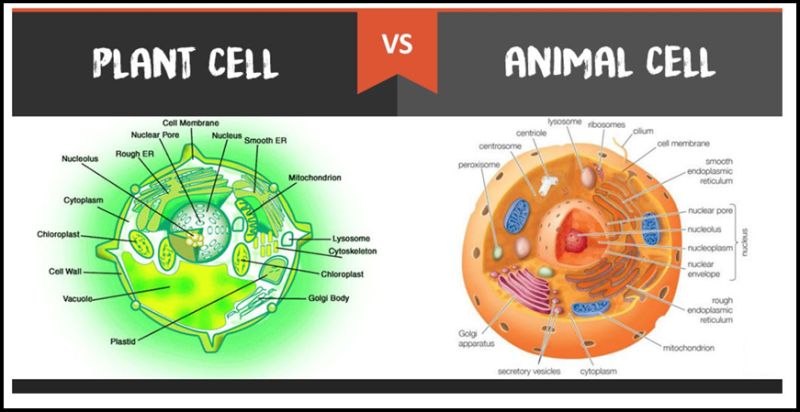
Video: (Short video on the differences between prokaryotic (bacteria) & eukaryotic (plants, animals, & fungi, etc.)

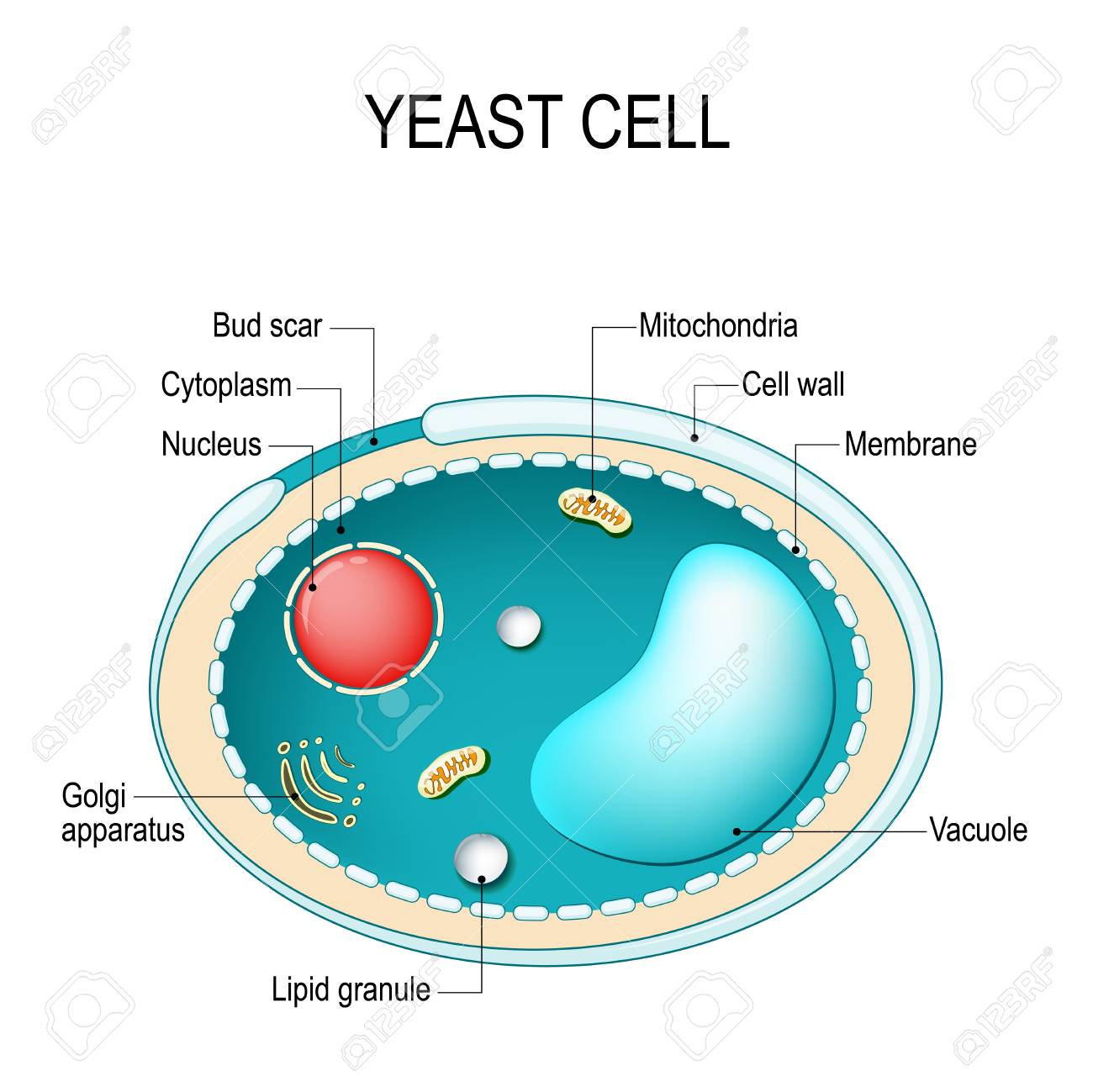


**Watch this video a couple of times to see the organelles inside moving to see how they are important to help the overall cell function.**

What does it mean to be multicellular and unicellular? Watch this 2 min. video below.





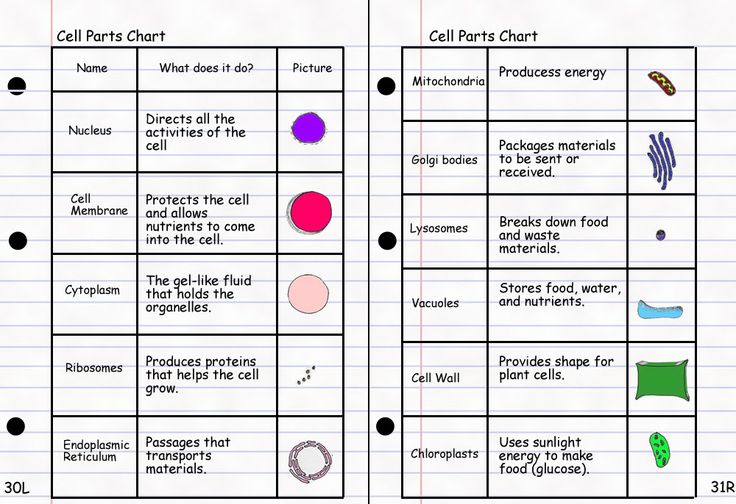


**Really know the key organelles (labeled parts). Organelles are like our organs in our body. Our organs help our body to function. Organelles (little organs) help the different cells (body) function.**

**On the MAAP, the main Eukaryotic Cells are Plants, Animals, and Fungi Cells**

**(Fungal Cell)**

|  |
| --- |
| Key Organelles (little organs): Memorize the Highlighted/Underlined functions |
| * Nucleus contains genetic information in the form of DNA * Nucleolus is inside the nucleus and creates ribosomes * Ribosomes travel through endoplasmic reticulum and makes (synthesize) proteins * Endoplasmic reticulum helps makes lipids (fats) and transporting nutrients in the interior (inside) of the cell * Golgi Apparatus (Golgi Bodies) prepares/packages protein to be imported (taken in) and exported (taken out) of the cell to be used * Mitochondria makes energy for the cell to do all of its functions * In the plant, the chloroplast creates a nutrient source (food) for the plant cell * Cytoskeleton is network of protein fibers to help give the cell shape (like our bones) * Vacuoles serves as storage for cells (like water & nutrients) * Prokaryotic cells are simple in their structure w/o a membrane bound nucleus * Eukaryotic cells are more complex with a membrane bound nucleus * Viruses contains either RNA or DNA * Viruses must have a host cell to reproduce. |

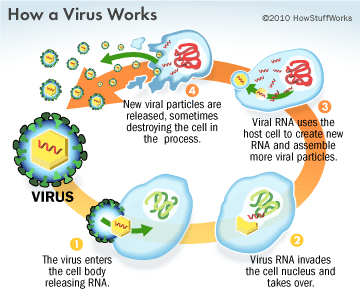


**Cell Functions**

**VERY IMPORTANT TO REMEMBER!!!!**

Viruses are **not cells,** **nor** are they **alive**, **BUT** they possess a lot of the characteristics of what is alive (from week one).

**Viruses** must **use living cells** by taking over it (cell) to reproduce more itself (more viruses) = **Very BAD Relationship** (one-sided, benefits one side), the viruses.



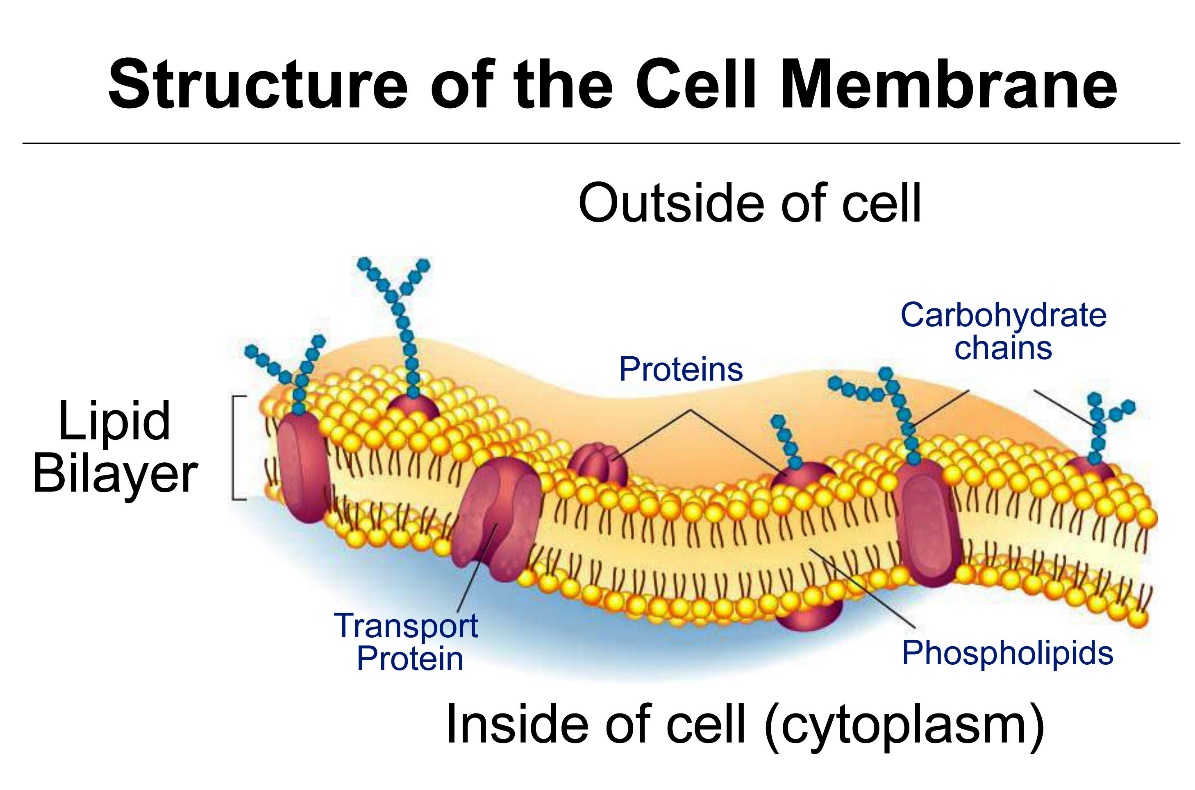
**Starts here…**

|  |  |  |  |
| --- | --- | --- | --- |
| KEY VOCBULARY: DIVERSITY & FUNCTIONS | | | |
| MS-CCR Standard(s):  Bio. 1C. Students will relate the diversity of organelles to a variety of specialized cellular functions.  BIO. 1C. 1. Develop and use models to explore how specialized structures within cells (e.g., nucleus, cytoskeleton, endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, mitochondria, chloroplast, centrosomes, and vacuoles) interact to carry out the functions necessary for organism’s survival.  BIO. 1C. 2. Investigate to compare and contrast prokaryotic cells and eukaryotic cells, and plant, animal, and fungal cells.  BIO. 1C. 3. Contrast the structure of viruses with that of cells and explain why viruses must use living cells to reproduce.  Bio. 1D. Students will describe the structure of the cell membrane and analyze how the structure is related to its primary function of regulating transport in and out of cells to maintain homeostasis  BIO. 1D. 1. Plan and conduct investigations to prove that the cell membrane is a semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes.  BIO. 1D. 2. Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump). | | | |
| **Name**  **Organelle (Part) that aids to the cell survival** | | **Picture** | **Function**  **(Job/Purpose) that aids with survival** | **Located in the Plant Cell, Animal Cell or in Both** | |
| **Nucleus** | | See the source image | -controls the cell  -contains the genetic material (DNA)  -surrounded by the Rough/Smooth ER  -in Eukaryotic Cells | Both | |
| **Mitochondria** | | See the source image | -“powerhouse of cell”  -acts like a battery for the entire cells  -mostly in Eukaryotic Cells  -double membraned bounded which forms like a “maze” in the center.  -uses ATP produced during cellular respiration | Both | |
| **Smooth ER** | | [Image result for smooth endoplasmic reticulum](https://www.bing.com/images/search?view=detailV2&ccid=W7UZyzAm&id=A8FECC655119821064836C9BBC4475545317C69E&thid=OIP.W7UZyzAmLLOzqzJNgKVG_AEsDh&mediaurl=https://img.haikudeck.com/mg/CD4F6C8C-E9AC-483A-98B8-4042EF81AF49.jpg&exph=768&expw=1024&q=smooth+endoplasmic+reticulum&simid=607987373575768551&selectedIndex=9) | -associated with protein synthesis (making of proteins)  - moves cellular materials  -attached to the Rough ER which is also attached to the nucleus | Both | |
| **Rough ER** | | See the source image | -makes proteins for export to the outside of the cell and enzymes to be incorporated into cellular organelles such as lysosomes.  -attached to the Rough ER which is also attached to the nucleus | Both | |
| **Ribosomes** | | See the source image | -site of biological protein synthesis (translation). Ribosomes link amino acids together in the order specified by messenger RNA (mRNA) molecules. | Both | |
| **Golgi bodies (apparatus/complex)** | | See the source image | -often thought of to be represented by a Postal office. it sorts proteins and other substances into vesicles. vesicles then send the proteins throughout the **cell**. It can also be seen as shipping and receiving as the **cell** is a factory. They move stuff in a **cell**. | Both  (Mostly in animal) | |
| **Vesicles** | | See the source image | -the bubble-like membranous structure that stores and transports cellular products, and digests metabolic wastes within the **cell**. The **cell** forms **vesicles** during exocytosis, endocytosis, and intracellular transport. | Both | |
| **Lysosomes** | | See the source image | -are membrane-enclosed organelles that contain an array of [enzymes](https://www.ncbi.nlm.nih.gov/books/n/cooper/A2886/def-item/A3042/) capable of breaking down all types of biological polymers—[proteins](https://www.ncbi.nlm.nih.gov/books/n/cooper/A2886/def-item/A3297/), nucleic acids, carbohydrates, and [lipids](https://www.ncbi.nlm.nih.gov/books/n/cooper/A2886/def-item/A3157/). Lysosomes function as the digestive system of the cell | Mostly in Animal | |
| **Vacuoles** | | See the source image | -vacuoles tend to be very large and are extremely important in providing structural support, as well as serving functions such as storage, waste disposal, protection, and growth | Plant  (mostly) | |
| **Microtubules** | | See the source image | -Are proteins that help define cell structure and movement, -microtubules are thick, strong spirals of thousands of subunits. Those subunits are made of the protein called **tubulin**.  - got their name because they look like a tube. | Both | |
| **Microfilaments** | | See the source image | -Are proteins that help define cell structure and movement  - are thin, strong spirals of thousands of subunits. Those subunits are made of the protein called **tubulin**.  - got their name because they look like a tube. | Both | |
| **Chloroplast** | | See the source image | - are organelles found in plant cells and eukaryotic algae that conduct photosynthesis.  -absorb sunlight and use it in conjunction with water and carbon dioxide gas to produce food for the plant.  -capture light energy from the sun to produce the free energy stored in ATP and NADPH through a process called photosynthesis | Plant | |
| **Cytoskeleton** | | See the source image | a microscopic network of protein filaments and tubules in the cytoplasm of many living cells, giving them shape and coherence | Both | |
| **Centrioles** | | See the source image | **-**are self-replicating organelles made up of nine bundles of microtubules and are found only in animal cells. They appear to help in organizing cell division | Both | |
| **Nucleolus** | | See the source image | -largest structure in the nucleus of eukaryotic cells, where it primarily serves as the site of ribosome synthesis and assembly | Both | |
| **Chromosomes** | | See the source image | -containing most of the DNA of a living organism  -structured by being wrapped around protein complexes called nucleosomes | Both | |
| **Nuclear Membrane** | | See the source image | a **semi** permeable protective layer that covers the surface of the nucleus. The nuclear membrane protects the nucleus. One function of the nuclear membrane is materials pass through this double membrane by going through pores. | Both | |
| **Cell Wall** | | See the source image | - is the rigid, semi-permeable protective layer  -Found on the outside of plants | Plants | |
| **Cytosol/ Cytoplasm** | | See the source image | -the water-soluble components of cell cytoplasm | Both | |
| **Cilia** | | See the source image | -are microscopic, hair-like structures that extend outward from the surface of many animal cells | Animal | |
| **Flagella** | | See the source image | -a slender threadlike structure, especially a microscopic whiplike appendage that enables many protozoa, bacteria, spermatozoa, etc., to swim | Prokaryotes like Bacteria | |
| **Cell membrane** | | See the source image | -The cell membrane is selectively permeable to ions and organic molecules and controls the movement of substances in and out of cells.  -Bilayer (two layers) | In both but on the outside of Animal | |
| **Plastids** | | See the source image | -any of a class of small organelles, such as chloroplasts, in the cytoplasm of plant cells, containing pigment or food | Plants | |
| **Retrovirus** | | Image result for retrovirus | -type of **RNA virus** that inserts a copy of its genome into the DNA of a host cell that it invades, thus changing the genome of the cell, like HIV | Any Cell | |
| **Lytic Cycle** | | Image result for lytic cycle | -**virus** results in the destruction of the infected cell and its membrane (ex. attack of a bacteria with a **bacteriophage)** | Any Cell | |
| **Lysogenic Cycle** | | Image result for lysogenic cycle | -**a viral** mode of reproduction whereas time goes by. Although dormant (not active), it replicates itself by letting the host cell copy the virus’ genetic material in cell division. | Any Cell | |

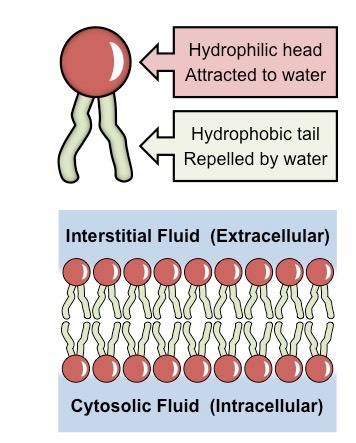


**Video on the difference between the Lytic and Lysogenic Cycle on how Viruses reproduce itself.**

CELL MEMBRANE- BIO 1.D. 1-2



**Cell membrane acts as a door and allows certain materials in, out, and back into the cell.**

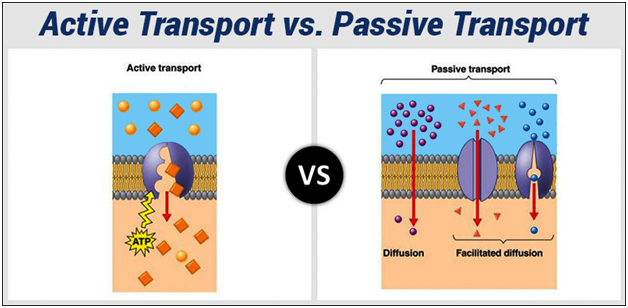
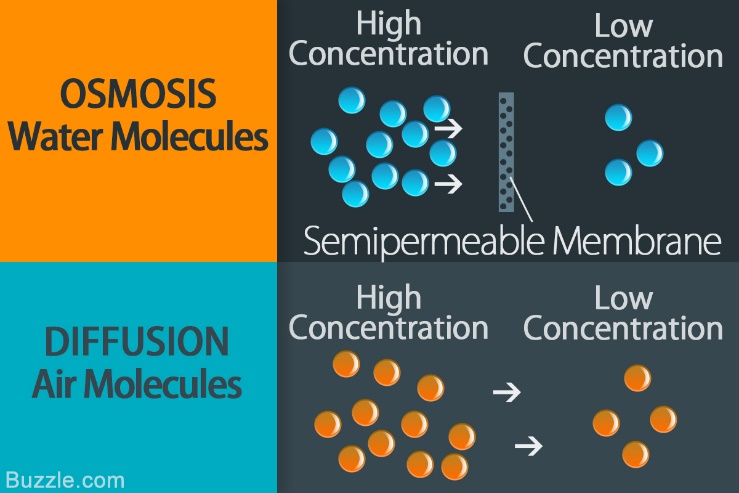


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**As materials go in and out of the cell and back in the cell, materials from high concentration to low concentration or vice versa through** **Active Transport & Passive Transport**

**Cell Membrane is the door**

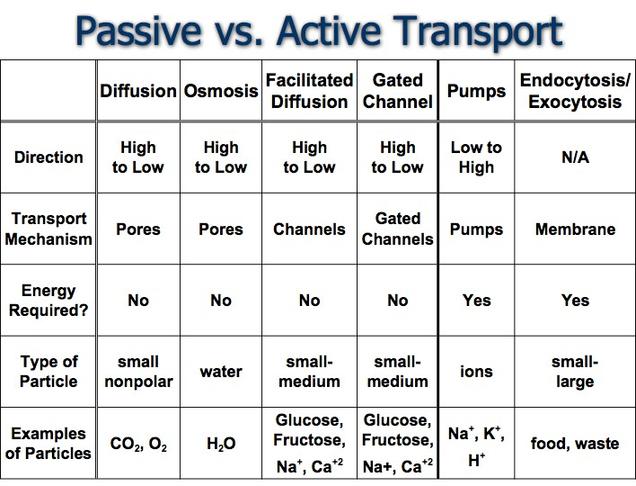
The free flow of materials from inside the cell to the outside (vice versa) creates HOMESTATISIS – a steady stable equilibrium between elements

KNOW THIS KEY INFORMATION:

**DOESN’T NEED ENERGY to move materials back and forth**

**NEEDS ENERGY to move materials back and forth**

**Aids in cell survival when moving from high concentration to low concentration and back (Homeostasis)**

.

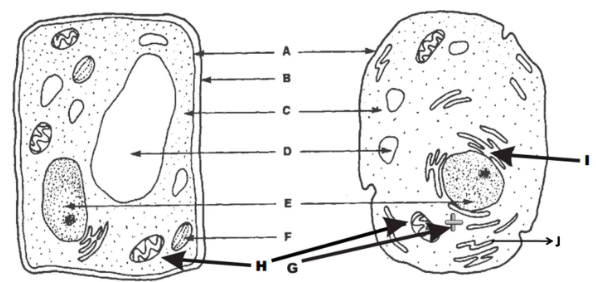
**WATCH THIS**



CONCEPTS REVIEW

1. Construct a hierarchy of life from cells to the biosphere.
   1. \_\_\_\_\_\_\_\_\_**CELL**\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_**TISSUE**\_\_\_\_\_\_\_\_\_\_\_
   3. \_\_\_\_\_\_\_\_\_**ORGAN**\_\_\_\_\_\_\_\_\_\_\_
   4. \_\_\_\_\_\_\_\_\_**ORGAN SYSTEM**\_\_\_\_\_\_\_\_\_\_\_
   5. \_\_\_\_\_\_\_\_\_\_**ORGANISM**\_\_\_\_\_\_\_
   6. **\_\_\_\_\_\_\_\_\_\_\_POPULATION\_\_\_\_\_\_**
   7. **\_\_\_\_\_\_\_\_\_\_\_\_\_COMMUNITY\_\_\_\_\_\_\_\_\_\_\_\_**
   8. **\_\_\_\_\_\_\_\_\_ECOSYTEM**\_\_\_\_\_\_\_\_\_
   9. \_\_\_\_\_\_\_**BIOME**\_\_\_\_\_\_\_\_
   10. \_\_\_\_\_\_\_\_\_**BIOSPHERE**\_\_\_\_\_\_\_\_\_\_\_
2. label the parts of the plant and animal cells

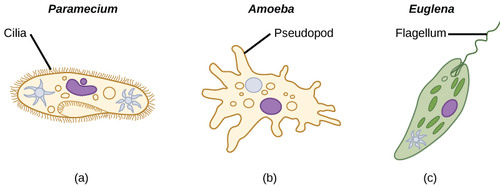
\_\_\_\_\_\_\_\_\_\_**PLANT**\_\_\_\_\_\_\_\_cell \_\_\_\_\_\_\_\_\_**ANIMAL**\_\_\_\_\_\_\_\_ cell



**Place the correct letter from above next to its name in the box below. Then uses these names to correctly fill in #’s 3-24.**

|  |  |  |  |
| --- | --- | --- | --- |
| C Cytoplasm | B Cell wall | E Chromatin (DNA) | Nucleus |
| A Cell Membrane | J Golgi body | F Chloroplast | D Vacuole |
| Nuclear Membrane | H Mitochondria | Cytoskeleton | Lysosome |
| Nucleolus | Rough ER | Smooth ER | Ribosome |

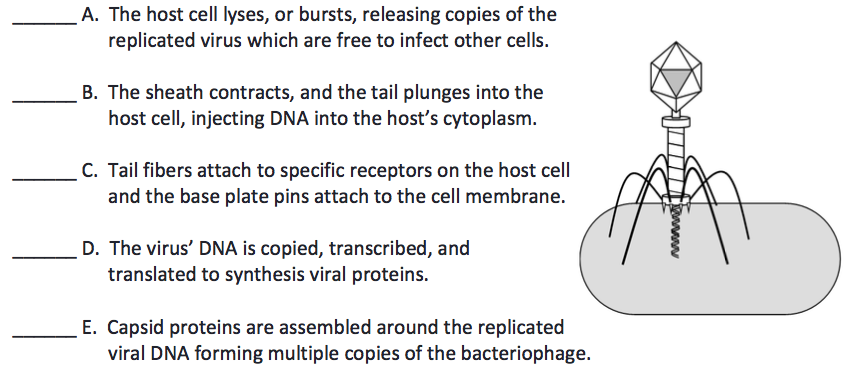
1. \_\_\_\_\_\_\_**PROKARYOTIC**\_\_\_\_\_ cells lack a nucleus and membrane bound organelles.
2. A \_\_\_\_\_\_\_**BACTERIAL**\_\_\_\_\_\_\_ cell is an example of a prokaryotic cell.
3. \_\_\_\_\_\_\_\_\_\_**EUKARYOTIC**\_\_\_\_\_ cells have a nucleus and membrane bound organelles.
4. \_\_\_\_\_\_\_\_\_**PLANT**\_\_\_\_\_ and \_\_\_\_\_\_\_**ANIMAL**\_\_\_\_\_\_\_\_\_ cells are eukaryotic cells
5. The \_\_\_\_\_**RIBOSOMES**\_\_\_\_\_\_\_\_\_ are responsible for making (synthesizing) proteins.
6. The \_\_\_\_\_\_\_**CYTOSKELETON**\_\_\_\_\_\_\_\_\_ provides a framework for the cell.
7. The \_\_\_\_\_\_**CELL**\_\_\_\_\_\_\_ \_\_\_\_\_\_**MEMBRANE**\_\_\_\_\_\_\_ acts as a selectively permeable barrier around the cell.
8. The tail (whip-like projections) of a cell that allows it to move from place to place is called a \_\_**FLAGELLA**\_\_\_\_\_\_
9. The tiny hair-like projections on the outside of a cell that allows it to move form place to place are called \_\_\_\_\_**CILLIA**\_\_\_\_\_\_\_\_\_\_.
10. The \_\_\_\_\_**CYTOPLASM**\_\_\_\_\_\_\_\_ is the jello-like interior of the cell that holds all of the organelles.
11. The \_\_\_\_\_**NUCLEAR**\_\_\_\_\_\_\_ \_\_\_\_\_\_**MEMBRANE**\_\_\_\_\_\_\_\_\_ is the membrane that surrounds the nucleus.
12. The \_\_\_\_**NUCLEOLUS**\_\_\_\_\_\_ is the site of ribosome synthesis.
13. The \_\_\_**CELL**\_\_\_\_\_ \_\_\_**WALL**\_\_\_ provides structure and support for the plant cell.
14. The \_\_\_\_\_**GOLGI**\_\_\_\_\_\_ \_\_\_\_\_**BODY/COMPLEX/APPARATUS**\_\_\_\_ modifies, sorts, and packages proteins for transport in and out of the cell.
15. The \_\_**MITOCHONDRIA**\_\_\_\_\_\_\_\_\_\_ is the powerhouse of the cell, making the energy needed to carry out cellular functions.
16. The \_\_\_\_**ENDOPLASMIC** \_\_\_\_\_\_\_ \_\_\_\_\_**RETICULUM**\_\_\_\_\_\_\_\_\_ serves as a transport system within the cell.
17. The \_\_\_\_\_**ROUGH**\_\_\_\_\_\_\_\_\_ endoplasmic reticulum has ribosomes attached to it.
18. The \_\_\_\_\_**SMOOTH**\_\_\_\_\_\_ endoplasmic reticulum is the site of carbohydrate and lipid production.
19. The \_\_\_**CHLOROPLAST**\_\_\_\_\_\_\_ is specialized plant cell structure that makes food with energy form the sun.
20. The \_\_\_\_**NUCLEUS**\_\_\_\_\_\_\_is the control center of the cell and stores all of the genetic information (DNA) of the cell.
21. \_\_\_**VACUOLES**\_\_\_\_\_\_\_\_\_\_\_ are the storage facilities of the cell.
22. \_\_\_\_\_**LYSOSOMES**\_\_\_\_\_\_\_\_\_\_ contain digestive enzymes and are found mainly in animal cells.
23. Identify how each of the cells below move in their environment: flagella, cilia, pseudopodia.



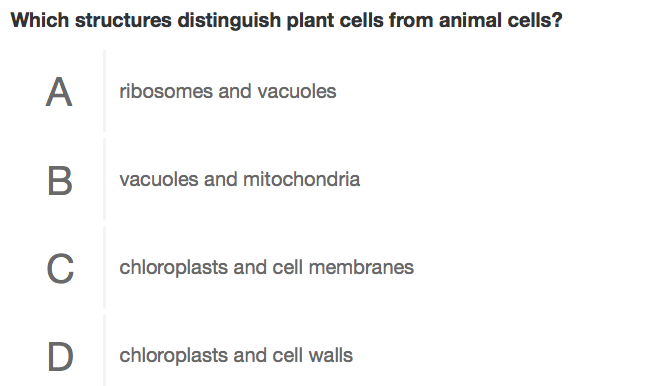
**CILLIA PSEUDOPODIA FLAGELLUM**

1. Place the following stages of the virus life cycle (lytic cycle) in the correct order by number the statements 1-5

**5, 2, 1, 3, 4**



MAAP TEST PREP



1. Define the following terms from the question above:

Distinguish **TO STAND APART FROM BY BEING DIFFERENT**

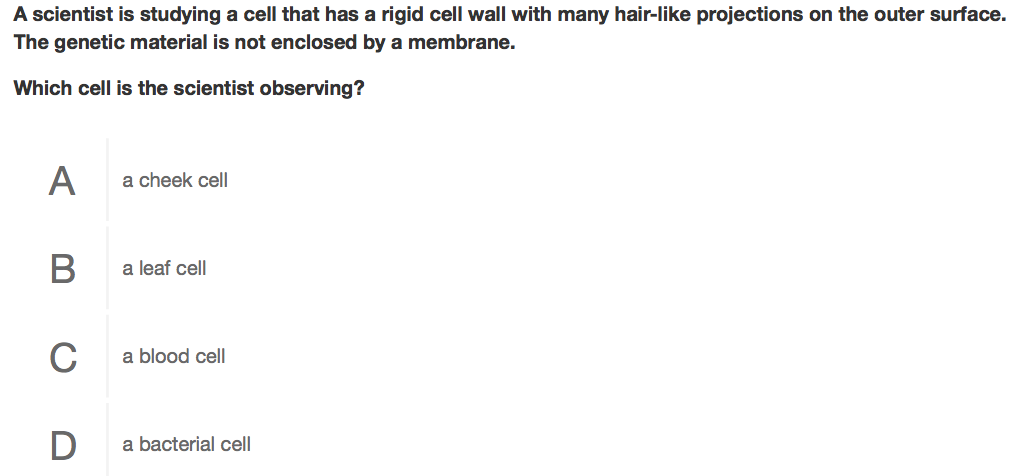
1. Rewrite the question in your own words. What are they really asking

**WHAT DO PLANT CELLS HAVE THAT ANIMAL CELLS DO NOT?**

1. What is the correct answer and WHY? (you will not get credit without an explanation)

**D, PLANTS HAVE CELL WALLS TO SUPPORT THEIR STRUCTORE AND CHLOROPLASTS TO PRODUCE GLUCOSE FROM THE SUNS ENERGY.**

2)



1. Define the following terms from the question above:

Projections**. APPENDAGES OR PARTS THAT STICK OUT FROM THE CELLS SURFACE**

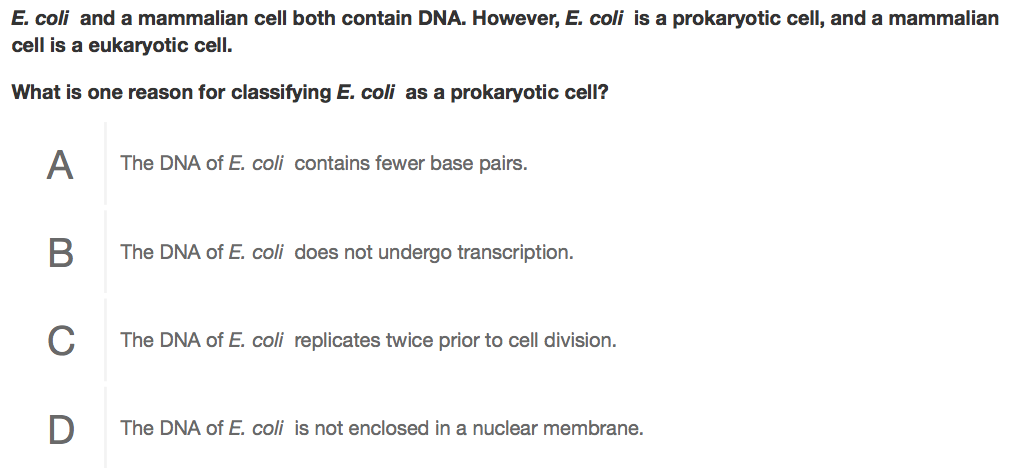
1. Rewrite the question in your own words. What are they really asking?

**WHAT ARE THE CHARACTERISTICS OF A PROKARYOTIC CELL?**

1. What is the correct answer and WHY? (you will not get credit without an explanation)

**A, BECAUSE THE BACTERIAL CELL IS THE ONLY PROKARYOTIC CELL, MEANING IT WOULD LACK MEMBRANE BOUND ORGANELLES.**

3)



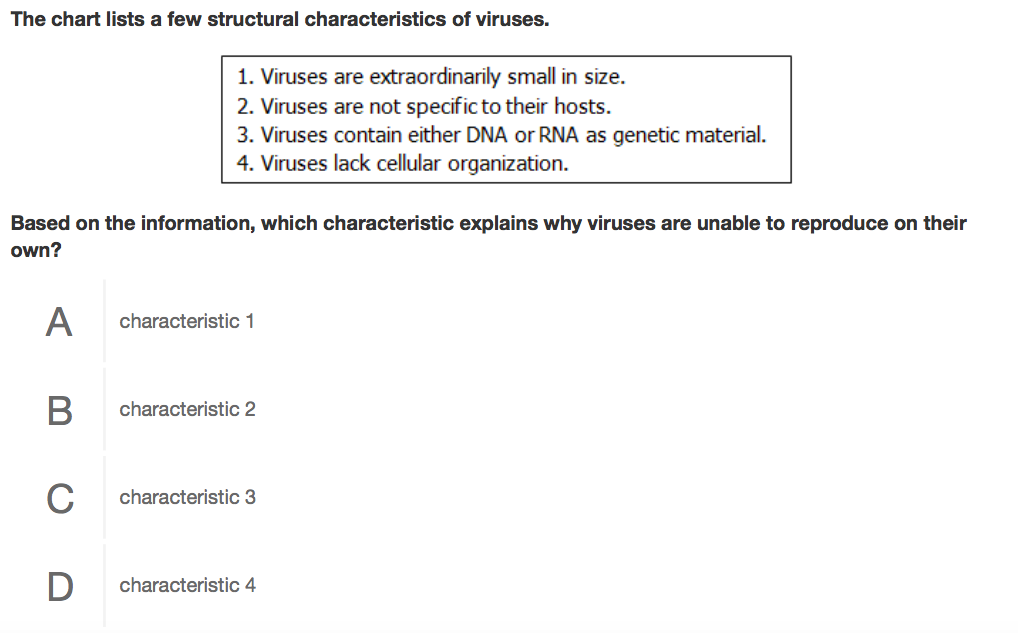
1. (circle the correct answer) E.Coli are (**Prokaryotes** / Eukaryotes) where as mammalian cells are (Prokaryotes **/ Eukaryotes**)
2. Rewrite the question in your own words. What are they really asking?

**WHAT IS THE MAJOR DIFFERENCE BETWEEN PROKARYOTES AND EUKARYOTES?**

1. What is the correct answer and WHY? (you will not get credit without an explanation)

**D, BECAUSE PROKARYOTES LIKE E. COLI DO NOT HAVE A NUCLEUS THAT CONTAINS DNA WHILE MAMMALIAN CELLS DO**

4)



1. Define the following terms from the question above:

Extraordinarily- **VASTLY DIFFERENT**

Host- **-an LIVING THING ON OR IN WHCH A VIRUS, PARASITE OR COMMENSAL ORGANISM LIVES OR REPRODUCES.**

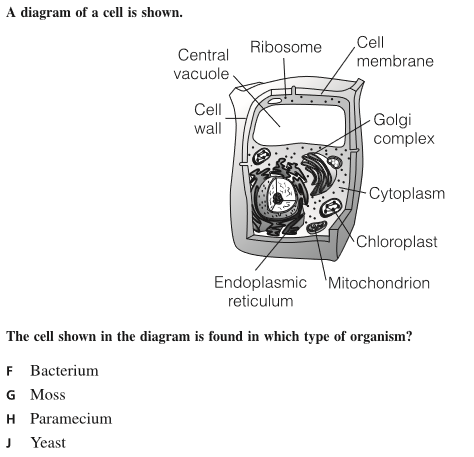
1. Rewrite the question in your own words. What are they really asking?

**WHY CAN’T VIRUSES REPRODUCE ALONE?**

1. What is the correct answer and WHY? (you will not get credit without an explanation)

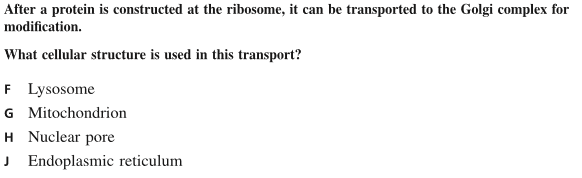
D BECAUSE WITH OUT CELLULAR STRUCTURES THE VIRUS CANNOT REPLICATE ITS GENETIC MATERIAL OR PRODUCE PROTEINS.

**MDE PT. 1 # 42**



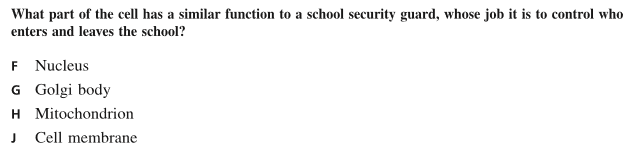
Answer G: **Clues-** “Moss” is a plant. Plants have central vacuoles. F is a prokaryotic not a eukaryotic, Same for H. Yeast do not have vacuoles.

**MDE PT. 2 # 4**



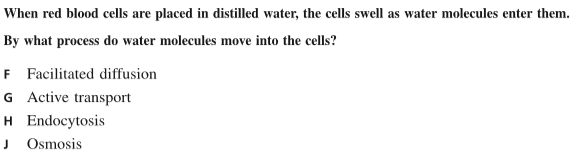
Answer J. **Clues**- “construction of protein” this occurs in J. F’s job is to clean the cell, G provide energy, and H does allow for transport but doesn’t have anything to construct protein.

**MDE PT. 2. # 16**



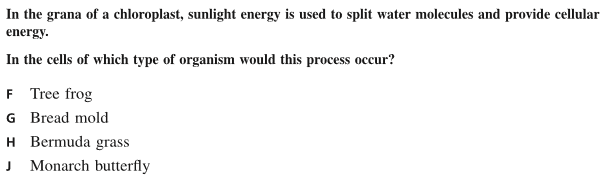
Answer J. **Clues-** “Controls what enters and leaves”. F, G, and H are inside the cell and serve different functions for the survival of the cell.

**MDE PT. 2. # 36**



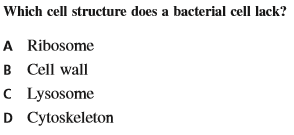
Answer J. **Clues-**“Cell Swells”- Increase of concentration. F is the spreading out of concentration. G is the overall process and H is the entrance of molecules into the cells.

**MDE PT. 2 # 56**



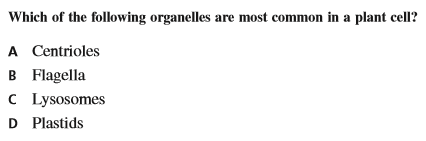
Answer H. **Clues-** “chloroplast” = plant. Plants only have chloroplast and the rest of the answer choices are not plats. They are animal or fungi.

**MDE. PT. 3 # 1**



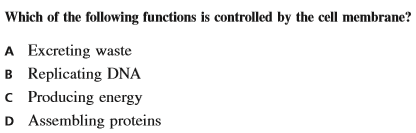
Answer C. **Clues-** “Lack”. This means that the bacterial cell has everything except one.

**MDE PT. 3 # 5**



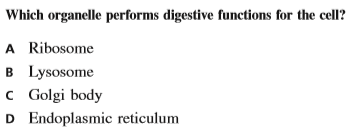
Answer: D. **Clues-**“most common in plant”. Answers A, B, C are mostly in animal cells.

**MDE PT. 3 # 11**

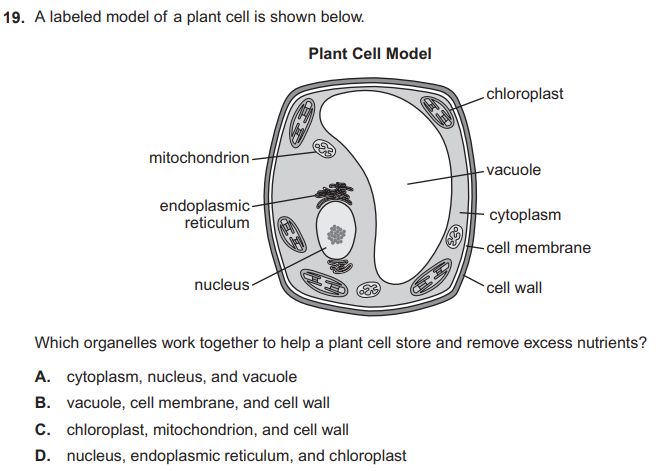


Answer A. **Clues-** “Excretes” = out . Cell membrane controls what enters and exits out of the animal cell.

**MDE PT.3 # 65**



Answer B. **Clues-** “digestive function”. The only answer choice that digest within the cell are lysosomes. A make proteins, C, transports, and D. assembles the ribosomes.



Answer: B. Clues: “Storage” ….Vacuole “Stores” and so does the membrane and well (proteins & carbohydrates, etc.”