



WESTLAKE HIGH SCHOOL

IB BIOLOGY YEAR 1 SUMMER ASSIGNMENT- SUMMER 2022

IB Biology will be a very intensive course. Though we will have 90-minute periods every other day, there is still a lot of new material to learn. The only way we can do this is because you already have one year of background in Honors Biology.

This summer assignment is a review of the cell's unit covered in Honors Biology and by having this topic fresh in your mind when you come into the IB class, will make it easier to move through the cell's unit faster and more efficiently.

Answer all the questions in your best handwriting or (type). Use any websites (bioninja.com is a good one) or books for reference. I have referenced some great websites below that you may use to assist with completing the assignment. All answers requiring more space should be typed or written out. As IB students, you are expected to become quite independent and disciplined learners.

Class Supplies

Notecards

Highlighters

Calculator

Ruler

Please do not put off this assignment until the end of the summer. Space out the topics over time and the work will not seem so overwhelming. Some of the material may be new to you, but it is important that you find all the answers. Everybody needs to have this assignment done by the first day of school. We will review it and there will be a test on it the beginning of the second week of school. You will be expected to be familiar with the information in this assignment, as it will be used as a basis for our class and referred to at critical points during the class. The assignment will be due on the First Friday of the school semester in August.

Looking forward to an awesome year in IB Biology!

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TOPIC I.
Cellular structure and organelles

Look for the definition and function of each of the cellular organelles below (this must be in your own words)

CYTOPLASM NUCLEAR

ENVELOPE NUCLEUS

CELL WALL NUCLEOLUS

RIBOSOME

ROUGH ENDOPLASMIC RETICULUM SMOOTH

ENDOPLASMIC RETICULUM GOLGI APPARATUS

LYSOSOME

MITOCHONDRION
(pl. mitochondria)

VACUOLE CHLOROPLAST

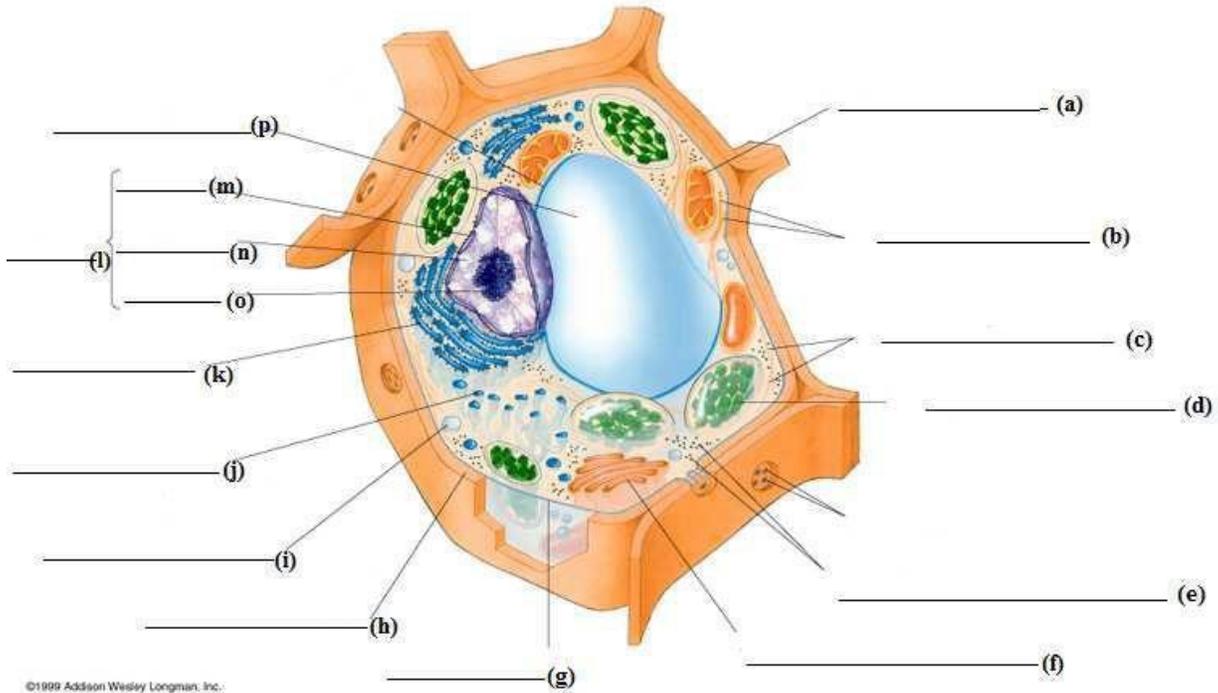
MICROFILAMENTS AND MICROTUBULES

PEROXISOMES

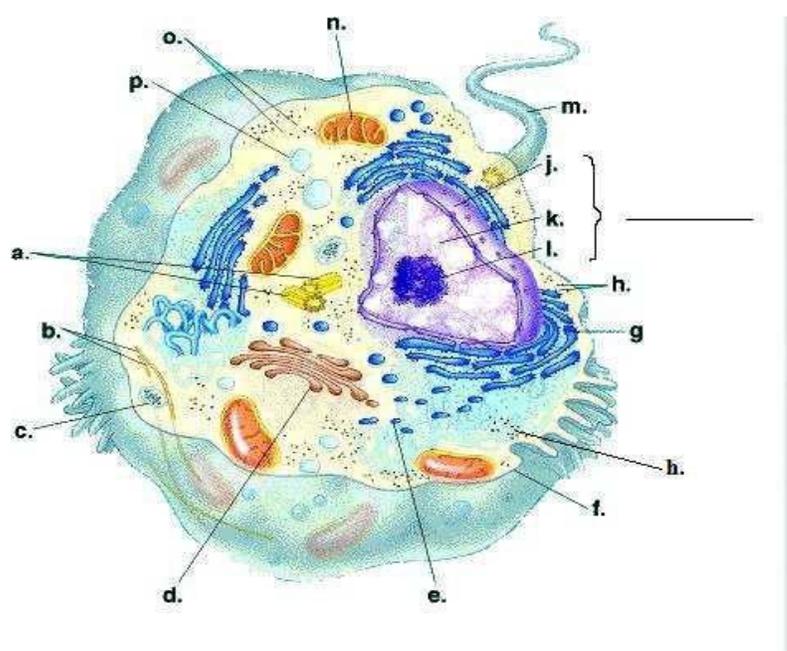
CELL MEMBRANE

Tour of the cell - Label the indicated structures in these diagrams of plant and animal cells

Plant Cell

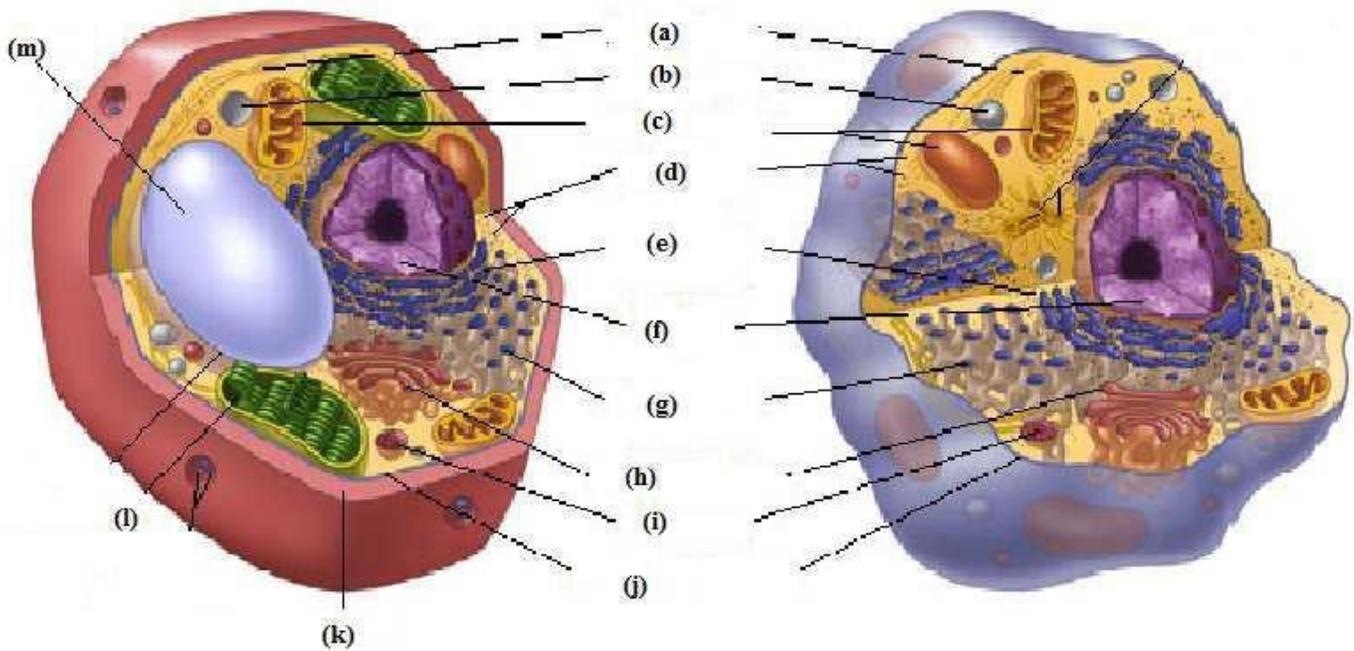


Animal Cell - write the names next to the letters



Compare plant and animal cells.

Compare a plant and an animal cell by identifying the common parts and the unique parts to the plant cell.



_____ Cell

_____ Cell

(a) _____

(g) _____

(b) _____

(h) _____

(c) _____

(i) _____

(d) _____

(j) _____

(e) _____

(k) _____

(f) _____

(l) _____

(m) _____

Add any missing parts of the cells, by drawing a line and labeling with the consecutive letters:

Topic II. Cell Membrane

Vocabulary - use the following words to describe the composition of a cell membrane (A) and how it works (B), in a couple of paragraphs in your own words:

A. Permeable - selectively (semi) permeable

Phosp
holipi
d
bilaye
r
Protei
ns
Chole
sterol
Carbo
hydra
tes

Hydrophilic - water loving
- Hydrophobic - water
hating -

B. Concentration (mass
per volume) - Solution
- solute, solvent,
solubility
Concentration
gradient

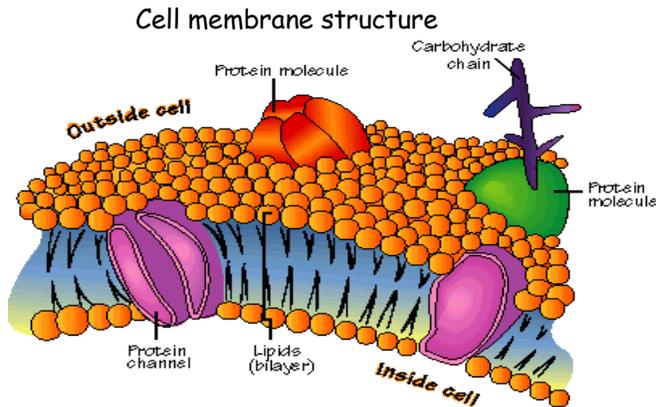
Hypertonic ("above strength" - high
concentration) Hypotonic ("below strength" - low
concentration) Isotonic ("same" - equal
concentration on both sides)

Turgid
Flaccid
Plasmolysis

Describe each of the following types of transport:

Diffusion, Osmosis, Passive Transport, Active

Transport Exocytosis, endocytosis,
(phagocytosis, pinocytosis)



CELL MEMBRANE - fill in the blanks -

The cell membrane organizes the chemical activities of the cell. It surrounds the cell and controls the traffic of molecules into or out of the cell. Some scientists consider it more important to the cell functioning than the nucleus.

The cell membrane is **selectively permeable** because _____

The main structure of cell membranes is composed of _____. Because of this, only

molecules soluble in _____, also called hydro _____ molecules can pass through

the membrane freely. On the other hand, hydro _____ molecules depend on _____

to cross the lipid bilayer. The most important to life of these latter molecules is _____.

A **solution** is a _____

Some examples of solutions are: _____

A solution has two components, one that dissolves, called the _____ and one that is the medium in which

the other dissolves, called the _____.

When a substance has the ability to dissolve in another to form a solution, it means that this first substance is

_____ in the other.

The concentration of a solution could be defined as the _____ of the _____ per _____ of

_____. Solutions can be concentrated or dilute, depending on how much solute is present.

How are these terms about solutions important to the study of cell membranes?

The following terms are extremely important to the understanding of the transport across cell membranes:

Hypertonic solution ("above strength" - solution with _

_____ concentrati

on of solutes than on the other side of the membrane)

Hypotonic solution ("below strength" - solution with

_____ concentrati

on of solutes than on the other side of the membrane)

Isotonic solution ("same strength" - solution with _

_____concentrati
on of solutes on both sides of the membrane)

Transport across membranes

Some molecules cross membranes without using any energy and other molecules need cell energy to cross.

1). **Passive transport** is when substances cross the cell membrane with / without
_____energy, going freely from where they are more / less
_____concentrated to where they are more / less
_____concentrated.

This can be observed in every day's life in the following examples:

- (1) _____
- (2) _____
- (3) _____
- (4) _____

Passive Transport is also called _____. There are two types of diffusion, free and facilitated diffusion.

Free diffusion is the tendency of particles to spread from where they are _____concentrate
d to where they

are _____concentrated, like in the examples above. This means molecules diffuse down
concentration

gradient until equilibrium is reached. Molecules continue to move back and forth in
equilibrium without change in concentration. In cells only hydro_____molecules can
diffuse freely through the cell membrane.

Why? _____

Facilitated diffusion needs protein channels to help hydro_____ molecules cross the phospholipid bilayer.

Transport proteins are embedded in the membrane, and they act as pores for passage of particular solutes down their

_____.

The main molecule that crosses in this way is _____, crucial to life.

The special type of facilitated diffusion that water uses to freely cross membranes is called_____.

It is the water movement through a selectively permeable membrane from a "weak" solution, also called

_____ to a "strong" solution, or _____ until equilibrium is reached, called

_____. This means that when the solute concentration outside the cell is higher than the one inside

the cell, the water will move ___ into / out _____ the cell, making the cell ___ smaller / bigger_____. In this case

water goes from a _____ tonic solution towards a _____ tonic solution until it reaches equilibrium and both

side become _____ tonic.

On the other hand, when there is higher concentration inside the cell than the outside, the water will move from _____ inside

/ outside __ of the cell towards the inside / outside __ of the cell. In scientific terms, water moves from a

_____ tonic solution towards a _____ tonic solution until equilibrium is reached and both sides are

_____ tonic. This specific process of water movement across cell membranes is called_____.

How does osmosis differ from diffusion?

Balance of water between cells and their surroundings is crucial to life. Water needs to be able to cross freely the cell membranes. Why isn't it able to cross by itself? _____

The reason why water moves across membranes is to release of **osmotic pressure** created by the difference in the concentrations on the two sides of the membrane. It's easier to have water balancing out the concentration rather than moving other solutes. Also, water can move freely across the membrane.

In order for plant cells to be healthy, they need to have a _____ concentration of water inside the cell, in order to keep their rigid structure and grow against gravity. Plant cells have adapted to keep this osmotic pressure:

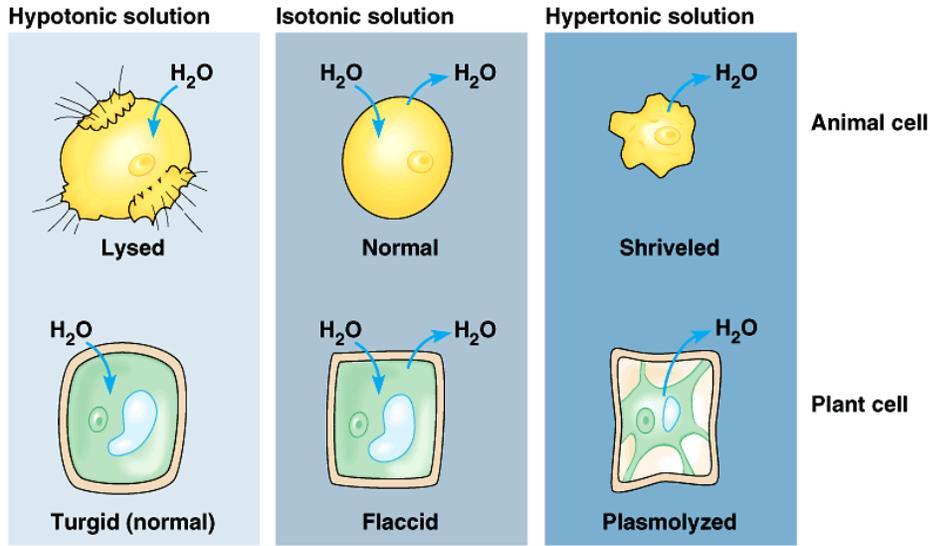
Cell wall

Outside the cell membrane

Supports and protects the cell by holding the pressure and preventing the cell from excess water uptake and bursting

Vacuole

Hold excess water and it pumps it out as needed



Analyze the picture above and complete the following paragraph:

Plant cells can be firm or _____. This is the _____, healthy state for plant cells, when in a

_____ environment. On the

other hand, an animal cell would _____ at

is no pressure inside to keep them turgid. However, this is the preferred environment for the animal cells. Why? _____

In a _____ environment, both animal and plant cells _____, as the water

excess water goes out of the cell. The cell wall protects the plant cell from dying right away and

they can go back to normal when the concentration of solutes is lowered on the _____ of the cell.

When this happens, the water will move from a _____ solution

towards a _____ solution through the process of _____.

2). **Active transport** is when molecules cross the cell membranes by moving from low concentration to high concentration ___ energy input. Transport proteins actively pump specific small solutes across membrane against their concentration gradient. This can be done with small molecules or with large molecules. For large molecules this type of transport is called

- **Endocytosis** is - _____

o **Phagocytosis** is - _____

- Pinocytosis is - _____
- Exocytosis is - _____

References

You can use the following resources below to assist with completing the assignment

www.Bioninja.com

www.bioknowledgy.info/

<http://www.mrrottbiology.com/ib-biology.html>

<https://www.peoriapublicschools.org/Page/19822>

<https://i-biology.net/>