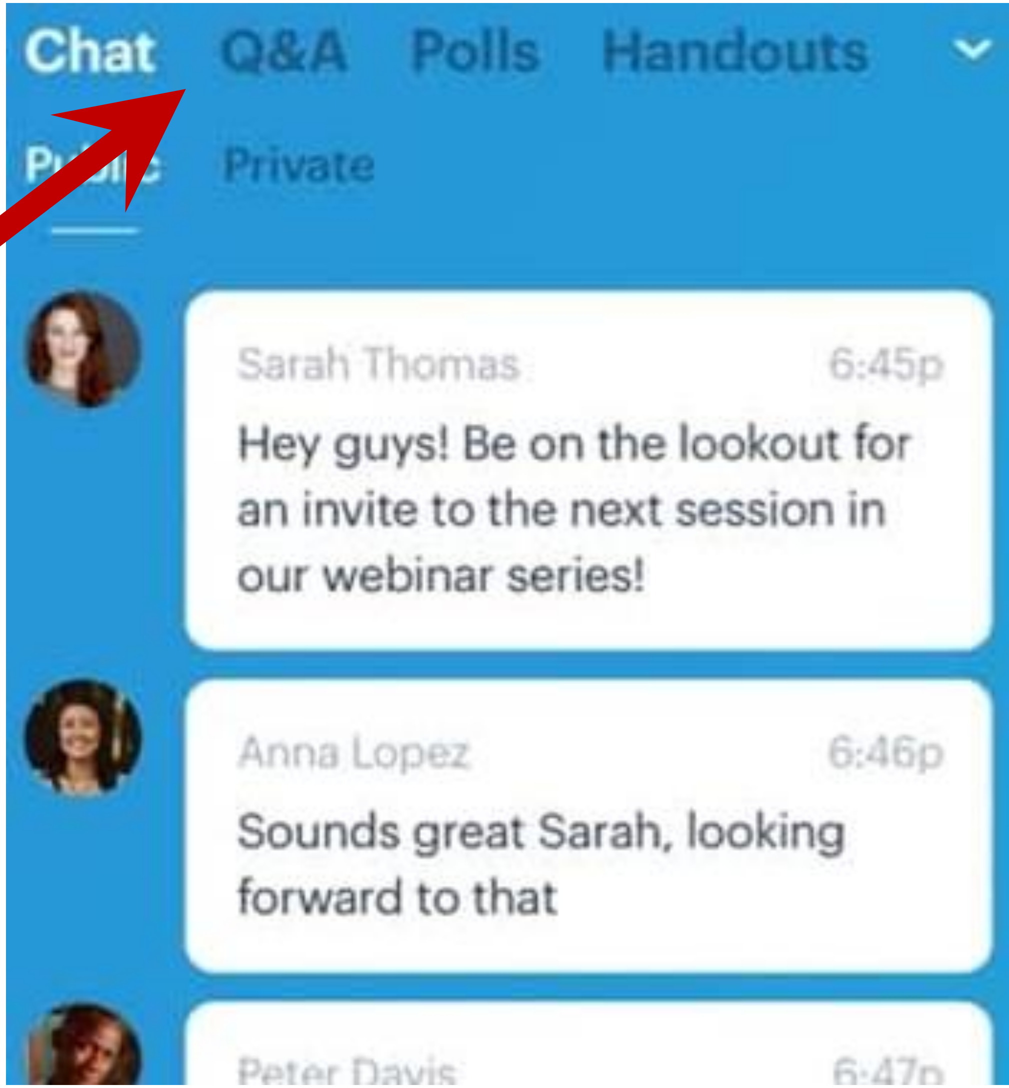
AP(R) Jumpstart Biology – Midterm Review

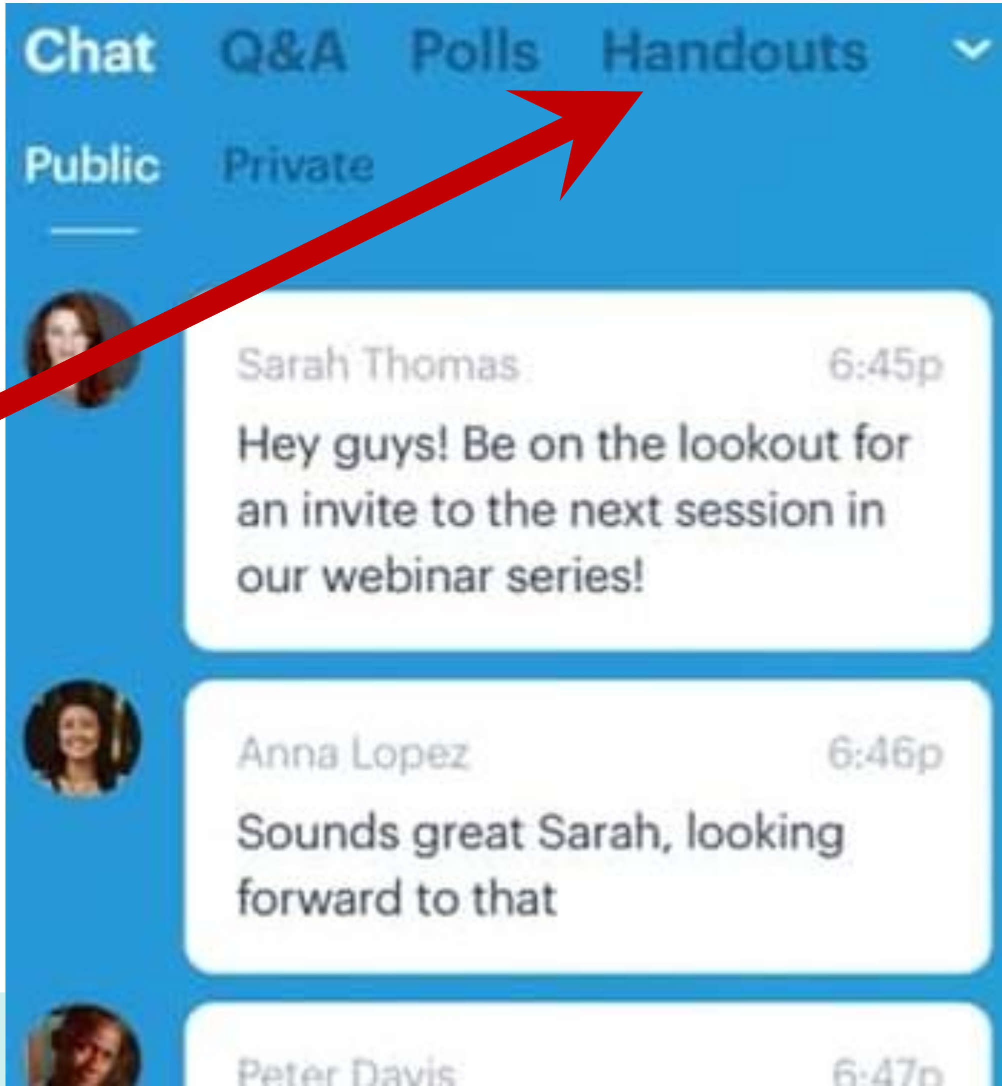
with Tiffany Jones (AP Bio Penguins)

Don't be shy! Talk to us in the **Chat** section

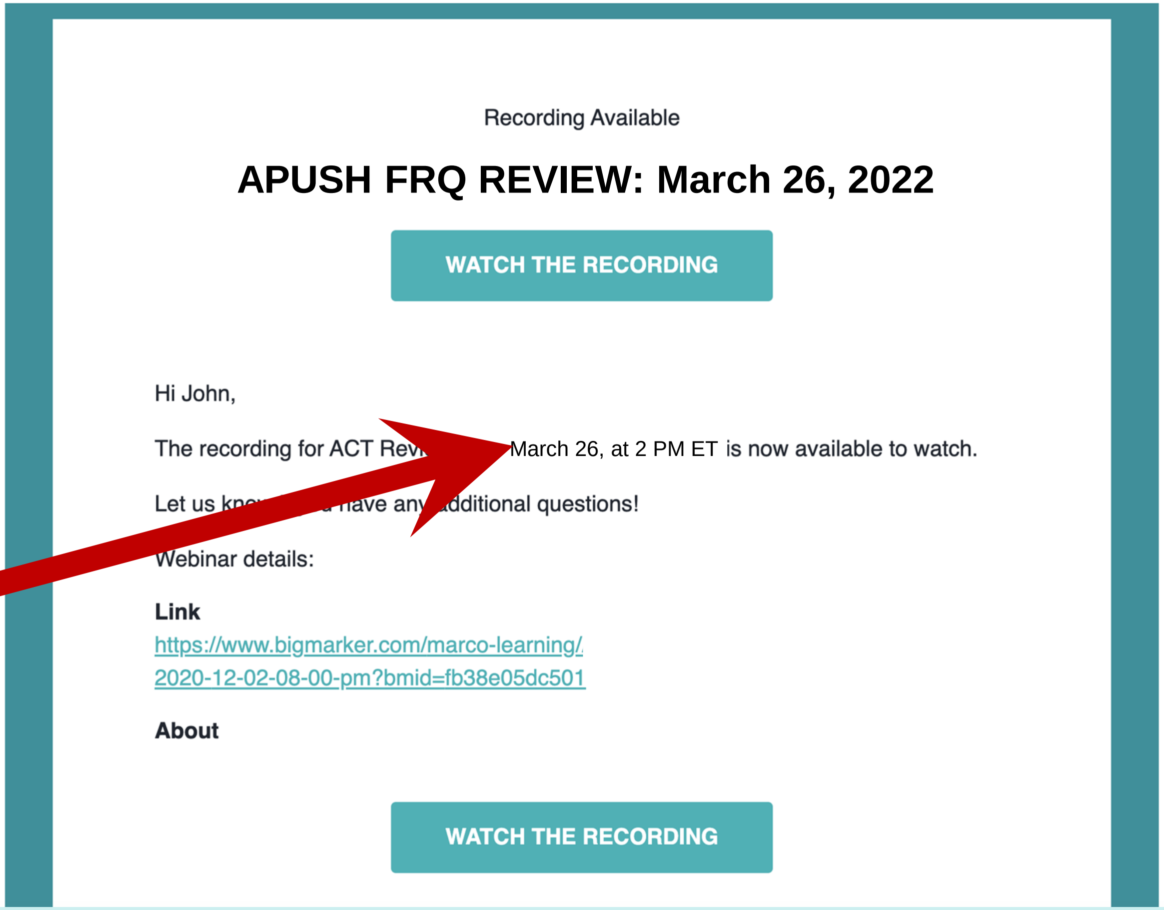
Post your questions in the **Q&A Section** and upvote your favorite questions.



Download your handouts and links in the **Handouts** tab.



All sessions **will be recorded** and sent to you via email.



Recording....

Don't forget to start the recording....

AP(R) Jumpstart Biology – Midterm Review

with Tiffany Jones (AP Bio Penguins)

Welcome – Who Are You?

Mrs. Tiffany Jones

- 12 years of AP Biology
- Georgia
- AP Reader
- B.S. in Biology
- Ed.S. in Instructional Tech
- Creator of AP Bio Penguins

AP Biology students are penguins because they are Dressed for Success!

You are now an
AP Bio Penguin!

AP Exam Topic Breakdown

MARCO LEARNING

Units of Study	Exam Weighing	#Qs (2020)
Unit 1: Chemistry of Life	8 – 11%	5 – 7 (5.7)
Unit 2: Cell Structure and Function	10 – 13%	6 – 8 (6.7)
Unit 3: Cellular Energetics	12 – 18%	7 – 10 (9.3)
Unit 4: Cell Communication and Cell Cycle	10 – 15%	6 – 9 (6.7)

Helpful Resources

MARCO LEARNING

AP Bio Penguins

351 page Review Guide
120+ Quizizz Games
Topic/CED TikTok Videos
Review PowerPoints
Unit Review Videos
FRQ Fridays
@apbiopenguins (IG, TT, YT)

apbiopenguins.weebly.com

Mark your Calendars for
Feb 1 DAILY review on IG

Helpful Resources

The APsolute RecAP

82 episodes (FREE) on any platform that offers podcasts

Guided listening sheets developed with podcast

theapsoluterecap.com

Helpful Resources

Bozeman Biology

Crash Course

Ameoba Sisters

Water Properties & Biochemistry

Hydrogen Bonds

Proteins

Lipids

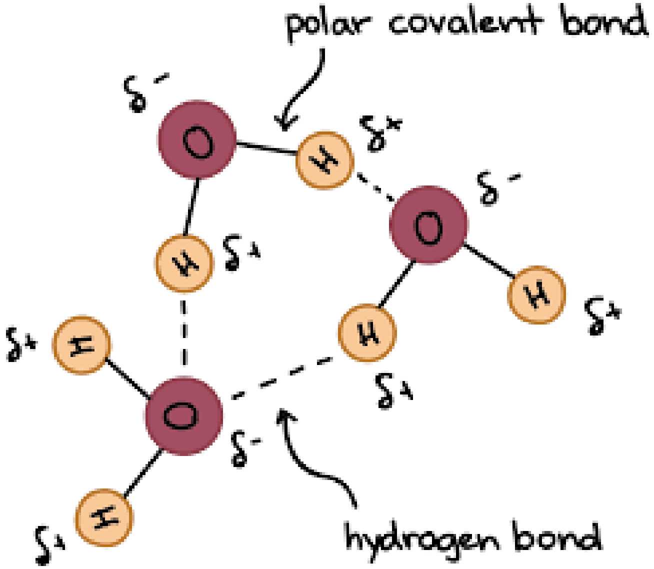
Nucleic Acids

Carbohydrates

MARCO LEARNING

Hydrogen Bonding

Polar covalent bonds between oxygen & hydrogen IN the water molecule

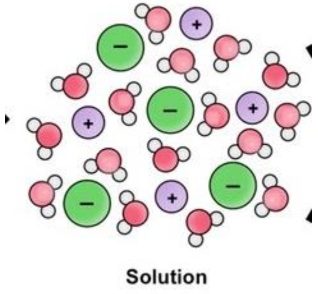


Hydrogen bonds between oxygen & hydrogen BETWEEN water molecules

Properties of Water

Universal Solvent

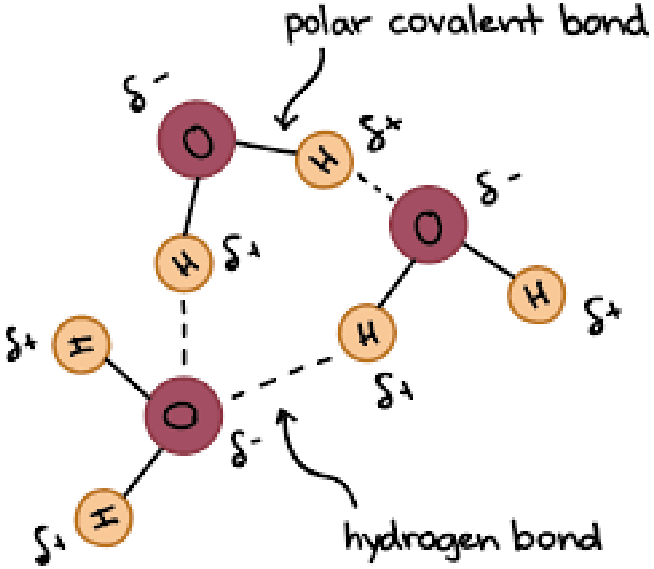
Partial negative oxygen binds with other polar molecules (partial positive end) & to positively charged ions (cations)



Partial positive hydrogen binds with other polar molecules (partial negative end) & to negatively charged ions (anions)

Hydrogen Bonding

Polar covalent bonds between oxygen & hydrogen IN the water molecule



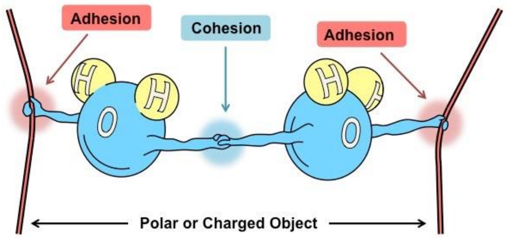
Hydrogen bonds between oxygen & hydrogen BETWEEN water molecules

Properties of Water

Cohesion & Adhesion

<u>Cohesion:</u>

Water molecules attracted to other WATER molecules



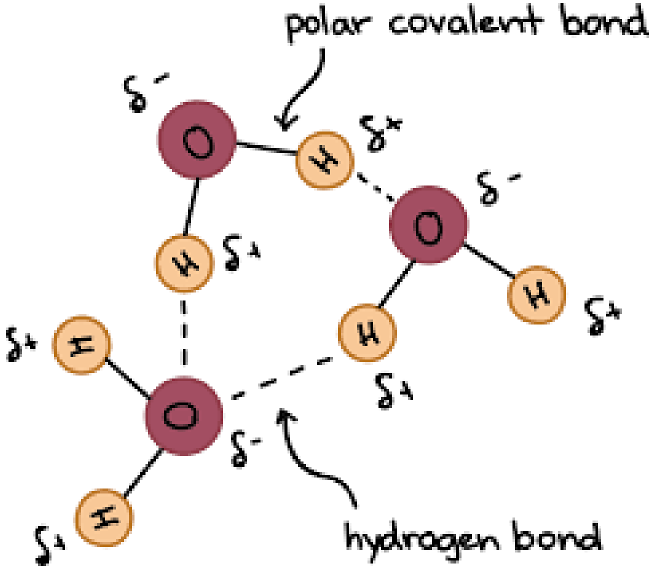
<u>Adhesion:</u>

Water molecules attracted to other POLAR substances

Together leads to Capillary Action

Hydrogen Bonding

Polar covalent bonds between oxygen & hydrogen IN the water molecule



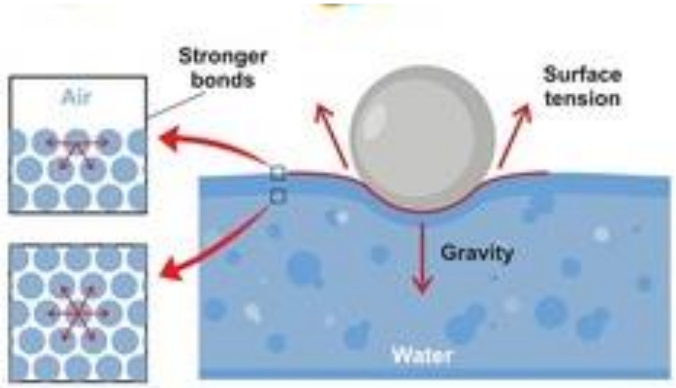
Hydrogen bonds between oxygen & hydrogen BETWEEN water molecules

Properties of Water

Surface Tension

Cohesion develops a "surface" based on the interaction of hydrogen bonds

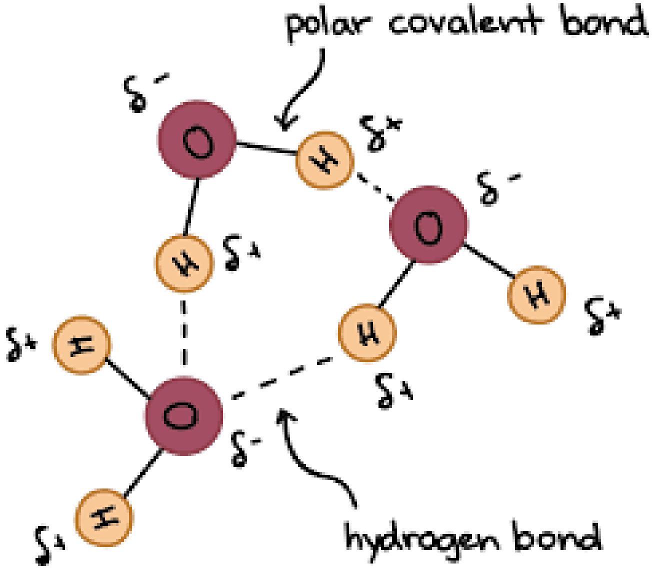
Allows you to skip rocks or water striders to walk on water



Unit 1: Chemistry of Life

Hydrogen Bonding

Polar covalent bonds between oxygen & hydrogen IN the water molecule



Hydrogen bonds between oxygen & hydrogen BETWEEN water molecules

Properties of Water

Less Dense Solid

Hydrogen bonds inhibit compaction

Ice floats; temperature buffer

High Specific Heat

Water must absorb or release A LARGE amount of energy to change 1 gram of water by 1°C.

$pH = -\log[H^+]$

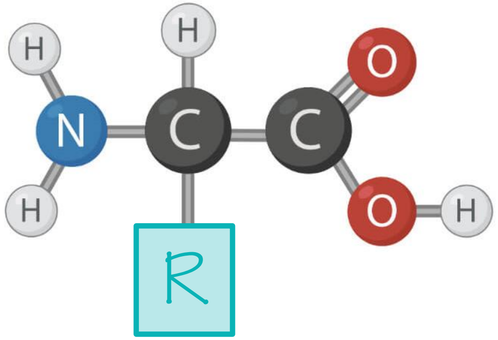
As the concentration of hydronium/hydrogen ion increases, the pH decreases

Unit 1: Chemistry of Life

Proteins

Composed of C, H, O, N, & S

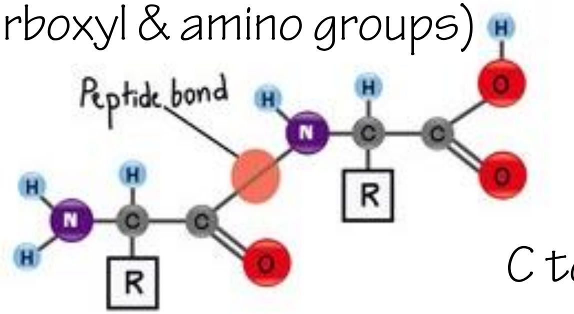
Monomer: Amino Acid



R group	Fold
Hydrophilic	Exterior
Hydrophobic	Interior
Charged	Exterior

Bond: Peptide bond
(between carboxyl & amino groups)

N terminus



C terminus

Primary:
Bond: peptide bonds between amino acids
Structure: string of amino acids

Secondary:
Bond: hydrogen bonds between backbone
Structure: alpha helix or beta pleated sheet

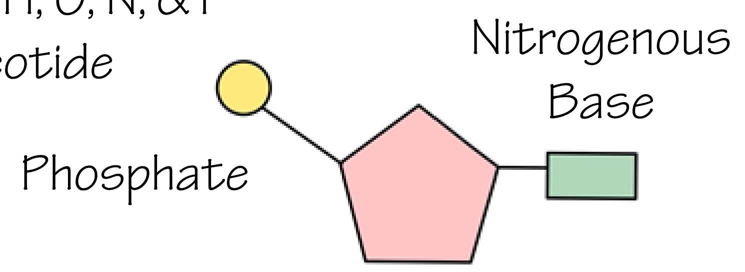
Tertiary:
Bond: ANY between R groups
Structure: final 3D structure

Quaternary:
Bond: ANY between R groups of different polypeptides

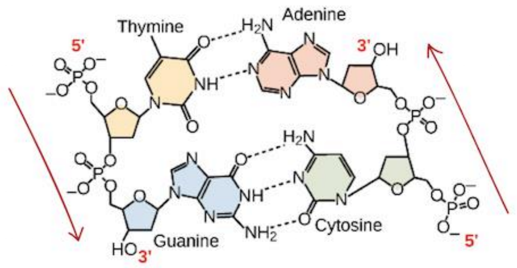
Nucleic Acids

Composed of C, H, O, N, & P

Monomer: Nucleotide



Bond: Phosphodiester linkage (between phosphate and hydroxyl)



Directionality: 5' → 3'; antiparallel

Nitrogenous Bases

Purine:
Double Ring
A & G

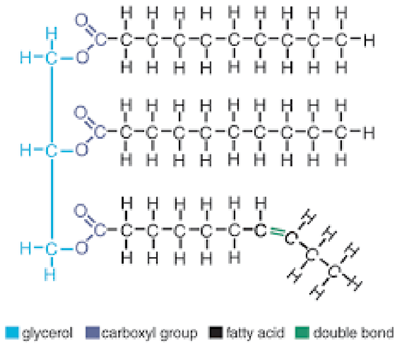
Pyrimidine:
Single Ring
C, U, T

Base Pairing	H bonds
A & T	2
C & G	3

	DNA	RNA
Nitrogenous Bases	A, T, C, G	A, U, C, G
Sugar	Deoxyribose	Ribose
Strandedness	"double"	"single"

Lipids

Composed of C, H, O, & P (in phospholipids)
Monomer: N/A
All of the lipids are NONPOLAR!!



Fats

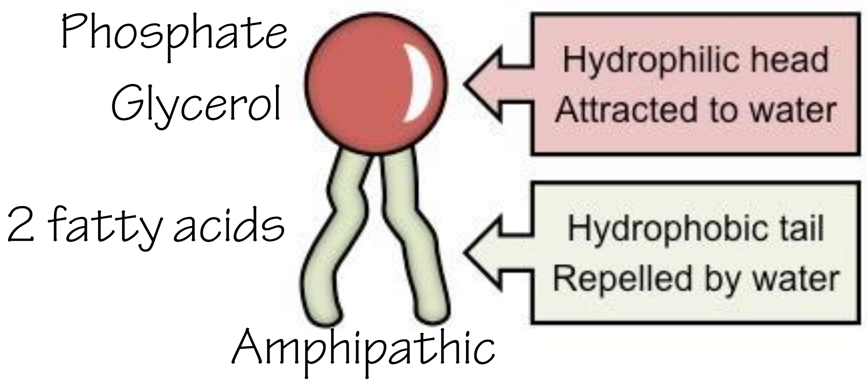
Saturated fatty acid

ALL single bonds
Each carbon is SATURATED by hydrogen

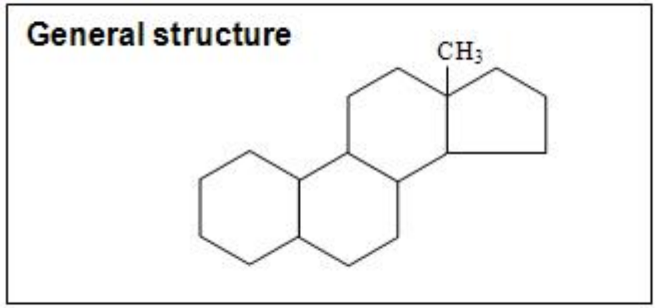
Unsaturated fatty acid

At least one double bond
NOT all carbons are SATURATED by hydrogen

Phospholipids



Steroids

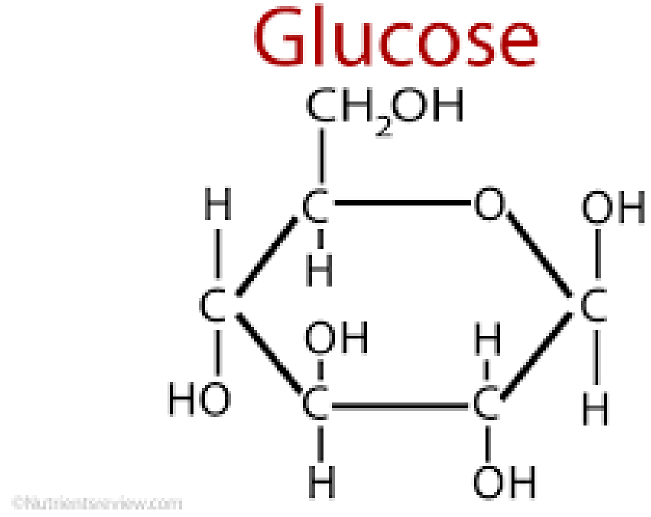


Carbohydrates

Composed of C, H, & O – Ratio: 1:2:1

Monomer: Monosaccharide

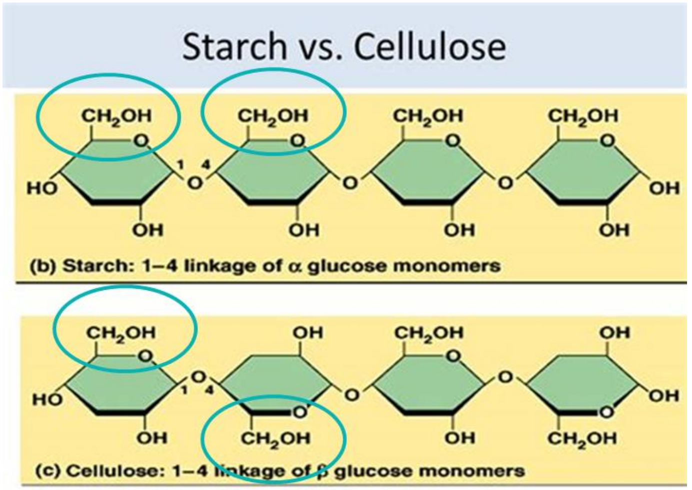
Bond: Glycosidic Linkage



<u>Structural:</u>

Cellulose: found in plant cell walls

Chitin: found in fungi cell walls & exoskeleton of arthropods



<u>Storage:</u>

Starch: found in plants

Glycogen: found in animals

Practice FRQ

Geneticists investigated the mode of inheritance of a rare disorder that alters glucose metabolism and first shows symptoms in adulthood. The geneticists studied a family in which some individuals of generations II and III are known to have the disorder. Based on the pedigree (Figure 1), the geneticists concluded that the disorder arose in individuals II-2 and was caused by a mutation in mitochondrial DNA.

(a) The disorder alters glucose metabolism. **Describe** the atoms AND types of bonds in a glucose molecule.

- The atoms are carbon, hydrogen, and oxygen (C, H, and O) and are held together by covalent bonds.

Unit 1: Chemistry of Life

Practice FRQ

During meiosis, double-strand breaks occur in chromatids. The breaks are either repaired by the exchange of genetic material between homologous nonsister chromatids, which is the process known as crossing over (Figure 1A), or they are simply repaired without any crossing over (Figure 1B). Plant breeders developing new varieties of corn are interested in determining whether, in corn, a correlation exists between the number of meiotic double-strand chromatid breaks and the number of crossovers.

(a) The double-strand breaks occur along the DNA backbone. **Describe** the process by which the breaks occur.

Accept one of the following:

- (Enzymatic) hydrolysis occurs between the sugars and phosphates/nucleotides.
- The covalent bonds between the sugars and phosphates/nucleotides are broken.

Practice MCQ

Scientists examined the folded structure of a purified protein resuspended in water and found that amino acids with nonpolar R groups were primarily buried in the middle of the protein, whereas amino acids with polar R groups were primarily on the surface of the protein. Which of the following best explains the location of the amino acids in the folded protein?

A. Polar R groups on the surface of the protein can form ionic bonds with the charged ends of the water molecules.
B. Polar R groups are too bulky to fit in the middle of the protein and are pushed toward the protein's surface.
C. Nonpolar R groups that cannot form hydrogen bonds with water are pushed into the middle of the protein.
D. Nonpolar R groups from different parts of the protein form covalent bonds with each other to maintain the protein's structure.

Organelles & Membrane Transport

Cell Organelles

Plasma Membrane

Osmosis

Passive Transport

Active Transport

Cellular Organelles

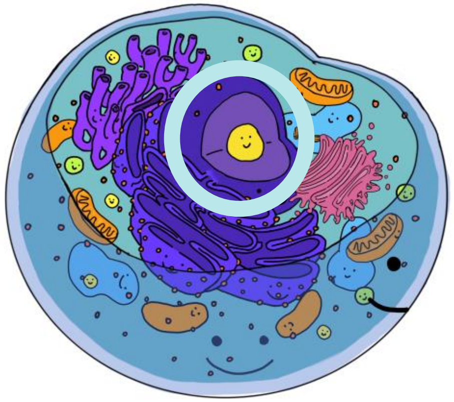
Nucleus:

Structure:

Double membrane (nuclear envelope) with pores

Functions:

Stores genetic information (DNA)
Synthesis of RNA
Ribosome subunit assembly



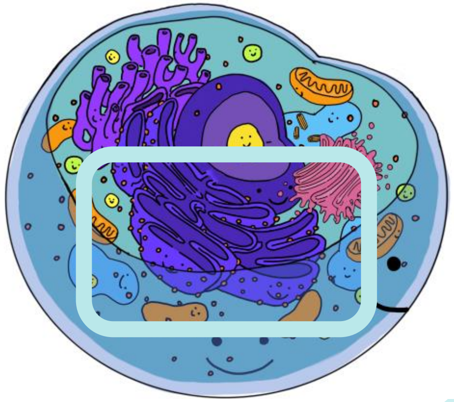
Rough ER:

Structure:

Membrane studded with ribosomes attached to nuclear envelope

Functions:

Site of membrane-bound protein and secreted protein synthesis
Cell compartmentalization
Mechanical support
Role in intracellular transport

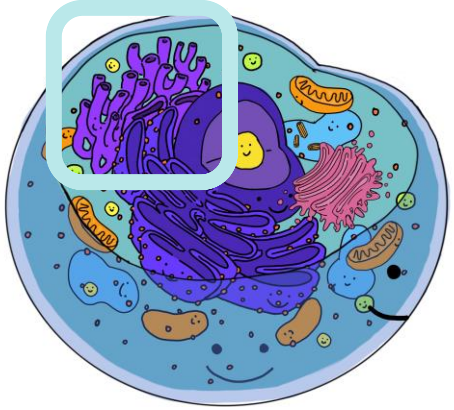


Cellular Organelles

Smooth ER:

<u>Structure:</u>
Folded, tubelike structure (cisternae)

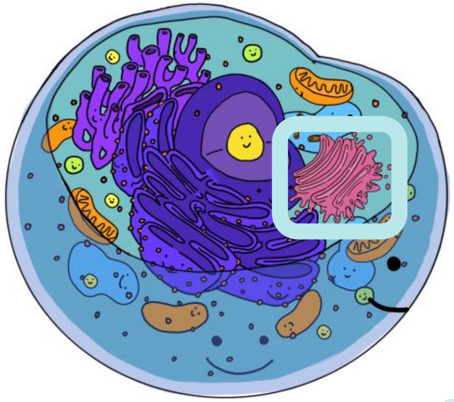
<u>Functions:</u>
Detoxification
Calcium Storage
Lipid synthesis



Golgi:

<u>Structure:</u>
Membrane-bound structure composed on flattened sacs (cisternae)

<u>Functions:</u>
Folding and chemical modification of synthesized proteins
Packaging protein traffic



Cellular Organelles

Ribosomes

<u>Structure:</u>

Composed of rRNA and protein

Large & small subunits

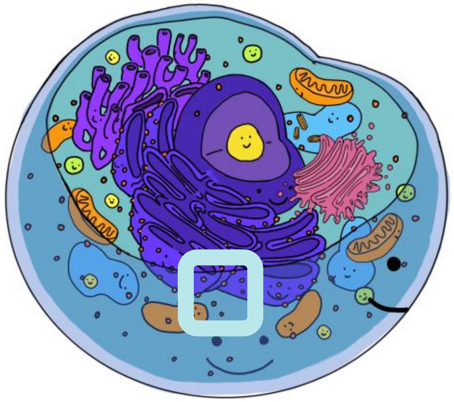
<u>Functions:</u>

Protein synthesis

<u>Types:</u>

Bound

Free (cytoplasmic)



Lysosome:

<u>Structure:</u>

membrane-enclosed sacs that contain hydrolytic enzymes

<u>Functions:</u>

Intracellular digestion (recycle cell organic materials & programmed cell death: apoptosis)

Cellular Organelles

Ribosomes

<u>Structure:</u>

Composed of rRNA and protein

Large & small subunits

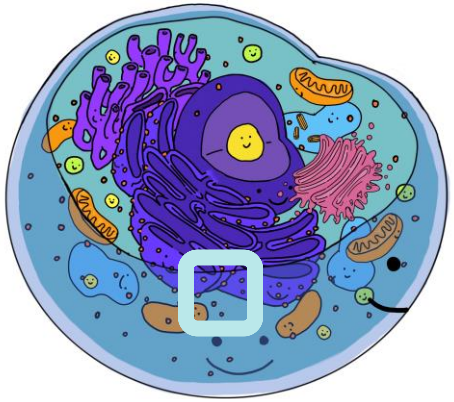
<u>Functions:</u>

Protein synthesis

<u>Types:</u>

Bound

Free (cytoplasmic)



Vacuole:

<u>Structure:</u>

membrane-bound sac

<u>Functions:</u>

storage and release of macromolecules and cellular waste products

<u>Types:</u>

Central: water retention – turgor pressure

Contractile: osmoregulation (protist)

Food: phagocytosis, fuse with lysosome

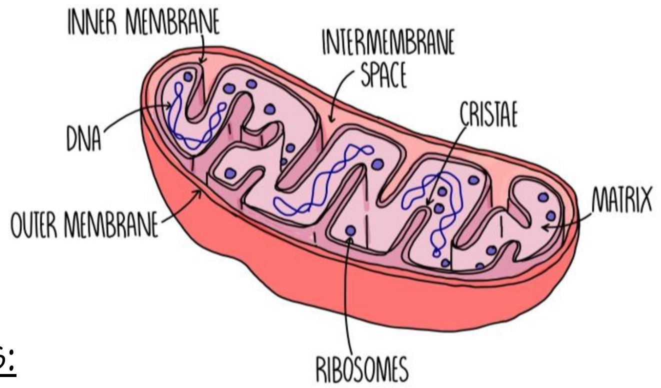
Cellular Organelles

Mitochondria

Structure:

Double membrane

(outer: smooth; inner: highly folded)



Functions:

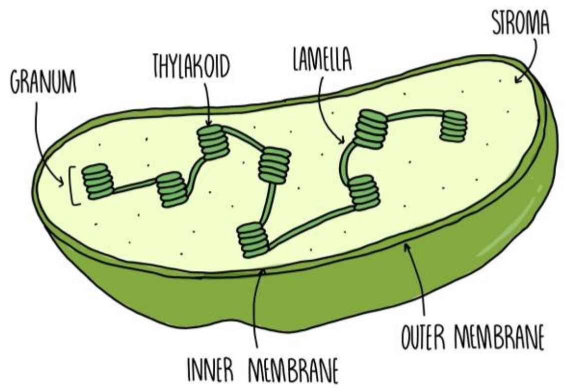
Site of oxidative phosphorylation (cristae/inner membrane)

Site of Krebs Cycle (matrix)

Chloroplast:

Structure:

Double outer membrane (thylakoid sac stacked: grana and fluid: stroma)



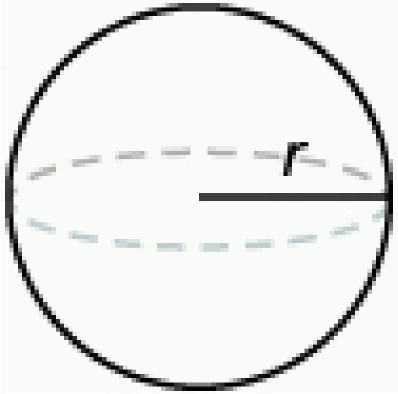
Functions:

Site of photosynthesis

Thylakoid: Light Reactions

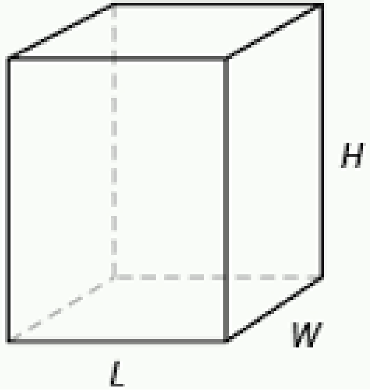
Stroma: Calvin-Benson Cycle

Surface Area to Volume Ratio



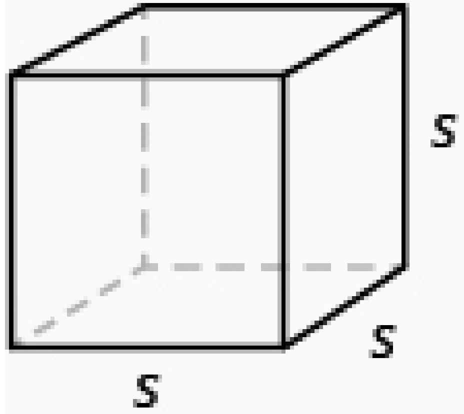
Volume: $V = \frac{4}{3}\pi r^3$

Surface Area: $S = 4\pi r^2$



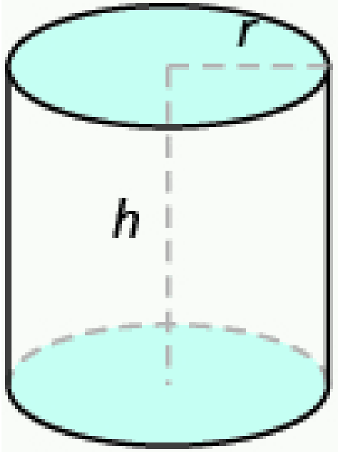
Volume: $V = LWH$

Surface Area: $S = 2LH + 2LW + 2WH$



Volume: $V = s^3$

Surface Area: $S = 6s^2$



Volume: $V = \pi r^2 h$ or $V = Bh$

Surface Area: $S = 2\pi r^2 + 2\pi rh$

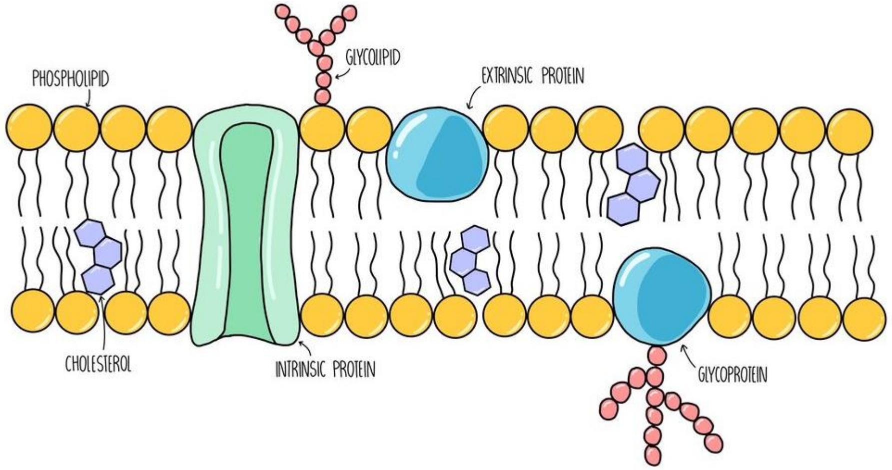
Smaller cells typically have a higher surface area-to-volume ratio and more efficient exchange of materials with the environment.

Membrane Transport

Plasma Membrane

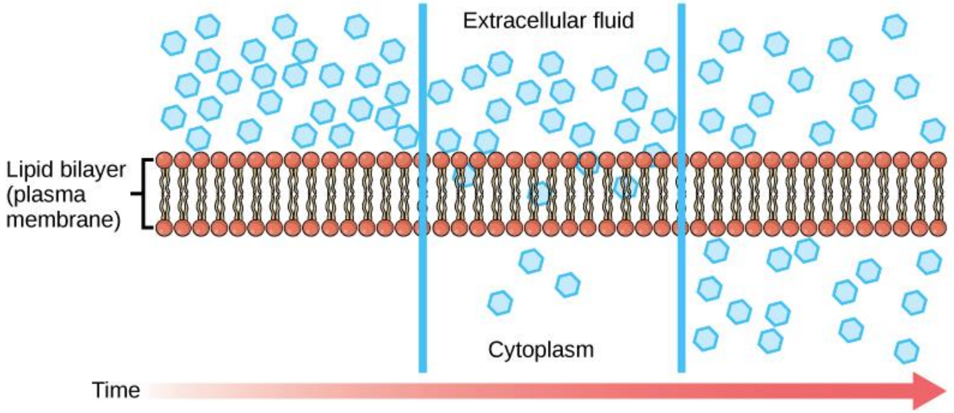
Composed of:

- Phospholipids
- Membrane Proteins
- Glycolipids/Glycoproteins
- Cholesterol



Simple Diffusion:

Passive Transport, No NRG
Down concentration gradient
Small, Nonpolar
No transport protein needed
Examples: CO_2, O_2, N_2, steroids
Small amount of H_2O leak through membrane

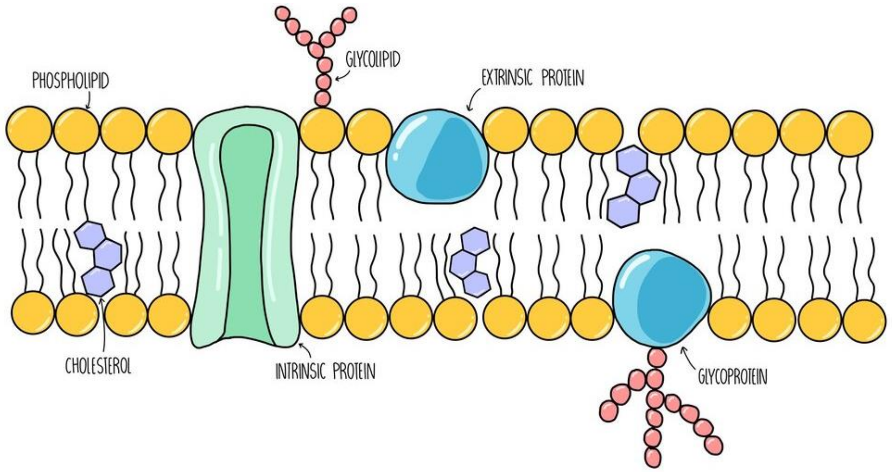


Membrane Transport

Plasma Membrane

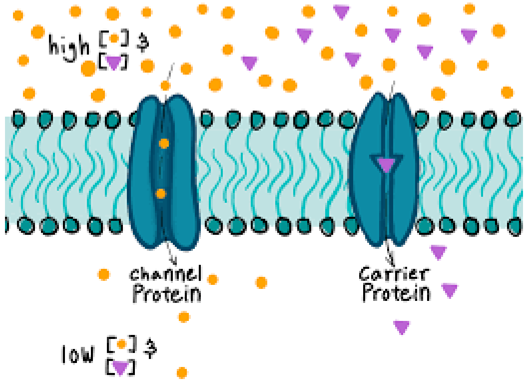
Composed of:

- Phospholipids
- Membrane Proteins
- Glycolipids/Glycoproteins
- Cholesterol



Facilitated Diffusion:

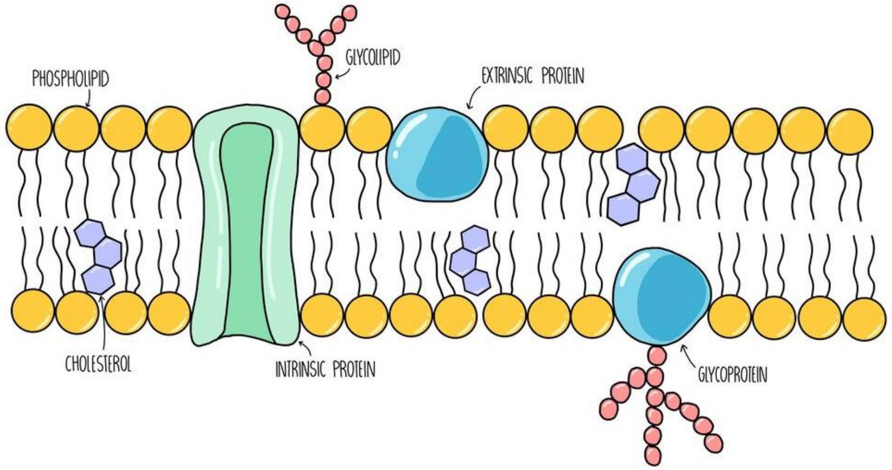
- Passive Transport, No NRG
- Down concentration gradient
- Small Molecules
- Requires transport protein
  - Channel vs. Carrier protein
- Example: water, Na^+, K^+, Ca^+



Membrane Transport

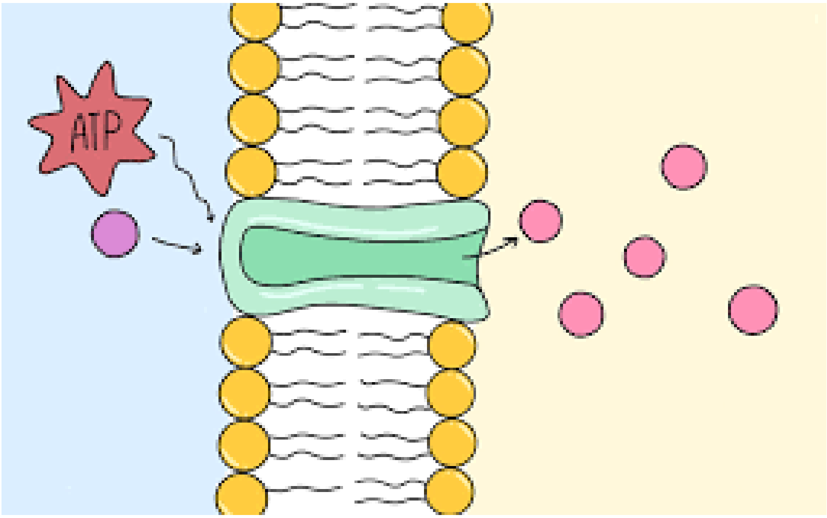
Plasma Membrane

Composed of:
- Phospholipids
- Membrane Proteins
- Glycolipids/Glycoproteins
- Cholesterol



Active Diffusion:

Requires input of NRG
Against concentration gradient
Requires transport protein (carrier protein)
Example: Na^+, K^+, Ca^+, H^+

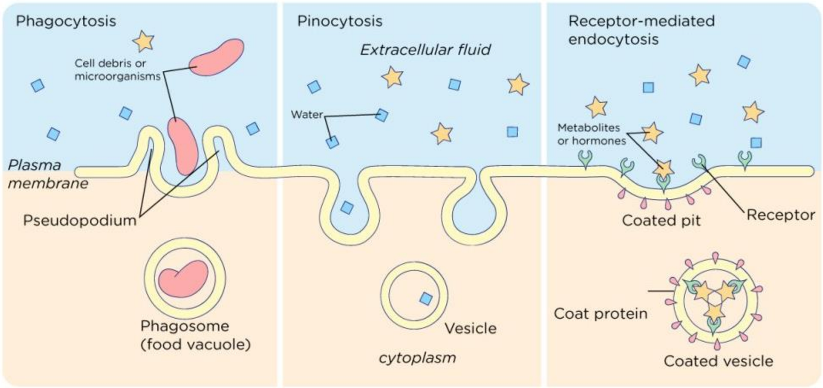


Membrane Transport

Endocytosis

Import of materials

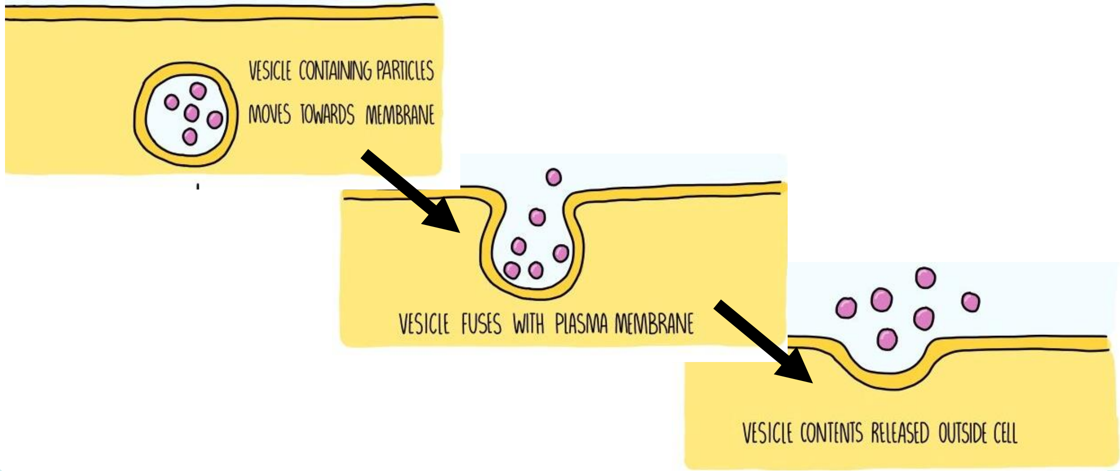
Types:
Phagocytosis: Cellular Eating
Pinocytosis: Cellular Drinking
Receptor-Mediated: Endocytosis



Exocytosis:

Export of materials

Pathway:
Rough ER (synthesize) → Golgi complex (package/modification) → Plasma Membrane

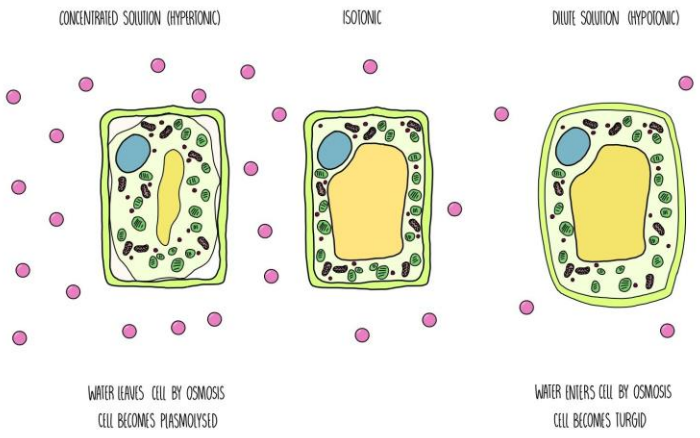


Membrane Transport (Osmosis)

Hypertonic Solution

HIGH solute concentration
LOW free water concentration

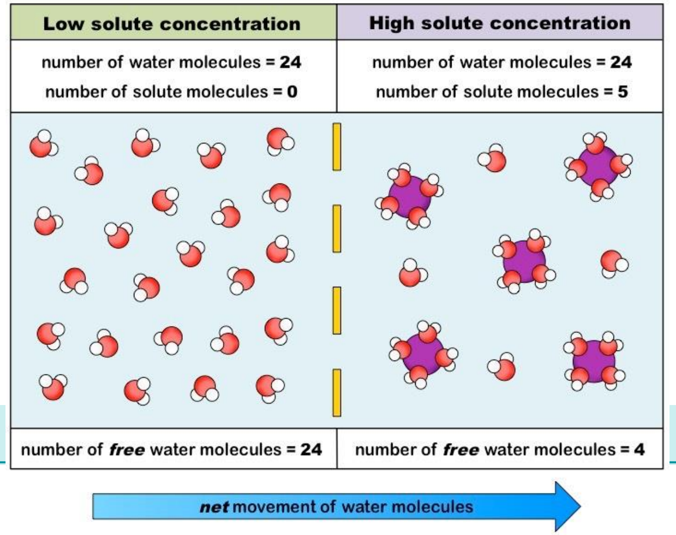
GAINS water from hypotonic solution



Isotonic Solution

EQUAL solute concentration
(as other solution)
EQUAL free water concentration
(as other solution)

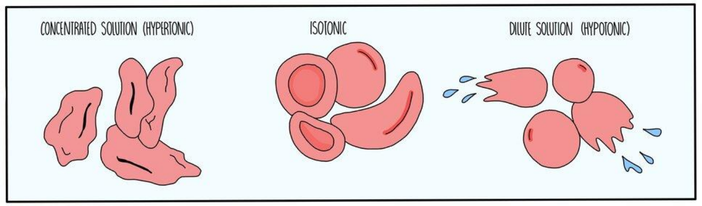
Equal water movement into and out of solution



Hypotonic Solution

LOW solute concentration
HIGH free water concentration

LOSES water to hypertonic solution



Unit 2: Cell Structure & Function

Practice FRQ

Cystic fibrosis is a genetic condition that is associated with defects in the CFTR protein. The CFTR protein is a gated ion channel that requires ATP binding in order to allow chloride ions (Cl-) to diffuse across the membrane.

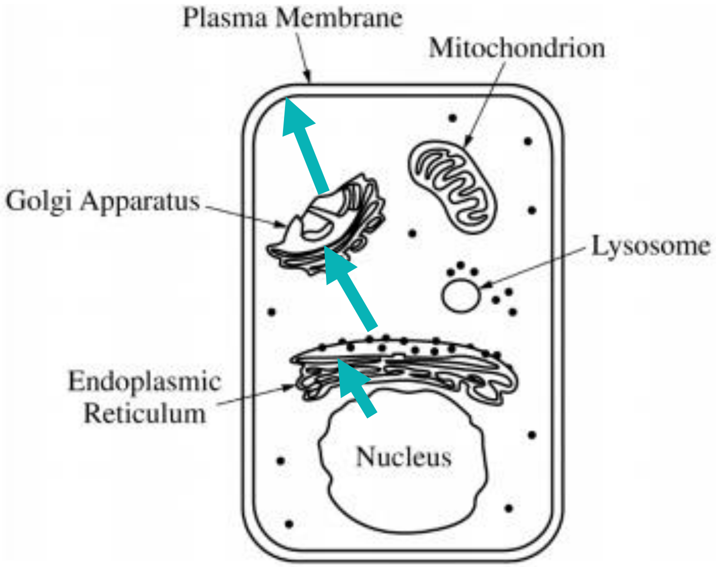
(a) In the provided model of a cell, **draw** arrows to describe the pathway for production of a normal CFTR protein from gene expression to final cellular location.

(b) **Identify** the most likely cellular location of the ribosomes that synthesize CFTR protein.

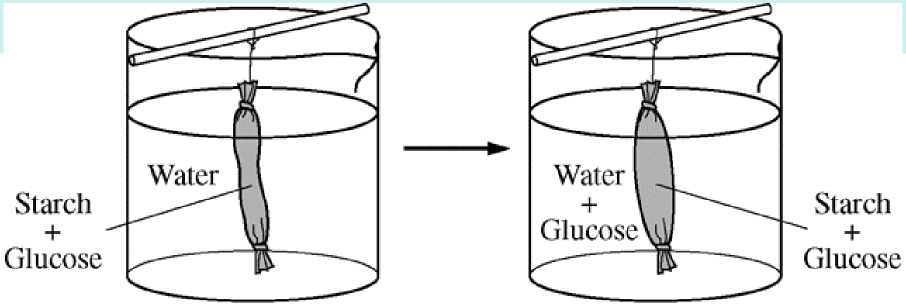
(Rough) Endoplasmic Reticulum/ER

(c) **Identify** the most likely cellular location of a mutant CFTR protein that has an amino acid substitution in the ATP-binding site.

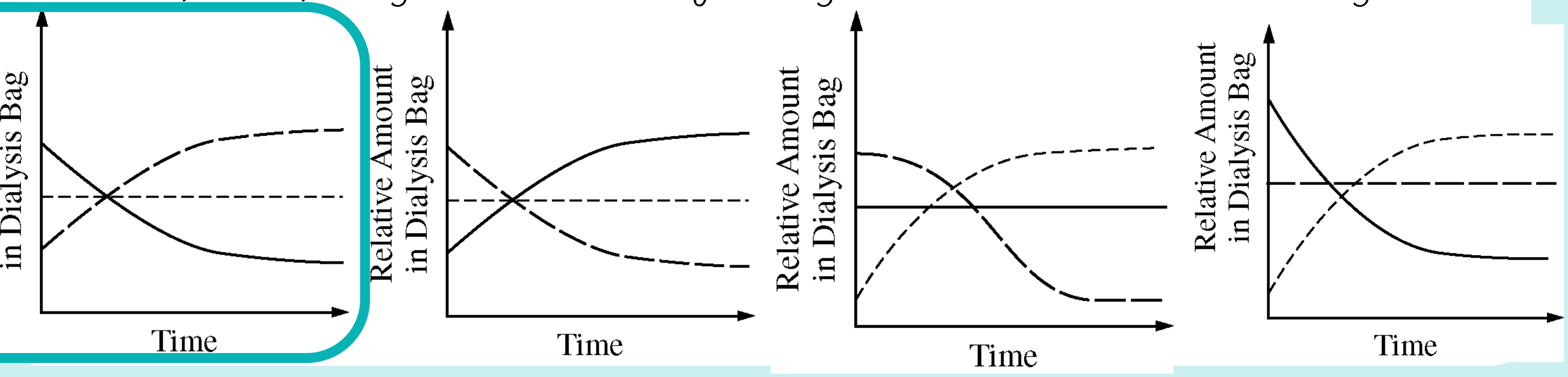
In the (cellular/plasma) membrane



Practice MCQ



A common laboratory investigation involves putting a solution of starch and glucose into a dialysis bag and suspending the bag in a beaker of water, as shown in the figure below. The investigation is aimed at understanding how molecular size affects movement through a membrane. Which of the following best represents the amount of starch, water, and glucose in the dialysis bag over the course of the investigation?



Unit 3: Cellular Energetics

Don't get stuck on the minor details…

What goes in?
What comes out?
Where does it take place?
Why is it important?

Enzymes & Energy

Proteins/Enzymes
Cellular Respiration
Photosynthesis

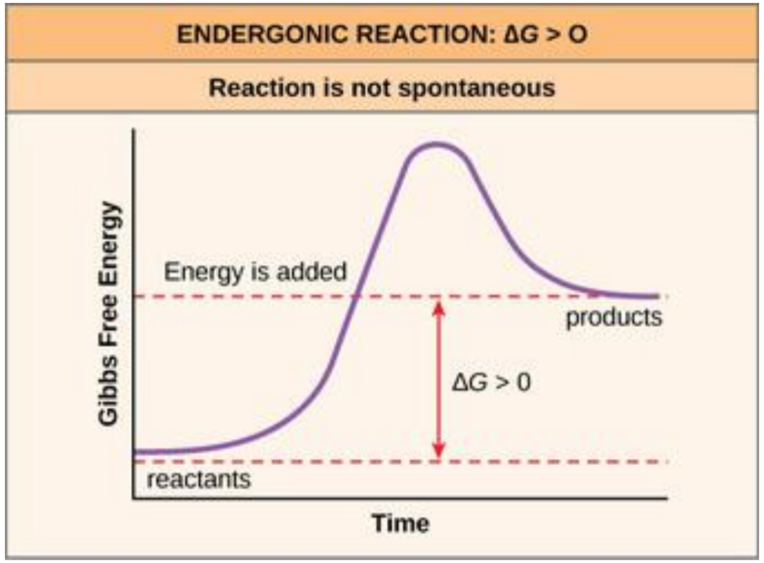
Gibbs Free Energy

Endergonic Reaction

Not spontaneous

ABSORB energy

Example: ADP + P_i → ATP

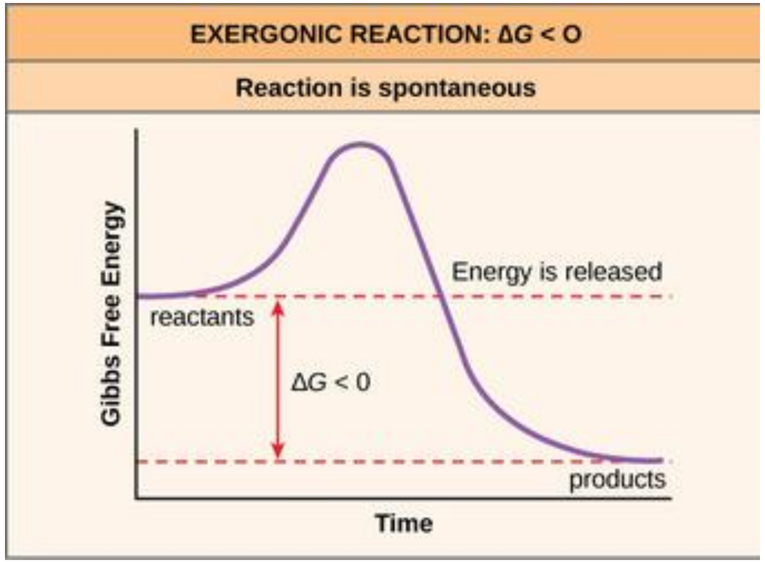


Exergonic Reaction

Spontaneous

RELEASE energy

Example: ATP → ADP + P_i

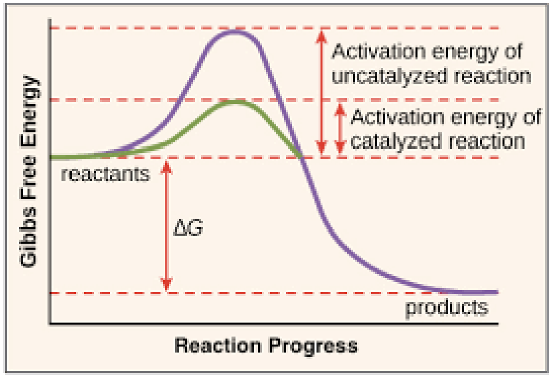


Unit 3: Cellular Energetics

Enzymes

Functions

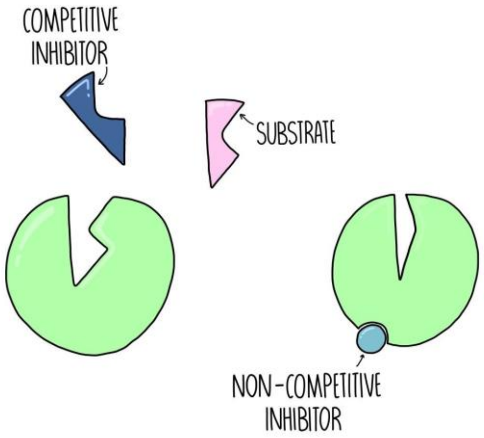
Biological catalyst
Speeds up chemical reactions
Reduces the activation energy
Enzymes are PROTEINS
Are NOT consumed by the reaction
Have no effect on the change in Gibbs Free Energy



Inhibitors

<u>Competitive:</u>
Binds to active site

<u>Noncompetitive:</u>
Binds to allosteric site



Denaturation

Environmental Temperatures
pH (outside of optimal range)
Salinity

Unit 3: Cellular Energetics

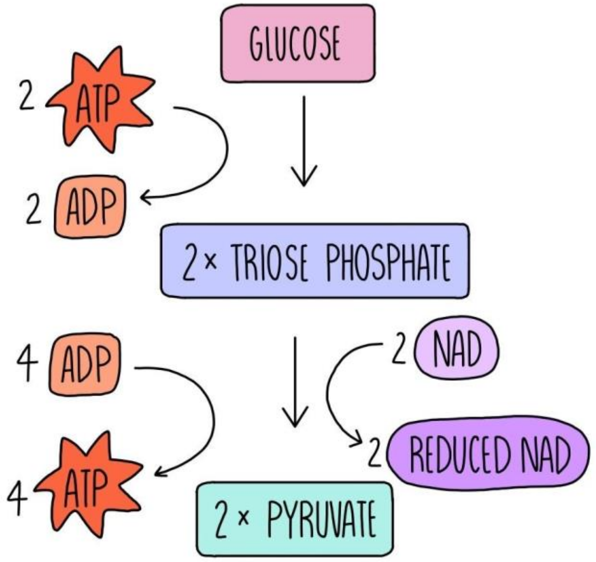
Cellular Respiration

Glycolysis

<u>Location:</u>
Cytosol

<u>Starting Material:</u>
Glucose

<u>Products:</u>
2 Pyruvate
2 NADH
2 ATP

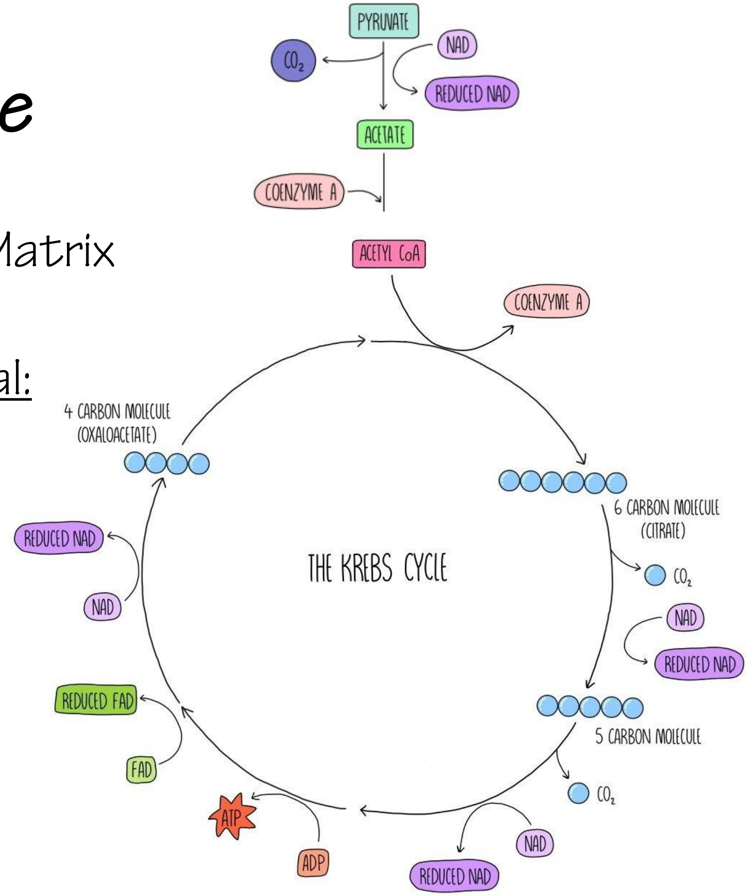


Krebs Cycle

<u>Location:</u>
Mitochondrial Matrix

<u>Staring Material:</u>
Acetyl CoA

<u>Products:</u>
2 CO_2
3 NADH
1 $FADH_2$
1 ATP

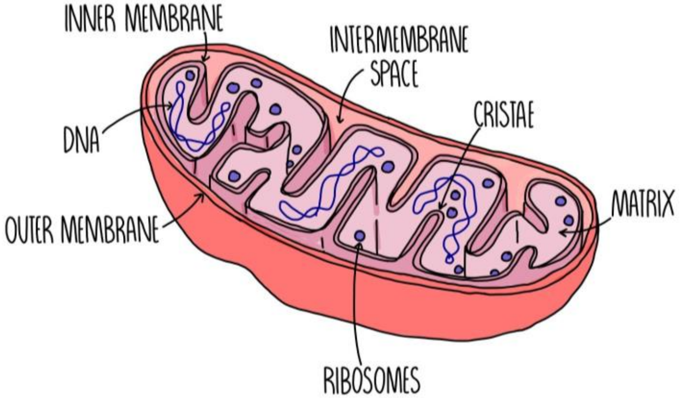


Cellular Respiration

Oxidative Phosphorylation

<u>Location:</u>
Mitochondrial Cristae

<u>Starting Material:</u>
NADH/FADH$_2$
(electrons)

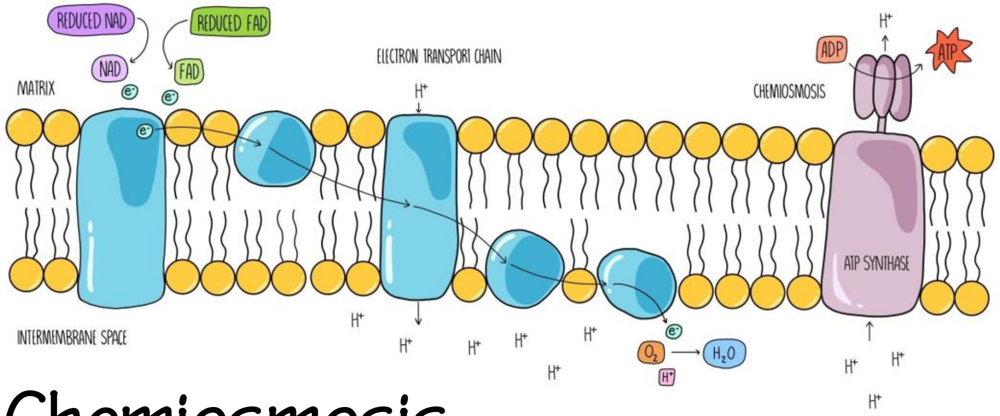


<u>Product:</u>
ATPs

<u>Two Parts:</u>
Electron Transport Chain & Chemiosmosis

Electron Transport Chain (ETC)

Protons pumped into IM space
Generates proton gradient
Final electron acceptor: OXYGEN



Chemiosmosis

ATP Synthase uses proton gradient
Synthesizes ATP

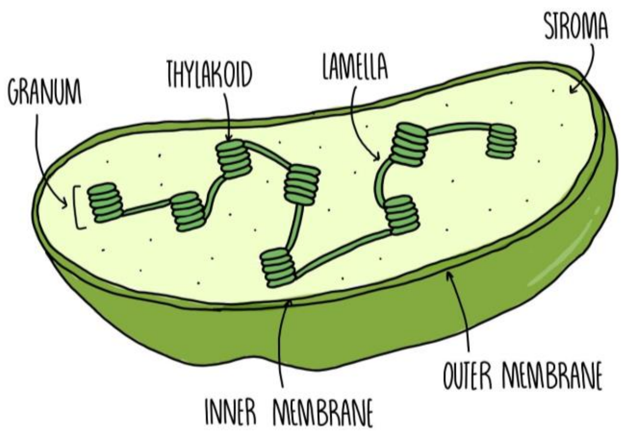
Photosynthesis

Light Reactions

Location:
Thylakoid Membrane

Starting Material:
Water (electrons)
Photons (energy)

Products:
ATP
NADPH



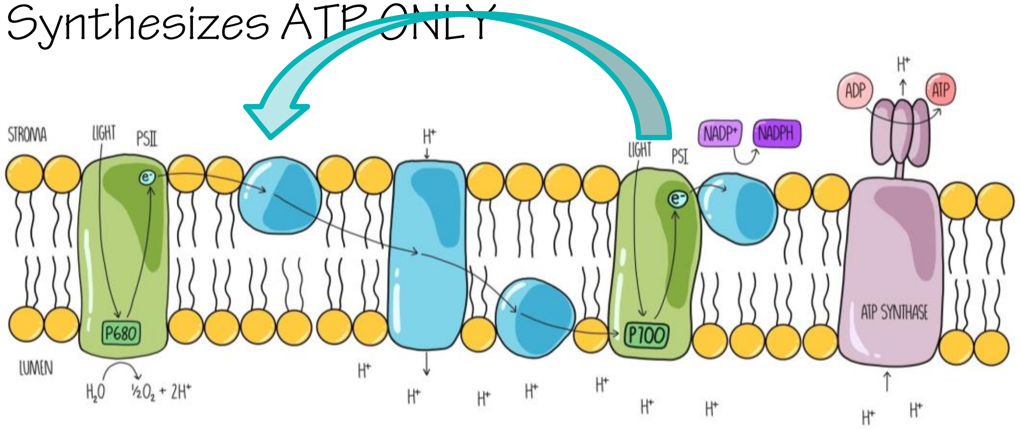
Electron Transport Chain
Protons are pumped into the thylakoid space

Linear Electron Flow

PS I & PS II
Synthesizes ATP & NADPH

Cyclic Electron Flow

PS I ONLY
Synthesizes ATP ONLY



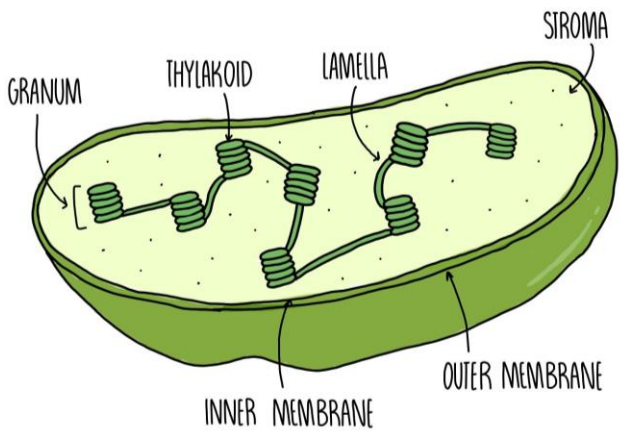
Photosynthesis

Calvin Cycle

Location:
Stroma

Starting Material:
3 CO_2
9 ATP
6 NADPH

Products:
G3P



Practice FRQ

Elevated levels of CO_2 increase the rate of photosynthesis and growth in plants. Scientists studying the mechanisms involved in these increases examined a variety of species and found that when plants are exposed to elevated levels of CO_2, there is an increase in the number of chloroplasts per cell. To investigate whether the elevated levels of CO_2 have a similar effect on the number of mitochondria in plant cells, the scientists then selected six of these species to quantify the number of mitochondria per cell when the plants were exposed to both normal and elevated levels of CO_2 (Table 1).

(a) **Describe** the role of the inner mitochondrial membrane in cellular respiration.

Accept one of the following:

- It provides the location for the components of the electron transport chain/ATP synthase/oxidative phosphorylation.
- It separates (reactions in) the intermembrane space from (reactions in) the matrix.
- It allows the establishment of a proton gradient.

Practice FRQ

Noncyclic electron flow and cyclic electron flow are two major pathways of the light-dependent reactions of photosynthesis. In noncyclic electron flow, electrons pass through photosystem II, then components of a chloroplast electron transport chain, and then photosystem I before finally reducing $NADP^+$ to NADPH. In cyclic electron flow, electrons cycle through photosystem I and some components of the electron transport chain (Figure 1).

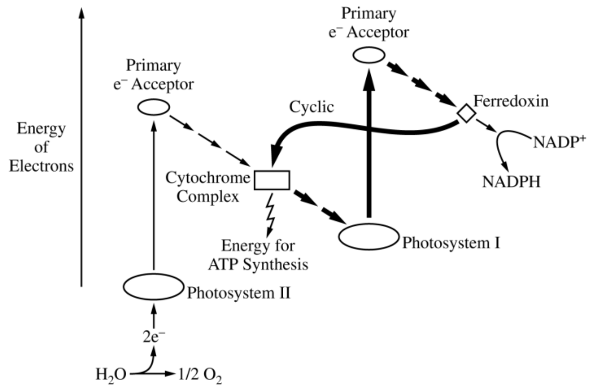


Figure 1. The pathways of noncyclic and cyclic (heavy arrows) electron flow. The cytochrome complex is a component of the electron transport chain between the two photosystems.

(a) **Describe** the role of chlorophyll in the photosystems of plant cells.

Accept one of the following:

- Chlorophyll captures/absorbs light (energy).
- Chlorophyll receives electrons (from water)/receives electrons (from an electron transport chain)/transfers electrons (to an electron transport chain).

(b) Based on Figure 1, **explain** why an increase in the ratio of NADPH to $NADP^+$ will cause an increase in the flow of electrons through the cyclic pathway.

- There is less/no $NADP^+$ to accept the electrons, so the electrons pass (instead) to the cyclic pathway/from ferredoxin to the cytochrome complex.

Signal Transduction & Mitosis

Reception Transduction

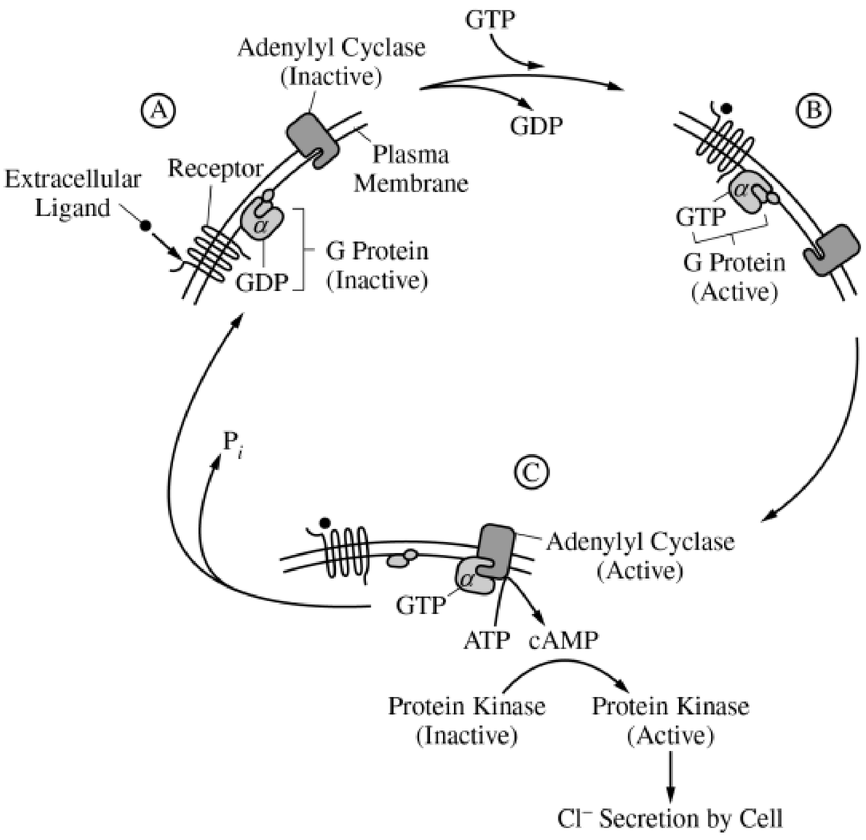
Response

Checkpoints

Interphase

Mitosis

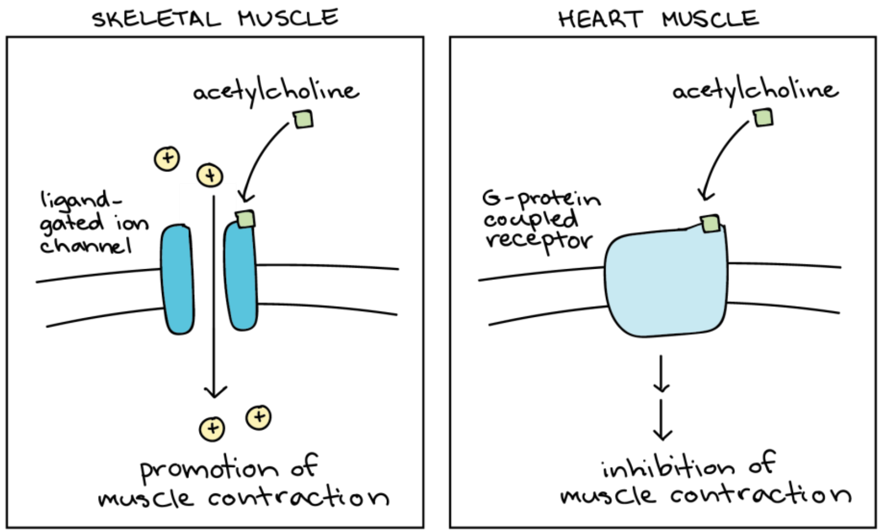
Cytokinesis

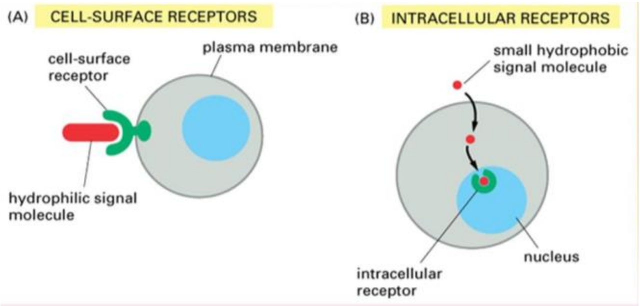


Cellular Communication

Reception

Ligand (signaling molecule) binds to receptor
Causes confirmational shape change
Ex: G protein coupled receptor





Signaling Molecules

<u>Steroid Hormone:</u>
Release: Simple Diffusion
Receptor: Intracellular
Example: Testosterone, Estrogen

<u>Protein Hormone:</u>
Release: Exocytosis
Receptor: Extracellular
Example: Insulin

Cellular Communication

Transduction

Signaling cascades relay signals from receptors to cell targets, often amplifying the incoming signals

Phosphorylation Cascade

Protein Kinase

Phosphorylate relay molecules

Secondary Messengers:

Ca^{2+}

cAMP

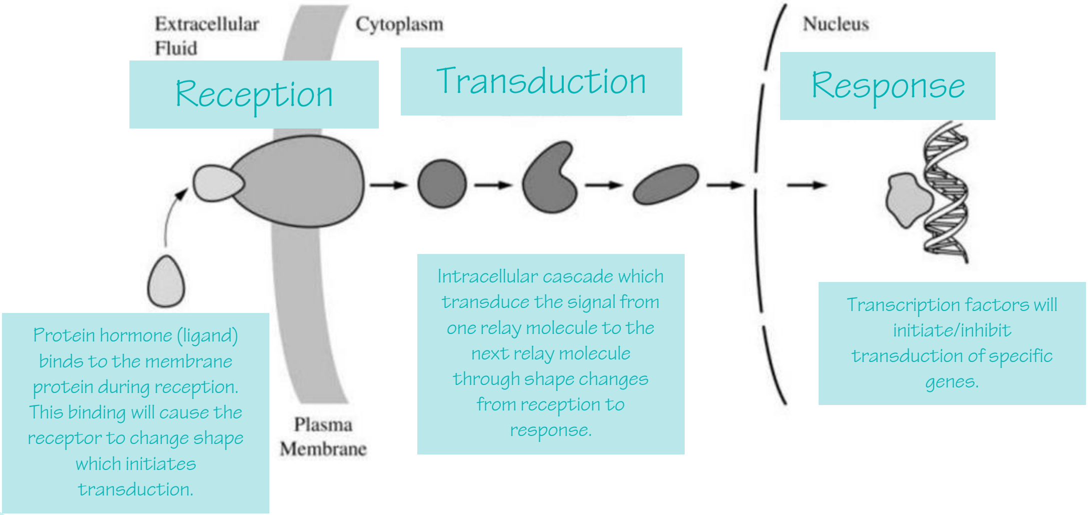
Response

cell growth

secretion of molecules

gene expression

apoptosis



Cell Cycle

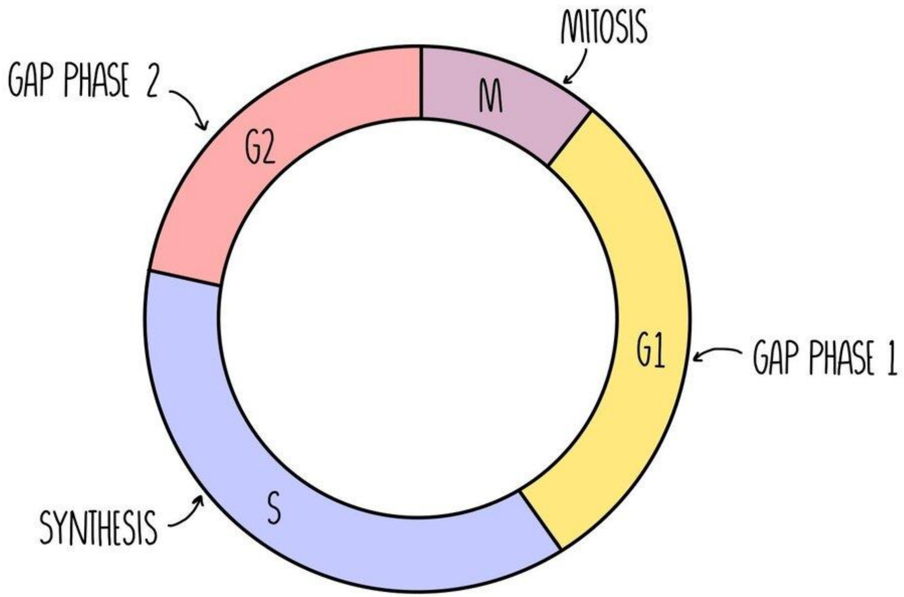
Interphase

The cell grows through all the different phases of interphase

G1:
Duplication of cell organelles
Synthesis of proteins, RNA, and building blocks

S:
Replication of genetic material and centrosomes

G2:
Synthesis of proteins and RNA
Makes organelles
Reorganizes cellular contents



Cell Cycle

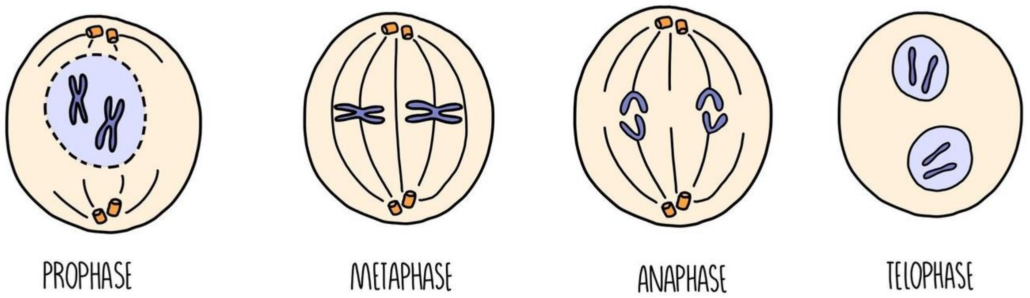
Mitosis

Prophase:
PREPARE to divide

Metaphase:
Sister Chromatids line up in the MIDDLE

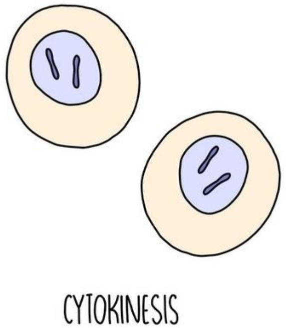
Anaphase:
Sister Chromatids pulled APART
to opposite poles

Telophase:
TWO new nuclei are formed



Cytokinesis

Division of the cytoplasm



MARCO LEARNING

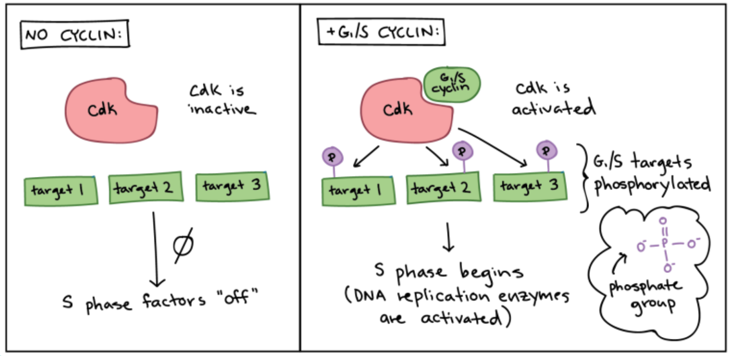
Checkpoints

G_1

During G_1, determines whether to complete the cell cycle

- Growth factor
- Adequate reserves
- Check for DNA damage

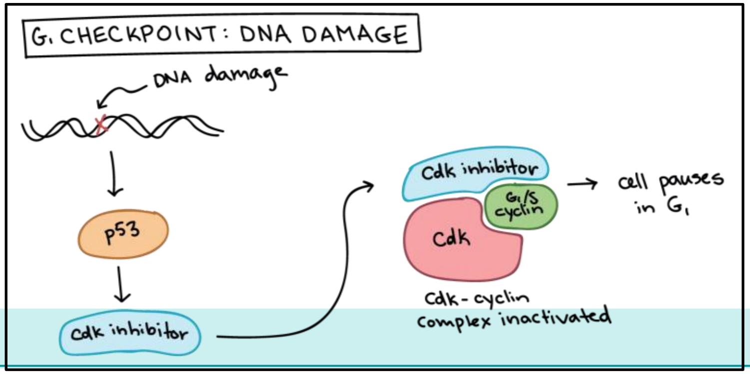
If do not pass, enter G_0 (nondividing state)



G_2

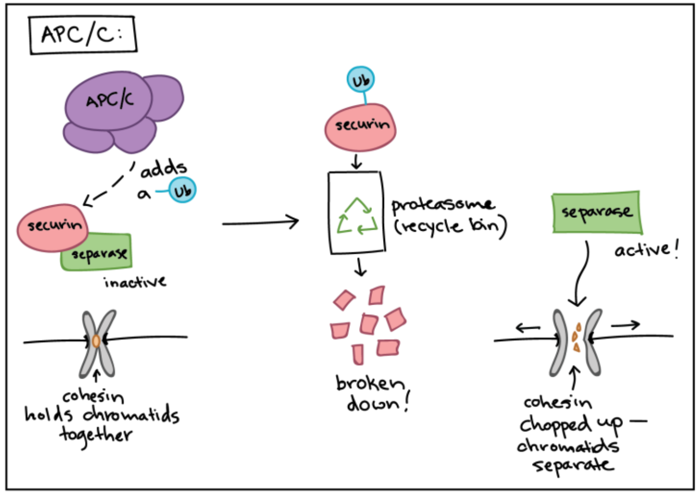
Check all DNA replicated and not damaged.

If detect problems with DNA, the cell cycle is halted, to complete DNA replication or repair the damaged DNA.



M

Check sister chromatids attached to the spindle microtubules



Unit 3: Cellular Energetics

Practice MCQ

Insulin is a protein hormone that is secreted in response to elevated blood glucose levels. When insulin binds to its receptors on liver cells, the activated receptors stimulate phosphorylation cascades that cause the translocation of glucose transporters to the plasma membrane.

Based on the information provided, which of the following best describes the role of insulin in this liver cell signal transduction pathway?

a. It acts as a ligand.
b. It acts as a receptor.
c. It acts as a secondary messenger.
d. It acts as a protein kinase.

Practice FRQ

In response to intracellular pathogens, the inactive caspase-1 is cleaved and forms an active caspase-1 (step 1). Active caspase-1 can cleave two other proteins. When caspase-1 cleaves an inactive interleukin (step 2), the active portion of the interleukin is released from the cell. An interleukin is a signaling molecule that can activate an immune response. When caspase-1 cleaves gasdermin (step 3), the N-terminal portions of several gasdermin proteins associate in the cell membrane to form large, nonspecific pores.

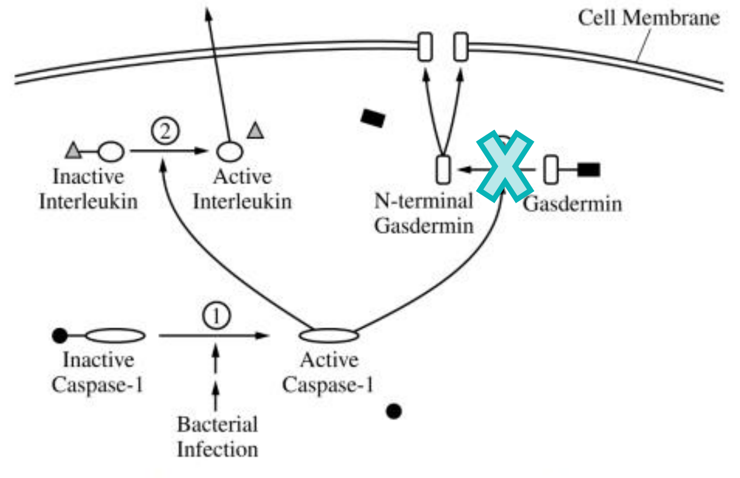


Figure 1. Cellular response to infection by pathogenic bacteria

(a) **Describe** the effect of inhibiting step 3 on the formation of pores AND on the release of interleukin from the cell.

Description (2 points)

- Pores will not form.
- Interleukin release will not be affected/interleukin release continues.

Practice FRQ

The binding of an extracellular ligand to a G protein-coupled receptor in the plasma membrane of a cell triggers intracellular signaling (Figure 1, A). After ligand binding, GTP replaces the GDP that is bound to $Gs\alpha$, a subunit of the G protein (Figure 1, B). This causes $Gs\alpha$ to activate other cellular proteins, including adenylyl cyclase that converts ATP to cyclic AMP (cAMP). The cAMP activates protein kinases (Figure 1, C). In cells that line the small intestine, a cAMP-activated protein kinase causes further signaling that ultimately results in the secretion of chloride ions (Cl^-) from the cells. Under normal conditions, $Gs\alpha$ hydrolyzes GTP to GDP, thus inactivating adenylyl cyclase and stopping the signal (Figure 1, A).

the toxin. In a separate experiment, scientists engineer a mutant adenylyl cyclase that cannot be activated by $Gs\alpha$. The scientists claim that cholera toxin will not cause excessive water loss from whole intestinal cells that contain the mutant adenylyl cyclase. **Justify** this claim.

Practice FRQ

the toxin. In a separate experiment, scientists engineer a mutant adenylyl cyclase that cannot be activated by Gsα. The scientists claim that cholera toxin will not cause excessive water loss from whole intestinal cells that contain the mutant adenylyl cyclase. **Justify** this claim.

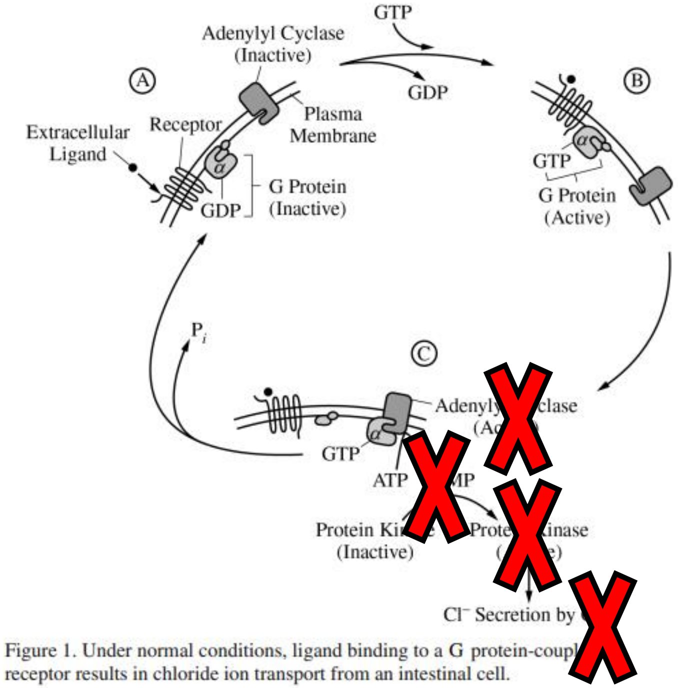


Figure 1. Under normal conditions, ligand binding to a G protein-coupl receptor results in chloride ion transport from an intestinal cell.

Helpful Resources

MARCO LEARNING

AP Bio Penguins

351 page Review Guide
120+ Quizizz Games
Topic/CED TikTok Videos
Review PowerPoints
Unit Review Videos
FRQ Fridays
@apbiopenguins (IG, TT, YT)

apbiopenguins.weebly.com

Mark your Calendars for Feb 1 DAILY review on IG

Quizizz Game Codes

MARCO LEARNING®

Water Properties
92633238

Carbohydrates
67938959

Nucleic Acids
97605151

Biochemistry
86983137

Lipids
96108750

Proteins
93888284

Unit 1 Review (CED):
99612257

Unit 1:

Unit 1: Chemistry of Life

Unit 1 Insta-Review
102 Qs: 73144781
Random 10 Qs: 73386136

1.1:
Structure of Water and Hydrogen Bonding
73627491

1.2:
Elements of Life
73724033

1.3:
Introduction to Biological Macromolecules
73917117

1.4:
Properties of Biological Macromolecules
74013659

1.5:
Structure and Function of Biological Macromolecules
74110201

1.6:
Nucleic Acids
74303285

Quizizz Game Codes

Unit 2:

Plasma Membrane
89058790

Organelles
67621556

Diffusion & Osmosis
72834824

Unit 2 Review (CED):
67252102

Codes are updated when games max out at 1K plays. Check website for most up to date codes.

Unit 2: Cell Structure and Function

Unit 2 Insta-Review
180 Qs: 74592911
Random 10 Qs: 74882537

2.1:
Cell Structure: Subcellular Components
75268705

2.2:
Cell Structure and Function
75510060

2.3:
Cell Size
75703144

2.4:
Plasma Membrane
75847957

2.5:
Membrane Permeability
76137583

2.6:
Membrane Transport
76378938

2.7:
Facilitated Diffusion
76765106

2.8:
Tonicity and Osmoregulation
77006461

2.9:
Mechanisms of Transport
77344358

2.10:
Cell Compartmentalization
77489171

2.11:
Origins of Cell Compartmentalization
77778797

Quizizz Game Codes

Enzymes
97345636

Cellular Respiration
68460993

Glycolysis
91695813

Kreb Cycle
90875206

Oxidative Phosphorylation
92275065

Fermentation
91116561

Photosynthesis
70922814

Unit 3 Review (CED):
68169251

Unit 3:

Codes are updated when games max out at 1K plays. Check website for most up to date codes.

Unit 3: Cellular Energetics

Unit 3 Insta-Review
128 Qs: 78261507
Random 10 Qs: 78551133

3.1:
Enzyme Structure
79661366

3.2:
Enzyme Catalysis
80481973

3.3:
Environmental Impacts on Enzyme Functions
81012954

3.4:
Cellular Energy
81881832

3.5:
Photosynthesis
82123187

3.6:
Cellular Respiration
82412813

3.7:
Fitness
82557626

Quizizz Game Codes

Mitosis
92564691

Cell Communication
70179919

Unit 4 Review (CED):
68555419

Unit 4:

Unit 4: Cell Communication and Cell Cycle

Unit 4 Insta-Review
107 Qs: 82847252
Random 10 Qs: 83233420

4.1:
Cell Communication
83378233

4.2:
Introduction to Signal Transduction
85212531

4.3:
Signal Transduction
85405615

4.4:
Changes in Signal Transduction Pathways
86033138

4.5:
Feedback
86129680

4.6:
Cell Cycle
86177951

4.7:
Regulation of Cell Cycle
86467577

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