

Grade 8
Living Environments Regents- Remote Learning Assignments
Week 3: April 6th - 10th

Day	Assignments
Monday 4/6/2020	Part A: Review Past Content and Work on Do Now Part B: Watch video and complete Stop-and-Jots & Multiple Choice - Guided Practice Part C: Read article independently and complete Stop-and-Jots Part D: Complete the Exit Ticket using this Illuminate Link CODE - 5GCTYDU
Tuesday 4/7/2020	Part A: Watch Video & Guided Practice Part B: Independently review the article from Day 1- Complete Chart Part C: Complete the Exit Ticket using this Illuminate Link CODE - BBXC225
Wednesday 4/8/2020	Part A: Do Now - Respiration Review Part B: Watch video and complete Stop and Jots and Multiple Choice Part C: Read <i>Passive transport and active transport across a cell membrane</i> article and complete Stop-and-Jots Part D: Watch video and complete Stop and Jots and Multiple Choice Part E: Complete the Exit Ticket using this Illuminate Link CODE - BFCWZSU
Thursday 4/9/2020	N/A
Friday 4/10/2020	N/A

**You must know your ID number in order to submit your answers in Illuminate. If you do not know your ID number, please let your teacher know and they can help you.*

Name: _____

Objective: SWBAT

Understand: Respiration is a process that takes energy from sugar molecules and places it in molecules of ATP. ATP is the energy source of all living things.

1. Aerobic respiration requires oxygen, and yields more ATP (energy) for a molecule of sugar than anaerobic (no oxygen) respiration.
2. When humans are forced to get energy from anaerobic respiration, we produce lactic acid that damages muscles ("the burn" you feel during exercise).
3. Photosynthesis and Aerobic Respiration are opposite reactions! They are also important in cycling oxygen, carbon, hydrogen and water through the environment.

SWBAT

Understand:

4. Common mistakes:
 - a. "Plants use photosynthesis, not respiration." All organisms, including plants, use respiration to get their energy.
 - b. "Respiration is breathing." Breathing is not respiration. Breathing exchanges the gases needed for respiration. The simple process of inhaling and exhaling does not give you ATP.
 - c. "Oxygen is used to breathe." This is backwards. Breathing is used to get oxygen. Oxygen is then used to obtain energy from chemical respiration. Without oxygen, you have no ATP, and no energy.
 - d. "All living things need oxygen/need to breathe." Anaerobic organisms do not need oxygen, and do not have to breathe.

Lesson At-A-Glance for Today

- A. Do Now - Photosynthesis Review
- B. Watch Kahn Academy Cellular Respiration Introduction and complete Stop and Jots and Multiple Choice
- C. Read article and complete stop and jots.
- D. Complete the Exit Ticket using this [illuminate link](#) CODE - 5GCTYDU

PART A: Do Now- Complete the following as a review.

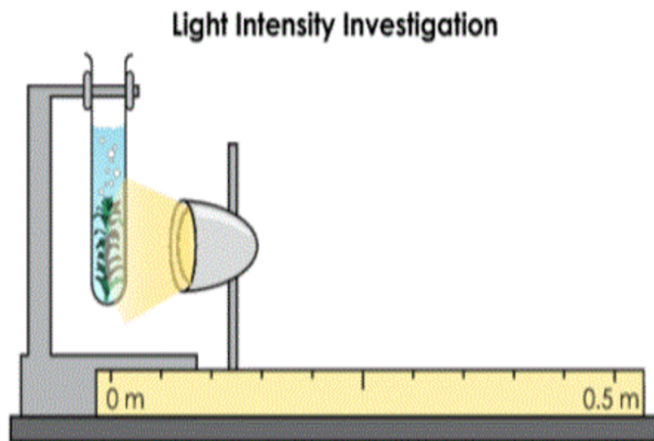
Photosynthesis is a process that is important to the survival of many organisms on Earth.

State **one** reason why photosynthesis is necessary for animals to survive.

Photosynthesis is a process that is important to the survival of many organisms on Earth.

Identify **two** raw materials necessary for photosynthesis.

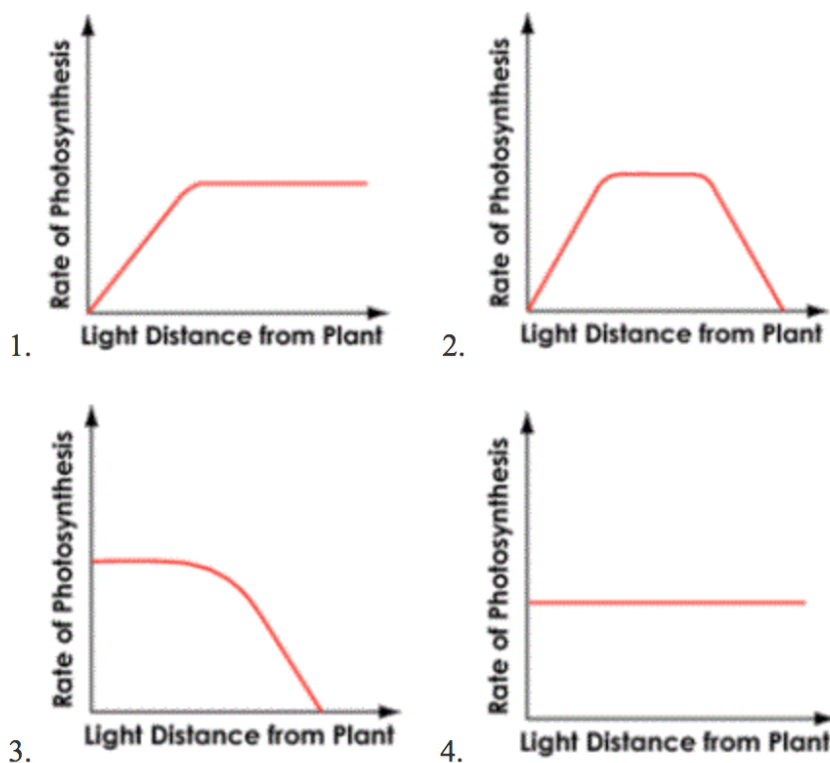
Students investigate how light intensity affects the rate of photosynthesis in an aquatic plant. Their setup is shown in the diagram.



The students place a light at different distances from the plant and record the number of bubbles produced. Their data are shown in the table.

Student Data

Distance (m)	Bubbles Produced per Minute
0.1	124
0.2	124
0.3	84
0.4	31
0.5	6



Which graph shows the relationship between the rate of photosynthesis and light intensity?

- ☐ Graph 1
☐ Graph 2
☐ Graph 3
☐ Graph 4

PART B: Guided Practice - Watch Kahn Academy Cellular Respiration Introduction and complete Stop and Jots and Multiple Choice

Link: [Cellular Respiration Introduction](#)

Url: https://www.youtube.com/watch?v=2f7YwCtHcgk&feature=emb_title

Stop and Jot- What are the three stages of Aerobic Cellular Respiration?

What are the products of Cellular Respiration? (Multiple Selecons)

- ☐ Carbon Dioxide
- ☐ Water
- ☐ Oxygen
- ☐ Glucose
- ☐ ATP Energy

Can cells produce ATP energy without oxygen?

- ☐ No, respiration cannot occur.
- ☐ Yes, Aerobic respiration will produce ATP energy during the Krebs Cycle.
- ☐ Yes, Anaerobic glycolysis will produce a small amount of ATP energy
- ☐ Yes, the Electron Transport chain will produce the most abundant amount of ATP energy without oxygen

Stop and Jot- What is the main difference between Aerobic and Anaerobic respiration?

During Aerobic Cellular respiration, what stage produces the most ATP?

- ☐ Glycolysis
- ☐ The Krebs Cycle
- ☐ The Electron Transport Chain

PART C: Independent Practice - Read article independently and complete stop and jots.

Cellular respiration

Cellular respiration can occur both aerobically (using oxygen), or anaerobically (without oxygen).

During *aerobic cellular respiration*, glucose reacts with oxygen, forming ATP that can be used by the cell. Carbon dioxide and water are created as byproducts.

The overall equation for aerobic cellular respiration is:



The three stages of aerobic cellular respiration are *glycolysis* (an anaerobic process), *the Krebs cycle*, and *oxidative phosphorylation*.

Stop and Jot- What type of reactions are occurring during Cellular Respiration? Why?

Fermentation

Some organisms are able to continually convert energy without the presence of oxygen. They undergo glycolysis, followed by the anaerobic process of *fermentation* to make ATP.

- Muscle cells can continue to produce ATP when oxygen runs low using *lactic acid fermentation*. However, this often results in muscle fatigue and pain.
- Many yeast use alcoholic fermentation to produce ethanol. For this reason, humans have domesticated yeast to use for many commercial purposes including baking as well as beer and wine production.

The buildup of waste products in muscle cells that are active might cause

- ☐ cellular respiration
- ☐ digestion
- ☐ increased fatigue
- ☐ decreased heartrate

Which of the following stages of Cellular Respiration are Anaerobic? (Multiple Correct)

- ☐ The Electron Transport Chain
- ☐ Glycolysis
- ☐ Lactic Acid Fermentation
- ☐ The Krebs Cycle

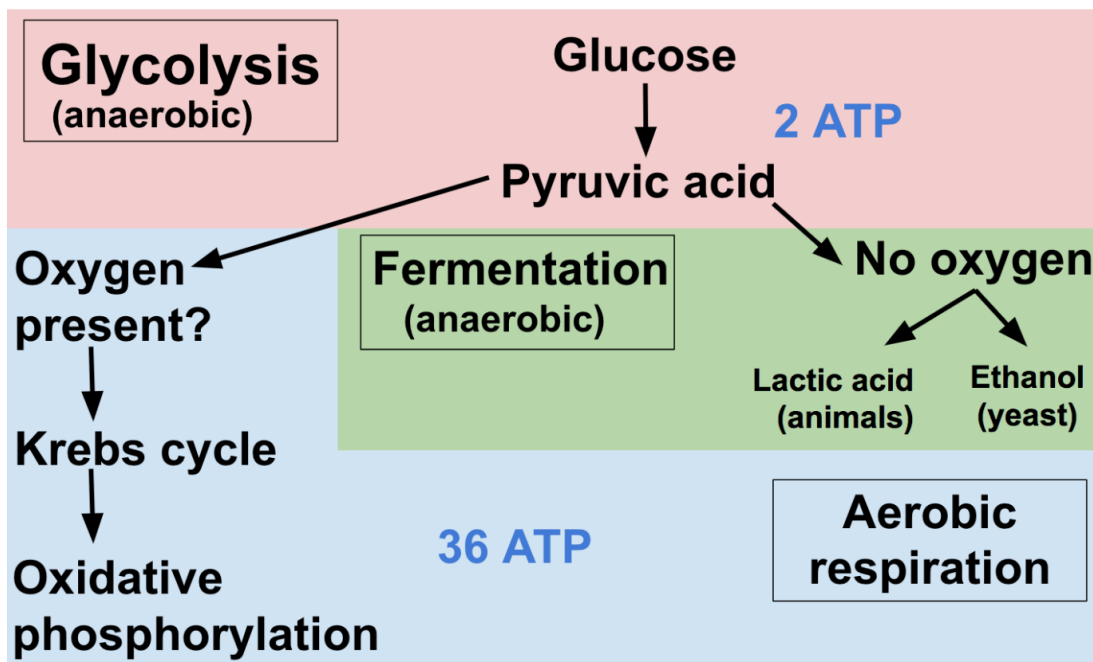
Aerobic vs anaerobic respiration

	Aerobic	Anaerobic
Reactants	Glucose and oxygen	Glucose
Products	ATP, water, CO ₂	ATP and lactic acid (animals); or ATP, ethanol, and CO ₂ (yeast)
Location	Cytoplasm (glycolysis) and mitochondria	Cytoplasm
Stages	Glycolysis (anaerobic), Krebs cycle, oxidative phosphorylation	Glycolysis, fermentation
ATP produced	Large amount (36 ATP)	Small amount (2 ATP)

Stop and Jot- What connection can be made between the lack or presence of oxygen and ATP production?

Common mistakes and misconceptions

- **Anaerobic respiration is a normal part of cellular respiration.** Glycolysis, which is the first step in all types of cellular respiration is anaerobic and does not require oxygen. If oxygen is present, the pathway will continue on to the Krebs cycle and oxidative phosphorylation. However, if oxygen is not present, some organisms can undergo fermentation to continually produce ATP.



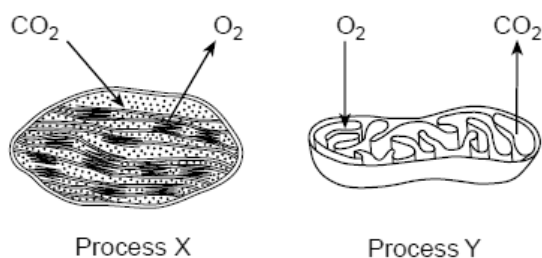
- **Plants undergo cellular respiration.** Many people believe that plants undergo photosynthesis and animals undergo respiration. Really, plants do both! Plants simply undergo photosynthesis first as a way to make glucose. Animals don't need to photosynthesize since they get their glucose from the food they eat.
- **Cellular respiration is not simply the same as "breathing."** This can be confusing! People often use the word "respiration" to refer to the process of inhaling and exhaling. However, this is *physiological* respiration, not cellular respiration. The two are related processes, but they are not the same.

PART D: Exit Ticket - Complete the following questions. Annotate your questions! Submit your answers online using this [Illuminate Link](#)

1. During the process of cellular respiration, energy is released from
 - A. carbon dioxide
 - B. oxygen atoms
 - C. water molecules
 - D. chemical bonds

2. Which dissolved substance do aquatic animals remove from their external environment for use in cellular respiration?
 - A. carbon dioxide
 - B. ATP molecules
 - C. oxygen molecules
 - D. nitrogen gas

Two biological processes that occur in certain organelles are represented in the diagrams below.



3. Which statement is correct regarding the types of organisms able to carry out these processes?
 - A. Process X occurs in heterotrophs, but not in autotrophs.
 - B. Process Y occurs in consumers, but not in producers.
 - C. Both processes X and Y occur in all living things.
 - D. Both processes X and Y occur in green plants.

4. In your own words, explain **two** common misconceptions about cellular respiration.

Objective: **SWBAT**

- Describe the structure and function of the cell nucleus
- Describe the role of vacuoles, lysosomes, and the cytoskeleton
- Identify the role of ribosomes, endoplasmic reticulum, and Golgi apparatus and making proteins.
- Describe the function of the chloroplast and mitochondria in the cell
- Describe the function of the cell membrane

Lesson At-A-Glance for Today

Part A: Do Now - Watch BrainPop video and answer questions

Part B: Read the **Cell Structure** article and complete STOP & JOT activities

Part D: Watch Amoeba Sisters video and complete the Cell Chart

Part F: Complete the Exit Ticket using this [Illuminate Link](#) CODE - BBXC225

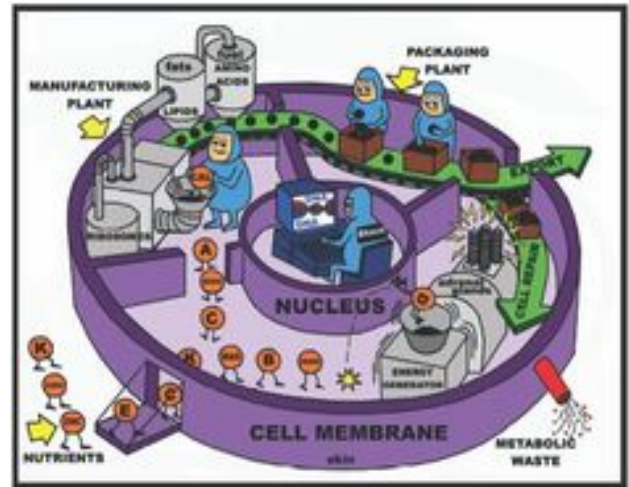
Part A: Do Now (<https://www.brainpop.com/science/cellularlifeandgenetics/cellstructures/>)

Watch the BrainPop! Video linked [here](#) and answer the questions that follow.

1. What structure keeps harmful chemicals out of animal cells?
 - a. The cell membrane
 - b. The cell wall
 - c. The Golgi apparatus
 - d. The nucleus
2. If you wanted to find DNA, where would you look?
 - a. Inside a cell's ribosomes
 - b. Inside a cell's nucleus
 - c. Inside a cell's Golgi bodies
 - d. Inside a cell's vacuoles
3. What part of the cell makes protein?
 - a. The mitochondria
 - b. The ribosomes
 - c. The Golgi bodies
 - d. The cytoplasm
4. Which structures break down food and release energy?
 - a. Mitochondria
 - b. Ribosomes
 - c. Golgi bodies
 - d. Vacuoles

Part B: Guided Reading**Cell Organization**

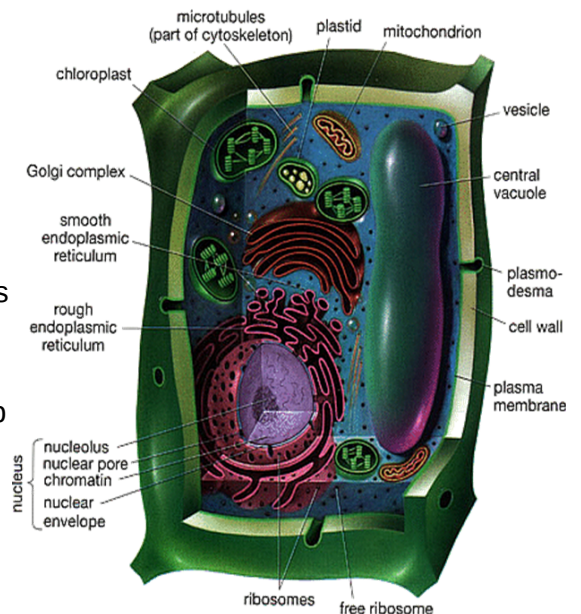
- Eukaryotic cells contain a nucleus and a many specialized structures
- **Cytoplasm** is the portion of a cell outside the nucleus
- Organelles are structures that have specialized functions in eukaryotic cells
- The nucleus contains **DNA** and controls the activity of a cell



STOP & JOT: Describe the relationship between the cytoplasm and the nucleus of a cell.

Organelles that Store, Clean up, and Support

- **Vacuoles:** membrane enclosed sac-like structures that store water, salt, and organic molecules
- **Lysosomes:** small organelles filled with enzymes that break down large molecules and organelles that are no longer useful
- **Cytoskeleton:** a network of protein filaments; it helps the cell maintain its shape and is involved in movement
- **Centrioles:** organelles made from tubulins; they help organize cell division found only in animal cells



STOP & JOT: What are vacuoles?

What is the role of lysosomes in the cell? Why is this a vital role?

Organelles that Build Proteins

- There are three kinds of organelles that work with the nucleus to make and distribute proteins
 1. **Ribosomes:** small particles of RNA and protein found throughout the cytoplasm in all cells; they produce proteins by following coded instructions from DNA
 2. **Endoplasmic Reticulum (ER)** an internal membrane system where lipid components of the cell membrane are assembled, along with proteins and other materials
 3. **Golgi Apparatus:** an organelle that appears as a stack of flattened membranes; it modifies, sorts, and packages proteins and other materials from the ER for storage in the cell or release outside the cell

STOP & JOT:

Using the cell as a factory analogy, describe the role of the Golgi apparatus in cells.

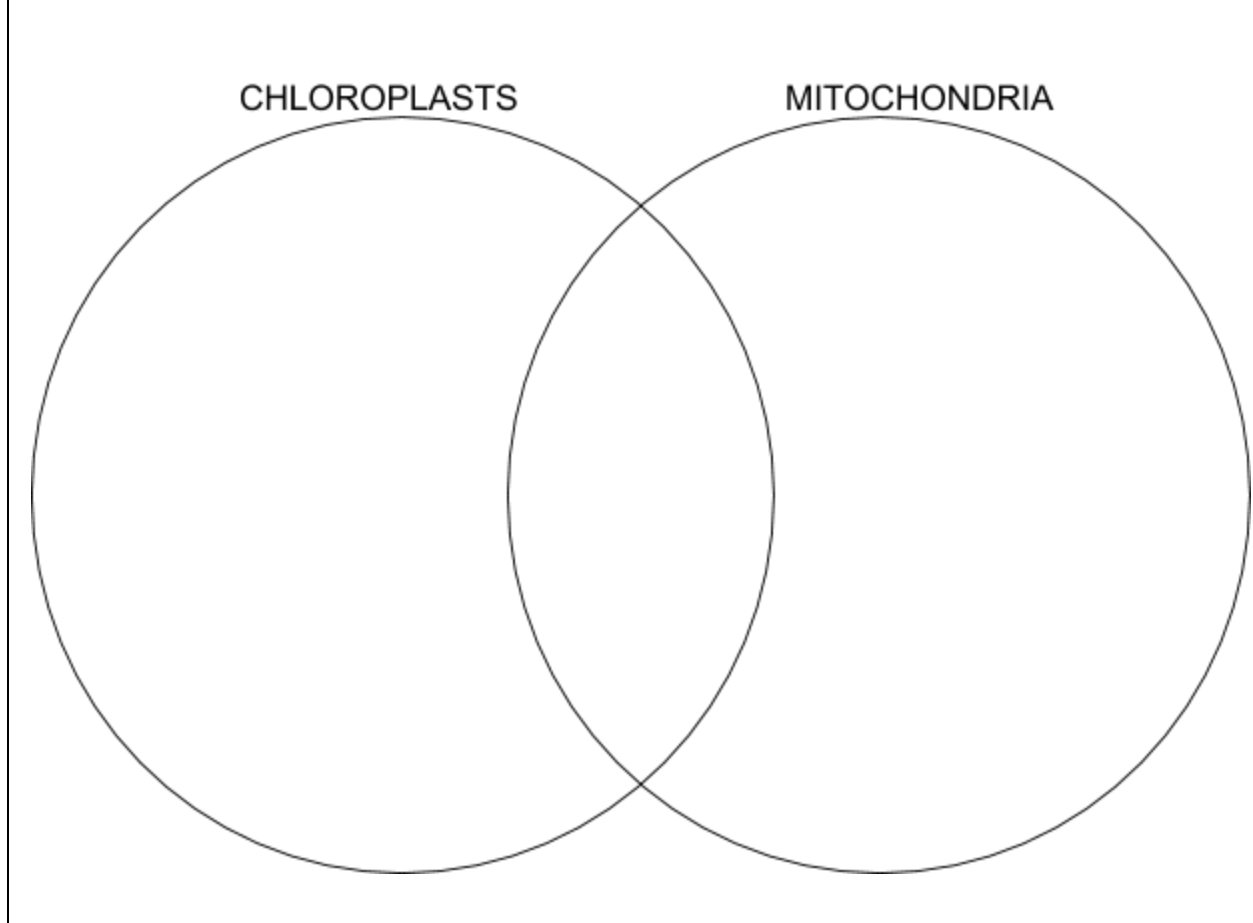
Suppose a cell's Golgi apparatus does not function properly. How might this problem affect other cells?

Organelles that Capture and Release Energy

- **Chloroplasts:** capture the energy from sunlight and convert it into food that contains chemical energy in a process called photosynthesis. Cells of plants and some other organisms contain chloroplasts, which contain chlorophyll

- **Mitochondria:** found in nearly all eukaryotic cells; they convert the chemical energy stored in food to a usable form

STOP & JOT: Complete the Venn diagram to compare and contrast chloroplasts and mitochondria,



Cell Boundaries

- All cells are surrounded by a **cell membrane**. Many cells also have a **cell wall**. **Both** cell membranes and cell walls separate cells from the environment and provide support
- **Cell wall:** supports, shapes, and protects the cell. Most prokaryotes and many eukaryotes have them. Animals do not have cell walls. Cell walls lie outside the cell membrane. Most cell walls allow materials to pass through them.
- A **Cell Membrane** consists of a **lipid bilayer**, *a strong but flexible barrier between the cell and its surroundings*. The **cell membrane** regulates what enters and leaves the cell and also protects and supports the cell. Most biological membranes are **selectively permeable**, *allowing some substances, but not others, to pass across them*.

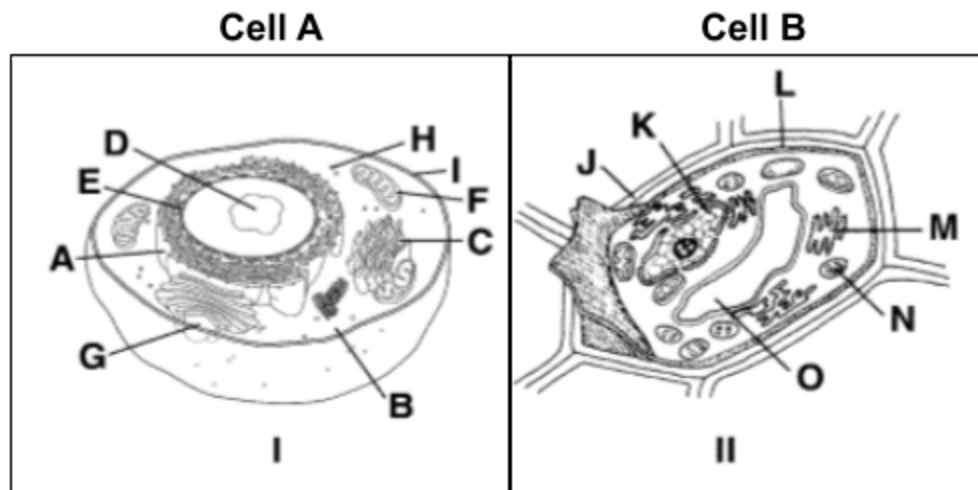
Part C: [Video](#)

Directions: Watch the Amoeba Sisters video above and complete the chart below using the guided reading and new knowledge from the videos.

Structure or Organelle	Makes Me Think of... (provide an illustration or analogy!)	Function(s)	Is it in both prokaryotes and eukaryotes or just eukaryotes?
Cell Membrane			
Cytoplasm			
Ribosome			
Nucleus			
Endoplasmic Reticulum (Rough & Smooth)			
Golgi apparatus			
Mitochondria			
Cell Wall			
Chloroplast			
Vacuole			

Part D: Exit Ticket**Directions:** Complete the Exit Ticket using this [Illuminate Link](#)

- Which organelle converts the chemical energy stored in food into usable energy?
 - Chloroplast
 - Golgi apparatus
 - Endoplasmic Reticulum
 - Mitochondrion
- Which of the following is a function of the cell membrane?
 - Breaks down lipids, carbohydrates, and proteins from foods
 - Stores water, salt, proteins, and carbohydrates
 - Keeps the cell wall in place
 - Regulates the movement of materials into and out of the cell
- Which organelle breaks down organelles that are no longer useful?
 - Golgi apparatus
 - Lysosome
 - Endoplasmic reticulum
 - Mitochondrion
- Study the two cells in Figure 7-11 below.

**Figure 7-11**

Which cell, cell A or cell B, contains organelles that carry out photosynthesis? What is the name of this organelle?

Objective: SWBAT

Understand the differences between types of passive and active ways molecules can cross a cell membrane.

1. Diffusion: movement of molecules from high concentrations to low concentrations. Requires no energy (passive transport).
2. Active Transport requires the use of energy, usually moving molecules from a low concentration to a high concentration (against the flow of diffusion).
3. Osmosis is the diffusion of water into or out of the cell. If water diffuses into the cell, the cell swells (get larger) and may burst. If it loses water (being put in salt water for example) it will shrivel up.

Lesson At-A-Glance for Today

- A. Do Now - Respiration Review
- B. Watch Amoeba Sisters Cell Transport video and complete Stop and Jots and Multiple Choice
- C. Read *Passive transport and active transport across a cell membrane* article and complete Stop-and-Jots
- D. Watch Amoeba Sisters Osmosis video and complete Stop and Jots and Multiple Choice
- E. Complete the Exit Ticket using this [illuminate link](#) CODE - BFCWZSU

PART A: Do Now- Complete the following as a review.

A biological process that occurs in both plants and animals is shown below.



Which row in the chart below identifies the lettered substances in this process?

Row	A	B	C	D
1.	O ₂	CO ₂	glucose	enzymes
2.	glucose	O ₂	enzymes	CO ₂
3.	enzymes	O ₂	CO ₂	glucose
4.	glucose	CO ₂	enzymes	O ₂

PART B: Amoeba Sisters - Cell Transport - Watch video and complete Stop and Jots and Multiple Choice: <https://www.youtube.com/watch?v=Ptmlvtei8hw>

Amoeba Sisters Video Recap: Cell Transport

The cell membrane is important for maintaining **homeostasis**, because it controls what enters and leaves a cell.



1. Sketch the **phospholipid bilayer** of a cell membrane below and label the **polar heads** and **nonpolar tails**.

2. What is **simple diffusion**?

3. Circle the statements below that would be TRUE about **simple diffusion**. HINT: There is more than one!

- A) It is a form of passive transport.
- B) Molecules travel with the concentration gradient.
- C) It is how glucose travels across the cell membrane.
- D) It is how oxygen and carbon dioxide travel across the membrane.
- E) This transport is typical for large molecules.

PART C: Passive and Active Transport Across a Membrane Article - Read article and complete Stop-and-Jots

Transport Across a Cell Membrane

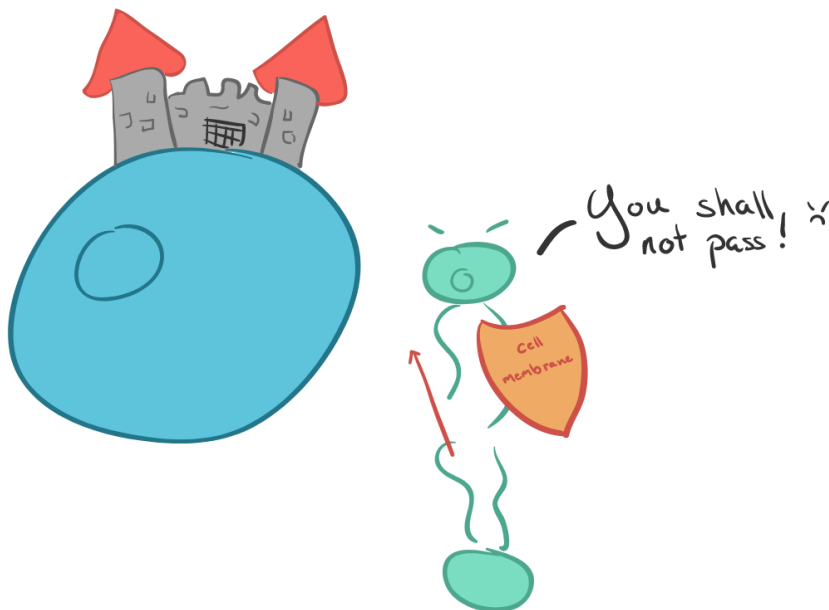
The cell membrane is one of the great multi-taskers of biology. It provides structure for the cell, protects cytosolic contents from the environment, and allows cells to act as specialized units. A membrane is the cell's interface with the rest of the world - it's gatekeeper, if you will. This phospholipid bilayer determines what molecules can move into or out of the cell, and so is in large part responsible for maintaining the delicate homeostasis of each cell.

Stop and Jot- If your school was a cell, what would be the cell membrane? What object or people? Why?

Semi-Permeability

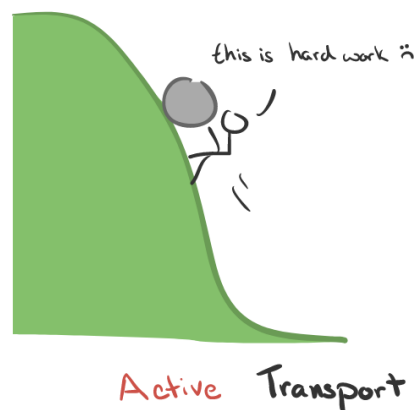
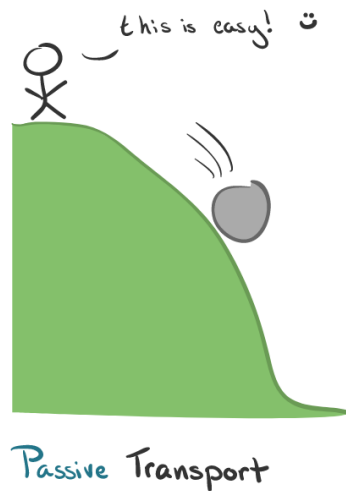
Some cells function best at a pH of 5, while others are better at pH 7. The steroid hormone aldosterone is made in the adrenal gland, but affects mostly the kidney. Sodium is more than ten times more concentrated outside of cells rather than inside. If our cells couldn't control what crossed their membranes, either no molecules would make it across, or they'd be traveling willy-nilly and the internal environment would always be in flux. It'd be like taking every item on a menu and blending it together before serving (not the tastiest idea).

So how do cells maintain different concentrations of proteins and molecules despite the pressures on them to be homogenous? Cell membranes are semipermeable, meaning they have control over what molecules can or cannot pass through. Some molecules can just drift in and out, others require special structures to get in and out of a cell, while some molecules even need an energy boost to get across a cell membrane. Each cell's membrane contains the right mix of these structures to help that cell keep its internal environment just right.



Movement Across a Membrane and Energy

There are two major ways that molecules can be moved across a membrane, and the distinction has to do with whether or not cell energy is used. Passive mechanisms like diffusion use no energy, while active transport requires energy to get done.



Diffusion: the Simple and the Facilitated

Diffusion is the movement of particles down their gradient. A gradient is any imbalance in concentration, and moving down a gradient just means that the particle is trying to be evenly distributed everywhere, like dropping food coloring in water. This is what happened when we made our granola - a bunch of separate ingredients came together and spread out across the whole mixture. We call this evening-out moving "downhill", and it doesn't require energy. The molecule most likely to be involved in simple diffusion is water - it can easily pass through cell membranes. When water undergoes simple diffusion, it is known as **osmosis**.

Simple diffusion is pretty much exactly what it sounds like – molecules move down their gradients through the membrane. Molecules that practice simple diffusion must be small and nonpolar*, in order to pass through the membrane. Simple diffusion can be disrupted if the diffusion distance is increased. If the alveoli in our lungs fill with fluid (pulmonary edema), the distance the gases must travel increases, and their transport decreases. **Facilitated diffusion** is diffusion that is helped along (facilitated by) a membrane transport channel. These channels are glycoproteins (proteins with carbohydrates attached) that allow molecules to pass through the membrane. These channels are almost always specific for either a certain molecule or a certain type of molecule (i.e. an ion channel), and so they are tightly linked to certain physiologic functions.



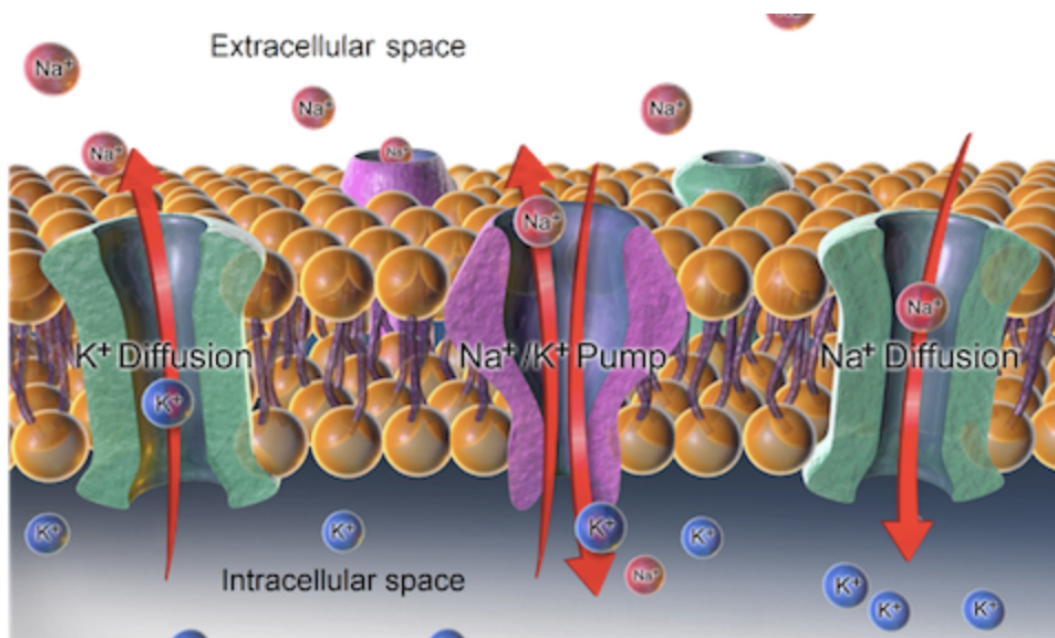
"Simple diffusion."

Stop and Jot - In the image above, food coloring was added to a beaker of water. Explain why this is an example of simple diffusion.

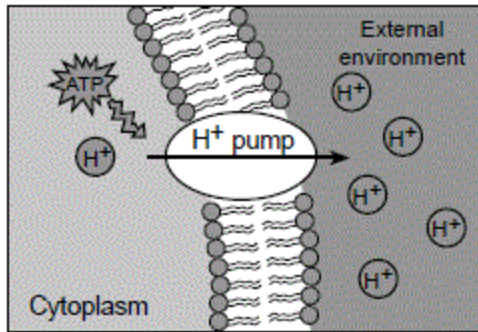
keywords - particles, concentration, high, and low

Active Transport

Sometimes the body needs to move molecules against their gradient. This is known as moving “uphill”, and requires energy from the cell - imagine how much easier it is to shake the trail mix together than it would be to then separate all the pieces again. This is most obvious in the sodium-potassium pump (Na^+/K^+ ATPase) that helps maintain resting potential in the cell. This protein uses the energy released from hydrolysis of ATP (adenosine triphosphate) to pump three sodium ions out of and two potassium ions into the cell. ATP is an energy molecule, and when hydrolysis happens, it gets broken down to release the energy that was stored in its chemical bonds.



The diagram below represents a portion of a cell membrane.



The arrow indicates that the cell membrane is carrying out the process of

- A. respiration
- B. cell recognition
- C. diffusion
- D. active transport

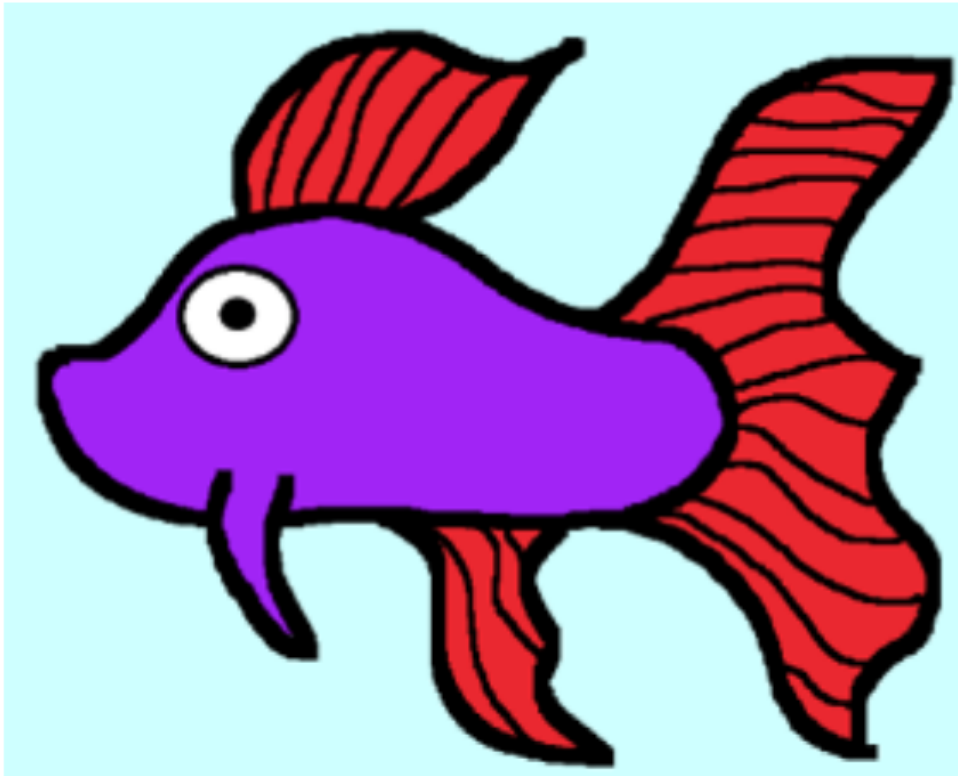
Stop and Jot - Why did you choose this?

PART D: Amoeba Sisters - Osmosis - Watch video and complete Stop and Jots and Multiple Choice: <https://www.youtube.com/watch?v=laZ8MtF3C6M>

3. Osmosis Scenario: The video clip mentioned a disaster scenario of a saltwater fish being placed in fresh water.

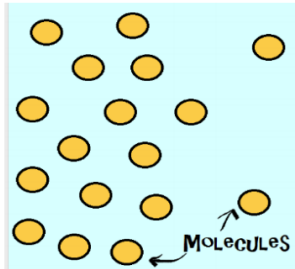
What would occur if, instead, a freshwater fish was placed in saltwater?

Your answer needs to have an **arrow** indicating the direction of water flow in osmosis, a label for “**hypertonic**,” and a label for “**hypotonic**.”



Amoeba Sisters Video Recap of Osmosis

1. The below picture represents **diffusion** of molecules. Place the following labels in the diagram: **high concentration**, **low concentration**, and an **arrow** showing the direction that the molecules would travel before equilibrium is reached.



2. **Osmosis** is a type of diffusion, but it involves the movement of water. Similar to diffusion, osmosis is the movement of molecules (water molecules if osmosis) from a high concentration to a low concentration.

The video clip explains that you can also look at water as moving to a _____ concentration of **solute** molecules.

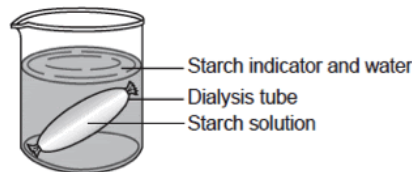
Why can it also be viewed this way?

PART E: Exit Ticket - Complete the following questions. Annotate your questions! Submit your answers online using this [Illuminate Link](#)

Base your answer to the question on the diagram below and on your knowledge of biology. The diagram represents an experimental setup.

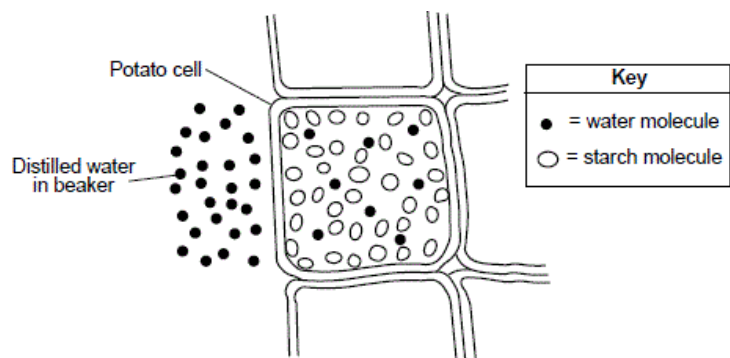
1. Which term correctly identifies the process by which molecules move through the dialysis tube membrane?

- A. paper chromatography
- B. active transport
- C. diffusion
- D. digestion



Base your answer to this question on the information and diagram below and on your knowledge of biology.

A cube cut from a potato is placed in a beaker of distilled water. The potato cells have a relatively high concentration of starch and a relatively low concentration of water. The diagram represents the water and starch molecules in and around one of the potato cells in contact with the water in the beaker.



2. Which row in the chart correctly

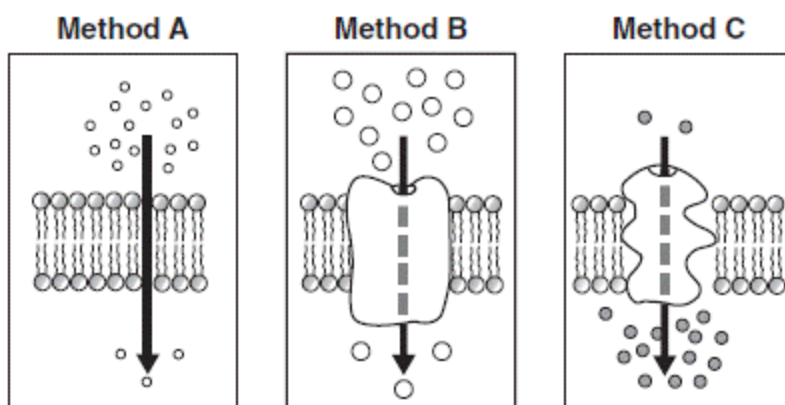
describes what would be expected to occur in the potato cells, with regard to both the starch and water molecules?

Row	Water	Starch
1.	More water will move into the cell than will leave the cell.	Starch will remain inside the potato cell.
2.	More water will leave the cell than will enter.	Starch will move out of the cell.
3.	Water content of the cell will not change.	Starch will move out of the cell.
4.	More water will leave the cell than will enter.	Starch will remain inside the potato cell.

3. The processes of diffusion and active transport are both used to

- A. break down molecules to release energy
- B. move molecules into or out of cells of the body
- C. bring molecules into cells when they are more concentrated outside of the cell
- D. move molecules against a concentration gradient, using ATP molecules

Base your answer to the question on the diagram below and on your knowledge of biology. The diagram represents three sections of a cell membrane showing three different methods involved in the transport of various molecules across the membrane.



4. Methods A and B are classified as methods of passive transport because they do not require

- A. ATP
- B. carbon dioxide
- C. light
- D. DNA