

Cell Structure and Processes

TEKS Supported in This Unit

4A – [Reporting Category 1] – compare and contrast prokaryotic and eukaryotic cells

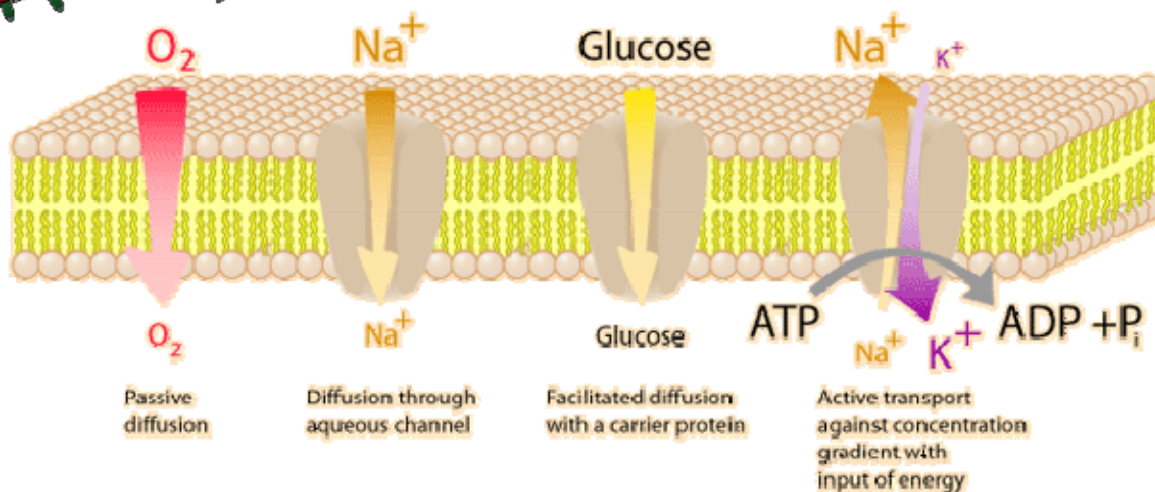
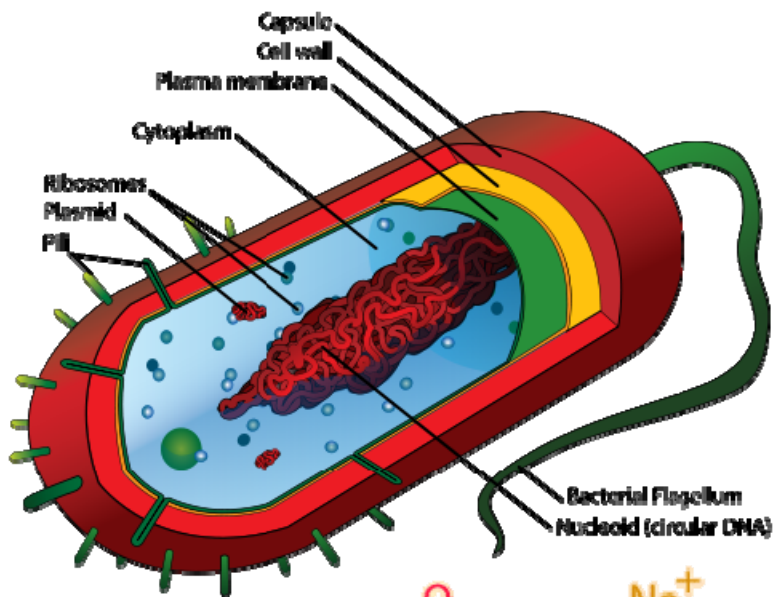
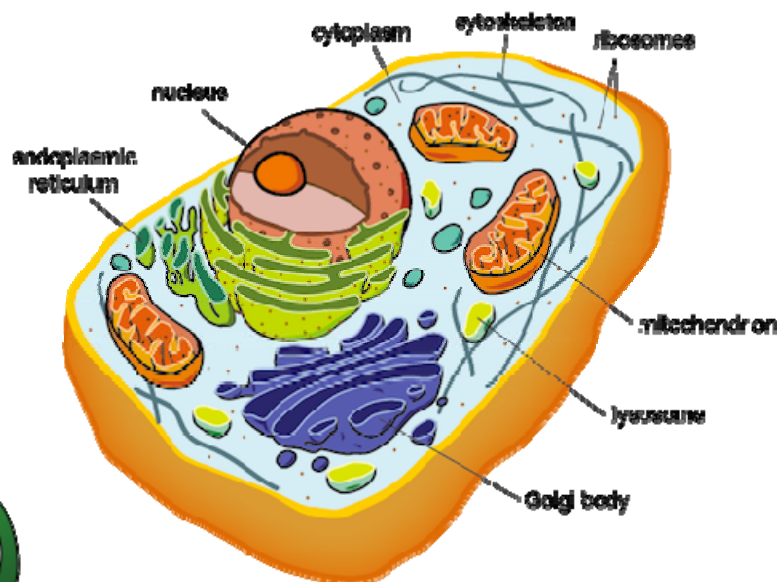
4B – [Reporting Category 1] – investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules

5B – [Reporting Category 1] – examine specialized cells, including roots, stems, and leaves of plants; and animal cells such as blood, muscle, and epithelium

9B – [Reporting Category 4] – compare the reactants and products of photosynthesis and cellular respiration in terms of energy and matter

Contents of This Packet

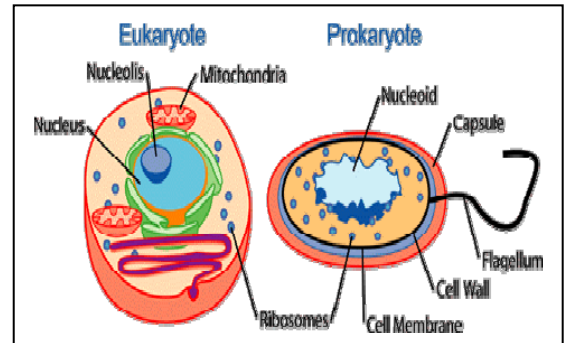
- I. Review and Practice
- II. Vocabulary Cards
- III. Practice Items
- IV. Sapling Instructions



Cell Structure: Prokaryotic and Eukaryotic Cells

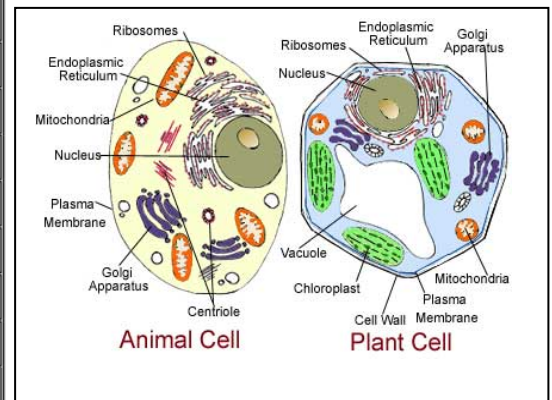
- Cells are the smallest units of life.
- Comparing Prokaryotic and Eukaryotic Cells – Pro No [Nucleus], Eu Do [have a nucleus]
 - Prokaryotic Cells: bacteria
 - Eukaryotic Cells: animal cells, plant cells

	Prokaryotic	Eukaryotic
Cell membrane	Yes	Yes
Cytoplasm	Yes	Yes
Genetic Material	Yes	Yes
Ribosomes	Yes	Yes
Nucleus	No	No
Organelles	No	No
Type of Cell	Simple	Complex

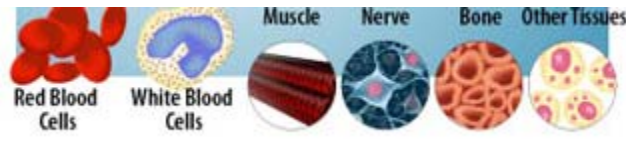


- Animal Cells and Plant Cells are Eukaryotic Cells with cell organelles.
CELL ORGANELLES

ORGANELLE	LOCATION	DESCRIPTION	FUNCTION
CELL WALL	Plants cells only	OUTER LAYER, RIGID, STRONG, STIFF, NON-LIVING	*Protects and Support Cell * Allows oxygen and water to pass through
CELL MEMBRANE	Both plants and animal cells	Plant - inside cell wall Animal - outer layer	Controls what comes in and out of the cell
NUCLEUS	Plant and Animal Cells	Rounded shape surrounded by rest of organelles	Controls the cells activities
CYTOPLASM	Both plants and animal cells	Clear gel-like fluid	Home to the cell's organelles
MITOCHONDRIA	Both plants and animal cells	Bean shaped with inner membrane	Breaks down sugar molecules to create energy
ENDOPLASMIC RETICULUM	Both plants and animal cells	Network of folded tubes or membranes	Carries protein and other materials from one part of the cell to another
RIBOSOMES	Both plants and animal cells	Small bodies floating free or attached to the endoplasmic reticulum	Produces proteins
GOLGI BODIES	Both plants and animal cells	Flattened sacs or tubes	Receives proteins and other materials from the Endoplasmic Reticulum and packages them and then redistributes them
CHLOROPLASTS	Plants cells only	Green, oval structures usually containing chlorophyll	Captures energy from sunlight and uses it to produce food for cells
VACUOLES	Both plants and animal cells	Fluid-filled sacs	Storage area for cells
LYSOSMES	Plants cells - uncommon Animal cells - common	Small round structures	Use chemicals to break down large food particles into smaller ones, and breaks down old cells.



- Specialized cells are cells that have developed special functions and features. Each cell starts to specialize into its special job—this is determined by the DNA, which holds the genetic code and controls what a cell turns into.

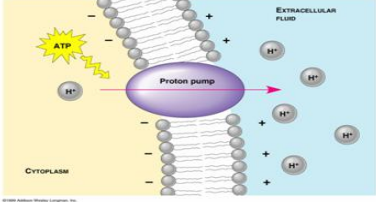

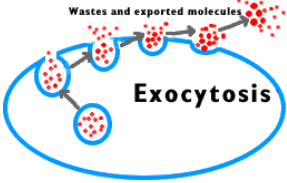


Cell Energy: Photosynthesis and Cellular Respiration

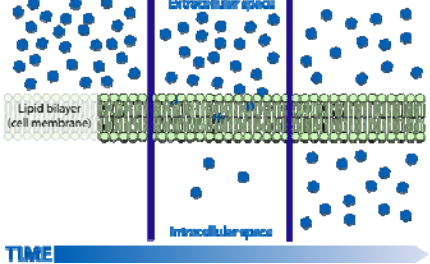
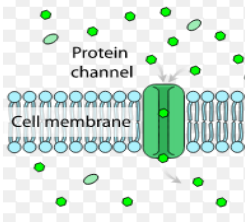
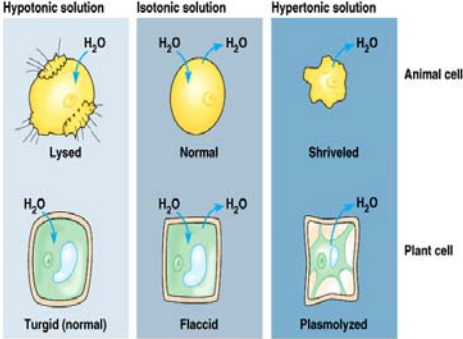
	Photosynthesis	Cellular Respiration
Occurs in:	Plant Cells, Some Prokaryotic and Protist Cells	Plant Cells and Animal Cells
Takes place in the:	Chloroplast	Mitochondria
Reactants (uses)	Water + Carbon Dioxide + Sunlight (energy)	Glucose + Oxygen
Produces (creates)	Glucose + Oxygen	Water + Carbon Dioxide + ATP (energy)
Full Equation	$6 \text{CO}_2 + 6 \text{H}_2\text{O} \xrightarrow{\text{Light energy from the sun}} \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$ <p>carbon dioxide water Light energy from the sun glucose oxygen</p>	$\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 6\text{CO}_2 + \text{energy}$ <p>(glucose + oxygen → water + carbon dioxide + energy)</p>

Cell Transport: Moving molecules across the cell membrane in order to maintain homeostasis.

- Cells move things across the cell membrane in order to maintain homeostasis—a balance, equilibrium. There are two types of transport—Active Transport and Passive Transport.
- Active Transport requires energy input in order to move things across the cell membrane.

<p>Active Transport</p> <p>Moves molecules in and out of the cell using a protein pump in the cell membrane</p>		<p>Example:</p> <p>Sodium/Potassium Pump</p>
<p>Endocytosis</p> <p>Cell membrane eats/ingests food or liquids into the cell</p>	<p>Endocytosis</p> 	<p>Example:</p> <p>A White Blood Cell eating a foreign particle</p>
<p>Exocytosis</p> <p>A cell releases a substance like hormones or wastes through the cell membrane.</p>		<p>Example:</p> <p>A cell releasing hormones</p>

- Passive Transport does not require energy.

<p>Diffusion</p> <p>Movement of small molecules from areas of high concentration to areas of low concentration</p>		<p>Example:</p> <p>Diffusion of respiratory gases-- CO₂ and O₂ across the blood vessels and cells for cellular respiration</p>
<p>Facilitated Diffusion</p> <p>Uses protein channels to move larger molecules that cannot pass through the cell membrane. Does not require energy!!</p>		<p>Example:</p> <p>Glucose leaving the blood stream into cells for cellular respiration</p>
<p>Osmosis</p> <p>Movement of WATER ONLY across cell membranes of cells. Does not require energy!!</p>		<p>Example: Salt and Fresh Water Fish</p> <p>Hypertonic: Water enters cell, cells swell, and burst</p> <p>Hypotonic: Water leaves cell, cells shrink and dies</p> <p>Isotonic: Equilibrium, cells are happy 😊</p>