BIOLOGY ROOTS

Engaging Science Lessons

Thank you so much for supporting BIOLOGY ROOTS!

I am so excited that you will be using one of my products in your classroom to benefit you and your students. Listed below are some general categories of products that I offer in my TpT store:

Digital Interactive Notebooks	Complete Units- No prep!
Traditional Interactive Notebooks	Super Duper Science Sub Plans
Captivating Presentations	Terrific Task Cards

Copyright Notice and Terms of Use © 2015 Vanessa Jason ("Biology Roots")

All rights reserved by author. This product is to be used by the original purchaser only. Duplication for other classes or by other teachers or for use in school?wide distribution is strictly forbidden. **Posting Biology Roots products on the internet in any form is strictly forbidden and violates the DMCA. Not for public display, including ANY websites. Violations are subject to the penalties of the Digital Millennium Copyright Act.**

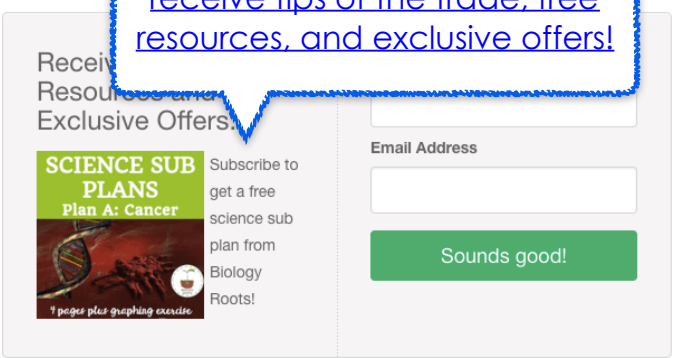
It IS Okay to…	*It is NOT Okay to…*
Use this in your classroom as often as you would like, every year!	• ***Share this resource with your coworkers or friends unless you buy additional licenses, (1 per each additional teacher), which are offered for half the cost of the product to make it easier).*** • ***Post this item to your school website or personal web site.***






BIOLOGY ROOTS

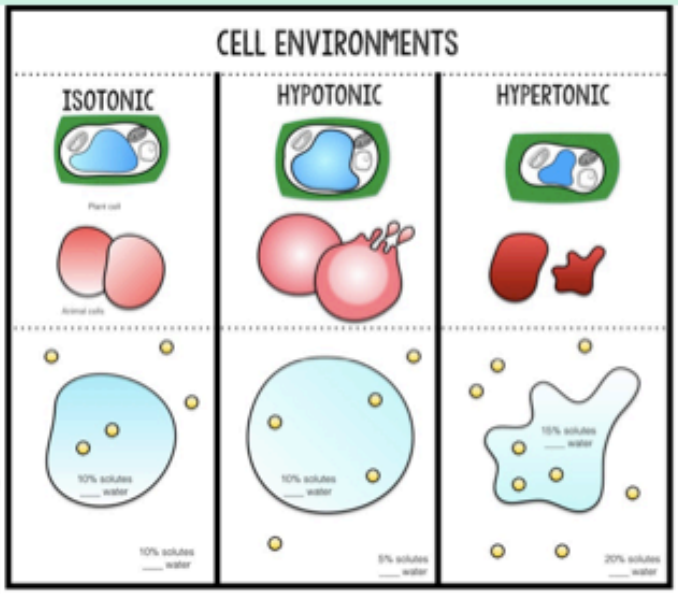
Sign up for my newsletter to receive tips of the trade, free resources, and exclusive offers!

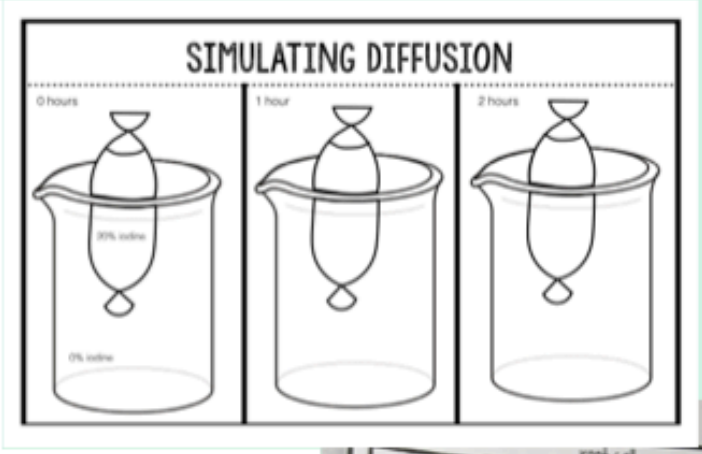


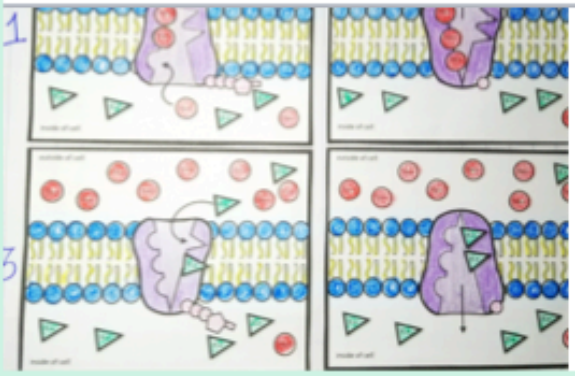
CELLULAR TRANSPORT

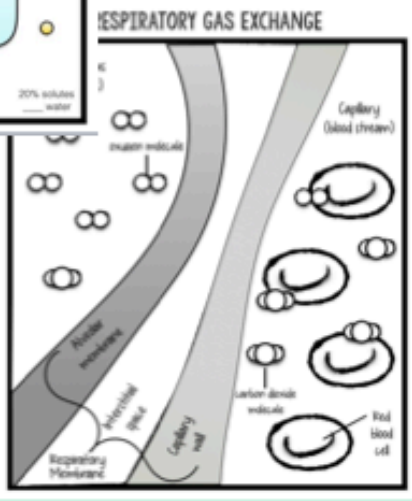
BIOLOGY ROOTS

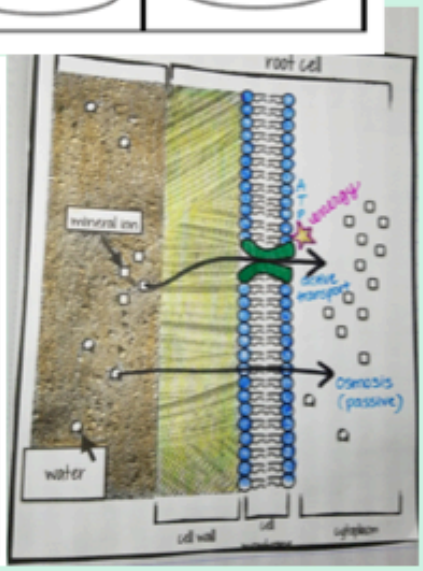
20+ Interactive Notebook Activities



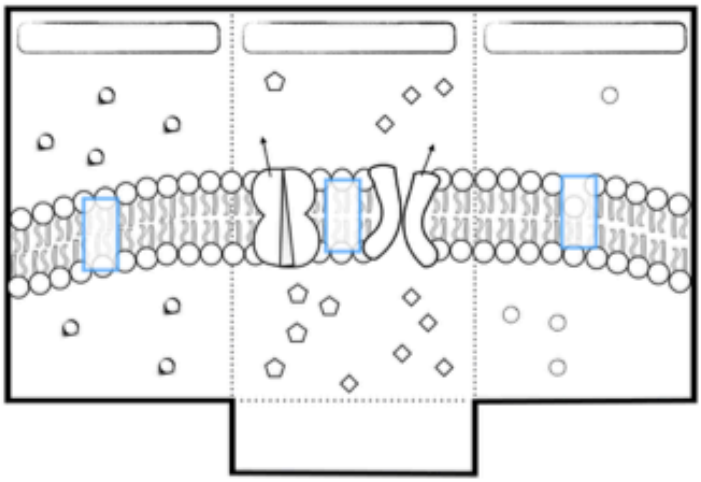


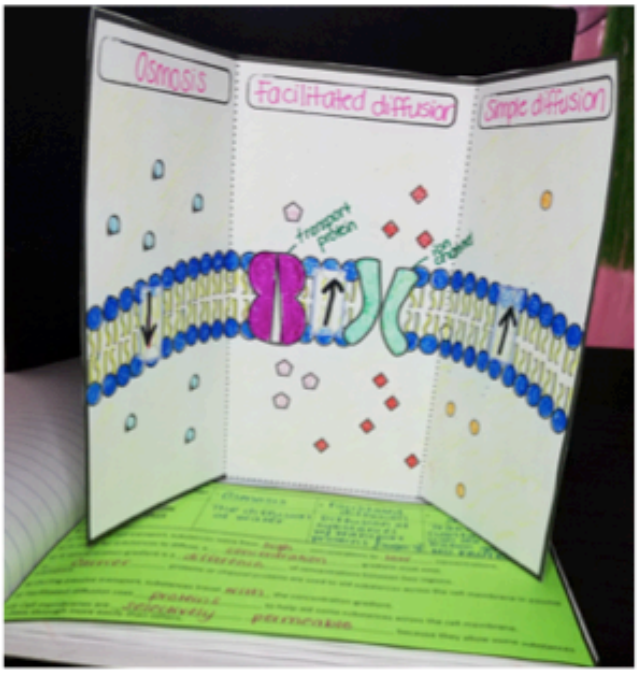


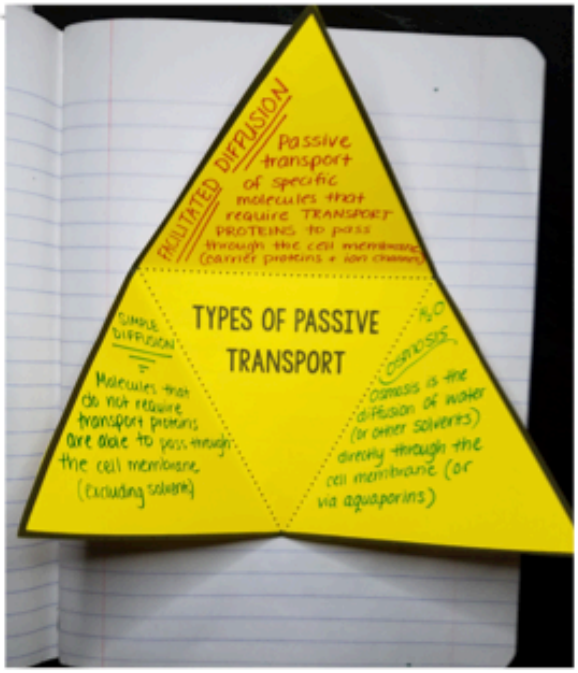


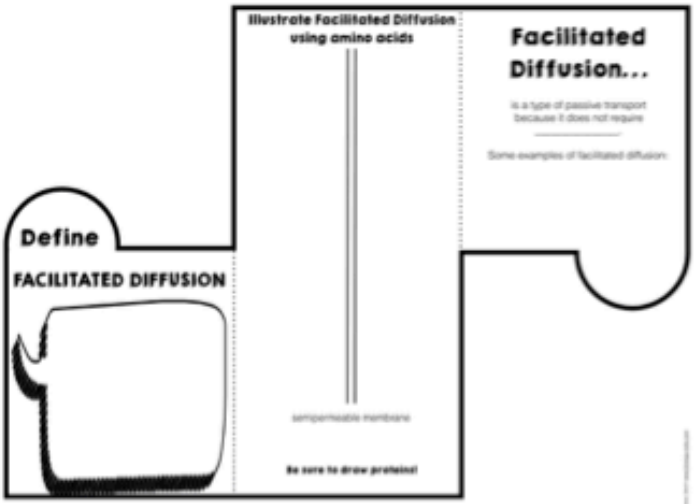


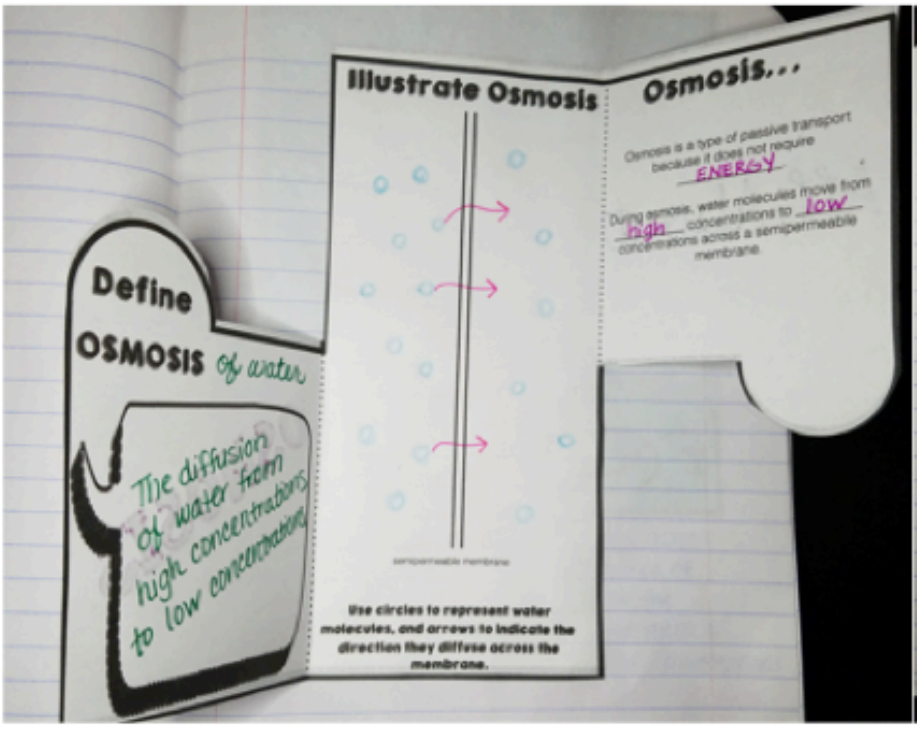
Passive Transport:
Osmosis, Facilitated Diffusion;
Active Transport:
Endocytosis, Exocytosis, Sodium Potassium Pump
Cell Environments:
Hypotonic, Hypertonic, Isotonic

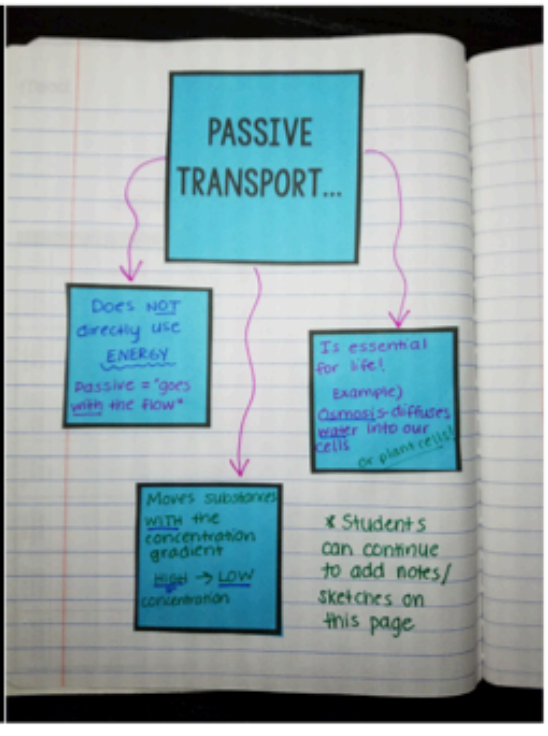


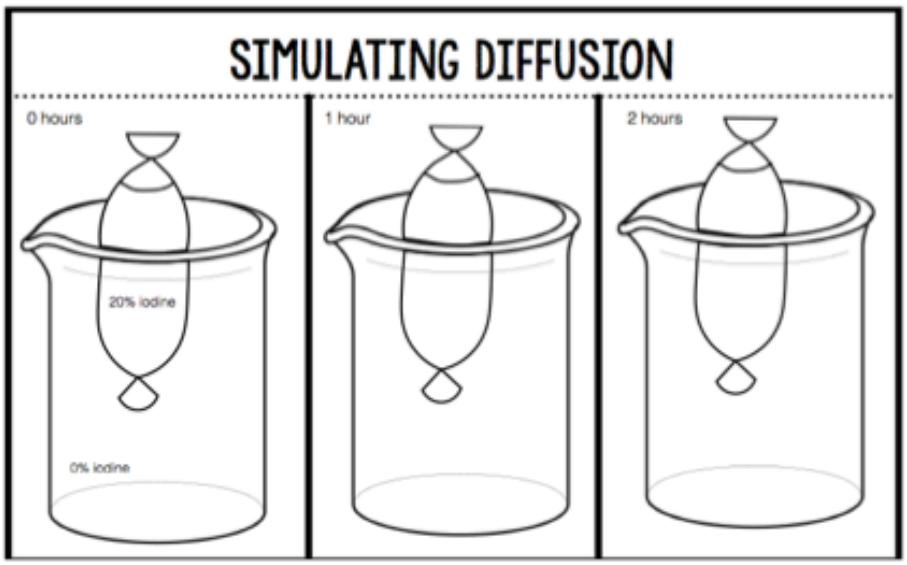

Osmosis
Facilitated diffusion
Simple diffusion
transport protein

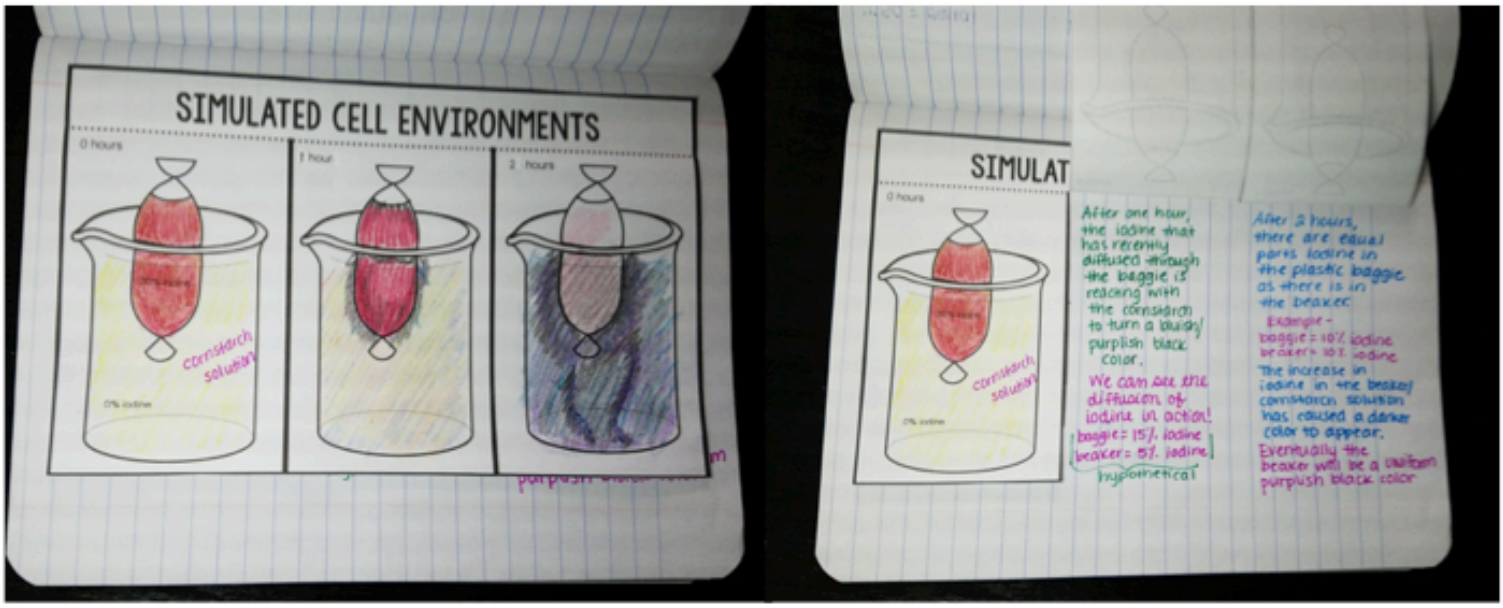

FACILITATED DIFFUSION
Passive transport of specific molecules that require TRANSPORT PROTEINS to pass through the cell membrane (carrier proteins + ion channels)
TYPES OF PASSIVE TRANSPORT
SIMPLE DIFFUSION
Molecules that do not require transport proteins are able to pass through the cell membrane (excluding solvents)
OSMOSIS
Osmosis is the diffusion of water (or other solvents) directly through the cell membrane (or via aquaporins)

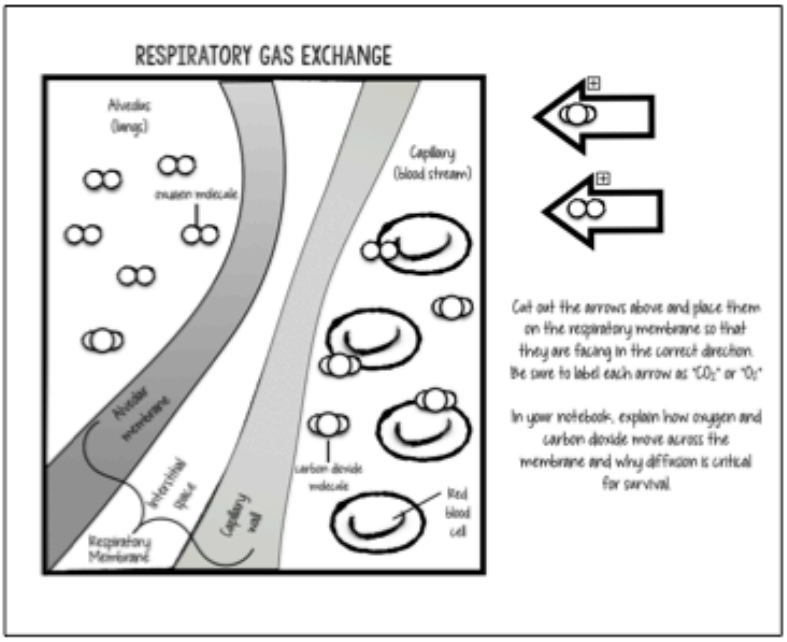

Define
FACILITATED DIFFUSION
Illustrate Facilitated Diffusion using amino acids
semipermeable membrane
Be sure to draw proteins!
Facilitated Diffusion...
is a type of passive transport because it does not require
Some examples of facilitated diffusion:

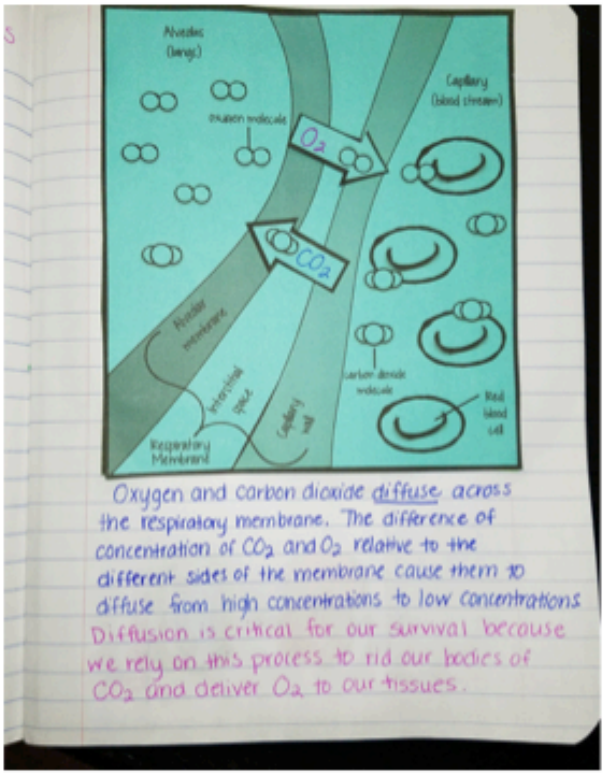

Define
OSMOSIS of water
The diffusion of water from high concentrations to low concentrations
Illustrate Osmosis
semipermeable membrane
Use circles to represent water molecules, and arrows to indicate the direction they diffuse across the membrane.
Osmosis...
Osmosis is a type of passive transport because it does not require
ENERGY
During osmosis, water molecules move from high concentrations to low concentrations across a semipermeable membrane

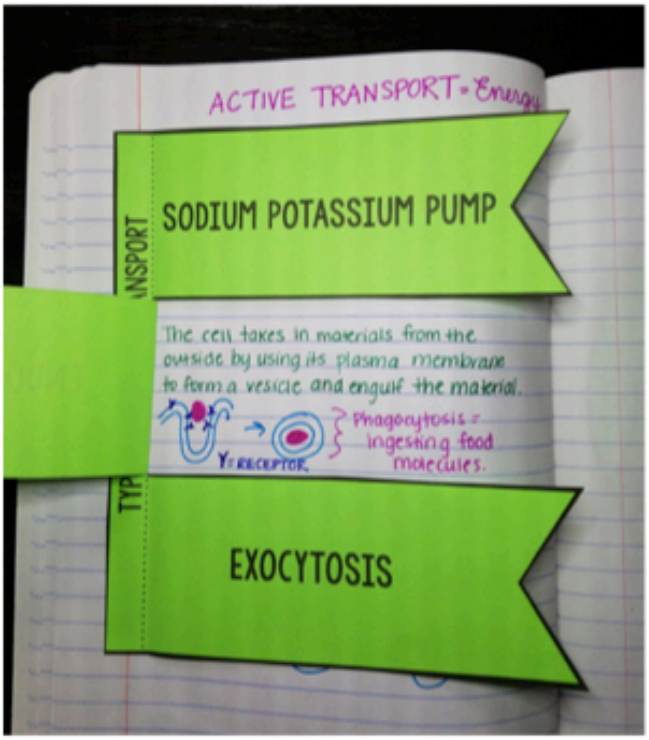

PASSIVE TRANSPORT...
Does NOT directly use ENERGY
Passive = "goes with the flow"
Is essential for life!
Example)
Osmosis diffuses water into our cells
or plant cells!
Moves substances WITH the concentration gradient
High → LOW concentration
* Students can continue to add notes/ sketches on this page

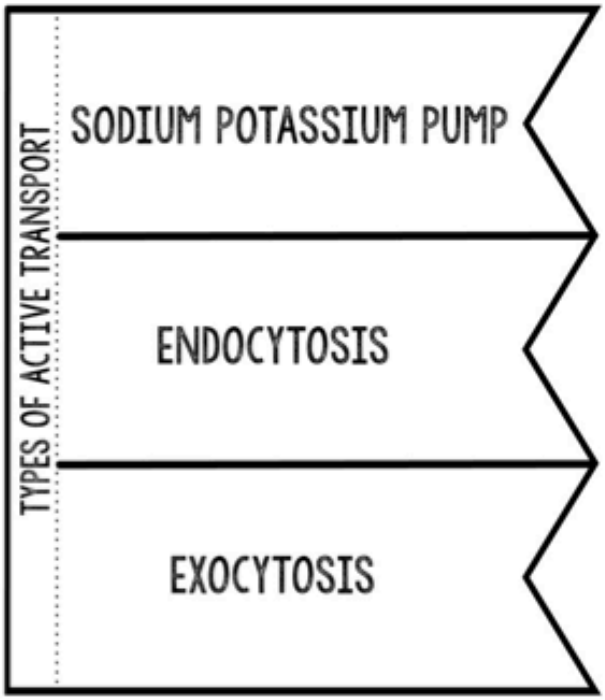

SIMULATING DIFFUSION
0 hours
1 hour
2 hours
20% iodine
0% iodine


SIMULATED CELL ENVIRONMENTS
0 hours
1 hour
2 hours
cornstarch solution
0% iodine
SIMULAT
After one hour, the iodine that has recently diffused through the baggie is reacting with the cornstarch to turn a bluish/purplish black color.
We can see the diffusion of iodine in action!
baggie= 15% iodine
beaker= 5% iodine
hypothetical
After 2 hours, there are equal parts iodine in the plastic baggie as there is in the beaker.
Example -
baggie = 10% iodine
beaker= 10% iodine
The increase in iodine in the beaker/cornstarch solution has caused a darker color to appear.
Eventually the beaker will be a uniform purplish black color


RESPIRATORY GAS EXCHANGE
Alveolus (lung)
oxygen molecule
Capillary (blood stream)
Alveolar membrane
Interstitial space
Capillary wall
Respiratory Membrane
carbon dioxide molecule
Red blood cell
Cut out the arrows above and place them on the respiratory membrane so that they are facing in the correct direction. Be sure to label each arrow as "CO_2" or "O_2"
In your notebook, explain how oxygen and carbon dioxide move across the membrane and why diffusion is critical for survival.


Alveolus (lung)
oxygen molecule
O_2
Capillary (blood stream)
CO_2
Alveolar membrane
Interstitial space
Capillary wall
Respiratory Membrane
carbon dioxide molecule
Red blood cell
Oxygen and carbon dioxide diffuse across the respiratory membrane. The difference of concentration of CO_2 and O_2 relative to the different sides of the membrane cause them to diffuse from high concentrations to low concentrations. Diffusion is critical for our survival because we rely on this process to rid our bodies of CO_2 and deliver O_2 to our tissues.

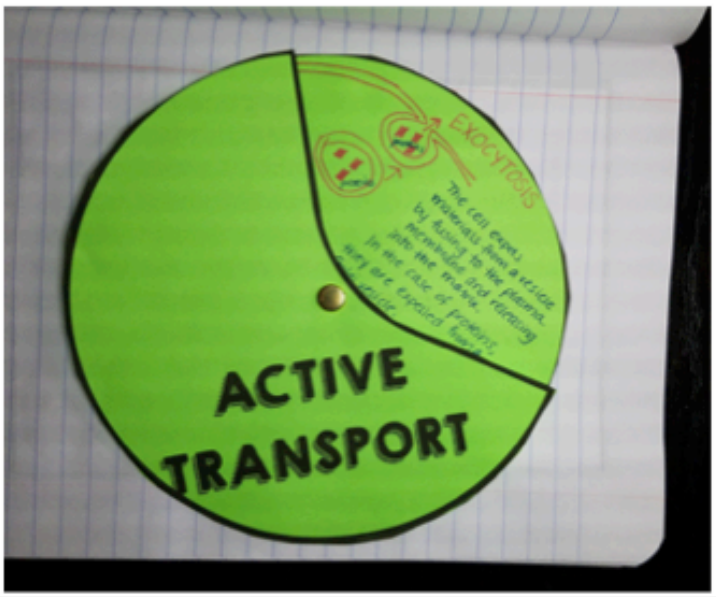


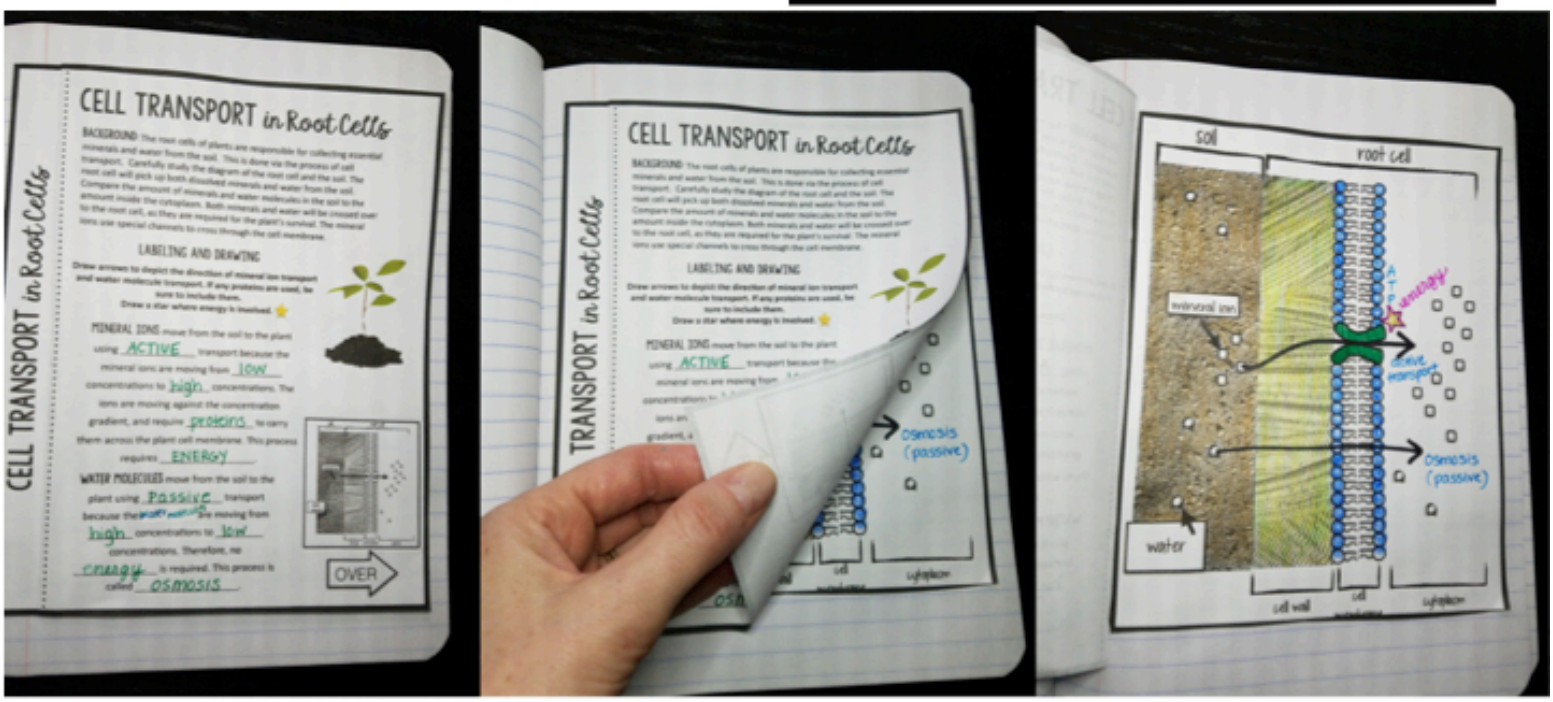




ACTIVE TRANSPORT SPINNER WHEEL

DIRECTIONS:
On the second page, describe the three main types of active transport within the three slices of the spinner wheel. Simple illustrations can also be included to enhance your description.
Cut on the outer solid lines of both the top portion and the bottom portion of the spinner wheel.
Place the top portion on top of the bottom portion and fix together with a brad.
Dot glue onto the back of the bottom portion only and secure into your notebook.





MACROPHAGES AND CELL TRANSPORT

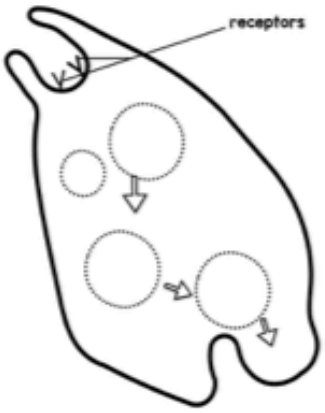
BACKGROUND: Macrophages are specialized immune cells that are one of our body's first line as defense. They use receptors to help identify foreign substances and engulf them. Once engulfed, the macrophages use strong lysosomes to attack the bacteria by fusing them with the phagosome to form a phagolysosome. The lysosomes may use enzymes or peroxide to attack the bacteria. The broken-down bacteria are no longer harmful and are released outside of the macrophage as soluble waste.

USE THE BACKGROUND INFORMATION TO HELP BUILD YOUR MACROPHAGE MODEL.
Cut out each piece below and glue it into the appropriate spot within the macrophage to show how macrophages process bacteria. The dotted circular lines in the macrophage are where you should paste your items. When you are finished building your macrophage, cut it out and paste it into your notebook. On the same page, describe which type of cell transport is happening in as much detail as possible- both endocytosis and exocytosis.

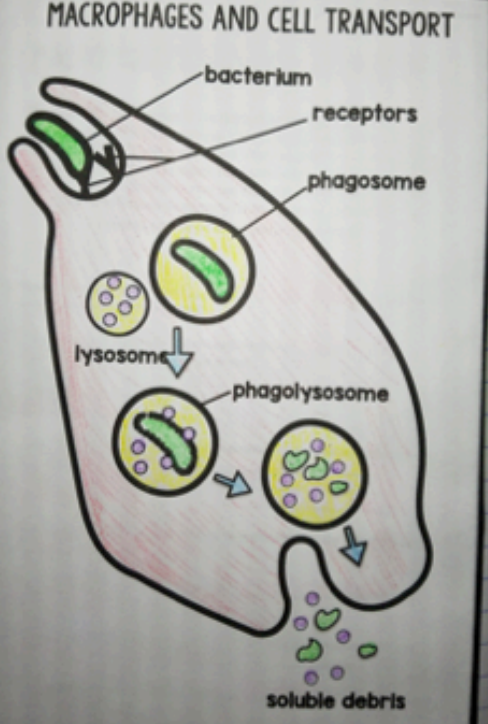
phagosome | lysosome | bacterium

phagolysosome (early stage) | phagolysosome (late stage) | soluble waste

MACROPHAGES AND CELL TRANSPORT



MACROPHAGES AND CELL TRANSPORT



EXOCYTOSIS

COLORING KEY

Hydrophilic Head (dark blue)
Hydrophobic tails (highlight yellow)
proteins from Golgi (green)
Shade the cytoplasm light blue

outside of cell

GOLGI

inside of the cell

DESCRIPTION: A Golgi vesicle carrying proteins fuses with the plasma membrane to release the proteins outside the cell.

EXOCYTOSIS
outside cell

COLORING KEY

Hydrophilic Head (dark blue)
Hydrophobic tails (highlight yellow)
disaccharide (pink)
Shade the cytoplasm light blue

DESCRIPTION:

ENDOCYTOSIS:

Cut out this square on the black outer edge, as well as on the black line between phagocytosis and pinocytosis. Define endocytosis on the speech bubble above. Fold the paper on the dotted lines to create a flap. Lift the flaps up and define phagocytosis and pinocytosis into your notebook under the corresponding picture.

PHAGOCYTOSIS

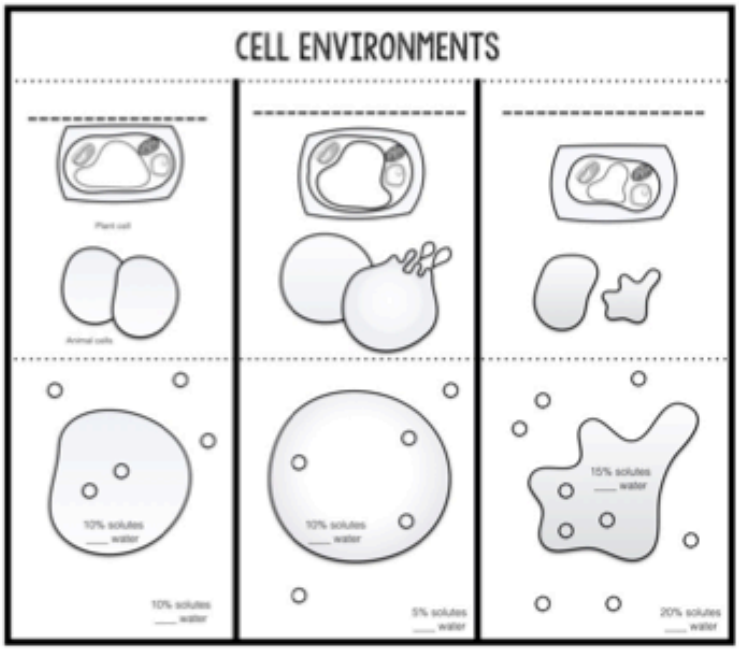
PINOCYTOSIS

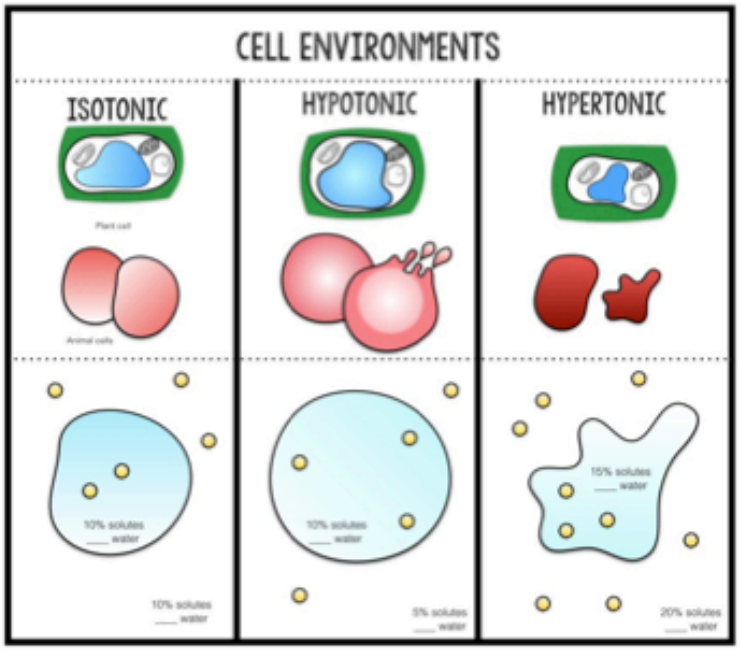
ENDOCYTOSIS:

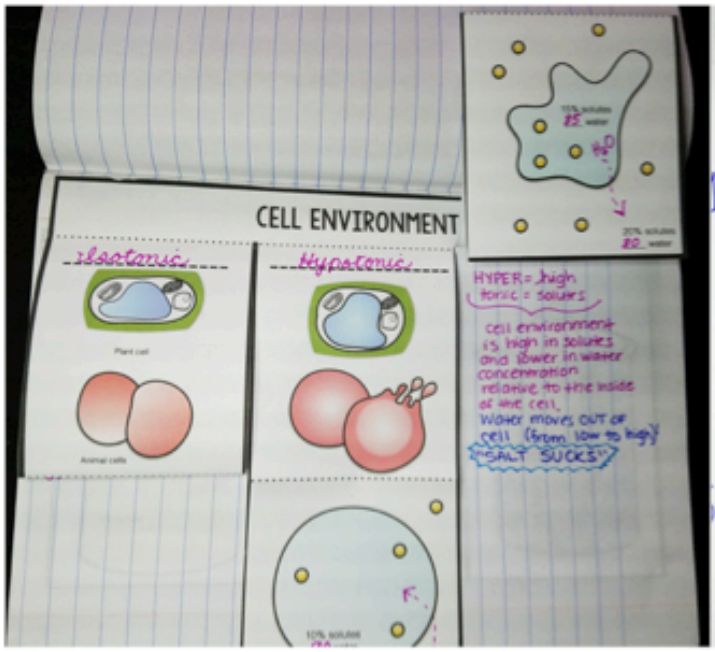
Cut out this square on the black outer edge, as well as on the black line between phagocytosis and pinocytosis. Define endocytosis on the speech bubble above. Fold the paper on the dotted lines to create a flap. Lift the flaps up and define phagocytosis and pinocytosis into your notebook under the corresponding picture.

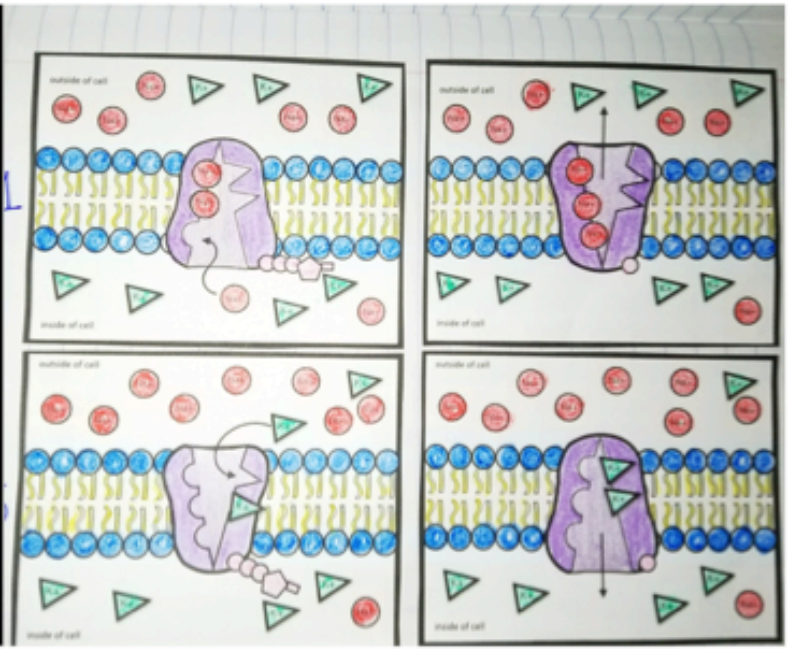
PHAGOCYTOSIS

PINOCYTOSIS









ACTIVE TRANSPORT TRIANGLE FOLD

DIRECTIONS:
In each triangle, name and describe three types of active transport.
Cut on the outer solid line.
Dot glue into notebook on the middle triangle only (behind title "Types of Active Transport".
Fold on the dotted lines.

TYPES OF ACTIVE TRANSPORT

SODIUM POTASSIUM PUMP CUT N PASTE

