

Wk

## Types of ~~systems~~ can enter

open system: energy AND matter enter AND leave the system

closed system:

and leave the system but matter does NOT.

isolated system: neither energy nor matter enter or leave the system

1) 7, 8, 10, 20, 1500

2) The larger organism encircled the smaller one, then released digestive enzymes to get nutrients.

Name

# Organisms: Cells to Body September 9

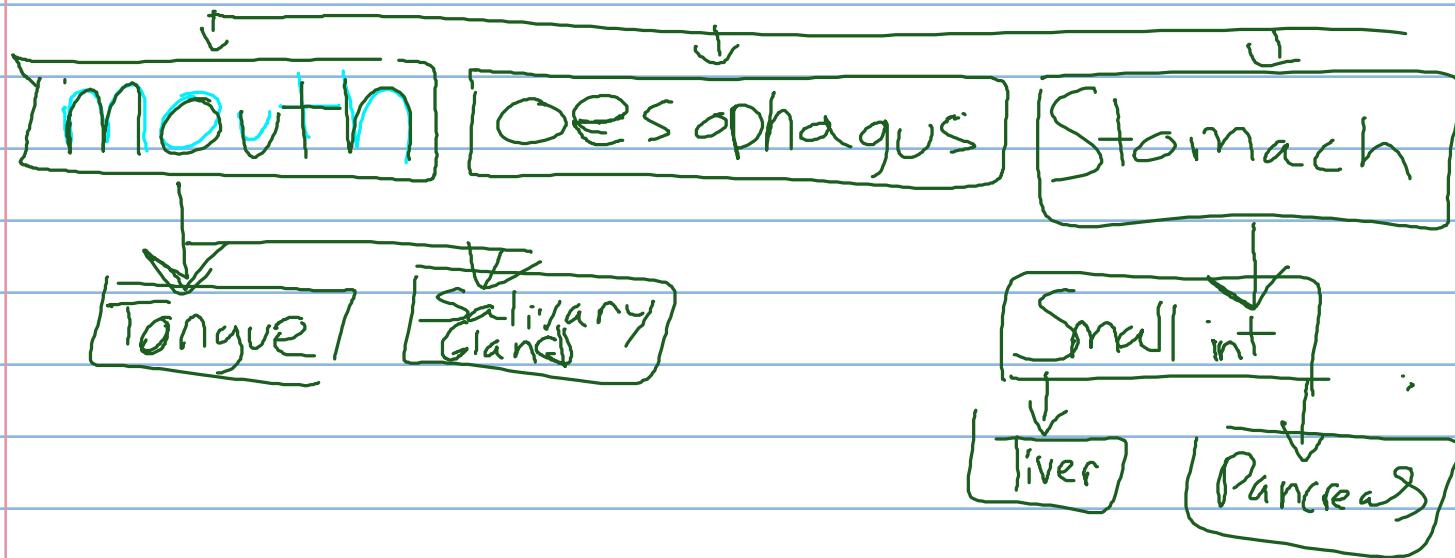
- How do you think body systems interact to produce sensations like "butterflies" in your stomach?
- organ system: two or more organs that work together to perform body functions
- How do cells help lungs function?
  - Ciliated cells: remove foreign substances from lungs
- How would organ systems be impacted if the circulatory system failed?
  - Body would shut down
    - Respiratory System would not be able to get  $\text{CO}_2$  out of body

Name

# Exploration 1: Interacting Systems September 1

organ: group of tissues that perform a specific function

- How might the digestive system and the immune system interact to protect the body?
- The digestive system releases food. The immune system protects body from disease. Food has bacteria that may be harmful to the body. The digestive system breaks down most of that bacteria. Any leftover bacteria that is harmful will get a response from the immune system.

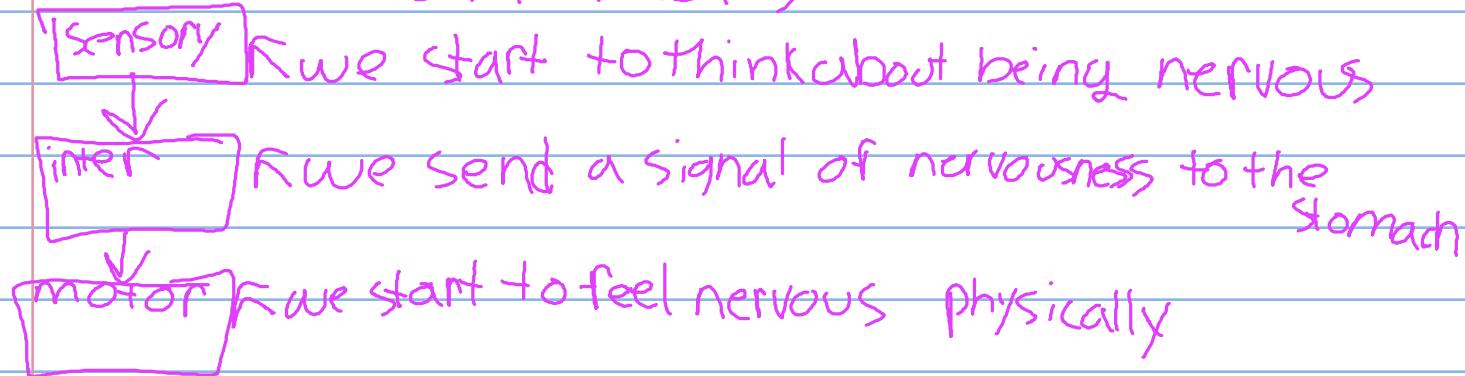


- tissue: a group of similar cells that work together to perform a specialized function
- A tendon attaches muscle to bone, what type of tissue do tendons have? Why.
  - Tendons have connective tissue because the term attach is synonymous with connect therefore tendons are most likely connective tissue.
- cell : the most basic unit of life, cells make up all tissues.
- cell differentiation: process by which cells become specialized to perform a specific function.

Name

# Exploration I Interacting Systems September 16

- sensory neurons: send sensory signals to the brain
- interneurons: receive sensory signals and send out reaction signal to motor neurons
- motor neurons: receive signal from interneurons, carry out response
- How would the breakdown of the myelin sheath affect the functioning of the neuron?  
The breakdown of the myeline sheath would cause the electrical signal transmission to slow down across the axon.
- Construct a model showing how "butterflies" in your stomach happens when we are nervous?  
(Think about how the types of neurons interact)



Name  
September

Name

## Exploration 2: Cell Body September 18

### DO NOW

- 1) How do the three types of neurons interact?

Sensory neurons take in sensory stimuli and send that information to the interneurons.

The interneurons, located in the brain, generate a response signal and send that signal to the motorneurons. Then the motorneurons carry out the response function.

### CHART OF CELL ORGANELLES

<u>Name</u>	<u>Function</u>	<u>Visual</u>
Cell Membrane	controls movement of materials in & out of cell	Outer wall of cell
Cytoplasm	holds organelles in the cell body	Jelly like substance
Nucleus	stores genetic information	Sphere like in center

- Describe how the endoplasmic reticulum, mitochondrion, and Golgi apparatus are structurally similar?

mitochondria	supply energy to cell	wavy structure
Rough endoplasmic reticulum	Protein production helps ER make proteins	wavy structure "bump" in ER
ribosome		
smooth ER	breaks down alcohol & drugs	

Name

## Exploration 2 The Cell System September 25

- The cell walls of plants have openings and channels. How is this structure most likely related to the proper functioning of the plant system?
- The cell wall has openings to allow water into the plant system.
- chloroplast: carry out the process of photosynthesis
- When a plant wilts, its leaves shrivel. How is this related to the vacuole?  
When a plant wilts, it means that the vacuole does not have much water in storage.

Name

# Lab: Connecting Form to Function October 2

Root

Stem

Leaf

Function



Name

# Exploration I: Homeostasis

October 9

homeostasis: ability to maintain stable internal condition.

- Why do some people respond to a fever by shivering? Even though shivering is a response to a decrease in body temperature.

We think the reason the body starts to shiver is because your body is trying to get the fever out of your system

- Identify a change in your environment that might affect homeostasis. Explain using the terms stimulus, control center, set point, receptors, effectors, and imbalance

A change in temperature is received by receptors in the skin. This stimulus information is sent to the control center. Once the temperature drops below the set point. Then the control center signals to the effectors the appropriate response to get internal temperature back to normal.

- hormone: chemical signals secreted into bloodstream

- Feedback loop: interaction between the receptor, control center, and the effector.

Name

# Exploration I: Mechanisms of Homeostasis

October 11

Define homeostasis

What are the functions for the following organelles:

Nucleus, mitochondria, endoplasmic reticulum, golgi apparatus, cell membrane, and cell wall

Name

## Exploration 2: Homeostasis in Human Body October 14

- If blood pressure is too high or too low, how might other organ systems be impacted?

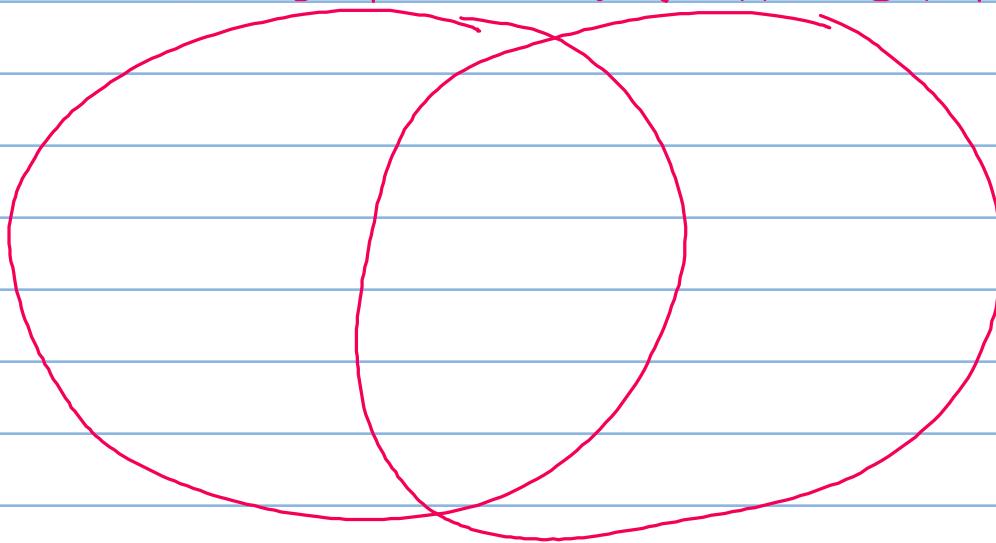
When blood pressure drops below a set point, other parts of the body are not able to get oxygen from red blood cells. This can cause the nervous system to shut down in extreme cases.

Name

# Exploration I: Atoms, Elements, Compounds October 23

Ionic Bond

Covalent Bond



### Similar

- bond atoms together
- Positive & negative ions
- Both have electrons that orbit nucleus

### Covalent

- electrons are SHARED between ions.
- weaker bond
- called molecules

### Ionic

- electron is given away by one ion to the other.
- stronger bond

Name

## Exploration 2: Properties of Water October 28

### DO NOW

How are covalent and ionic bonds different?

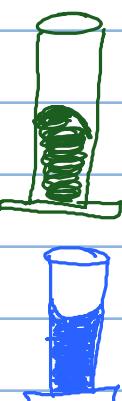
- Ionic bonds takes electrons from another ion while Covalent bonds shares electrons
- What characteristics of a water molecule make it unique. Why does the oxygen atom have a slightly positive charge?

- How are hydrogen bonds similar to ionic bonds?

A hydrogen bond is similar to an ionic bond because the hydrogen ALWAYS gives up its only electron to the other ion.

### IMPORTANT PROPERTIES OF WATER

- 1) High Specific Heat
  - water can resist change in temperature very well.
- 2) Cohesion
  - attraction between molecules
- 3) Adhesion
  - ability to stick to different molecules



- Mercury has greater cohesion than water. We know this because the mercury forms a concave shape at the top while inside the graduated cylinder indicating that the mercury does not stick to the glass.

- Why is it important that water is able to dissolve many different things? It is important for water to dissolve many things because organisms need to breakdown many different substances to survive.

### Acids & Bases

- acids have a higher concentration of hydrogen ions ( $H^+$ )
- bases have a lower concentration of hydrogen ions ( $H^+$ )
- parts hydrogen (pH) amount of parts hydrogen a solution has.

Name

Exploration 3: Reactions & Enzymes      October 30  
DO NOW

- 1) What are three properties of water?
- 2) How are hydrogen bonds different from covalent?

# Exploration 3: Chemical Reactions

Name  
November

# Exploration 2: Structure of CBM November 13

## DO NOW

1) How are ionic and covalent bonds different?

Ionic bonds → electron gained/lost

Covalent bonds → electrons shared

2) What does it mean for a molecule to be polar?

A polar molecule has a positive pole and a negative pole.

3) What is the function of an enzyme? What feature of the enzyme allows it to function?

The function is to increase the rate of a chemical reaction. The shape of the enzyme allows it to function

4) What are three properties of water? Why does water have these properties (think bonds)?

- Adhesion: ability for diff molecules to stick

- Cohesion: ability for like molecules to stick

- Specific heat capacity: ability to resist temp change

Hydrogen bonds give water unique properties.

5) What are the parts of an atom?

How does an atom become an ion?

The parts of the atom are the protons (+), neutrons ( $\emptyset$ ), and electrons (-). An atom becomes an ion by losing or gaining an electron.

Saturated fatty acid chain

- ALL single bonds
- straightish shape
- solid @ room temp
  - butter

Unsaturated fatty acid chain

- has double bonded carbons
  - bent shape
  - harder to digest
  - Vegetable oils
- Phospholipid

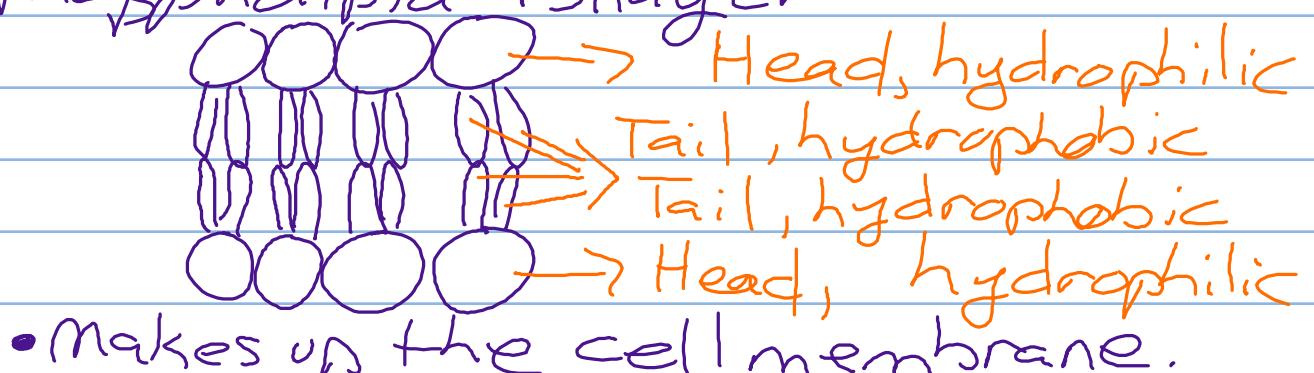
Hydrophilic Head  
(likes water)

glycerol

Hydrophobic Tail  
does NOT like water

Fatty acid chains

## Phospholipid Bilayer



- Makes up the cell membrane.

Name

## Exploration 2: Structure and Function of Carbon November 18

### DO NOW

1) What elements make up carbohydrates and lipids?

Carbon, hydrogen, and oxygen make up carbohydrates and lipids.

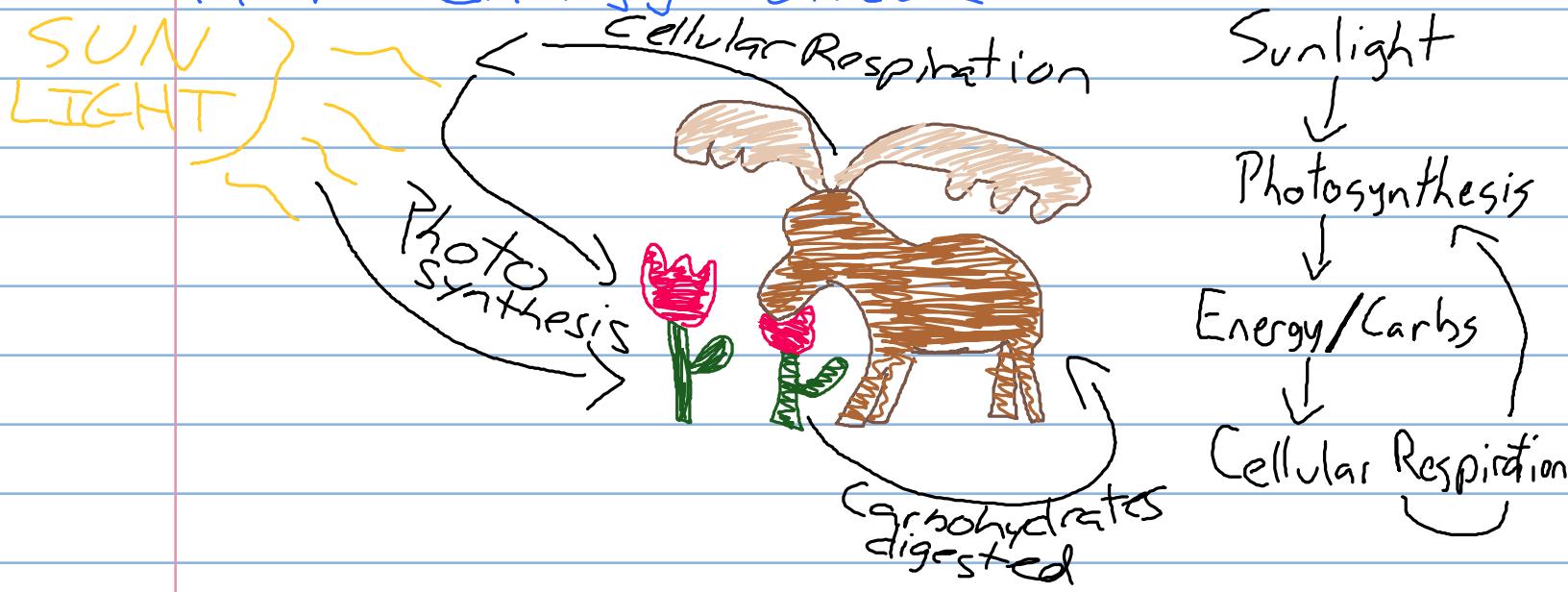
2) How are saturated and unsaturated fats different?

Saturated fats are simple / straight in shape whereas unsaturated fats are more complex / not straight. Saturated fats are found in animals whereas unsaturated plant oils.

Name \_\_\_\_\_  
November 20

## Exploration 3: Chemical Energy

ATP: energy molecule



Name

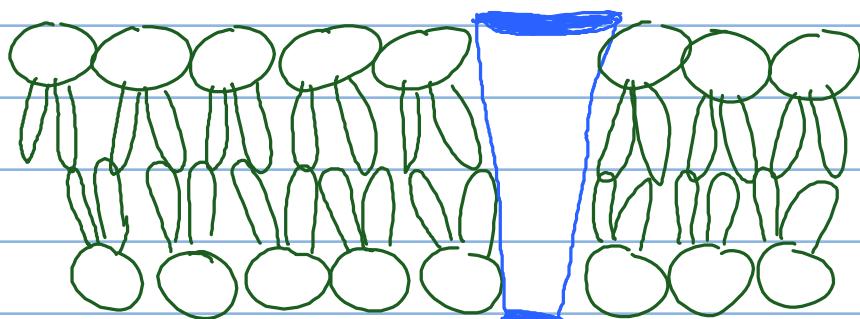
## Exploration 4: The Cell Membrane December 4

### DO NOW

1) What molecule is used for energy? Through which processes are that molecule made?

ATP is the molecule used for energy (Adenosine TriPhosphate). Cellular respiration & photosynthesis ultimately create ATP since they produce glucose.

- The cell membrane allows certain things into and out of cell.
- Cells function within a larger system by the creation of proteins that embed themselves into the phospholipid bilayer. These proteins allow for substance transport.



- Passive Transport

- 1) Diffusion: ions move from area of high concentration to low concentration.  
*NO ENERGY NEEDED*

f

## 2) Facilitated Diffusion

- molecules go from high concat. to low concat. through a protein channel.

## 3) Osmosis: movement of water

From low concentration to high concentration

- How does the structure of the cell membrane allow the cell to function within a larger system?
- The proteins embedded in the phospholipid bilayer allow molecules from other systems to enter the cell.
- Active transport: the movement of molecules from low concentration to high concentration.

REQUIRES ENERGY

En= In

1) Endocytosis: the process by which a cell creates a vesicle to move liquids or large molecules into the cell

Ex= Out

2) Exocytosis: the process by which large molecules exit the cell by creating a vesicle.

Name

## Unit 2 Lesson 2 Review

December 9

1) How does a cell transport molecules into and out of the cell without using energy? (Three different ways)

- Diffusion } Go From high concentration
- Facilitated Diffusion } to low concentration.
- Osmosis }

2) What are the ways in which cells move large molecules from low concentration to high concentration?

Endocytosis: moves into cell

Exocytosis: moves out of cell

Name

## Unit 2: Carbon Based Molecules Review December 13 DO NOW

- 1) What elements make up each of the four carbon based macromolecules?
- Carbohydrates: C, H, O      Proteins: C, H, O, N  
Lipids: C, H, O      Nucleic Acid: C, H, O, N, P

- 2) Explain the cycle by which carbon is redistributed?

- Plants take in CO<sub>2</sub> for photosynthesis
- Animals eat plants, take in carbon
- Cellular respiration puts CO<sub>2</sub> into atmosphere & geosphere.

Name

# Exploration 1 - Photosynthesis January 22

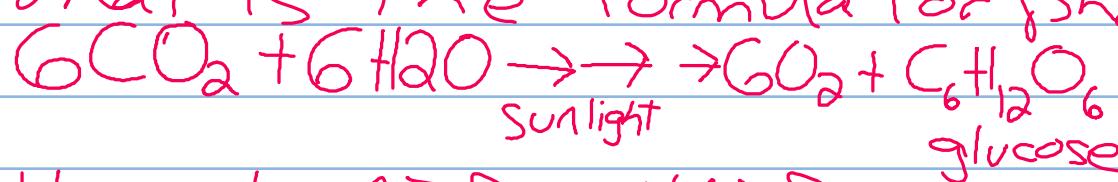
- What do you need to grow plants on another planet? What other information do you need to know about the planet?  
Oxygen level, Sunlight, Soil, Water and Time.
- What is the climate? Can that be controlled?
- How much  $\text{CO}_2$  does the planet have?
- producer: an organism that converts light energy into chemical energy used for cellular processes.
- photosynthesis: the process by which producers convert light energy into chemical energy
- How does energy go from the sun to the very cute panda?  
The energy from the sun goes to the plant using photosynthesis then the panda eats the plant.
- chloroplast: the organelle responsible for light absorption and photosynthesis

Name

## Exploration 2 - Transferring Light into Chem Energy January 24

### DO NOW

1) What is the formula for photosynthesis?



- How do ATP & NADPH transfer sunlight into energy inside of a plant cell?

# Exploration I: Matter & Energy in Cell Respiration

- Claim: Cellular Respiration is an exothermic reaction.

Evidence: Based on the graph, the reactants have a greater amount of energy than the products.

Reasoning: An exothermic reaction is a reaction that releases energy therefore the product must have less energy than the reactant.

Name

## Exploration 2 - Using Chemical Energy

February 10

### DO NOW

- Justify the following

claim using evidence E

& supporting reason

OR create a counter

claim using evidence

& supporting reason.

Claim: Cellular respiration is an endothermic reaction.

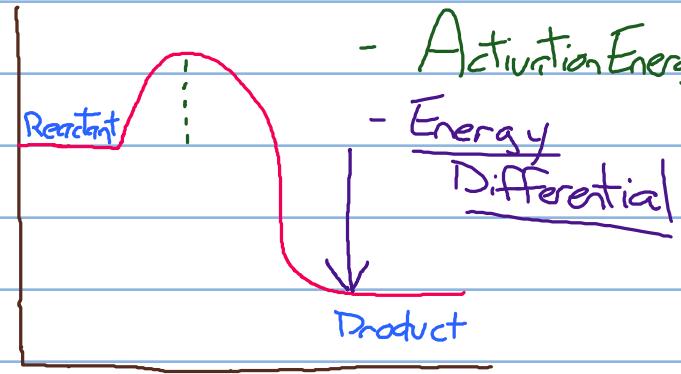
Counter: Cellular respiration is an exothermic reaction.

Evidence: The reactant energy is greater than the product energy.

Reason: An exothermic reaction is a reaction that releases energy. The energy differential decreasing over time indicates that energy is leaving the chemical reaction therefore exothermic.

- Identify the inputs & outputs of glycolysis & the two stages of cellular respiration

	<u>Input</u>	<u>Output</u>
1) glycolysis	glucose	pyruvate electrons
2) Krebs Cycle	pyruvate	ATP $\text{CO}_2$ ATP



3) ETC

Oxygen

$H_2O$   
ATP

- Creating bonds STORES energy  
Breaking bonds RELEASES energy

Name

# Exploration I - Matter Cycling Through Ecosystems March 3

Exploration I: Molecular & Genetic Evidence April 28

