Ag Biology
Energy Unit

Week 6

Sept. 18th – 22nd

Agriculture can be the solution to many of today's problems: Stopping Mass Extinction/ Improving Biodiversity/ Improving Farmland/ Healthy Soil

- Agricultural Issues:
  - Monocropping
  - Eutrophication
  - Releasing Nitrous Oxides into the air
  - Barren Land – Does not hold CO2
  - Synthetic Fertilizers – feed plant but not nourish soil
  - Methane Production from Cattle
  - Deforestation to grow farms
- Energy – Biodigestion of Animal Waste

Choose an Agricultural Setting

Choose an Agricultural Issue in that Setting

Research a solution to that issue, How can Agriculture be the Hero to major problems that contribute to Habitat Loss, Global Warming, Climate Change, Pollution, Extinction of Species

Agriculture can be the solution

- Wildlife Corridors
- Wildlife Habitats
- Cover Cropping
- Introducing Biodiversity into the Farm

SAE Qualification Questionnaire

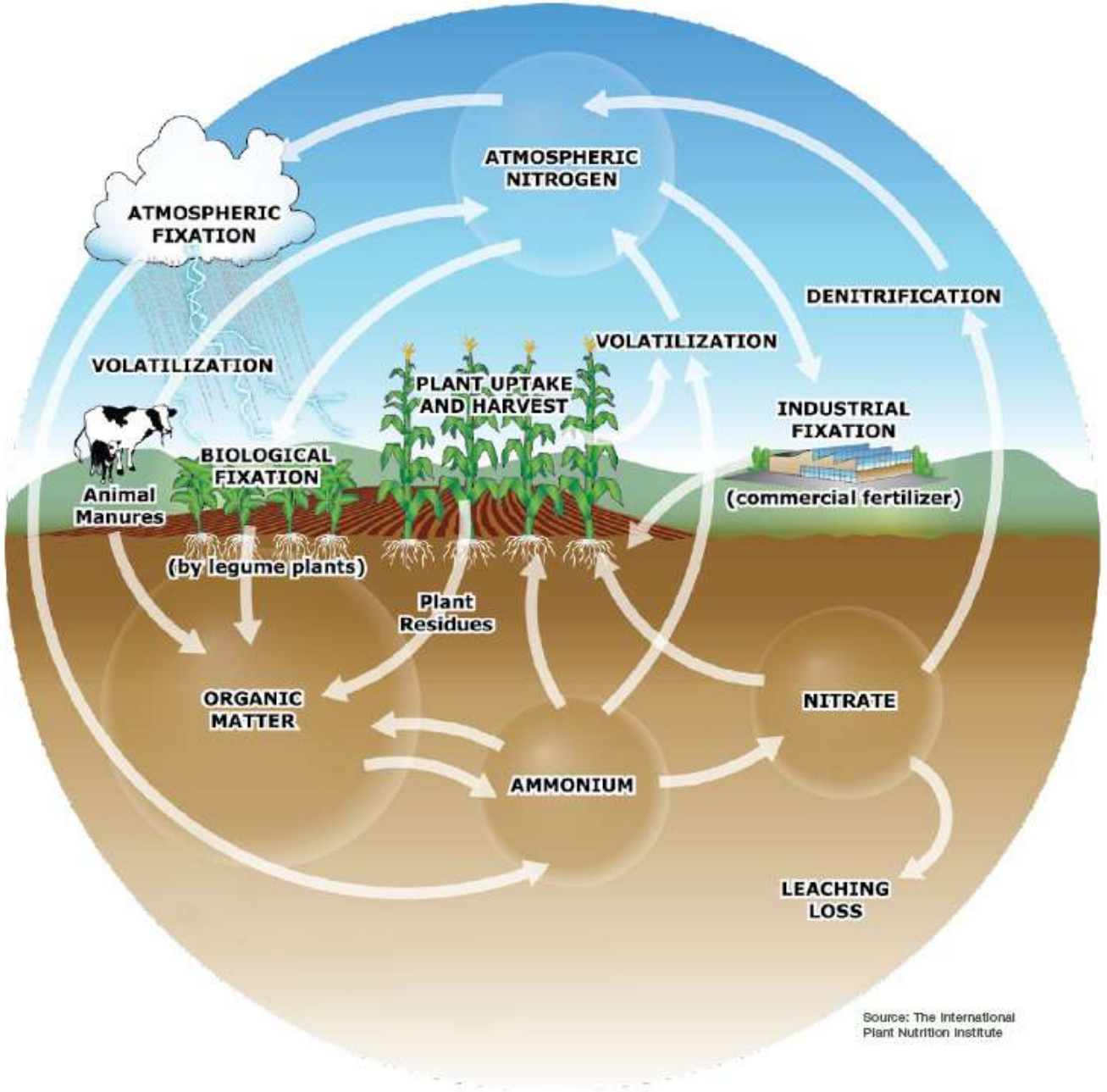
Your SAE must be agriculturally related, created by you, invested time of at least 8 hours, supervised by your Ag Teacher and be part of your grade.

- How does it provide real work situations?
- What careers is it related to?
- How is it part of your career goal?
- List the skills, knowledge and attitudes you need for this career that your SAE might apply to.
- How can you grow, and become more competent each year in the Ag program with this SAE?
- How does your SAE allow for expansion, and/or change?
- Have you kept records of your money, and time?

Cycles in Nature
2 groups/cycle

- Water: Taylor, Zarinna & Breanna; Paulina, Angela, & Carmen
- Carbon: Jason, Avi; Charline; Chris; Nathan
- Nitrogen: Estaban, Isaac, Jenna
- Phosphorus: Viri, Jaiden, Anna
- Oxygen: Tyler, Ronny, Andrik; Carolina Samantha, Daniella

The Nitrogen Cycle



Matter of Fact Notes

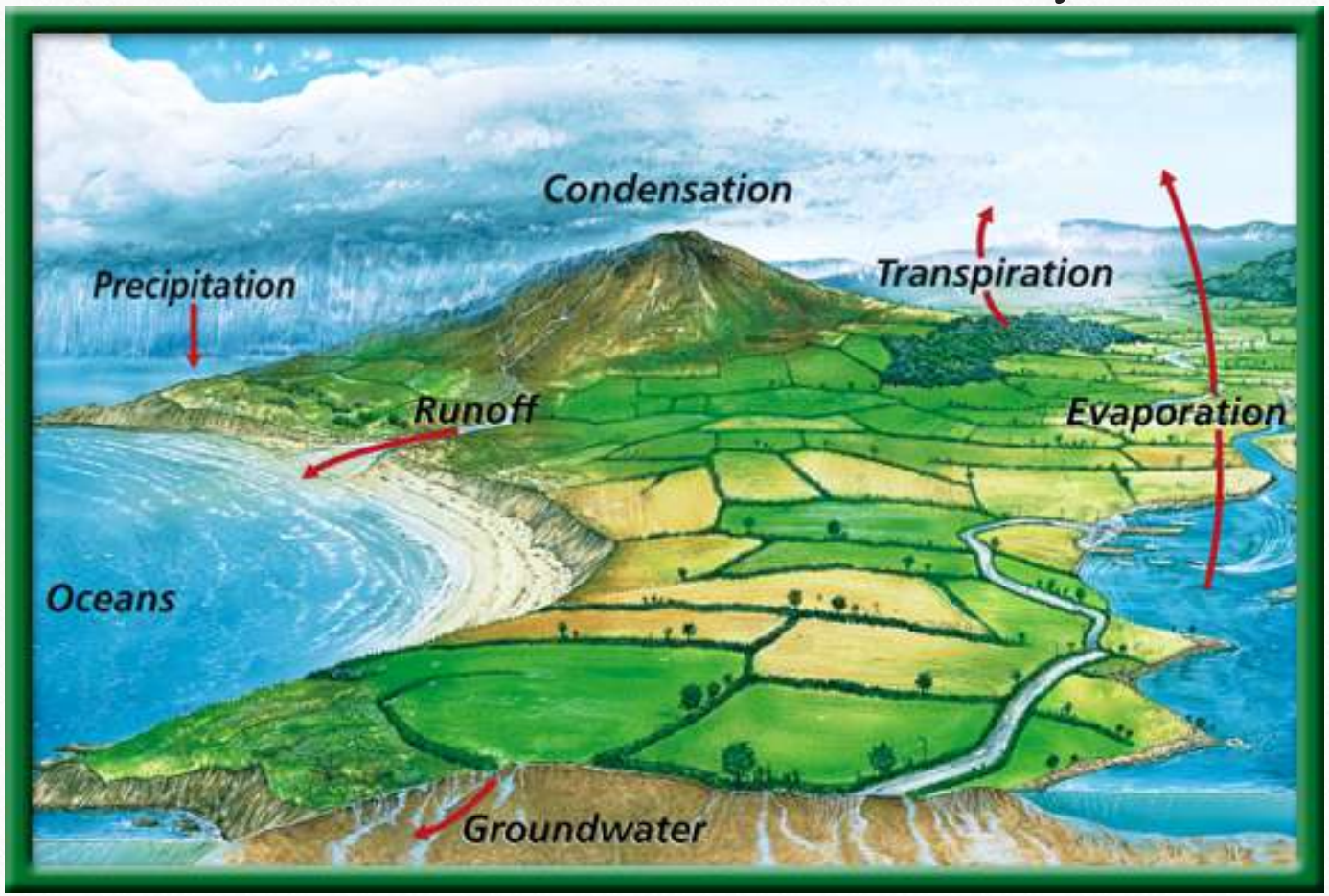
1. Matter, mass, space.
2. Atom -Ex: H, Hydrogen; N, Nitrogen; Na, Sodium
3. Molecule, Substance- Ex. N_2 Nitrogen Gas; H_2 Hydrogen gas; O_2 Oxygen Gas
4. Compound, at least two different, millions.

H_2O water, NH_4^+ Ammonium, NO_3^- Nitrate

5. Oxygen gas, O_2 & Nitrogen Gas N_2 are not considered compounds because they are each composed of the same element. Water, H_2O, is a compound because it is composed of more than one element.

6. Chemical formula, elements, subscripts. Ex: $C_6H_{12}O_6$ - Glucose

The Water Cycle P.53 BB



Be able to explain at least 5 parts of the cycle.

Does water leave the planet?

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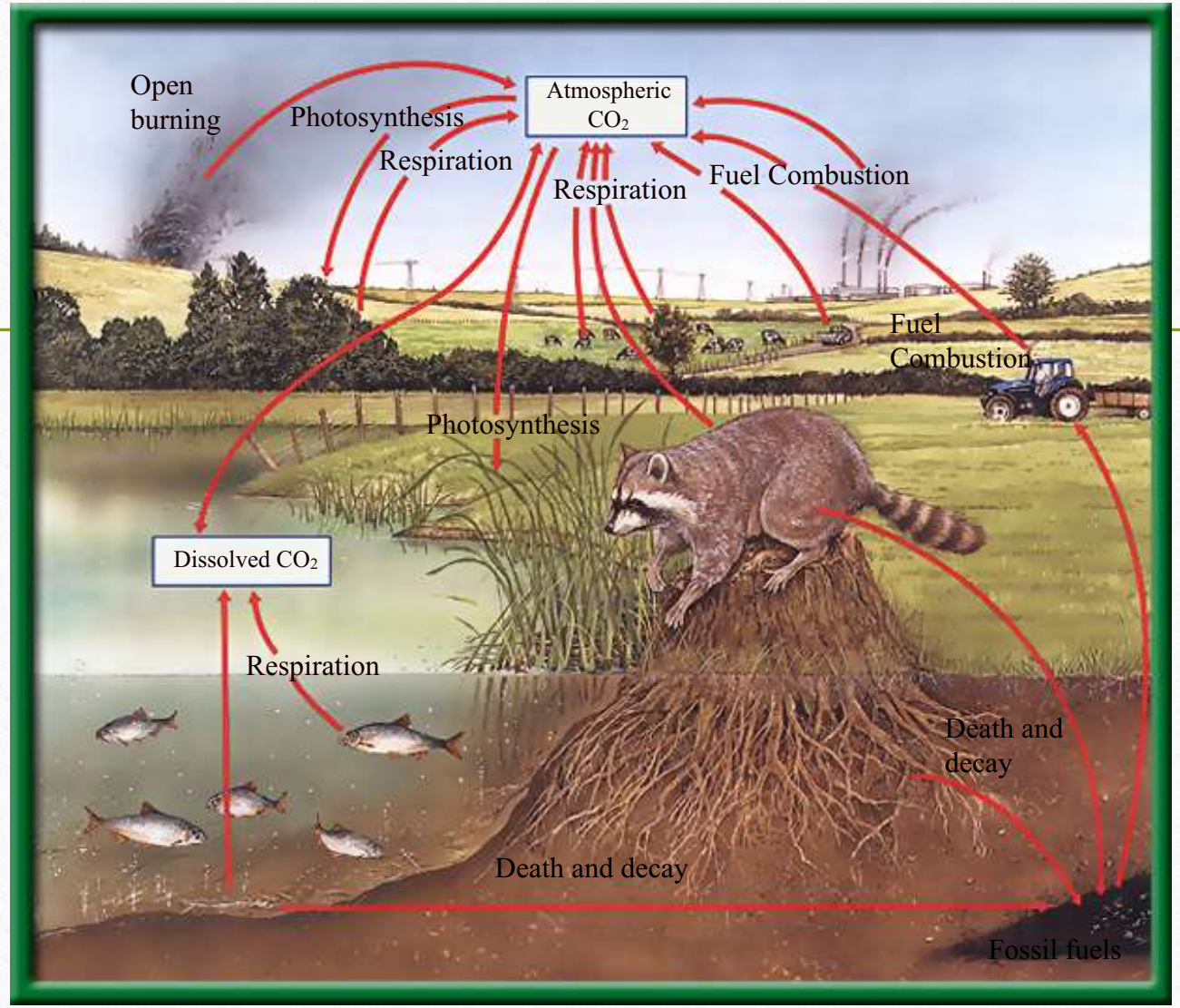
RESOURCES

The Carbon Cycle

What is the role of the autotroph?

What is a carbon sink?

What is the role of the heterotroph?



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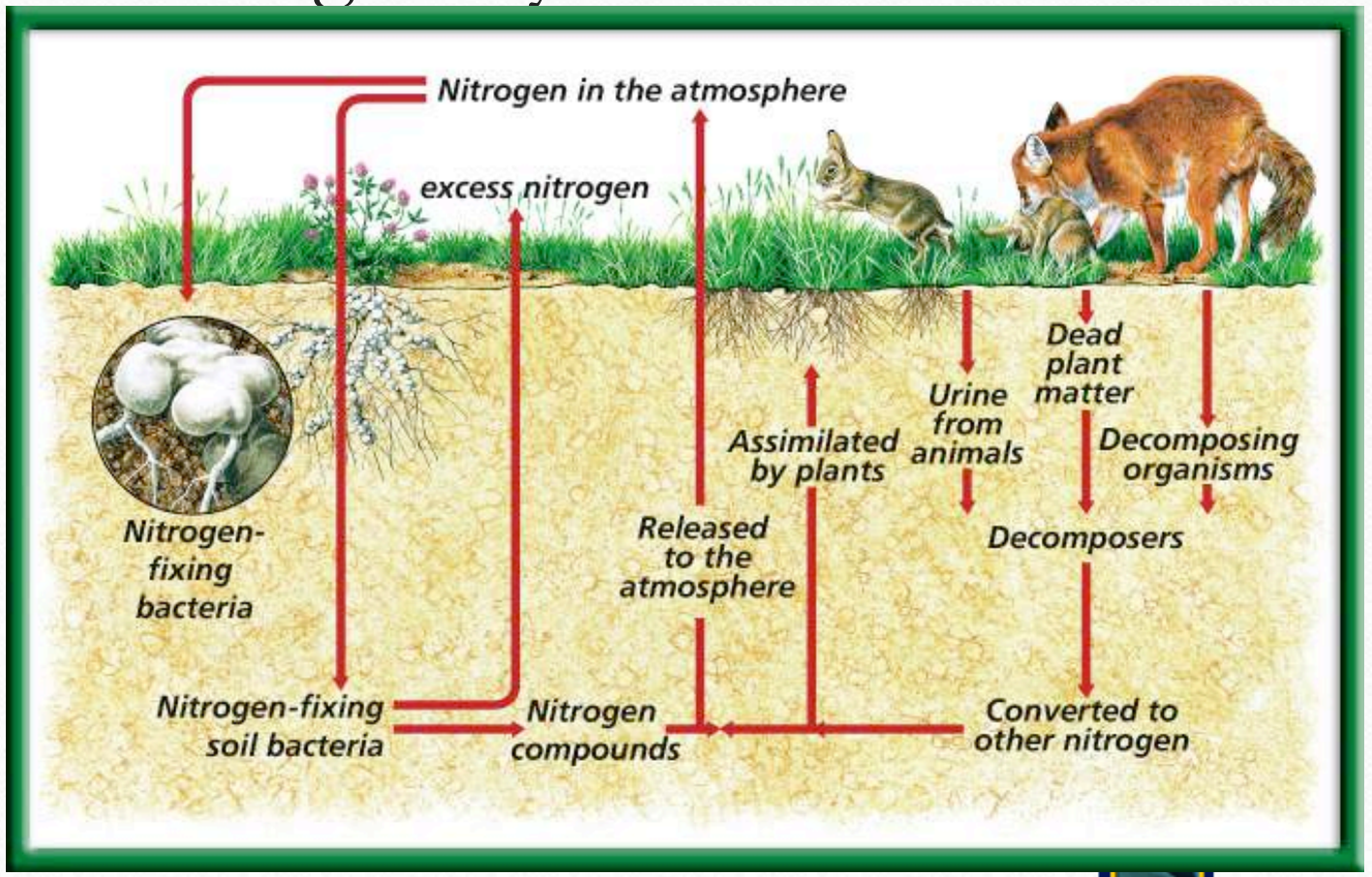
RESOURCES

The Nitrogen Cycle

What organism is essential for this cycle?



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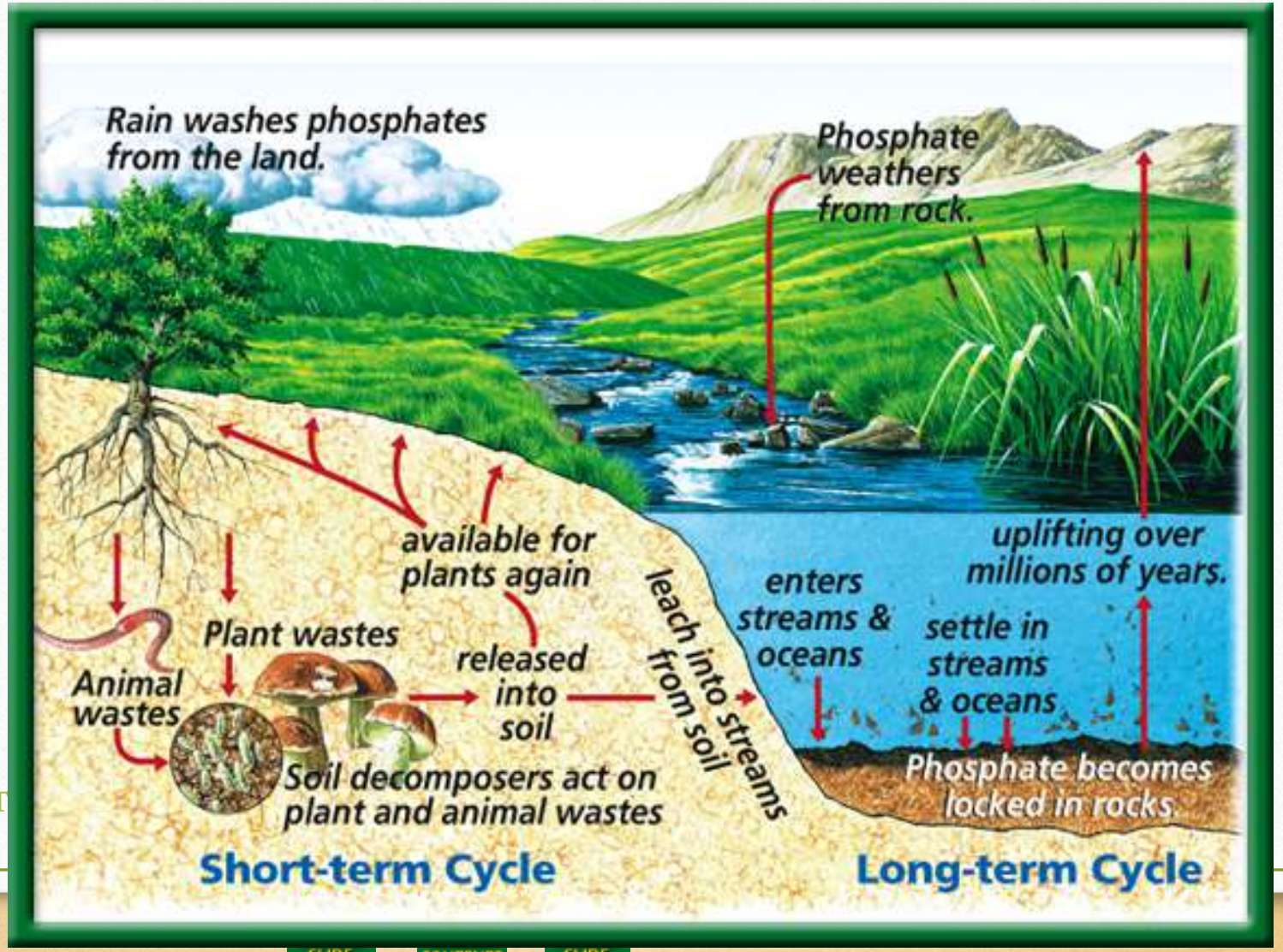
The Phosphorous Cycle

What role do humans play in these cycles?



Cycles in Nature: Conclusion Questions

1. Summarize your cycle in at least 5 sentences.
2. Do you think the element (compound) is ever lost or gained? Explain.
3. What is the role of an autotroph in the your cycle? A heterotroph? Explain.
4. What do you think is the most important "player" in the your cycle? Why?
5. How do humans play a role in all of the cycles? Do we help or hinder them? Explain.
6. Why are all of these processes (Water, Carbon, Oxygen, Phosphorus and Nitrogen cycles) called cycles? Why are they not shown in a pyramid? Explain.

Water is lost to the abiotic parts of the biosphere from the biotic parts by the process of:

- Infiltration
- Transpiration
- Photosynthesis
- Precipitation

•Transpiration

Cougars are predators that often eat weakened or diseased animals. This is a description of the __ of cougars.

- Ecosystem
- Habitat
- Niche
- Population

•Niche
Where is the Biosphere?

- Earth's Crust
- Upper Mantle
- Core
- Mantle

•Earth's crust

A relationship between cats and mice could best be described as:

- Consumer – Producer
- Parasite – Host
- Scavenger – Carrion
- Predator - Prey

•Predator – Prey

If coyotes eat a cat that eats a mouse that eats grass, the coyote would be:

- Decomposers
- Second – order consumers
- Third – order consumers
- Herbivores

Third- order Consumer

A pod of Killer whales (Orca's) is known as:

- Biosphere
- Population
- Ecosystem
- Community

•Population

Draw an Energy Pyramid including grasses, flowers, grasshoppers, birds, and a fox.

~~Which level has the smallest number of organisms?~~

- Grass
- Grasshoppers
- Birds
- Fox

Agriculture & Cycle in Nature Project
Present 1 minute about an aspect of your Cycle in Nature & why it is important to Agriculture

- Include a diagram/picture.
- Show/Explain the processes of the cycle.
- Choose one process of your cycle and show how Symbiosis (Competition, Mutualism, Parasitism, and Commensalism) is a part of your cycle.
- Demonstrate how Agriculture has been impacted from this cycle or how the cycle in agriculture will impact then Environment.

How Wolves Change Rivers

- The need for Keystone Species in ecosystems p.33 NB NOTES

Theaet.com

- Profile
- Manage your Resume Information
- Reference:

  Mrs. McAllister

  Ag/ FFA Teacher

  Bryte Career and College Training

  637 Todhunter Ave.

  West Sacramento, Ca 95605

  (916) 375 - 7901

Profile

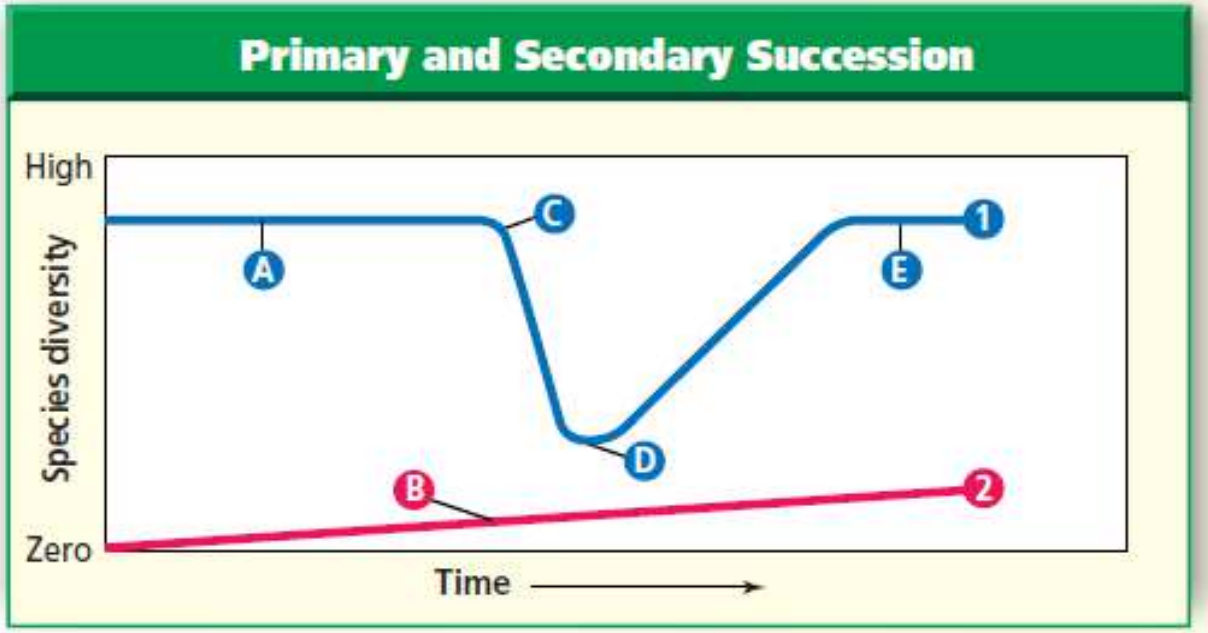
- Your Activities
  - Experience Manager (SAE)
    - Add New
- Fill out your experience
- Pencil

Journal

Classroom Experience

Write about what you have learned in class/ activities.

Problem Solving Lab 3.1 P. 33 NB P. 68 BB



1.Line 2 is primary succession because it begins with no species.
Line 1 is Secondary Succession because it has some existing species, also it has a drop from a climax community.

2. C = Climax Community they exist before a disturbance
D – is Pioneer Species have low species diversity.

3. A sudden, disruptive event such as a fire followed by a community recovery.

Importance to nature

#1. Biodiversity is the variety of life or the different types of species

- Living things are interdependent.
  - Living things can be niches for other living things.
  - Populations are adapted to live together in communities.

#2. Biodiversity brings stability

- Biodiversity can bring stability to an ecosystem.
- A pest could easily destroy all the corn in a farmer's field, but it would be far more difficult for a single type of insect or disease to destroy all individuals of a plant species in a rain forest.
- Ecosystems are stable if their biodiversity is maintained.

Cycles of Nature Posters

- 1 – 3 people may work on the Poster
- Draw the Carbon, Water or Nitrogen Cycle
- Answer the following questions for your poster.
  - How does Carbon, Water or Nitrogen return to the Biotic parts of the Ecosystem?
  - The burning (CO_2), evaporation (H_2O)or leaching (N_2) of each of these returns them where?

#3. Global Warming – Climate Change

- Rise in CO2 concentration
- Increase melting of Polar ice caps
- Increase average temperature of ocean
- Increase in severe weather events

CH 4 Population Biology

Critical Thinking – the Effect of Predators on Prey Populations p.37NB

1. a. The number of deer increased from about 7000 to about 100,000.

   b. With fewer predators, more young deer survived to become breeding adults. The lack of predators may have make it possible for older and less fit deer to survive longer.

2. a. From 100,000 to 40,000, or 60%

   b. From 100,000 to 20,000, or 80%

   c. From 100,000 to 10,000, or 90%

CH 4 Population Biology
Critical Thinking – the Effect of Predators on Prey Populations

3. Predators no longer kept the deer population within the carrying capacity of the land. By the early 1920's, most of the food available in the area had been consumed, so many deer starved.
4. The rapidly increasing deer population had consumed most of the food supply. As a result, the land's carrying capacity was reduced.

The Greenhouse Effect on Natural Systems p. 39 NB

- Get into groups of four.
- Get a White Board, Expo Marker & Eraser
- Read the assigned article and take notes on the board to present to the class.
- Students will take notes on page 79 NB

Group 1 - Climate Change in the Golden State Page 2 - 4

Group 2 – Climate Change in the Golden State Page 4 - 6

Group 3 – Water Vapor: A GHG p.7-8

Group 4 – Carbon Dioxide: A GHG p. 9-10

Group 5 – Methane: A GHG p. 11-12

Group 6 – Nitrous Oxide: A GHG p. 13 - 14

Group 7 – What Can Ice Tell Us About the Past Climate? P.15

Group 8 – California's Global Warming Solutions of 2006 p.16 - 20

Climate Change in the Golden State

- Measured temperature wind patterns
- Greenhouse gases impact the climate
- Earth's Climate system: Biosphere, Atmosphere, Geosphere, Hydrosphere
- Natural
- Sierra snowpack is melting earlier
- More Air pollution & health effects
- Record warmer temperatures
- Evidence - Ice ages & Warming, Fossil Record

Water Vapor – A GHG

- Water has a bigger influence on Earth's climate than any other greenhouse gas.
- Sources: Evaporation from water sources.
- Sinks: Oceans, Ice sheets, claciers, Aquifers, Soil

Carbon Dioxide – a GHG

- Soils, Forests and Ocean are sinks for Carbon dioxide.
- Sources: Respiration, Forest Fires, Volcanoes, Decomposition, Fossil Fuels
- Sinks: Fossil Fuel Deposits, Oceans, Forests, Wetlands, Photosynthesis

Methane – a GHG

- Sources: Atmospheric, Produced by cattle, Released during decomposition
- Landfill release Methane, we use it for energy
- Fossil fuel, stored in the Earth for millions of years
- Sinks: Permafrost peat bogs, wetlands, soils

Nitrous Oxide: A GHG

- Sources: Atmosphere, Nitrogen based fertilizer, Soil management – Denitrification by Bacteria, decomposition
- 300 x greater “global warming potential that CO2”
- Sink: Photolytic reactions in the stratosphere

CA Global Warming Solutions Act of 2006

- Greenhouse gases increasing in the atm.
- Increase in .5 Degrees C in one century.
- 1990's was the hottest decade in a thousand years.

Footprint network

- Video – Global Warming
- How many earth's does it take to support your lifestyle? P 79 NB
- Record the number and give to Mrs. McAllister.
- Concept map – CH 5 slide 231
- Work on study guide.
- Foldable – biodiversity.
- Classtime – work on project?
- Mt. St. Helen's Video slide 41

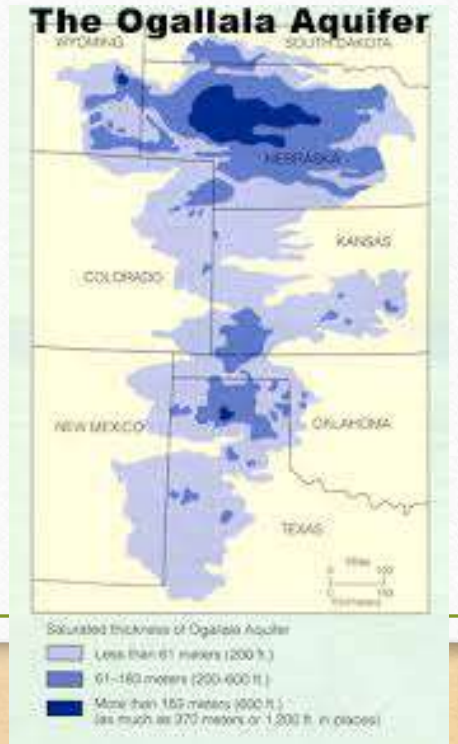
The Greenhouse Effect on Natural Systems p. 79 NB

- Consider how climate has changed in the past and the fact that climate is continuing to change. How could life be different in the future? What are some of the issues people need to consider when examining climate change?
- Use the article you just read and the Graph of the Greenhouse Effect to answer your question.

Here is a picture of America's

Largest Aquifer – underground

Body of water.

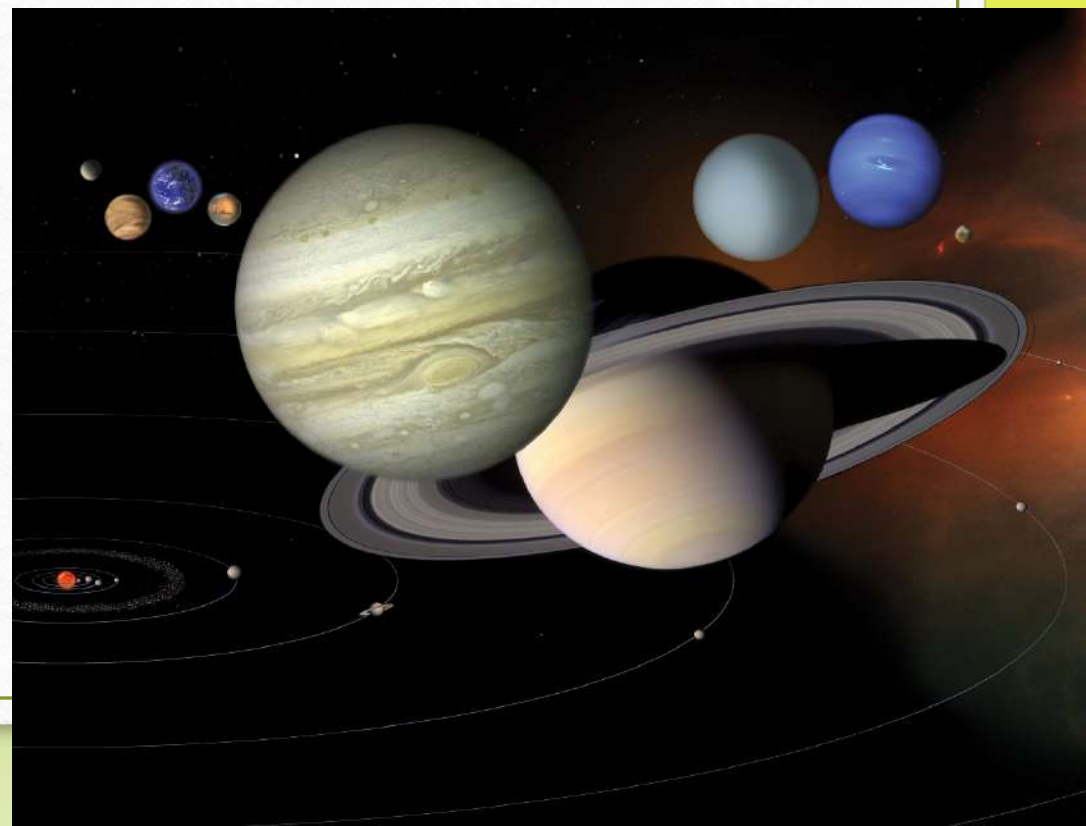


9/12 Where do planets come from?

Obj. TSW learn about the formation of our solar system, our planet and specifically Earth. P. 42 NB

1. Where does most of the energy come from in our solar system?
2. What planets make up our solar system?
3. How old is our Solar System? Earth? How do we know?

Video Earth



Garden Planning sheet

- Make sure to pick tomatoes! Quality – inspect them. Give to Ms. Sutton
- Refresh all the flowers-get Mr. Smith's flask. Longer stems please, more water. Deliver
- Take out garden bed close to culinary doors, cut up greens for compost. Cut Basil
- Add water to 3rd compost bin, push down, add new compost.
- Finish Tower Gardens. Add all pots and reseed, add water and label. Zoe
- Take pictures of students working and of your garden to upload onto Theaet.com Record book. Arina?
- Plant the best 8 trees and place along the east side of garden beds.

Nominations for FFA Officers
1 – 3 minute speech

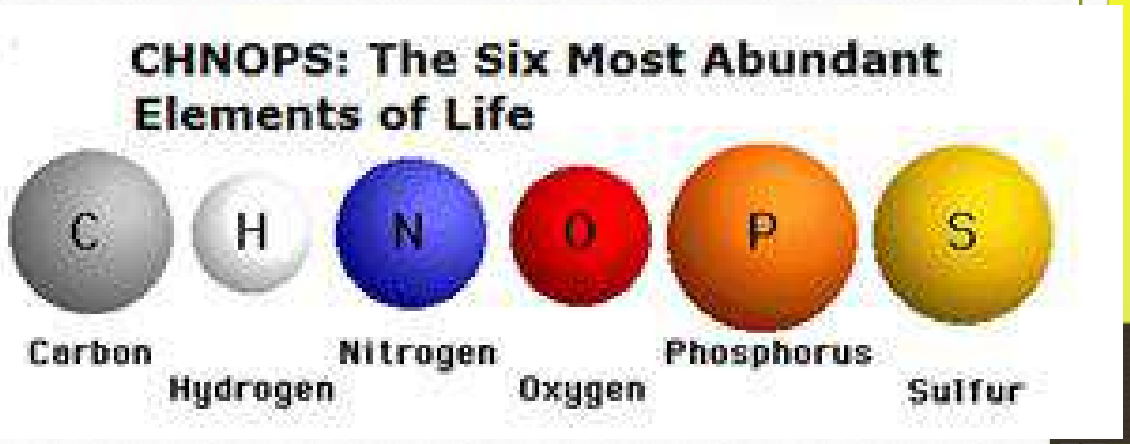
- **President:** Andrik, Melina
- **Vice President**: Zoe
- **Secretary:** Isaac
- **Treasurer:** Avi, Estaban
- **Reporter:** Jason, Arina
- **Sentinel:**
- Chaplain:
- Parliamentarian
- Historian: Arina

Research Activity P. 41 NB

- https://solarsystem.nasa.gov/planets/solarsystem
- If you had to be one of our planets in our solar system, which one would you be and why?
- List 5 facts about it

9/13 Building Molecules CH 6.3

Obj. TSW identify the macromolecules living things are made of and describe their properties. P. 44NB

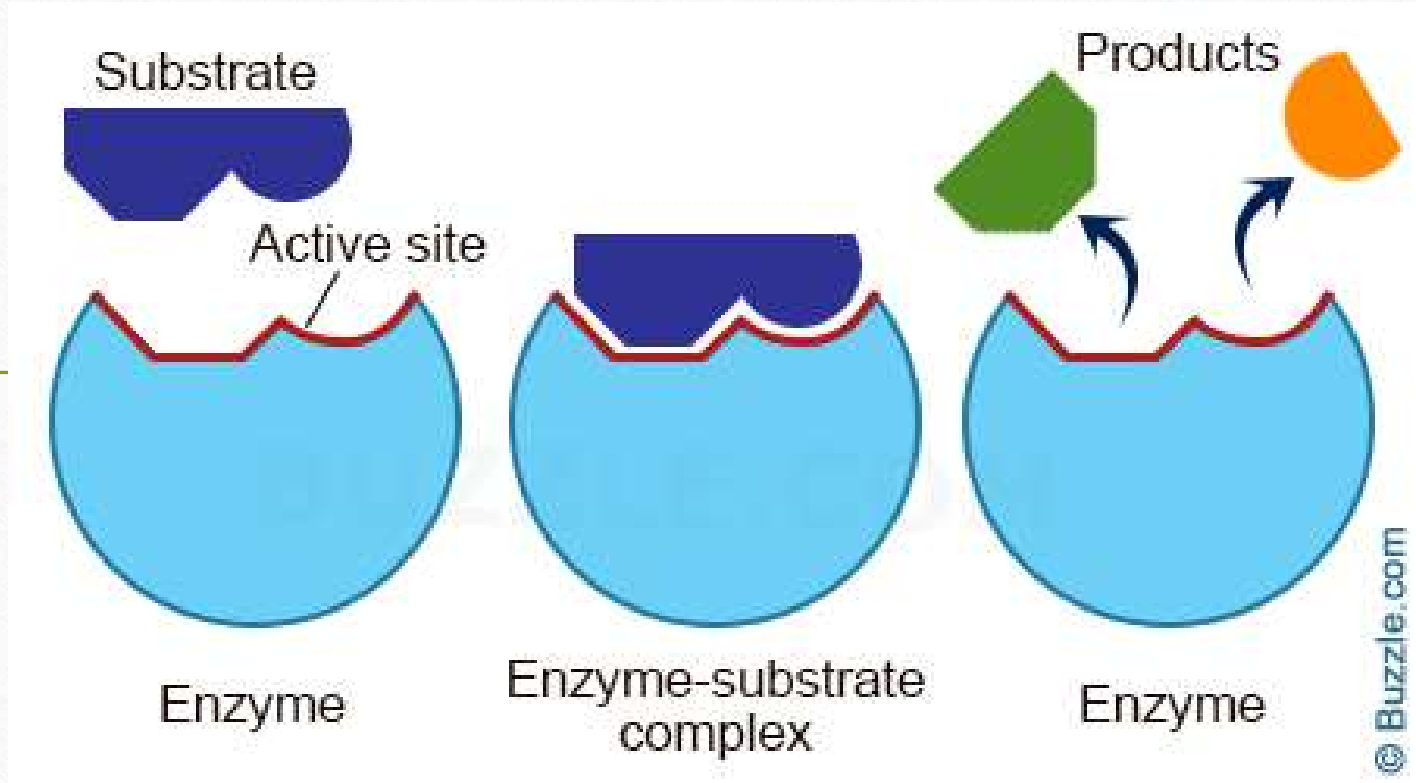


Organic Compounds

Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus and Sulfur are found in all living things

"CHONPS"

1. What are the 6 main elements that make up the 4 macromolecules?
2. What is an Enzyme?
3. What three environmental factors determine the enzymes function?



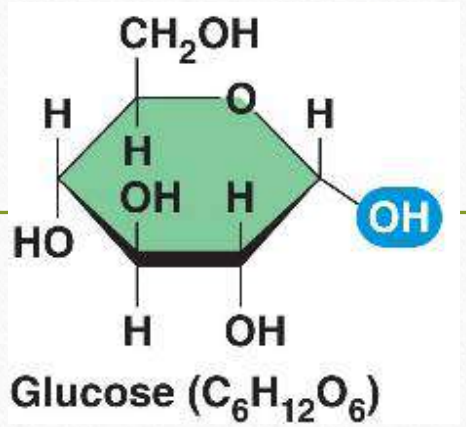
1. Temperature, pH, Amount of substrate or enzyme, Ionic Conditions (Salt)

Build a Monosaccharide!

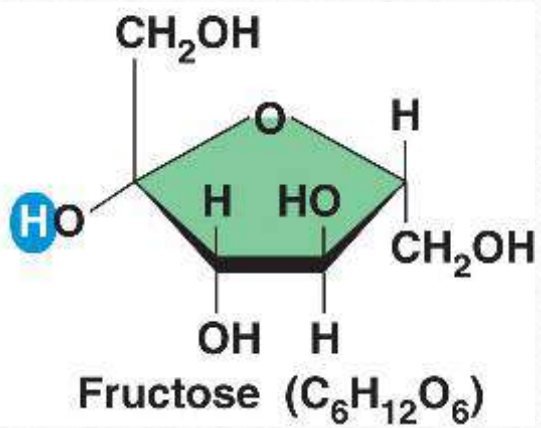
Show me a correct monosaccharide for extra credit!

Some Helpful Hints:

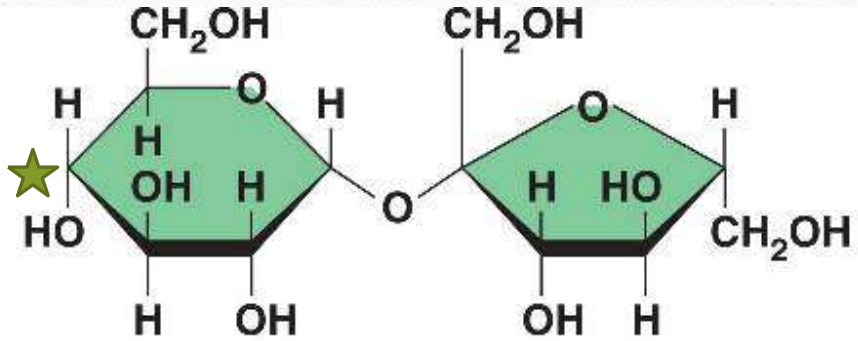
- **Black** atoms are **Carbon** (**C**).
  - Carbon always needs to be bonded to 4 other atoms.
- White atoms are Hydrogen (H).
  - Hydrogen only bonds to 1 atom.
- Red atoms are Oxygen (O)
  - Oxygen bonds to 2 atoms.
- Every unidentified **corner** is a **Carbon** atom.
  - For example, look at the ★ which identifies the corner on Sucrose. That is a carbon atom.



Glucose ($C_6H_{12}O_6$)

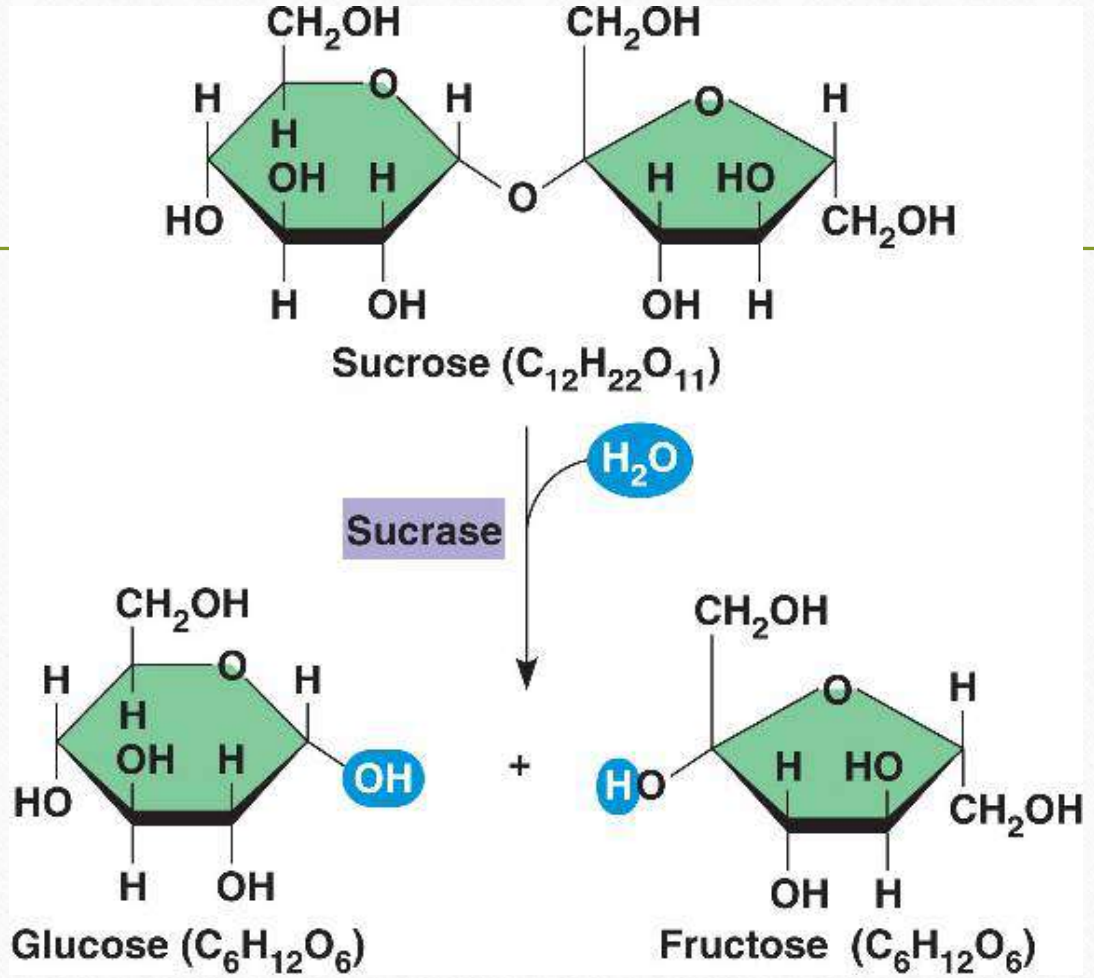


Fructose ($C_6H_{12}O_6$)



Sucrose ($C_{12}H_{22}O_{11}$)

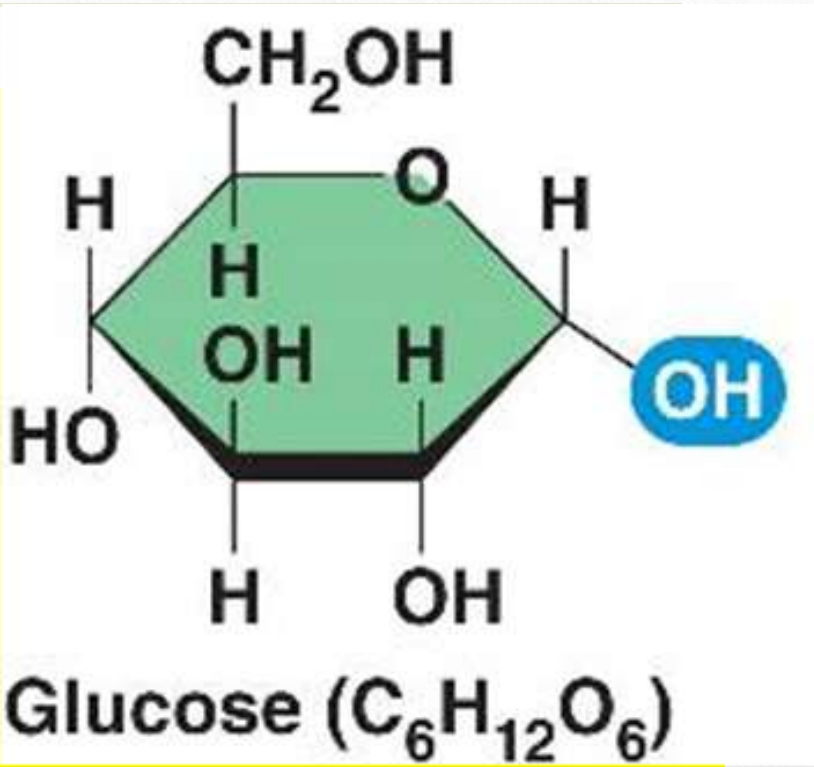
Enzymatic Reaction of Sucrase on Sucrose



Using your Cycles in Nature, build the molecule that is most evident for your cycle:

H2O, CO2, NH3, NO, NO2, NO3, O2, CH4, C6H12O6

- Carbon = Black
- Oxygen = Red
- Hydrogen = White
- Nitrogen = Blue

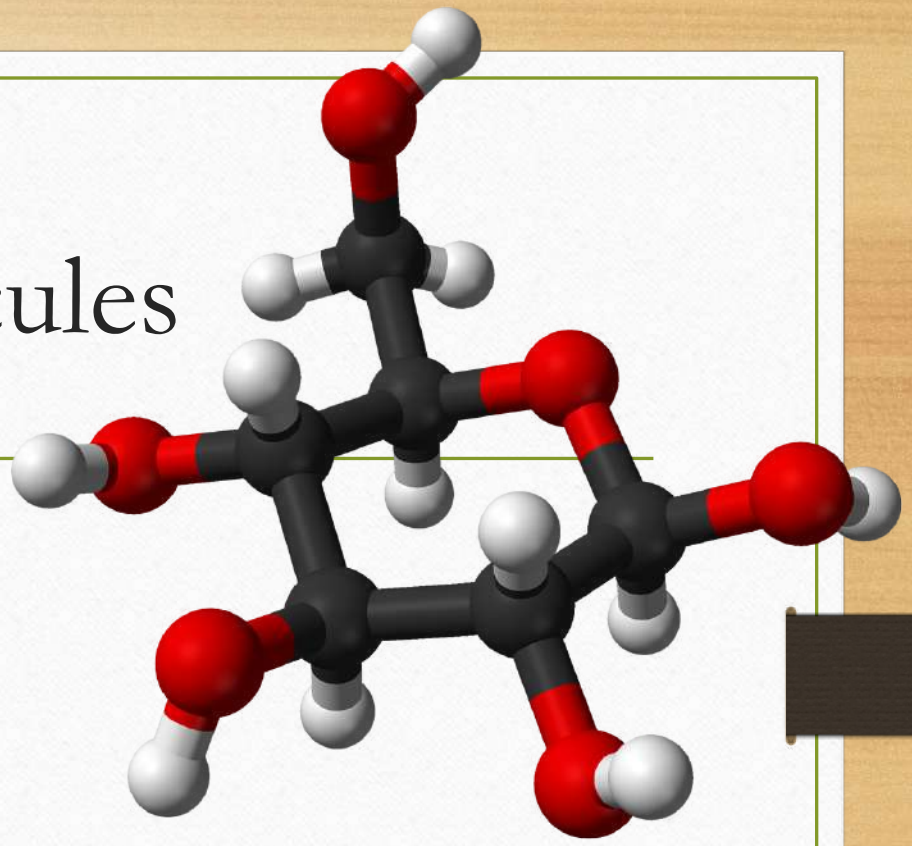


Google: Molecule Building
Unit 2 Energy

Theaet.com

- What is your SAE type?
- Describe your SAE idea on the blank space on the paper P. 43 NB
- Click on Experience Manager in the Profile section of AET.
  - ADD NEW
  - Add the project name
  - The level
  - The Type of SAE
  - Your experience

Elements & Molecules



- Carbon
- Hydrogen
- Oxygen
- Nitrogen

- Build O_2, CO_2, H_2O, $C_6H_{12}O_6$, Sucrose, N_2, NH3, NO2, NO3

The Day WHO Parachuted Cats into Borneo

- Place the events in chronological order
- Aerial view of Borneo:

Parachuting Cats in Borneo

p. 61 NB

Biomagnification

- Human activity with the best of intentions can have untended consequences.
- Map of Borneo

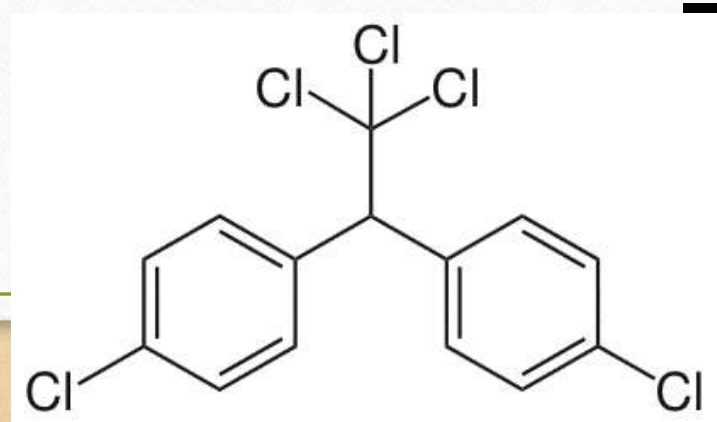
The Day WHO Parachuted Cats into Borneo

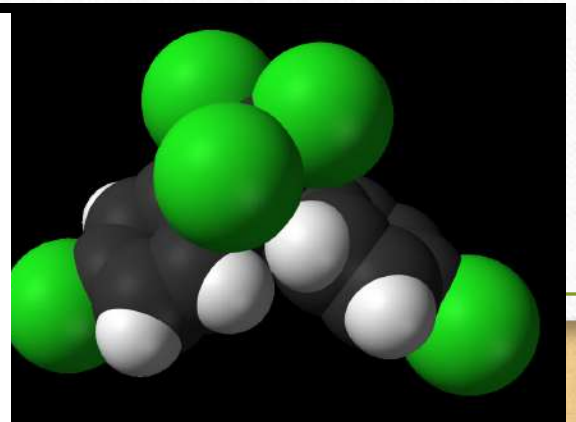
Some time ago, World Health Organization sent supplies of DDT to Borneo to Fight mosquitoes that spread malaria among the people. The mosquitoes were quickly wiped out. But billions of roaches moved into the villages and they simply stored the DDT in their bodies. One kind of animal that fed on the roaches was a small lizard. When these lizards ate the roaches, they also eat a lot of DDT. Instead of killing them, DDT only slowed them down. This made it easier for the cats to catch the lizards, one of their favorite foods. About the same time, people also found that hoards of caterpillars had moved into feed on the roofing materials of their homes. They realized the lizards that previously had kept the caterpillars population under control had been eaten by the cats. And now, all over North Borneo, cats that ate the lizards died from DDT poisoning. Then rats moved in because there were no cats to control their population. With the rats came a new danger, THE Plague,. Officials sent out emergency call for cats. Cats were sent in by airplane and dropped by parachute to control the rats.

Questions for pg. 29

- 1. Explain your thinking process in relation to DDT, biomagnification, and ecosystem connections.
  Dichlorodiphenyltrichloroethane (**DDT**)

- 2. How did one simple change to an ecosystem set off a whole chain of events?
- 3. Give another example of an unintended consequence of human intervention on the Natural World.





Catalase Lab

ml H2O2	Person 1	Person 2	Person 3	Person 4	Person 5
5	100				
6					
7		120			
8			120		
9				170	
10					140

Catalase Lab P. 27

- 1 flask / 2 people
- GLX
- Pressure Probe
- Yeast – 1 tsp.
- Hydrogen Peroxide 5ml
- Swirl
- Make observations.
- Write a summary paragraph about the function of enzymes with a picture of a substrate & enzyme & active site. What factors allow for the enzyme to function? What volume of H_2O_2 did Catalase work the best? Why does the enzyme speed up chemical reactions? Enzymes can be used again & again (Catalytic), how is this important in chemical reactions? At what volumes (ml) did the Catalase work the best? Write the chemical equation.

AXES Paragraph – Catalase Lab

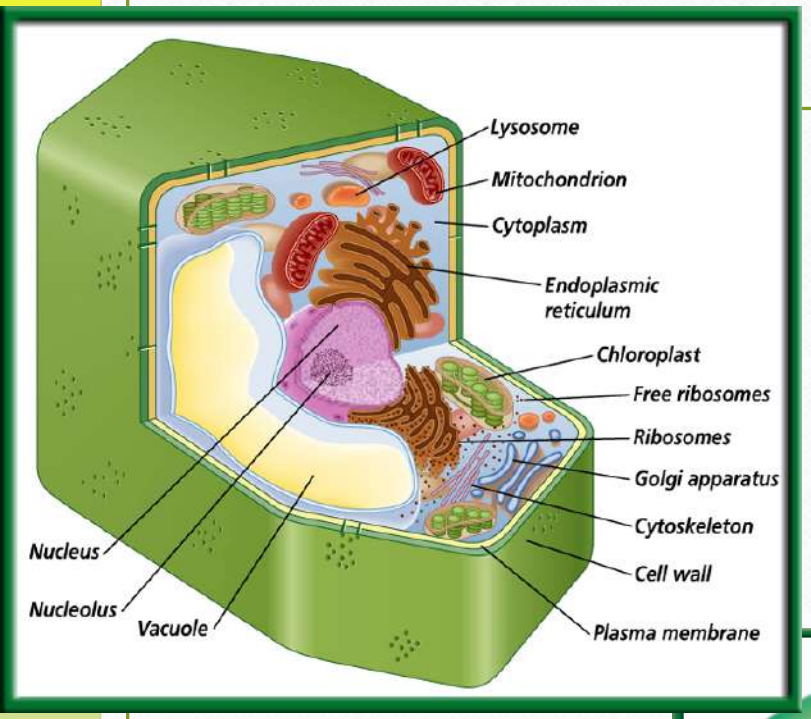
- Assertion What is Exothermic Reaction? Use vocabulary.
- eXample Discuss an example of an enzyme. Include details from the lab.
- Explanation Describe the function of the enzyme, and factors that influence it.
- Significance Why are enzymes important for us?

Macromolecules

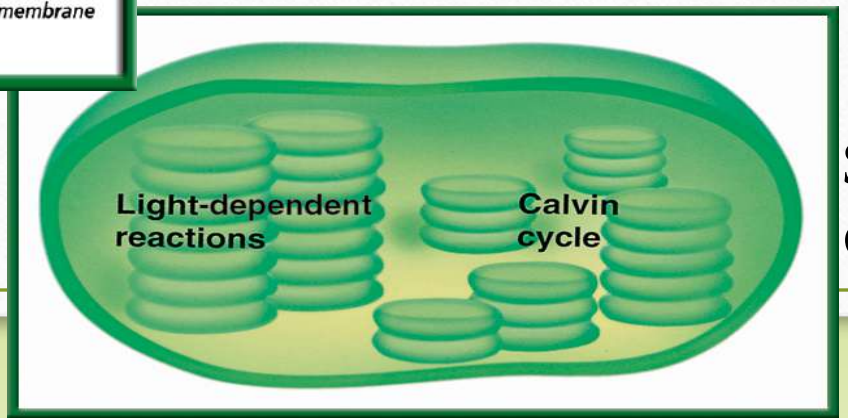
Protein	Lipids	Carbohydrates	Nucleic Acids

9/14 **Photosynthesis: Trapping the Sun's Energy** 9.2

Obj. TSW demonstrate how usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar by completing the warm up and participating in a photosynthesis class activity. P.46 NB

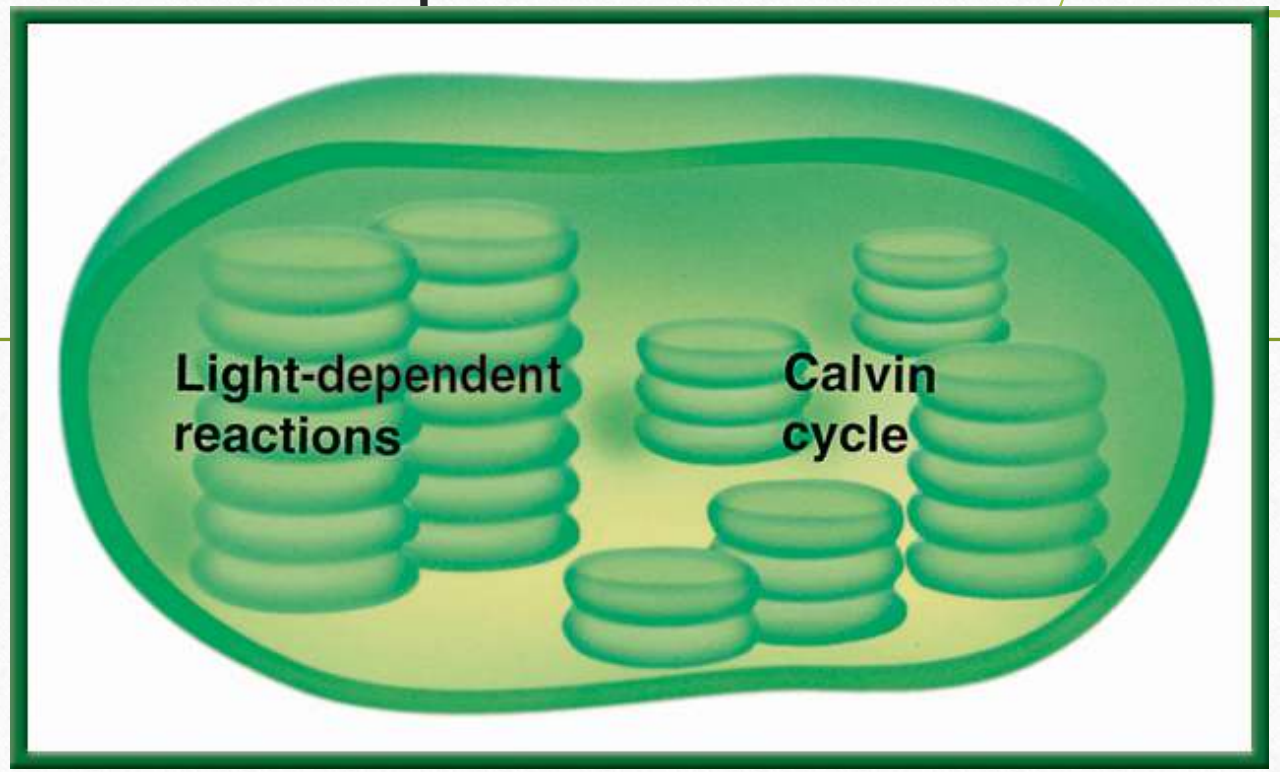


1. What organelle in the plant cell traps the suns energy, what is that process called?
2. Write and memorize the equation for photosynthesis.
3. What are the Reactants and the Products for Photosynthesis, what is the catalyst for this process?



Show Photosynthesis video
Osmosis AXES

#1 Chloroplast - Photosynthesis

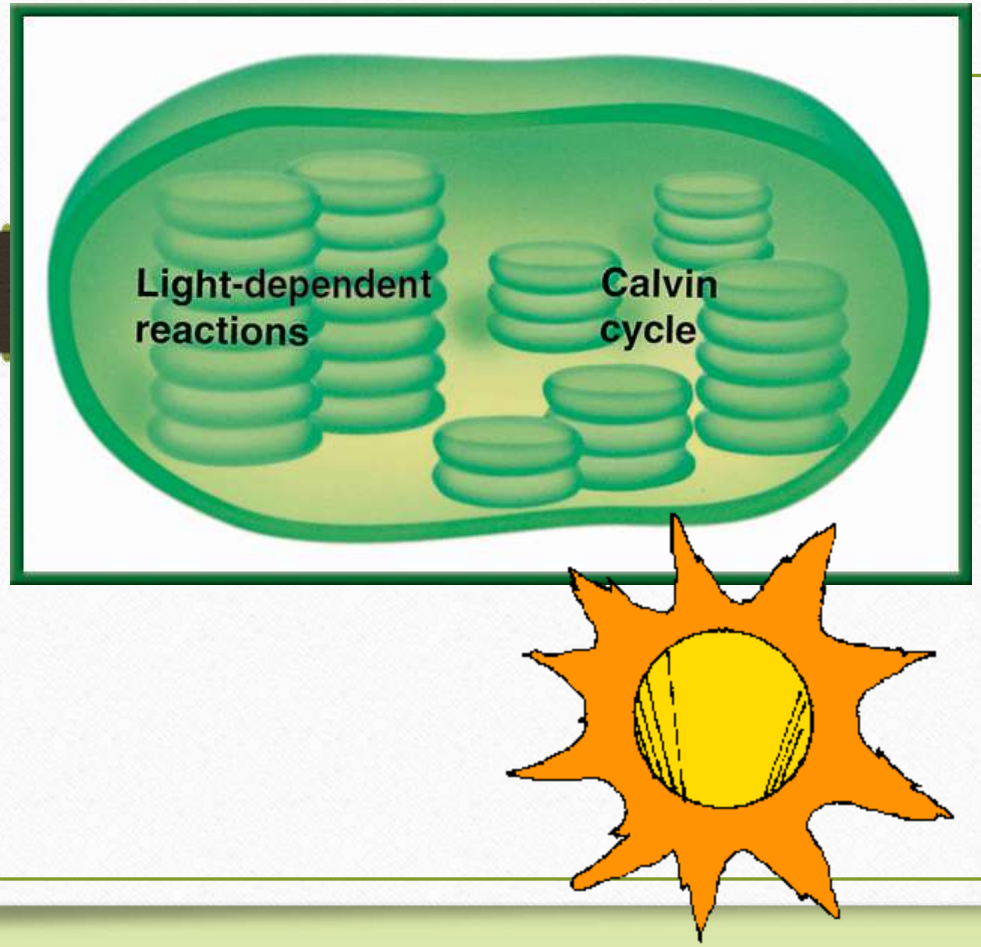


#2. $6CO_2 + 6H_20 \rightarrow 6O_2 + C_6H_{12}O_6$

#3. Reactants Products

9/15 Light-Dependent & Light-Independent Reactions CH 9.2

Obj. TSW demonstrate how light energy is captured by chloroplasts and converted to chemical energy (glucose) from CO_2 and H_20 by doing a flow chart. 48 NB



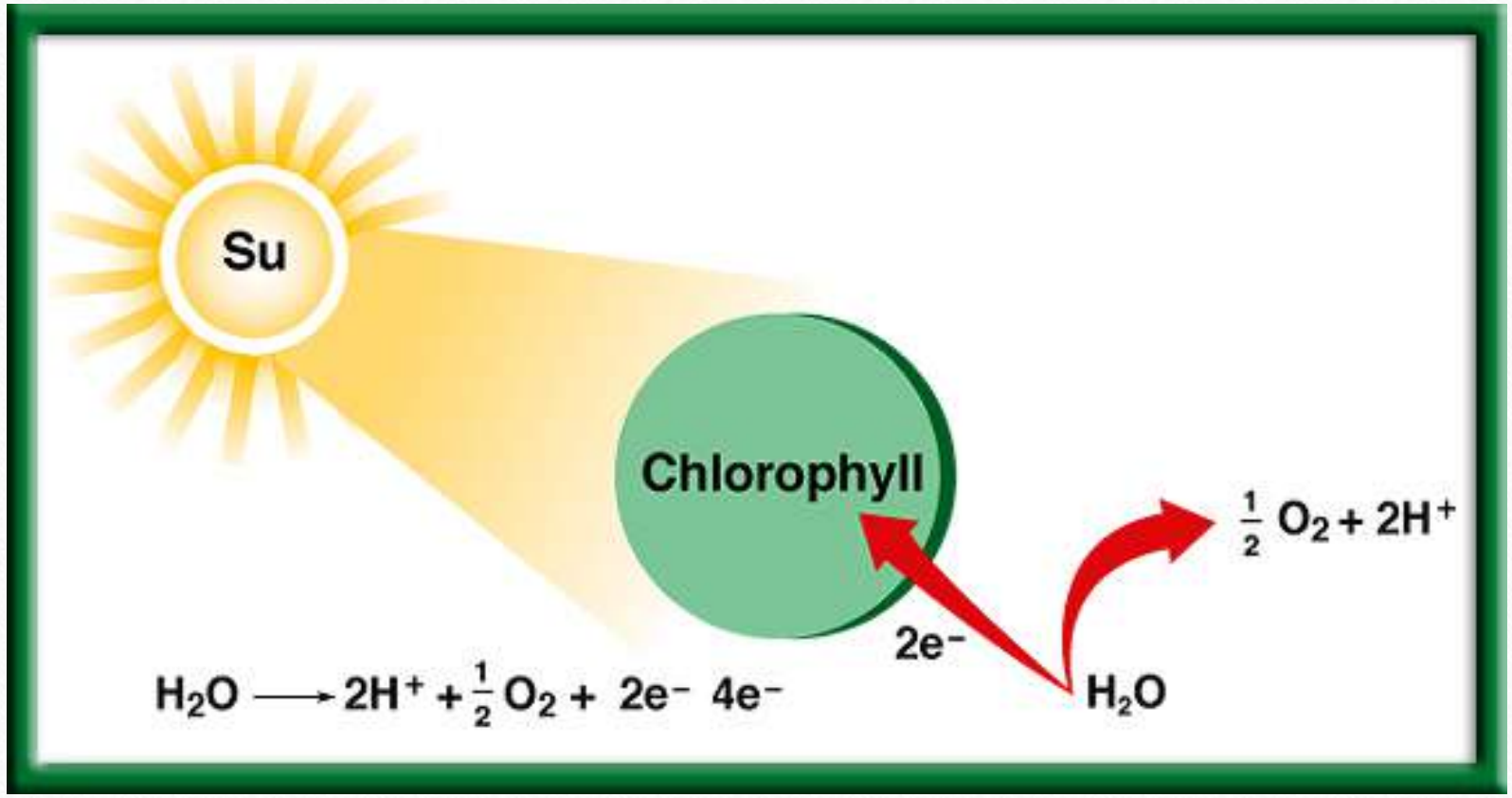
1. Why is **Photolysis** important?
2. Compare and Contrast **Light Dependent** reactions and **Light Independent** reactions.
3. Where does the **Calvin Cycle** happen in the cell and what does it produce?

Study guide is due tomorrow! P. 59NB

Read CH 6.3, 7, 8.1 & 9

Show Videos

#1. Photolysis – Breaks up H_2O (Water) to release O, that makes O_2.



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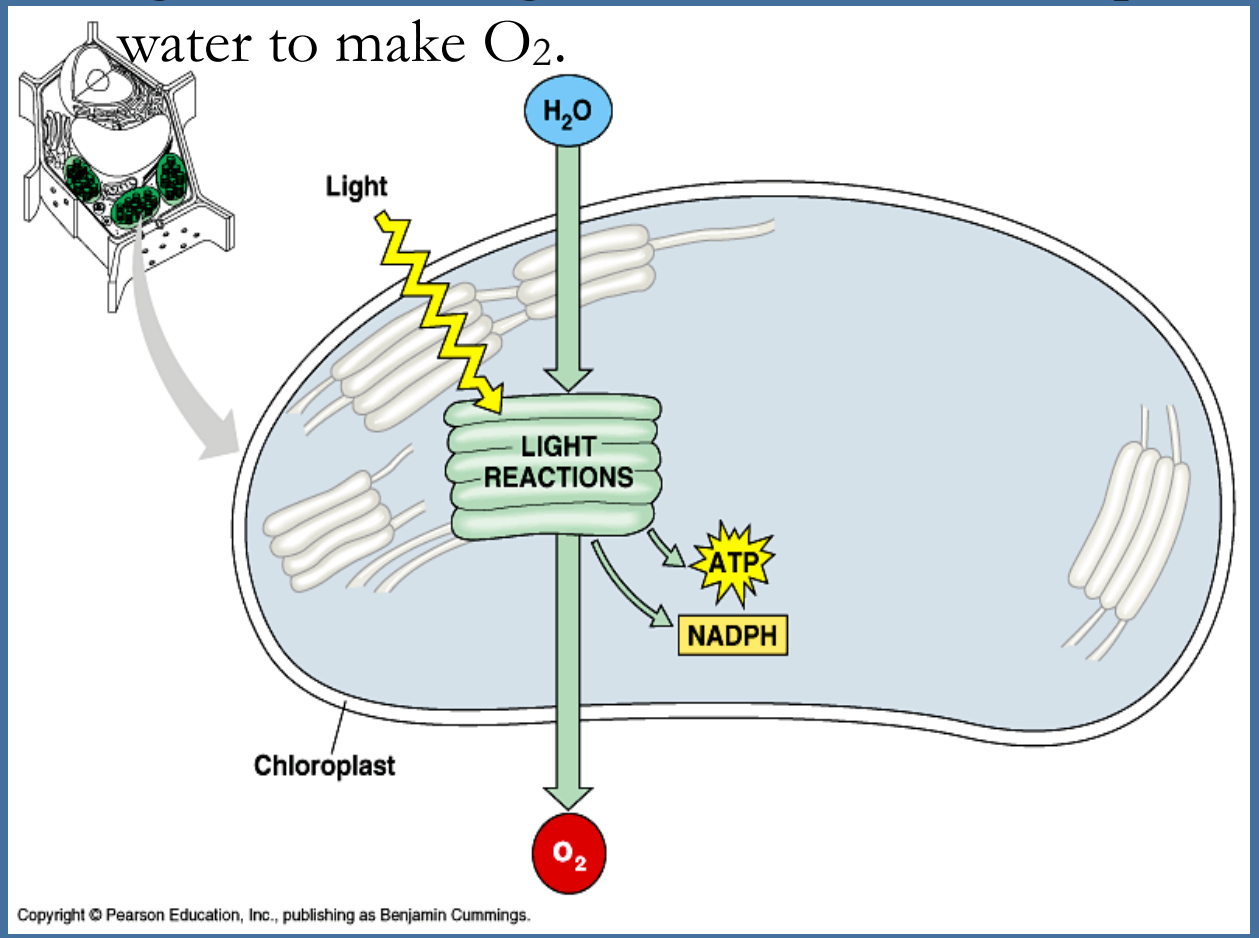
Restoring electrons

- The oxygen produced by photolysis is released into the air and supplies the oxygen we breathe.
- The electrons are returned to chlorophyll.
- The hydrogen ions are pumped into the thylakoid, where they accumulate in high concentration.

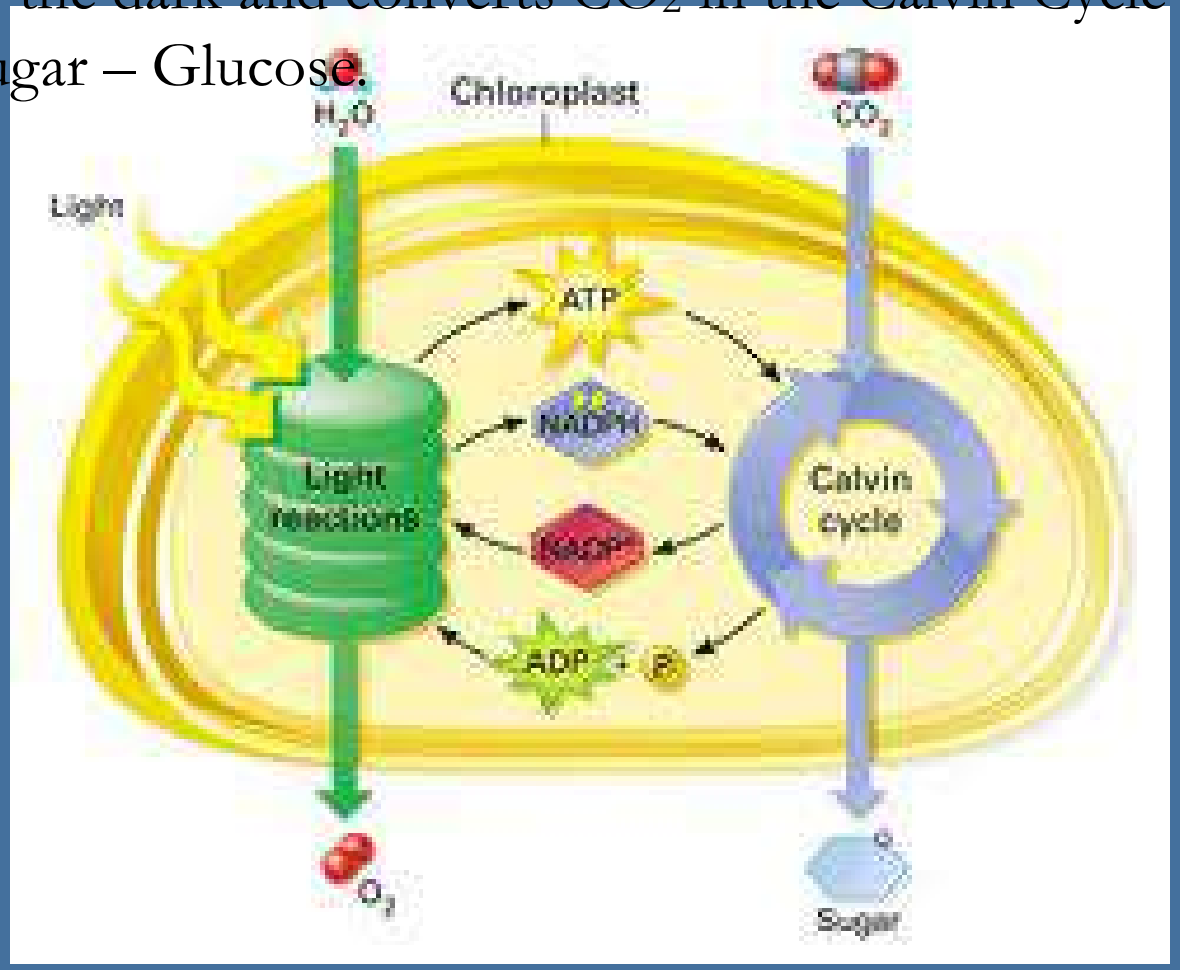
#2. How does light energy become chemical energy?

Light Dependent Reaction happens in the light when the light hits the Grana and splits water to make O_2.



#2. How does light energy become chemical energy?

Light Independent Reaction happens in the light or the dark and converts CO_2 in the Calvin Cycle to Sugar – Glucose.



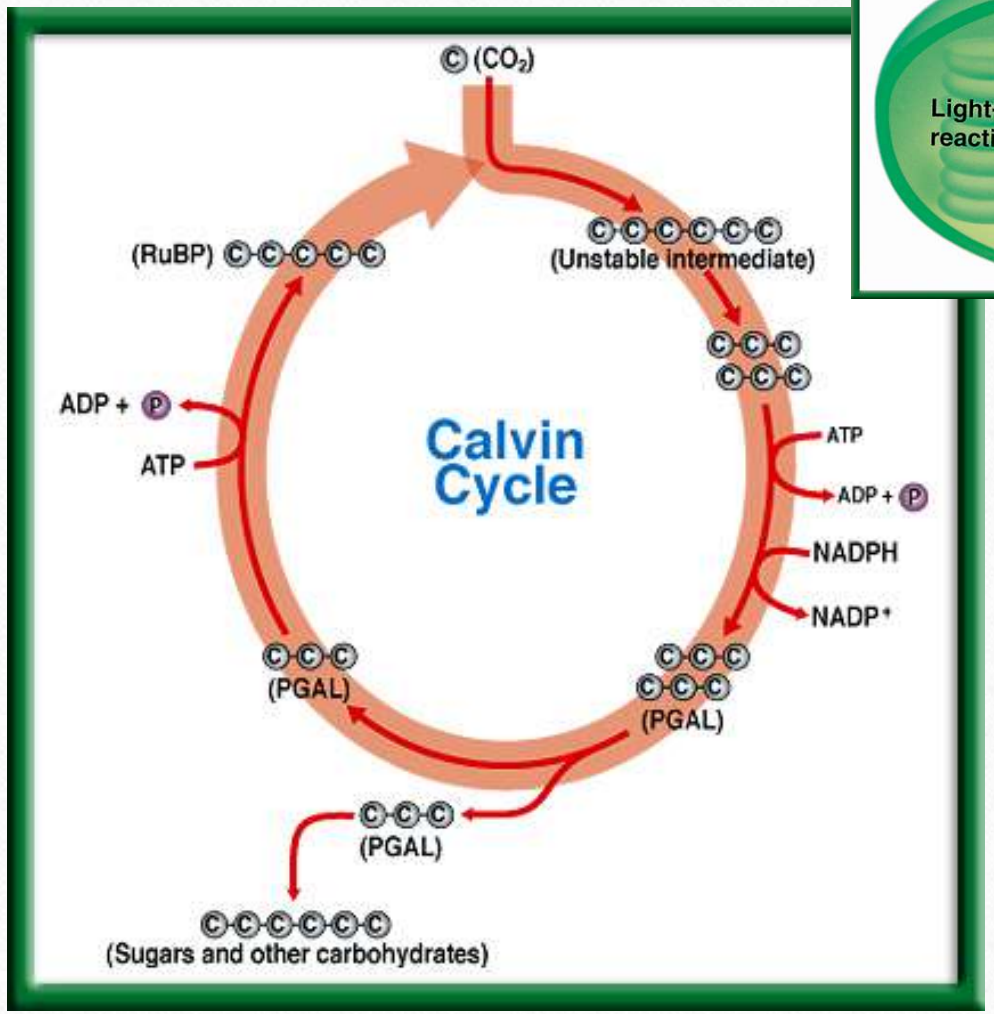
Trapping Energy from Sunlight

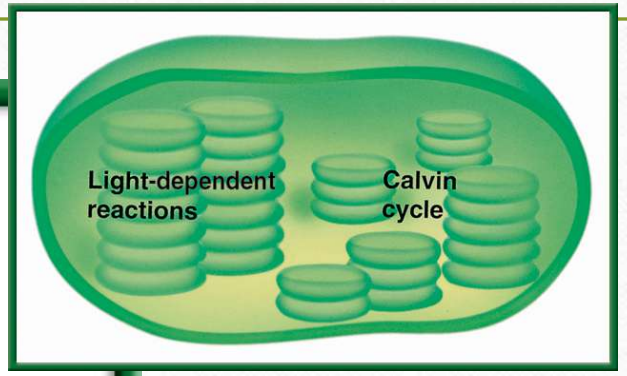
- Photosynthesis happens in two phases.

1. The light-dependent reactions convert light energy into chemical energy.
2. The molecules of ATP produced in the light-dependent reactions are then used to fuel the light-independent reactions that produce simple sugars.

- The general equation for photosynthesis is written as $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

#3. The **Calvin Cycle** happens in the **Stroma** of the **Chloroplast**, and produces the glucose for the plant.





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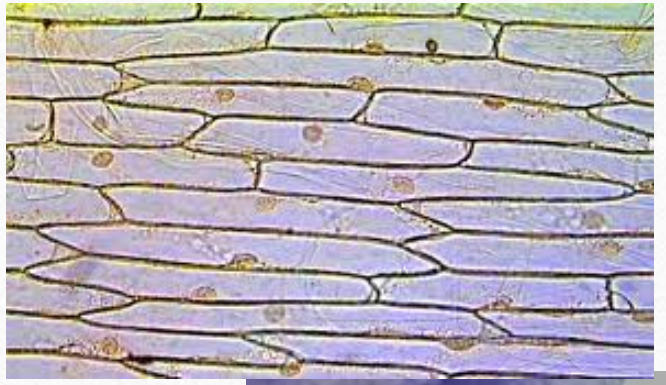
Cell Lab p.47NB

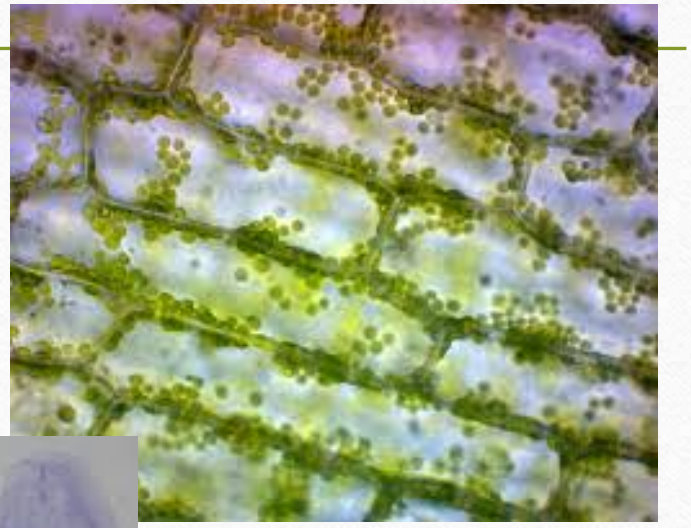
4x- Red Objective lens = 40

10x – Yellow Objective lens = 100

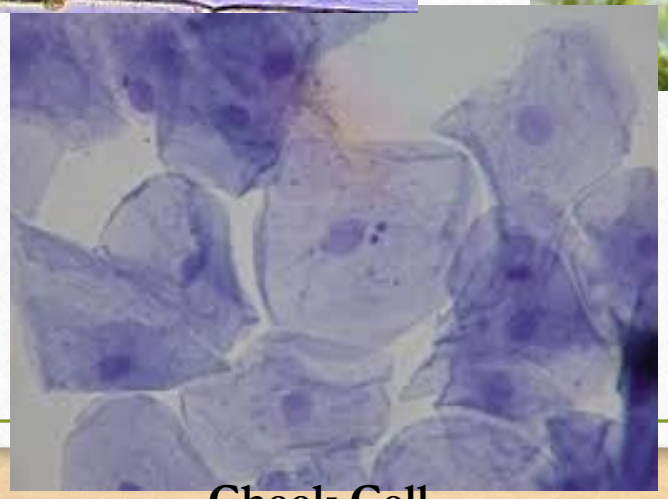
- Label on your picture of Cheek Cell, Onion Cell & Elodea Leaf Cell:
- Cell Wall
- Nucleus
- Cytoplasm
- Chloroplast
- Plasma Membrane

Onion Cell





Elodea Cell



Cheek Cell

Lab – Scientific Method using Elodea Leaf, Onion Cells & Cheek Cells
p. 49 NB

- **Observation(s):**
- **Questions:**
- **Hypothesis:** If, Then, & Testable
- **Materials:** 1 glass slide, 1 cover slip, one toothpick, 1 piece of onion, forceps, Methyl Blue, Iodine
- **Procedure:**

Get 1 glass slide, 1 cover slip, put 3 drops of Iodine on the slide for the onion, peal the inner membrane off & lay onto the Iodine, then put on the cover slip.

Get 1 glass slide, 1 cover slip, put 3 drops of Methyl Blue on the slide for the cheek cell, get a toothpick and just touch the inside of your cheek, then swirl the toothpick around in the MB and put on the cover slip.

Get 1 glass slide, 1 cover slip, put 3 drops of water on the slide, place 1 elodea leaf on the slide, then put on the cover slip.

Cont. Lab Onion & Cheek Cells p. 49 NB

- **Data:**

  Qualitative (words, pictures, descriptions) & Quantitative (#'s, graphs, tables)
  Label the nucleus, plasma membrane, cytoplasm, chloroplast, & cell wall

- **Control Group:** What are you comparing your cheek cells to?

- **Independent Variable:** Brushing teeth, or how many times you touched your cheek.

- **Dependent Variable:** The amount of Cheek Cells

- **Conclusion:** 3 – 5 sentences Accept or Reject your hypothesis, what you learned, what would you do differently? Why did you not see chloroplasts in the onion cell? What was different about the cheek cell? Were the chloroplasts moving in the Elodea Leaf?

Conclusion P. 49 NB

- sentences Accept or Reject your hypothesis, what you learned, what would you do differently? Why did you not see chloroplasts in the onion cell? What was different about the cheek cell? Were the chloroplasts moving in the Elodea Leaf?

- Accept or Reject? We learned that there are cells in plants and animals. The onion cells look like bricks. The Cheek cells were circular, and the plant cells looked like bricks. I would change nothing about the lab. There were no chloroplasts in the onion cell because it was underground. The Chloroplasts were green in the Elodea Leaf.

How to Make Carbohydrates Activity p. 51NB

1. $6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O$

Carbon Dioxide + Water = Glucose + Oxygen

2. Sunlight – Catalyst
3. The chlorophyll inside the chloroplast
4. There were 6 molecules of O2 left over.
5. The extra oxygen atoms give air to other organisms.
6. The O2 diffuse into the atmosphere through the stomata.
7. $6\ H_2O + 6\ CO_2 \rightarrow$(light) Catalyst $\rightarrow C_6H_{12}O_6 + O_2$

Glucose Synthesis Activity

Photosynthesis: $6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O$

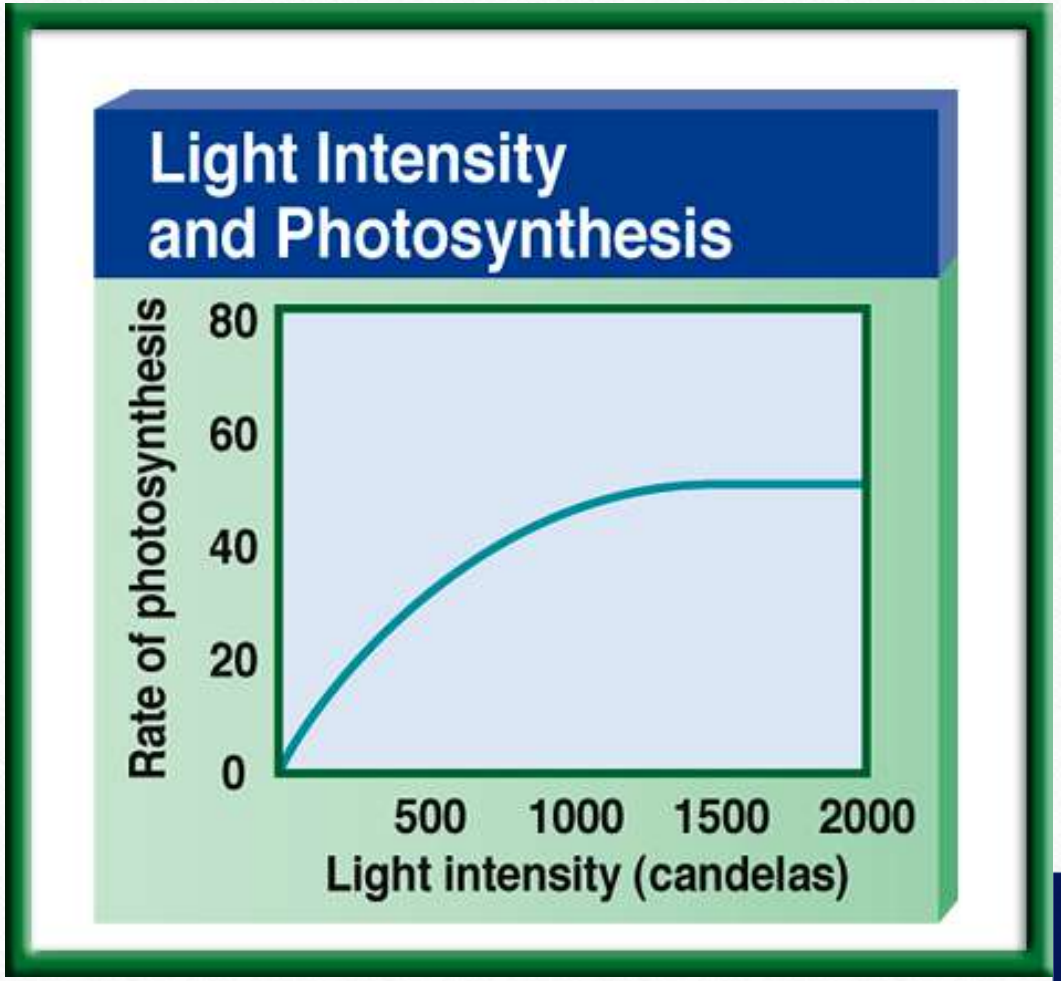
- Black = Carbon
- White = Hydrogen
- Red = Oxygen
- Person 1 – Root = H_2O
- Person 2 – Stomata = CO_2
- Person 3 – Chloroplast = Light Energy (Sun)
- Person 4 – Glucose Synthesis/ O_2
- Person 5 – Get ATP for Cellular Respiration

- Glucose
- $C_6H_{12}O_6$

Cellular Respiration: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_20 + 36\ ATP + Heat$

p. 47 NB

- Copy this graph and explain what it means in a short paragraph.
- Use your knowledge of Independent and Dependent Variables to explain what happens.
- Explain the relationship between the two variables
- Come up with a better title



END OF SLIDE

To return to the chapter summary click escape or close this document.

PREVIOUS SLIDE
TABLE OF CONTENTS
NEXT SLIDE
RESOURCES

p. 47 NB
Write a 3 – 5 sentence summary

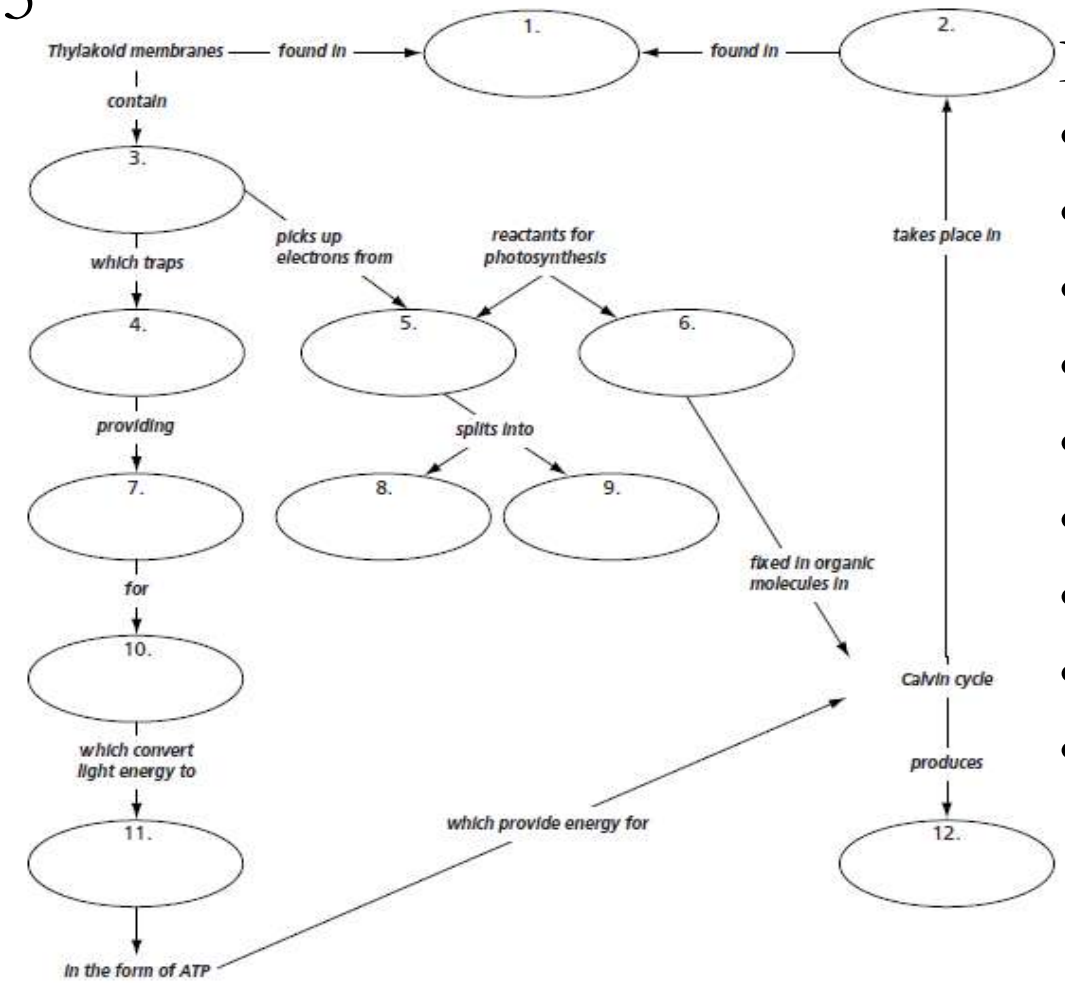
Chapter 9 Energy in a Cell

Concept Mapping

Use with Chapter 9, Section 9.2

Photosynthesis: Trapping the Sun's Energy

Complete the concept map describing photosynthesis. Use these words or phrases once: *chemical energy, oxygen, light-dependent reactions, chlorophyll, stroma, glucose, water, sunlight, oxygen, carbon dioxide, hydrogen ions, chloroplasts.*



Word Bank

- Chemical energy
- Oxygen
- Light Dependent Reactions
- Chlorophyll
- Stroma
- Glucose
- Water
- Sunlight
- Carbon Dioxide
- Hydrogen ions
- Chloroplasts
- Energy

Taboo

- Chloroplast
- Cell Wall
- Plasma Membrane
- Passive transport
- Active Transport

Taboo

- Cellular Respiration
- Photosynthesis
- Mitochondria
- Theory
- Scientific Method
- Nucleic Acid

Honors Biology
Do the Math

- What is the Percent change in temperature of your Catalase Reaction?
- $\frac{V1 - V2}{V1} \times 100\%$
- $\frac{21 - 36}{21} \times 100\% = ?$
- 76%
- Include this in your Data Analysis.

Question 1

The process that uses the sun's energy to make simple sugars is _____.

A. cellular respiration

B. glycolysis

C. photosynthesis

D. photolysis

The answer is C. Photosynthesis happens in two phases to make simple sugars and convert the sugars into complex carbohydrates for energy storage.

Question 1

Why do you add baking soda solution to the water containing the Elodea plants?

Answer

The baking soda supplies carbon dioxide, a necessary component of photosynthesis.

END OF SLIDE

To return to the chapter summary click escape or close this document.

PREVIOUS SLIDE | TABLE OF CONTENTS | NEXT SLIDE

RESOURCES

Question 2

Why does the experiment use aquatic plants?

Answer

The oxygen given off by an aquatic plant will form visible bubbles in the water that can be easily observed.

To return to the chapter summary click escape or close this document.

END OF SLIDE

PREVIOUS SLIDE | TABLE OF CONTENTS | NEXT SLIDE

RESOURCES

Question 3

What is the independent variable in this experiment?

Answer

The independent variable in this experiment is the color of light that is directed on the Elodea.

To return to the chapter summary click escape or close this document.

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PREVIOUS SLIDE

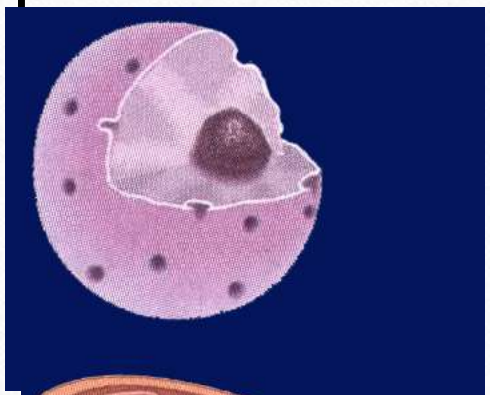
TABLE OF CONTENTS

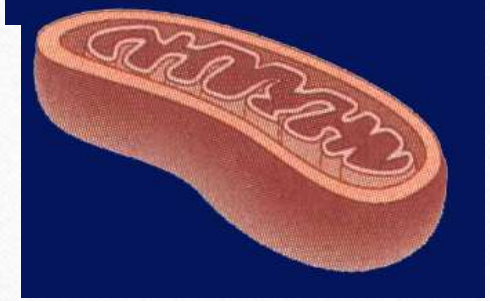
NEXT SLIDE

RESOURCES

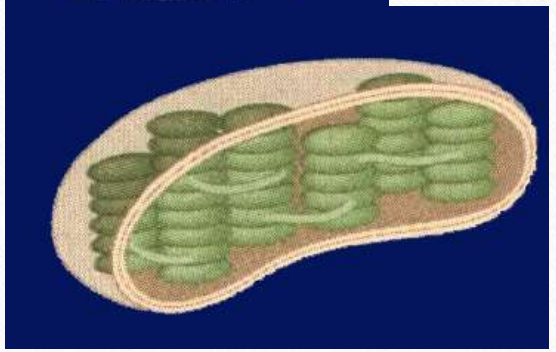
Question 4

In which of the following structures do the light-dependent reactions of photosynthesis take place?

A. 

B. 

C. 

D. 

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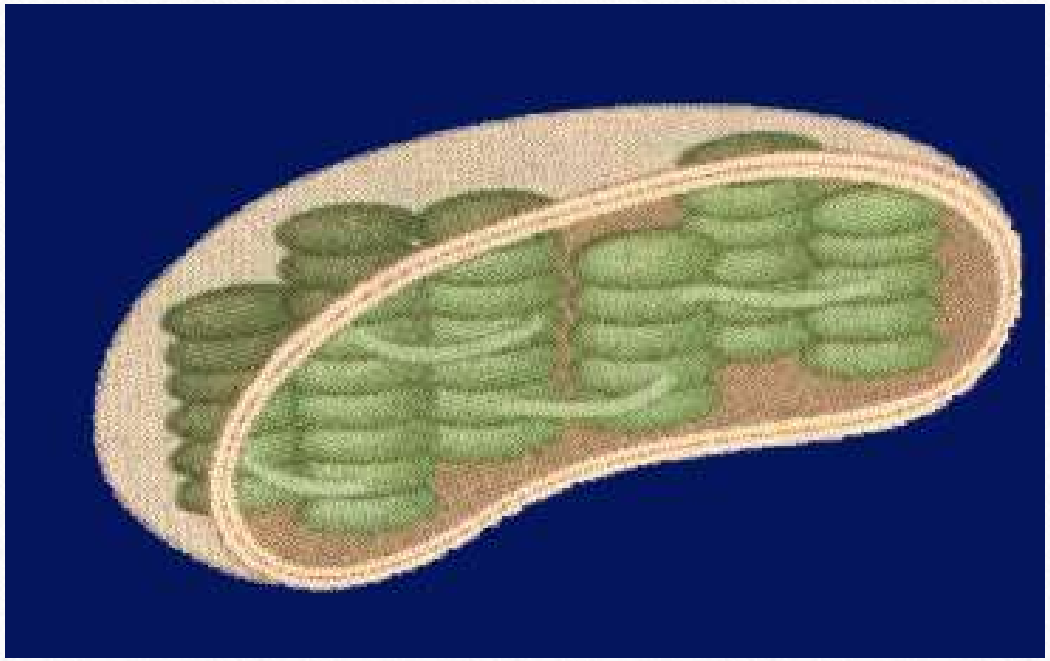
The answer is D. The light-dependent reactions of photosynthesis take place in the thylakoid membranes of chloroplasts.



Quote of the Day

Everything you can imagine is real.

- Pablo Picasso

Kahoots Energy Quiz

9/18 Cellular Respiration & Fermentation 9.3

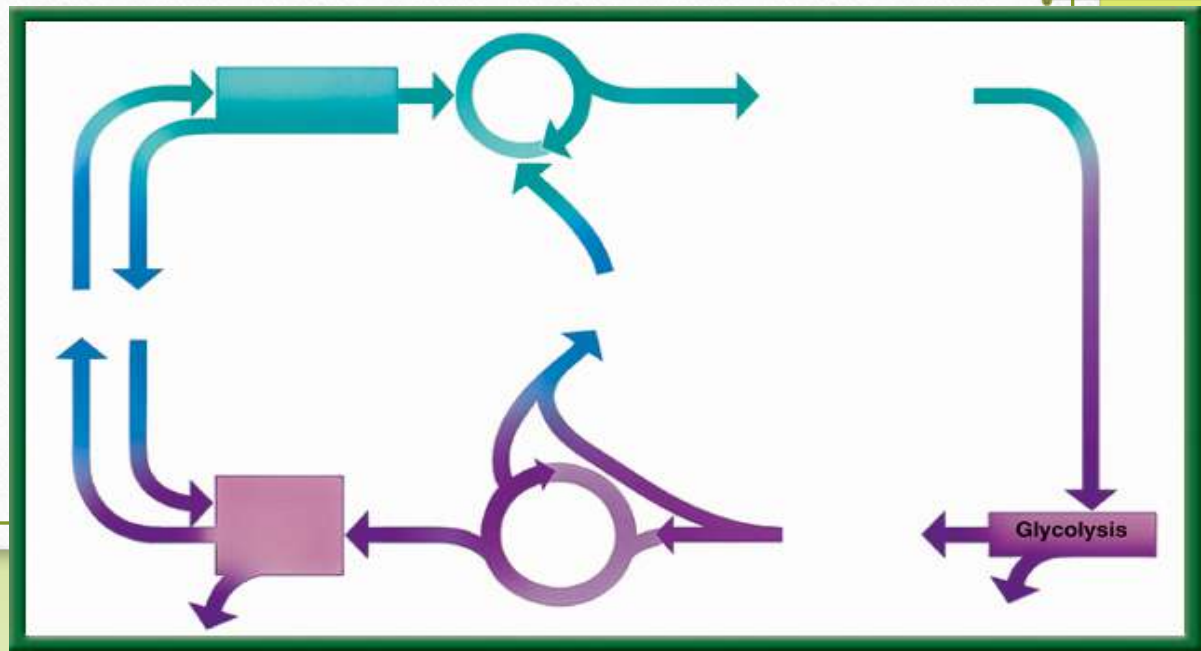
Obj: TSW be able to compare and contrast photosynthesis and cellular respiration by completing the flow chart activity. pg. 50 NB

---

1) What is **Cellular Respiration**? Identify the three stages.

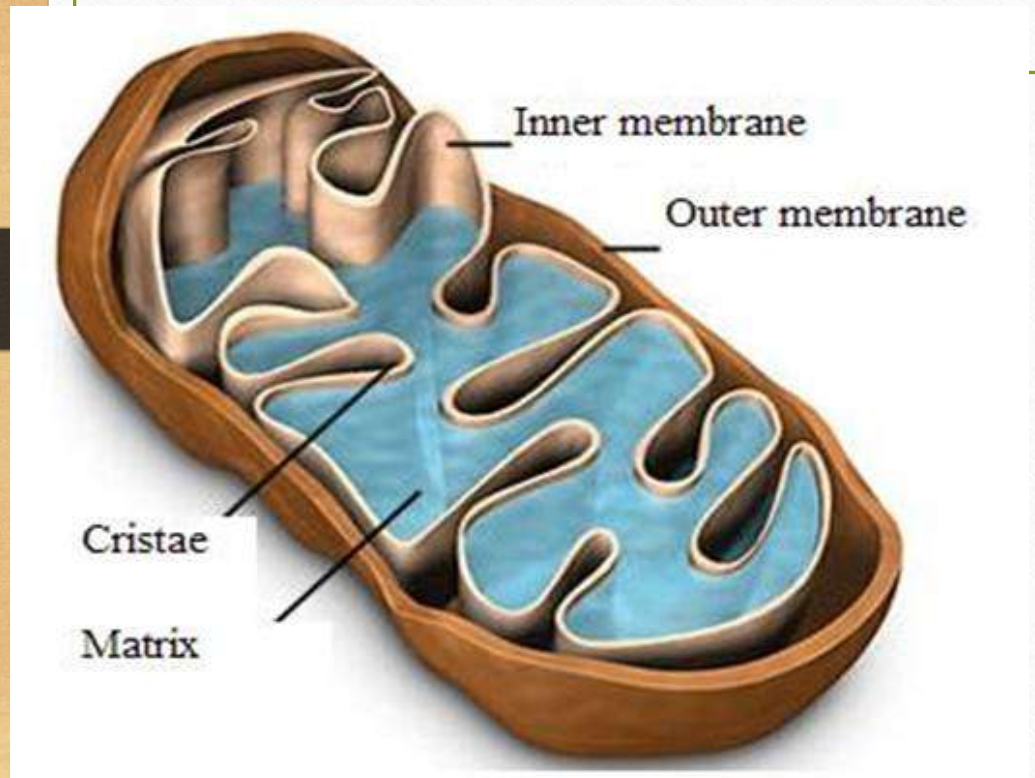
2) How is it related to Photosynthesis?

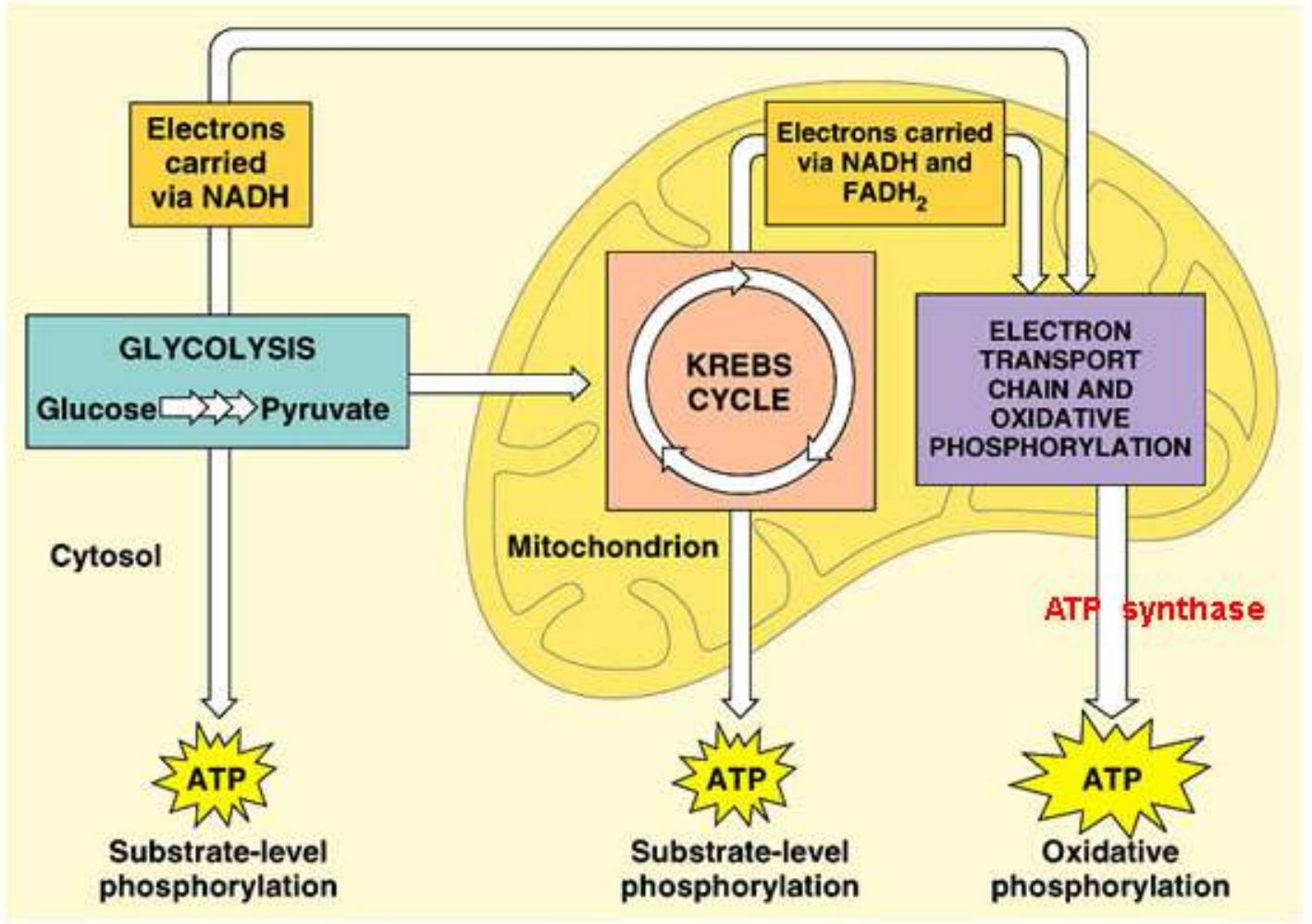
3) What is fermentation, where does it happen in the cycle?



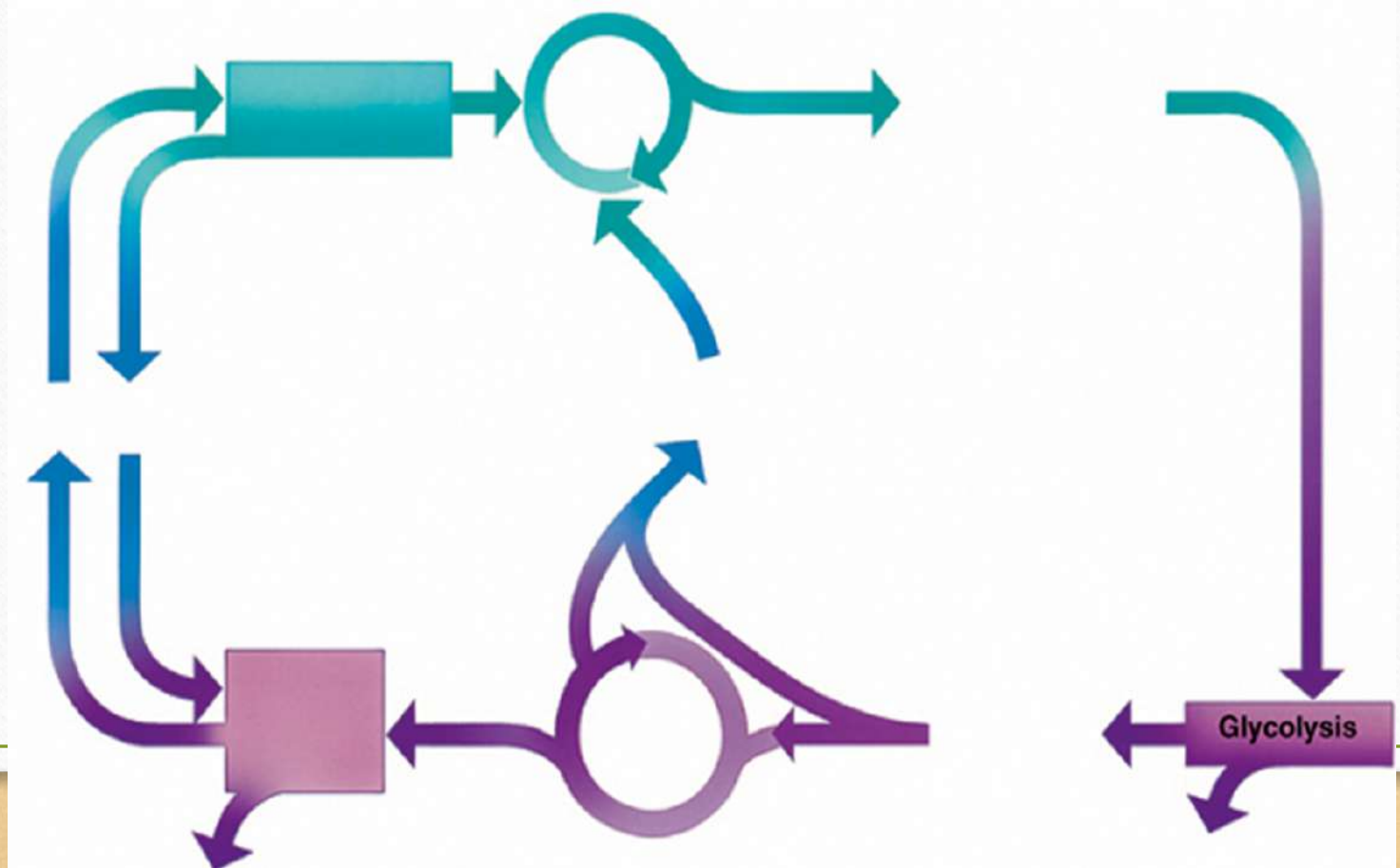
1. Cellular Respiration – converts glucose in to ATP and Heat in the mitochondria.

All living organisms perform Cellular Respiration, including plants.





#2. The reactants for Photosynthesis (CO2 & H2O) are the Products for Cellular Respiration.



9.3

2. P.50 NB Compare and contrast **cellular respiration** and **photosynthesis**.

3. Fermentation happens during glycolysis when not enough oxygen is present.

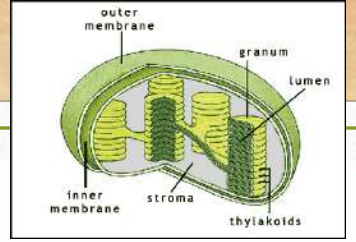
Photosynthesis vs. Cellular Respiration

	Photosynthesis	Cellular Respiration
Stores Energy as glucose	✓	
Releases Energy in glucose		✓
Occurs in Living Cells	✓	✓
Uses an Electron Transport Chain	✓	✓
Occurs in Plant Cells	✓	✓
Occurs in Animal Cells		✓
Releases Oxygen	✓	
Releases Carbon Dioxide		✓
Creates Energy	Neither!	

To return to the

?

P. 51 NB Write a summary paragraph



PHOTOSYNTHESIS (in the chloroplast)

Photolysis

•Uses light energy to break water (H_2O) down to oxygen (O_2).
•Needs light!

H_2O O_2

Calvin cycle

•Uses energy from photolysis and CO_2 to produce sugar = glucose → $C_6H_{12}O_6$
•Does not need light!

CO_2

Glucose is made

Where most of your energy is made. Needs Oxygen

Breaks down sugar into pyruvic acid → 2*($C_3H_6O_3$) and ATP (energy)
Cytoplasm
Pyruvic acid

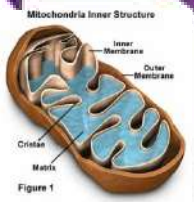
Glycolysis

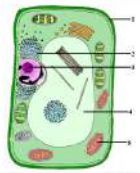
2 ATP

Electron Transport chain

36 ATP Heat

Citric acid Or Krebs Cycle





CELLULAR RESPIRATION (in cytoplasm and mitochondria)

Taboo

Cellular Respiration

Vacuole

Prokayotic

Osmosis

Passive Transport

Macromolecule

Taboo

- Photosynthesis
- Nucleus
- Eukaryotic Cell
- Active Transport
- DNA
- Protein

Taboo

- Scientific Method
- Independent Variable
- Plasma Membrane
- Bacteria
- Prokaryotic
- Chloroplast

- Dependent Variable
- Control
- Selective Permeability
- Endoplasmic Reticulum
- Cell Wall
- Vacuole

Comparing Photosynthesis and Cellular Respiration Notes p. 53 NB

Table 9.1 Comparison of Photosynthesis and Cellular Respiration

Photosynthesis	Cellular Respiration
Food synthesized = Endergonic	Food broken down = Exergonic
Energy from sun stored in glucose	Energy of glucose released
Carbon dioxide taken in	Carbon dioxide given off
Oxygen given off	Oxygen taken in
Produces sugars = $C_6H_{12}O_6$	Produces CO_2, H_2O, ATP & Heat
Requires light	Does not require light
Occurs only in presence of chlorophyll	Occurs in all living cells, **including plants**

Photosynthesis & Cellular Respiration AXES Paragraph Bottom of page 51NB

- The mechanisms for P & CR are related because they are essentially opposite reactions. Photosynthesis transforms energy from the sun and Cellular Respiration makes use of chemical bond energy.
- Photosynthesis = Chloroplast
- Cellular Respiration = Cytoplasm, Mitochondria
- $6CO_2 + 6H_20 \rightarrow C_6H_{12}O_6 + 6O_2$ Photosynthesis
- $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_20 + 36$ ATP + Heat Cellular Respiration

Gallery Walk – Cell UNIT Review

Describe, Draw, and Explain the importance of each of the following concepts/ processes on a poster paper, for a Gallery Walk review. Page 51NB

- Osmosis
- Plasma Membrane
- Eukaryotic Cell
- Prokaryotic Cell
- Photosynthesis
- Cellular Respiration
- Folded Membranes
- Active & Passive Transport
- Macromolecules
- Scientific Method

Warm Up Answers

1) **Cellular Respiration**: process by which mitochondria break down food molecules (glucose) to produce **ATP**. The stages are: **glycolysis, citric acid cycle, electron transport chain.**

2) **Glycolysis**: series of chemical reactions in the cytoplasm of the cell that breaks down **glucose** into (2) **pyruvic acids- $C_3H_6O_3$.**

3). **Fermentation –** in the absence of Oxygen during glycolysis, Lactic acid (animals) or alcohol (plants) are produced.

Table 9.1 in text

Cellular Respiration: **Food broken down, energy of glucose released, CO2 given off, O2 taken in, does not require light, occurs in all living cells**

They both produce Energy.

Photosynthesis: **Food synthesized, energy from sun stored in glucose, CO2 taken in, O2 released, requires light, occurs only cells that contain chlorophyll**

Both: use electron carriers, have cycles of chemical reactions, and form ATP

Cellular Respiration & Yeast Lab

- Get into groups of 3 people. Get 1 flask, 1 balloon, 1 sugar cube, and ½ tsp. of Yeast, combine with 50 ml warm water.
- Place Balloon on the end of the Flask
- Record results
- What happens to the balloon?
- Why? What is the process called? What are the Products?

Cellular Respiration & Yeast Lab P. 55

- Question: How much Carbon Dioxide will be produced?
- Independent Variable: Changed the number of sugar (C6 H12 O6) cubes.
- Dependent Variable: More Carbon Dioxide was produced.
- Control: 1 sugar cube was the control.

- Constant: Same Sugar, Yeast, balloons, Flasks
- Materials & Equipment: Yeast – ½ tsp., water – 100 ml, sugar, balloons, Hot plate, Flask
- Experimental Set up: Draw only
- Safety Concerns: Don't eat the sugar cubes.
- Procedure : Write the steps…. Step 1, Step 2, Step 3,

Enzymes, Cataylase & Potatoes Page 47 NB

- Get into groups of 3 people. Get 1 flask, 1 balloon, H2O2, and 1 piece of Potato – raw, 1 piece of potato cooked.
- Place Balloon on the end of the Flask
- Record results
- What happens to the balloon?
- What do you know about enzyme function?
- Under what conditions do they function best?
- Why? What is the process called? What are the Products?

Enzyme Lab P. 47NB

- Question: How much Carbon Dioxide will be produced?
- Independent Variable: Changed the number of pieces of potato, or more H2O2.
- Dependent Variable: More Carbon Dioxide was produced.
- Control: 10 mL of H2O2 & 1 piece of potato.

Enzyme – Catalyse Lab Page 55 NB

- Constant: Same potato, H2O2, balloons, Flasks
- Materials & Equipment: H2O2½ tsp., balloons, Hot plate, Flask
- Experimental Set up: Draw only
- Safety Concerns: Don't eat the potatos.
- Procedure : Write the steps…. Step 1, Step 2, Step 3,
- Answer Analysis questions on the lab.

Leaf Disk Assay Lab
Honor Biology Due Friday

- Enter data into **Excel**
- Make a **scatter plot graph** to show the **50% floating point.**
- **Data Analysis:** What does the graph mean? Error analysis
- **Conclusion:** Discuss why measuring the photosynthesis can be a problem. What competing process is occurring at the same time? Include in your discussion the relationship between Photosynthesis and Cellular Respiration by comparing and contrasting the equations.

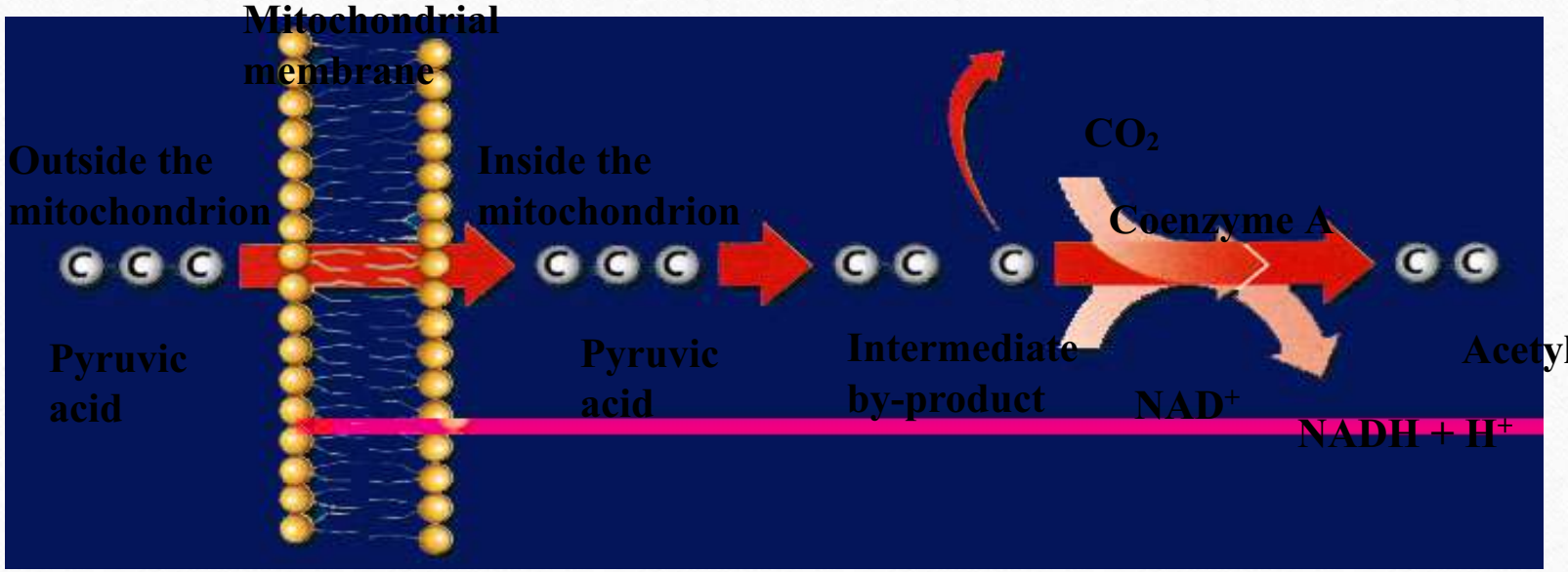
STAGE 1: GLYCOLYSIS

- Takes place in the cytoplasm of the cell

- Process where glucose is broken down and some energy is released
- In the absence of Oxygen, fermentation happens.

Glycolysis

- Before citric acid cycle and electron transport chain can begin, pyruvic acid undergoes a series of reactions in which it gives off a molecule of CO_2 and combines with a molecule called coenzyme A to form acetyl-CoA.



STAGE 2: CITRIC ACID CYCLE

- AKA Krebb's cycle
- Happens in the mitochondria
- Produces: carbon dioxide and some ATP

STAGE 3: ELECTRON TRANSPORT CHAIN

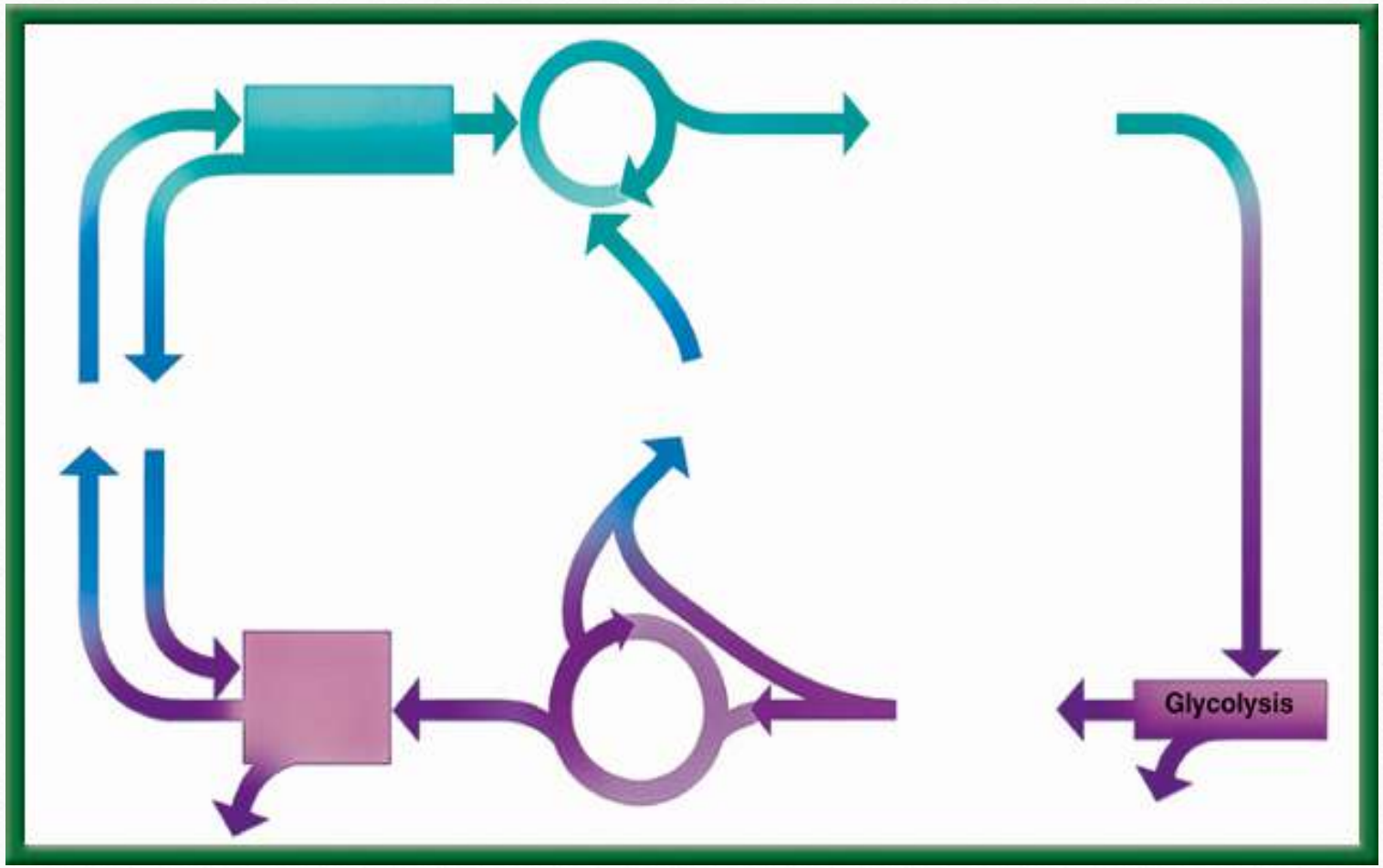
- Happens in the mitochondria
- Series of proteins that transfers energy
- Net creation of whole process: 36 ATP

PROBLEM

- What happens when our cells run out of oxygen? Can cell respiration occur?

FERMENTATION

- Without oxygen cell respiration can not occur.
- However, instead of giving up and dying, our cells have another way to create energy without using oxygen→ FERMENTATION
- Occurs after glycolysis
- Lactic acid fermentation: animal cells (us!)
- Alcoholic Fermentation: plant cells



To return to the chapter summary click escape or close this document.

The Effect of growing Radish Seeds with Lettuce Seeds
Germination of lettuce seeds when grown with Radish seeds

My First & Last Name

Date

Class & Period

Mrs. McAllister

12 Font only

Allelopathy Lab

- **Objective:** Using the Scientific Method, test whether different seeds (Radish and Lettuce) impact each others growth.
- **Essential Question:** Can radish seeds impact the growth of lettuce seeds?
- **Background:** (Paragraph) Explain Vocabulary: Germination, Competition for Resources
  - Cite Sources: Allelopathy: How Plants Suppress Other Plants (Ferguson, Rathinasabapathi, Chase, 2013)
- **Hypothesis/ Purpose:** If radish seeds are grown with lettuce seeds, then the lettuce seeds will not germinate.

Allelopathy Lab

- **Materials:** Petri Dishes, Pipettes (2mL), Petri dish paper, Radish seeds, Lettuce seeds
- **Procedure:** (Make sure your procedure can be duplicated exactly by someone who has never done this lab – Be very specific.)
  - **Step 1:**
  - **Step 2:**
  - **Step 3:**
  - **Step 4:**
  - **Step 5:**

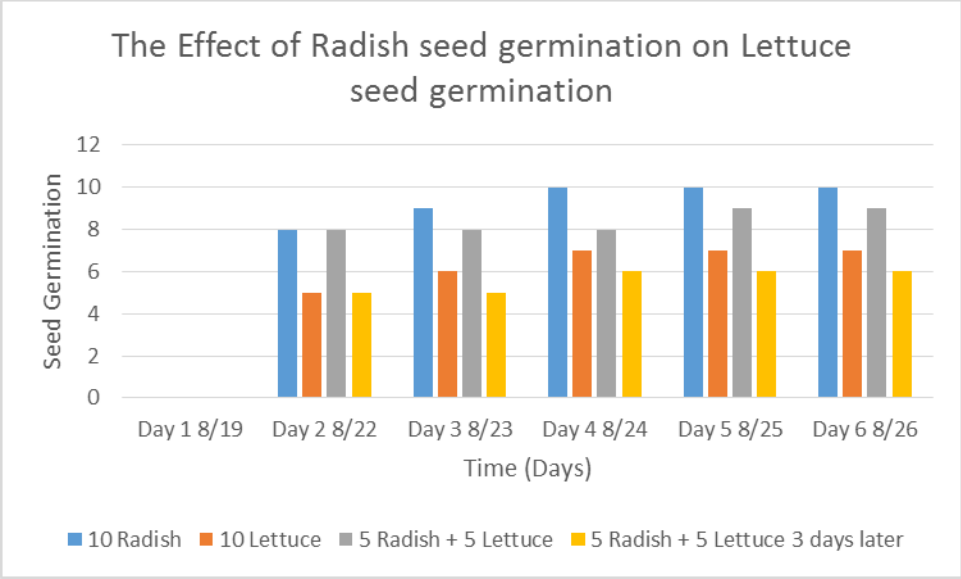
Allelopathy Lab

- **Data:** (Qualitative & **Quantitative – numbers, values**)
  - **Table 1:** The table below shows the different germination rates of radish and lettuce seeds when grown together and separately. (10 font)

	10 Radish	10 Lettuce	5 Radish + 5 Lettuce	5 Radish + 5 Lettuce 3 days later
Day 1 8/19				
Day 2 8/22				
Day 3 8/23				
Day 4 8/24				
Day 5 8/25				
Day 6 8/26				

Allelopathy Lab

- **Data:** (Qualitative & **Quantitative-numbers, values**)
  - Graph 1:



  - The radish seeds over 6 days showed increased germination compared to the lettuce seeds. (10 Font)

Allelopathy Lab

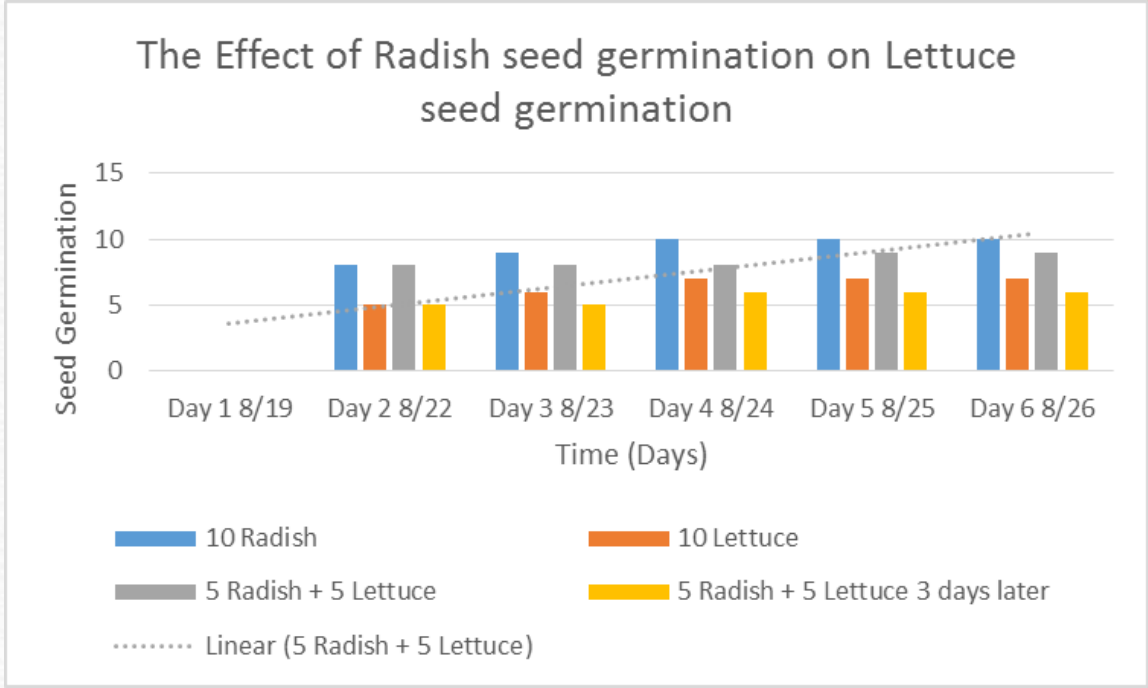
- **Data:** (**Qualitative – descriptive words & Pictures**)
  - The radish seeds looked …… they smelled….
  - The lettuce seeds roots were longer and had more root hairs.

Allelopathy Lab

Data Analysis: (Paragraph)

Explain your data - results. Why did we see the results in the graph? Discuss any trends.

Cite Sources: Allelopathy: How Plants Suppress Other Plants (Ferguson, Rathinasabapathi, Chase, 2013)



Allelopathy Lab

- **Conclusion:** (Paragraph)
  - Restate hypothesis and explain if it was supported or not. Tie your Data Analysis to your Background and hypothesis. Did your data support what you thought would happen? How? Explain why allelopathy is important. At the very least, write an AXES paragraph about Allelopathy between radish and lettuce seeds and how it applies to Agriculture.
  - Cite Sources: Allelopathy: How Plants Suppress Other Plants (Ferguson, Rathinasabapathi, Chase, 2013)

Works Cited

1. James J. Ferguson, emeritus professor; Bala Rathinasabapathi, professor; and Carlene A. Chase, associate professor, Horticultural Sciences Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
2. Yes – one more
3. Yes – still one more ☺
4. Done!

Feb. 23rd West Sacramento FFA Officer Meeting at the Ca State Capital

Reactants and Products : Making a cake

Reactants

Catalyst

Product

Angelica's cake!

Making of Carbohydrates & Cellular Respiration p.57NB

Working with three other students:

answer questions 1 – 3. Each students gets to have a job.

Photosynthesis

$6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$

Hydrogen

Carbon

Oxygen

1 Roots – collect 6 H_2O

2 Stomata – Collect 6 CO_2

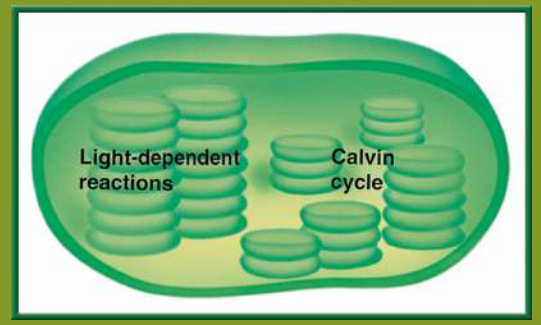
3 Chloroplasts – collect 6 light energy convert to chemical energy

4 Product of Photosynthesis- make Glucose & 6 O2

Cellular Respiration

$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + 36$ ATP + Heat

Disassemble your Glucose & O_2 to the proper carts.



How to Make Carbohydrates Activity p. 57NB

1. $6\ CO_2 + 6\ {}_2O \rightarrow C_6\ {}_{12}O_6 + 6\ O$

Carbon Dioxide + Water = Glucose + Oxygen

2. Sunlight – Catalyst

3. The chlorophyll inside the chloroplast

Glucose Synthesis Activity

Photosynthesis: $6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$

- Black = Carbon
- White = Hydrogen
- Red = Oxygen
- Person 1 – Root = H_2O
- Person 2 – Stomata = CO_2
- Person 3 – Chloroplast = Light Energy (Sun)
- Person 4 – Glucose Synthesis/ O_2
- Person 5 – Get ATP for Cellular Respiration

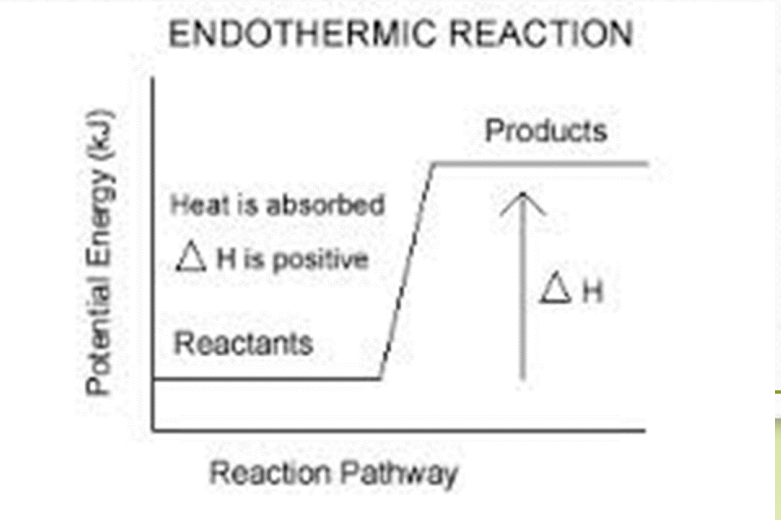
- Glucose
- $C_6H_{12}O_6$

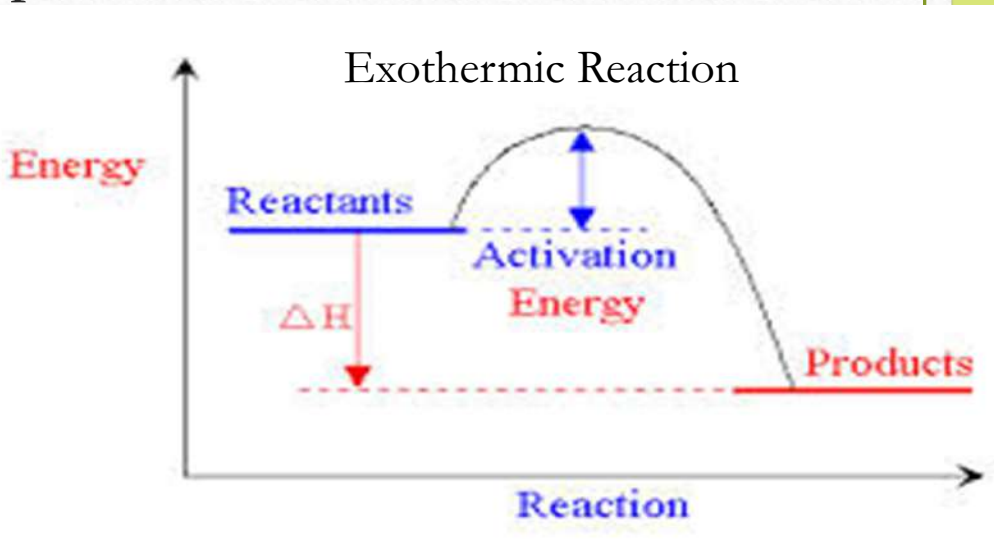
Cellular Respiration: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_20 + 36\ ATP + Heat$

9/19 Energy in Cells

Obj. TSW learn how energy is stored in the bonds of molecules and released when bonds are broken. P. 52 NB

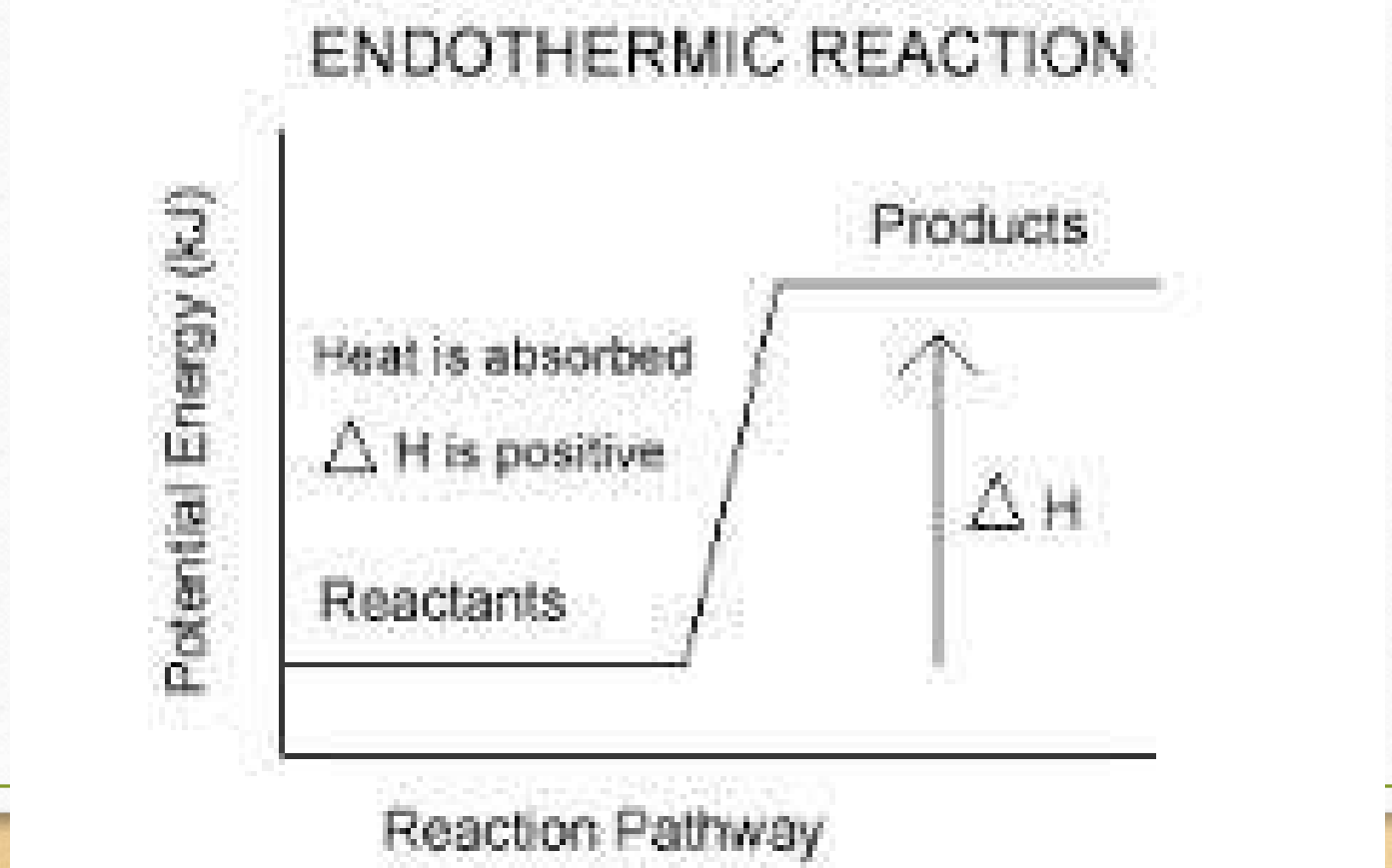
1. Copy this graph of an **endothermic** reaction. Describe in complete sentences how energy is stored using the Independent and dependent variables.
2. Copy this graph of an **exothermic** reaction. Describe in complete sentences how energy is released using the Independent and dependent variables in our explanation.
3. What molecule in plants stores energy, what is the product we feel in an exothermic reaction?





Endothermic Reaction – Photosynthesis p. 45 NB

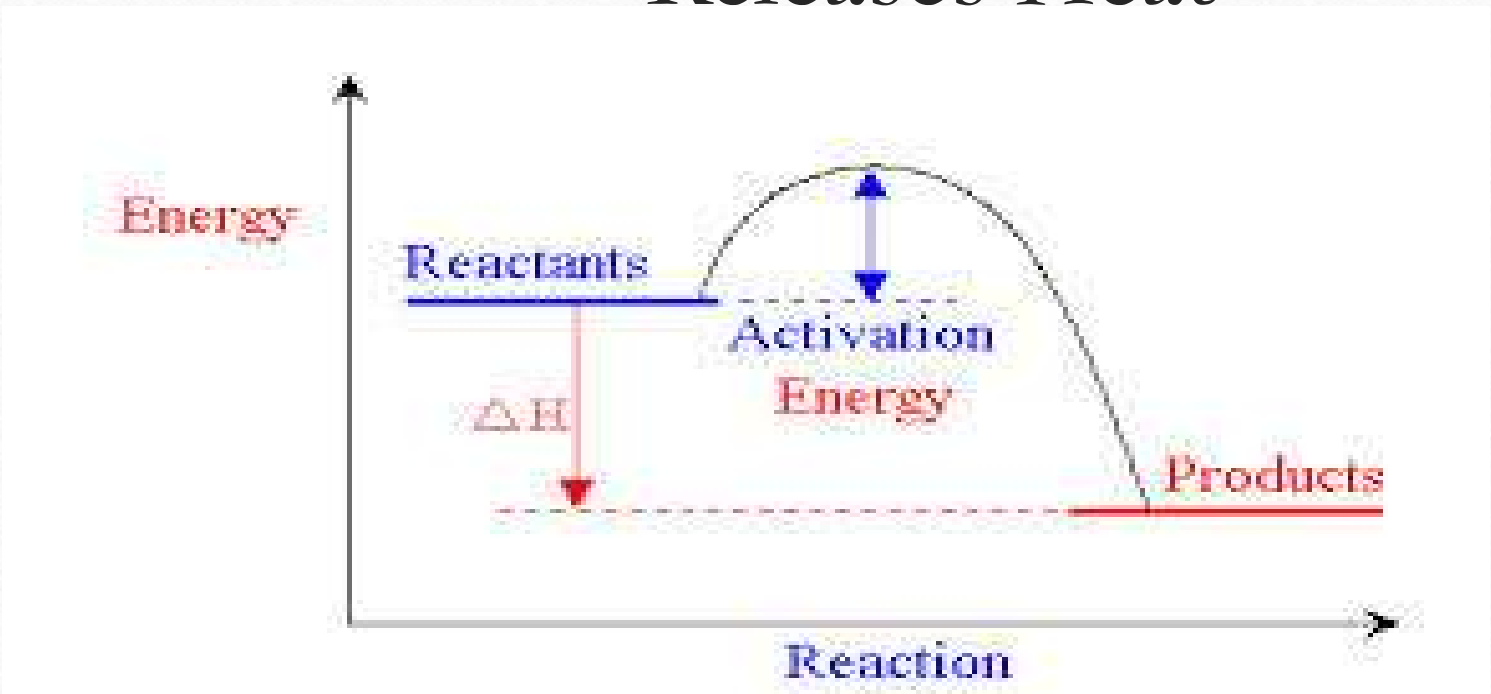
Stores energy in Chemical Bonds - Glucose



Exothermic Reaction – Yeast + Hydrogen Peroxide

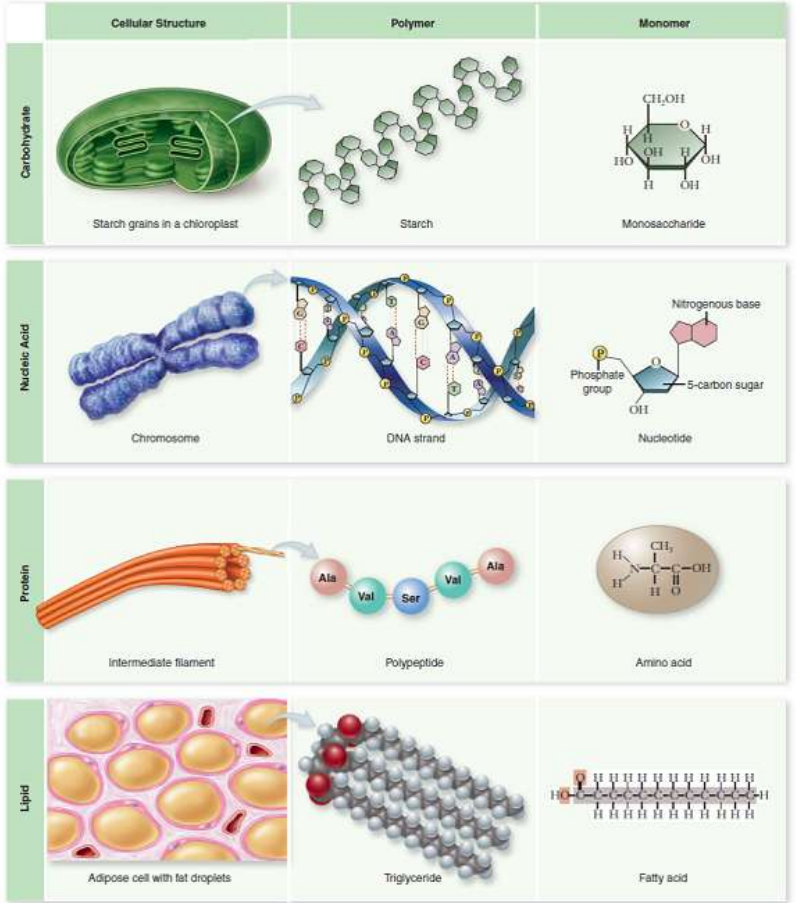
Cellular Respiration P. 45NB

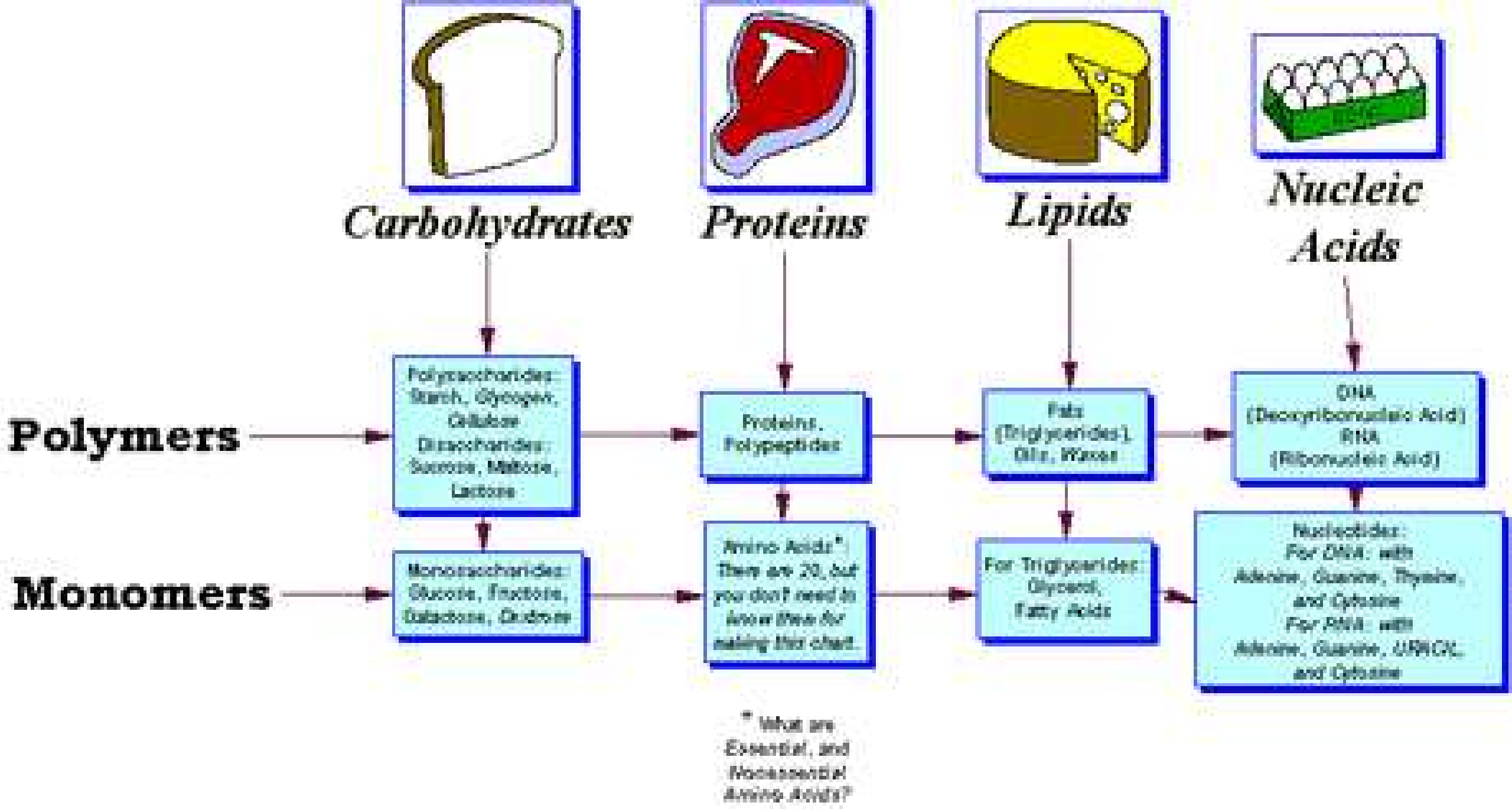
Releases Heat



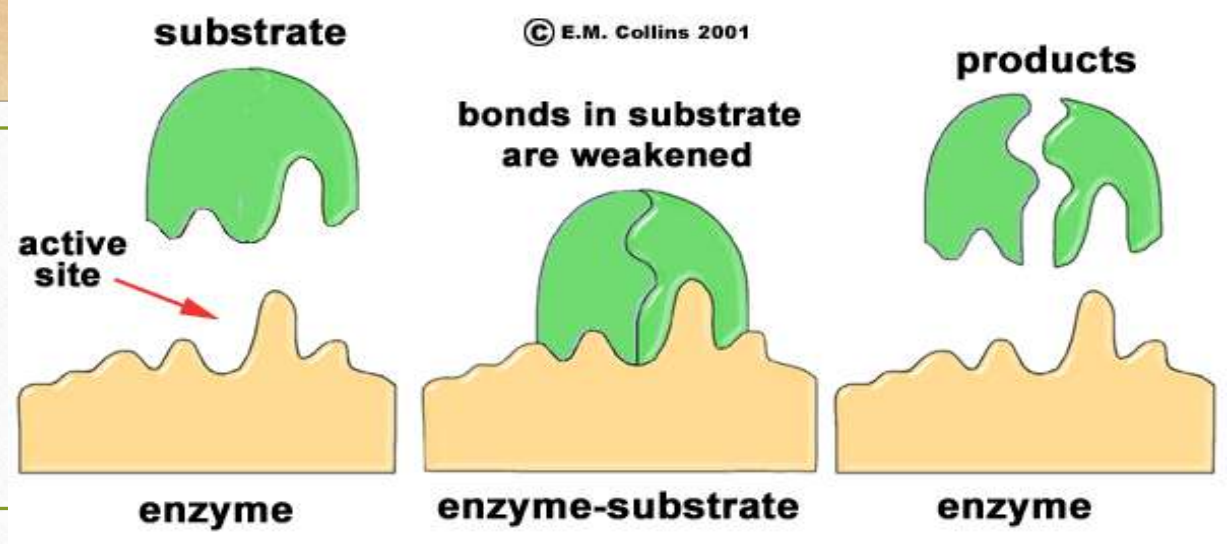
9/20 Monomers & Polymers CH 6.3
Obj. TSW learn the 4 macromolecules and the subunits that make them. P. 54 NB

1. Review your notebook or CH 6.3 and write the 4 Macromolecules/ Biomolecules or Life Molecules.
2. Read carefully through the book and write the subunits (monomers) for each of the Biomolecules. What are each of the Biomolecules made of?
3. What elements make each of the monomers?

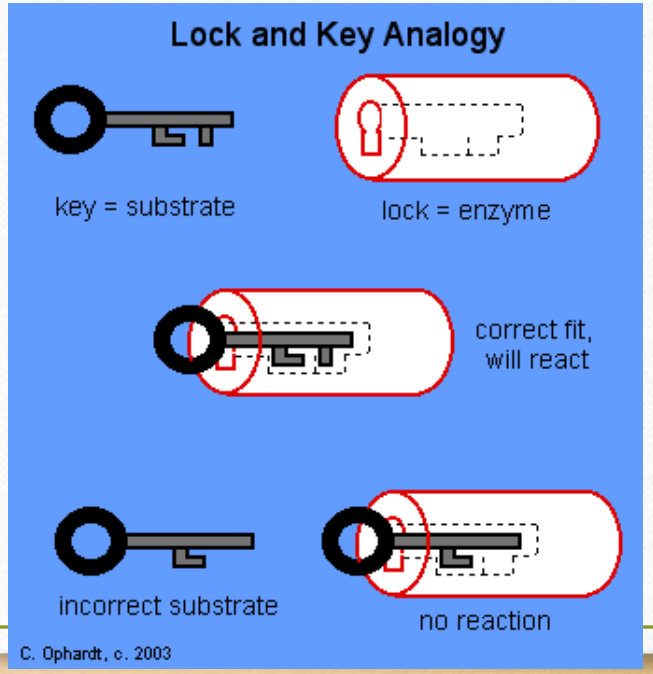



Carbohydrates
Proteins
Lipids
Nucleic Acids
Polymers
Monomers
Polysaccharides: Starch, Glycogen, Cellulose
Disaccharides: Sucrose, Maltose, Lactose
Monosaccharides: Glucose, Fructose, Galactose, Deoxyribose
Proteins, Polypeptides
Amino Acids*: There are 20, but you don't need to know these for making this chart.
Fats (Triglycerides) Oils, Waxes
For Triglycerides: Glycerol, Fatty Acids
DNA (Deoxyribonucleic Acid)
RNA (Ribonucleic Acid)
Nucleotides: For DNA: with Adenine, Guanine, Thymine, and Cytosine
For RNA: with Adenine, Guanine, URACIL, and Cytosine
* What are Essential, and Nonessential Amino Acids?

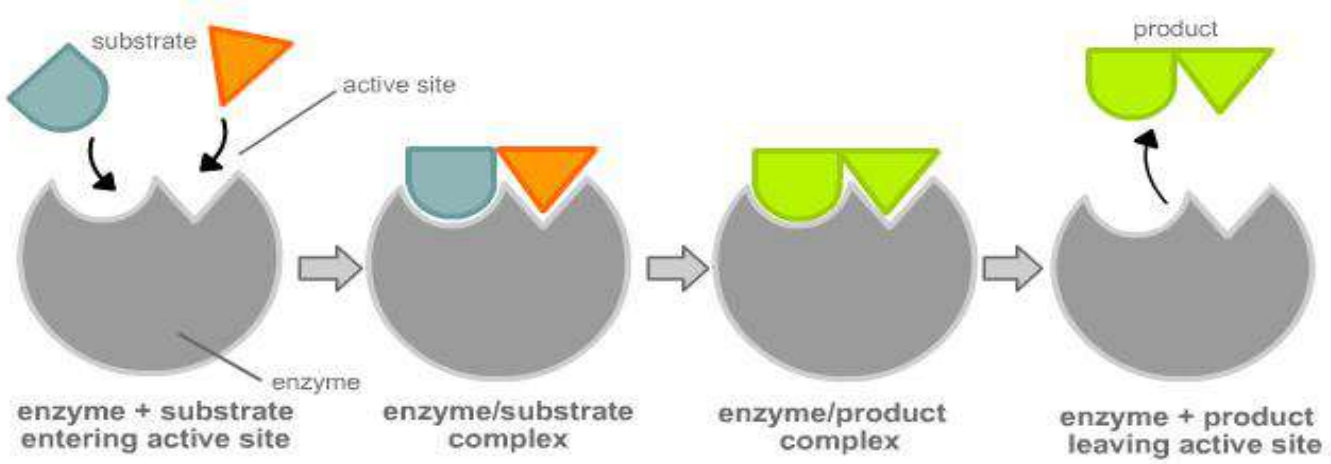
Macromolecules & Subunits Notes p. 31NB



- **Lipid** (pm) – Fatty Acids
- **Carbohydrate**(pm) - Saccharides
- **Protein** (pm) (Enzymes)– Amino Acids
  - Temperature
  - pH
  - [Substrate] & [Enzymes]
  - [Salt]
- Nucleic Acid - Nucleotides



Enzyme Activity



- You will be given a substrate or a part of an enzyme.
- Find the matching part, that fits your active site.
- Bring your matching Enzyme/ Substrate combinations (Lock & Key) to McAllister
- I will quiz you on your knowledge of monomers and polymers in endergonic & exergonic reactions.

Expectations of Myself…

- List 3 expectations you have of yourself on page 59 NB

Expectations of My West Sacramento FFA Chapter (CA0577)…

- List 3 expectations you have of your Chapter on page 59 NB

Expectations of My Advisor

- List 3 expectations you have of your Advisor on page 59 NB

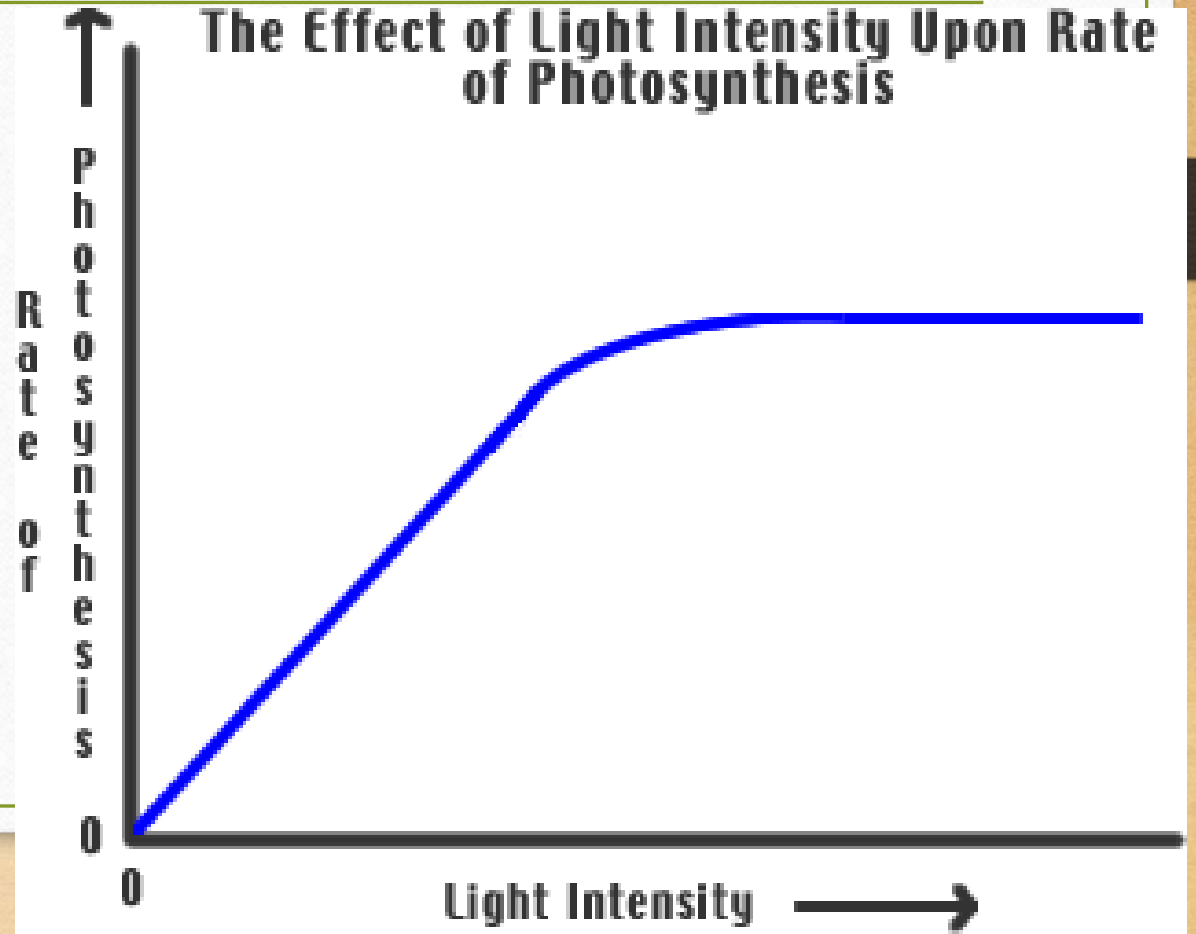
Elections Tomorrow!!!!

Garden Planning sheet 9/20

- Make sure to pick tomatoes! Quality – inspect them. Give to Ms. Sutton
- Refresh all the flowers-get missing flasks. Longer stems please, more water. Deliver
- Take out garden bed to the right of our classroom, cut up greens for compost.
- Add water to 3rd compost bin, push down, add new compost, Use shovel to cut up compost.
- Add water to Tower Gardens. Add all pots, rock wool and reseed, and label. Zoe
- Take pictures of students working and of your garden to upload onto Theaet.com Record book. Arina?
- Water the 8 trees along the east side of garden beds.
- Inspect irrigation – Tyler & Chris
- Thin the Radishes Feed the hens, add nutrients to water. Bring potatoes & garlic to plant next week.

9/21 Reading a Photosynthesis Graph
Obj. TSW review variables and the control in a lab and analyze the graph. P. 46 NB

1. Compare & Contrast Independent and Dependent Variables by identifying each and explaining what they are.
2. Why is the Control important?
3. Using the graph, what is the trend? How do you know?



9/22 Floating Leaf Disk Assay

Obj. TSW learn about how rate of photosynthesis is determined by light intensity and sodium bicarbonate. P. 58 NB

1. Read the lab procedure for Leaf Disk Lab. What is the purpose of the lab? What do we want to know/ learn?
2. What is the Independent Variable? What factor do we change to test whether photosynthesis is happening? What is the dependent Variable? What are we measuring?
3. What is the control group? What are we testing against?

Leaf Disk Assay Lab P. 57, 59, or 61NB

- Hypothesis:
  - If I put 10 leaf disks (no O2) in a beaker with Sodium Bicarbonate then they w rise faster than just the water (control).

	Sodium Bicarbonate # Floating Leaf disks	**Water # of Floating Leaf disks**
0 Minute	0	0
5 Minutes		
10 minutes		
15 minutes		
20 minutes		
25 minute		
35 minutes		

Computer Lab Write Up for Leaf Disk Assay Lab

- Enter data into **Excel**
- Make a **scatter plot graph** to show the **50% floating point.**
- **Data Analysis:** What does the graph mean? Error analysis
- **Conclusion:** Discuss why measuring the photosynthesis can be a problem. What competing process is occurring at the same time? Include in your discussion the relationship between Photosynthesis and Cellular Respiration by comparing and contrasting the equations.

Photosynthesis & Cellular Respiration AXES Paragraph READ & highlight parts of your article, Write an AXES paragraph on page 57, 59 or 61NB

Assertion

e**X**ample

Explanation

Significance

- The mechanisms for P & CR are related because they are essentially opposite reactions. Photosynthesis transforms energy from the sun and Cellular Respiration makes use of chemical bond energy and converts it to ATP & Heat
- Photosynthesis = Chloroplast
- Cellular Respiration = Cytoplasm, Mitochondria
- $6CO_2 + 6H_20 \rightarrow C_6H_{12}O_6 + 6O_2$ Photosynthesis
- $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_20 + 36$ ATP + Heat Cellular Respiration