

Ag Biology

Energy Unit

Week 5

Sept. 11th – 15th

Agricultural Careers

- Research 3 Different Careers in Agriculture that have to do with the 5 F's of Ag: Food, Fiber, Flowers, Forests, Fuel.
- Develop 3 questions you have about each career.
 - They might be about the education/ training you need for that career
 - About the pay scale
 - Opportunity for advancement
 - The best part of the job, or the worst
 - Describing the job
 - Recommendations for us as students?

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

9/11 How does Carbon cycle through Planet Earth? P. 40 NB

1. Carbon is the main element of life in organic organisms. Look the Carbon Cycle on page 55 in the biology book. How does carbon cycle through the Atmosphere? Where is it released from?
2. Carbon not only cycles through the Atmosphere, but also the Biosphere – zone of life. How does carbon get absorbed and released in and from living things?
3. The Geosphere (Earth) and the Hydrosphere (Water) are two more spheres that CO₂ can cycle through. What are each of them? How does carbon get into and out of each?

Four Corner Activity

Stand in the corner for the answer you believe
for each statement.

- Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
1. Energy is lost to the Environment.
 2. Energy increases as it is passed from one organism to another.
 3. Energy is not lost between organisms in a food chain.

Energy is lost to the Environment.

P. NB

-
- Strongly Agree or Agree, because energy at each trophic level is lost as heat.

Energy increases as it is passed from one organism to another. P. NB

- Disagree, because the energy decreases as you increase the trophic level. 90% of the energy is lost at each level as heat.

Energy is not lost between organisms in a food chain. P. NB

- Strongly disagree or Disagree, because food chains make up the Energy Pyramid. Less organisms exist in the higher trophic levels due to energy loss.

Activity – Popcorn

Energy Transfer in the Ecosystem

1. Energy
2. Passing off energy to the next trophic level
3. This represented the organisms daily activities that it would use energy.
4. The popcorn on the ground is the loss of energy to the ecosystem.
5. If there was no popcorn to pass off the organism would die.

-
6. The amount of energy as we move through each trophic level is lost.
Popcorn fell on the ground.
 7. Most food chain only have 3 – 5 organisms because that is the amount of energy that can support those organisms.
 8. Energy Pyramid:

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.

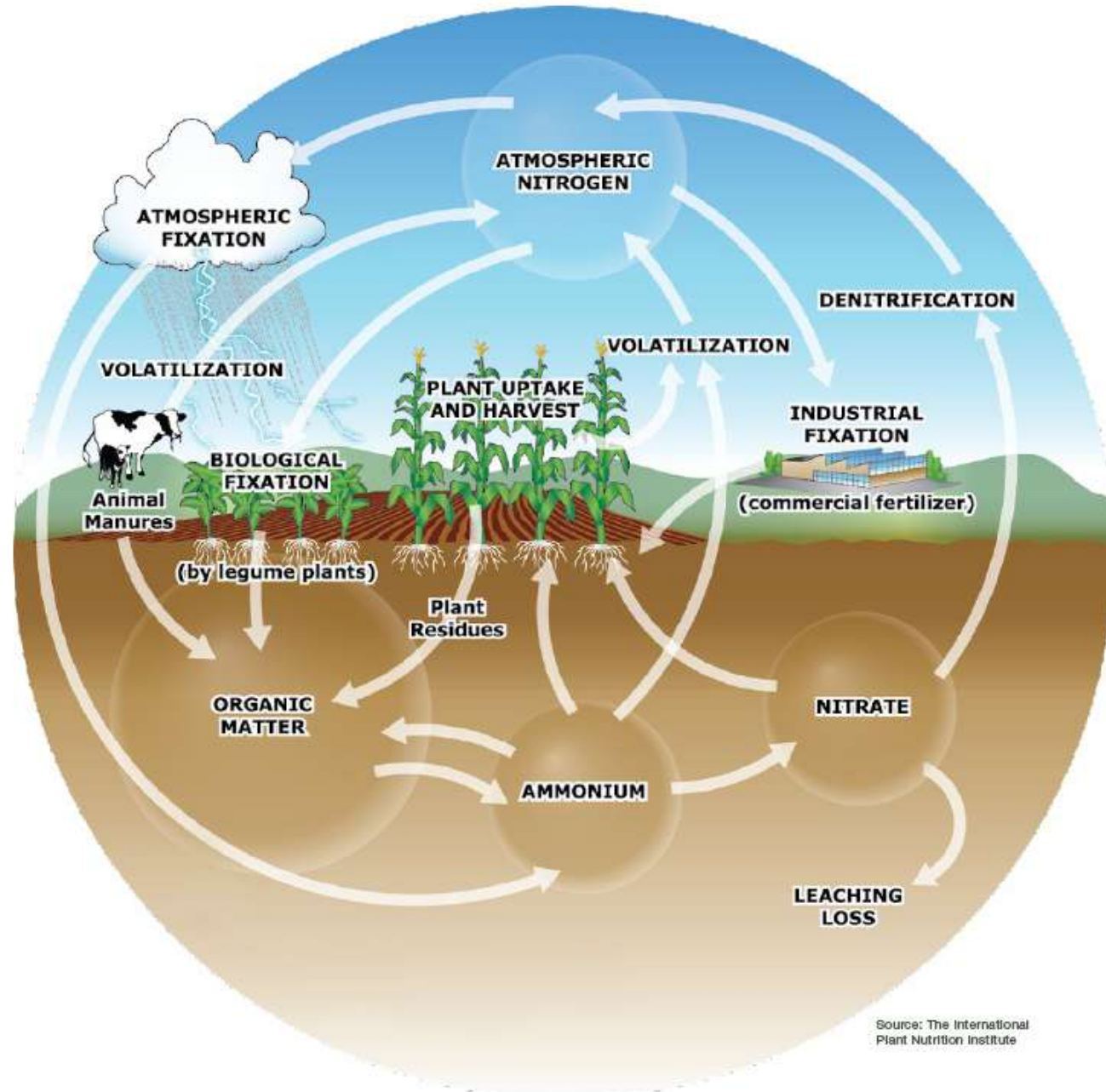
- How does it provide real work situations?
- What careers is it related to?
- How is it part of your career goal?
- List the skills, knowledge and attitudes you need for this career that your SAE might apply to.
- How can you grow, and become more competent each year in the Ag program with this SAE?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

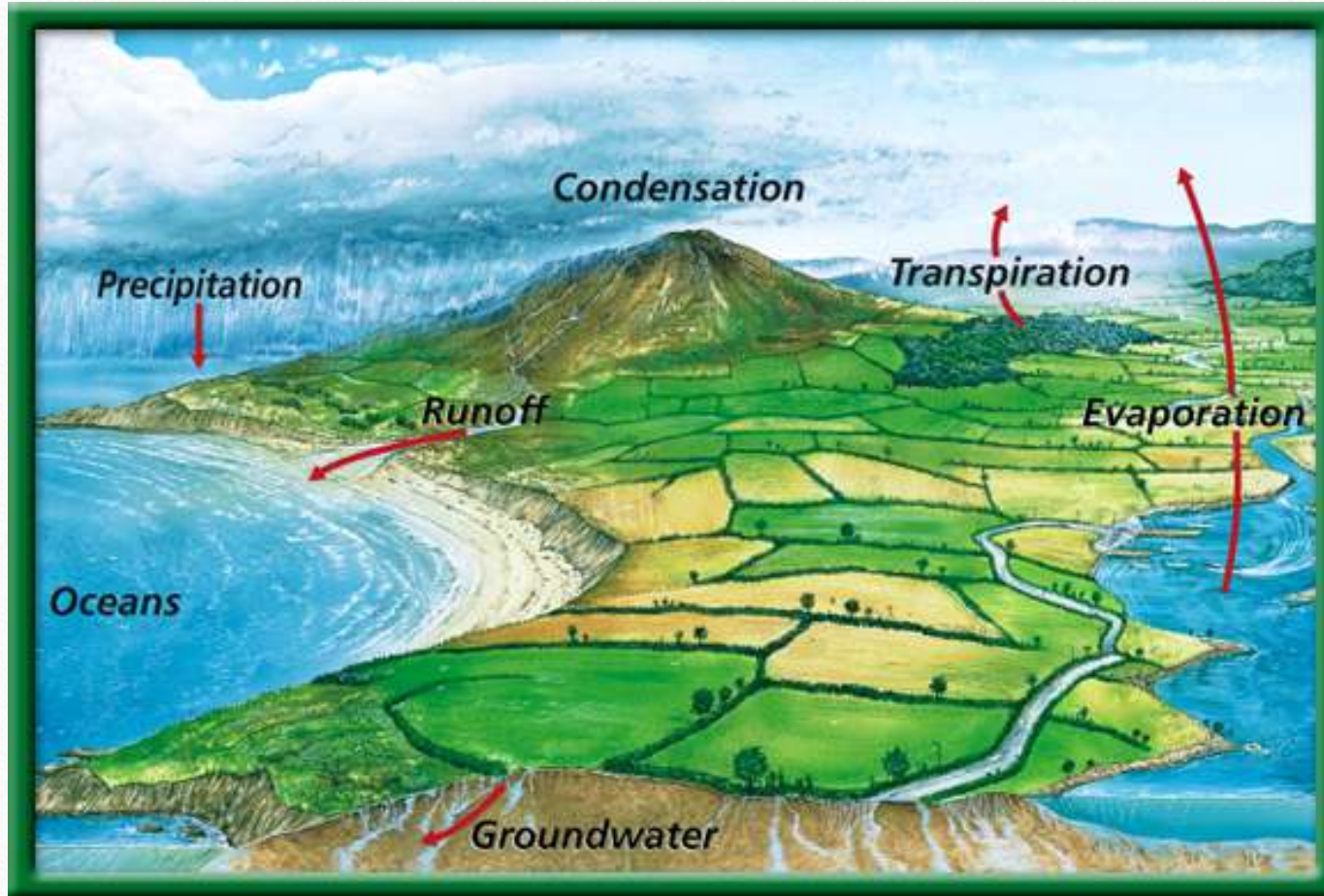
1. Matter, mass, space.
 2. Atom -Ex: H, Hydrogen; N, Nitrogen; Na, Sodium
 3. Molecule, Substance- Ex. N_2 Nitrogen Gas; H_2 Hydrogen gas; O_2
Oxygen Gas
-

4. Compound, at least two different, millions.

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

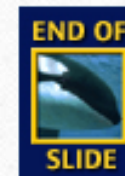
5. Oxygen gas, O_2 & Nitrogen Gas N_2 are not considered compounds because they are each composed of the same element. Water, H_2O , is a compound because it is composed of more than one element.
6. Chemical formula, elements, subscripts. Ex: $C_6H_{12}O_6$ - Glucose

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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2.2

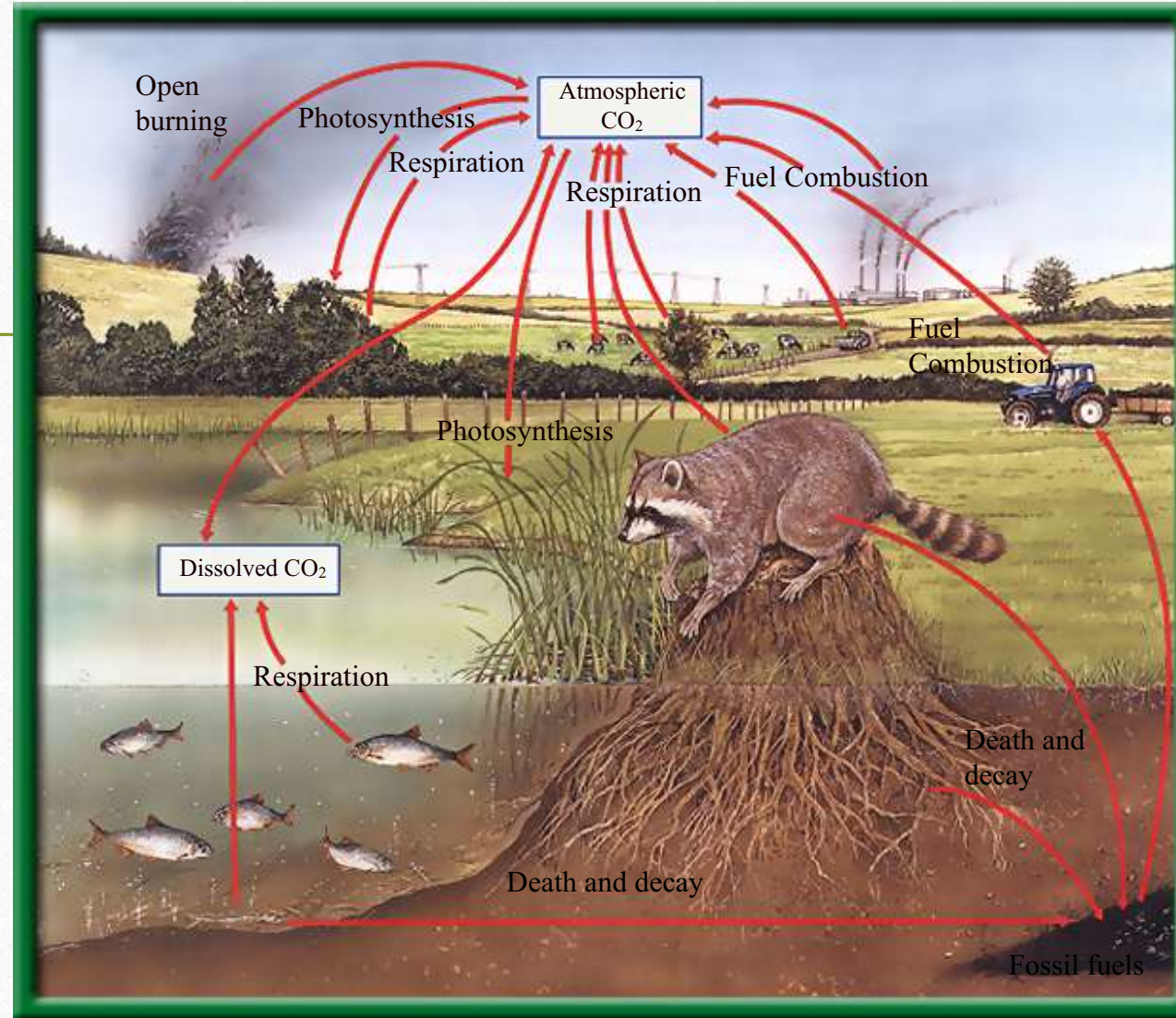
Nutrition and Energy Flow

The Carbon Cycle

What is the role of the autotroph?

What is a carbon sink?

What is the role of the heterotroph?



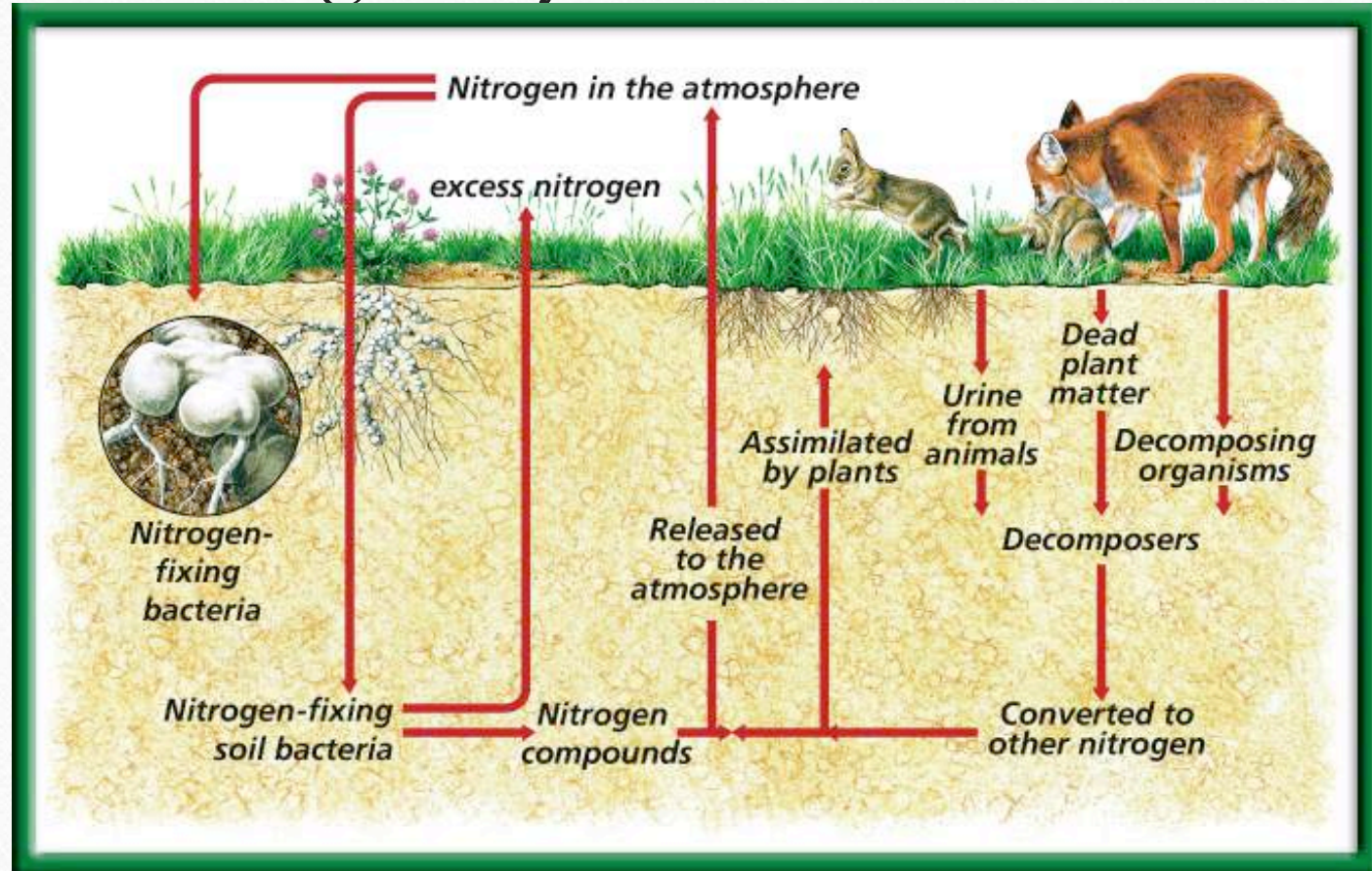
END OF SLIDE



RESOURCES

The Nitrogen Cycle

What organism is essential for this cycle?

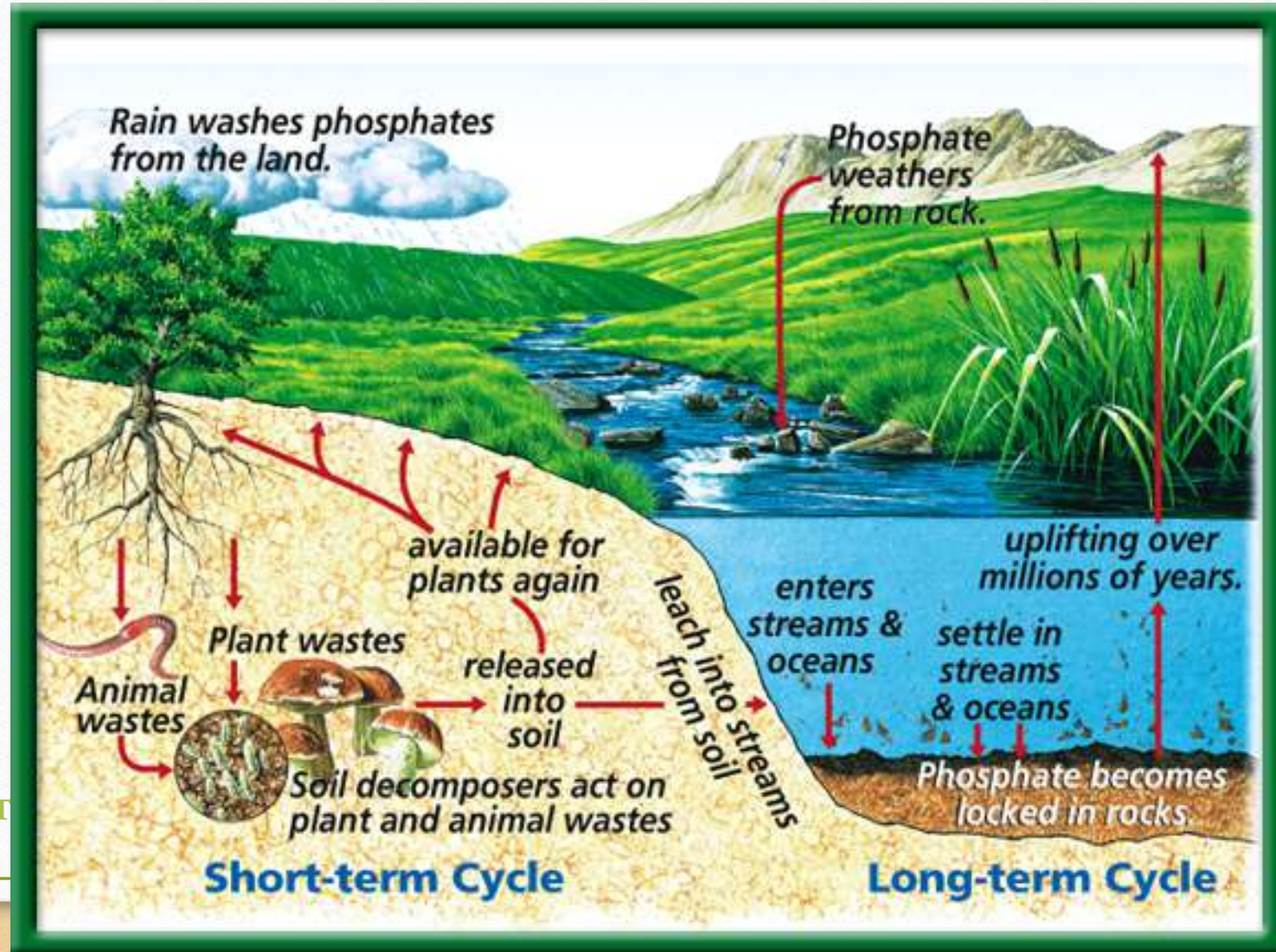


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The Phosphorous Cycle

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.

Ecosystem Activity Get a White Board & Expo Marker

Directions: Make Food Chain, a Food Web, and Energy Pyramid and a Title for this Ecosystem

- | | |
|------------------|-----------------|
| 1. Tree | 7. Owl |
| 2. Squirrel | 8. Grasses |
| 3. Fox | 9. Hawk |
| 4. Beaver | 10. Grasshopper |
| 5. Mountain Lion | 11. Bird |
| 6. Mouse | |

Quiz Answers

2. Possible answer: Grass-> Mouse-> Fox-> Mountain Lion
3. Beaver, Squirrel, Rabbit, Mouse, Grasshopper
4. Mountain Lion, Hawk, Owl, snake
5. Worms, Fungi, Bacteria – anywhere, even grass gets decomposed.
6. Arrows indicate the direction of the flow of energy from what just got eaten to who eat it.

Quiz Answers

7. Table 1 Classifying Organisms in Trophic Levels.

PRODUCERS	PRIMARY CONSUMERS	SECONDARY CONSUMERS	TERTIARY CONSUMERS
TREES	BEAVER	FOX	MOUNTAIN LION
GRASS	SQUIRREL	BIRD	HAWK
	RABBIT	SNAKE	SNAKE
	MOUSE	FROG	OWL
	GRASSHOPPER		

Quiz Answers



CONSUMER 3 –
MOUNTAIN LION,
HAWL, OWL

CONSUMER 2 – FOX, BIRD,
SNAKE, FROG

CONSUMER 1 – BEAVER,
SQUIRREL, RABBIT, MOUSE,
GRASSHOPPER

PRODUCERS – TREES, GRASSES

How Wolves Change Rivers

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

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- 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

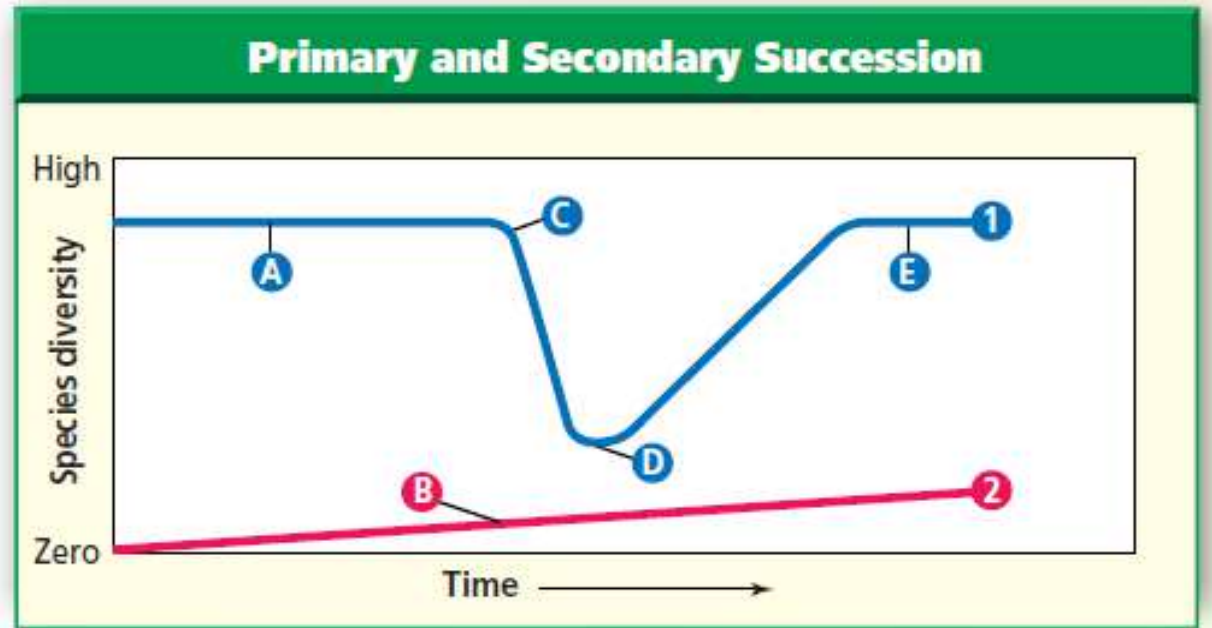
Classroom Experience

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

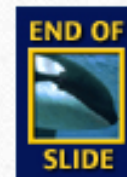
D – is Pioneer Species have low species diversity.

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

Importance to nature

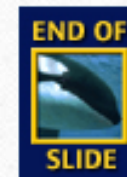
#1. Biodiversity is the variety of life or the different types of species

- 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 made 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, glaciers, 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 than 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

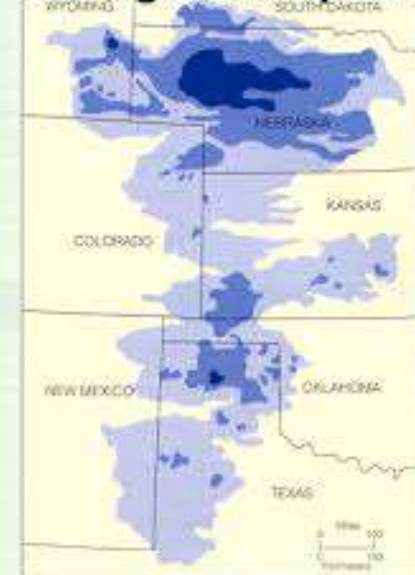
- Video – Global Warming
- How many earth's does it take to support your lifestyle? P 79 NB
- Record the number and give to Mrs. McAllister.
- Concept map – CH 5 slide 231
- Work on study guide.
- Foldable – biodiversity.
- Classtime – work on project?
- Mt. St. Helen's Video slide 41

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.

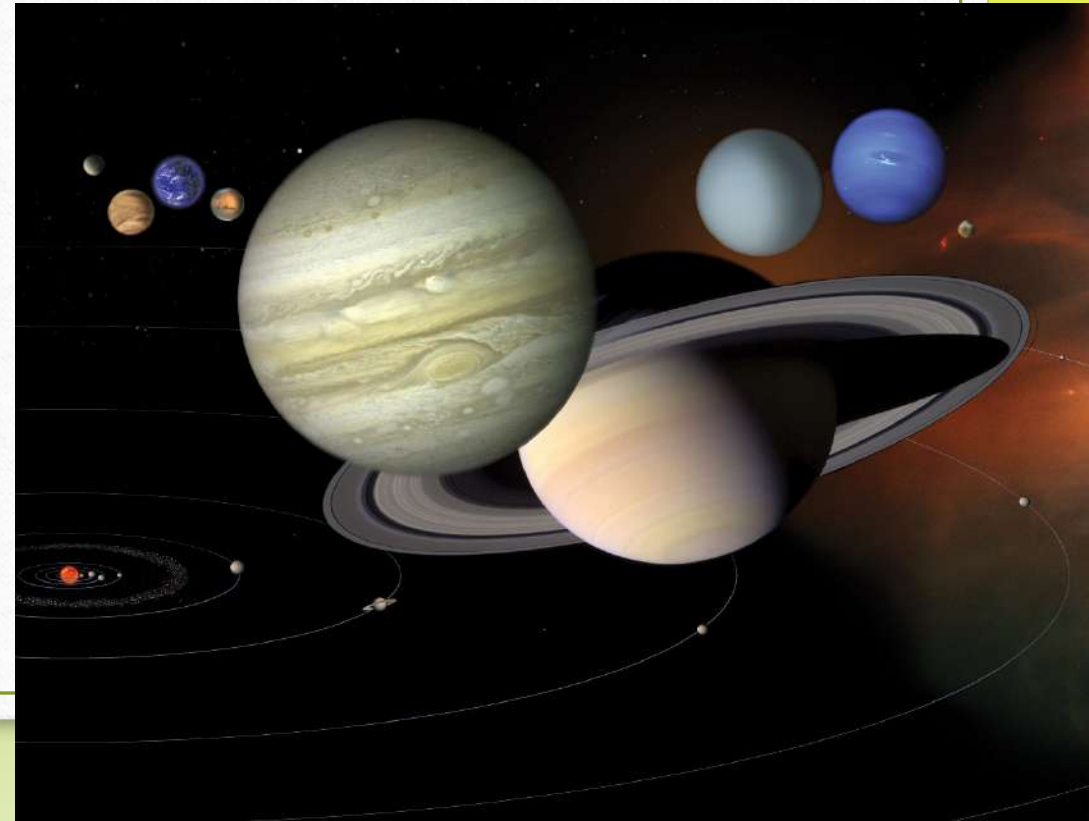
The Ogallala Aquifer



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?



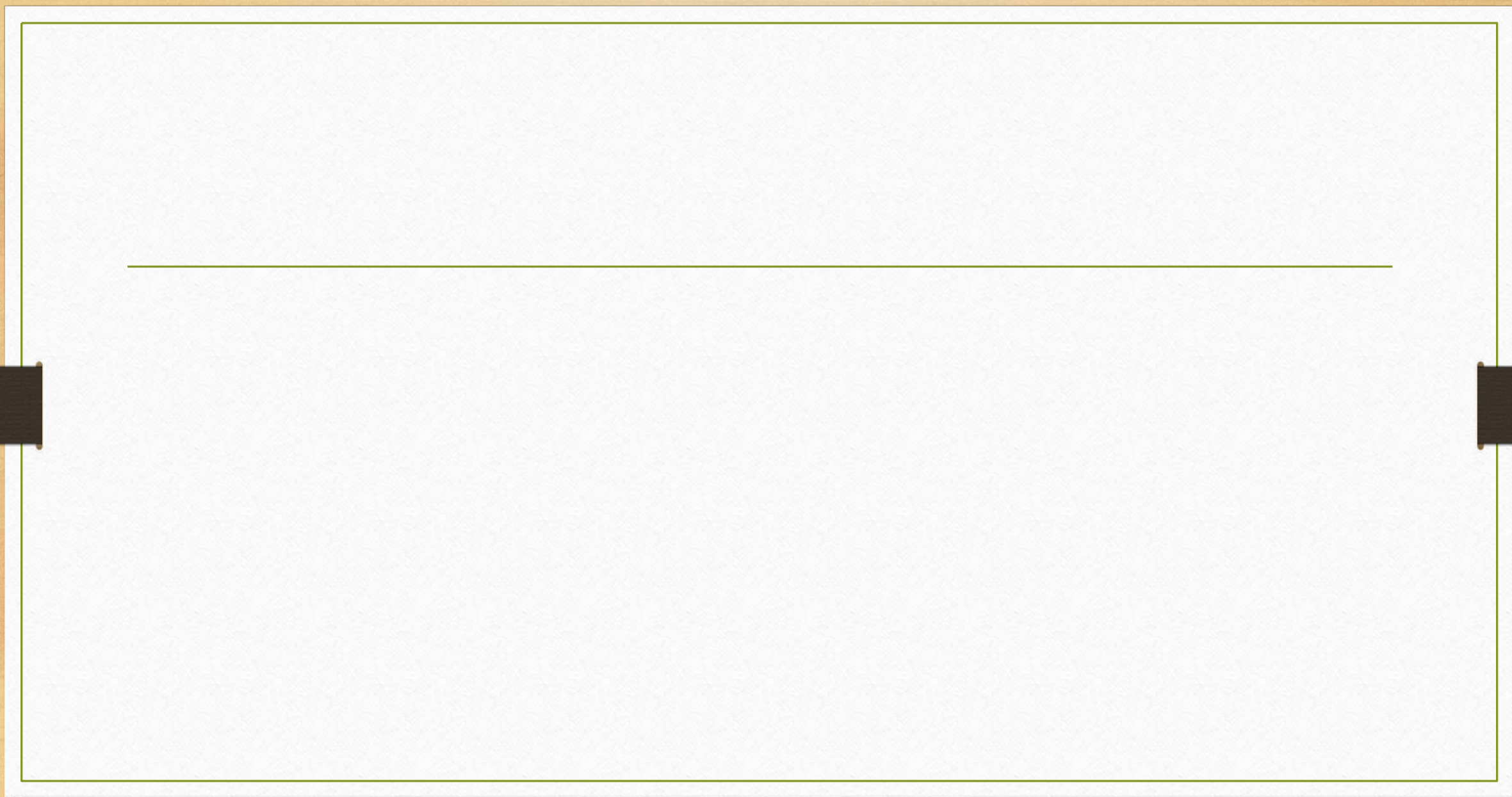
Garden Planning sheet

- 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, 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
- Vice President: Jason
- Secretary: Isaac
- Treasurer: Avi, Estaban
- Reporter: Jason, Arina
- Sentinel: Daniela, Samantha
- Chaplain: Carolina
- 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

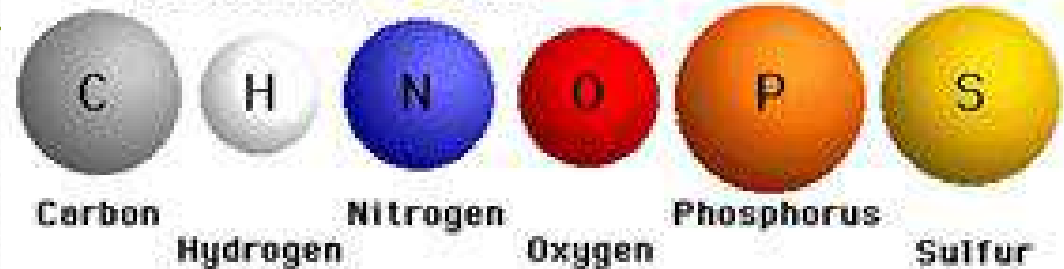
Organic Compounds

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

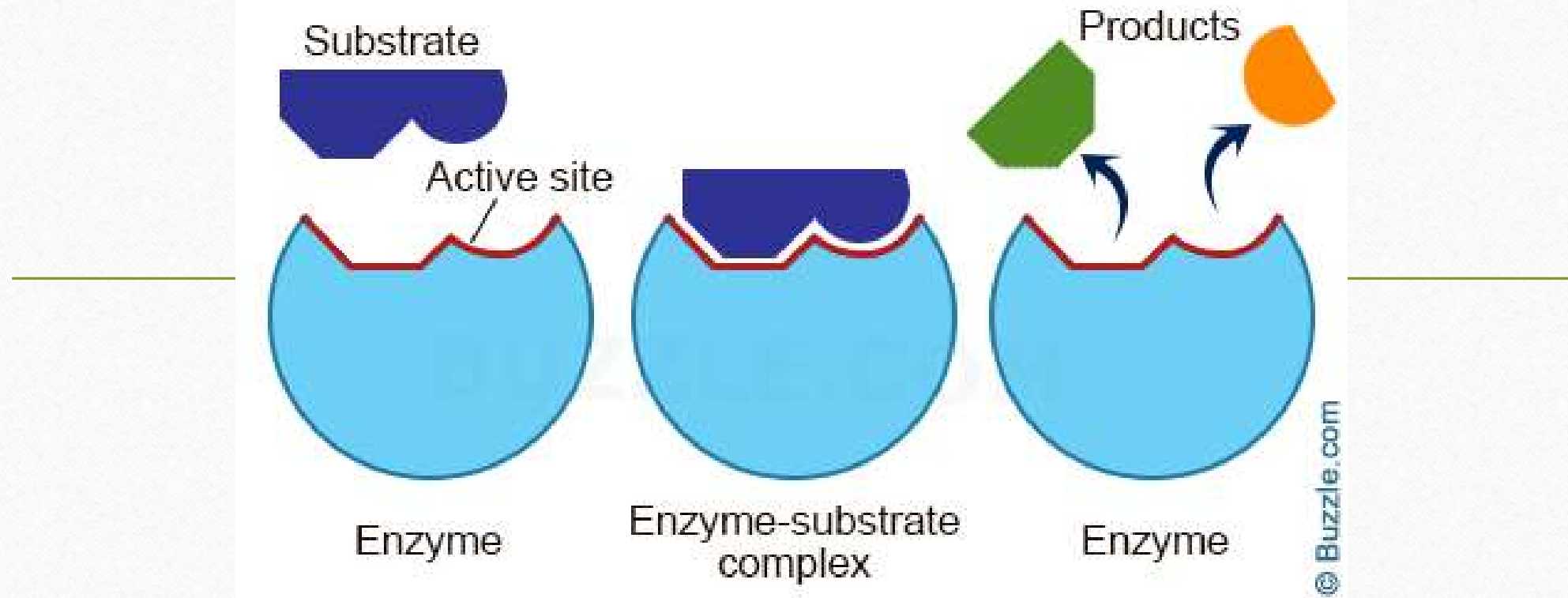
"CHONPS"



CHNOPS: The Six Most Abundant Elements of Life



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?



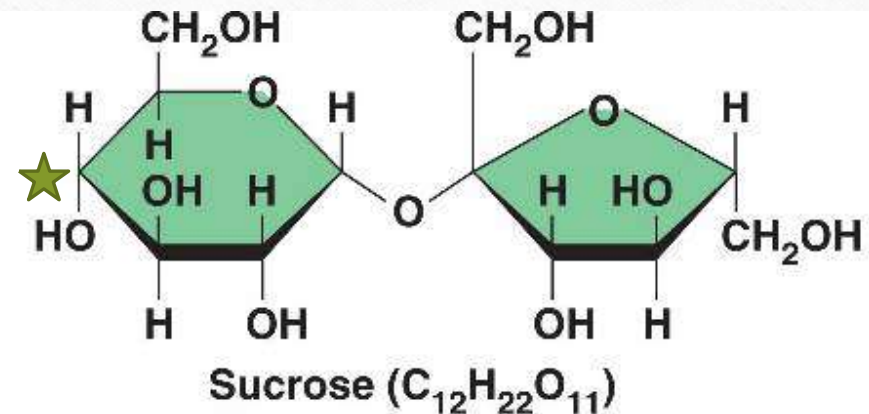
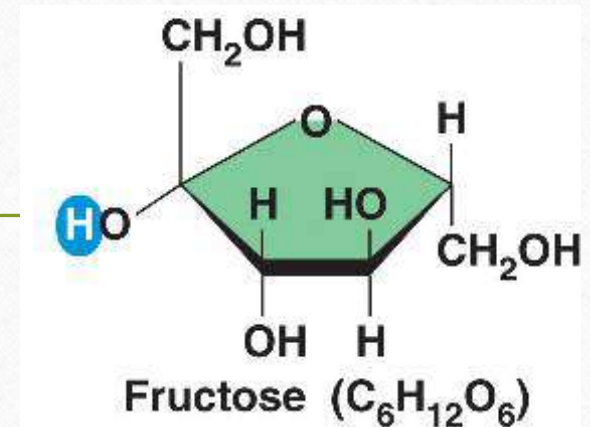
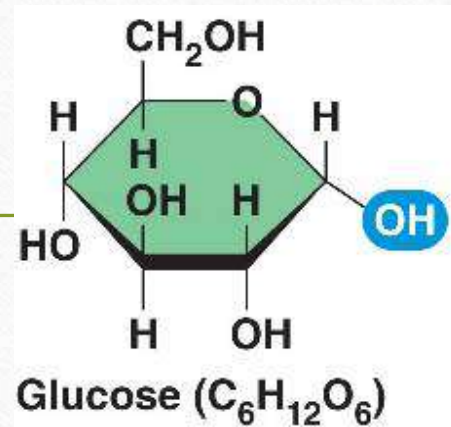
1. Temperature, pH, Amount of substrate or enzyme, Ionic Conditions (Salt)

Build a Monosaccharide!

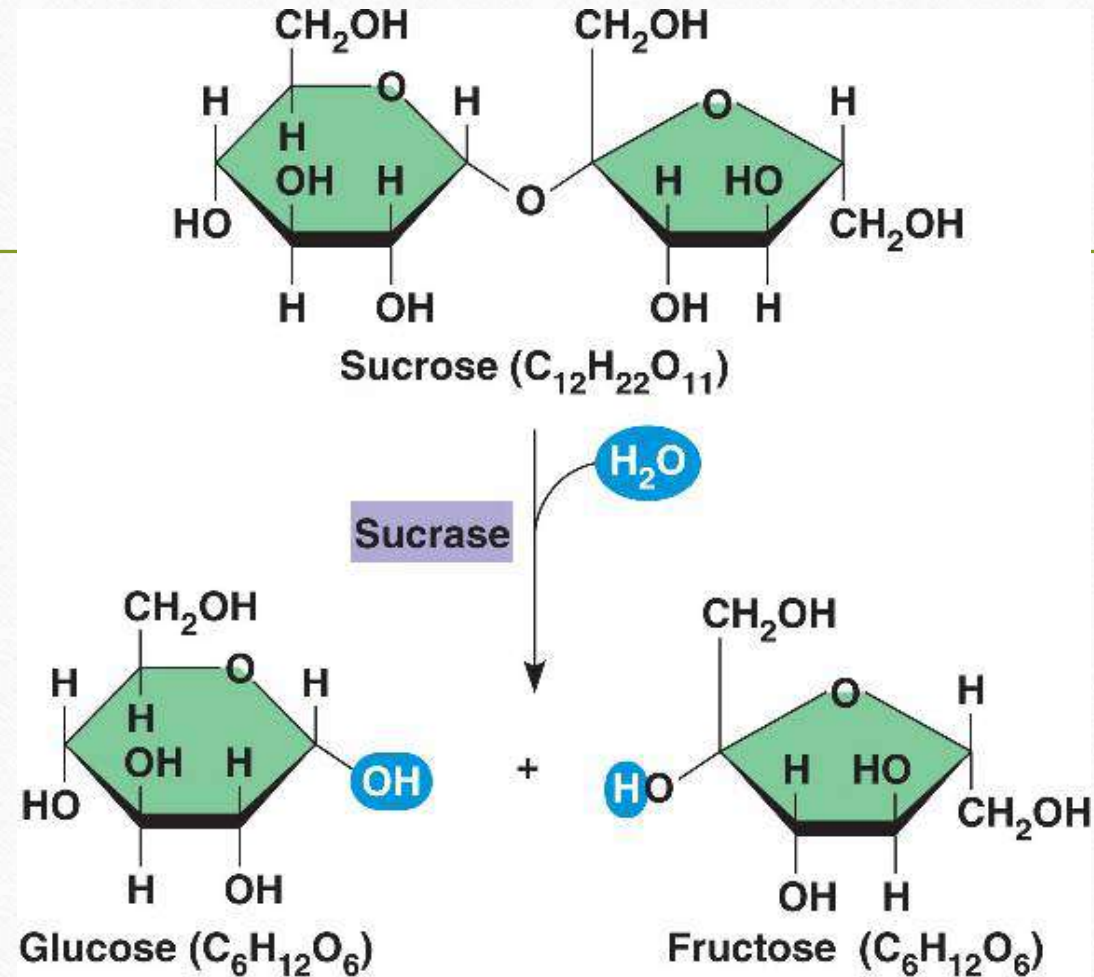
Show me a correct monosaccharide for extra credit!

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.



Enzymatic Reaction of Sucrase on Sucrose

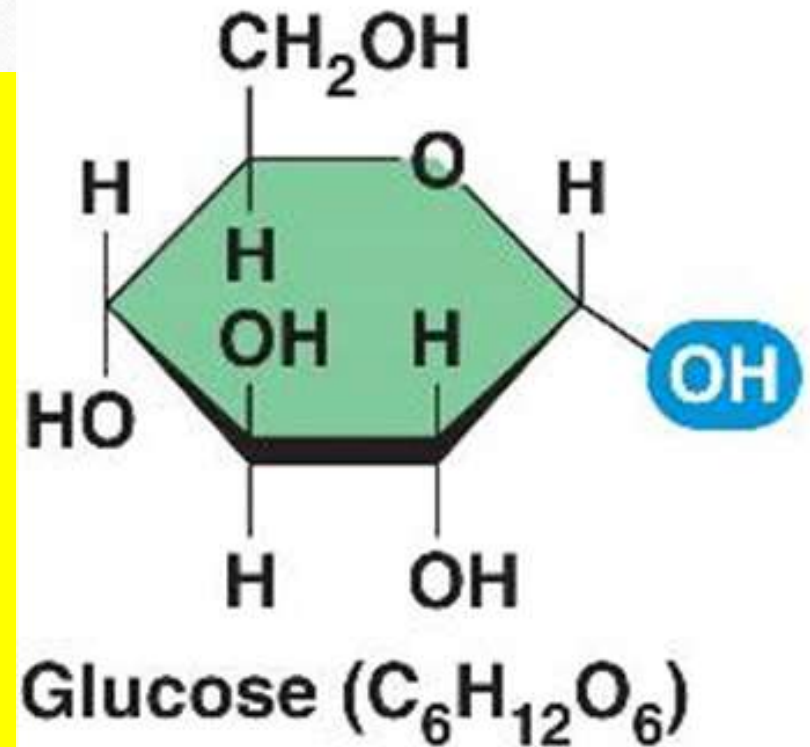


Using your Cycles in Nature, build the molecule that is most evident for your cycle:

H₂O, CO₂, NH₃, NO, NO₂, NO₃, O₂, CH₄,

C₆H₁₂O₆

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

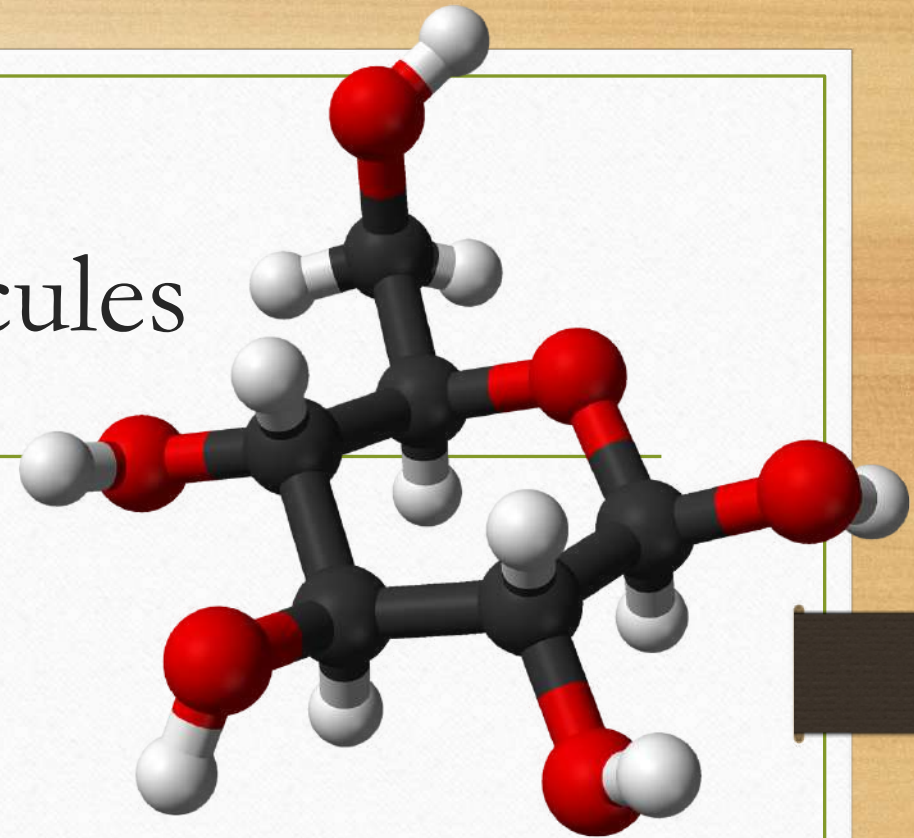


Theaet.com

- 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, NH_3 , NO_2 , NO_3



The Day WHO Parachuted Cats into Borneo

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



Parachuting Cats in

The Day WHO Parachuted Cats into Borneo

Borneo

p. 61 NB

Biomagnification

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

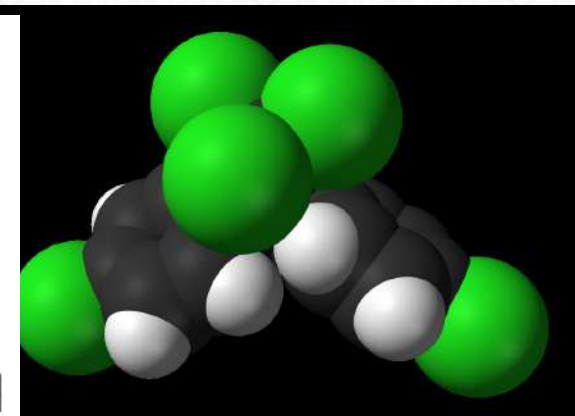
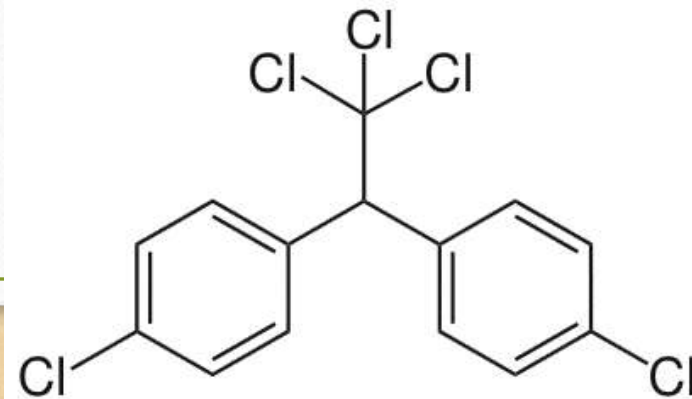
Some time ago, World Health Organization sent supplies of DDT to Borneo to Fight mosquitoes that spread malaria among the people. The mosquitoes were quickly wiped out. But billions of roaches moved into the villages and they simply stored the DDT in their bodies. One kind of animal that fed on the roaches 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.



Case 1

ml H2O 2	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 H₂O₂ 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 Reactions? 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?

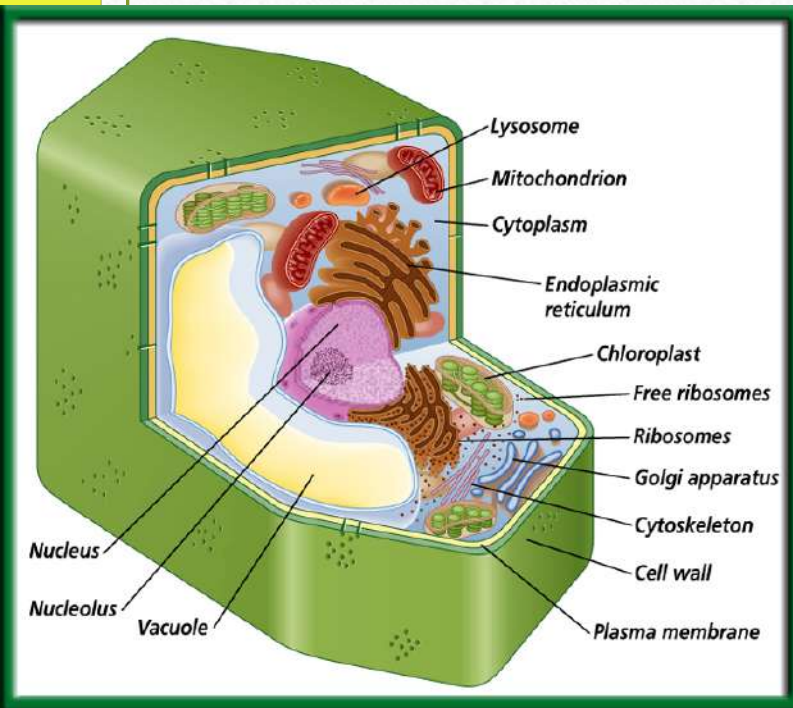
Macromolecules

Protein	Lipids	Carbohydrates	Nucleic Acids

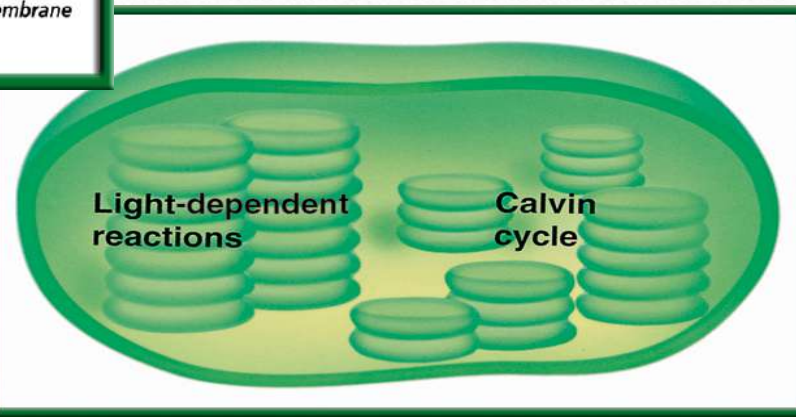
9/14 Photosynthesis: Trapping the Sun's Energy 9.2

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

Cellsalive.com

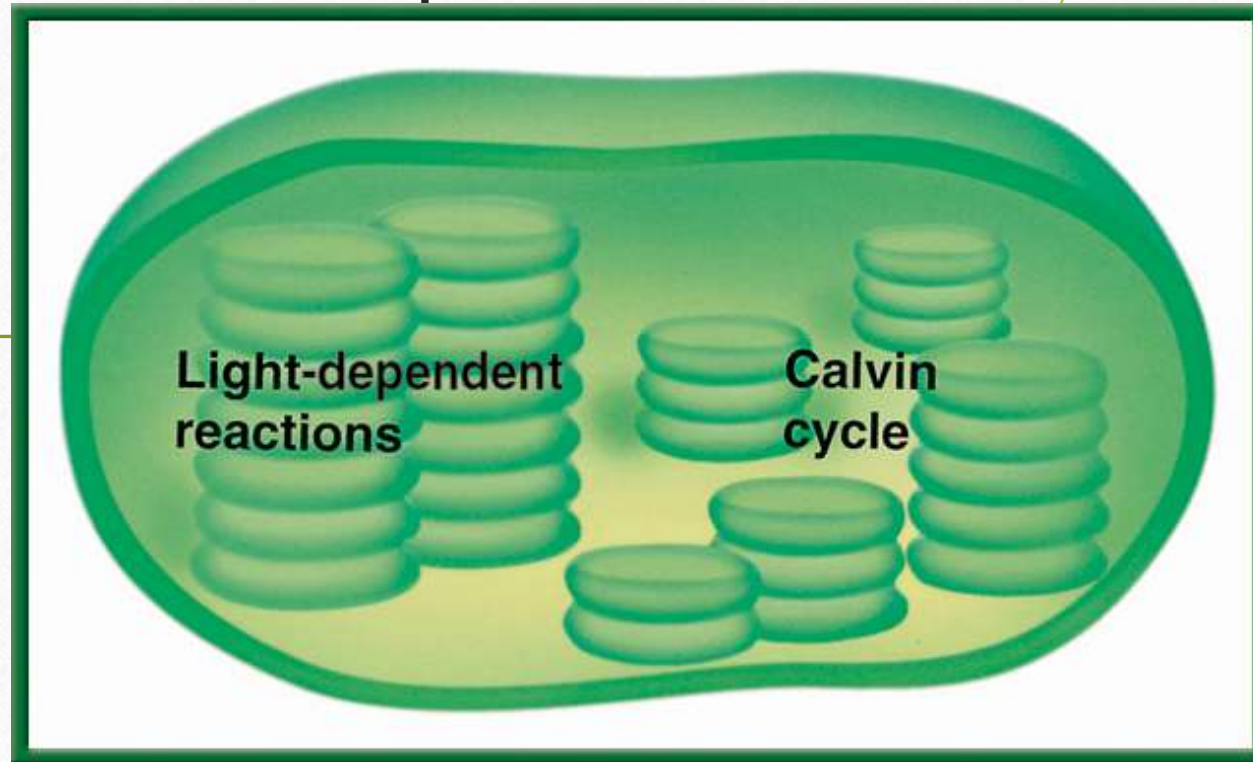


1. What organelle in the plant cell traps the sun's energy, what is that process called?
2. Write and memorize the equation for photosynthesis.
3. What are the Reactants and the Products for Photosynthesis, what is the catalyst for this process?



Show Photosynthesis video
Osmosis AXES

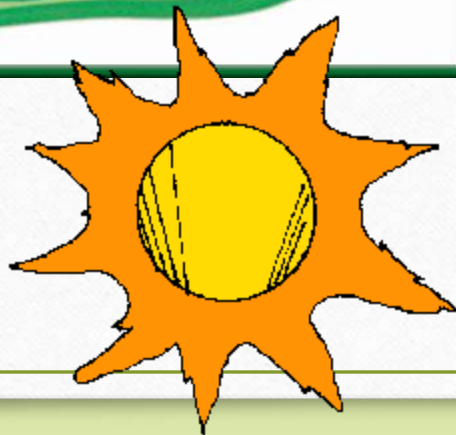
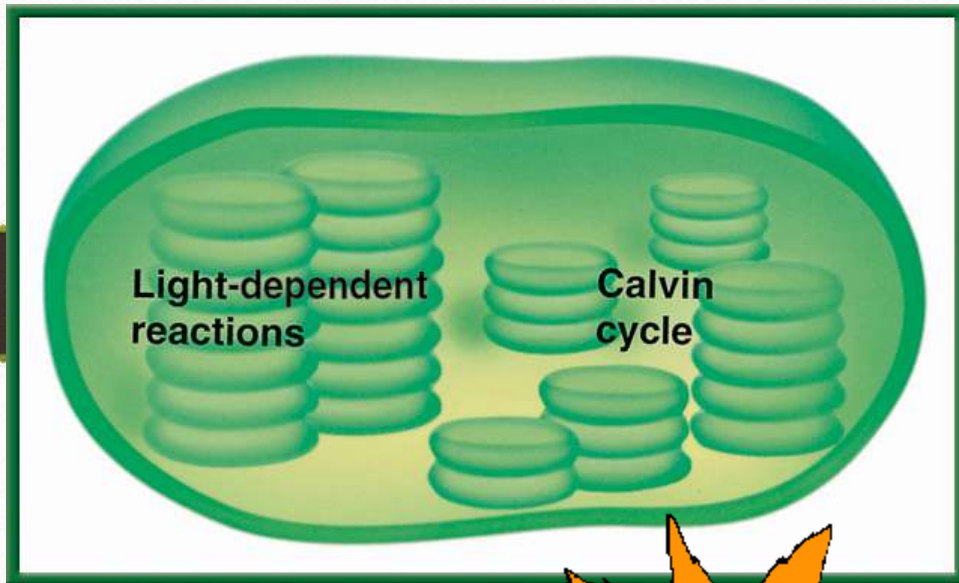
#1 Chloroplast - Photosynthesis



#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_2O by doing a flow chart. 48 NB



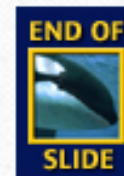
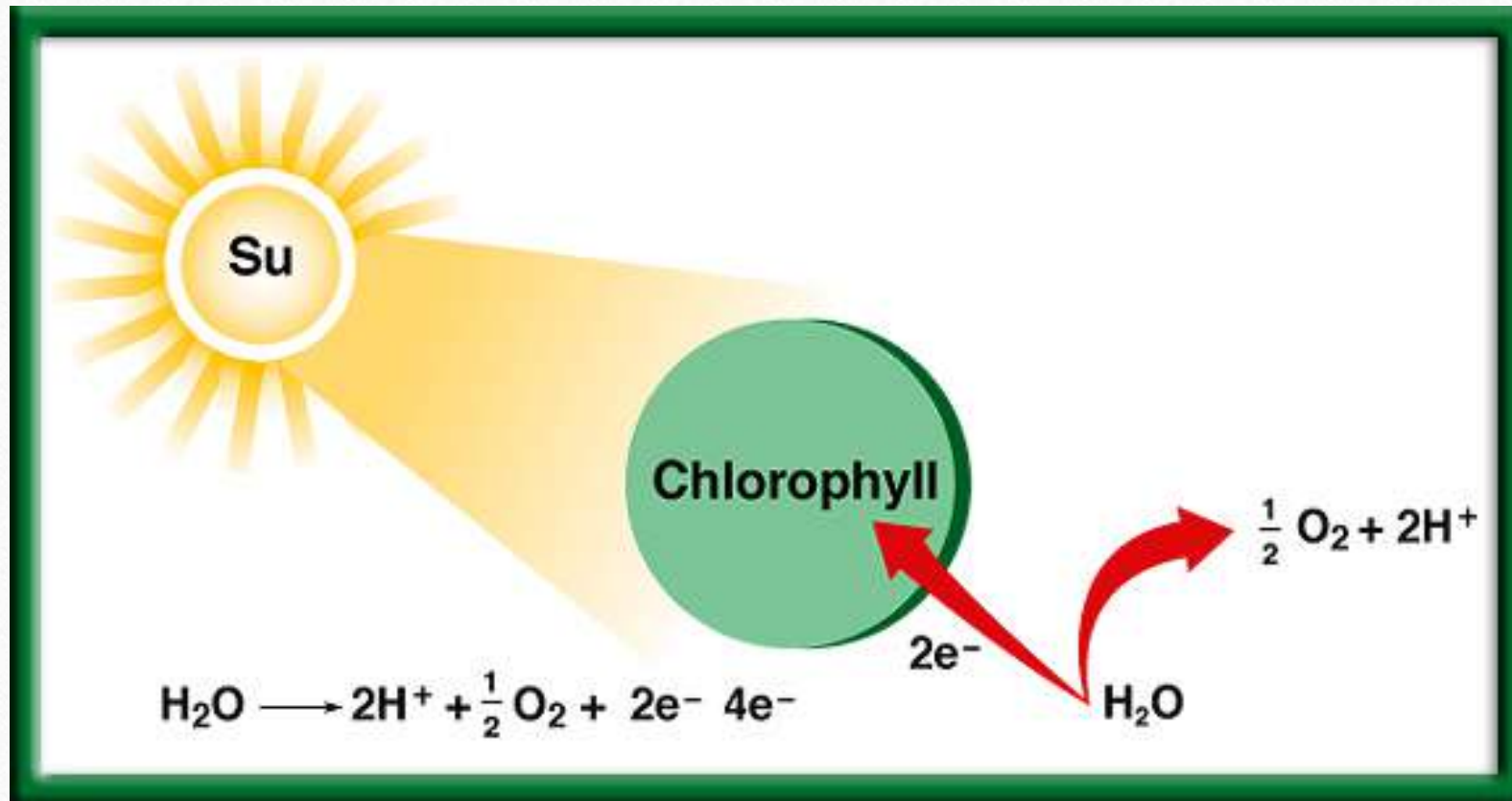
1. Why is **Photolysis** important?
2. Compare and Contrast **Light Dependent** reactions and **Light Independent** reactions.
3. Where does the **Calvin Cycle** happen in the cell and what does it produce?

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 .



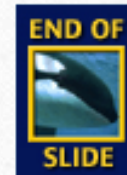
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RESOURCES

Restoring electrons

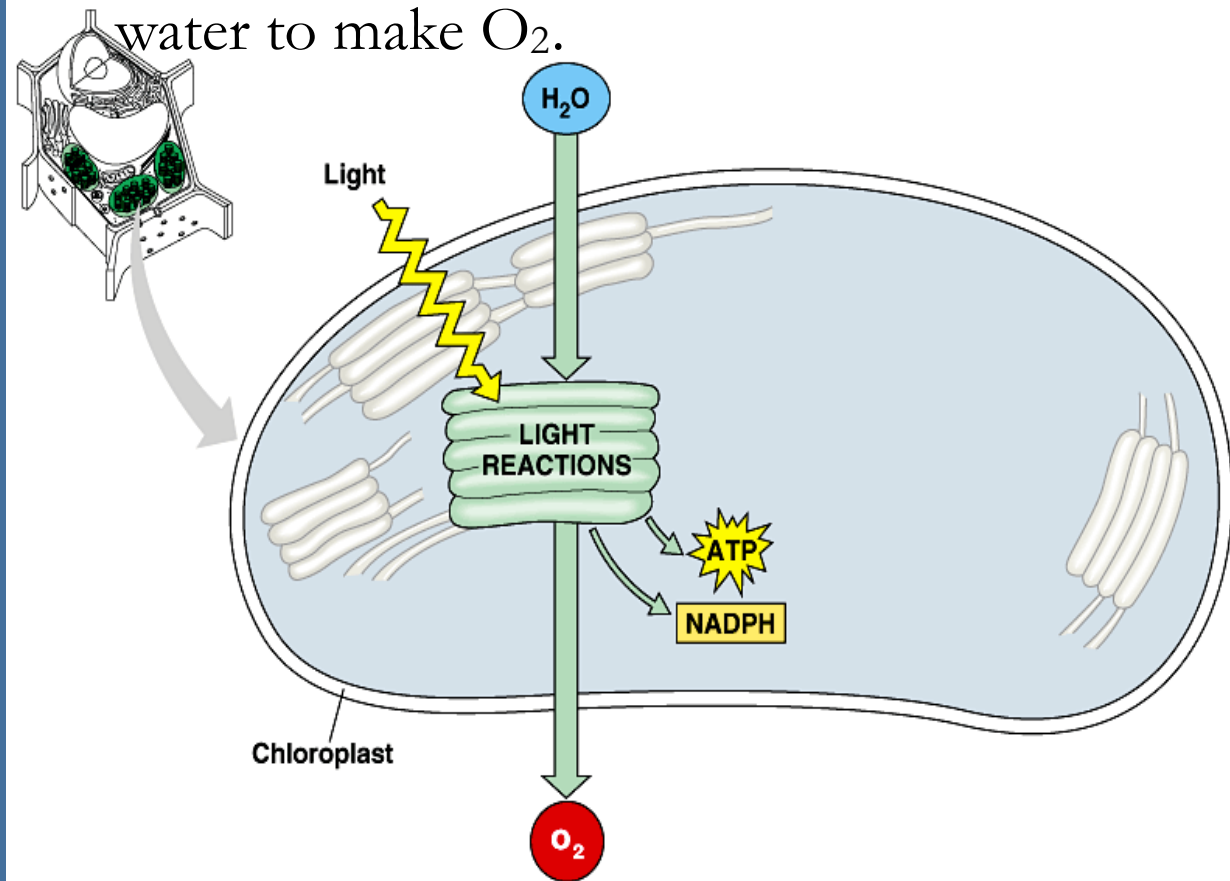
- The oxygen produced by photolysis is released into the air and supplies the oxygen we breathe.
- The electrons are returned to chlorophyll.
- The hydrogen ions are pumped into the thylakoid, where they accumulate in high concentration.



#2. How does light energy become chemical energy?

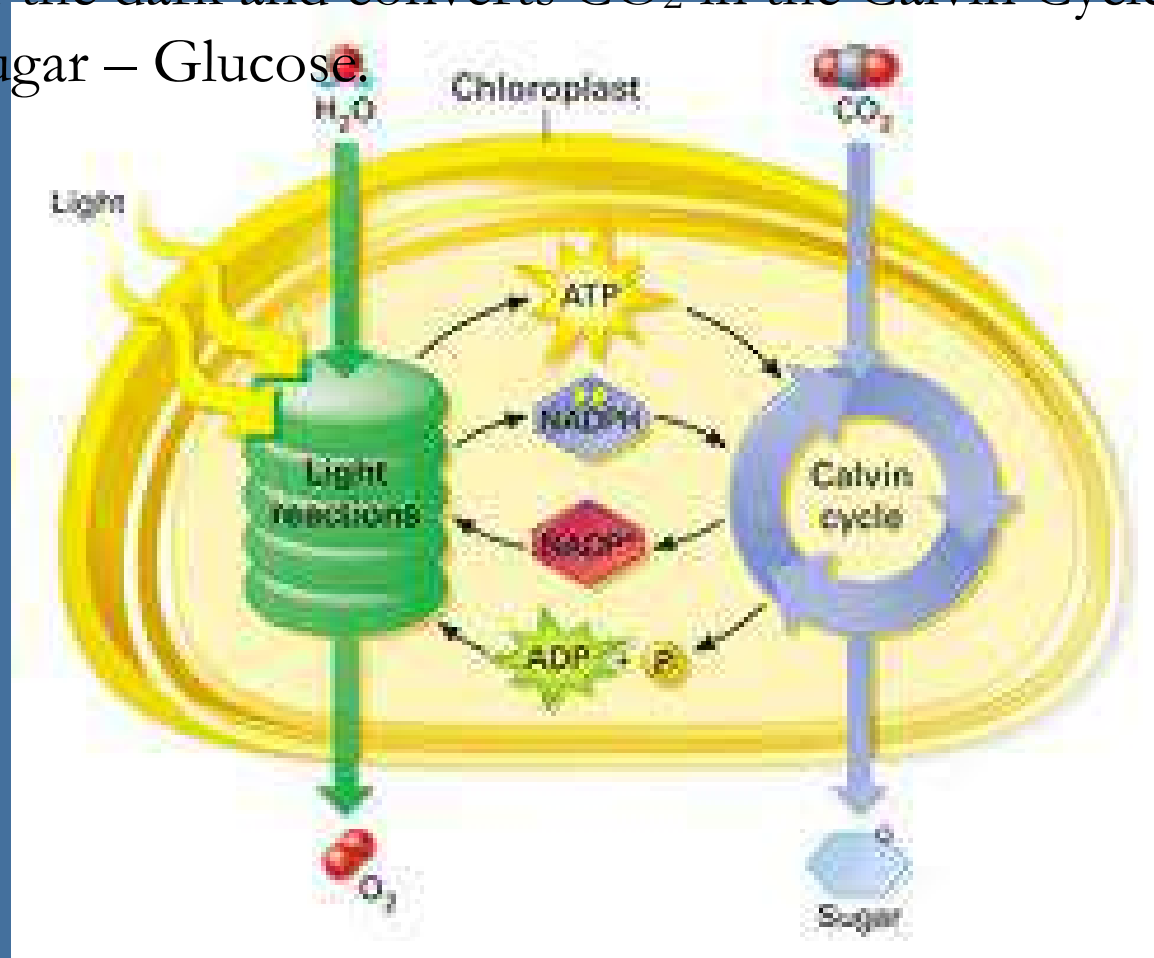
Light Dependent Reaction happens in the light when the light hits the Grana and splits

water to make O_2 .





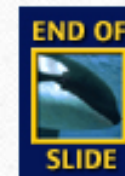
#2. How does light energy become chemical energy?

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 $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

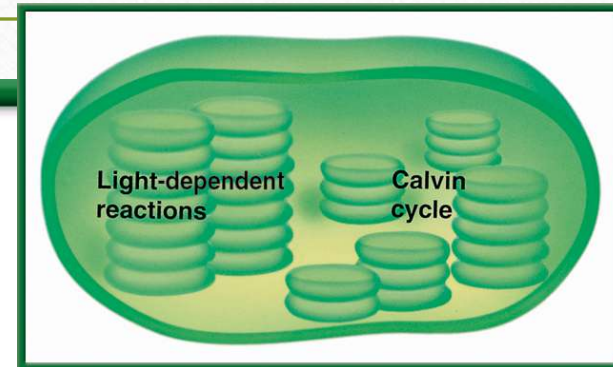
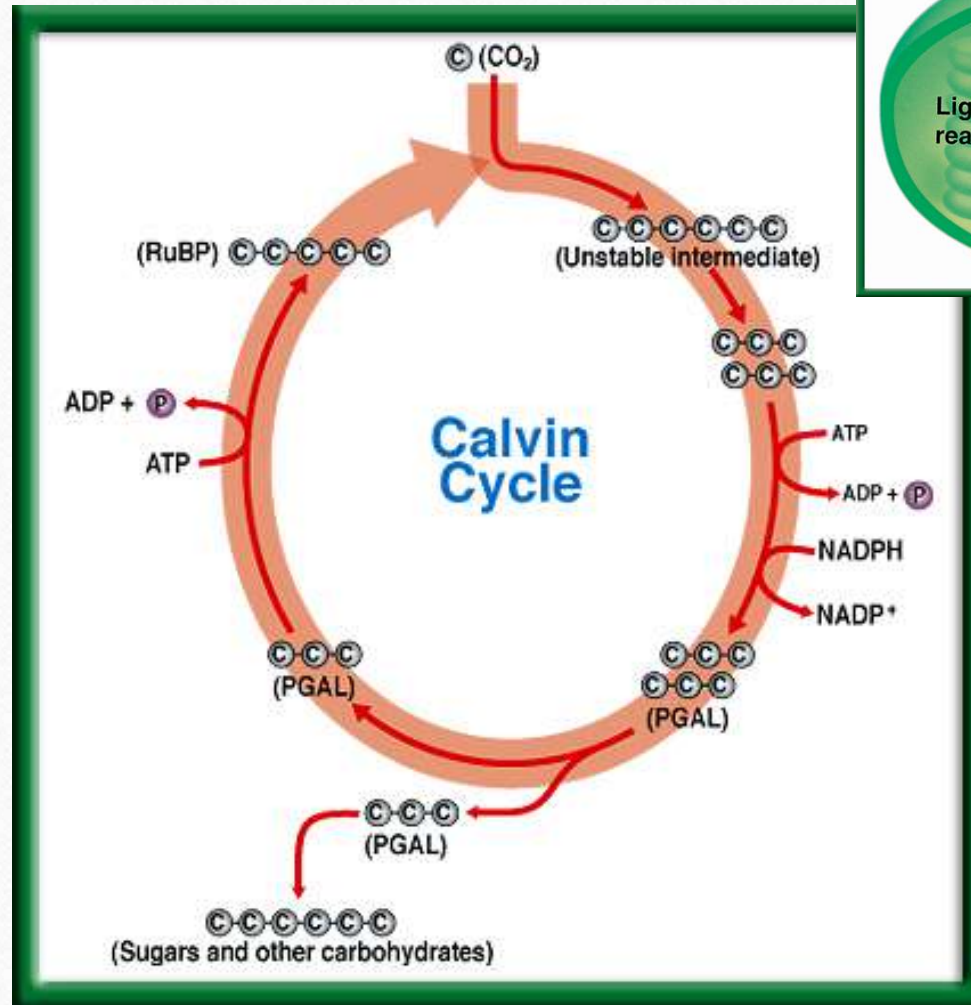


Chapter 9

Image Bank

Calvin Cycle

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



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

END OF SLIDE



RESOURCES

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

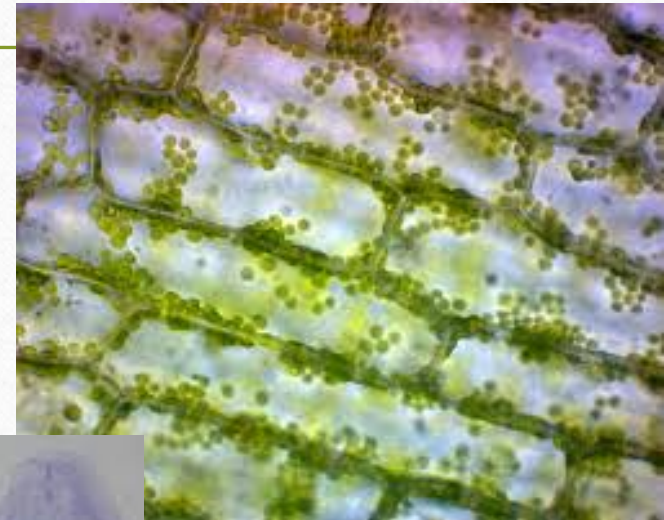
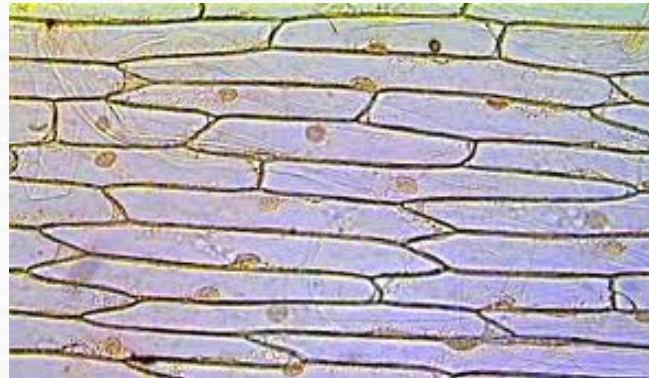
- Nucleus

- Cytoplasm

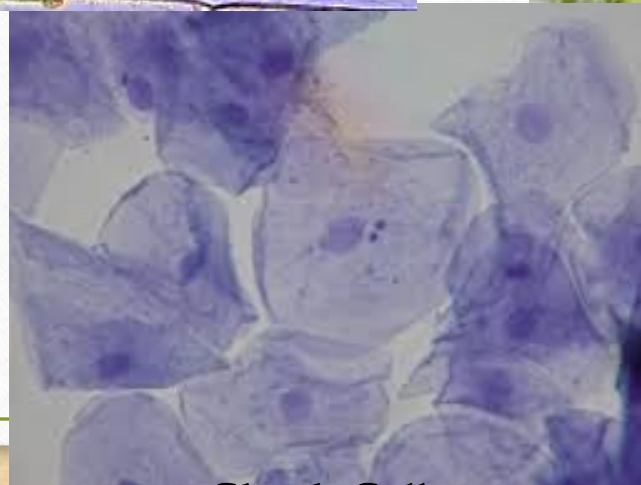
- Chloroplast

- Plasma Membrane

Onion Cell



Elodea Cell



Cheek Cell

Lab – Scientific Method using Elodea Leaf, Onion Cells & Cheek Cells

p. 47 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, peel 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. 47 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.

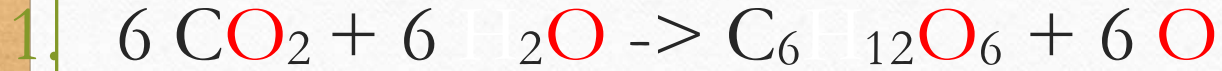
- **Dependent Variable:** The amount of Cheek Cells

- **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. 47 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. 55NB



Carbon Dioxide + Water = Glucose + Oxygen

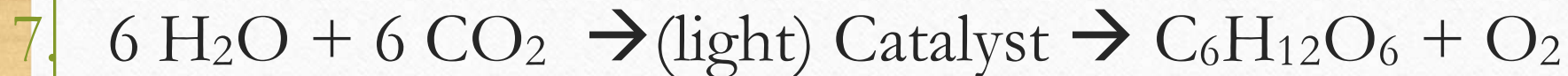
2. Sunlight – Catalyst

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.



Glucose Synthesis Activity

Photosynthesis: $6 \text{CO}_2 + 6 \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}$

- 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

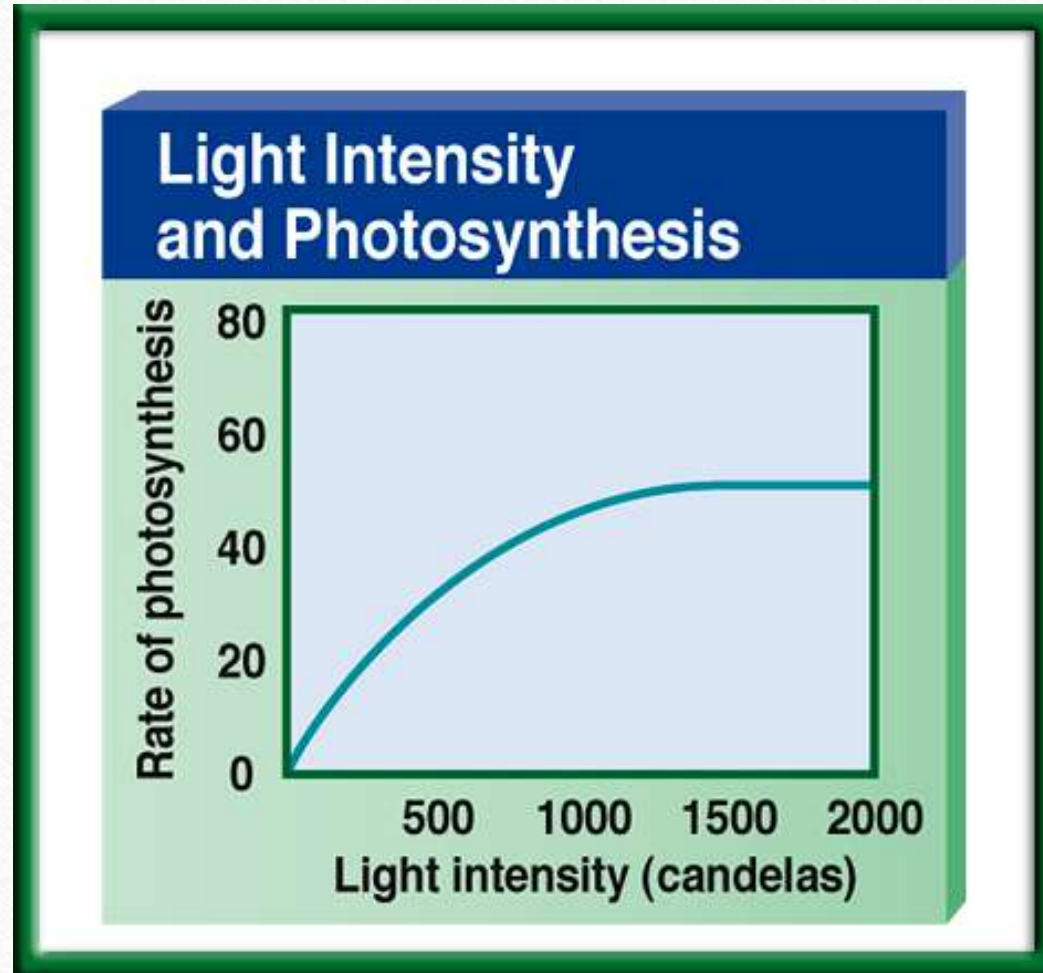
- Person 5 – Get ATP for Cellular Respiration

- Glucose

- $\text{C}_6\text{H}_{12}\text{O}_6$

Cellular Respiration: $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + 36 \text{ATP} + \text{Heat}$

- 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



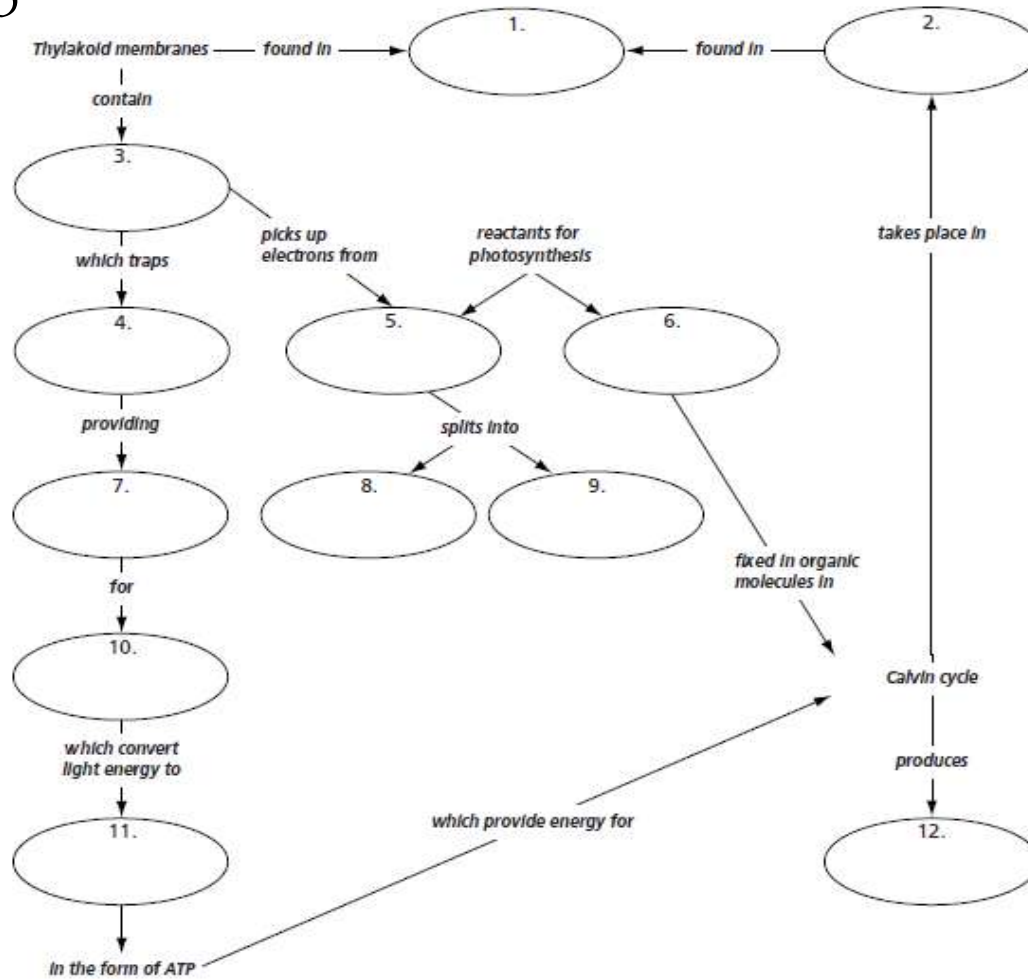
To return to the chapter summary click escape or close this document.



p. 47 NB
Write a 3 – 5
sentence
summary

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.*



- 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.

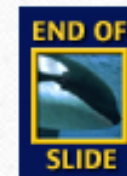
Question 1

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.



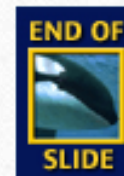
Question 1

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.

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



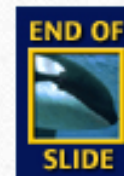
Question 2

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.



RESOURCES

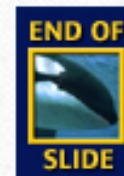
Question 3

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.

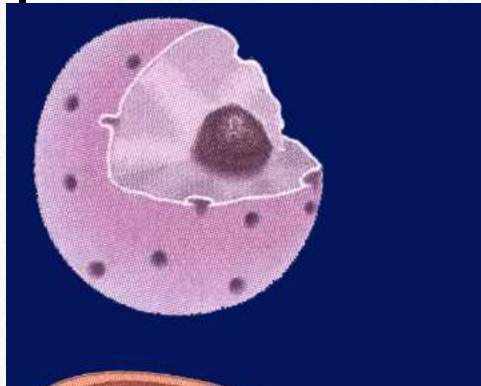


RESOURCES

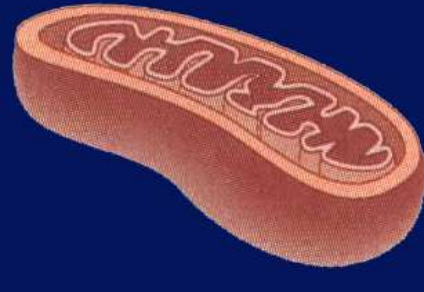
Question 4

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

A.



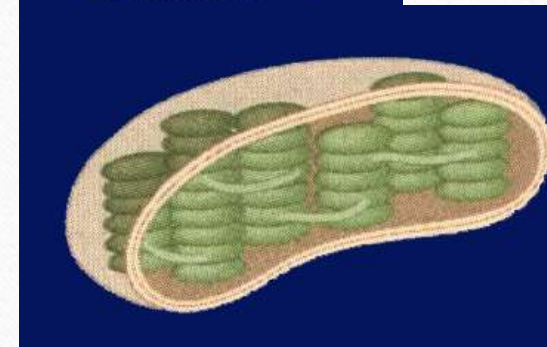
B.



C.



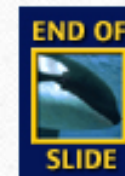
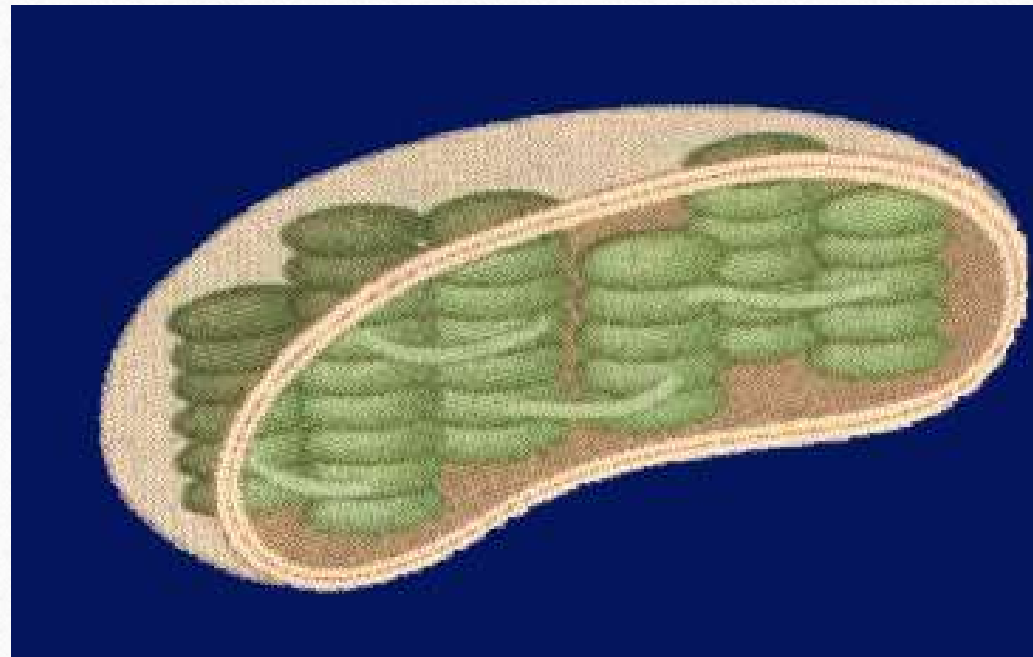
D.



END OF
SLIDE



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

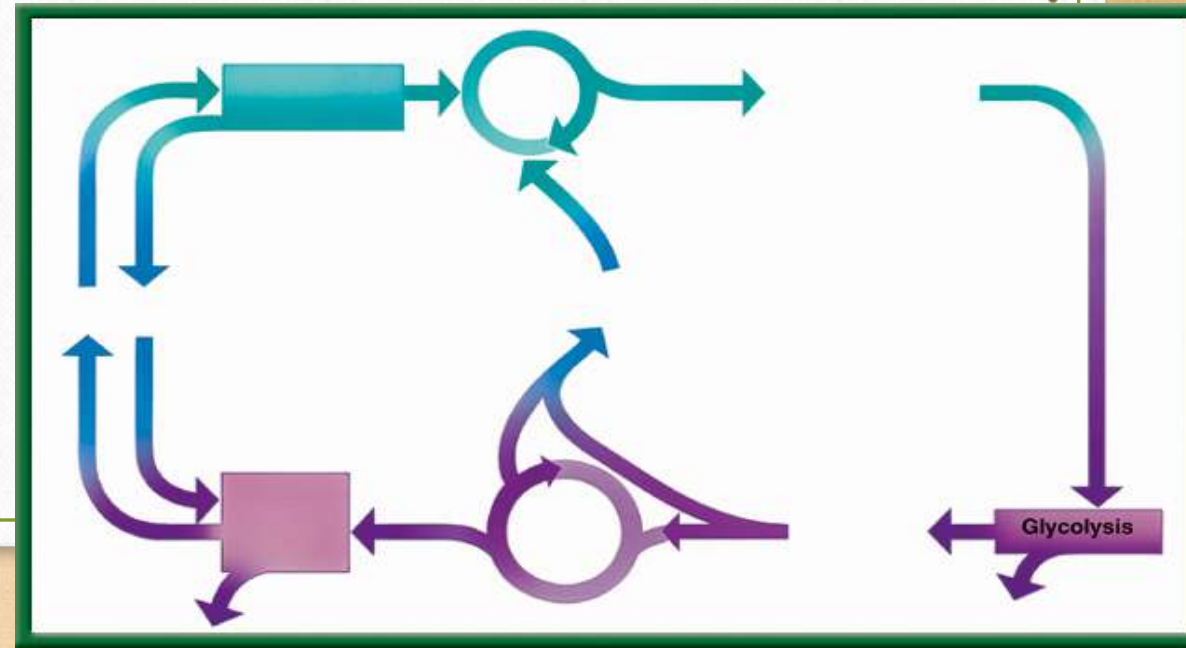
3/3 Cellular Respiration & Fermentation 9.3

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

pg. 58 NB

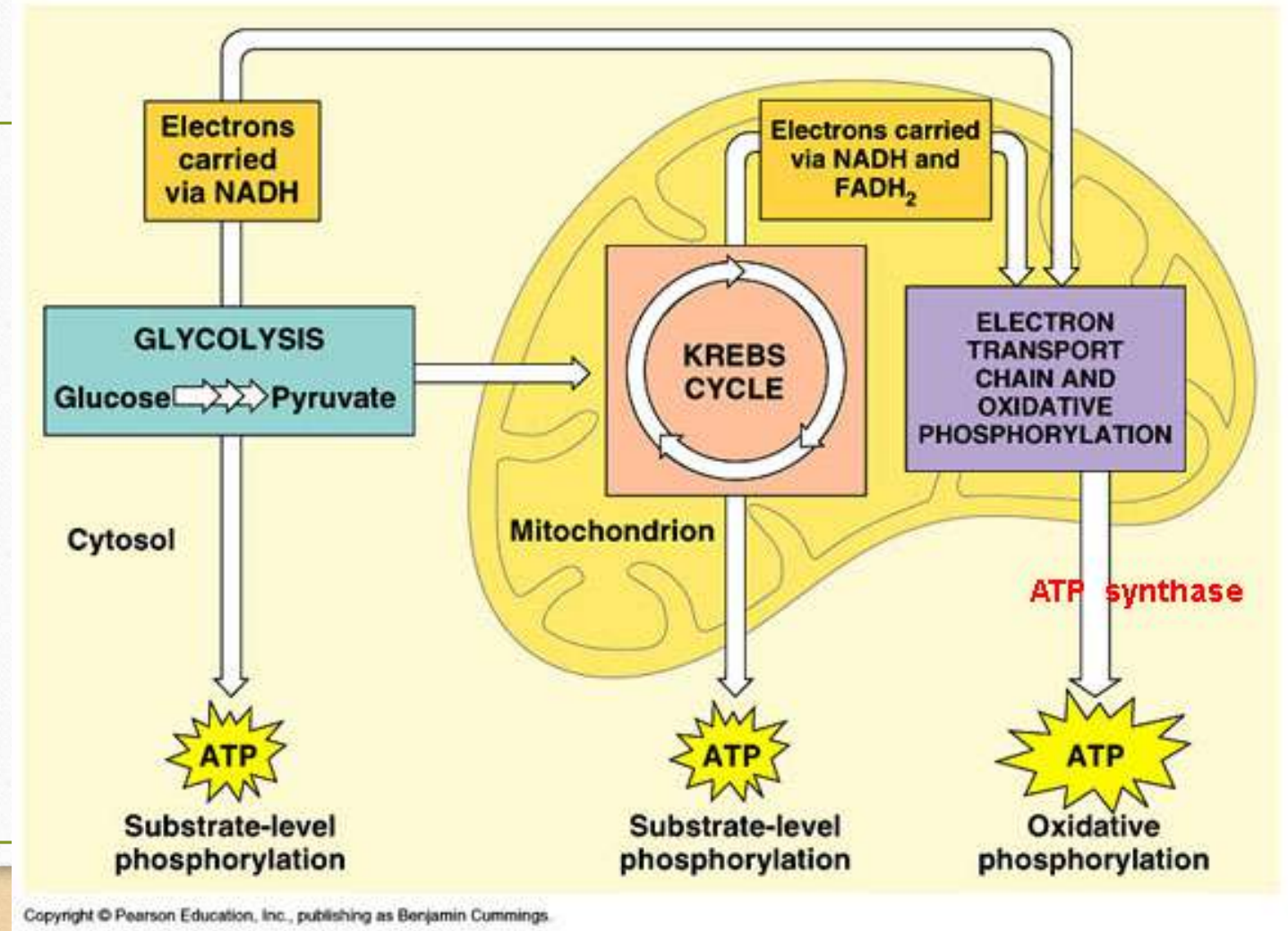
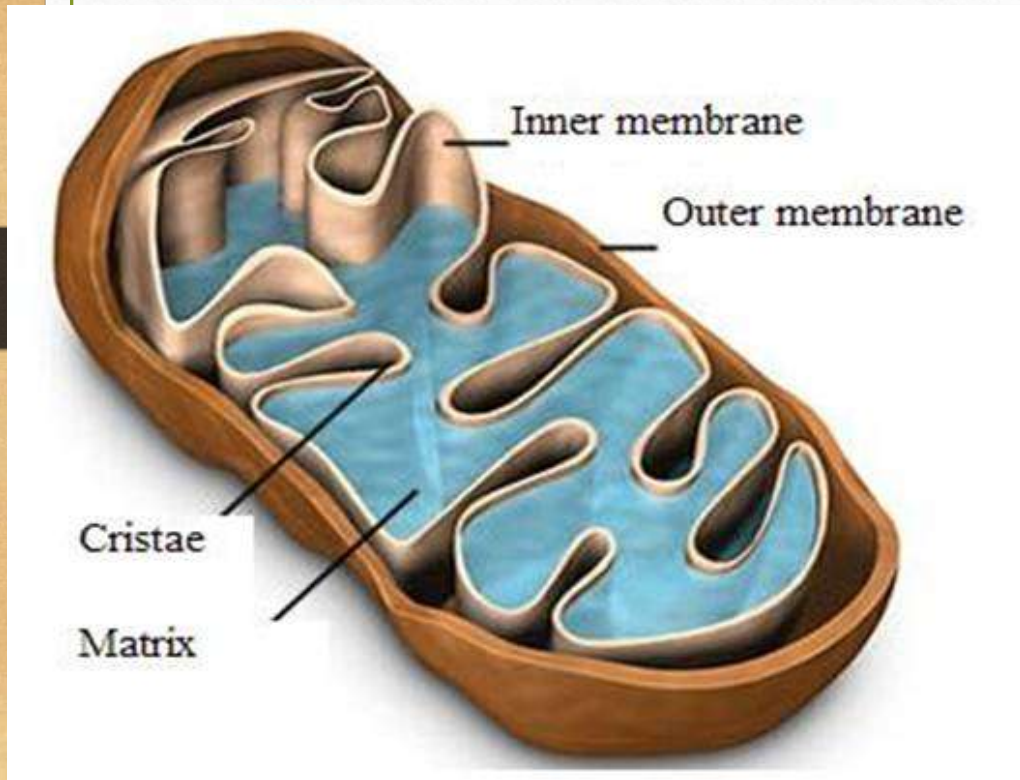
- <http://science.pppst.com/biology.html>

- 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?



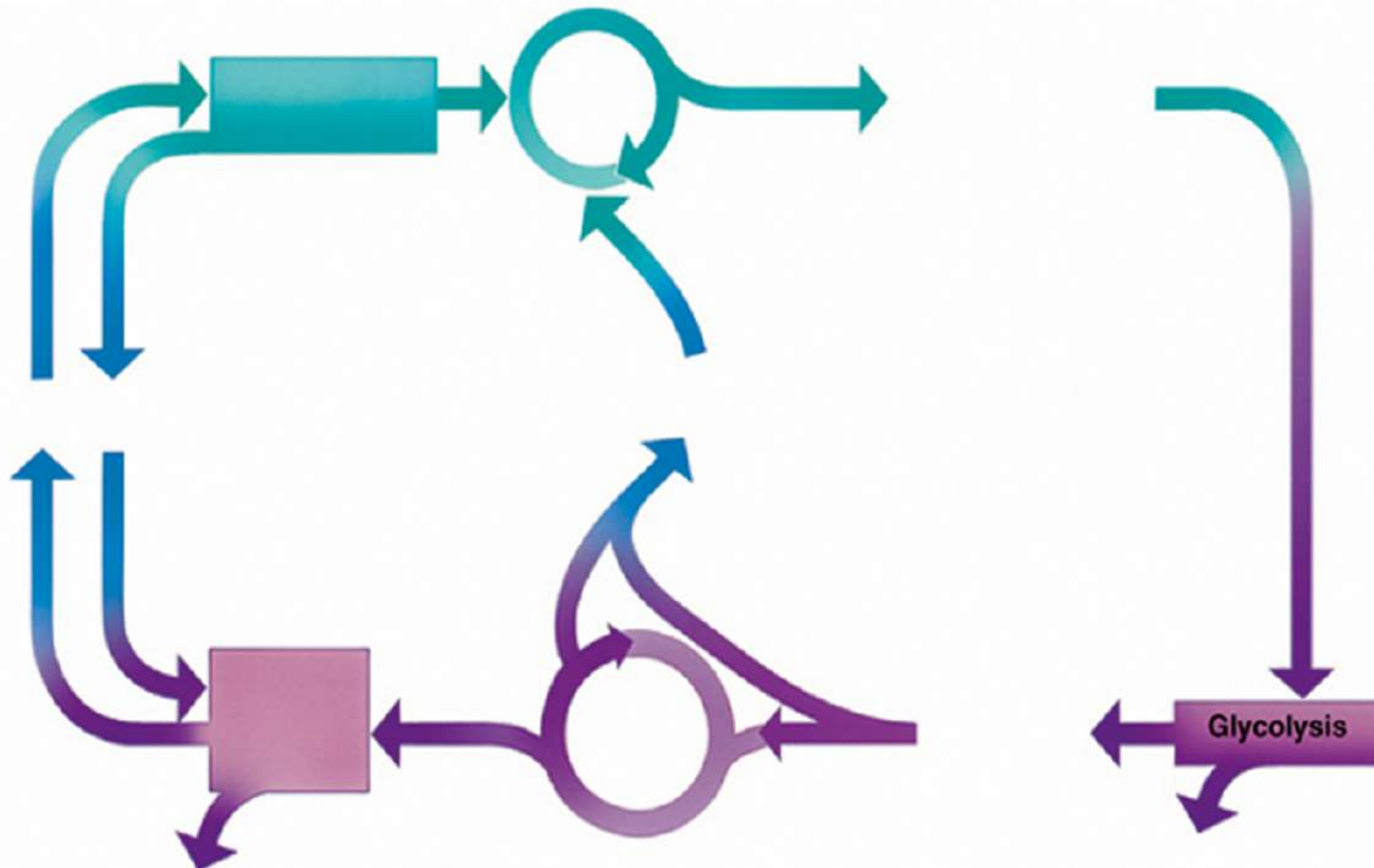
1. Cellular Respiration – converts glucose in to ATP and Heat in the mitochondria.

All living organisms perform Cellular Respiration including plants.



#2. The reactants for Photosynthesis (CO_2 & H_2O)

... ..ation.

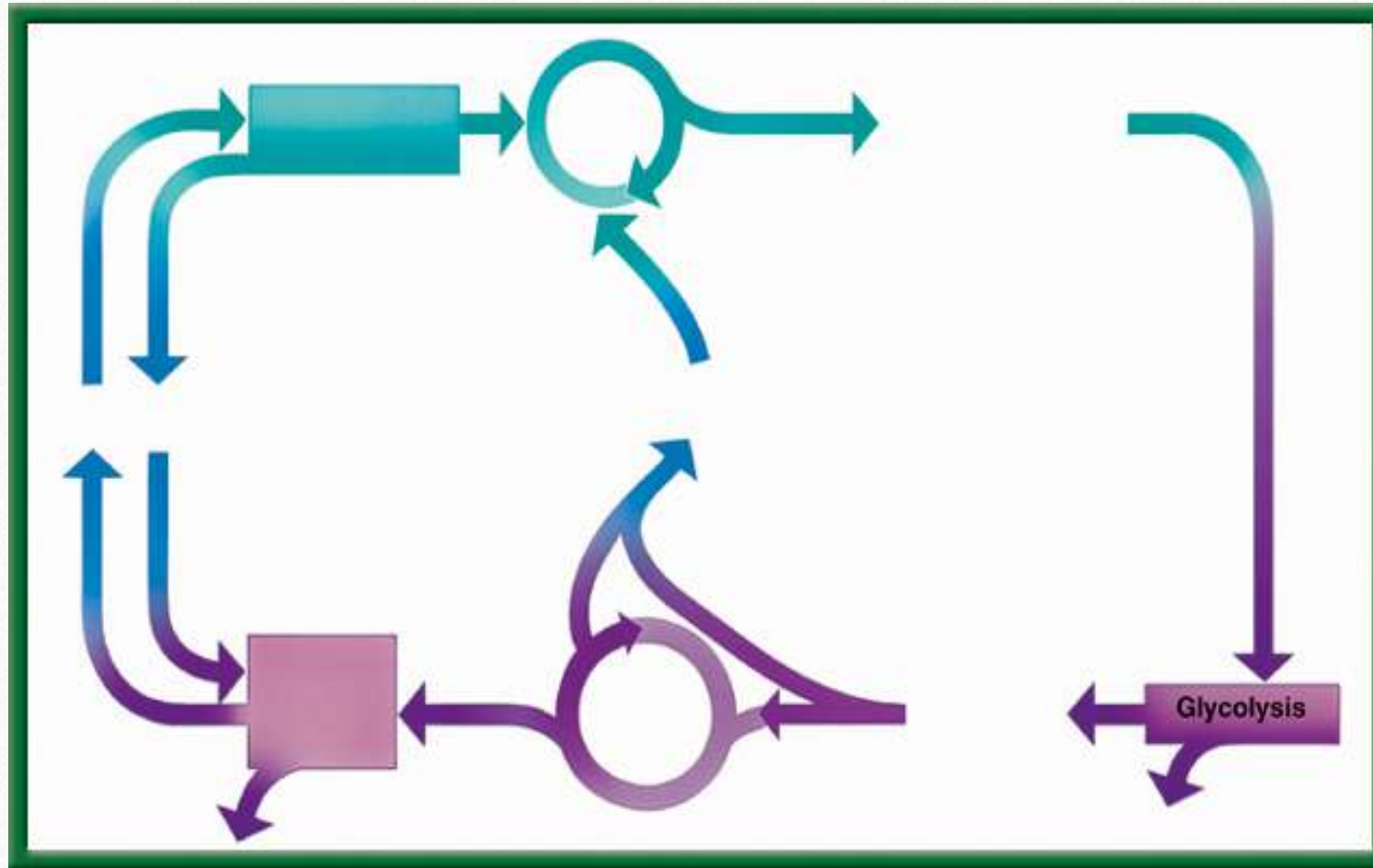


9.3

2.

P.55 NB Compare and contrast **cellular respiration** and **photosynthesis**.

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

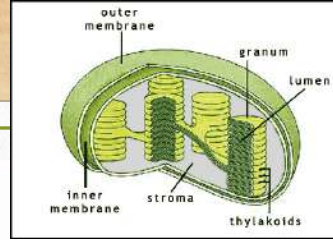


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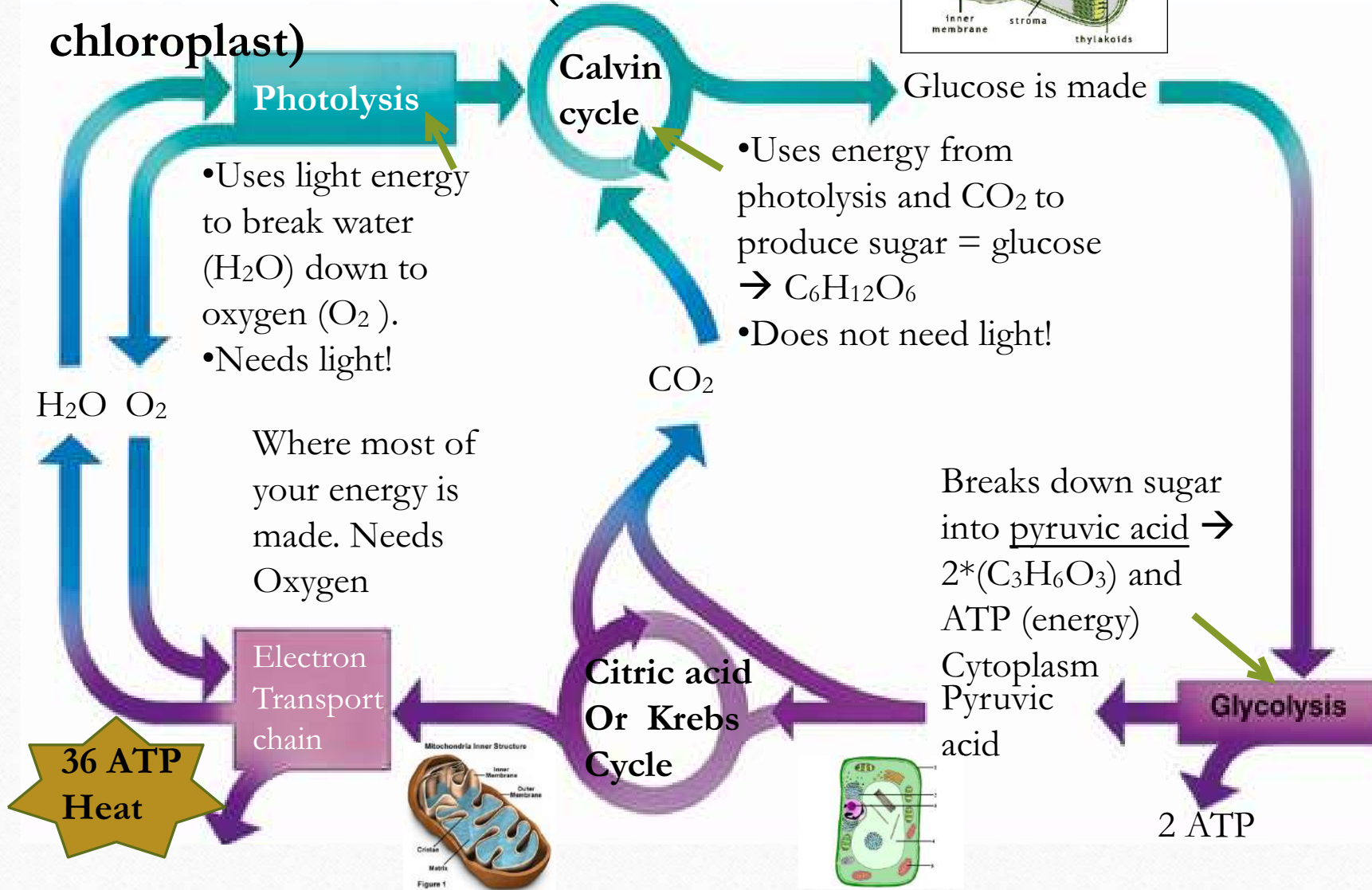
To return to the chapter summary click escape or close this document.



RESOURCES



PHOTOSYNTHESIS (in the chloroplast)



CELLULAR RESPIRATION (in cytoplasm and mitochondria)

Taboo

Cellular Respiration

Vacuole

Prokaryotic

Osmosis

Passive Transport

Macromolecule

Taboo

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

Taboo

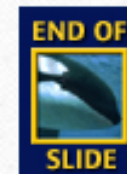
- Scientific Method
- Independent Variable
- Plasma Membrane
- Bacteria
- Prokaryotic
- Chloroplast

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

Comparing Photosynthesis and Cellular Respiration Notes p. 57 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 57NB

- 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
- $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ Photosynthesis
- $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + 36 \text{ATP} + \text{Heat}$
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

- Get into groups of 3 people. Get 1 flask, 1 balloon, 1 sugar cube, and $\frac{1}{2}$ 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 P. 31

- Question: How much Carbon Dioxide will be produced?
- Independent Variable: Changed the number of sugar ($C_6H_{12}O_6$) cubes.
- Dependent Variable: More Carbon Dioxide was produced.
- Control: 1 sugar cube was the control.

-
- Constant: Same Sugar, Yeast, balloons, Flasks
 - Materials & Equipment: Yeast – $\frac{1}{2}$ 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, Catalase & 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 47 NB

- Constant: Same potato, H₂O₂, balloons, Flasks
- Materials & Equipment: H₂O₂ 1/2 tsp., balloons, Hot plate, Flask
- Experimental Set up: Draw only
- Safety Concerns: Don't eat the potatoes.
- 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

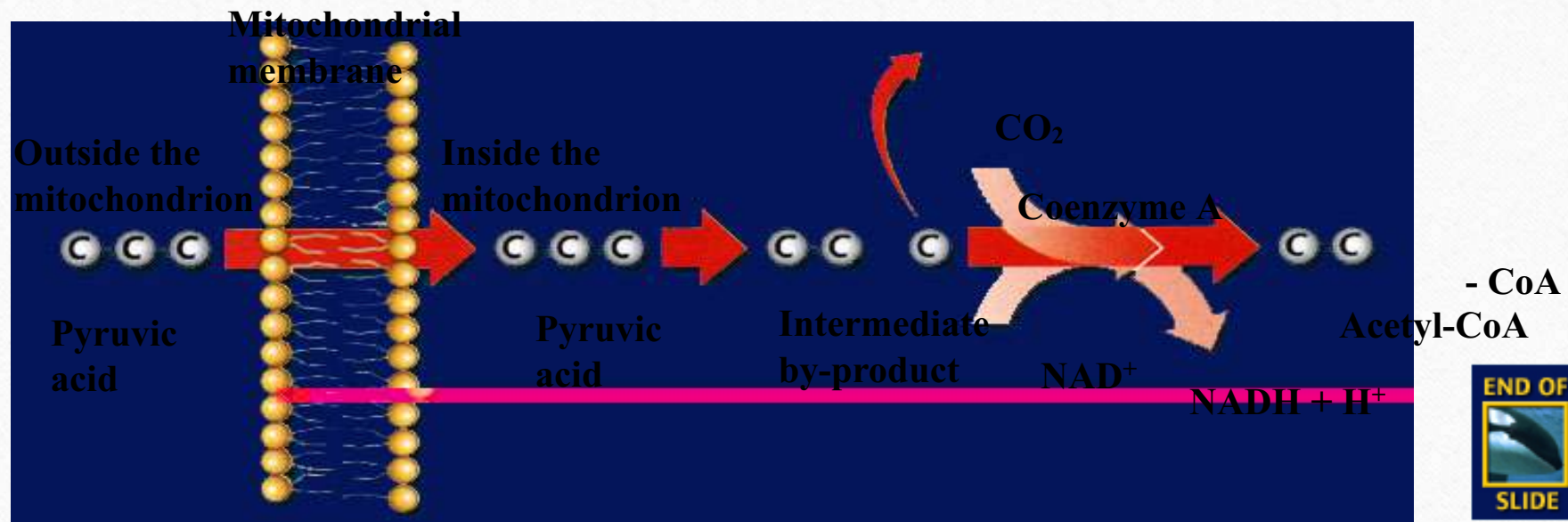
- Takes place in the cytoplasm of the cell
- Process where glucose is broken down and some energy is released
- In the absence of Oxygen, fermentation happens.

9.3

Getting Energy to Make ATP

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.

[RESOURCES](#)

STAGE 2: CITRIC ACID CYCLE

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

STAGE 3: ELECTRON TRANSPORT CHAIN

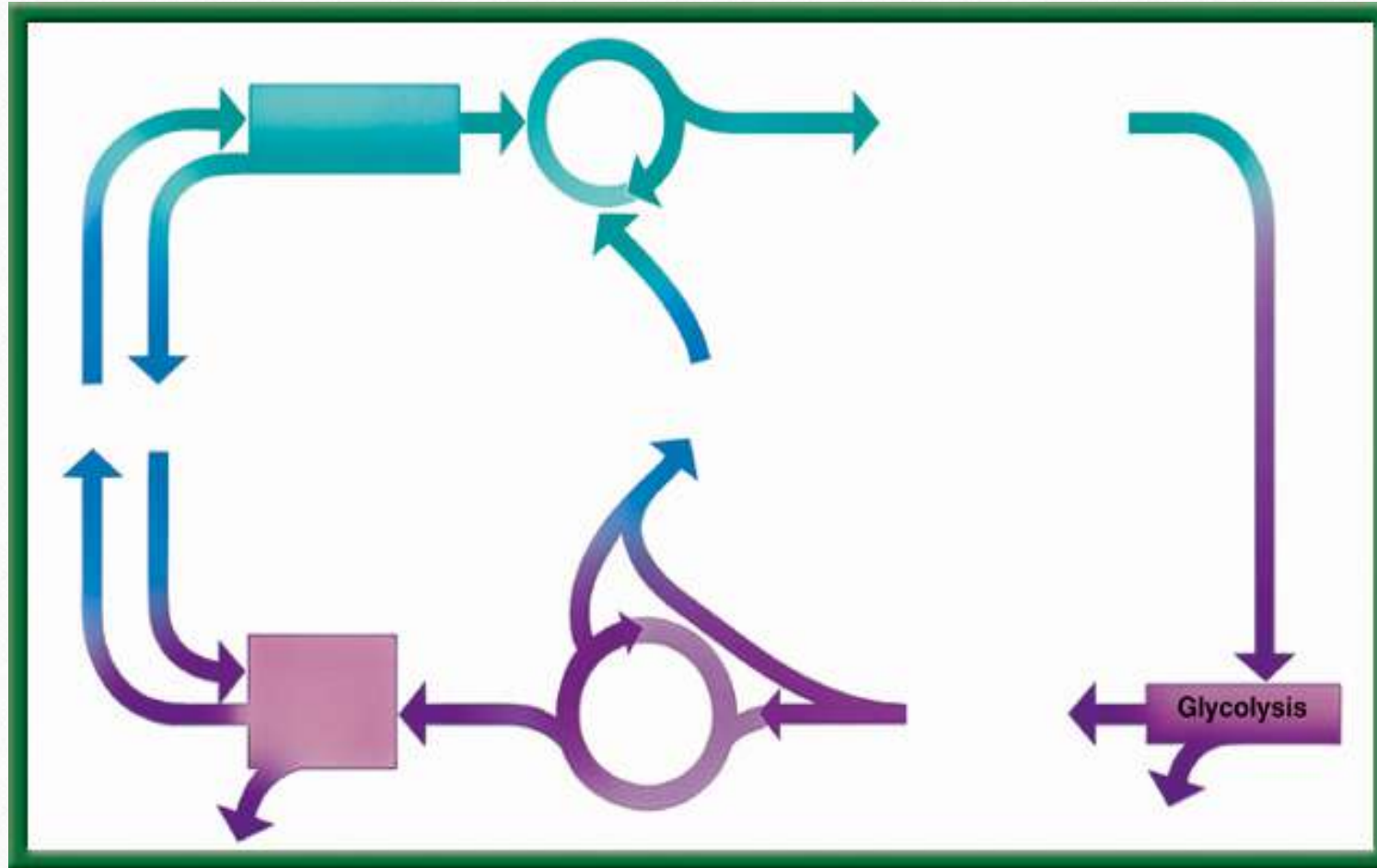
- Happens in the mitochondria
- Series of proteins that transfers energy
- Net creation of whole process: 36 ATP

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



END OF
SLIDE

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



RESOURCES

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)

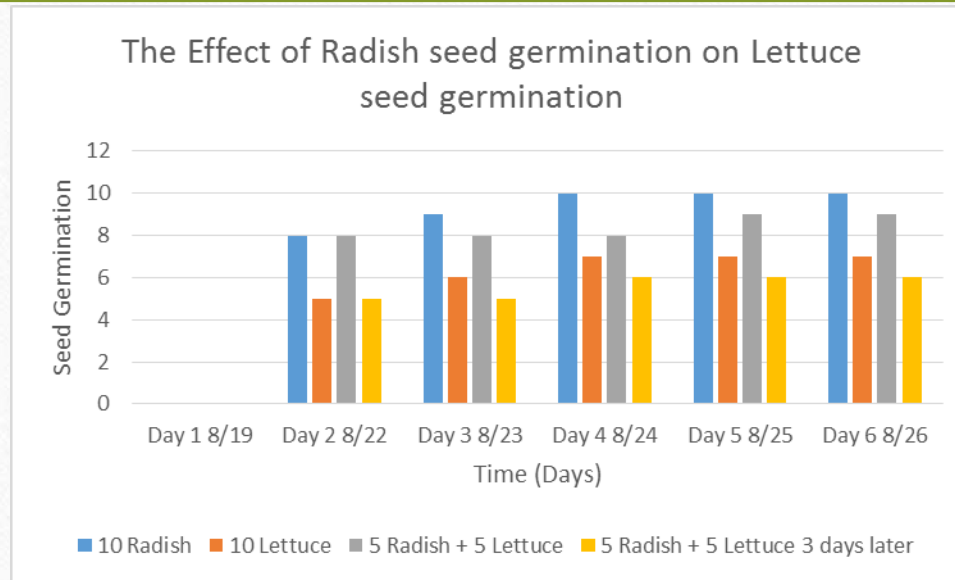
- **Table 1:** The table below shows the different germination rates of radish and lettuce seeds when grown together and separately. (10 font)

	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.

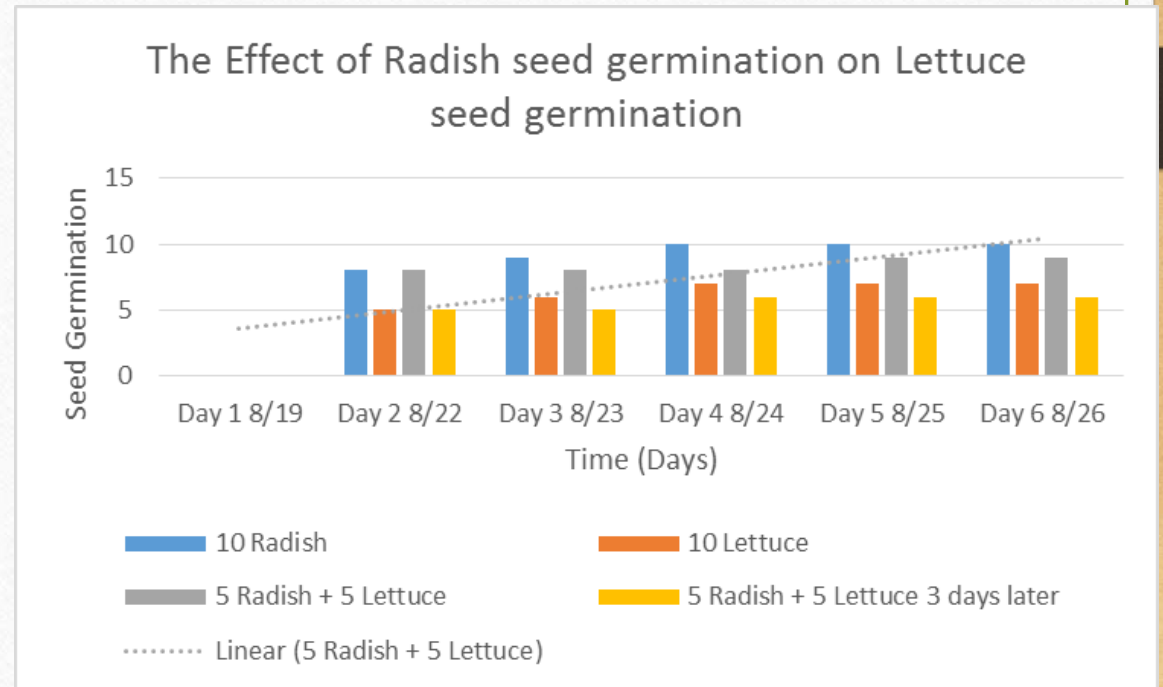


Allelopathy Lab

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)



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- **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!