

# BIOLOGY

## FIRST SEMESTER STUDY GUIDE

### CELLS

\* SPI 3210.1.1 and 3210.1.2 Compare the structure and function of cellular organelles in both prokaryotic and eukaryotic cells.

#### Define:

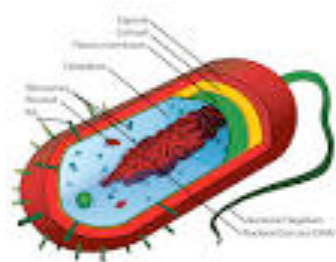
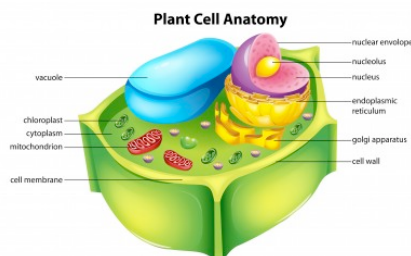
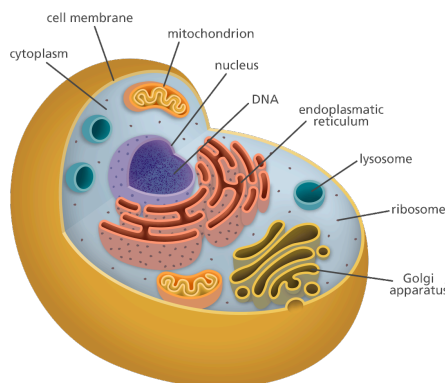
- eukaryotic cell-
- prokaryotic cell-
- organelle-
- cytoplasm-
- cell-
- cell membrane-
- nucleus-
- nuclear membrane-
- cell wall-

What is  
Biology?

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




# \* ORGANELLES \*

**Know the functions of these and be able to recognize a picture of them!**

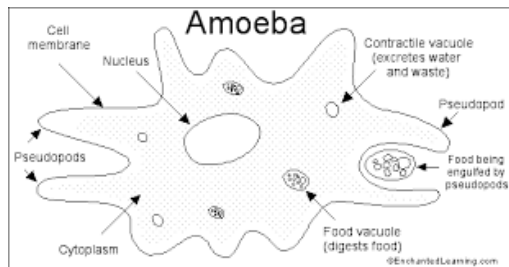
Cell Parts Chart		
Name	What does it do?	Picture
Nucleus	Directs all the activities of the cell	
Cell Membrane	Protects the cell and allows nutrients to come into the cell.	
Cytoplasm	The gel-like fluid that holds the organelles.	
Ribosomes	Produces proteins that helps the cell grow.	
Endoplasmic Reticulum	Passages that transports materials.	

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Cell Parts Chart		
Mitochondria	Produce energy	
Golgi bodies	Packages materials to be sent or received.	
Lysosomes	Breaks down food and waste materials.	
Vacuoles	Stores food, water, and nutrients.	
Cell Wall	Provides shape for plant cells.	
Chloroplasts	Uses sunlight energy to make food (glucose).	

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## UNICELLULAR VS MULTICELLULAR



*Unicellular*

*Define:*

*Examples:*



*Multicellular*

*Define:*

*Examples:*



\*SPI 3210.1.3 Distinguish among the structure and function of the 4 major organic macromolecules found in living things.

### Key Terms

carbohydrate-

monosaccharide-

polysaccharide-

protein-

amino acid-

peptide bond-

lipid-

nucleic acid-

nucleotide-

# Organic Macromolecules

## Carbohydrates

sugars, starches, & cellulose

Elements:

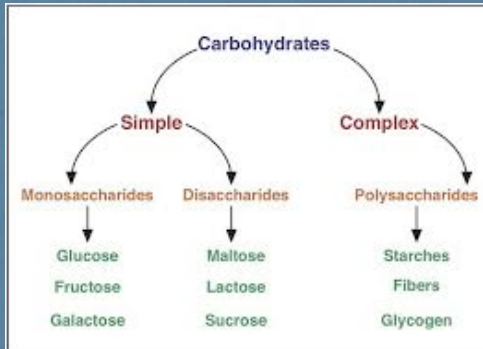
Ratio:

Functions (List 2)

1.

2.

Building Blocks



## Lipids

fats, oils, waxes, steroids

Element:

Functions (List 2)

1.

2.

Building Blocks:

What part of the cell is made of lipids?

What is the difference between saturated, unsaturated, and polyunsaturated?

## Proteins

collagen, hormones (insulin), catalysts (enzymes)

Elements:

Functions (List 2)

1.

2.

Building Blocks:

Groups on a protein:

1.

2.

## Nucleic Acids

DNA & RNA

Elements:

Function:

Building Blocks:



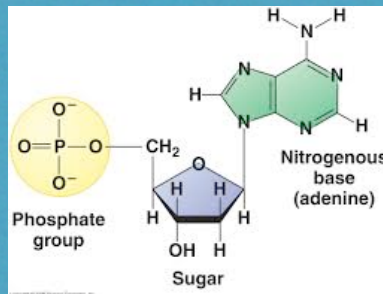
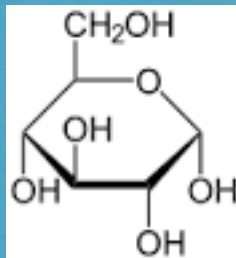
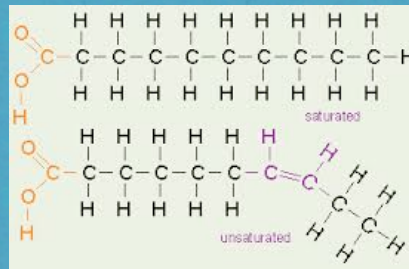
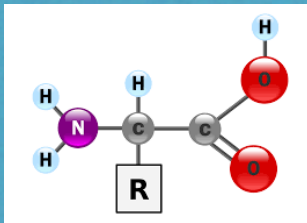


SPI 3210.1.4 Identify positive tests for carbohydrates, proteins, and lipids



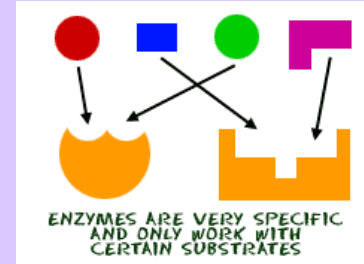
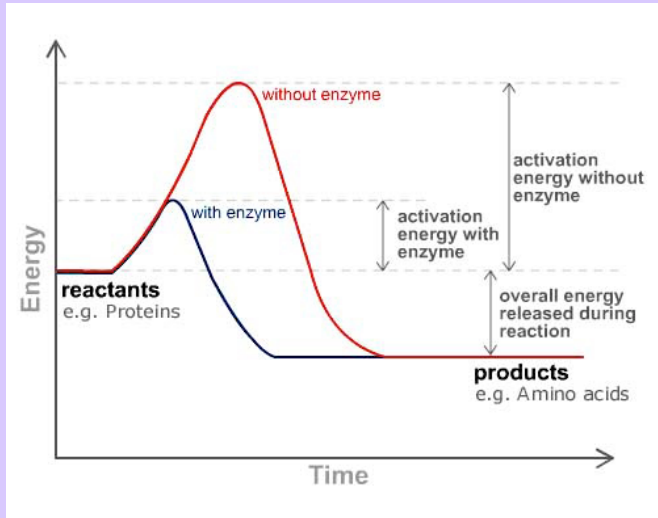
INDICATOR	MACRO-MOLECULE	NEGATIVE TEST	POSITIVE TEST
Benedict's solution	simple carbohydrate	blue	orange
IKI solution	complex carbohydrate	dark red	black
Biuret solution	protein	blue	violet, black
Sudan IV	lipid	dark red	reddish-orange


## WHAT MOLECULE IS IT?



# ENZYMES

**\* SPI 3210.1.4 Describe how enzymes regulate chemical reactions in the body.**



Important! 

## Key Terms:

Enzyme-

Substrate-

Active Site-

Activation Energy-

1. What are two factors that can affect enzyme activity?

2. What is the primary function of enzymes?

3. How do enzymes speed up chemical reactions?

4. What type of biomolecule is an enzyme?

# Homeostasis and Transport

**SPI 3210.1.7 and 3210.1.8 Compare active and passive transport. Also, predict the movement of water and other molecules across selectively permeable membranes.**

## Key Terms:

Homeostasis-

Semipermeable membrane-

Passive transport-

Diffusion-

Osmosis-

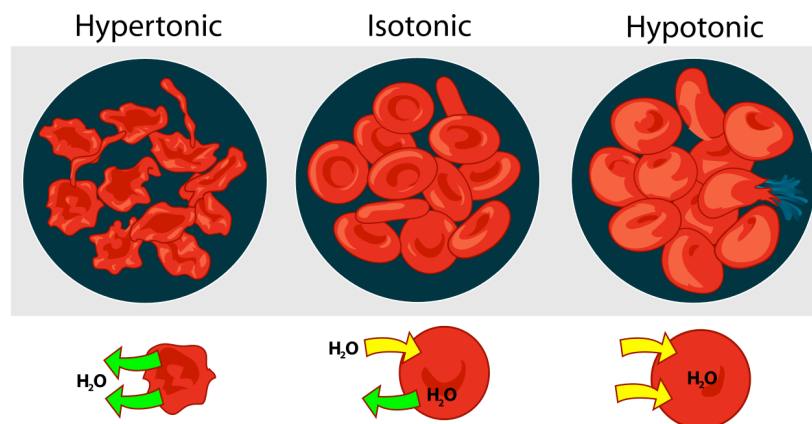
Facilitated diffusion-

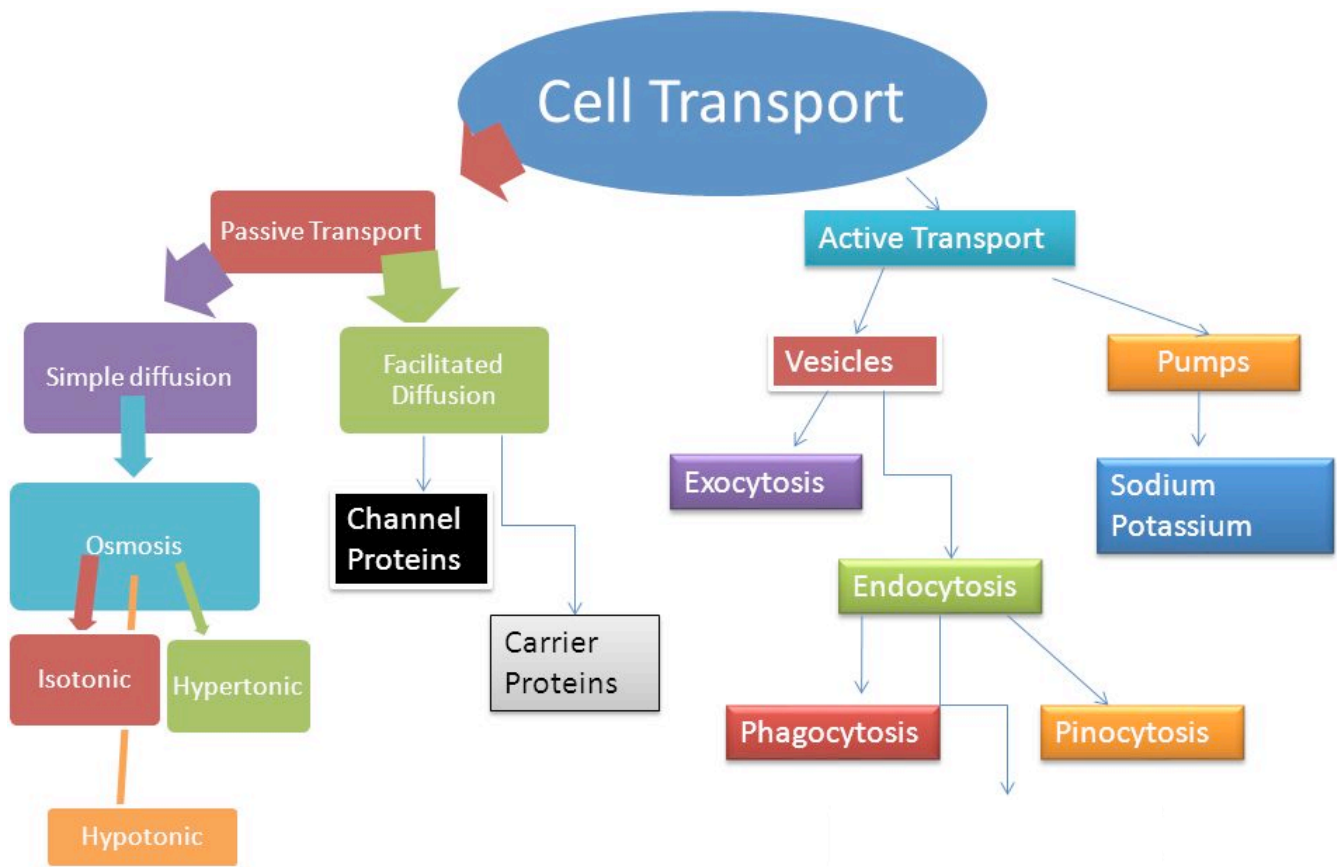
Channel protein-

Active transport-

Stimulus-

Response-





The diffusion of water from areas of higher concentration to areas of lower concentration across a semipermeable membrane is called

- passive diffusion
- active transport
- facilitated transport
- osmosis

Which structures in the cell membrane aid in the movement of substances by facilitated transport?

- cell walls
- ribosomes
- channel proteins
- phospholipids

The ability of an organism to maintain a relatively constant internal temperature is an example of

- photosynthesis
- homeostasis
- glycolysis
- decomposition

# POPULATION CHANGES

## Key Terms:

Population Density-

Niche-

Biotic Factor-

Abiotic Factor-

Immigration-

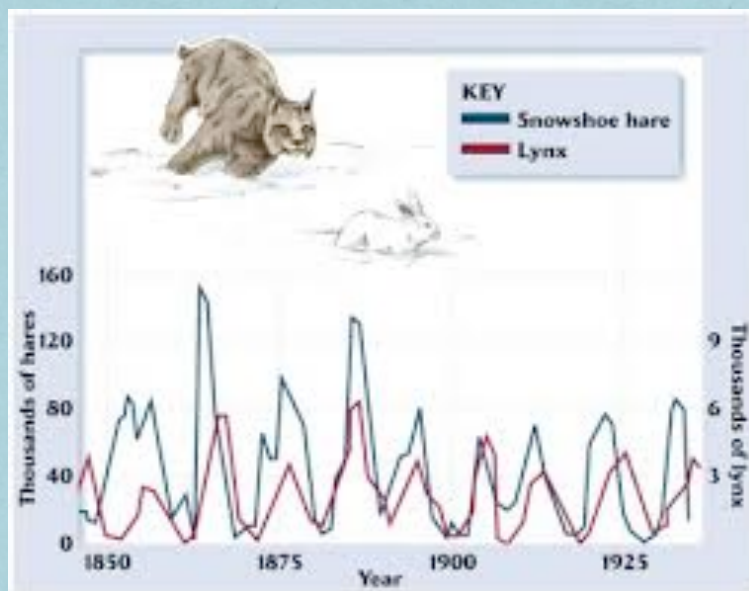
Emigration-

Exponential Growth-

Density-dependent Limiting Factor-

Density-independent Limiting Factor-

Carrying Capacity-



What does this graph show?

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Which of the following is a density-dependent limitation on population growth?

- a. wildfire
- b. competition
- c. severe drought
- d. unlimited nutrients

Which factor is biotic?

- a. number of predators
- b. disease
- c. competition
- d. soil

Which of the following is not an example of sustainable development?

- a. plowing land to prevent erosion
- b. replanting forests with a variety of trees
- c. conserving water
- d. desertification

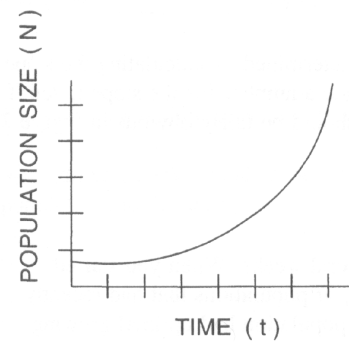
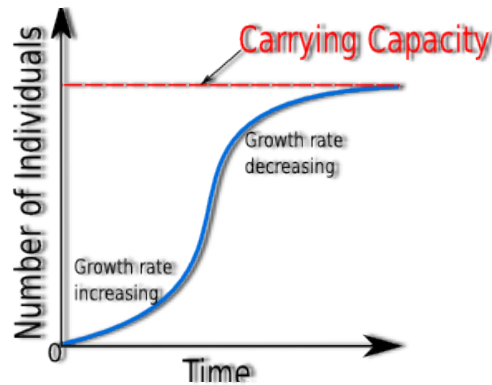
Which of these organisms is most likely to be harmed by acid rain?

- a. rainbow trout
- b. wheat
- c. wolves
- d. cactus

Deforestation and filling in wetlands are both examples of

- a. pollution
- b. habitat destruction
- c. conservation
- d. climate change

## Which type of graph is this?



# Human Activities

**SPI 3210.2.4 and 3210.4.5 Predict how various types of human activities affect the environment**

Natural resource-

Renewable resource-

Conservation-

Sustainable development-

desertification-

deforestation-

Overfishing-

Pollutant-

Biodiversity-

Acid rain-

# Endangered Species and Extinction

**SPI 3210.2.6 Predict how a specific environmental change may lead to the extinction of a particular species.**

## Key Terms:

Extinct-

Extinction-

Mass extinction-

Habitat-

Niche-

Endangered species-

The leading cause of extinction due to human activity is

- a. introduction of alien species
- b. pollution of land and water
- c. hunting
- d. habitat destruction

Which of these occurred 65 million years ago?

- a. extinction of the dodo bird
- b. extinction of large dinosaurs
- c. rise of the woolly mammoth
- d. pollution of land and water

Natural extinction usually occurs because

- a. a population's habitat changes more quickly than the population can adapt.
- b. populations adapt more quickly than their environment's change.
- c. human activities drastically change the habitat of an organism.
- d. people take organisms out of their natural environment and move them to new areas.

# Biological Succession

\*3210.2.7 Analyze factors responsible for the changes associated with biological succession.\*

## Key Terms:

Ecological Succession-

Primary Succession-

Secondary Succession-

Pioneer Species-

Climax Community-

## Primary or Secondary Succession?



1. \_\_\_\_\_



3. \_\_\_\_\_

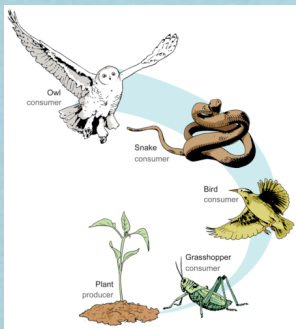
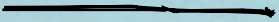
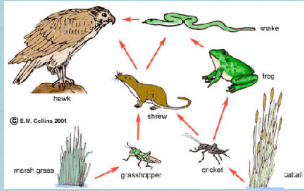


2. \_\_\_\_\_



4. \_\_\_\_\_

What is this?



# Energy Flow Through an Ecosystem

**\* SPI 3210.3.1 Interpret a diagram that illustrates energy flow in an ecosystem. \***

## Key Terms:

Producer-

Consumer-

Decomposer-

Trophic Level-

Food Chain-

Food Web-

Herbivore-

Carnivore-

Omnivore-

Energy Pyramid-

Ecosystem-

Ecology-

Why is 10% important when discussing energy flow in an ecosystem?

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# Anaerobic & Aerobic Respiration/Photosynthesis

\* SPI 3210.3.2 Distinguish between aerobic and anaerobic respiration. \*

## Key Terms:

ATP-

ADP-

ATP-ADP Cycle-

Cellular Membrane-

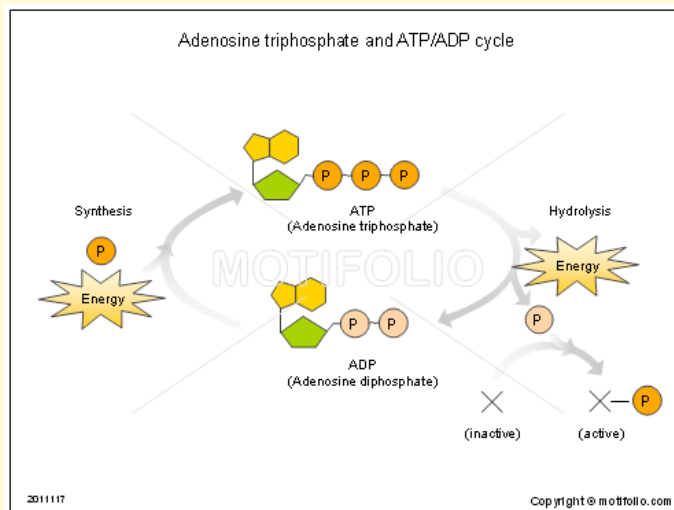
Aerobic process-

Glycolysis-

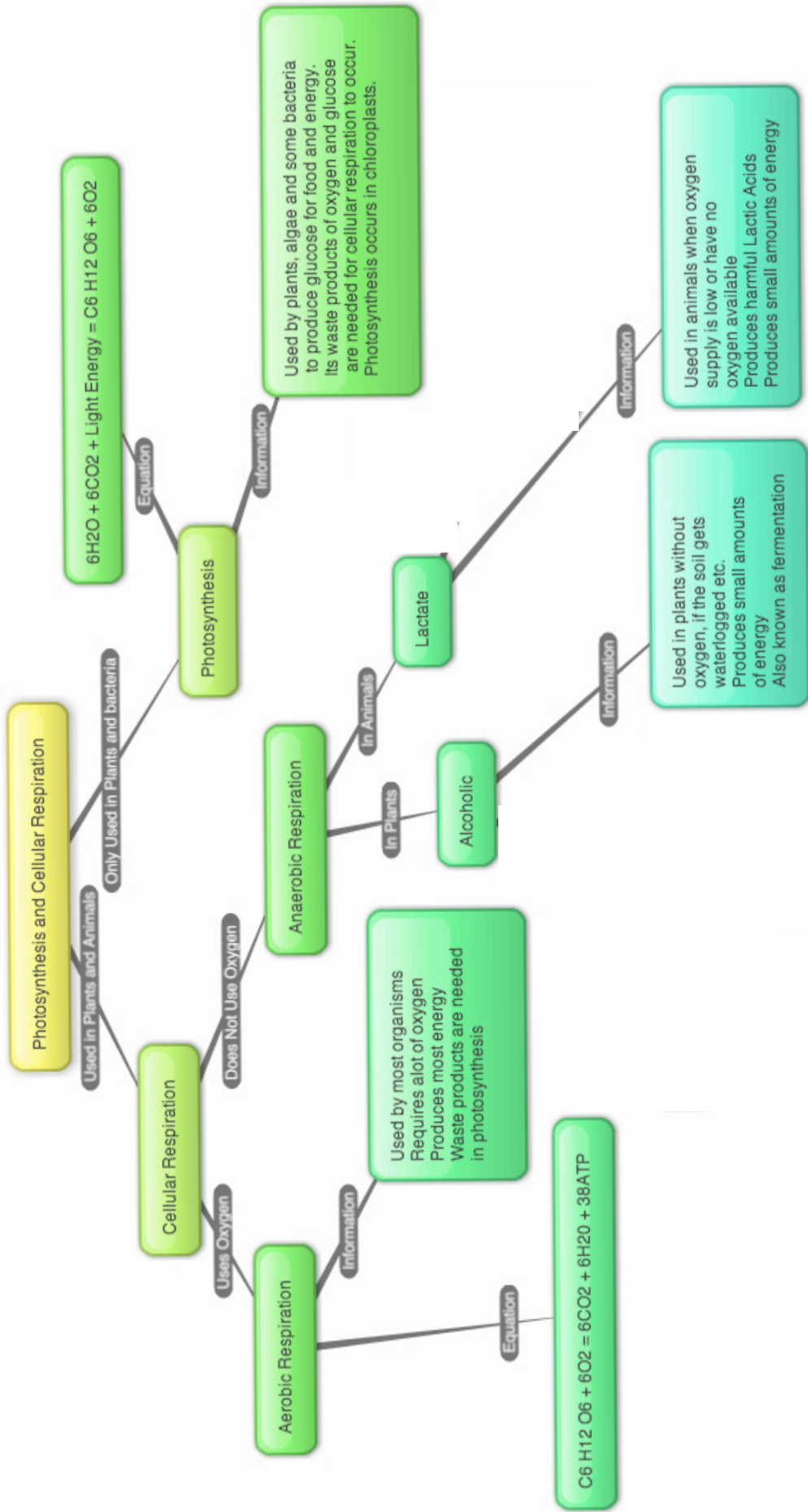
Krebs Cycle-

Anaerobic process-

Describe what is happening in this diagram.



Energy available to the cell is stored in which part of the ATP molecule? \_\_\_\_\_



# Photosynthesis vs Cellular Respiration

\*SPI 3210.3.3 Compare and contrast photosynthesis and cellular respiration in terms of energy transformation.\*

## Key Terms:

Photosynthesis-

Chloroplast-

Chlorophyll-

Mitochondria-

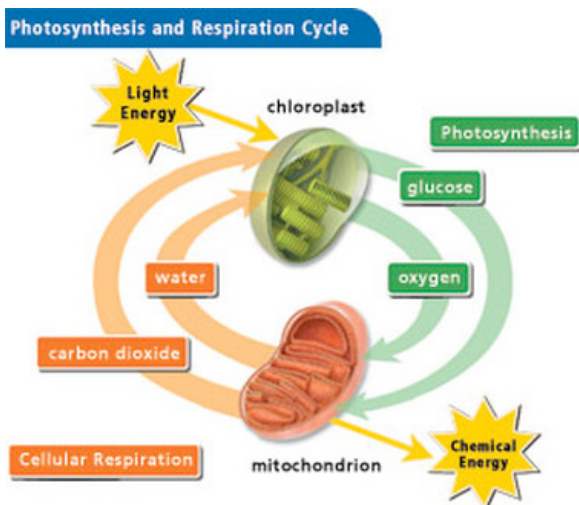
Which path produces the most  
ATP?  
Aerobic or Anaerobic  
(circle)

Write the equation for photosynthesis:

Write the equation for cellular respiration:

What organism perform photosynthesis? \_\_\_\_\_

Cellular respiration? \_\_\_\_\_



Explain this diagram.

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# Biogeochemical Cycles

## Key Terms:

Biogeochemical cycle-

Reservoir-

Water cycle-

Evaporation-

Transpiration-

Condensation-

Precipitation-

Nitrogen cycle-

Carbon-oxygen cycle-

How does fertilizing crops affect the nitrogen cycle?

What do humans do to disrupt the carbon/oxygen cycle? What does this cause?

What are CFCs? \_\_\_\_\_

How are they produced? \_\_\_\_\_

What affect do they have in the atmosphere? \_\_\_\_\_



