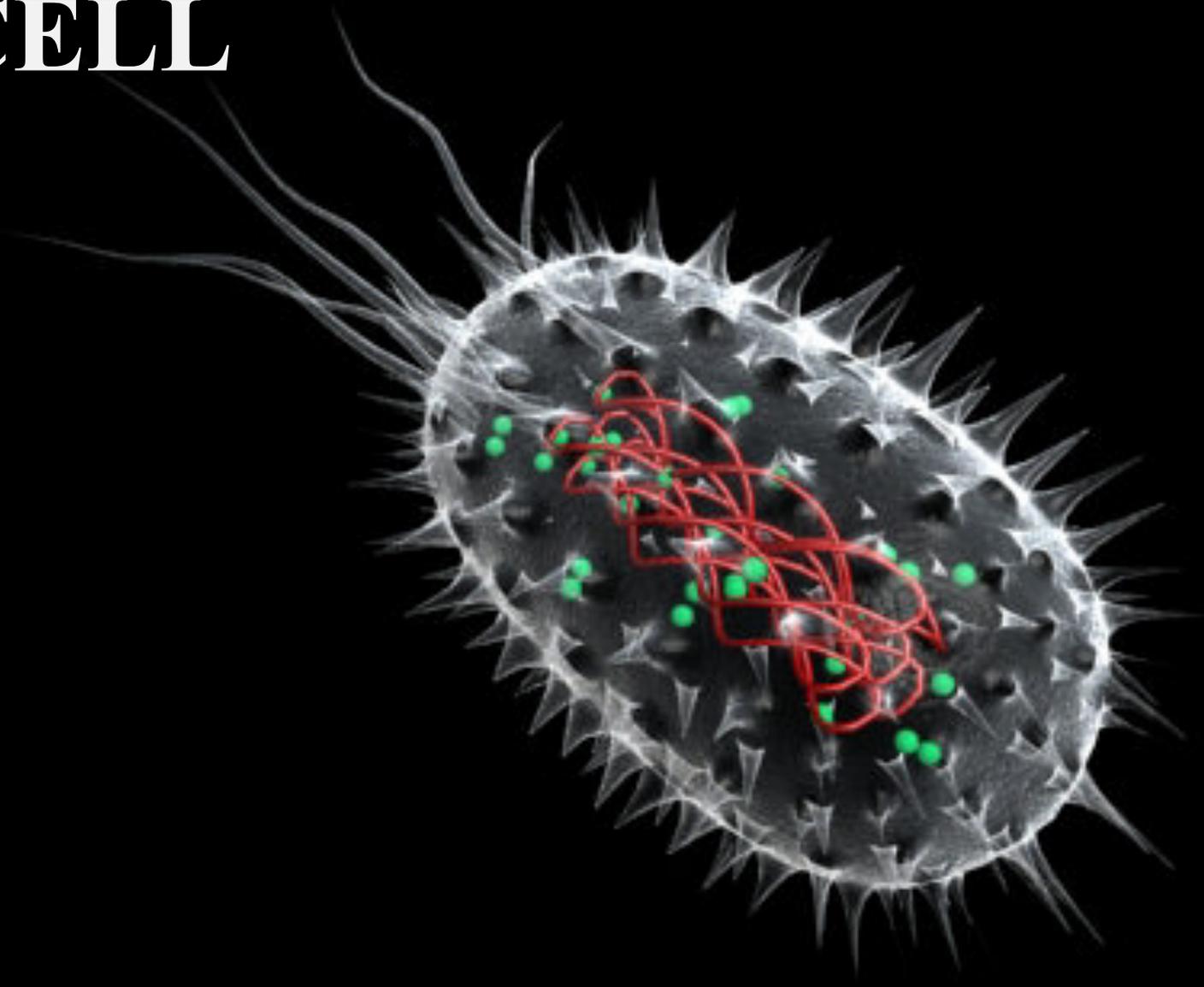


# ECOLOGY



The way all things  
relate to each other

# CELL

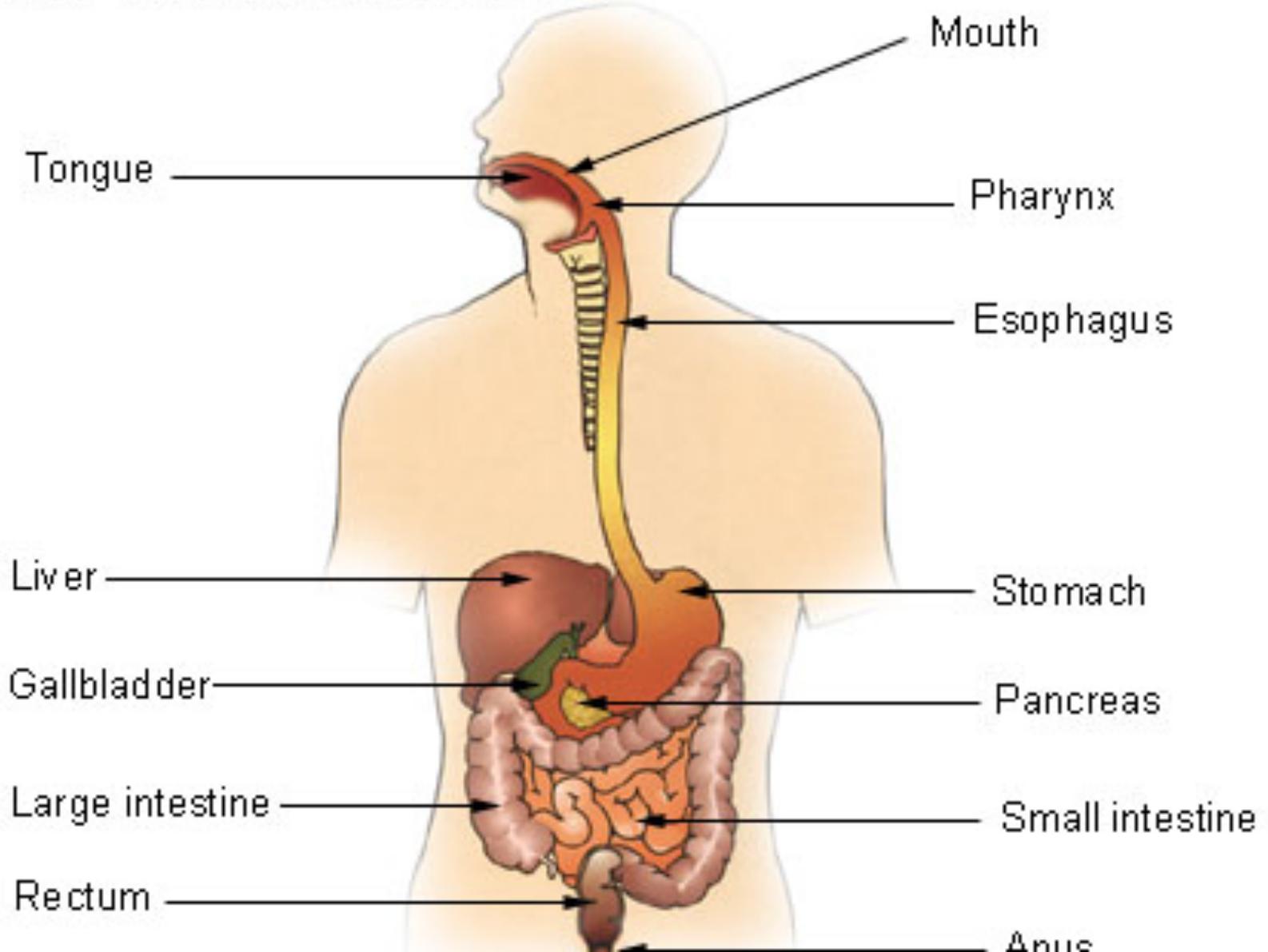


# TISSUE



# ORGAN and ORGAN SYSTEM

## Organs of the Digestive System



# ORGANISM



# POPULATION (SPECIES)



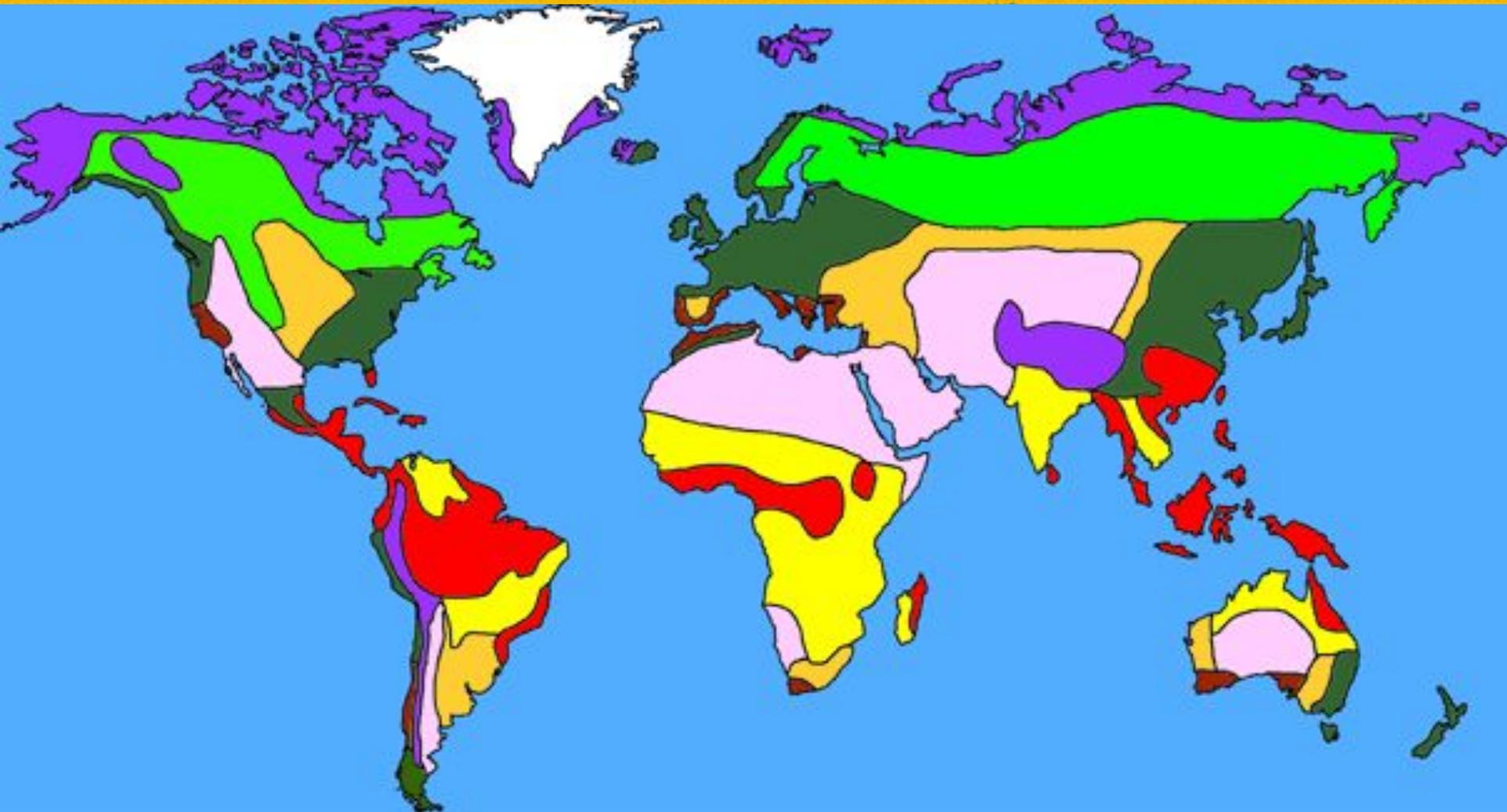
# COMMUNITY



# ECOSYSTEM

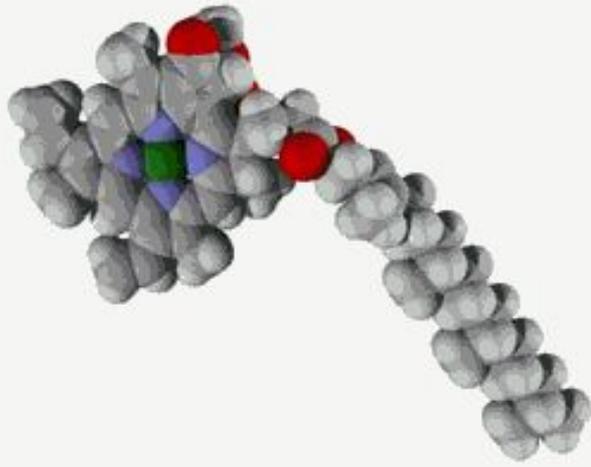


# BIOME

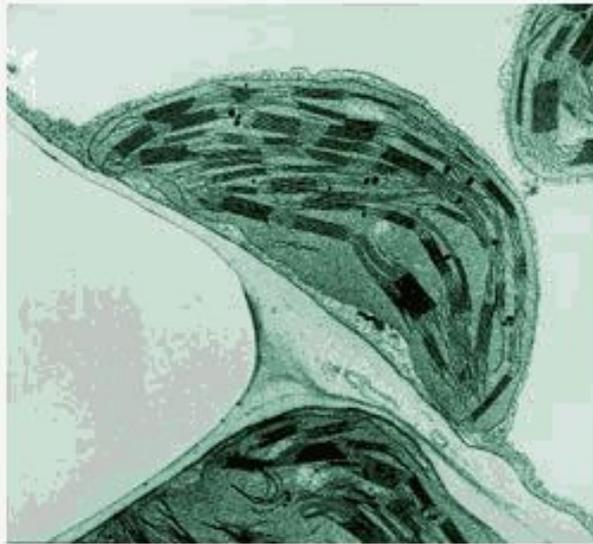


# BIOSPHERE

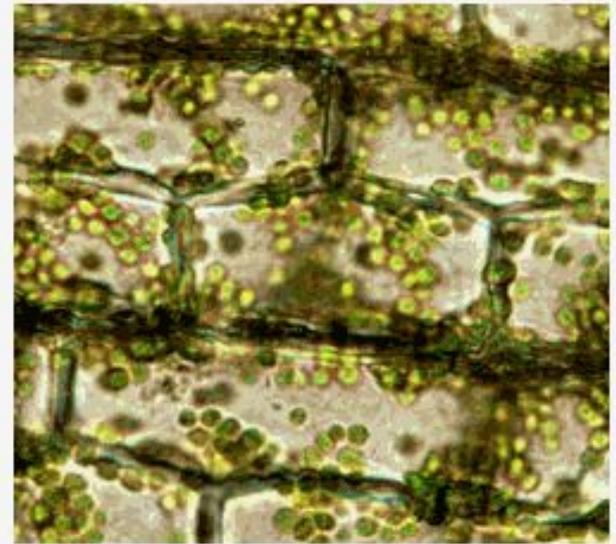




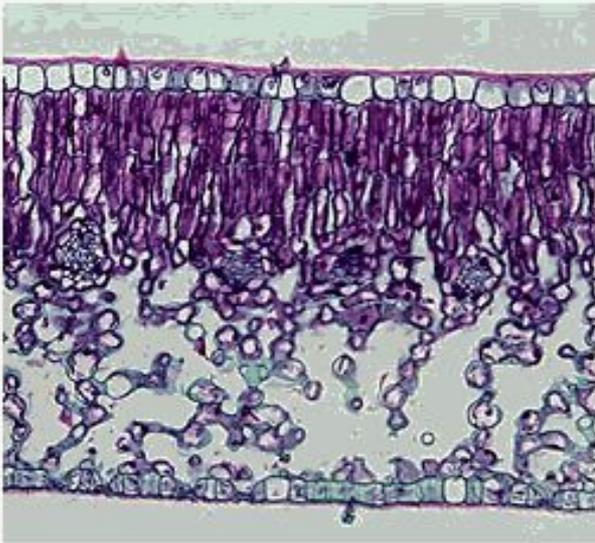
**Molecule**



**Organelle**



**Cells**



**Tissues**



**Organ**



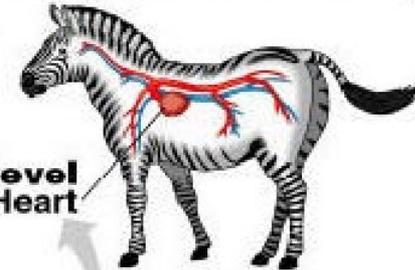
**Community**

# Levels of Organization



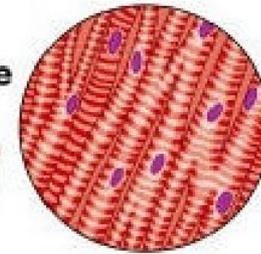
**Organism level**  
Zebra (Includes several organ systems)

**Organ system level**  
Circulatory system

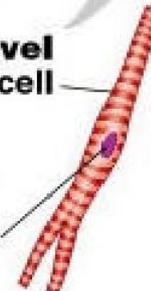


**Organ level**  
Heart

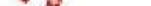
**Tissue level**  
Cardiac muscle tissue



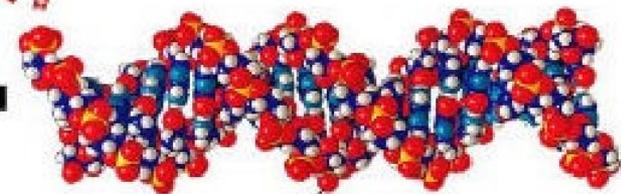
**Cellular level**  
Cardiac muscle cell



**Organelle level**  
Cell nucleus



**Molecular level**  
DNA



**Atomic level**  
Oxygen atom

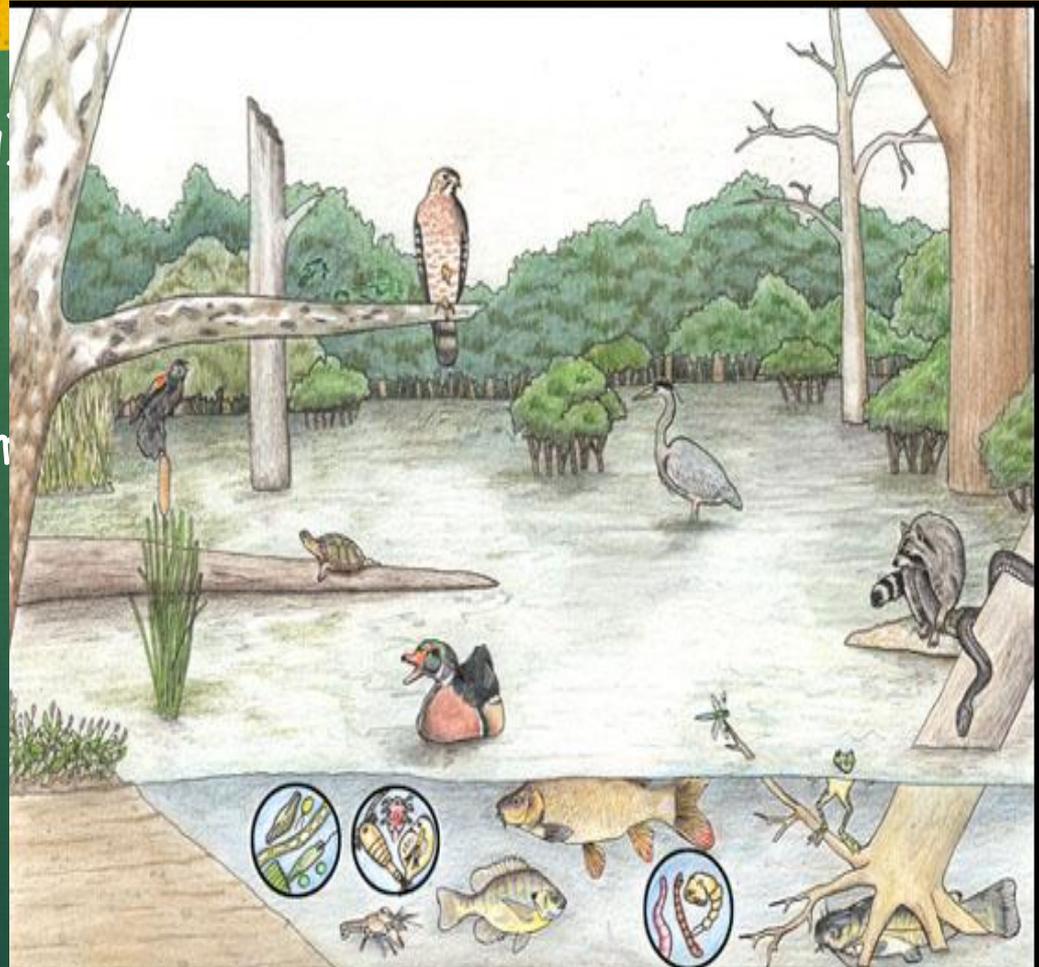
Levels Match-up

Power of Ten

Levels tutorial

# Ecosystems

- Collection of abiotic (nonliving) and biotic (living) factors in an area
- Together they influence growth, survival, and productivity of an organism



# Biotic and Abiotic Factors

Living and Non-living  
parts of the environment

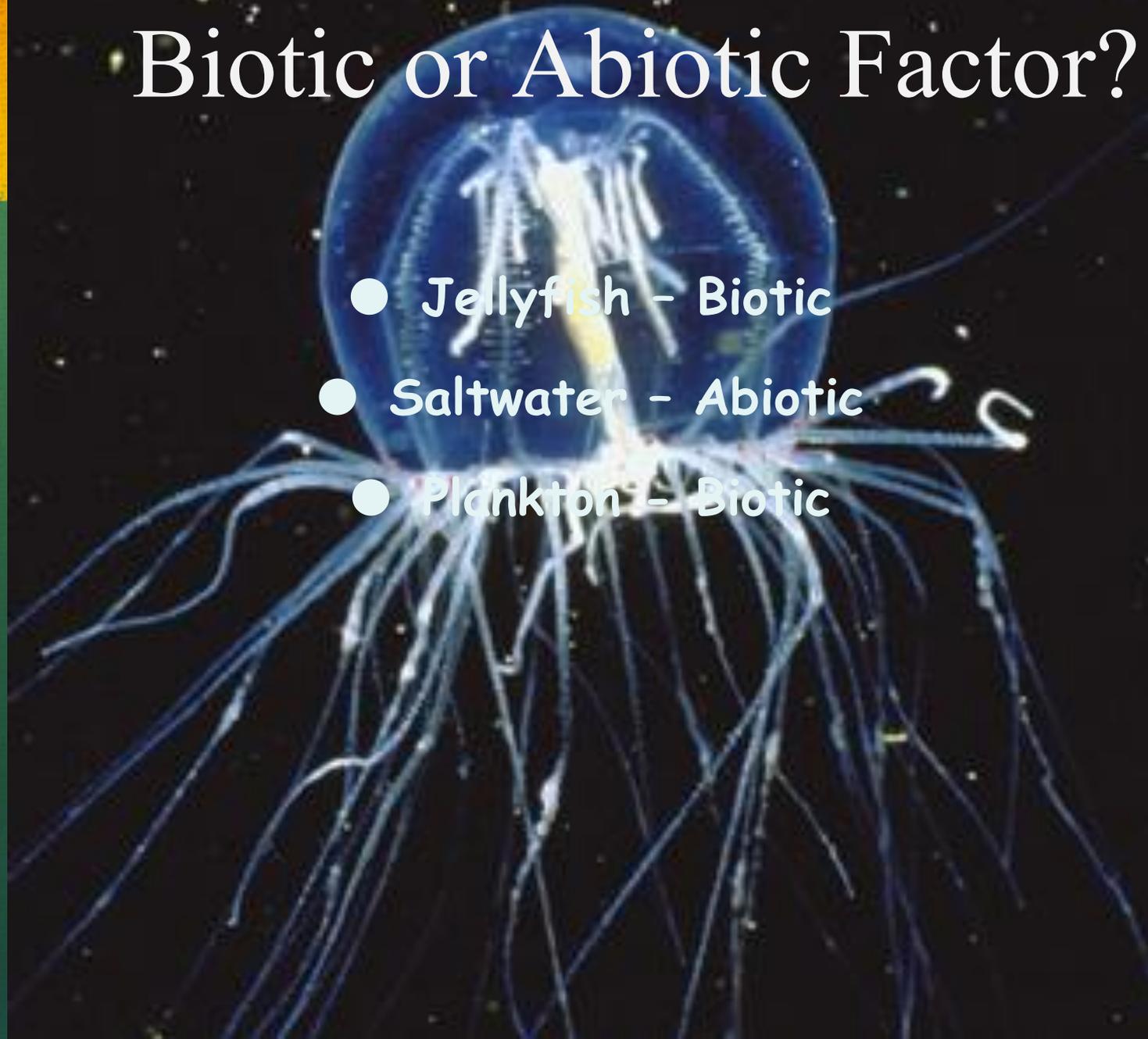
# Biotic or Abiotic Factor?

- Soil is ABIOTIC
- Rock is ABIOTIC
- Grass is BIOTIC



# Biotic or Abiotic Factor?

- Jellyfish – Biotic
- Saltwater – Abiotic
- Plankton – Biotic



<b>ABIOTIC FACTORS</b>	<b>BIOTIC FACTORS</b>
Non-living	Living
Soil, rock, water,	Grass, Jellyfish, plankton

The Abiotic Factors determine which Biotic factors will survive in an area

# Symbiotic Relationships

- Relationship between two organisms in which one benefits



- Types:

- Mutualism (+,+)

- Parasitism (+,-)



# Mutualism

- RELATIONSHIP WHERE BOTH SPECIES BENEFIT
- EX. Sea Anemone and clown fish, Lichen (fungus and algae)
- The fish is protected by the anemone and the anemone receives scraps of food from the fish
- Fungus protects algae and produces CO<sub>2</sub> for photosynthesis, algae makes sugars and O<sub>2</sub> for the Fungus

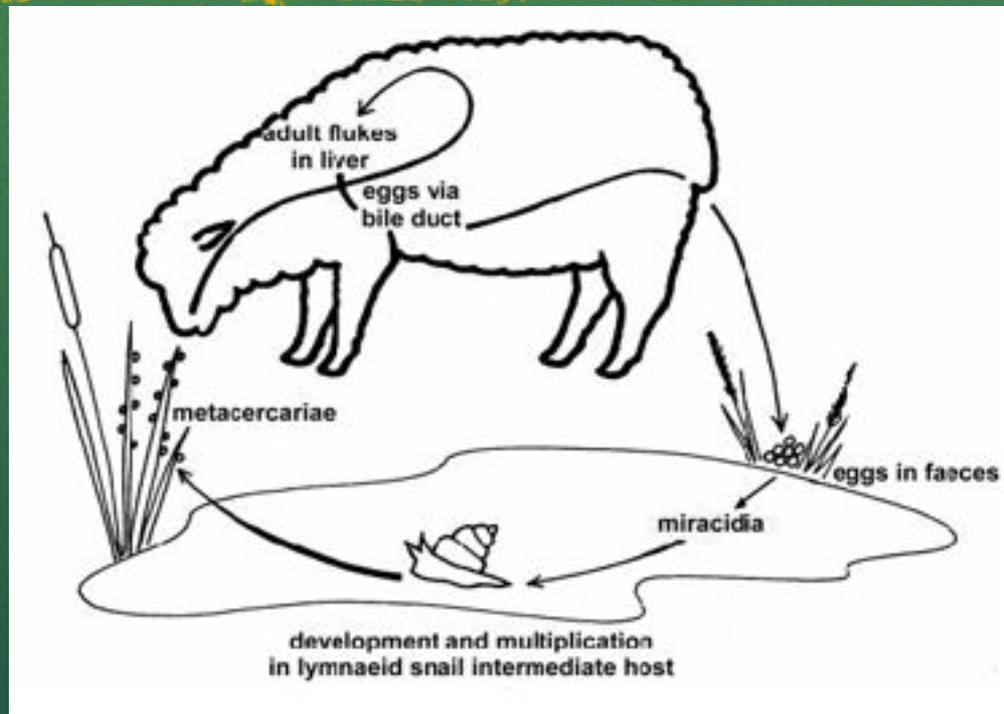
[http://video.nationalgeographic.com/video/player/animals/invertebrates-animals/other-invertebrates/clownfish\\_amonganemones.html](http://video.nationalgeographic.com/video/player/animals/invertebrates-animals/other-invertebrates/clownfish_amonganemones.html)



# Parasitism

- One organism benefits while the other is harmed
- Ex.- Tapeworm, liver flukes
- Feed off host and cause disease
- Parasite- live in bodies and feed on body or blood of victim







LET'S REVIEW  
RELATIONSHIPS!



- Clown fish fight off anemone-eating fish
- Anemones sting clown fish predators
- **MUTUALISM**

- 
- Mosquito sucks blood of host
  - Host loses blood, can get malaria!
  - PARASITISM



- Plants give bacteria a home in root nodules
- Bacteria "fix" nitrogen from the soil so plants can use it.
- **MUTUALISM**

# This is mutualism.

- What do you think is happening?
- It's a cleaner fish eating lunch and an eel getting cleaner teeth!

- [Click here for an article on cleaner fish](#)



# What type of symbiosis is this?

- PARASITISM
- Which organism is the host?
- The Purple Martin chick... poor little guy



The background features a green geometric pattern of overlapping triangles at the top and bottom. A horizontal band of yellow and orange gradient with a textured, paper-like appearance separates the two green sections.

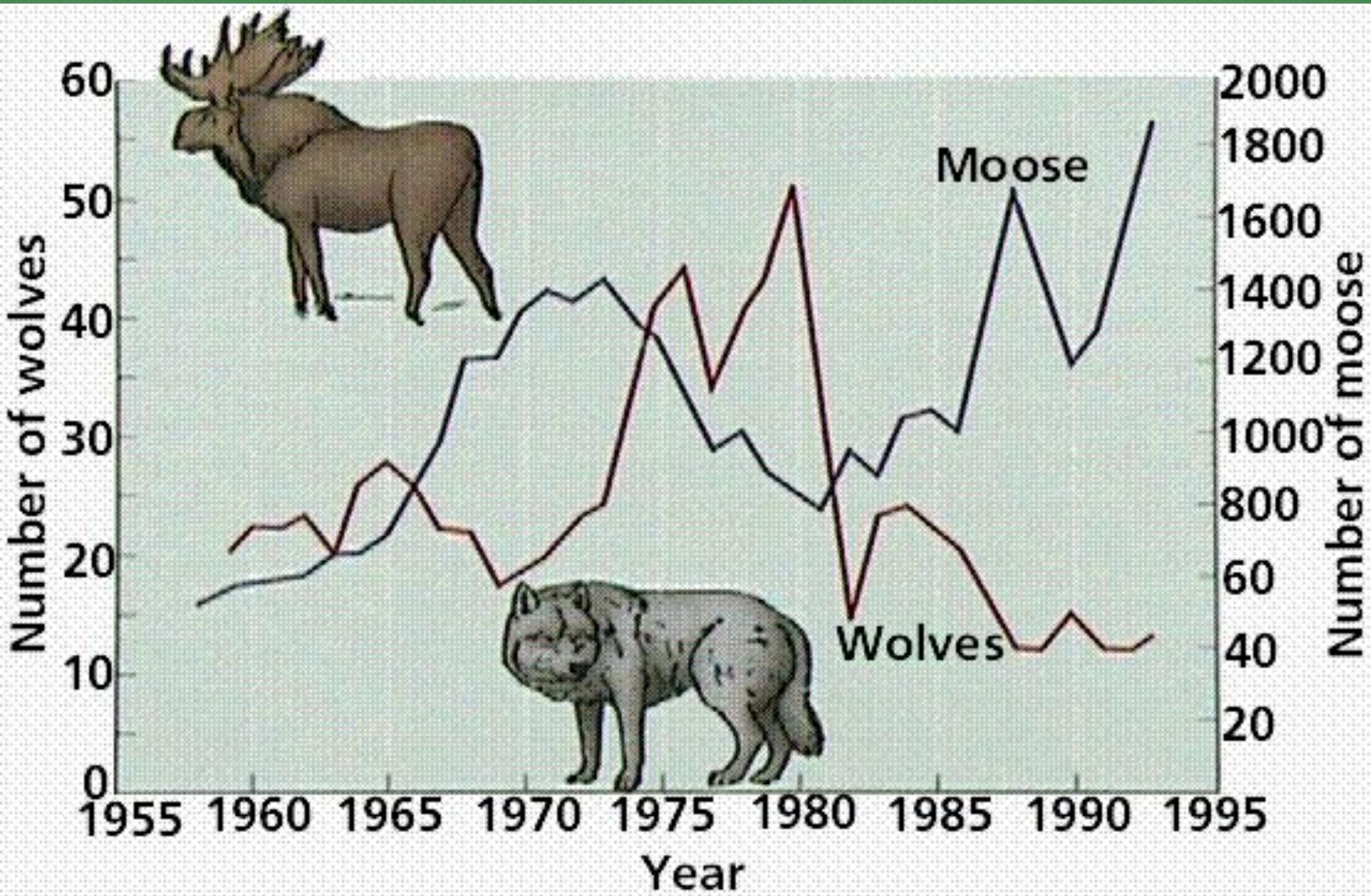
# Predator/prey relationships

# Predation

- Predator eats prey
- Evolve in response to one another



Predator/prey relationships



If predator population increases, what will happen to the prey population?

Ex. Snakes prey on mice, birds prey on snakes.

If the majority of snake eating birds living in an area die from disease, what will happen?

# TODAY'S ASSIGNMENT:

## CREATE AN ECOSYSTEM:

Poster must include:

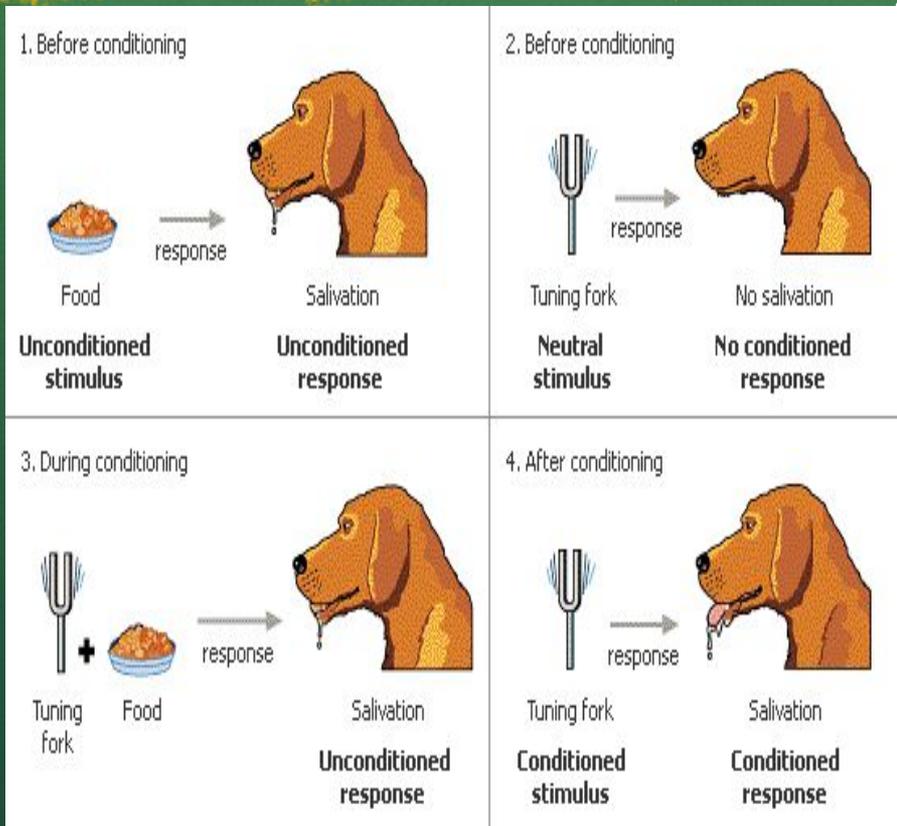
1. Drawing or cut out pictures of the Ecosystem
2. Must label 5 Biotic Factors and 3 Abiotic Factors
3. Must list at bottom an example of a predator prey relationship
4. Must list at bottom a mutualistic or parasitic relationship.

# Innate Behavior

- Behaviors an animal is born with
- Includes suckling, migration, hibernation
- Ex. weaving of spider webs



# Learned Behavior



- Behavior an animal acquires during its lifetime

- Includes

- Habituation
- Conditioning
- Trial and error

- Brain pop: Conditioning [http://highered.mcgraw-hill.com/sites/0078617022/student\\_view0/brainpop\\_movies.html](http://highered.mcgraw-hill.com/sites/0078617022/student_view0/brainpop_movies.html)

# Social Behavior

- Communication between individuals of the same species
- Can be courtship, territorial or chemical (pheromones)



**Read About Social  
behaviors in your  
table group**

# TODAY'S ASSIGNMENT

- MAKE A MINI- POSTER ABOUT TYPES OF BEHAVIOR
- Split paper up in to 3 parts label as follows:
  - Section 1: **INNATE**
  - Section 2: **LEARNED**
  - Section 3: **SOCIAL**
- For each section, draw an example of that behavior and explain what is happening

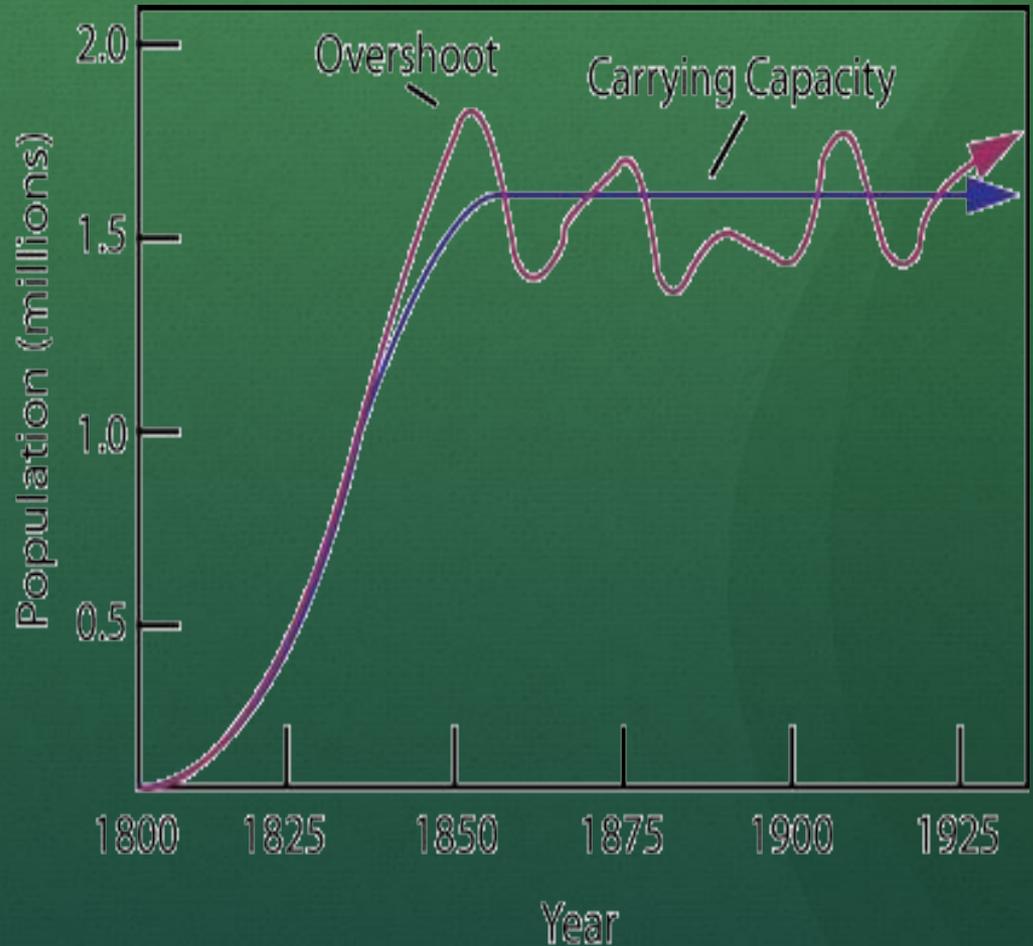
Nat. Geo Pop Growth

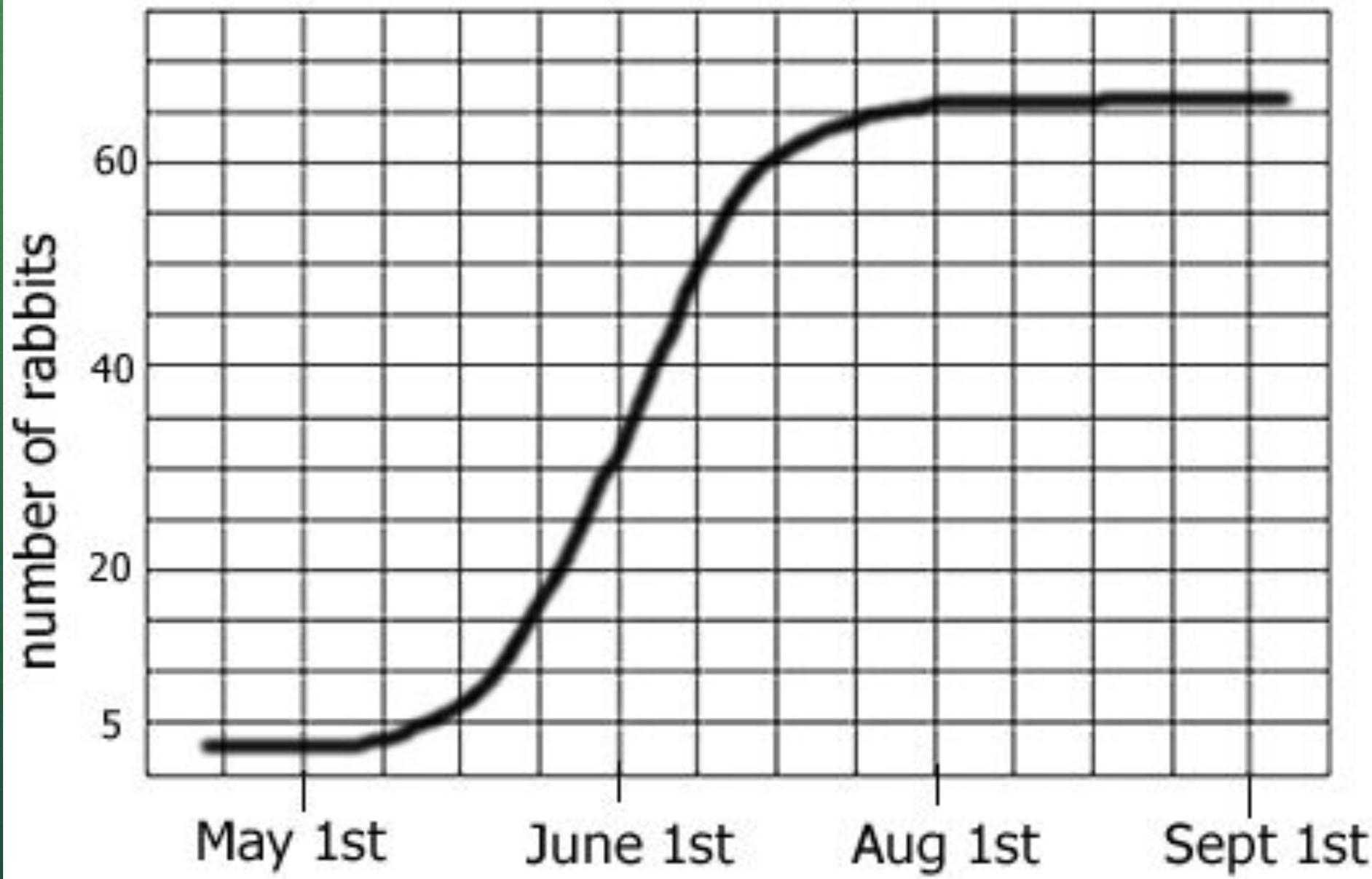
# Carrying Capacity

The maximum number of organisms in a population that an environment can support.

# Carrying Capacity

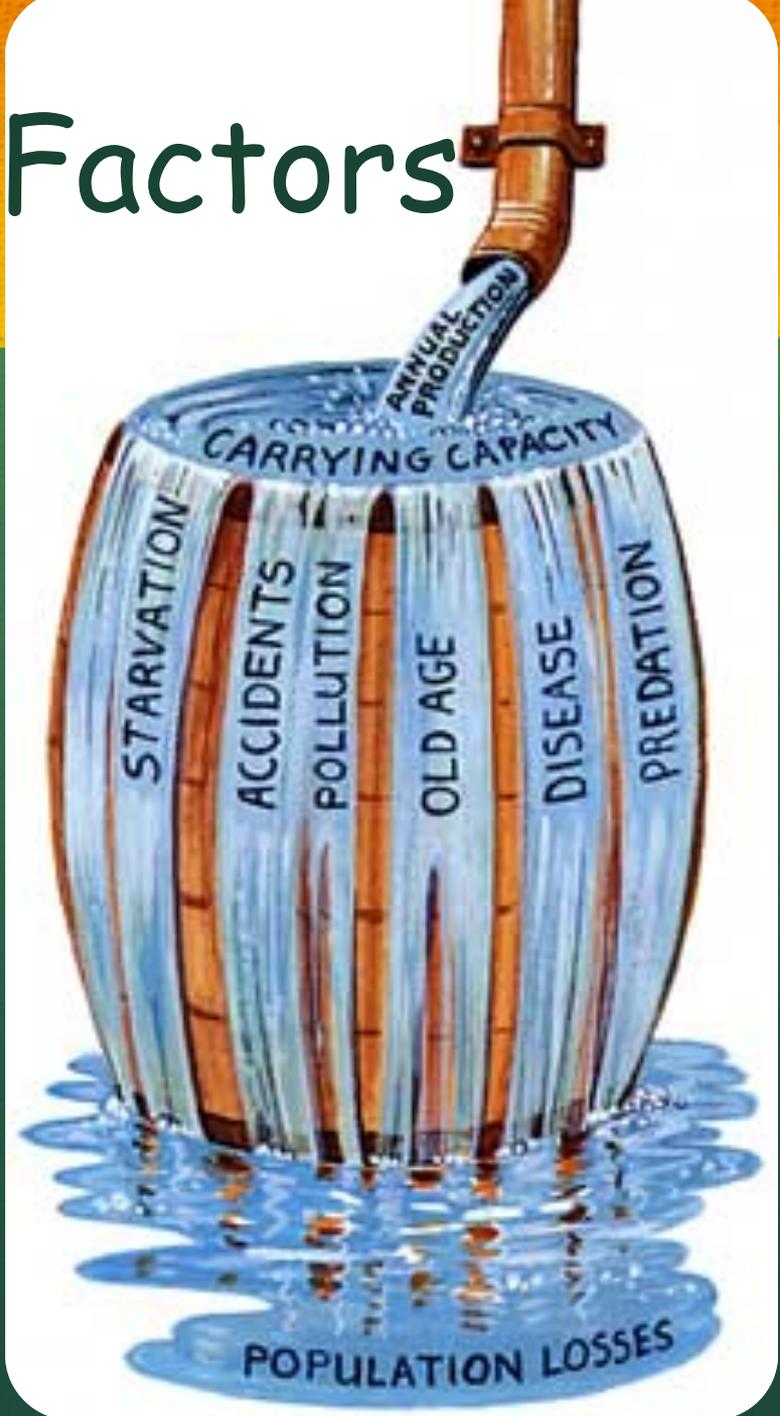
- Maximum number of individuals that an ecosystem can support
- Limiting factors:
  - Food availability
  - Competition
  - Disease
  - Predation
  - Natural Disasters





# Limiting Factors

- Limiting factors = things (usually ABIOTIC) that limit a population's growth causing it to reach the carrying capacity.



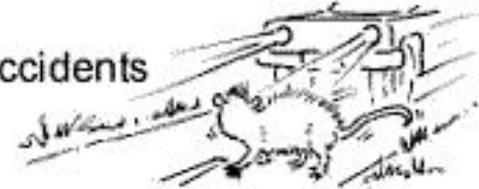
# Which are density-dependent limiting factors?

- These factors become more limiting as population becomes larger/more dense.

Disease/Parasites



Accidents



Natural Factors  
(fires, floods, etc...)



Starvation



Hunting  
(minimal effect  
on game animals)



Predation



Other



Ten fish are doing well in a 10-gallon fish tank. When five similar fish are added to the tank, some of the fish begin to die. Which **best** explains this loss of fish?

- A. the number of fish has exceeded the carrying capacity of the tank.
- B. the fish do not have enough space to swim.
- C. the fish are not getting enough food.
- D. the new fish begin to feed on the older fish, causing a decrease in population.

# TODAY'S ASSIGNMENT

- Complete Worksheet Activity on Carrying Capacity in groups
- This will be for a grade. Turn in box by end of class.



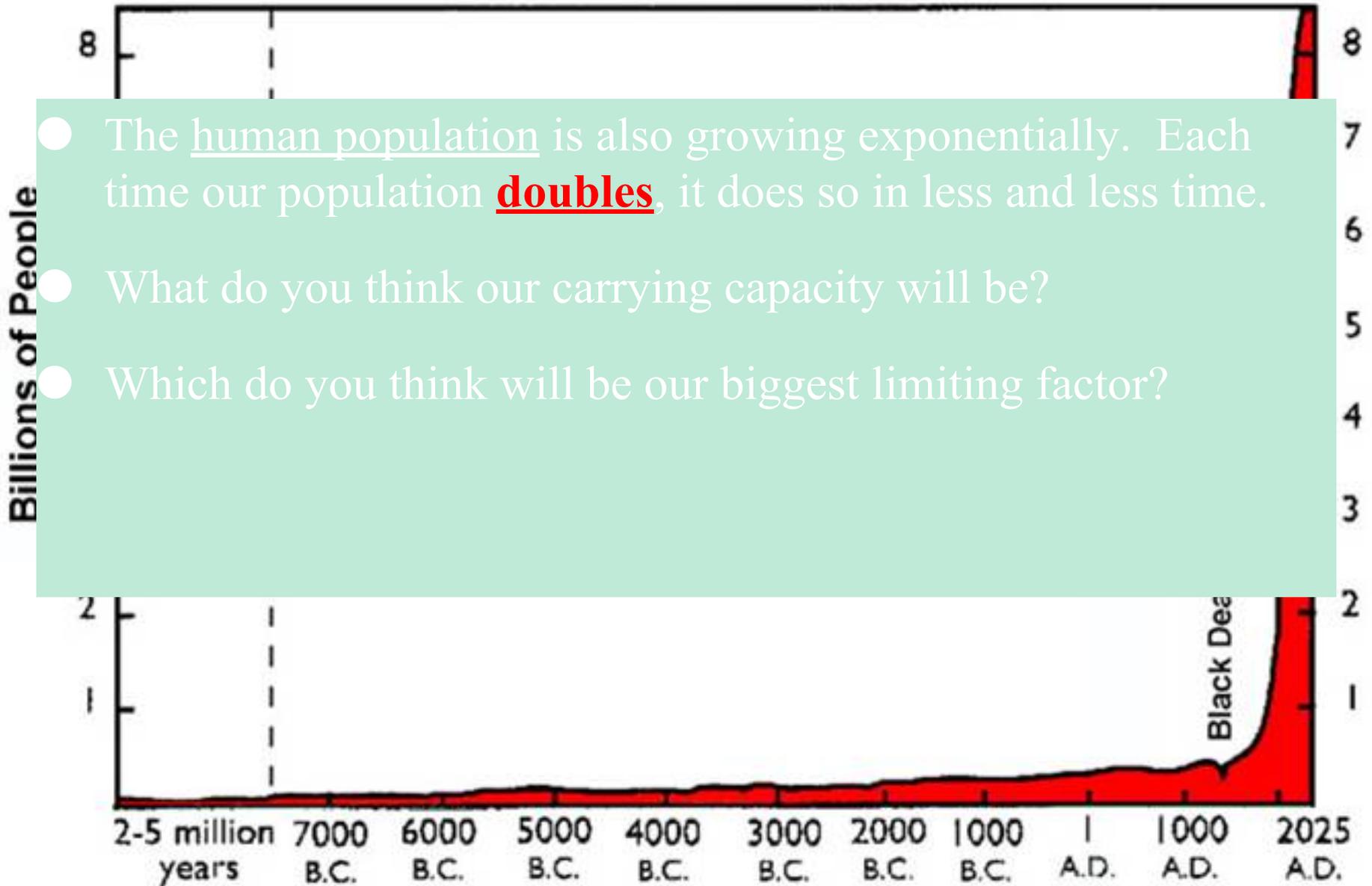
Population  
Video

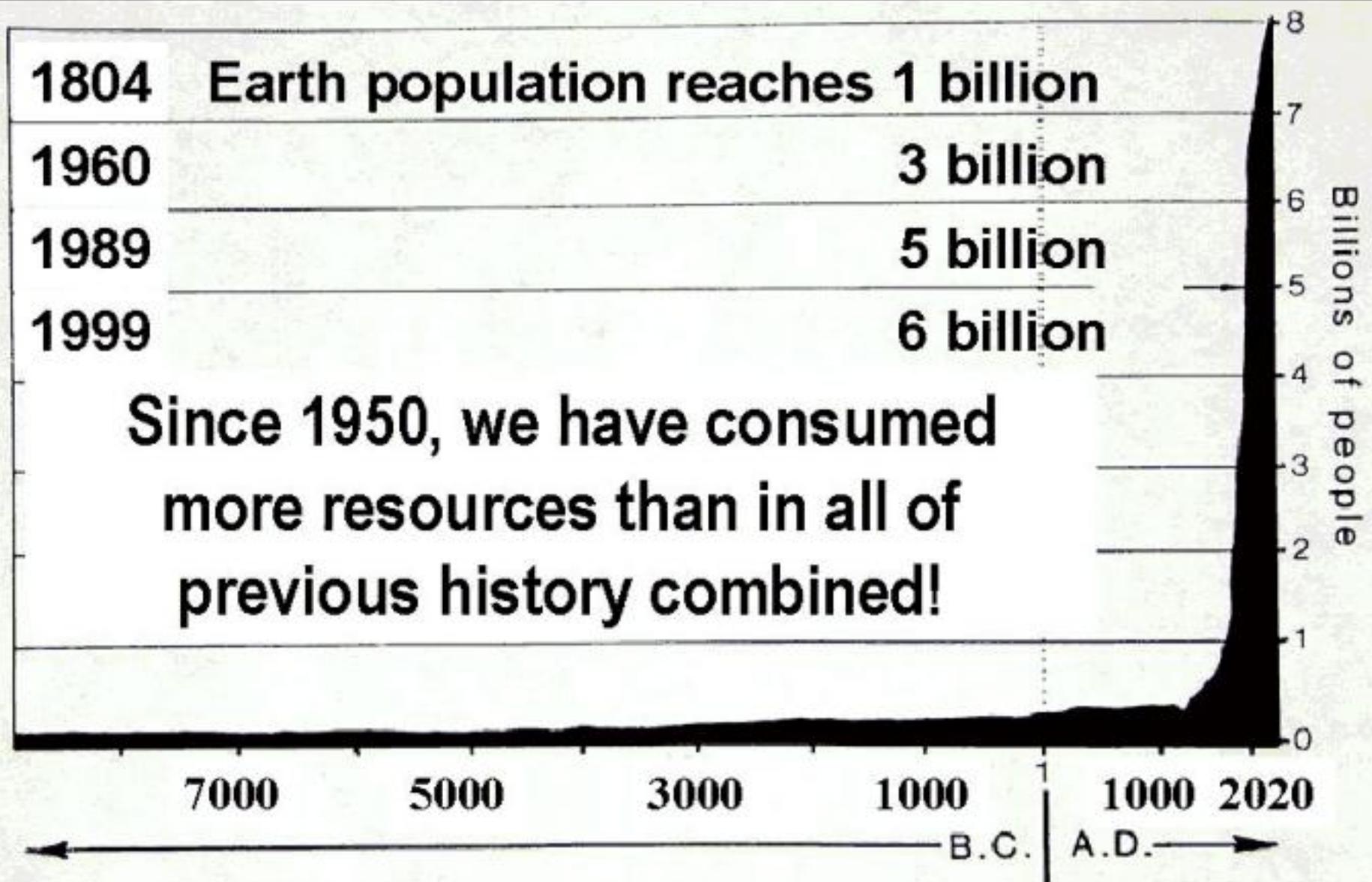
Crash Course Pop Growth

# Population Graphs

Populations of living organisms tend to grow exponentially.

# World Population Growth Through History

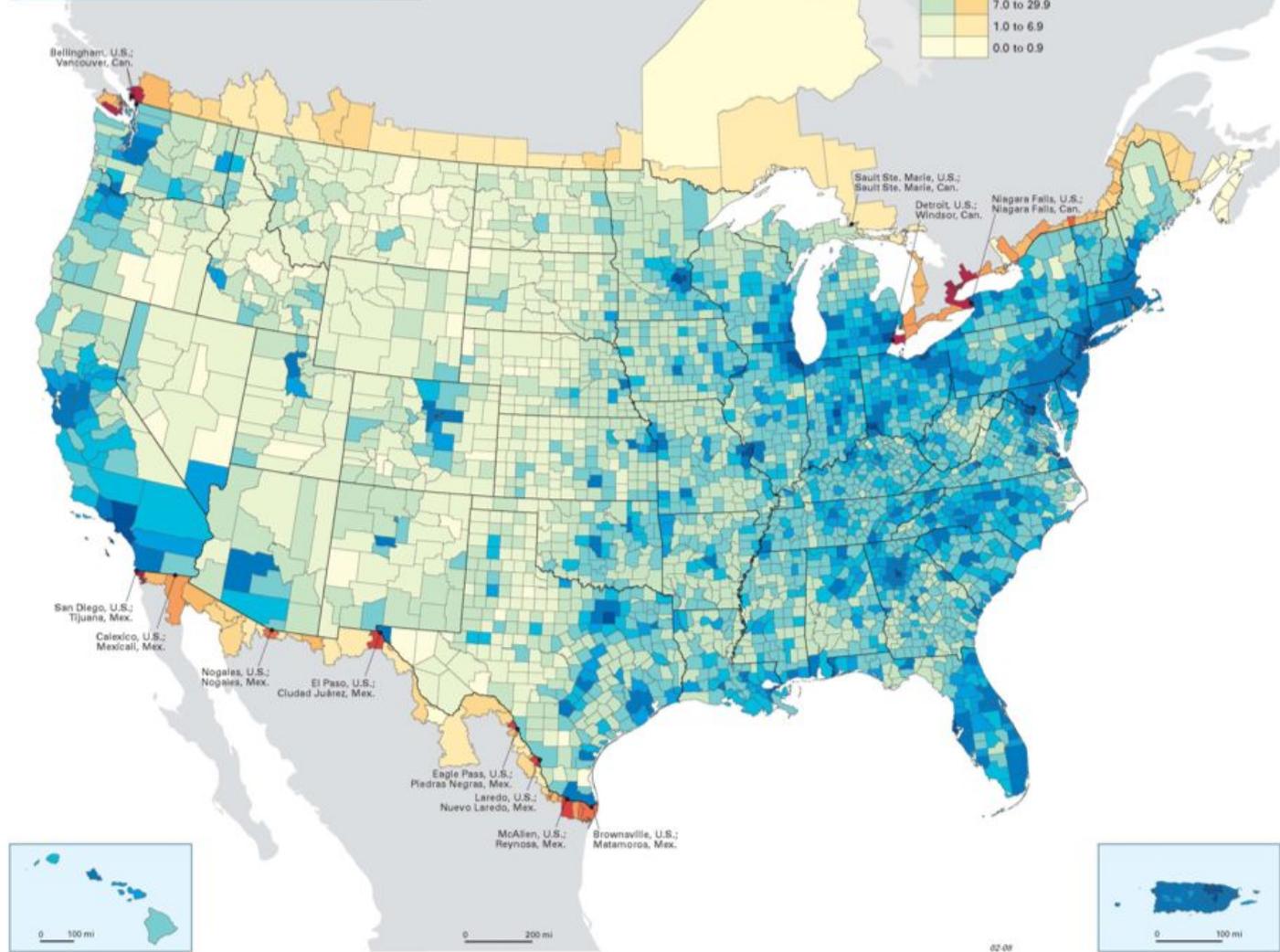
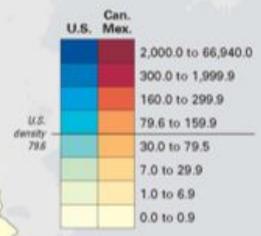


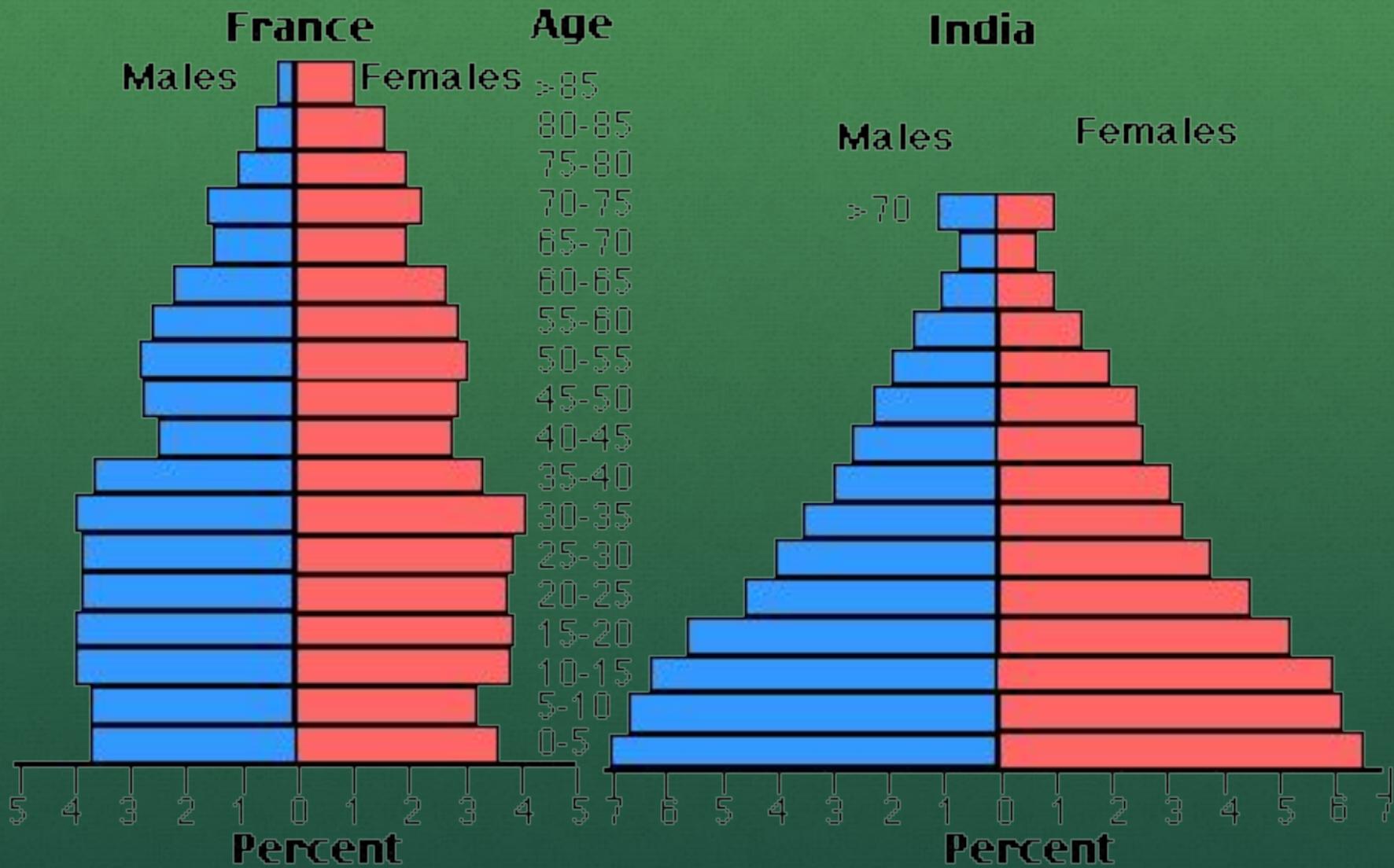


# Human Population Explosion

# Population Density, 2000 With Border Populations

Average population per square mile







# Birth Rates and Death Rates

# Birth Rate

Birth rate = how many organisms are born in a population over a certain period of time.

A decrease in the birth rate will lead to decreased population growth.

WHAT COULD CAUSE A DECREASE IN BIRTH RATE?

- *all birth control methods*  
*(pills, condoms, abstinence (duh))*
- *Lack of good prenatal care*
- *Lack of shelter/food/care for*
- *mothers/babies*



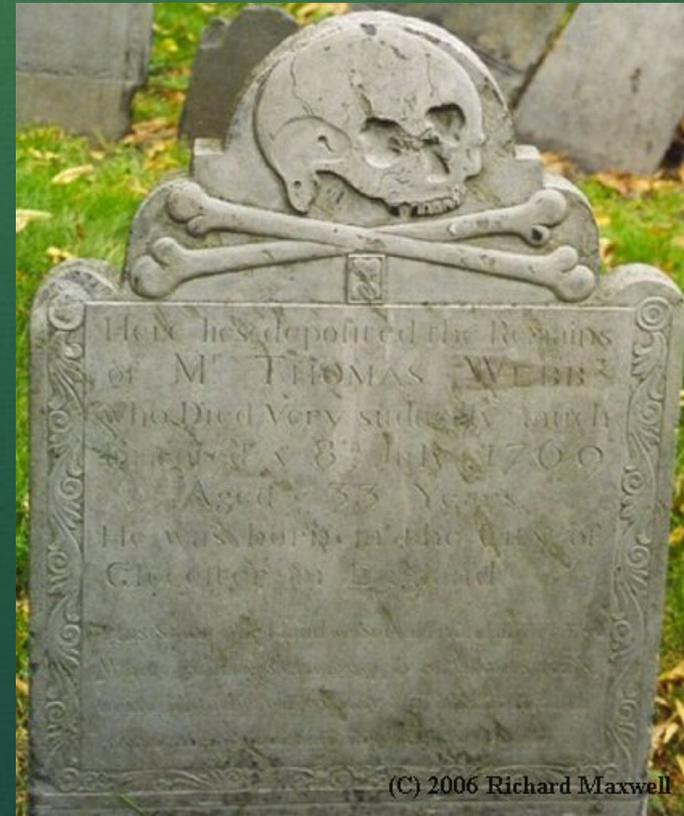
# Death Rate

Death rate = how many organisms in a population **die** over a certain period of time

A decrease in the death rate will lead to **increased population growth.**

What could cause a decrease in death rate?

- Better health care
- Improved medicine
- Healthy eating/lifestyle choices
- Cleaner/healthier environment



*If birth rate increases and death rate decreases...*

● **INCREASED POPULATION GROWTH**

*If birth rate decreases and death rate increases...*

● **DECREASED POPULATION GROWTH**

*If birth rate increases and death rate increases...*

● **POPULATION GROWTH REMAINS STEADY**

*Which has most contributed to the increase in the human population?*

● **A DECREASE IN DEATH RATE!**

# How to calculate population growth

- Natural population growth = Birth rate - death rate

Ex. 1) Over the year, 1000 babies born, 980 people died. What's the population growth?

- 20 people/year

Ex. 2) Over the year, 2000 babies born, 2500 people died. What's the population growth?

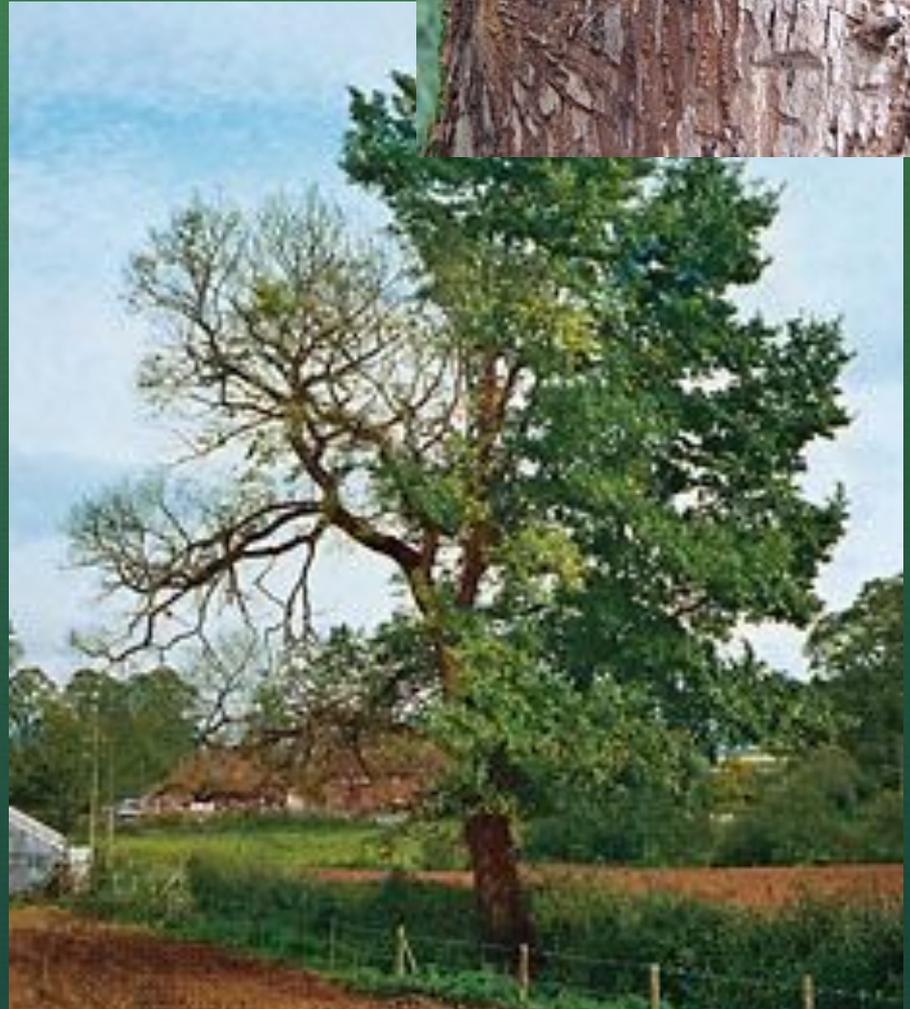
- -500 people/year

# Disease disrupts Ecosystem Balance

- AIDS
- INFLUENZA
- TUBERCULOSIS

# What about plants and animals?

- DUTCH ELM'S DISEASE: a fungi attacks the tree preventing the upward travel of nutrients, it dies from the top down. Beetles transfer it from tree to tree.



# PFIESTERIA

- *Pfiesteria* complex organisms (PCOs) were claimed to be responsible for large fish kills in the 1980s and 1990s on the coast of North Carolina and in tributaries of the Chesapeake Bay



*Pfiesteria*-related fish lesions. Photo courtesy of the Aquatic Botany Lab, North Carolina State University.

# Human Impact

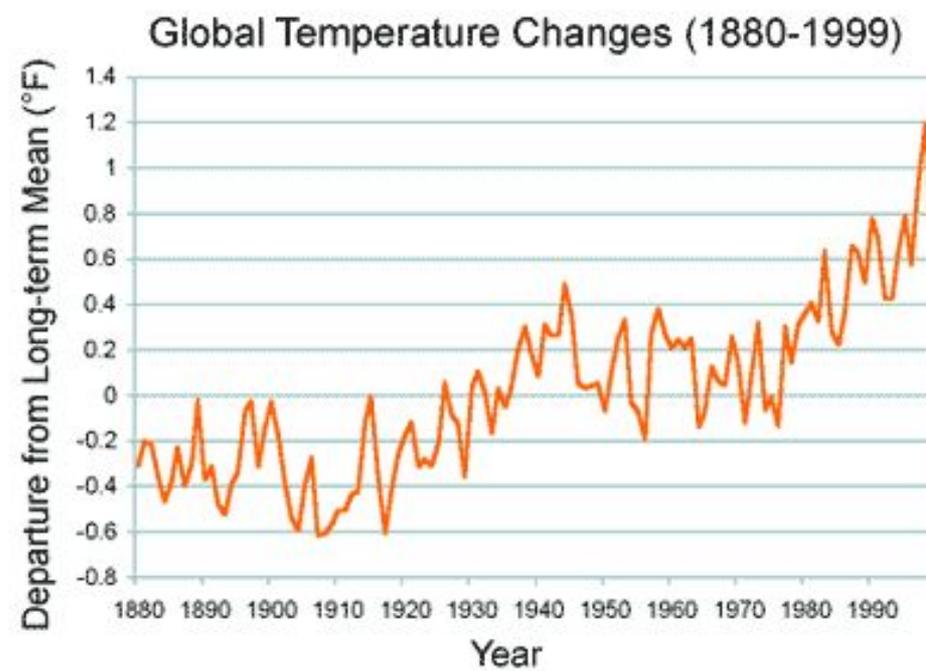
As our human population grows larger, we have a greater impact on other organisms in the environment.

# Greenhouse Effect and Global Warming (climate change)

The greenhouse effect keeps Earth warm - gases (like carbon dioxide) trap the sun's heat. Global warming is caused by a build-up of too many gases and too much heat being trapped.

# Global Warming

- Increase in the average temperature of the earth
- Caused by the release of too much  $CO_2$  into the atmosphere which amplifies the greenhouse effect
- Burning of fossil fuels, volcanic eruptions



Source: National Climatic Data Center<sup>14</sup>



# ATMOSPHERIC CARBON (CO<sub>2</sub>)

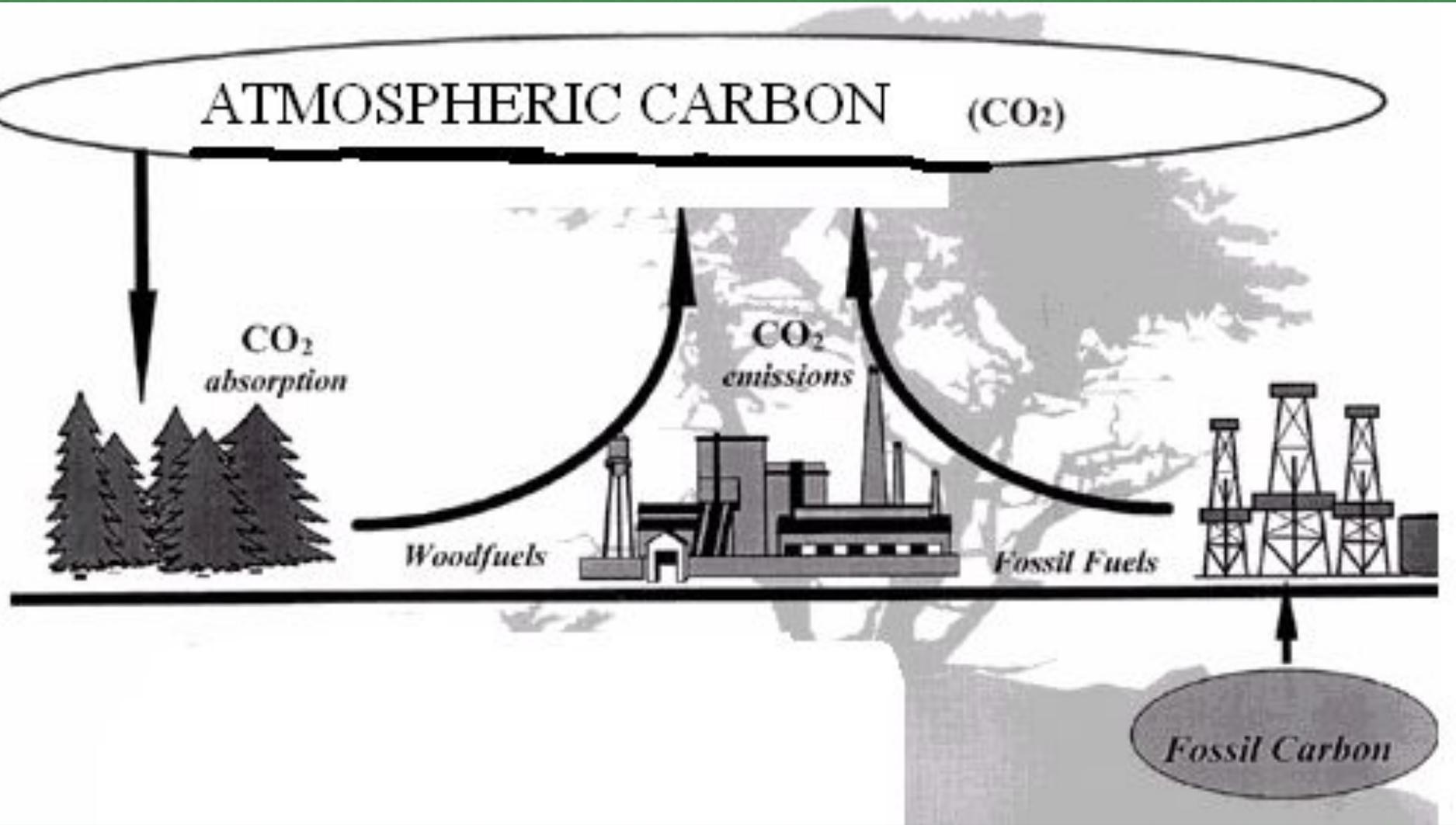
CO<sub>2</sub>  
absorption

CO<sub>2</sub>  
emissions

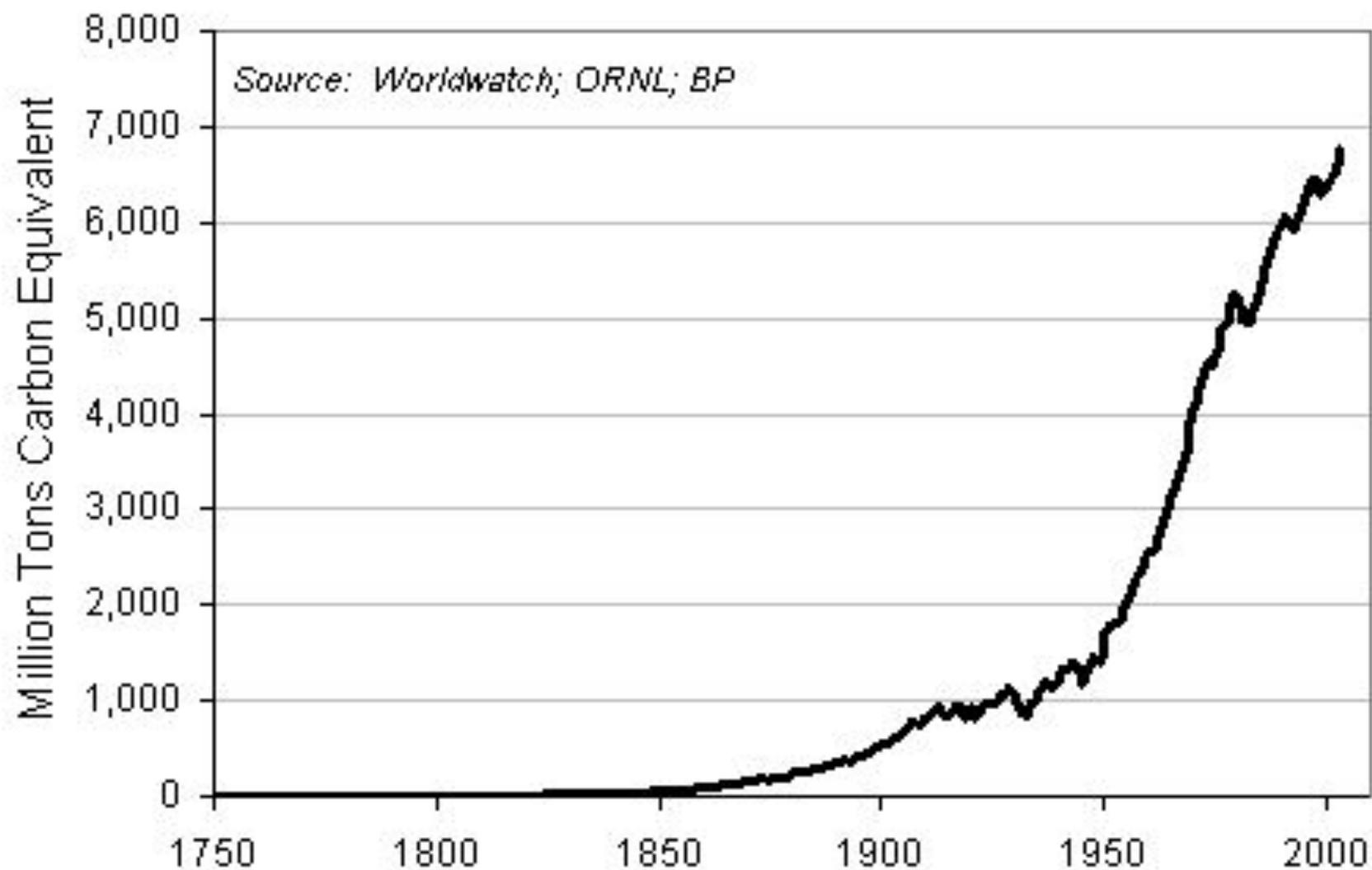
Woodfuels

Fossil Fuels

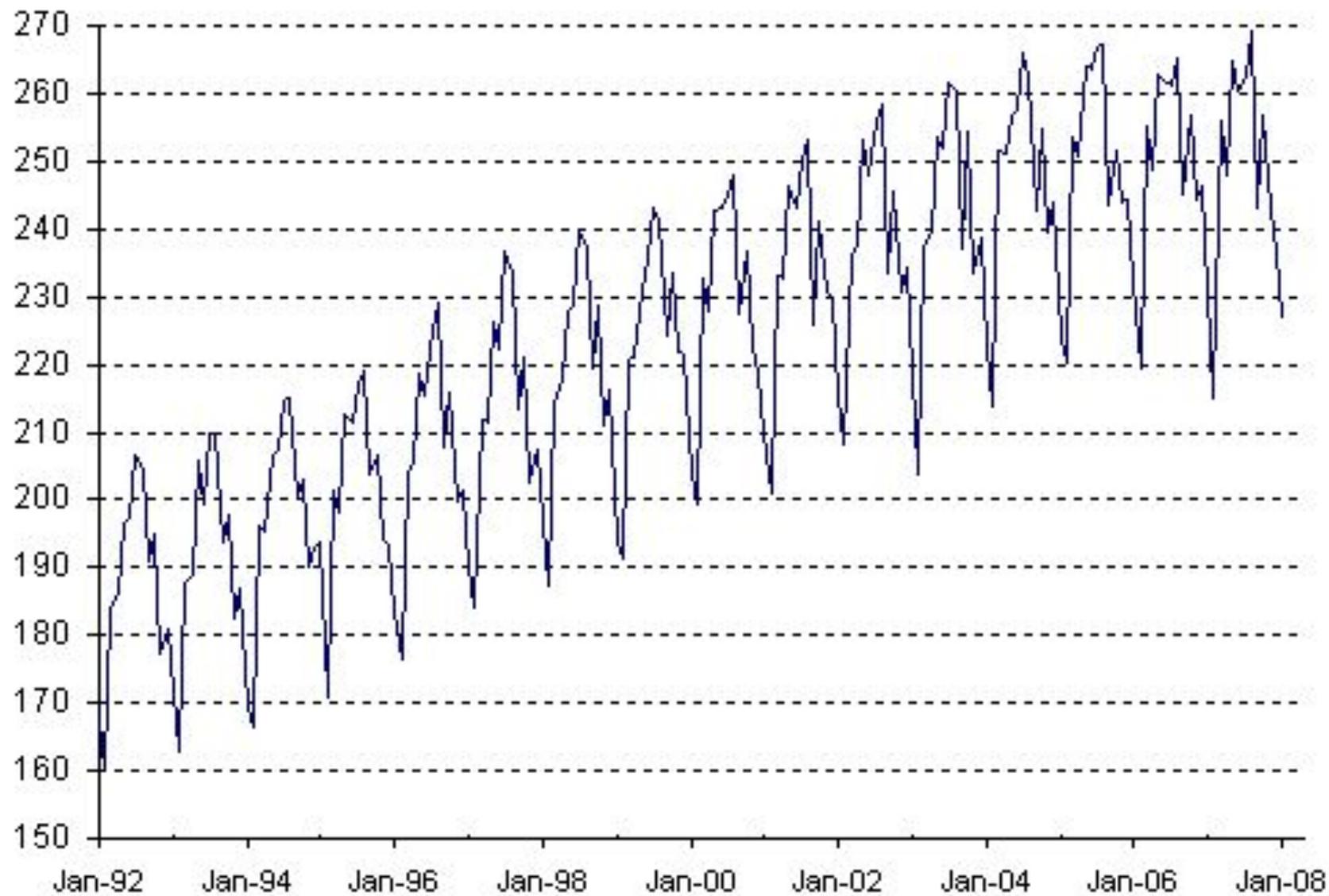
Fossil Carbon



## Global Carbon Emissions from Fossil Fuel Burning, 1751-2003



Billions



# Human Impacts

## Positive

- Reforestation
- Cover Cropping
- Recycling
- Sustainable practice

## Negative

- Acid Rain
- Deforestation
- Habitat Destruction
- Invasive Species
- Ozone depletion from the release of CFCs

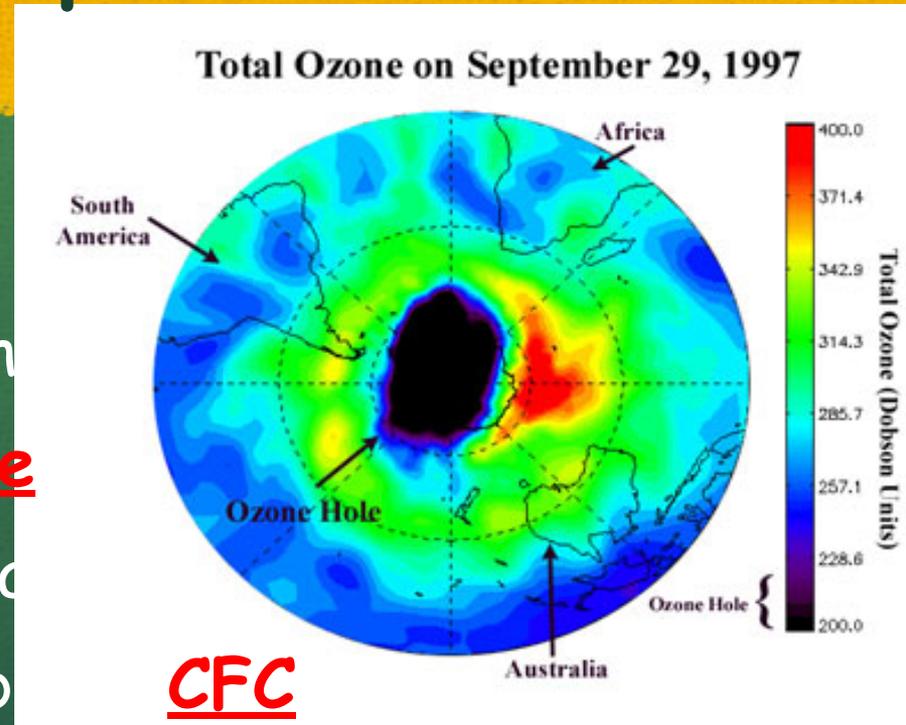


# Ozone Depletion

- Ozone Depletion - ozone ( $O_3$ ) molecules form a protective layer high in the atmosphere. There is a hole in the ozone caused by human release of Chloroflourocarbons

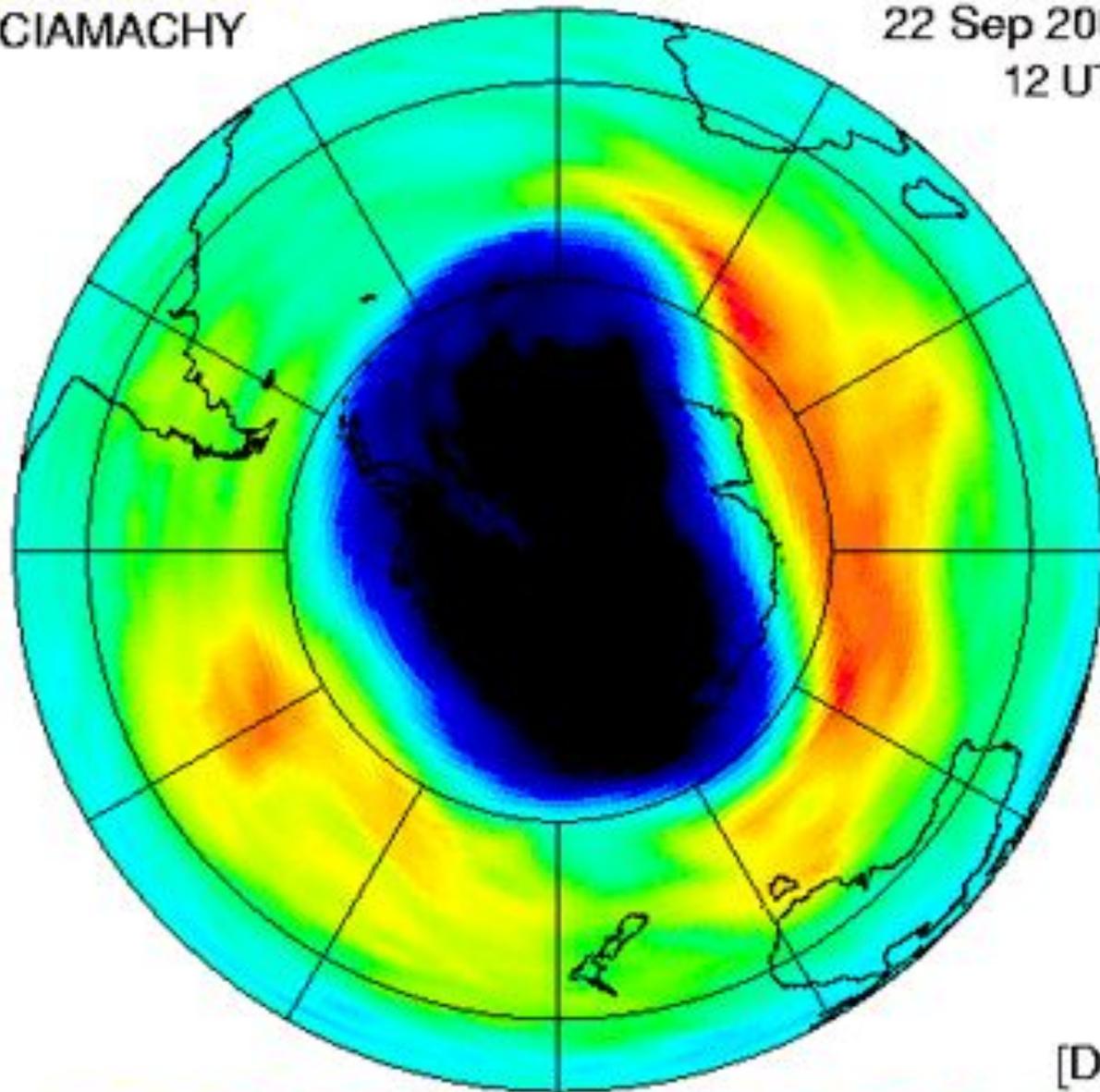
from refrigerators, air conditioners, aerosol cans, etc. This

hole has led to greater risk of cancer from harmful UV radiation.



KNMI / ESA  
SCIAMACHY

Assimilated total ozone  
22 Sep 2006  
12 UTC

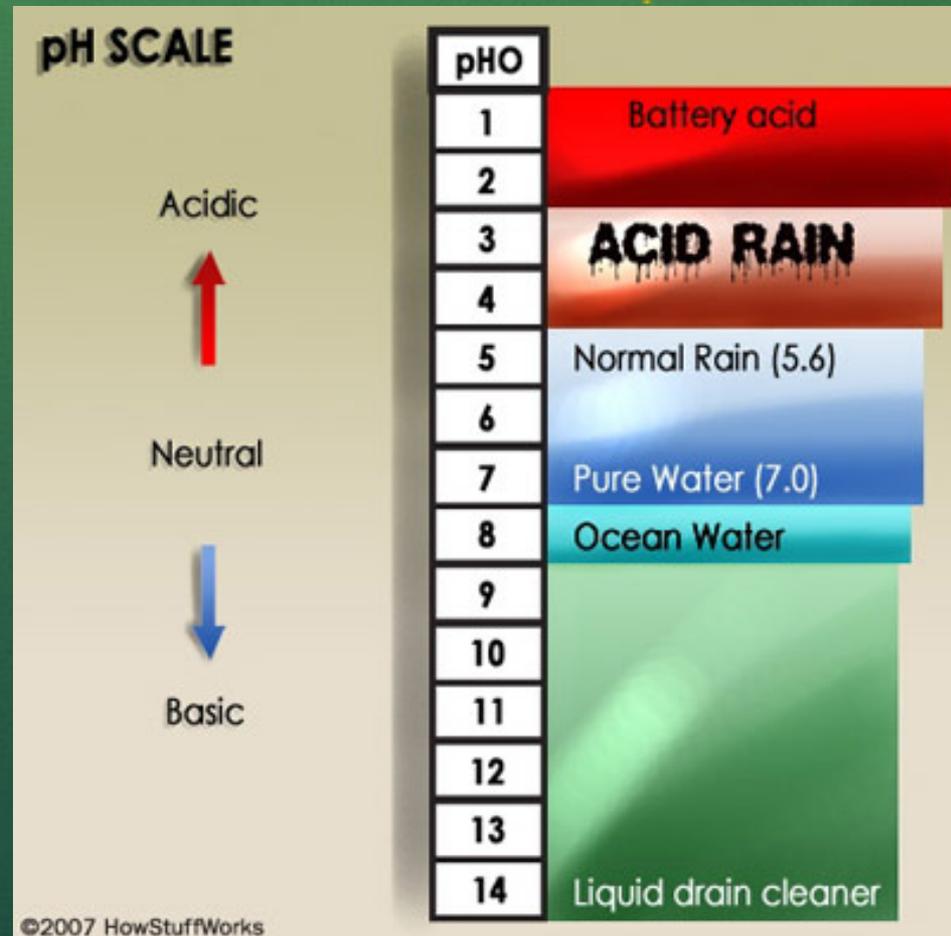


[DU]



# Acid Rain

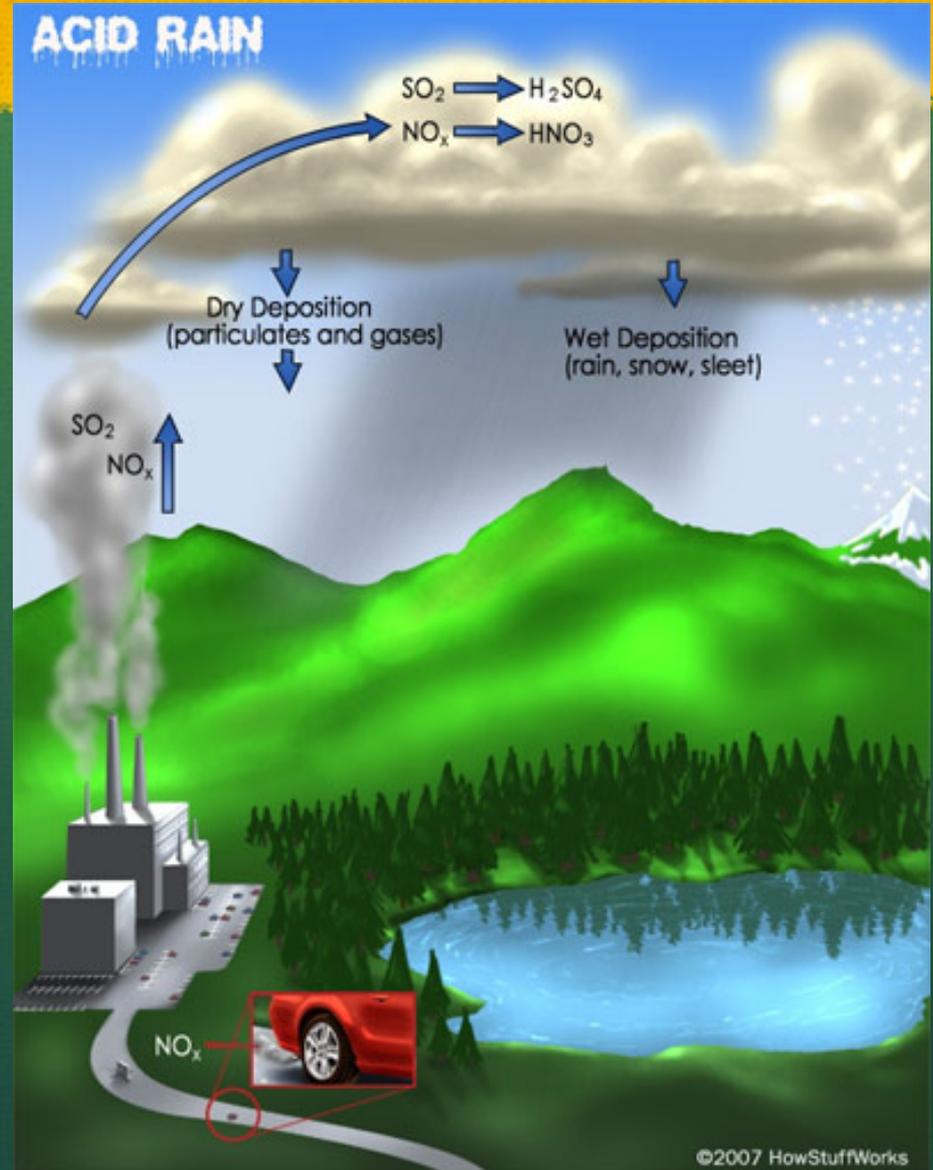
- ACID RAIN - rainwater becomes acidic ( $\text{pH} < 7$ ) as it falls through pollution in the air.

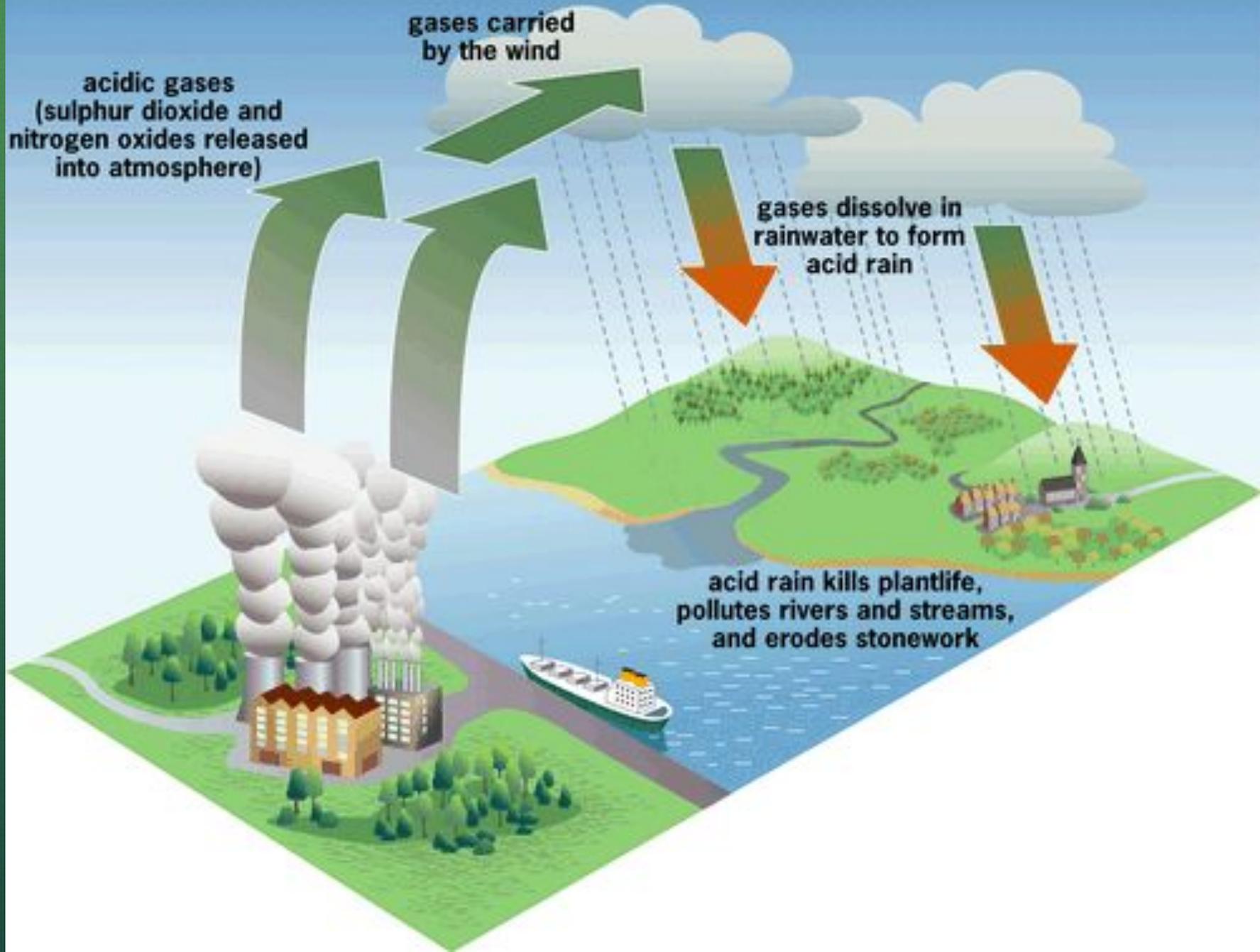


# Acid Rain

The main cause of this pollution is burning coal and other fossil fuels which releases **sulfur dioxide** into the air.

The sulfur dioxide turns into **sulfuric acid** which dissolves into the rain.





# Effects of Acid Rain



Corbis.com

# Introduced Species

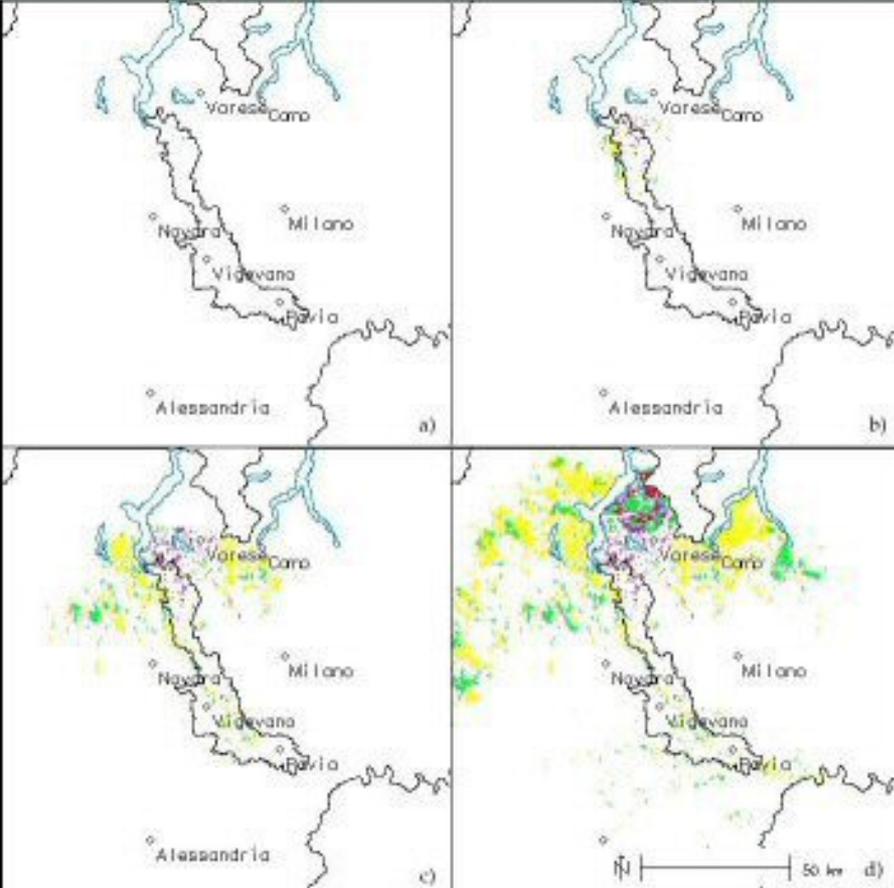
- Introduced Species - when an organism that hasn't evolved in a certain eco-system gets introduced into the area, there are usually devastating consequences for the eco-system. There are usually no natural predators or competition, and the introduced species starts to take over!
- Ex. Cane toads, kudzu, watercress



# Introduced Species

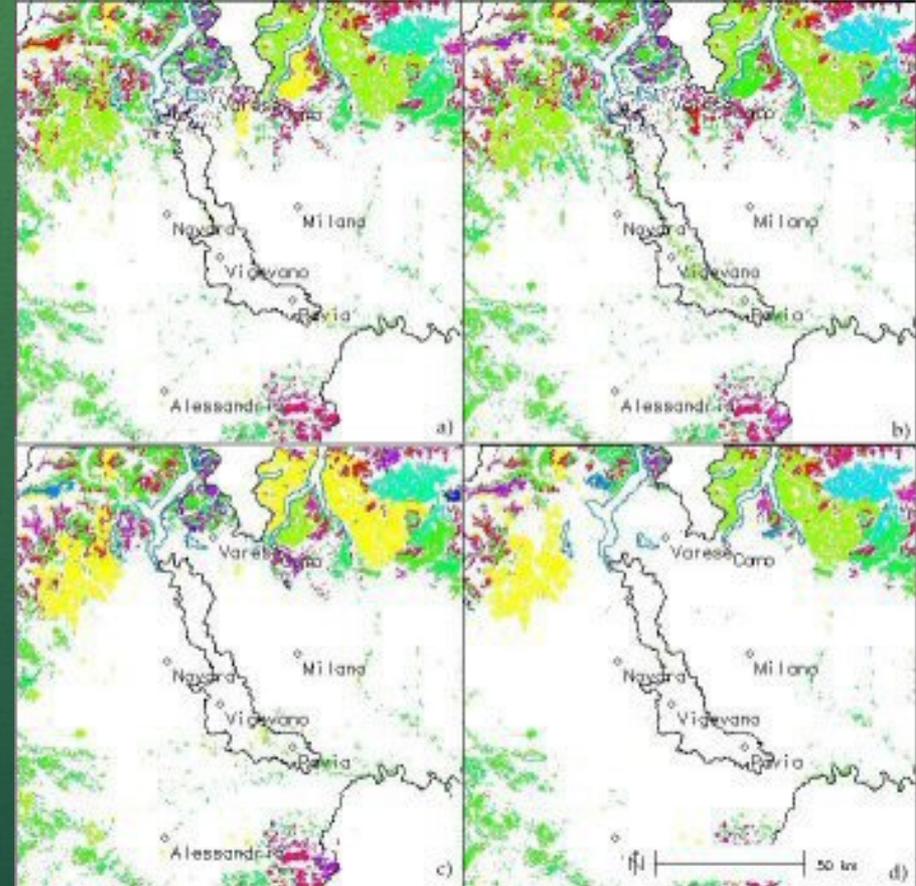






Gray squirrel density Ind/hectar

0.002    1    2    3    4    5



Red squirrel density Ind/hectar

0.001    0.3    0.6    0.8    1.1    1.3



# Habitat Destruction and Deforestation

- Habitat Destruction - many of our actions destroy the habitats of other organisms. The less biodiversity (variety of organisms) there is on Earth, the less healthy it becomes.
- Deforestation means cutting down trees or entire forests. As our need for space and land to grow food on, deforestation has increased.

# Deforestation

Why is deforestation so bad?

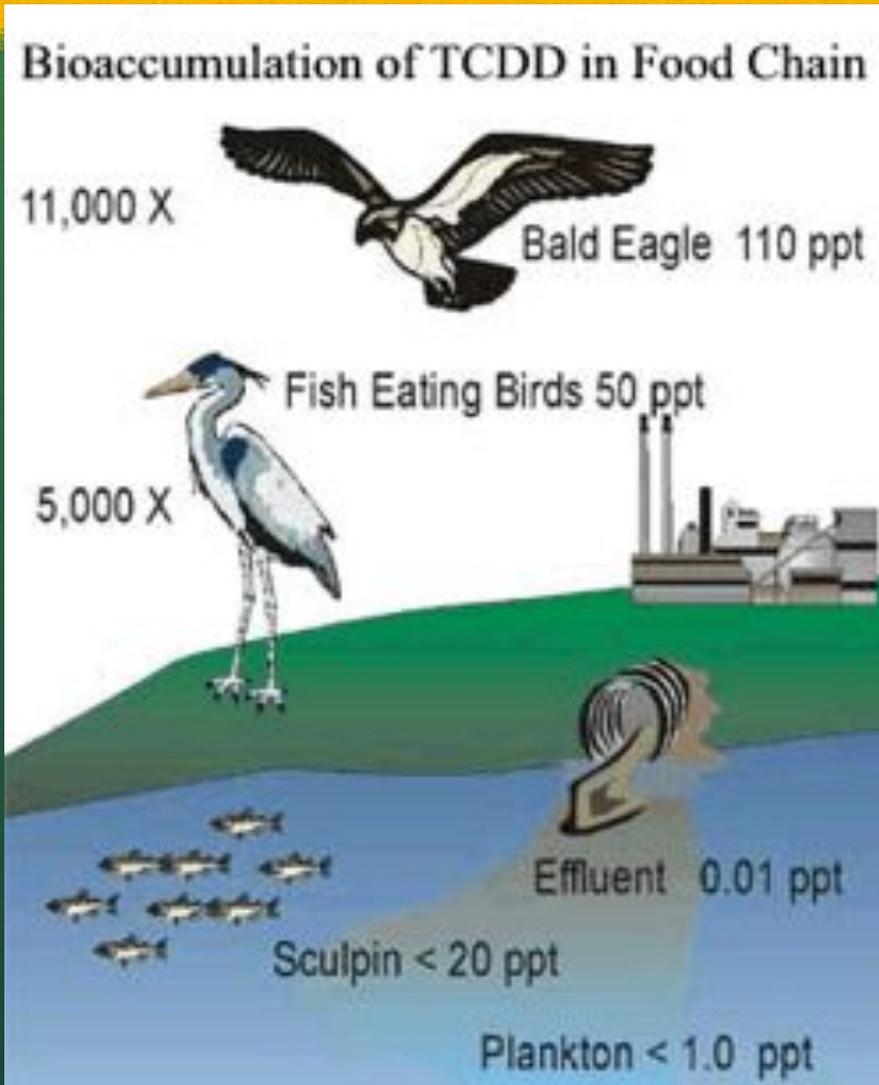
- Carbon Dioxide increases!!
- Habitat loss!
- Decreases biodiversity of Earth (less potential helpful species for humans)!
- More polluted air!
- More polluted underground water supply!
- Less of our beautiful world to enjoy!



# Pesticide Use

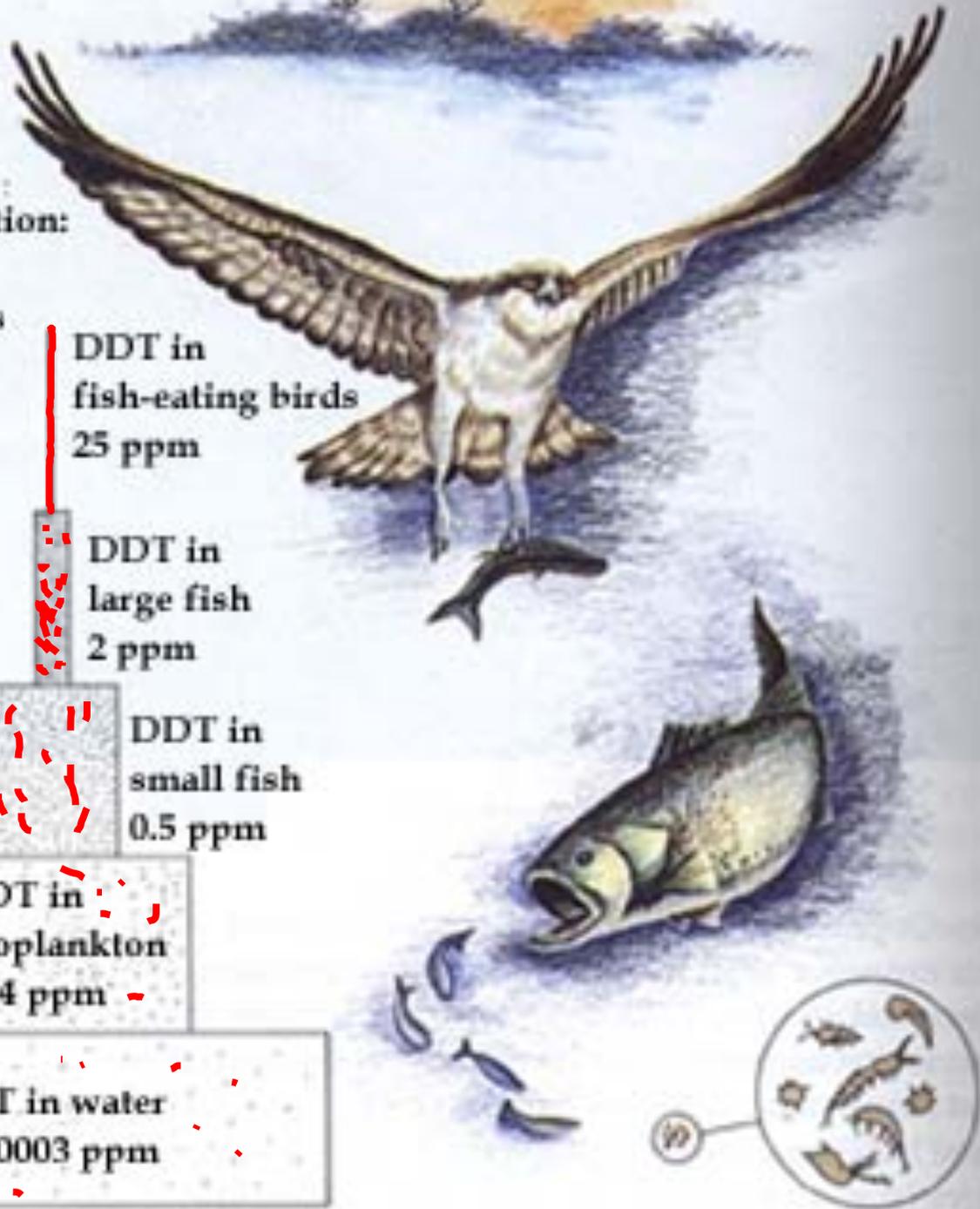
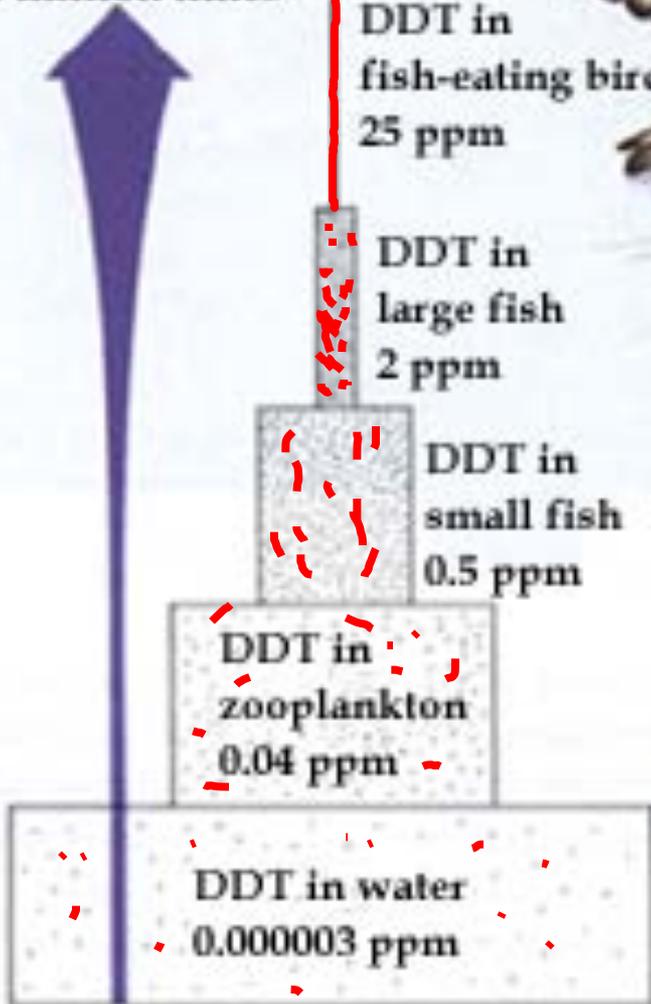
- Pesticides - pesticides are used to keep herbivores or parasites from harming plants. They are often made of harmful chemicals that can run-off into water supplies.
- An alternative to pesticides that would have less impact on the environment would be biological controls - using organisms instead of chemicals to control pests (good bugs killing bad bugs). Ex. Ladybugs and Christmas trees; fish and mosquito larvae.

# Bioaccumulation



- An increase in environmental toxins at higher trophic levels
- Ex. DDT and birds of prey

DDT concentration:  
increase of  
10 million times



# Bioaccumulation (biomagnification): The build-up of toxins through a food chain

- Once chemicals like DDT or metals like lead and mercury get into an organism they can stay **forever** and can be very dangerous.
- Organisms at the **top** (bald eagles) are affected the most.



# TODAY'S ASSIGNMENT

- In partner or by your self, Make a poster about two ways Human's are impacting our environment.
- Your goal is to inform Smith about these things!
- Each poster must include:
  - Pick 1 Impact
  - Three complete sentences about the way the impact affects the environment
  - Images
  - 1 Way to help for each

# **ENERGY FLOW:**

How do organisms get energy?

PRODUCERS

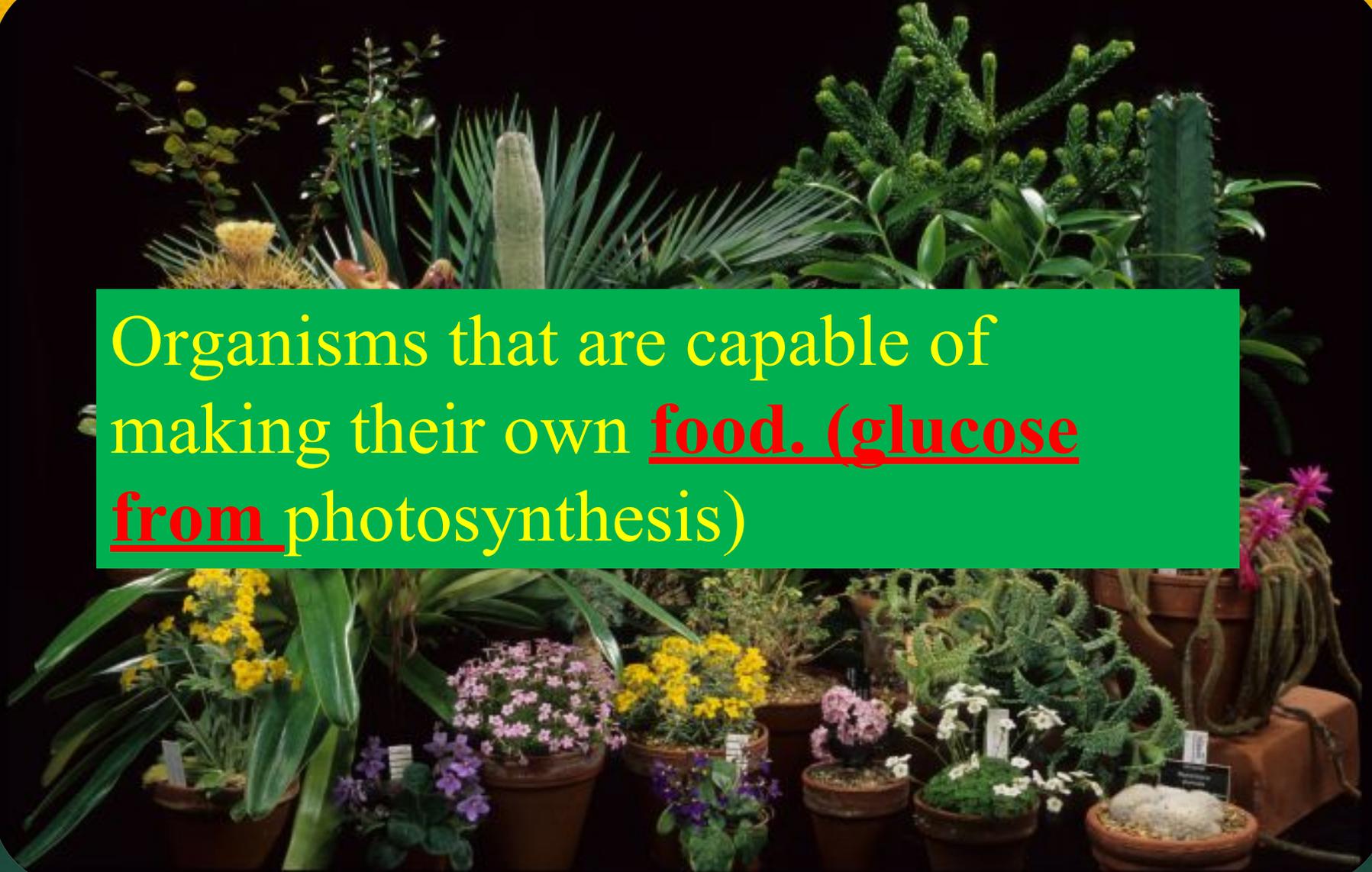
HETEROTOPHS

CONSUMERS

AUTOTROPHS

# AUTOTROPHS are PRODUCERS

Organisms that are capable of making their own food. (glucose from photosynthesis)



# HETEROTROPHS are CONSUMERS



Organisms that must consume other organisms for food





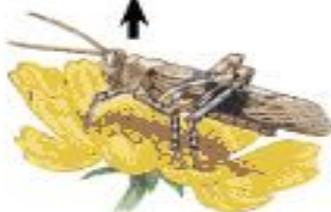
**Carnivore**



**Carnivore**



**Carnivore**



**Herbivore**



**Plant**

**Quaternary consumers**

**Tertiary consumers**

**Secondary consumers**

**Primary consumers**

**Primary producers**



**Carnivore**



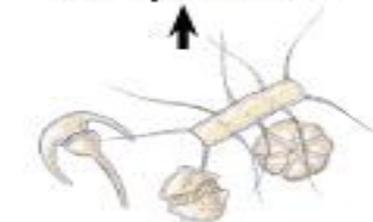
**Carnivore**



**Carnivore**



**Zooplankton**

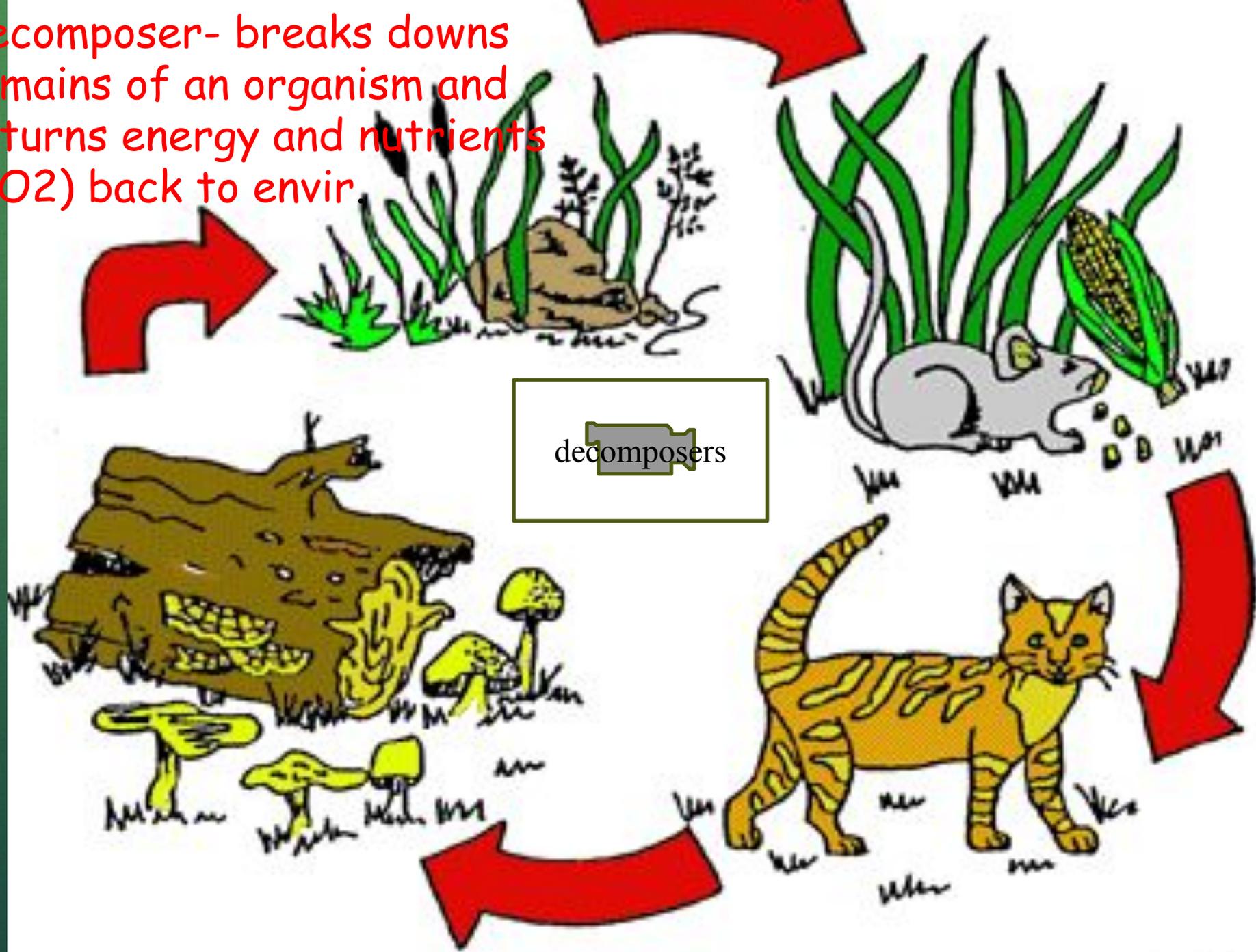


**Phytoplankton**

**A terrestrial food chain**

**A marine food chain**

Decomposer- breaks down  
remains of an organism and  
returns energy and nutrients  
(CO<sub>2</sub>) back to enviro.

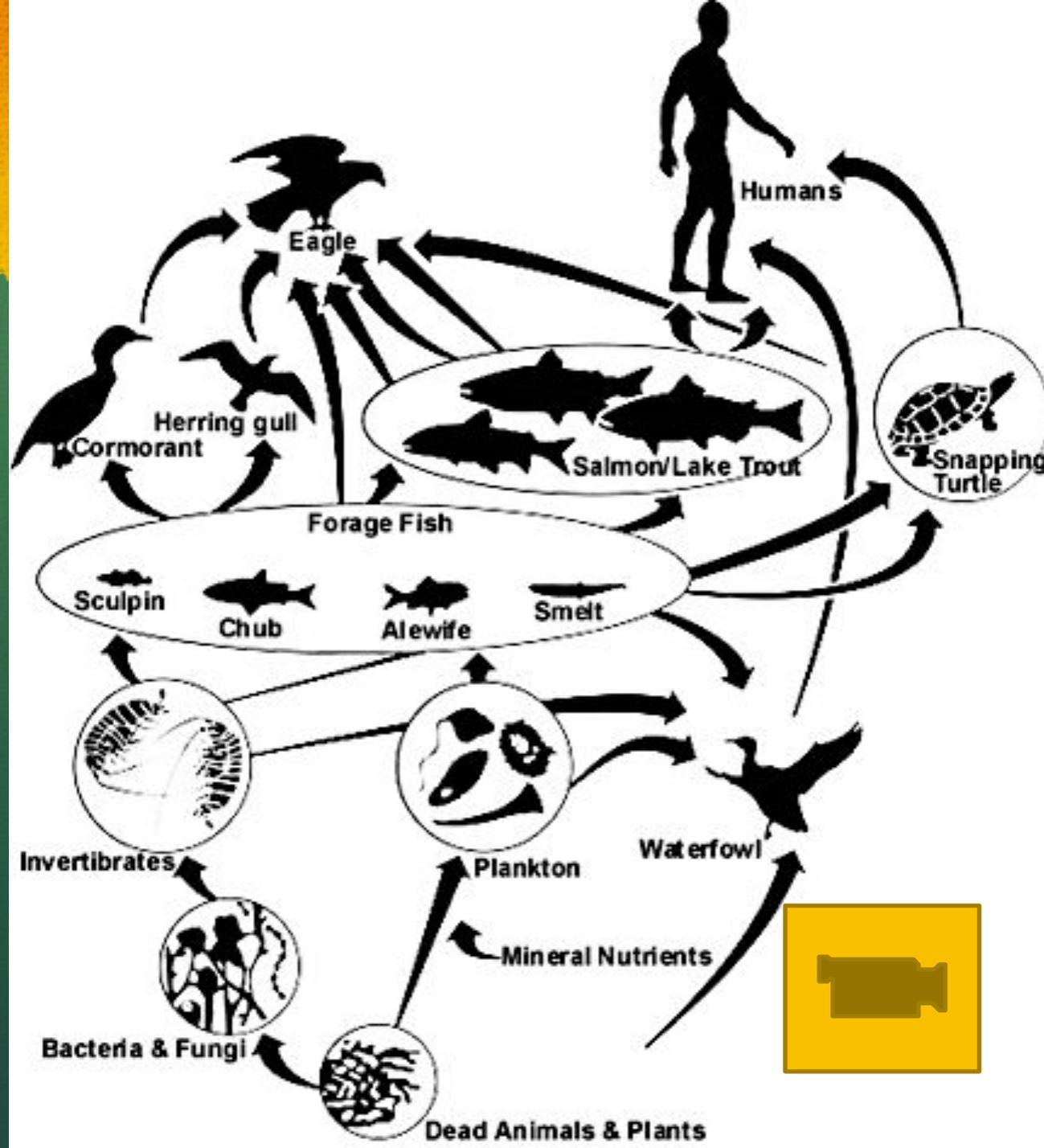


# FOOD CHAIN-

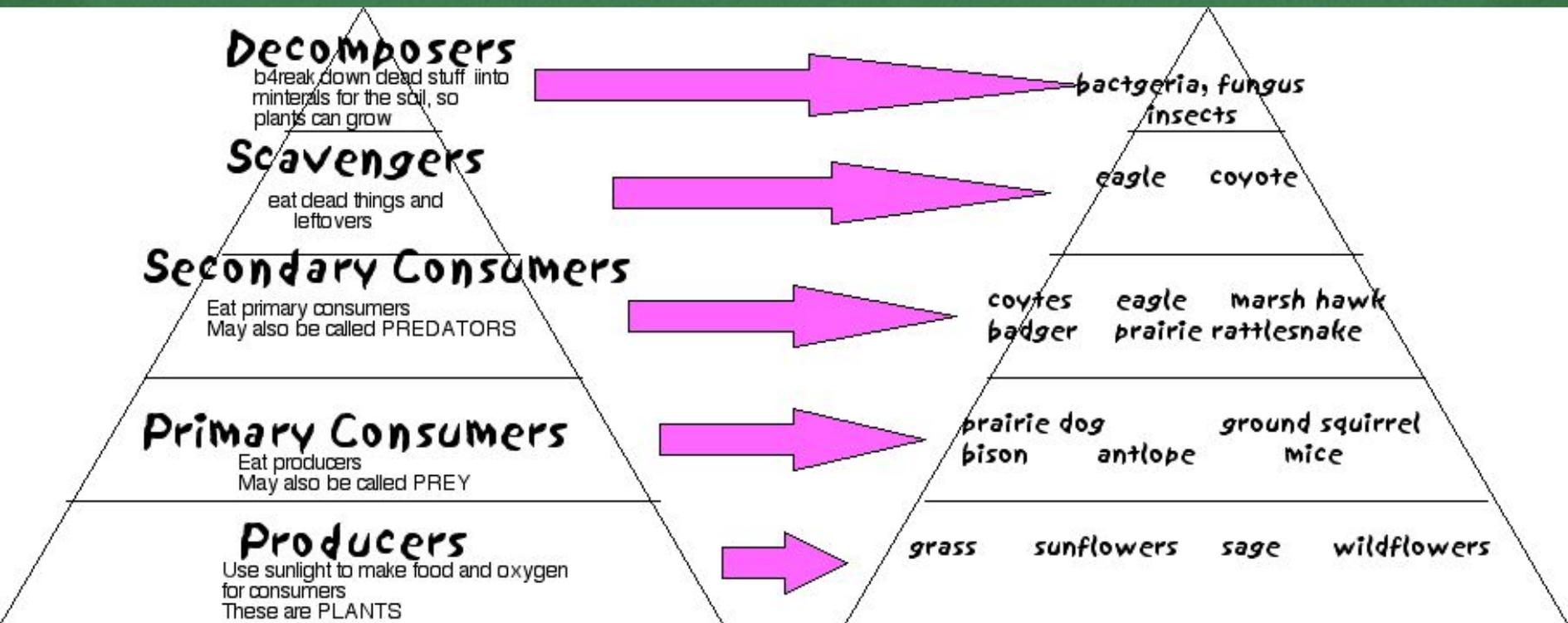
describe the flow of energy from producers to consumers to decomposers with arrows



Food Web:  
interaction  
of many  
food chains  
- that one  
organism can  
eat or be  
eaten by  
many  
different  
organisms.



# Energy pyramids (trophic structures): food chain in a triangle shape.

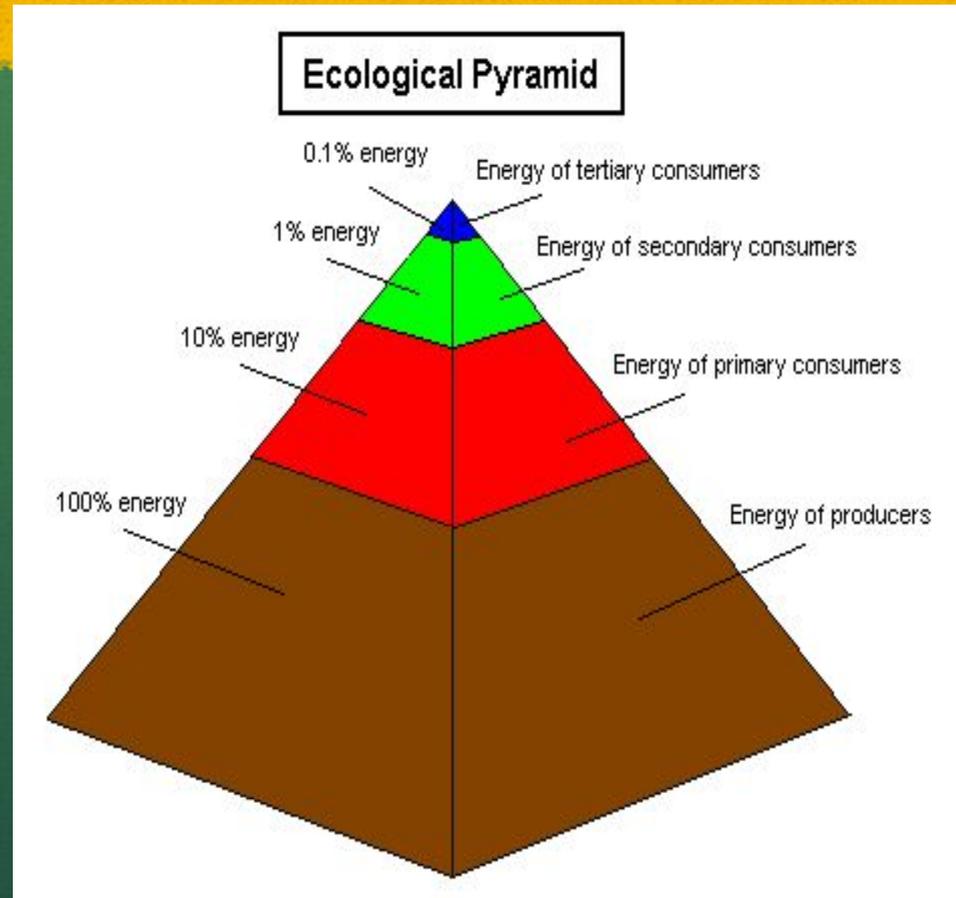


All Energy on Earth comes from  
the Sun

Prairie Ecosystem

# Trophic Levels

- Show steps in feeding relationships
- Energy passes from one organism to another
- About 10% of the energy at one level passes to the next

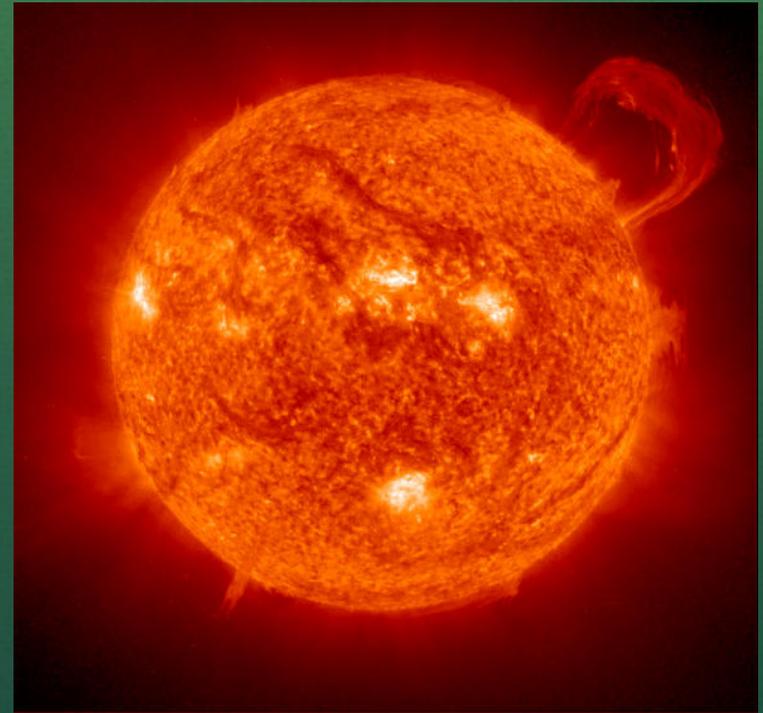


**1. Energy = GREATEST at BOTTOM of the food chain. Enough energy at top to support VERY FEW organisms.**

**2. 90% of the energy in each trophic level (a step in the food chain) is used/lost before it is passed to the next.**

**3. ALL of the energy in an eco-system comes from the sun so PRODUCERS be at the base!**

**4. The number of organisms (and biomass) is greatest at the BASE.**



**Tertiary  
Consumers**  
1 kcal



**Secondary  
Consumers**  
10 kcal



**Primary  
Consumer**  
100 kcal



**Producers**  
1,000 kcal

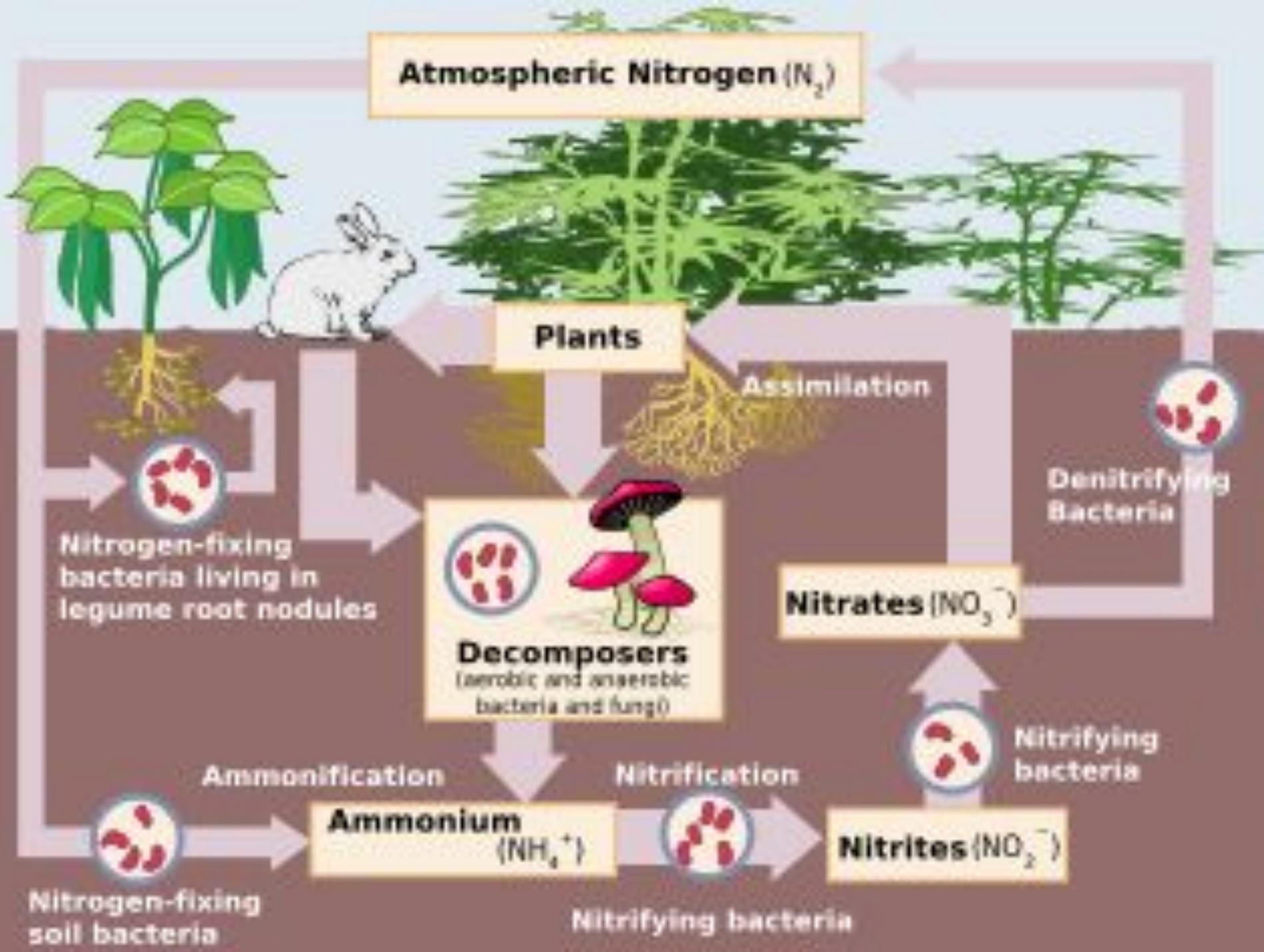


# TODAY'S ASSIGNMENT

- MAKE AN ENERGY PYRAMID
- Cut out Pyramid Pattern
- On the Bottom Center Draw a SUN
- On One side draw a producer > primary consumer > secondary consumer > tertiary consumer
- On another side label your pictures from above
- On other side SHOW how much energy passes up starting with 10,000 kcal for producers

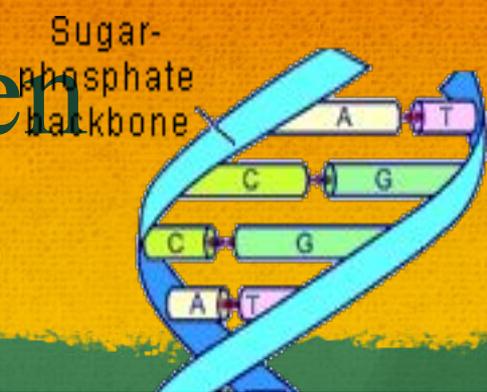
# TODAY'S ASSIGNMENT

- Make Brochure About Human Impacts in North Carolina
- You group will gather information from the Station on your topic.
- BROCHURE must include:
  - Title (what's your impact?)
  - 5 Quick facts about problem
  - 2 pictures/ images
  - At least 2 ways we can help
  - A five sentence summary of what the problem is and how we can help.





# Why do we need the nitrogen cycle?

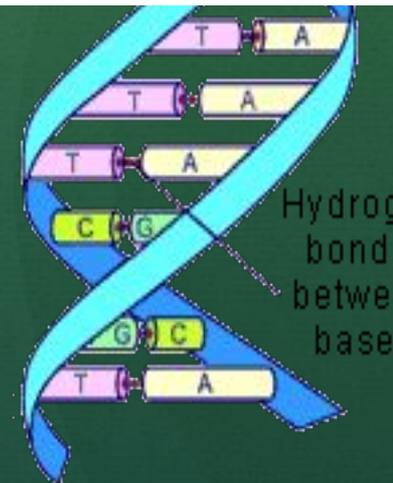
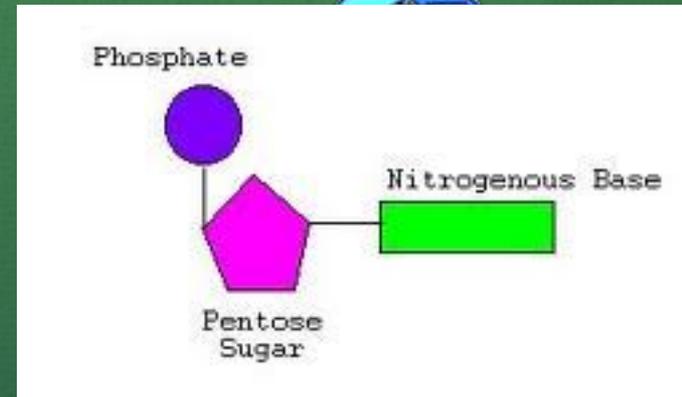


- Nitrogen helps compose DNA

- Proteins that helps you body

Carry out chemical reactions

Are made according to the sequence of nitrogenous bases!



# Greenhouse Effect and Global Warming (climate change)

The greenhouse effect keeps Earth warm - gases (like carbon dioxide) trap the sun's heat. Global warming is caused by a build-up of too many gases and too much heat being trapped.

[\(tiny movie on carbon cycle within tree\)](#)

# Carbon Cycle

# Carbon Cycle

- Cellular Respiration releases  $\text{CO}_2$  into the atmosphere and removes oxygen from the air
- Photosynthesis removes  $\text{CO}_2$  from air

- Carbon can be found in many forms.
- Two of the most important forms are carbon dioxide ( $\text{CO}_2$ ) and glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ).
- Carbon can be found in tissues of ALL organisms (living or dead).
- (That's why burning forests, dead leaves, etc. releases carbon dioxide into atmosphere)

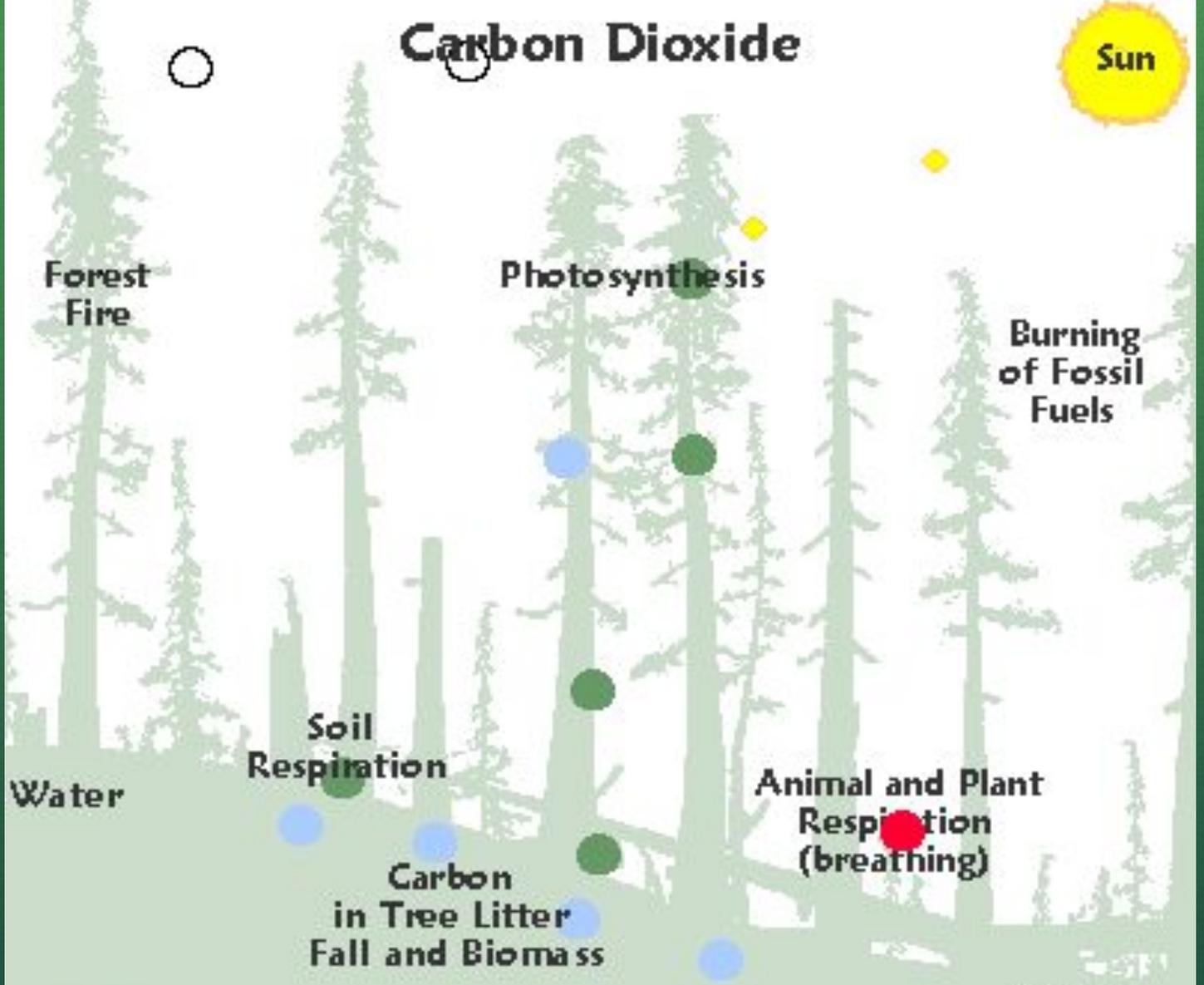
- Carbon is **recycled** over and over. It moves from the atmosphere, through producers, through consumers, and back to the atmosphere.

1. Carbon dioxide is taken into producers during photosynthesis

2. During photosynthesis it is turned into glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ )

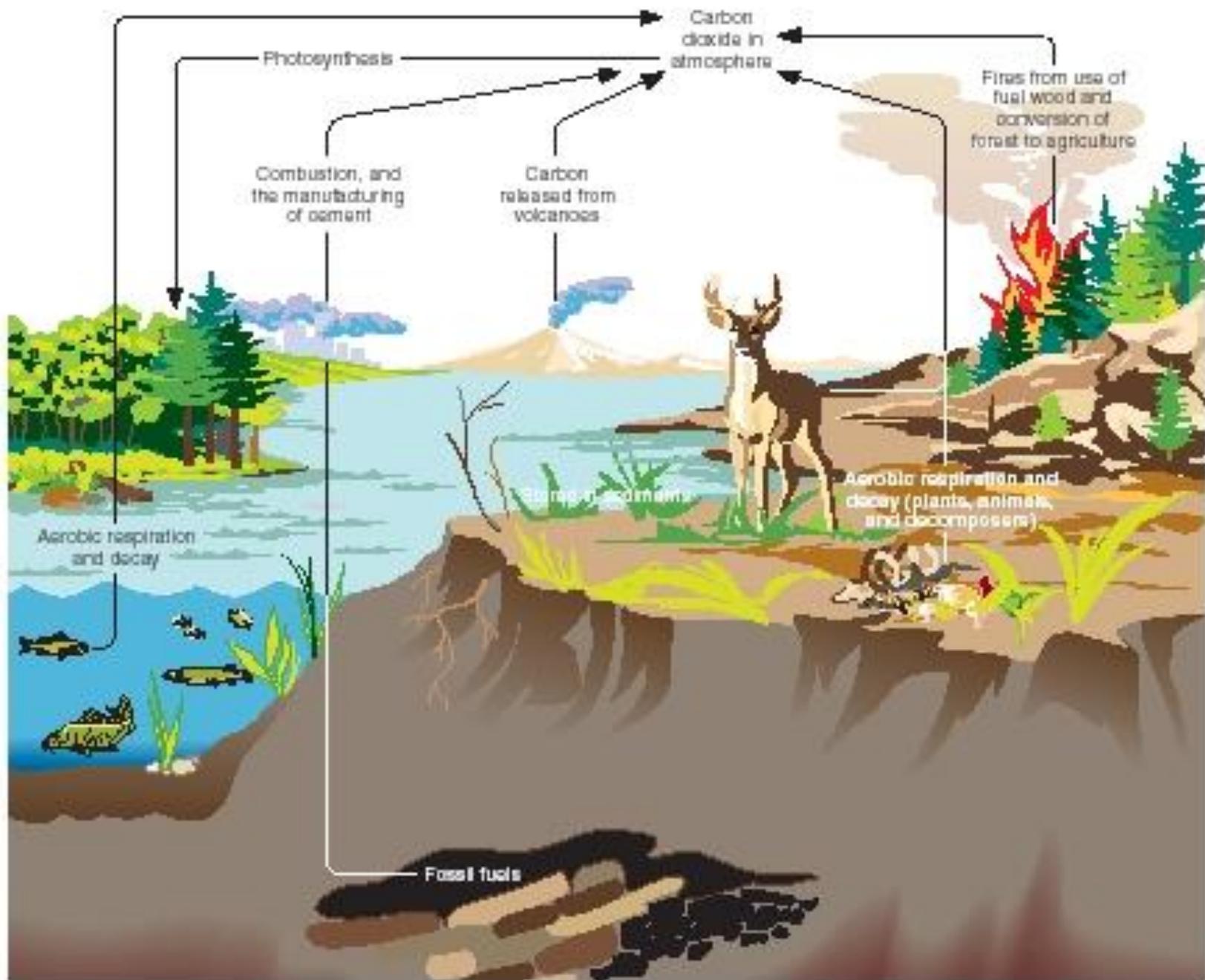
3. Organisms (like animals) eat the plants and get the glucose and use it to make ATP during cellular respiration. A by-product of cellular respiration is carbon dioxide.

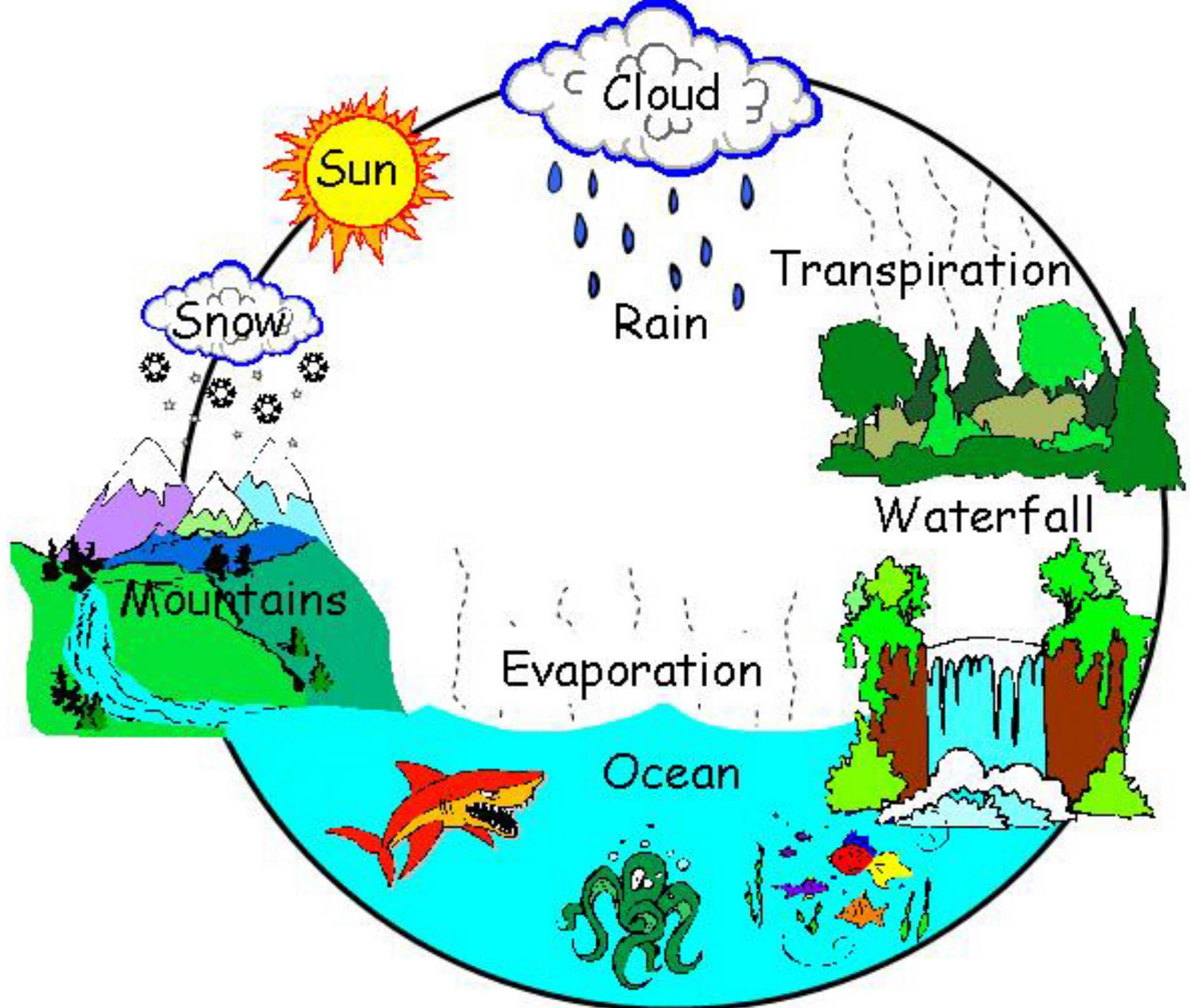
# Carbon Dioxide



## CARBON CYCLE in Olympic's Forests

Carbon  
in Water  
Chemistry





# POSTER ON CYCLES

CREATE A POSTER THAT ILLUSTRATES EACH OF THE 3 CYCLES WE TALKED ABOUT TODAY

- WATER
- CARBON
- NITROGEN

● INCLUDE THE FOLLOWING LABELS:

1. PHOTOSYNTHESIS
2. COMBUSTION
3. CELLULAR RESPIRATION
4. EVAPORATION
5. RUN-OFF
6. TRANSPIRATION

# Autotroph vs. Heterotroph

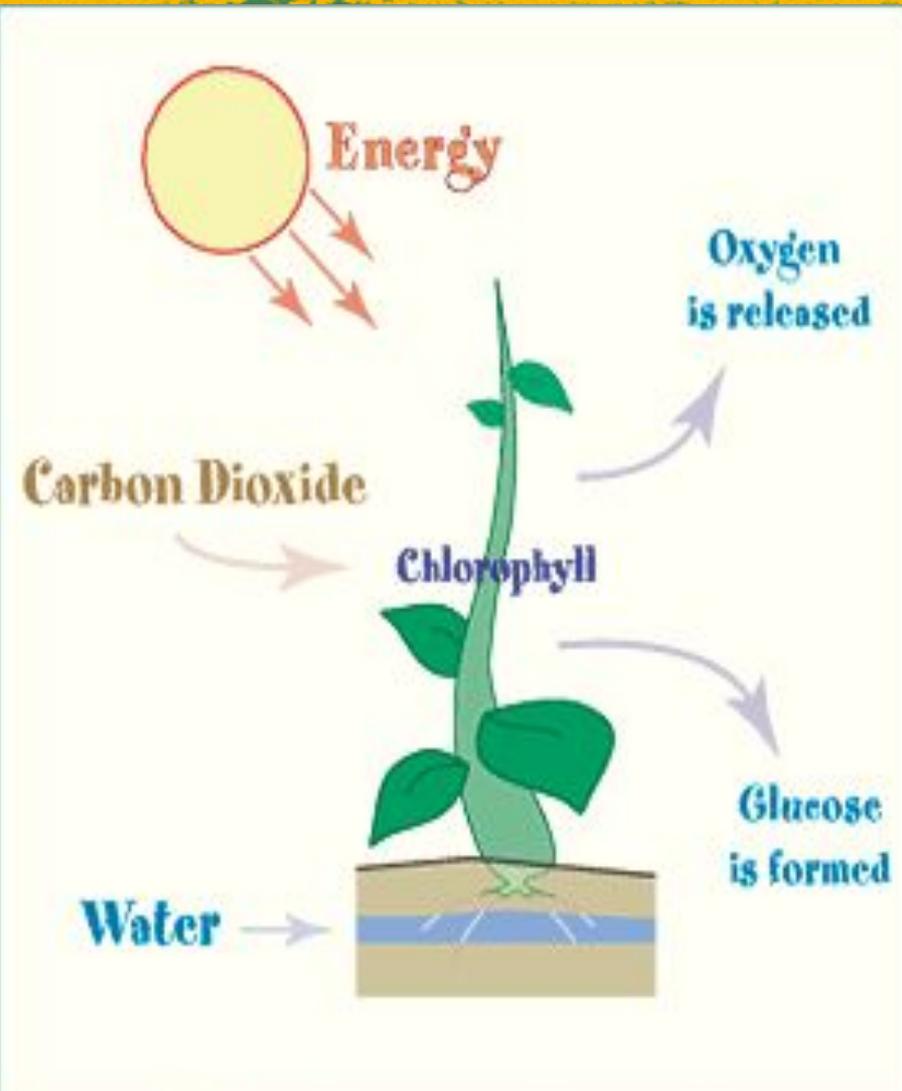
- Obtain energy from the environment
- Photosynthesis or chemosynthesis
- "Producers"
- Obtain energy from other living things
- "Consumers"



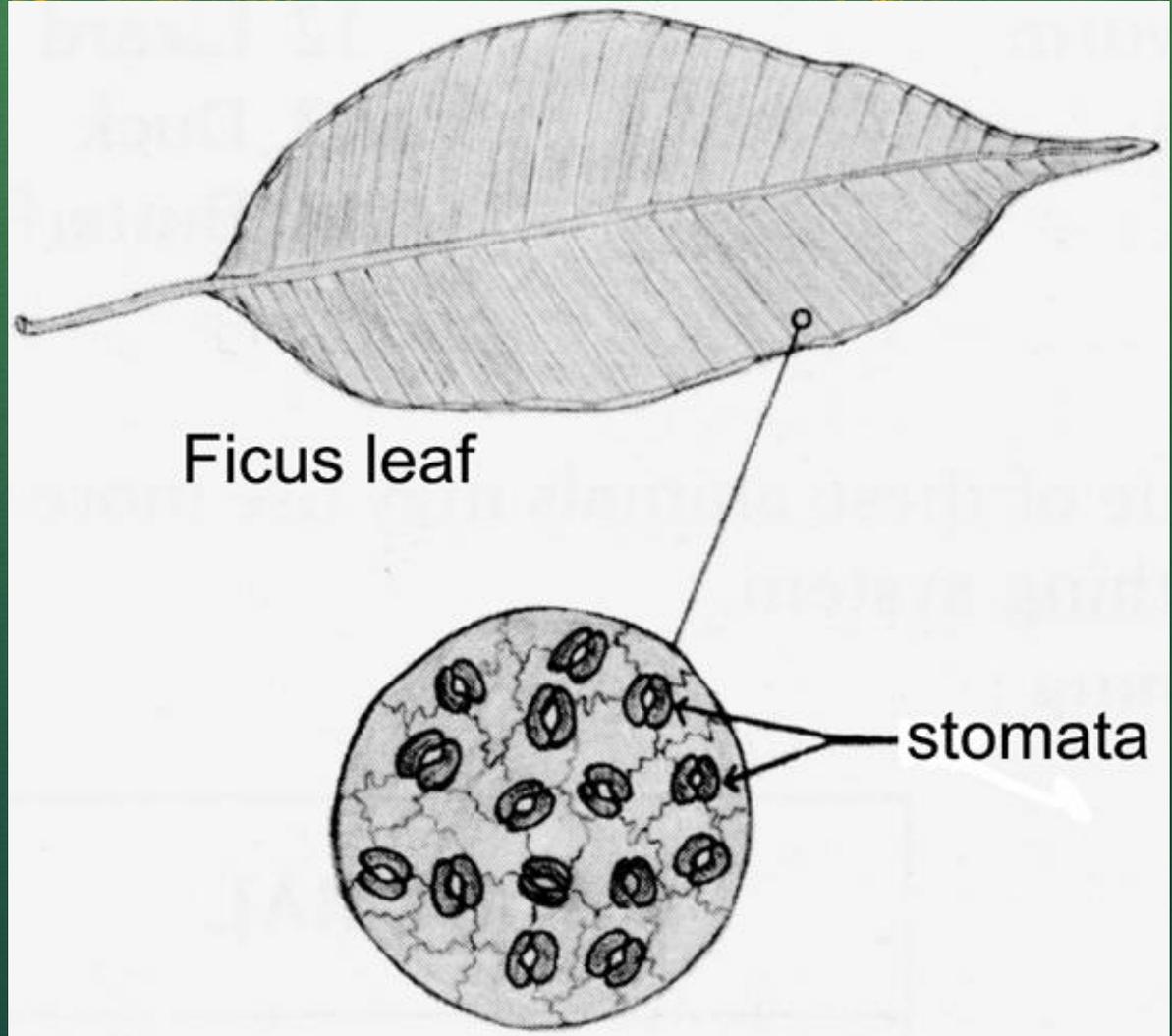
# Photosynthesis:



- Water and Carbon Dioxide used to produce Glucose & Oxygen
- Occurs in the chloroplast
- (organelle found in leaves)



# STOMATA: Where the gas comes in!



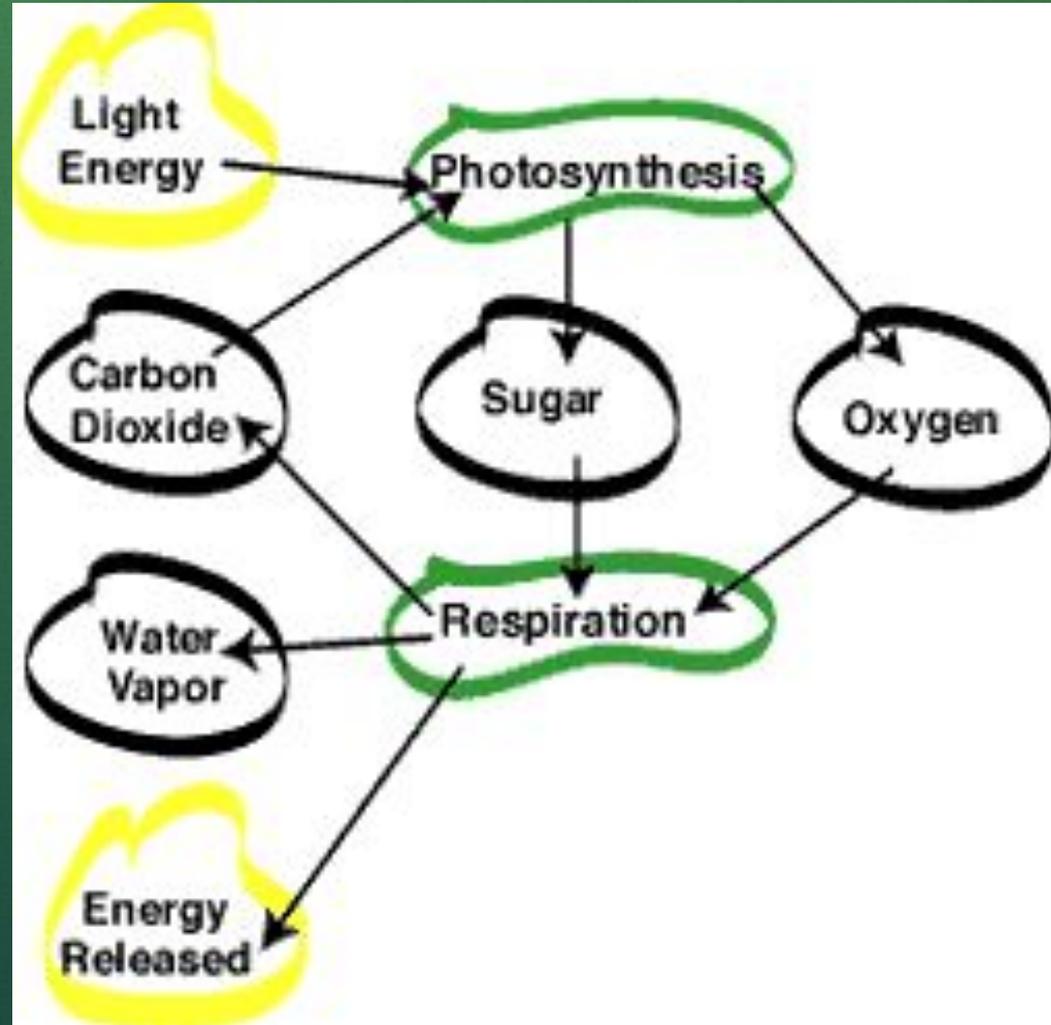
# CELLULAR Respiration:

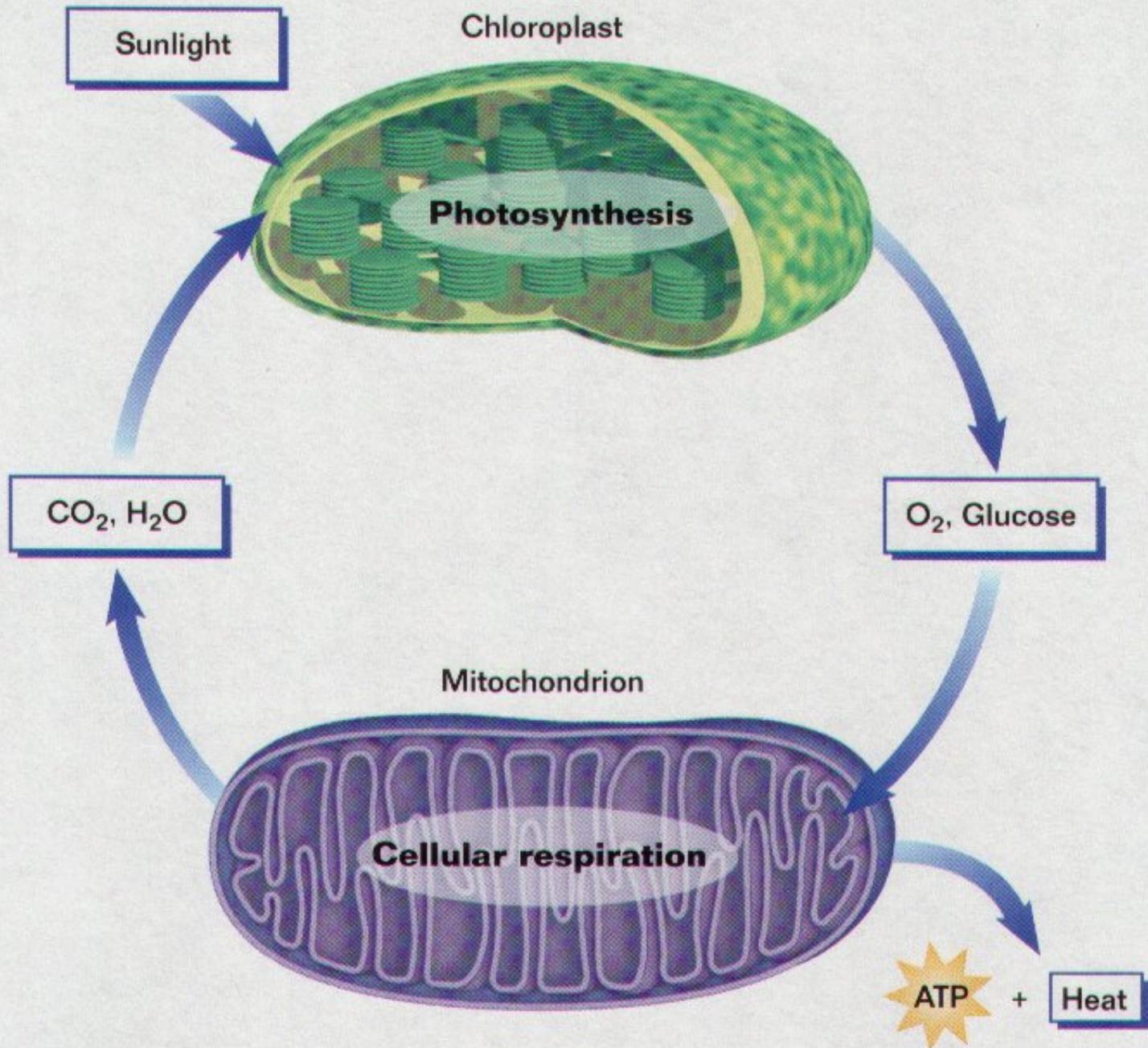


- Converts Glucose into ATP

- Used to release energy (ATP) for cellular use

- Occurs in the mitochondria





Sunlight

PHOTOSYNTHESIS

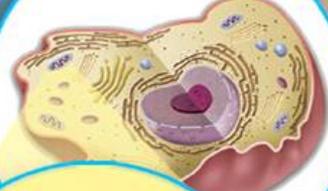
### Plants Produce

Carbohydrate ( $C_6H_{12}O_6$ )  
and Oxygen ( $O_2$ )

Plant cell



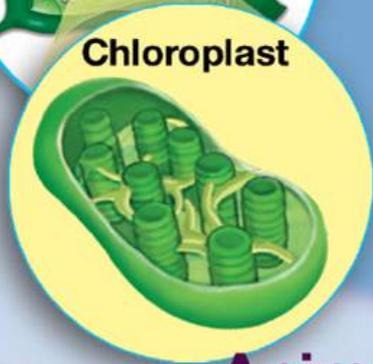
Animal cell



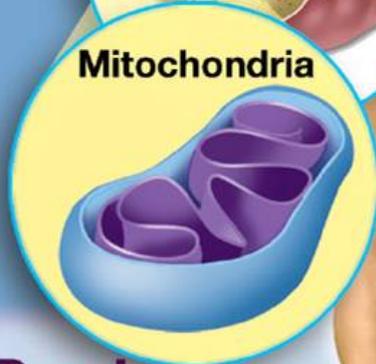
### Animals Use

Carbohydrate ( $C_6H_{12}O_6$ )  
and Oxygen ( $O_2$ )

Chloroplast



Mitochondria



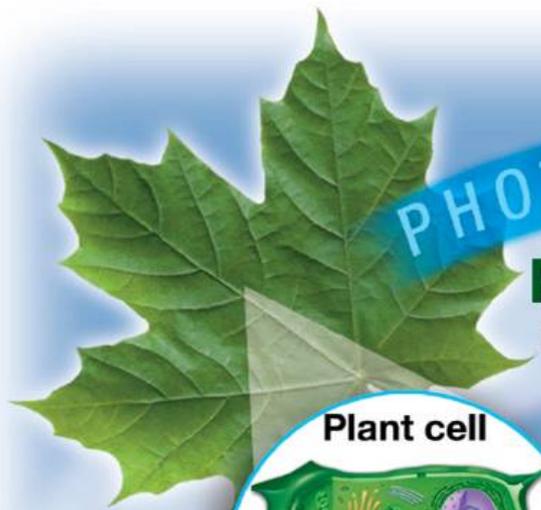
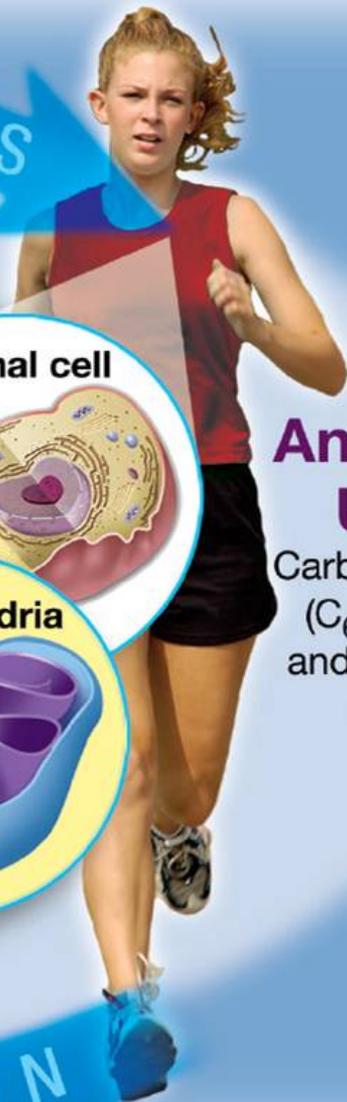
### Plants Use

Carbon  
Dioxide ( $CO_2$ )  
and  
Water ( $H_2O$ )

### Animals Produce

Carbon Dioxide ( $CO_2$ )  
and Water ( $H_2O$ )

RESPIRATION



How does the process of photosynthesis in plants provide energy for animals?

- a. The water and carbon dioxide used in photosynthesis are converted into glucose and ATP for animals.
- b. The glucose and ATP used in photosynthesis are converted into water and carbon dioxide for animals.
- c. The glucose and carbon dioxide used in photosynthesis are converted into proteins for animals.
- d. The oxygen and glucose produced through photosynthesis are converted into lipids for animals.

**Constructed Response:** What benefit does recycling provide for the biosphere?

2.2.1 Which of the following has contributed *most* to the overall warming of the earth's atmosphere?

- a. the burning of fossil fuels
- b. the depletion of the ozone
- c. the occurrence of acid rain
- d. the melting of the polar ice caps

Classify the relationship between flowering plants and bees, where the plant provides the bee with food and the bee spreads pollen for the plant.

- a. commensalism
- b. mutualism
- c. parasitism
- d. predation

# TODAY'S ASSIGNMENT

- Each of you will make a poster about Photosynthesis and Cellular Respiration.
- Each poster must include:
  - The Products and Reactants of Both
  - Pictures
  - Places these products and reactants can be found

# Anaerobic Respiration

aka Fermentation

- Does not require Oxygen
- also used to release energy, but not as efficient as aerobic respiration (less ATP)
- Products include  $CO_2$  and lactic acid or alcohol
- Two Types: Alcoholic Fermentation and Lactic Acid Fermentation



# ANAEROBIC RESPIRATION

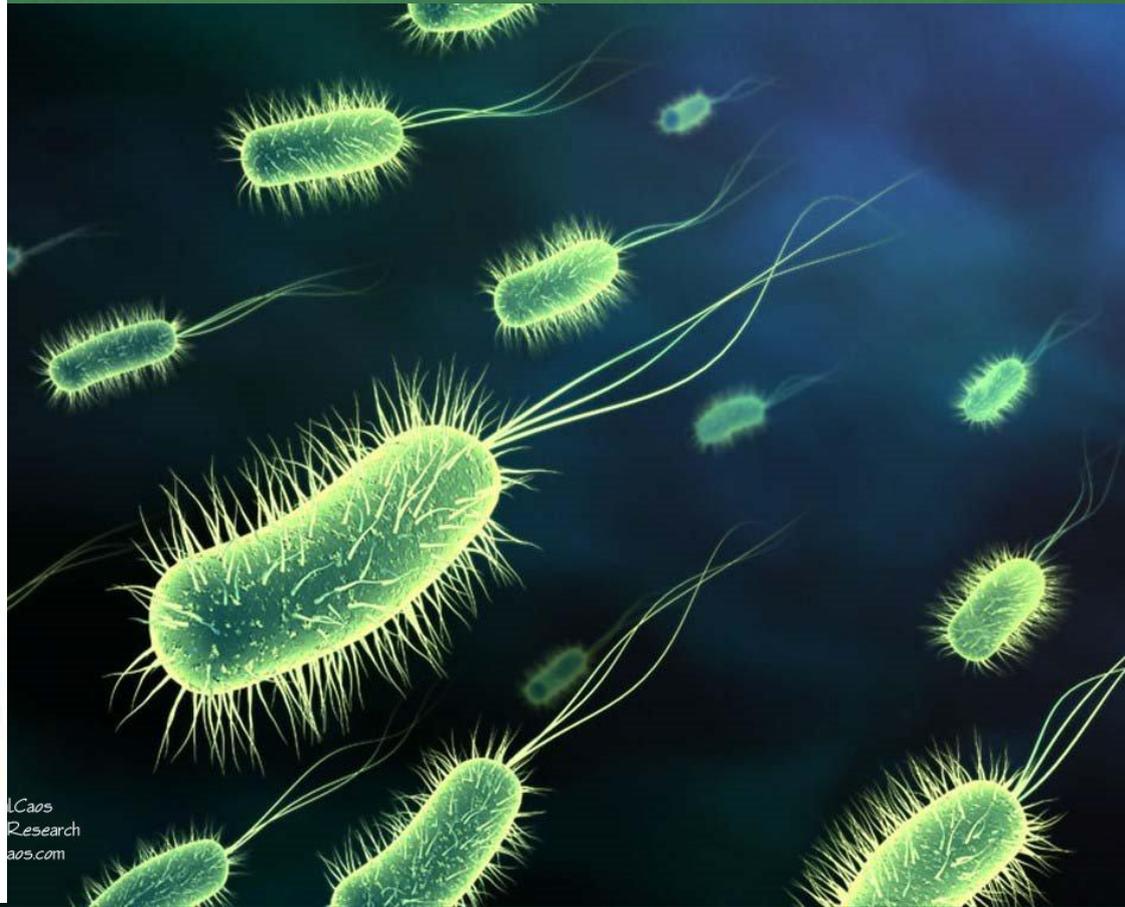
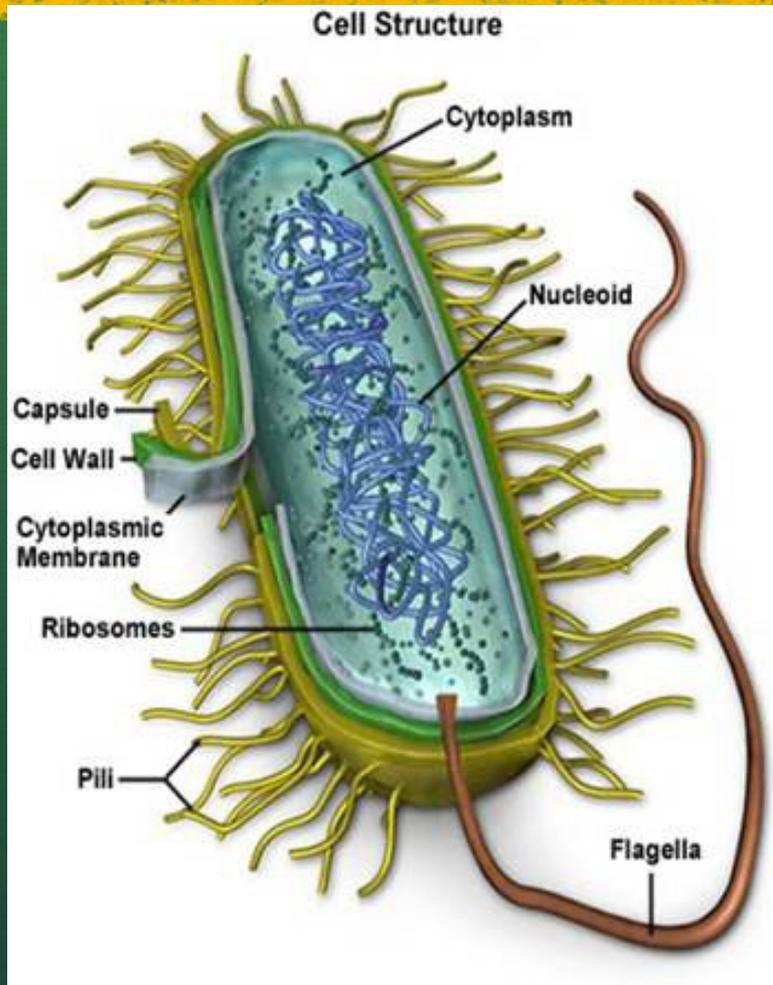
## LACTIC ACID FERMENTATION

- Performed in MUSCLE CELLS and in BACTERIA
- Produces:
  - CO<sub>2</sub>
  - 2 ATP
  - LACTIC ACID
- Causes pain in muscles

## ALCOHOLIC FERMENTATION

- Performed in YEAST and BACTERIA
- Produces:
  - CO<sub>2</sub>
  - 2ATP
  - ALCOHOL

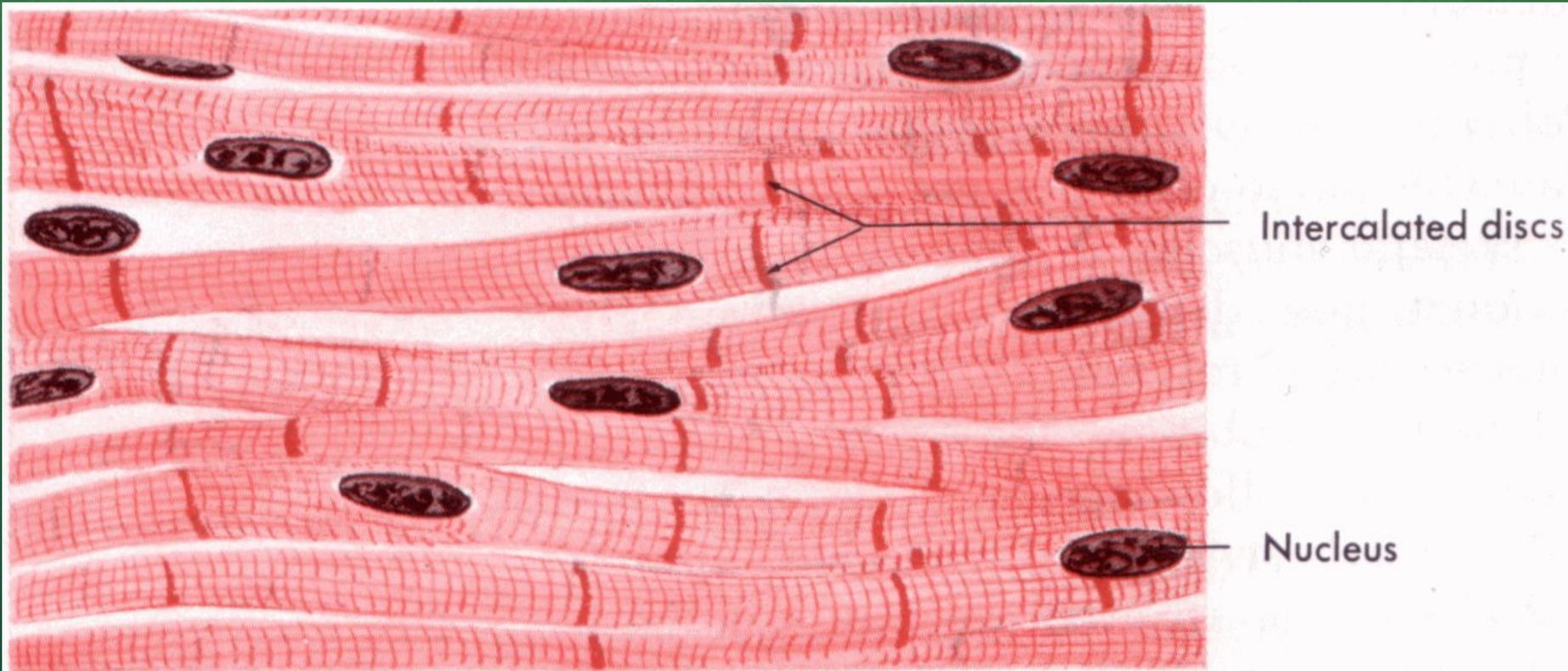
# BACTERIA: PROKARYOTE with NO nucleus



# YEAST: a unicellular fungi



# Muscle Cells



Cardiac or striated involuntary muscle tissue.

# Organic Compounds

- All living things are made of organic compounds.
- Contain the element Carbon
- Carbohydrates, Proteins, Lipids, Nucleic Acids



# *Problem to solve: What are Organic Molecules?*

Each of you has received a word. How does your word relate to Organic Molecules?

What does it answer:

- What are they made of?
- What do they do?
- What are some examples and specific function?

# Carbohydrates

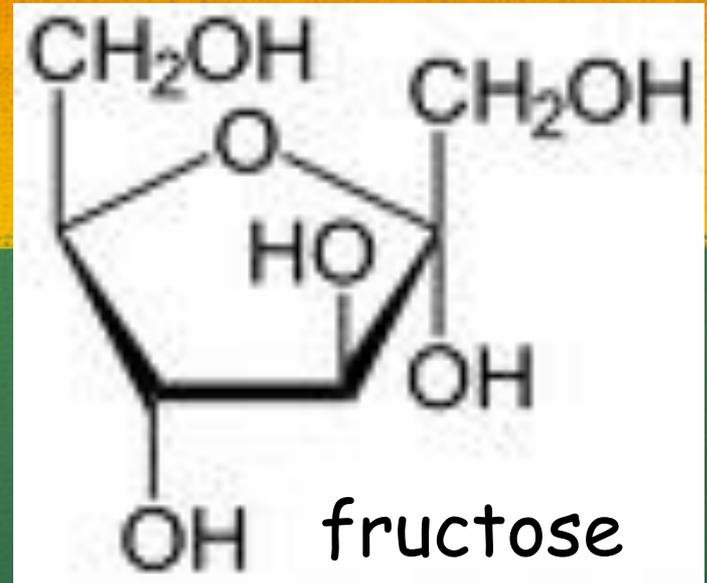
- Monomer-  
monosaccharide

- Function- energy  
source and structure

MONO: Glucose- Simple sugar

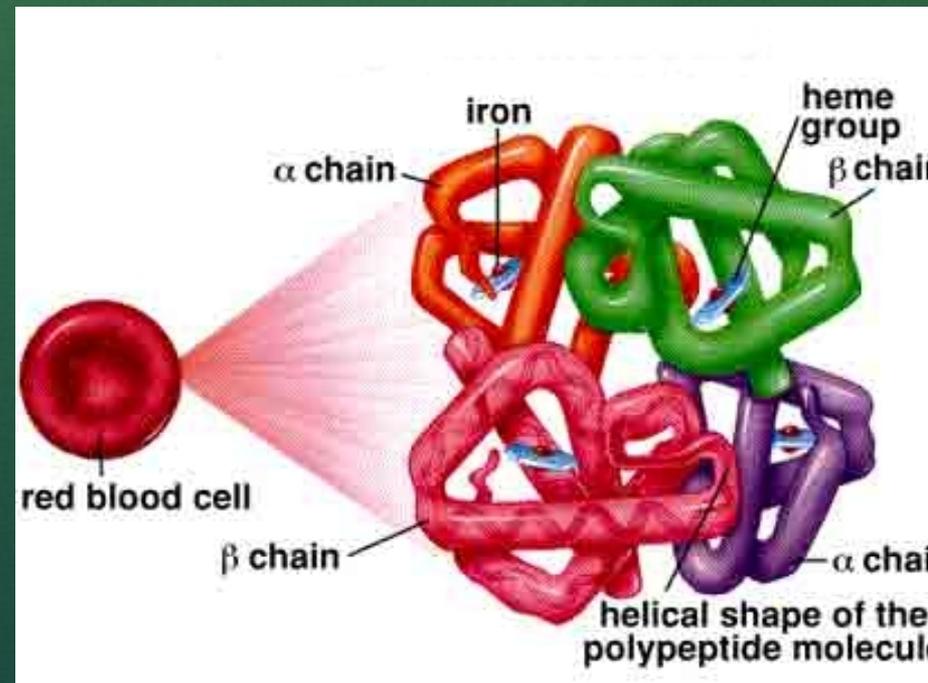
POLY:

- Cellulose- structure and support in cell walls
- glycogen- storage in animal cells
- Starch- storage in plant cells

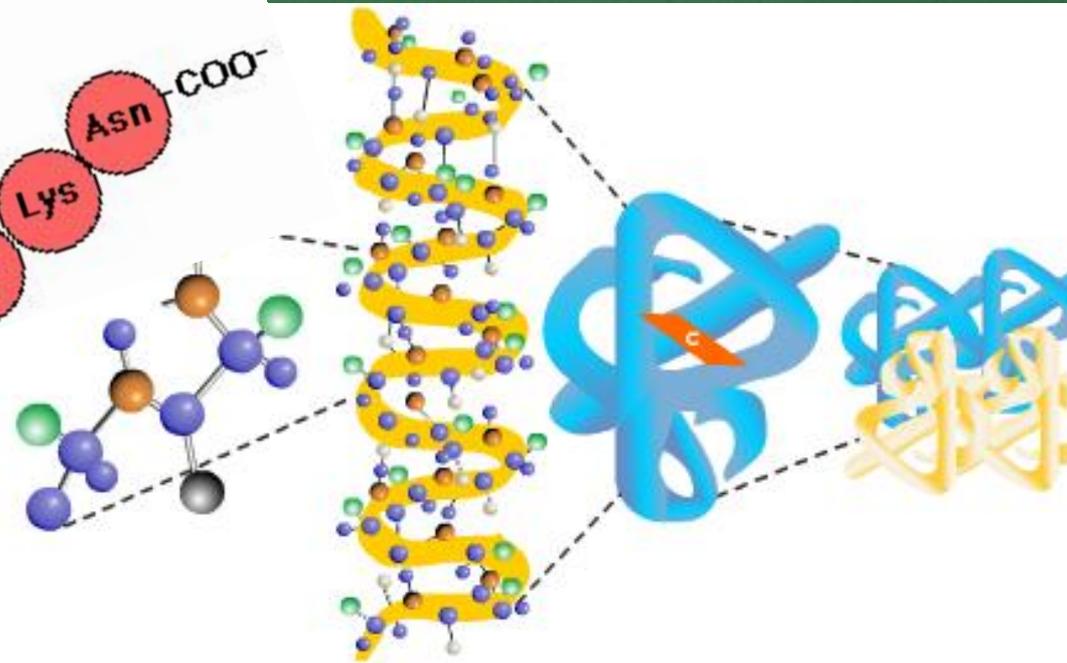
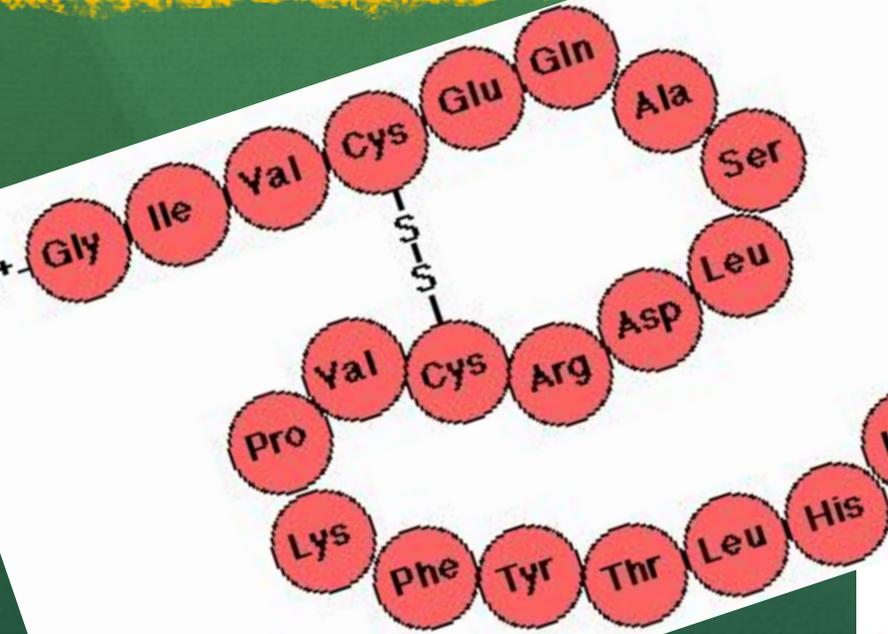


# Proteins

- Monomer- AMINO ACIDS connected by peptide bonds
- Function- building and repairing cells, communication, transport, and regulation
- Made in Ribosomes
- Examples: enzymes, hemoglobin, Insulin (hormone)



# Poly-PEPTIDE chain (makes a ?)



(a) Primary structure

● C  
● H

(b) Secondary structure

● C  
● H

(c) Tertiary structure

● R groups  
● Haeme group

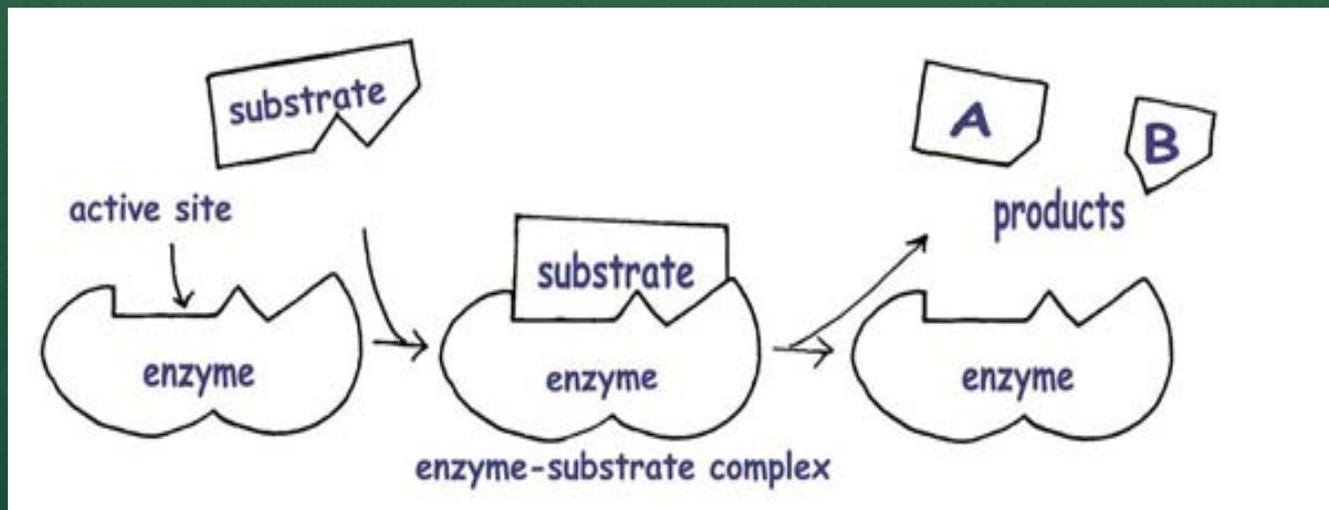
(d) Quaternary structure

# TODAY'S ASSIGNMENT

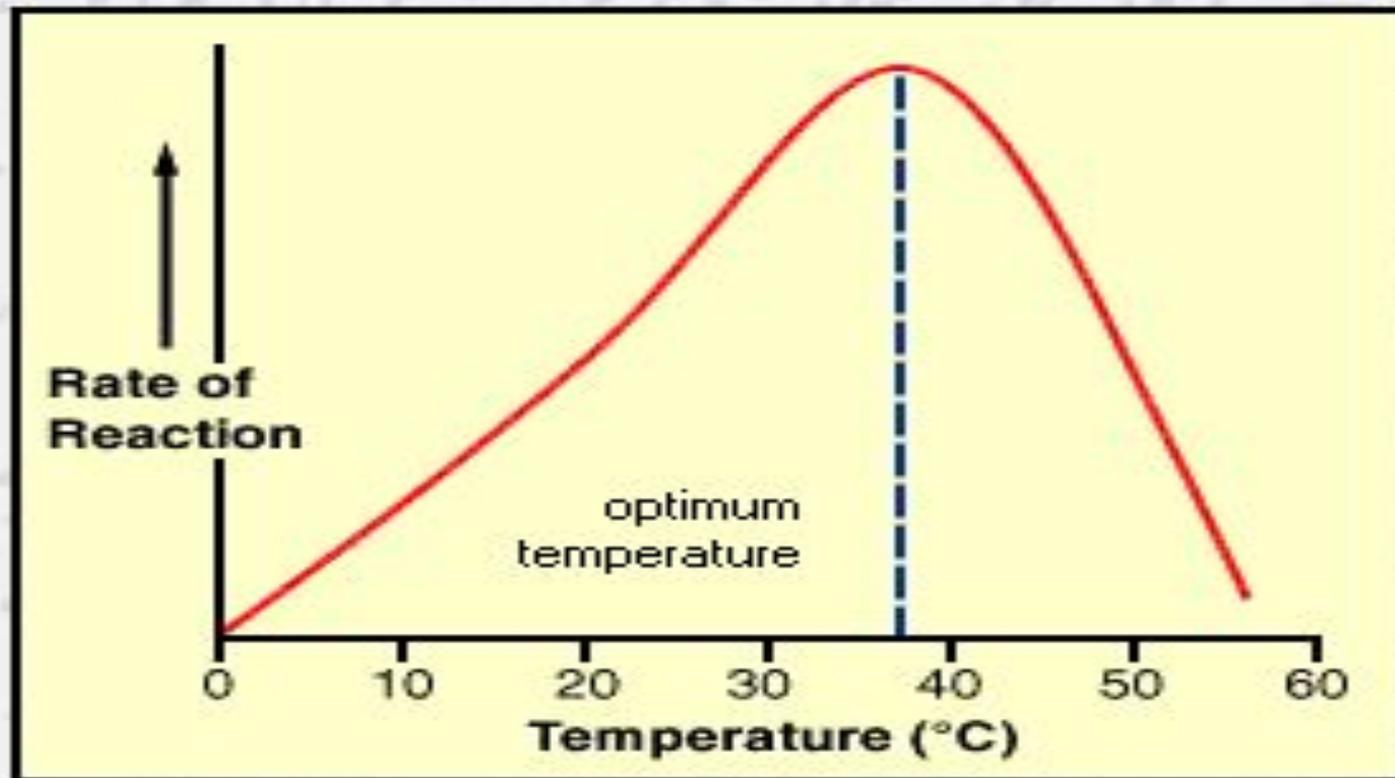
- You will write from the perspective of one of the two organic molecules we have learned about. You are simply telling me about “yourself” First statement is “I am ...”
- **MUST INCLUDE:**
  1. What specific Example you are (Cellulose, Starch, Glycogen, Insulin, Enzyme, Hemoglobin)
  2. What Organic Molecule you are
  3. What you are made of (your building block)
  4. Where were you synthesized? (made/ put together)
  5. What was this process that made you called?
  6. What is your function?
  7. Where do you “live”?

# Enzyme: a type of protein

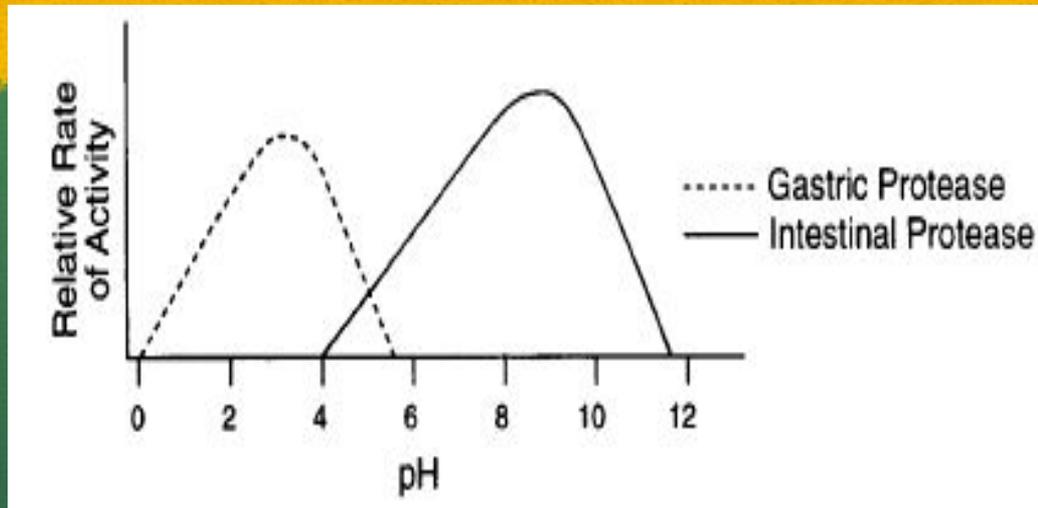
- Catalysts in living things (speed up chemical reactions by LOWERING activation E)
- Specific to a particular substrate
- Reusable
- Fragile- Affected by temperature and pH



[http://highered.mcgraw-hill.com/sites/0072495855/student\\_view0/chapter2/animation\\_how\\_enzymes\\_work.html](http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation_how_enzymes_work.html)



Which statement best expresses the information represented in the graph shown?

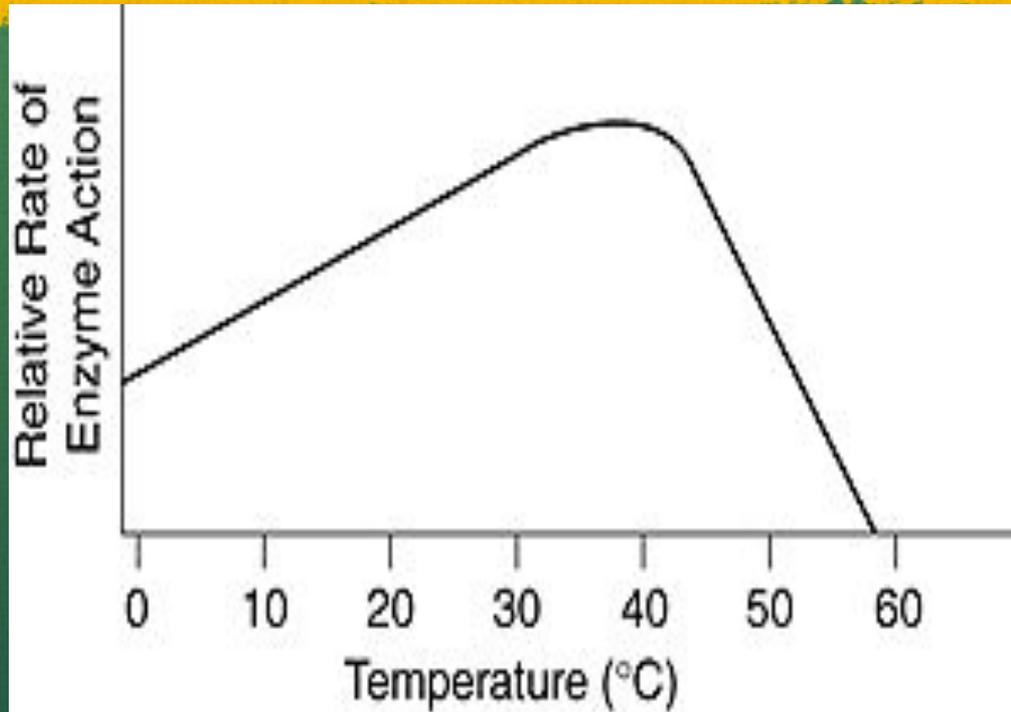


- The action of enzymes varies with pH.
- A pH of 7 provides the optimum environment for digestive enzymes
- Gastric juice is active at a pH extending from 0 to 12.
- Acids have a pH greater than 7.

What will *most likely* happen if an appropriate enzyme is added to a chemical reaction?

- A The reaction rate will increase.
- B The equilibrium of the reaction will be maintained.
- C The reaction rate will decrease.
- D The reaction will stop.

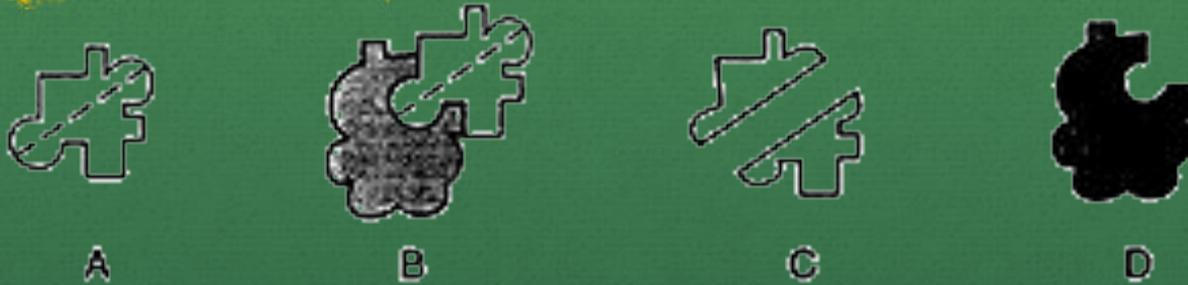
The effect of temperature on the relative rate of action of an enzyme is represented in the graph below.



The optimum temperature for the action of this enzyme is approximately

- a. 15 °C   b. 22°C   c. 37°C   d. 50°C

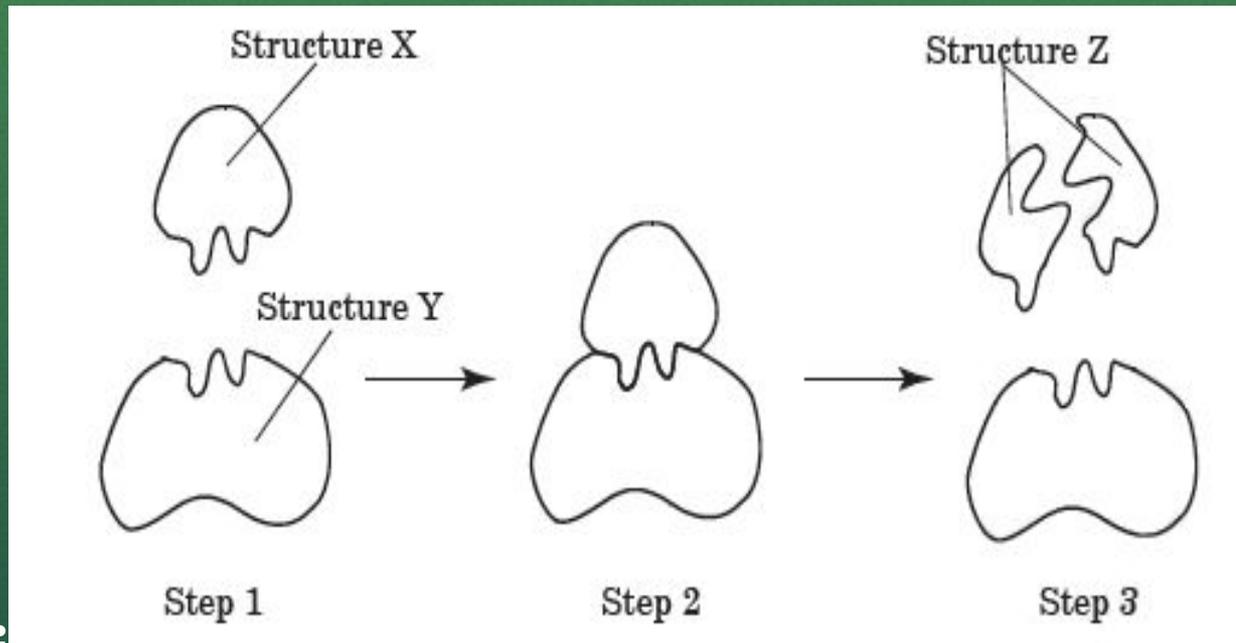
Here are of some stages of an enzyme-controlled reaction.



An enzyme-substrate complex is represented by diagram

- a. A    b. B    c. C    d. D

This diagram shows an enzyme-substrate complex.



Which is represented by Structure X?

- a. substrate
- b. product
- c. enzyme
- d. complex

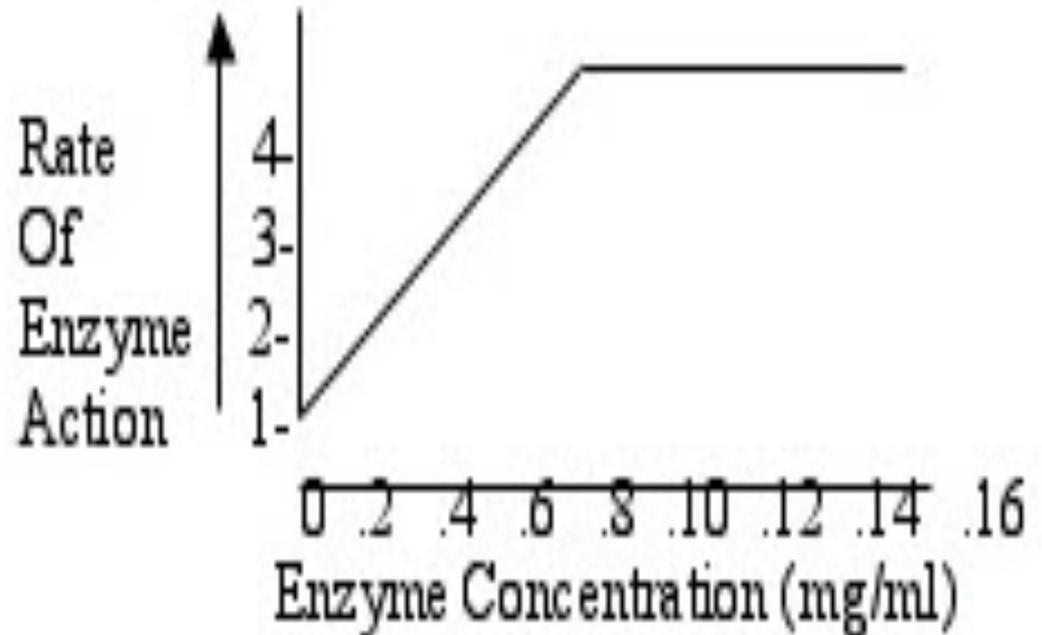
1. If more substrate is added at a concentration of .6 mg/mL, the rate of the reaction would most likely

a. decrease

b. increase and then decrease

c. increase

d. remain the same



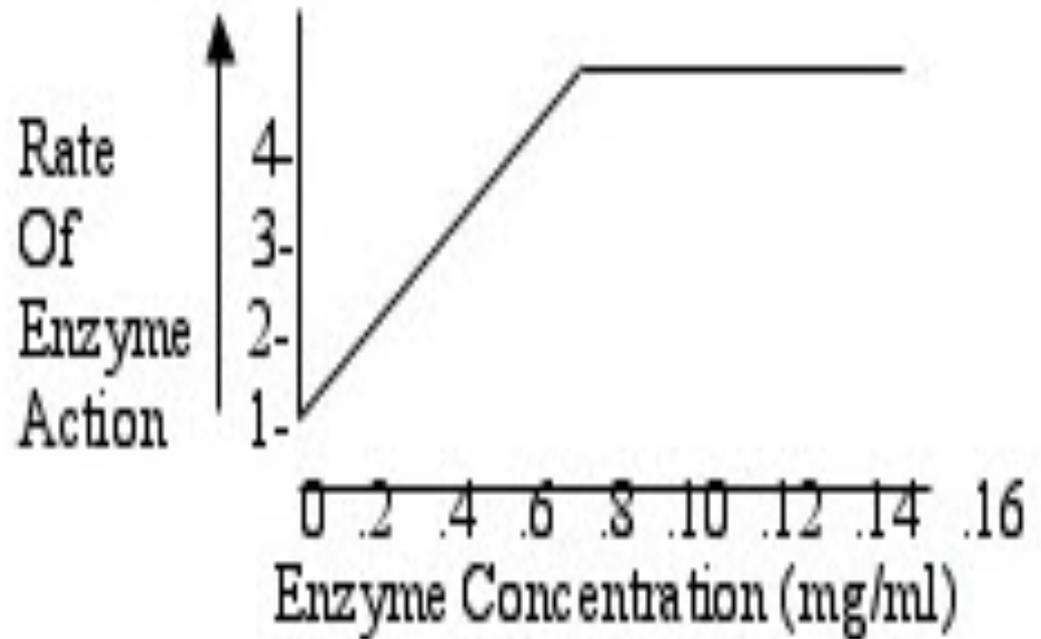
At which enzyme concentration does ALL of the available substrate react with the enzyme?

a. 0.1 mg/mL

b. 0.2 mg/mL

c. 0.5mg/mL

d. 0.7 mg/mL





The catalyst is represented by number

- a. 1
- b. 2
- c. 3
- d. 4

4. If structure 3 contains a peptide bond, structures 1 and 2 must represent

- a. nucleotides
- b. amino acids
- c. fatty acids
- d. simple sugars



The figure labeled 5  
represents

a. an enzyme-substrate  
complex

b. the formation of RNA

c. the formation of ATP bonds

d. an end-product

# TODAY'S ASSIGNMENT

- **Make a Brochure About Enzymes! Include the following things:**

1. **Why are Enzymes important to living things?**

2. **What Factors affect enzymes?**

3. **Draw and label all 4 Parts of Lock and Key Model:**

- **Enzyme**
- **Substrate**
- **Active Site**
- **Products**

4. **How are enzymes denatured?**

5. **Describe how enzymes work- include how a CATALYST and ENZYME are related**

6. **What are the building blocks of Enzymes?**