


I. VOCABULARY:

- **Ecology**- The scientific study of interaction between organism and their environments.



I. VOCABULARY:

- **Environments:** 
- **Biotic factors** - all the living organism that inhabit an environment



Environments:

- **Abiotic factors** - the nonliving parts of the environment
- Ex: air currents, temperature, moisture, light, and soil



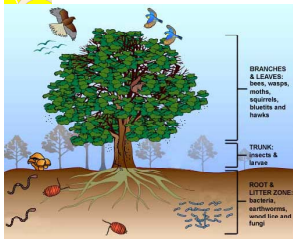
I. VOCABULARY:

- **Population** - is a group of organisms of one species that interbreed and live in the same place at the same time
- Organisms compete for food, water, mates.
- Determines how large each population can become



I. VOCABULARY:

- **Ecosystem**- The interacting system of a biological community and its nonliving environment.



I. VOCABULARY:

- **Community** - is a collection of interacting populations
- A change in one population in a community will cause changes in the other populations



I. VOCABULARY:

- **Habitat**- Place where an organism lives;
- Even in the same ecosystem, different organisms differ in their habitats.



II. SPECIES RELATIONSHIPS:

- **Producer**- Organisms that produce their own food are called **autotrophs**.
- Ex: Plants
- all of the species of the ecosystem depend on autotrophs for nutrients and energy.



II. SPECIES RELATIONSHIPS:

- **Consumer**- They obtain food by eating other organisms.
- All the organisms that cannot make their own food (and need autotrophs) are called **heterotrophs**.



II. SPECIES RELATIONSHIPS:

- There are different levels of consumers:
- Those that feed directly from producers, i.e. organisms that eat plant or plant products are called **primary consumers**.



How do you think we can classify consumers?

Based on what they EAT!!



II. SPECIES RELATIONSHIPS:

1. **Herbivores**- consumer that eats only plants
- Ex: grasshoppers, mice, rabbits, deer, beavers, moose, cows, sheep



II. SPECIES RELATIONSHIPS:

2. **Carnivores**- consumer that eats only other animals.
- Ex: Foxes, frogs, snakes, hawks, and spiders.



II. SPECIES RELATIONSHIPS:

3. **Scavengers** - consumer that eats the remains of dead animals.
- Ex: vultures, buzzards, crows, ants, beetles



II. SPECIES RELATIONSHIPS:

4. **Omnivores**- eats both plants (acting as primary consumers) and meat (acting as secondary or tertiary consumers).
- Ex: Bears --They eat insects, fish, moose, elk, deer, sheep as well as honey, grass



II. SPECIES RELATIONSHIPS:

5. **Decomposers**- organisms that break down the remains of other organisms.
- Found at the bottom of the food web.
- Ex: Bacteria, yeast, fungi, worms and many insects



III. RELATIONSHIPS FOR SURVIVAL:

- **Symbiosis** - permanent, close association between two or more organisms of different species



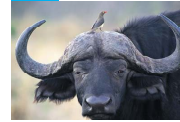
Symbiosis- 3 types:

1. **Commensalism** - one species benefits and the other species is neither harmed nor helped
 - Ex: an orchid growing on the branch of a larger plant



Symbiosis- 3 types:

2. **Mutualism** - relationship that is beneficial to both species
 - Ex: acacia trees (provides food/shelter for ants) and ants (protect tree by attacking any herbivore)



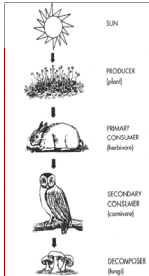
Symbiosis- 3 types:

3. **Parasitism** - one species benefits at the expense of the other species
 - Ex: ticks, tapeworms live on or in the organism



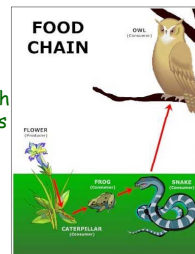
IV. MATTER & ENERGY IN ECOSYSTEMS:

- **Food Chain**- Show one prey-predator relationship and how each living thing gets its food.
- Some animals eat plants and some animals eat other animals.
- Ex: Trees/shrubs → giraffes → lions



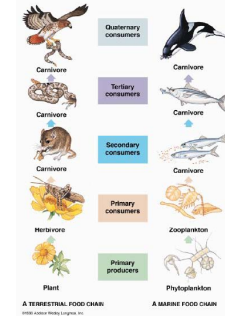
IV. MATTER & ENERGY IN ECOSYSTEMS:

- Each link in this chain is food for the next link.
- Always starts with plant life and ends with an animal.



IV. MATTER & ENERGY IN ECOSYSTEMS:

- **Trophic levels**-link represented by each organism in a food chain;
- Represents a feeding step in the transfer of **energy** and matter in an ecosystem.



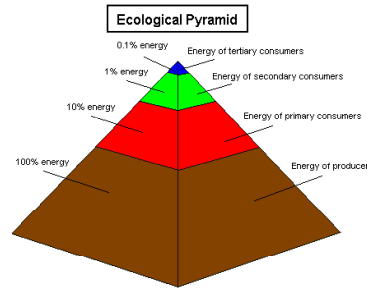
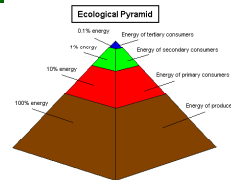
IV. MATTER & ENERGY IN ECOSYSTEMS:

- All energy in an ecosystem originates with the **sun**.
- Plants transform solar energy into chemical energy (food) via photosynthesis
- This is consumed by plant-eating animals, which are in turn consumed as food.



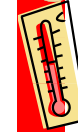
IV. MATTER & ENERGY IN ECOSYSTEMS:

- The total energy transfer from one trophic level to the next is only about **10%**, the other 90% is lost as **heat**



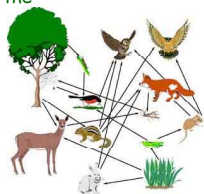
IV. MATTER & ENERGY IN ECOSYSTEMS:

- Heat is lost by:
 - 1) Organisms fail to capture and eat **ALL** food available at the trophic level below them
 - 2) Not all food that is captured and eaten **gets digested**
 - 3) Digested food is **used** by the organism as a source of energy.



IV. MATTER & ENERGY IN ECOSYSTEMS:

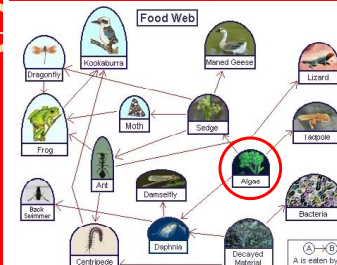
- **Food web**- model used to express feeding relationship among the members of a community.
- A group of interlinked **food chains**



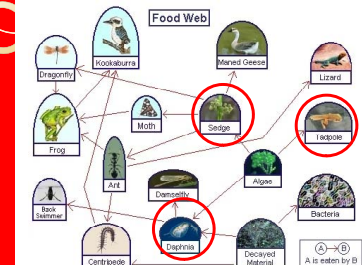
IV. MATTER & ENERGY IN ECOSYSTEMS:

- Illustrates:
 1. Who eats who?
 2. **Arrow** = Energy flow through the community
 3. Functional feeding groups
 4. Important ecological interactions

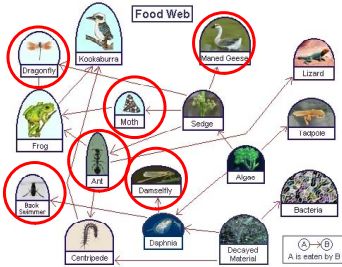
Identify a primary producer



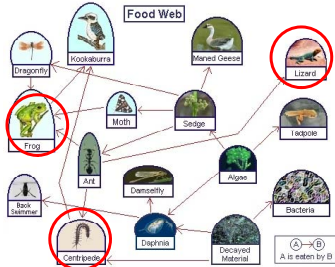
Identify a primary consumer



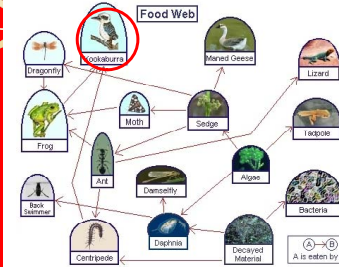
Identify a secondary consumer



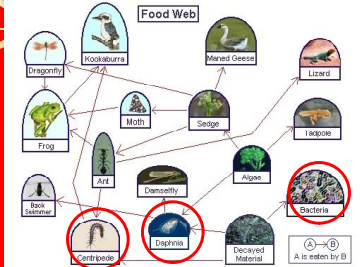
Identify a tertiary consumer



Identify a Quaternary Consumer



Identify a decomposer



V. Differences between a food web & food chain:

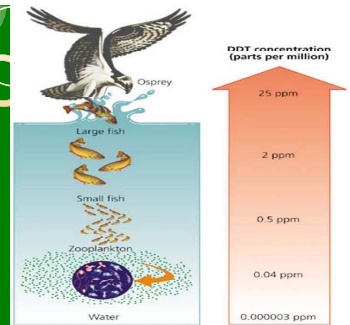
- Food chains** ONLY show one prey-predator relationship. The source of food is also often **seasonal** with many animals adapting to changes in the season by eating different types of food.
- Food webs** show a better picture of interrelationships between plants and animals.

VI. How Pollution Can Affect Organism:

- Biomagnification** = The process of increasing a chemical concentration through the food chain (Examples: DDT and PCB)
- Animals that eat other animals have **HIGHER** levels of contaminants than animals that eat plants.
- Some contaminants are persistent - once they are in the animal's body, they stay there for a long time.

Biomagnification:

- So when smaller animals are eaten by bigger animals, all the contaminants stored in their tissues are then **passed on** to the bigger animal.
- The result of biomagnification is that animals **at the "top" of their food chain have higher contaminant levels than animals at the "bottom"**.



Biomagnification:

- The top predators at the end of along food chain, such as lake trout, large salmon and fish-eating gulls, may accumulate concentrations of a toxic chemical high enough to cause serious deformities or death even though the concentration of the chemical in the open water is extremely low.
- The concentration of some chemicals in the fatty tissues of top predators can be millions of times higher than the concentration in the open water.

VII. A Change in Communities OVER Time: SUCCESSION

- Succession** = orderly, natural changes that take place in the communities of an ecosystem
 - The community of organisms inhabiting an area **gradually** changes.
 - Difficult to observe** since it can take decade or centuries for one type of community to completely succeed another.



Primary Succession

- Primary succession** = establishment of a community in an area of exposed rock that does not have any topsoil.
 - Ex: **Lava** flowing from a volcano destroys everything in its path, but when it cools it forms new land



Primary Succession

- Ex: **Streams** gradually deposit silt along their banks, creating new soil in which plants can take root.



Primary Succession

- After some time, primary succession slows down, and the community becomes fairly **stable**.
- A stable, mature community that undergoes little of NO succession is called a **climax community**.

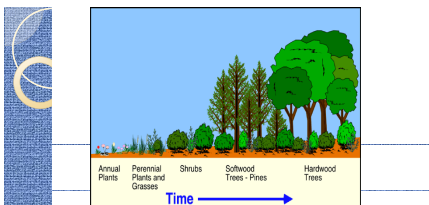


Figure 1: Succession of plant species on abandoned fields in North Carolina. **Pioneer species** consist of a variety of annual plants. This successional stage is then followed by communities of perennials and grasses, shrubs, softwood trees and shrubs, and finally hardwood trees and shrubs. This succession takes about 120 years to go from the **pioneer** stage to the **climax** community.

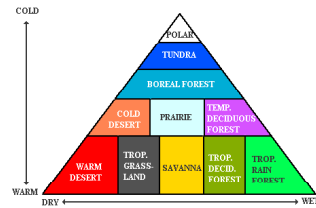
Secondary Succession:

• **Secondary succession** = the sequence of community changes that takes place when a community is disrupted by natural disasters or human actions

• Ex: Hurricanes, forest fires, farmers abandoning fields



BIOMES



VIII. Biomes

• **Biomes** = a large group of ecosystems that share the same type of climax community

• Two factors that will determine which biome will be dominant on land:

1. Temperature
2. Precipitation

