

Ecology

Name: _____ Period: _____ Date: _____

I. VOCABULARY:

- **Ecology**- The scientific study of interaction between organism and their environments.
 - Environments:
 - **Biotic Factors**—all the living organisms that inhabit an environment
 - **Abiotic Factors**—the nonliving parts of the environment
 - Ex: air currents, temperature, moisture, light, and soil
- **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
- **Ecosystem** - The interacting system of a biological community and its nonliving environment.
- **Community** – is a collection of interacting populations
 - A change in one population in a community will cause changes in the other populations
- **Habitat**- Place where an organism lives;
 - Even in the same ecosystem, different organisms differ in their habitats.

II. SPECIES RELATIONSHIPS:

- **Producers** - Organisms that produce their own food.
 - Ex: Plants
 - all of the species of the ecosystem depend on autotrophs for nutrients and energy.
- **Consumers** - They obtain food by eating other organisms.
 - All the organisms that cannot make their own food (and need autotrophs) are called heterotrophs.
 - There are different levels of consumers:
 - Those that feed directly from producers, i.e. organisms that eat plants or plant products are called Herbivores.

✓ How do you think we can classify consumers?Based on what they EAT!!

1. **Primary Consumers**- consumer that eats only plants
Ex: grasshoppers, mice, rabbits, deer, beavers, moose, cows, sheep
2. **Secondary Consumers**- consumer that eats only other animals.
Ex: Foxes, frogs, snakes, hawks, and spiders.
3. **Scavengers** – consumer that eats the remains of dead animals.
Ex: vultures, buzzards, crows, ants, beetles
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
5. **Detritivores** - 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

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III. RELATIONSHIPS FOR SURVIVAL:

- **Symbiotic Relationship**– permanent, close association between two or more organisms of different species
 - 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
 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)
 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:

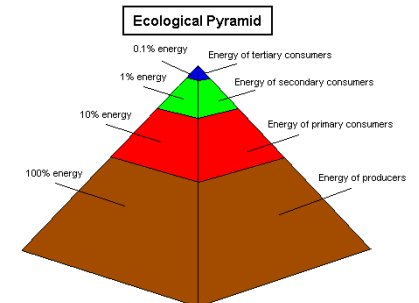
- **Food Chain**- Show one prey-predator relationship and how each living thing gets its food.
 - Some animals eat plants and some animals eat other animals.
 - Ex: Trees/shrubs → giraffes → lions
 - Each link in this chain is food for the next link.
 - Always starts with plant life and ends with an animal.
 - **Trophic Level** - link represented by each organism in a food chain;
 - Represents a feeding step in the transfer of energy and matter in an ecosystem.

→ 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.

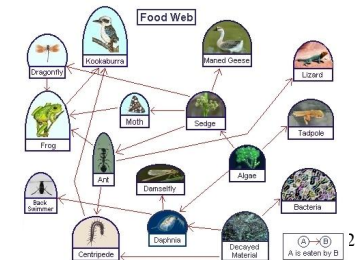
→ The total energy transfer from one trophic level to the next is only about 10%, the other 90% is lost as heat

- Heat is lost by:
 1. Organisms fail to capture and eat all of the 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.



- **Food Web** - model used to express feeding relationship among the members of a community.

- A group of interlinked food chains
- Illustrates:
 1. Who eats who?
 2. Arrows = energy flow through the community
 3. Functional feeding groups
 4. Important ecological interactions



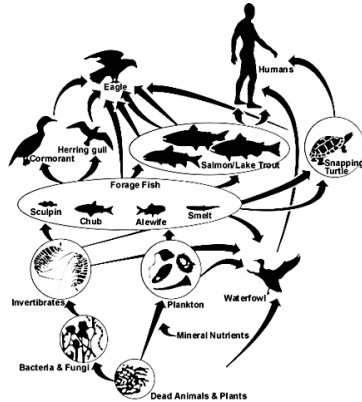
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V. Differences between a food web & food chain:

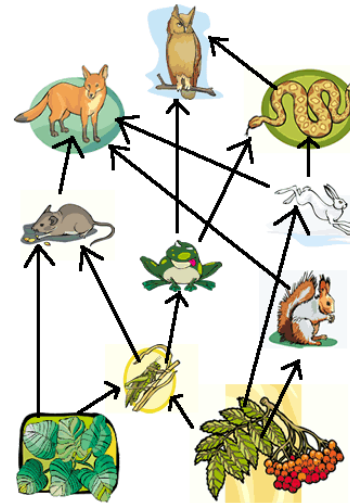
1. **Food chain** - ONLY shows one prey-predator relationship. The source of food is also often seasonal with many animals adapting to changes in the season by eating different types of food.
2. **Food web** - show a better picture of interrelationships between plants and animals.

VI. How Pollution Can Affect Organism:

- **Biomagnification** = The process of increasing a chemical concentration through the food chain (Examples: DDT and PCB)
 - o Animals that eat other animals have HIGHER levels of contaminants than animals that eat plants.
 - o Some contaminants are persistent - once they are in the animal's body, they stay there for a long time.
 - o So when smaller animals are eaten by bigger animals, all the contaminants stored in their tissues are then passed on to the bigger animal.
 - o The result of biomagnification is that animals at the "top" of their food chain have higher contaminant levels than animals at the "bottom".
 - o 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.
 - o 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.



Food Web Worksheet



Identify the:

1. Producers (2)
2. Primary Consumers (4)
3. Secondary Consumers (4)
4. Herbivores (3)
5. Carnivores (4)
6. Omnivores (1)
7. What elements are missing from this food web? _____

8. All energy in an ecosystem originates with the _____.

9. The total energy transfer from one trophic level to the next is only about _____%, the other _____% is lost in the form of heat.

10. A tick feeds on the blood of a rabbit. What type of symbiosis is this? _____

11. A squirrel eats the berries and spread the berry-plants seeds in its feces. What type of symbiosis is this? _____

12. Barnacles adhering to the skin of a whale. What type of symbiosis is this? _____

13. Look at the food web above. What would happen if a disease killed the entire grasshopper population?