

Ecology: Interaction Unit Notes Name:

(DO NOT LOSE)



Ecological systems are organized within each other. The effects on one system will effect them all. All systems are interconnected.



Animals are interconnected in a complex web of life. Changes on one part of the web will effect other parts of the web and the stability of the entire ecosystem.



Matter and energy cycle through the living and nonliving world. Organisms rely on this matter and energy cycling to survive.



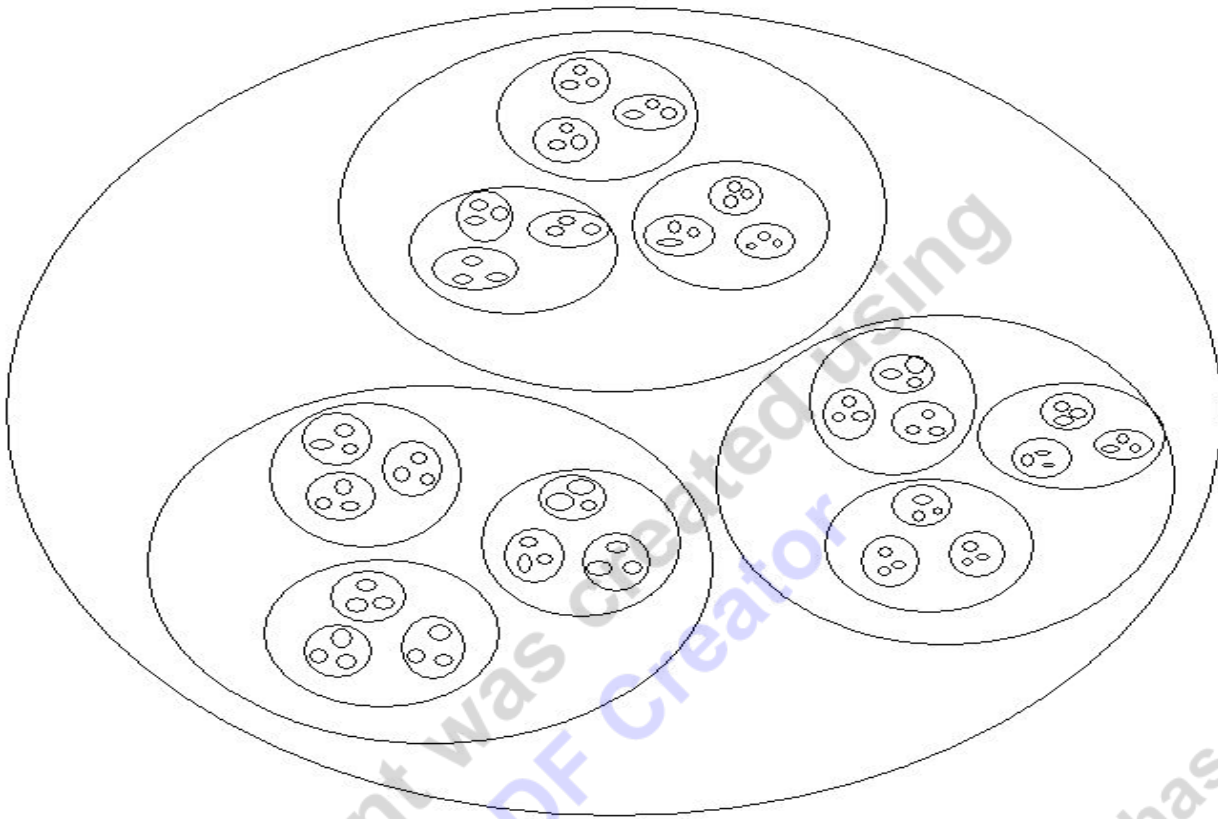
Organisms need energy to survive. Energy from the sun flows into and out systems. This energy drives our world and the organisms in it. Energy is lost "not destroyed" when it changes form. Flows **Hot** to **Cold**



Ecosystems have a way to balance changes so that up and down fluctuations are part of the natural balance of the whole.



All organisms are in a constant state of change over time with the environment. Some organisms will change with another and will develop special interactions. Others with the nonliving world.



- 1 Individual
- 2 Population
- 3 Community
- 4 Biome
- 5 Biosphere

Individual: Organism with unique DNA and cells

Population: Groups of similar individuals who tend to mate with each other in a limited geographic area.

Ecosystem: The relationships of populations with each other and their environment.

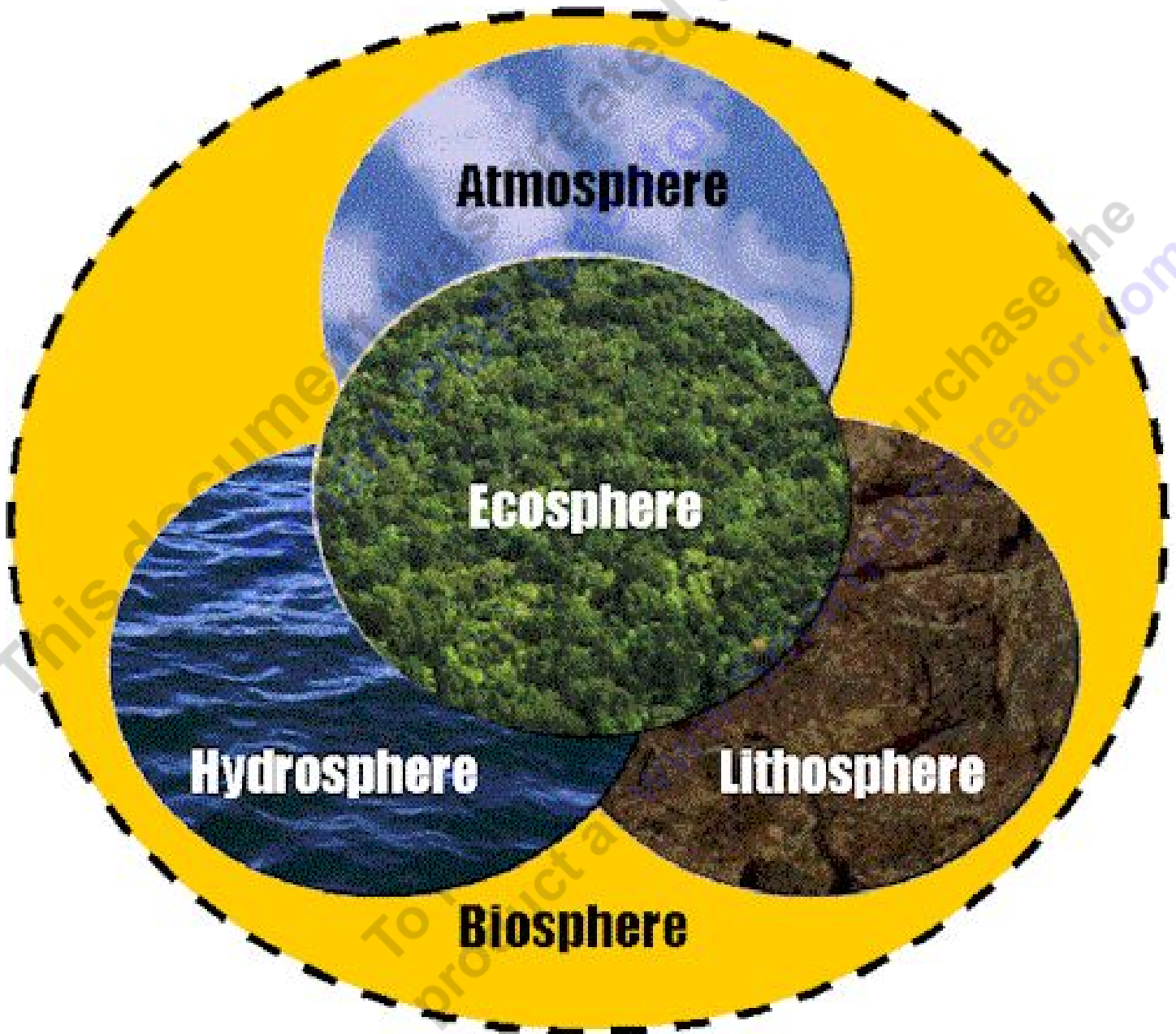
Community: The relationships between groups of populations.

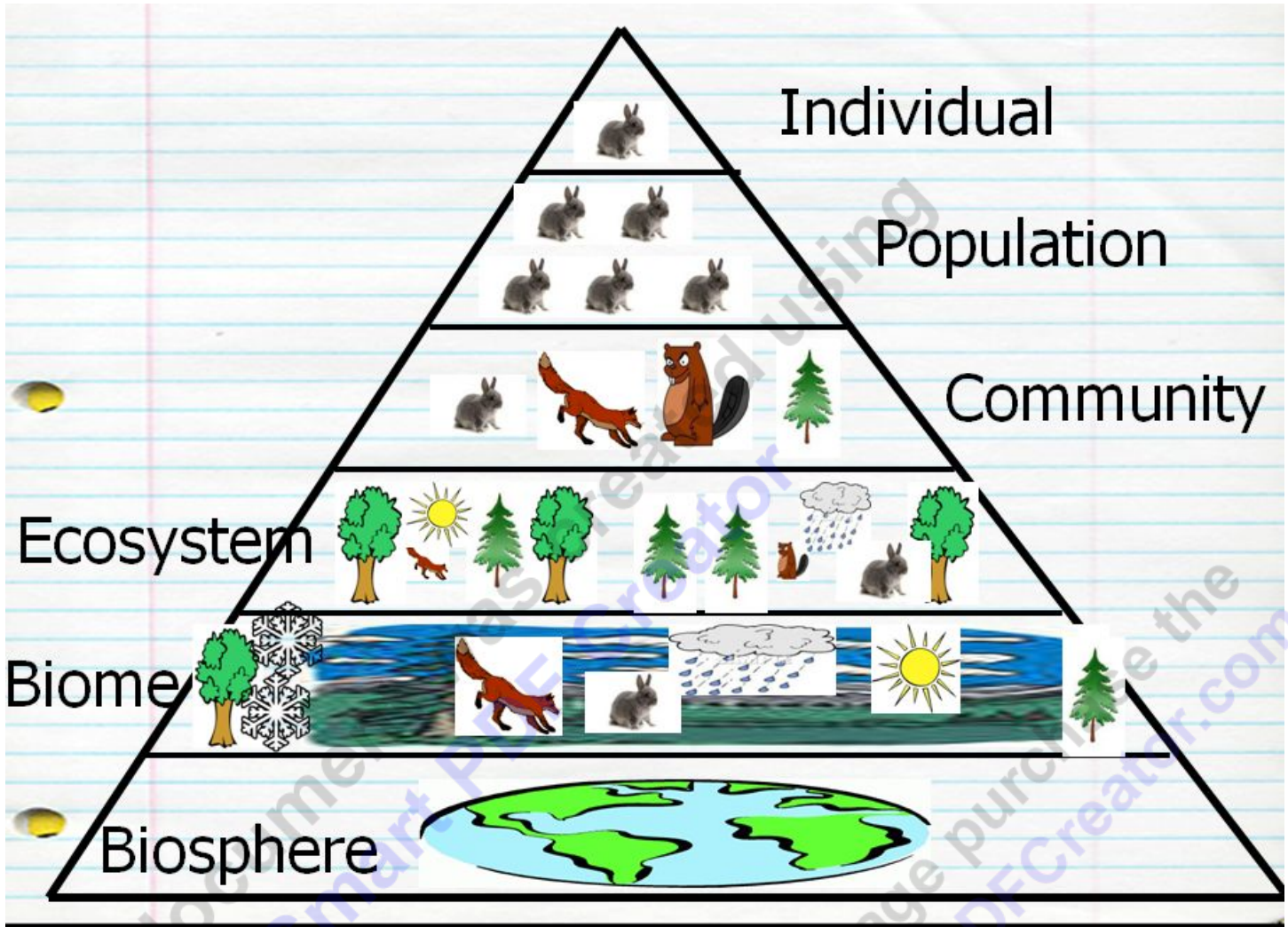
Biome: A regional ecosystem characterized by distinct types of vegetation, animals. Determined by temperature and rainfall.

Biosphere: The part of the earth and its atmosphere in which living organisms exist.

Biosphere consists of...

- Ecosphere – The surface of the earth and all the ecosystems.
- Lithosphere: Below the surface, in the crust and mantle.
- Hydrosphere: All waters not in atmosphere and lithosphere.
- Atmosphere: The area of gases that surround the planet.





Habitat: A place an organism lives.

The needs of an organism are...

- Air.
- Water.
- Food.
- Shelter.
- Space.

Ecological Niche: The place or function of a given organism within its ecosystem.

Limiting Factor: A factor that causes a population to decrease in size.

- Density Independent Factors (Nonliving)
 - Sunlight
 - Water

- Temperature
- Density Dependent Factors (Living)
 - Disease
 - Parasites
 - Predators
 - Competition

Carrying Capacity: The amount of food that an area of land will yield.

- Therefore, the number of people that an area of land will support.

Competition: The interaction between organisms or species, in which the fitness of one is lowered by the presence of another.

Four types of competition

- Interspecific competition: Over resources between different species.
- Intraspecific competition: The same species compete for resources.
- Interference competition: fighting / disrupting.
- Exploitative: Sharing resources.

● Theory

- Competitive Exclusion: One thrives, the other goes extinct.
 - No two species with the same job can coexist.
- Competitive Exclusion Theory: All organisms exist in competition for available resources. Those that create a competitive advantage will flourish at the expense of the less competitive. No two organisms can have the same niche. One lives, the other dies.

Most animal interactions

- Competing for the same food supply.
- Eating (predation).
- Avoid being eaten (avoiding predation).

Food Web: A complex network of many interconnected food chains and feeding interactions.

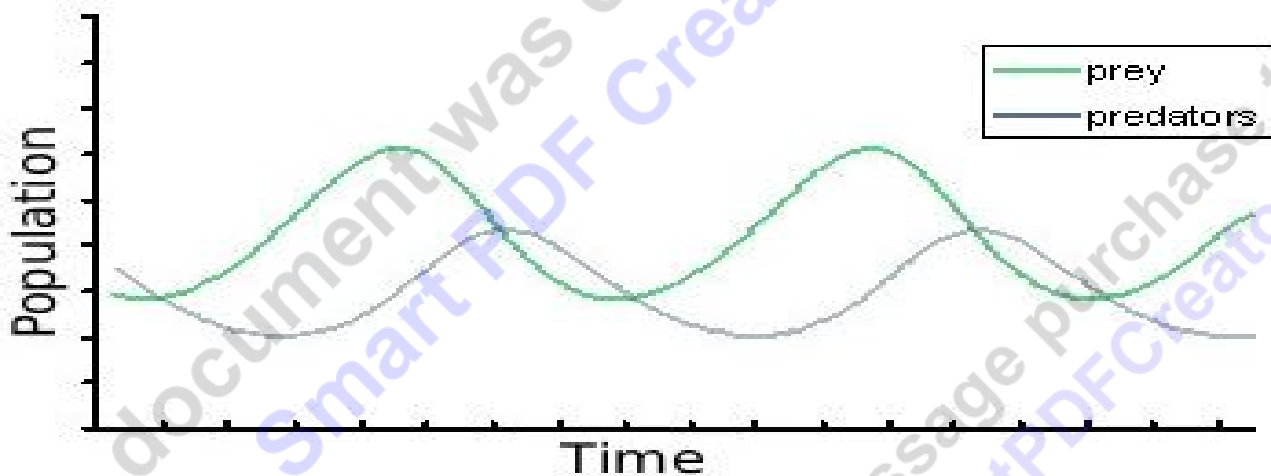
Predator: An organism that lives by preying on other organisms.

Prey: An animal hunted for food.

Habitat: The area or environment where an organism or ecological community normally lives.

Gregarious: Tending to form a group with others of the same species.

Typical Predator and Prey population graph.



Camouflage: An adaptation that allows the animal to blend in with its environment to avoid being detected.

Area of Mini Focus: Population sampling.

Abundance: Measurement of the amount of a species. Can be % cover, density, biomass, frequency.

Relative abundance: The amount of each species. Must sum to 1 or 100%.

Diversity: The variety, or number of kinds of species.

- Counting the number of different species.

Back to Animal Interactions

Mimicry: The resemblance of an animal species to another species or to natural objects.

Batesian mimicry: Looking like another species that is dangerous or may taste bad. There is a mimic, and the model.

Mullerian mimicry: Several unrelated species share warning colors that warn predators that these colors are dangerous or toxic.

Symbiosis: A long term relationship between two or more different species.

Three types of symbiosis

- Parasitism: One organism benefits while the other is harmed.
- Mutualism: Both organisms benefit.
 - Types of mutualisms
 - Trophic mutualism – Both help feed each other. Usually nutrient related.
 - Cleaning symbiosis – One species gets food and shelter, the other has parasites removed.
 - Defensive mutualisms: One species protects the other and gets some benefits for its help.
 - Dispersive mutualisms: One species receives food in exchange for moving the pollen or seeds of its partner.
- Commensalism: One organism benefits and the other doesn't benefit, or suffer harm.

New Area of Focus: Plant and Animal Interactions. Still a part of symbiosis.

Coevolution - When two or more species influence each other's evolution.

Animals Strategies to eat plants

- Animals have special teeth and mouth parts to eat plants.
- They use microbe farms (leaf cutter ants)
- Four chambered stomachs (many herbivores) Uses bacteria to break down plant matter.

Plant defense mechanisms

- Grow in a place difficult to be eaten.
- Repair quickly and let them eat non-essential parts of you.
- Mechanical Defenses - Thorns and serrated edges, and sap.
- Chemical Defenses such as toxins: Plants become poisonous (nicotine, mustard, caffeine).
- Be extremely hard to digest.
- You have protective insects, birds, or mammals that attack predators.
 - You feed your friends a bit (mutualism).

New Area of Focus: Exotic Species

Exotic species – A species that have been introduced to an ecosystem that are not endemic to the area. (non-native)

Endemic: Has lived in the area for a considerable amount of time. (native)

Human activities (globalization) have greatly increased the spread of exotic species.

Negative impacts of invasive exotic species.

- Increased predation.
- Increased competition.
- Spread disease.
- Habitat destruction.
- Cause the extinction of a native species.
- Damage the economy.

- Damage to human health.

Biological control: The purposeful introduction of natural enemies by scientists and environment managers as a means to weaken and suppress invasive exotic species.

Drawing of Eurasian Milfoil.



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