



13.1-13.6

Principles of Ecology

13.1 Ecologists Study Relationships

Focus Question: How does ecology show the relationship among organisms and their environment?



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Ecology – the study of the interactions between living things and their environment

These interactions are studied at different levels of complexity.

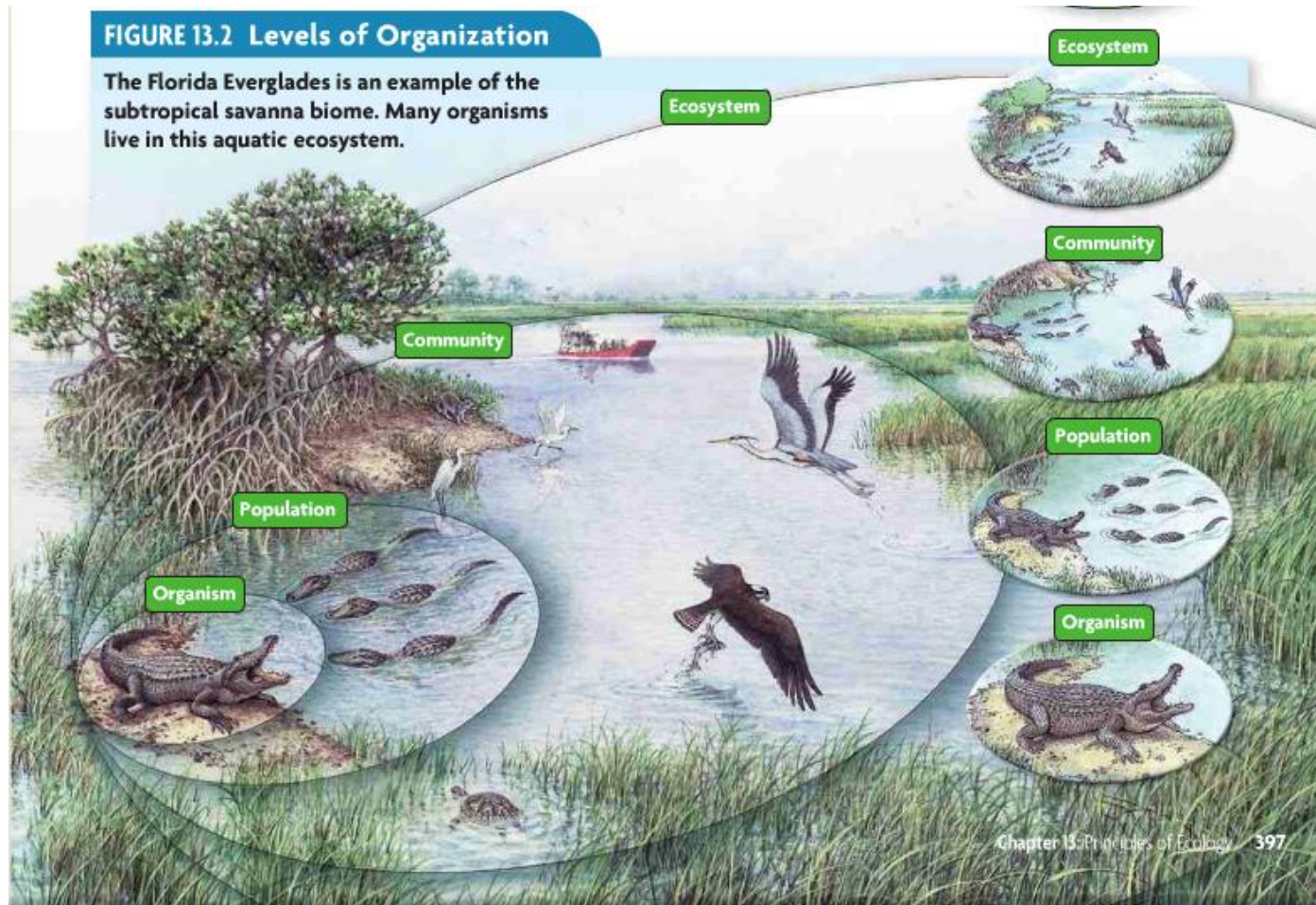
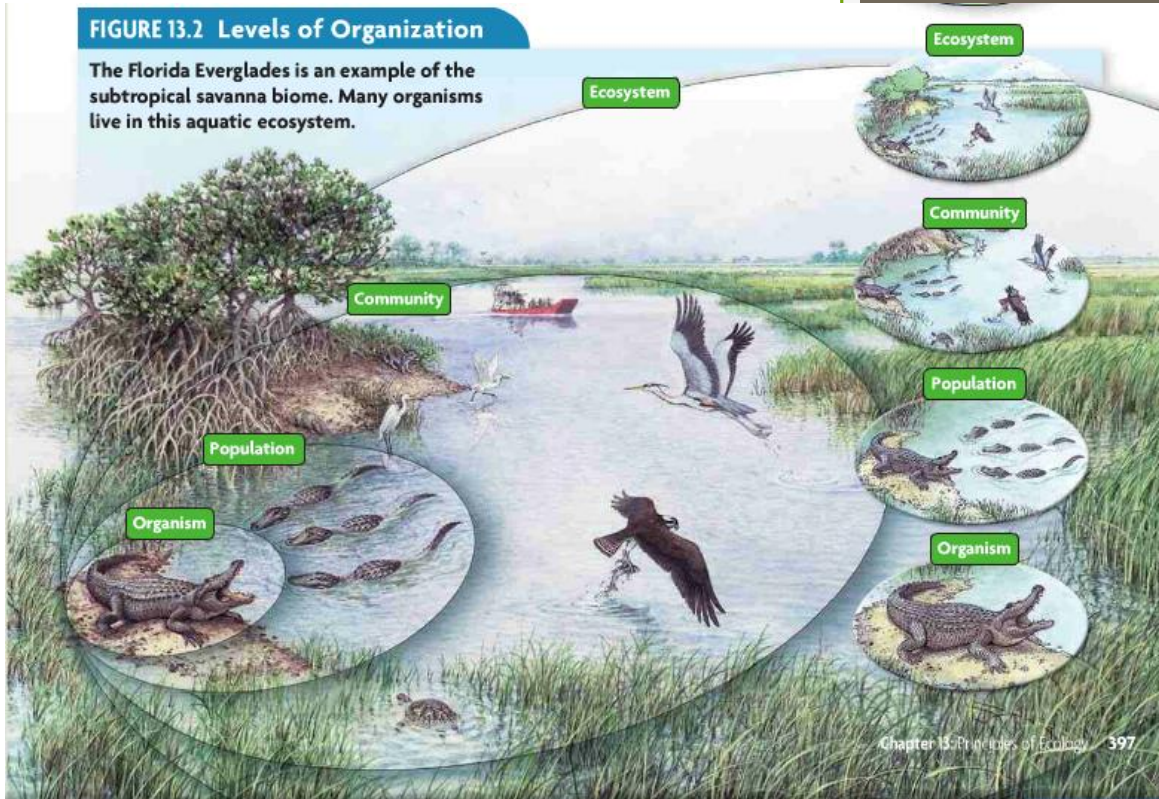


FIGURE 13.2 Levels of Organization

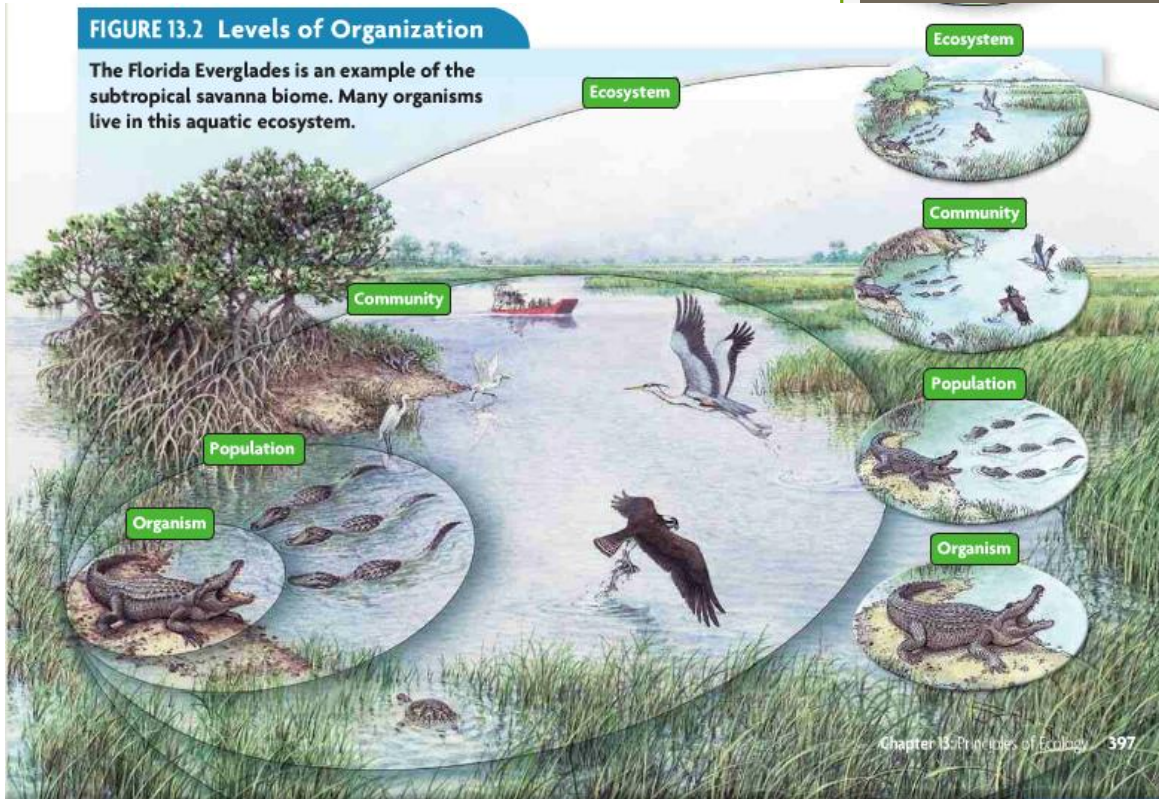
The Florida Everglades is an example of the subtropical savanna biome. Many organisms live in this aquatic ecosystem.



Organism – An individual living thing

FIGURE 13.2 Levels of Organization

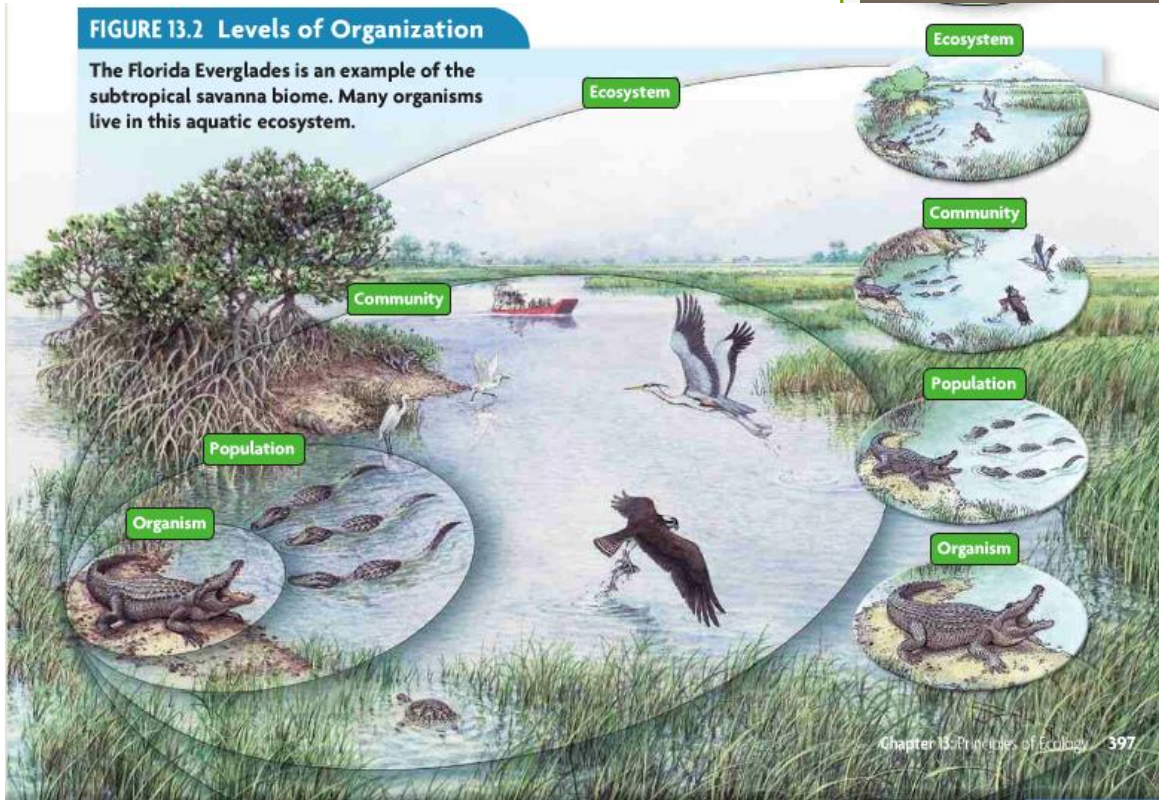
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Population – a group of the same species that live together in one area.

FIGURE 13.2 Levels of Organization

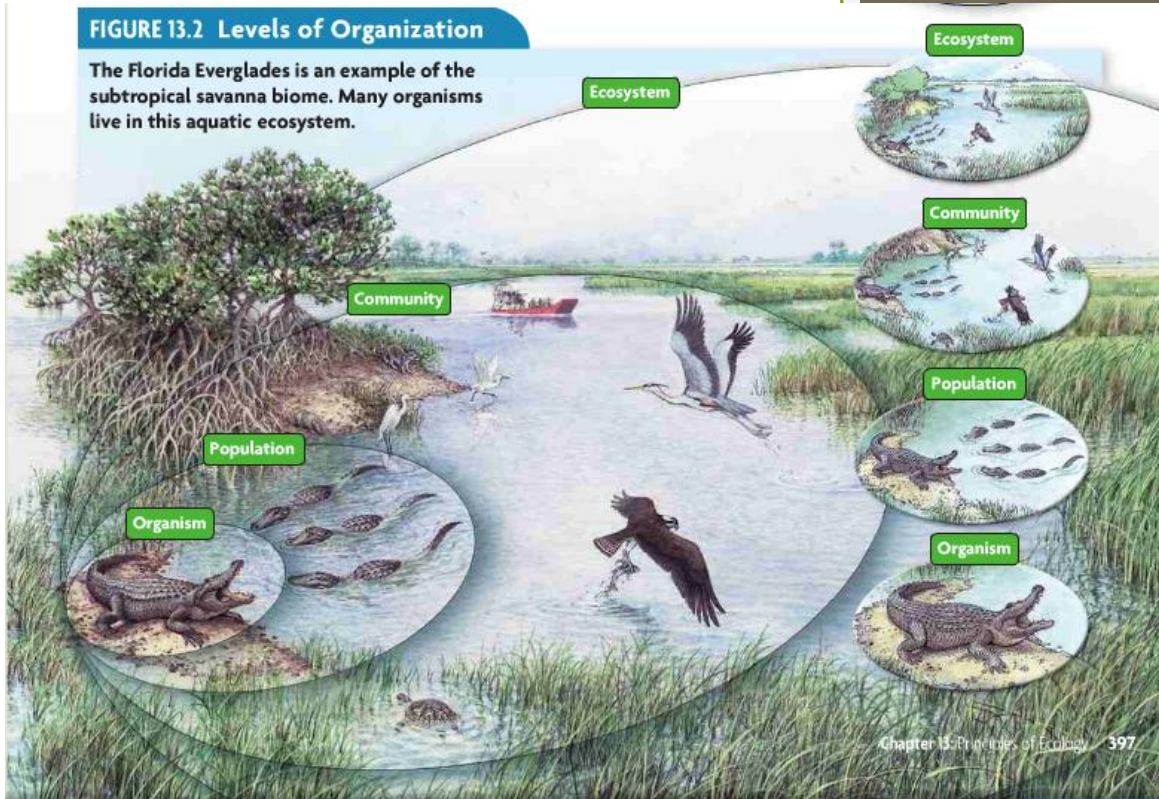
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Community – a group of different species that live together in one area.

FIGURE 13.2 Levels of Organization

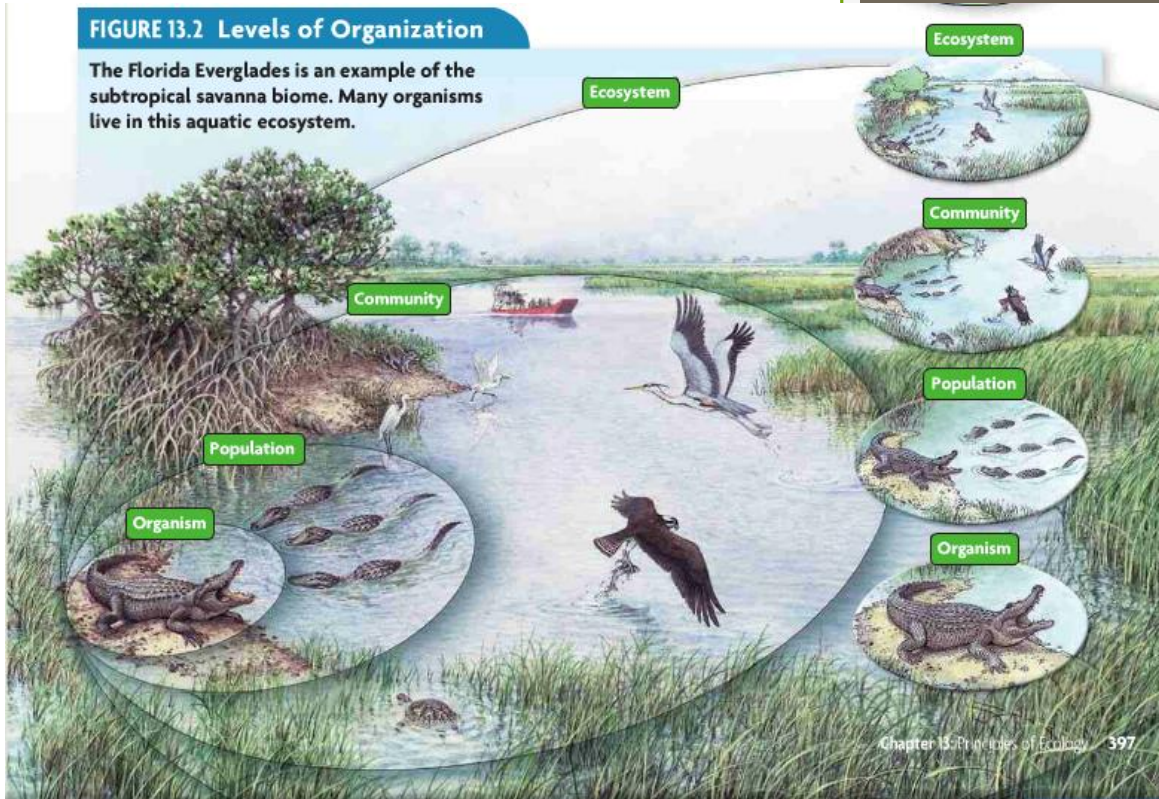
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Ecosystem – includes all of the living organisms as well as the nonliving things in a given area.

FIGURE 13.2 Levels of Organization

The Florida Everglades is an example of the subtropical savanna biome. Many organisms live in this aquatic ecosystem.



Biome – a major regional or global community of organisms. A biome is usually characterized by the climate conditions and the plant species that thrive there.

Ecologists use different techniques to study the relationship between organisms and their environment.



Observation (direct)



Observation (indirect)



Includes radio telemetry and tracking scat or recent kills.

Used for observing species that are difficult to track or have a broad range.



Observing populations

- Break: Random sampling



13.2 Biotic and Abiotic Factors

What are the biotic and abiotic factors in an ecosystem?

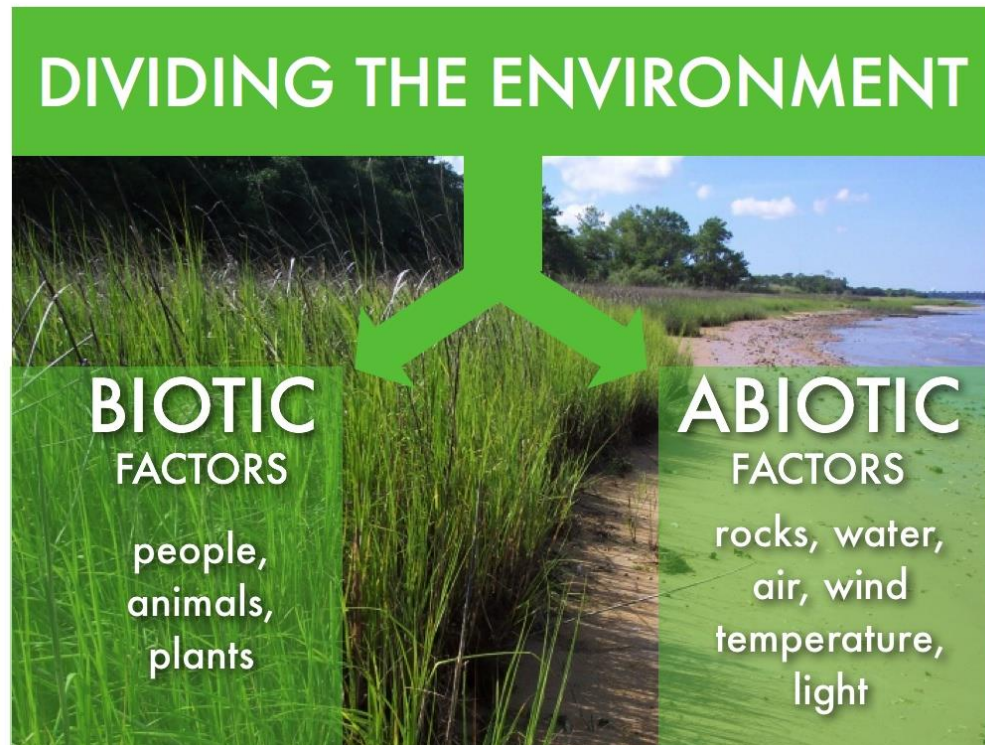


13.2 Biotic and Abiotic Factors

What are the biotic and abiotic factors in an ecosystem?

Biotic – living things

Abiotic – nonliving things



13.3 Energy in Ecosystems

Focus Question: How does life in an ecosystem acquire energy?

13.3 Energy in Ecosystems

- **Producers** provide energy for other organisms in an ecosystem.

13.3 Energy in Ecosystems

- **Consumers** get energy by eating living or once living organisms in an ecosystem.

13.3 Energy in Ecosystems

Type	Also Called	Description

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Type	Also Called	Description
producer		
consumer		

13.3 Energy in Ecosystems

Type	Also Called	Description
producer	autotrophs	
consumer	heterotrophs	

13.3 Energy in Ecosystems

Type	Also Called	Description
producer	autotrophs	Make their own food
consumer	heterotrophs	Get energy by eating other things

13.4 Food Chains and Food Webs

- Focus Question: How do a food chains and food webs show feeding relationships and energy flow in an ecosystem?

13.4 Food Chains and Food Webs

- A **food chain** is a model that shows a sequence of feeding relationships.

13.4 Food Chains and Food Webs

- A food chain shows the relationship between one producer and a single chain of consumers in an ecosystem.



What are the types of consumers?

Types of consumers:

1. Herbivores - eat only plants



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1. **Herbivores** - eat only plants
2. **Carnivore** - eat only animals



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3. **Omnivore** - eat plants and animals



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4. **Detritivore** - eats dead organic matter



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4. **Detritivore** - eats dead organic matter
5. **Decomposer** - detritivores that break down organic matter into simpler organic compounds



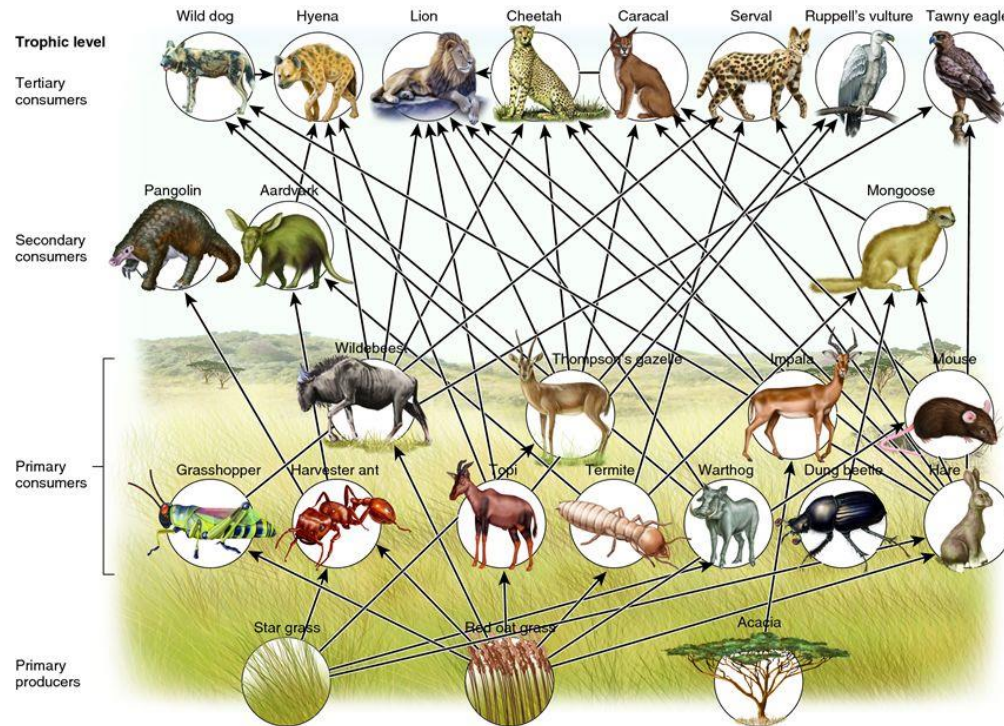
What are the trophic levels?

- Trophic levels are levels of nourishment in a food chain.
 - Producers (autotrophs)
 - Primary consumers (herbivores)
 - Secondary consumers (carnivores that eat herbivores)
 - Tertiary (third) consumers (carnivores that eat secondary consumers)

* omnivores may be listed at different trophic levels depending on what they are eating

What does a food web show?

A **food web** shows the **complex feeding relationships and flow of energy within** (and sometimes beyond) **an ecosystem.**





How might the introduction of a new predator affect the flow of energy through a food web?

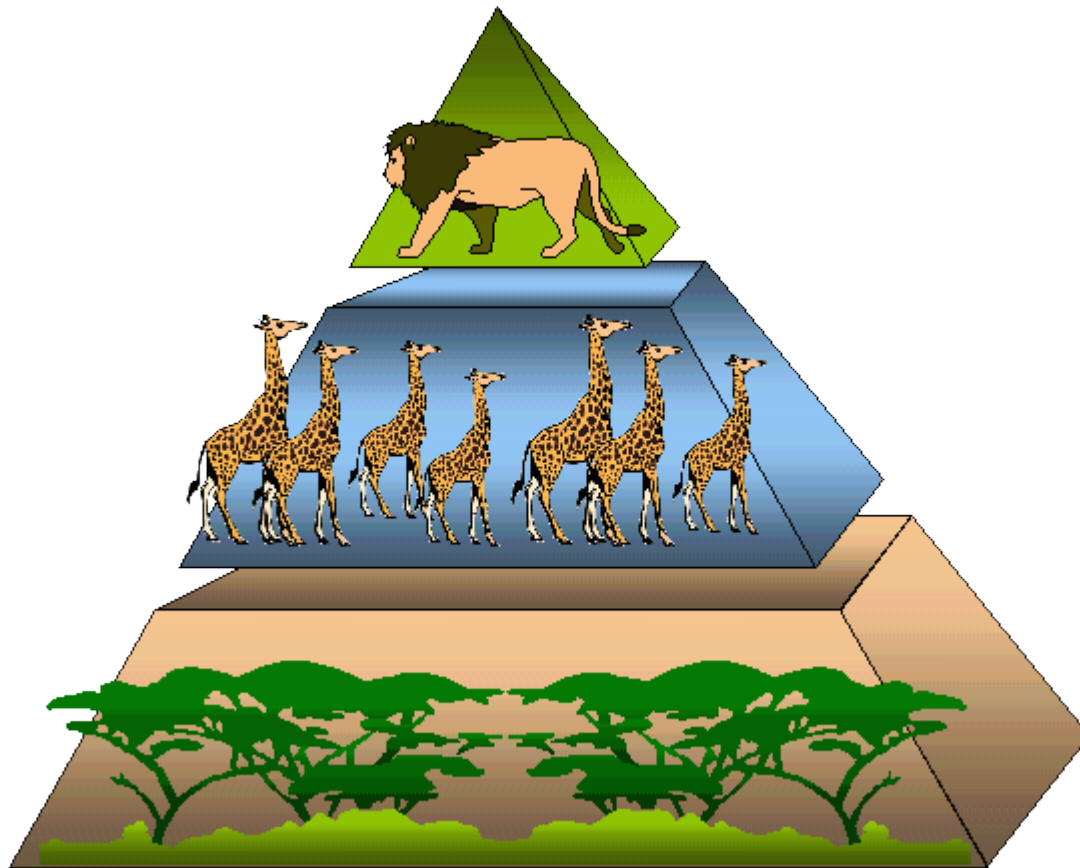


How might the introduction of a new predator affect the flow of energy through a food web?

A new predator might cause other populations in a food web to decrease in size, thus decreasing the amount of energy available.

13.6 Pyramid Models

Why do ecologists use pyramid models to show the distribution of energy and matter in ecosystems?



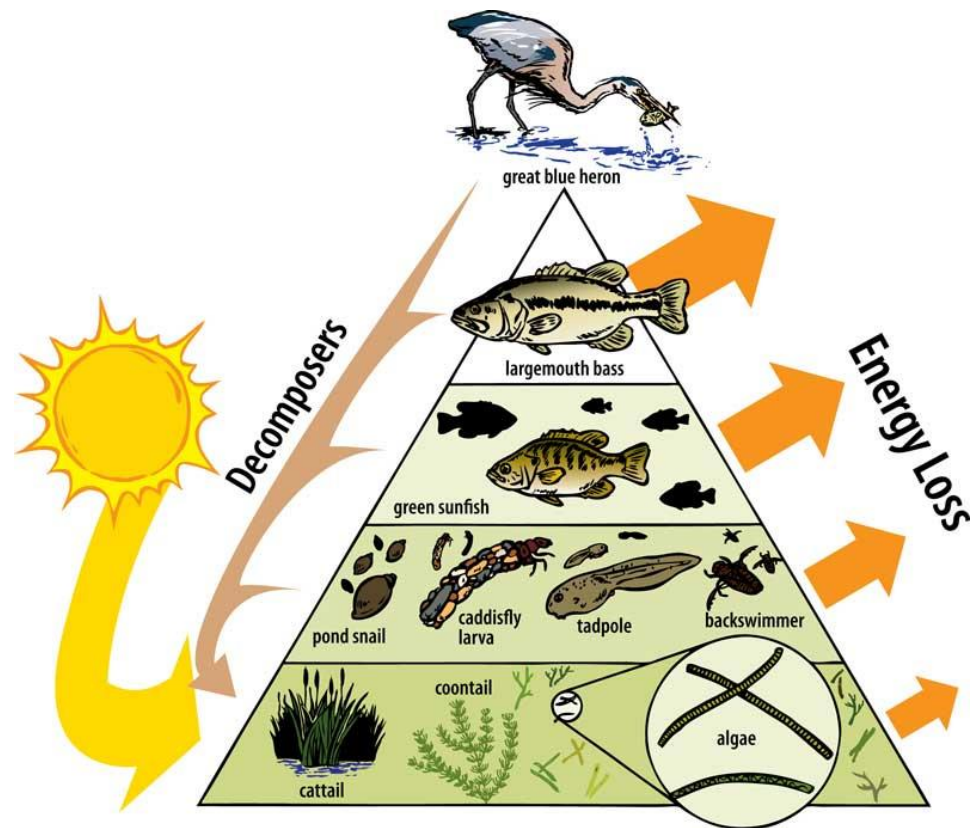


An energy pyramid shows the distribution of energy among trophic levels.

- Ecosystems get their energy from sunlight.
- Energy is lost as it moves along a food chain in the form of heat. Therefore, each level in the food chain contains much less energy than the level before it. About 90% of the energy in one trophic level is lost between trophic levels.

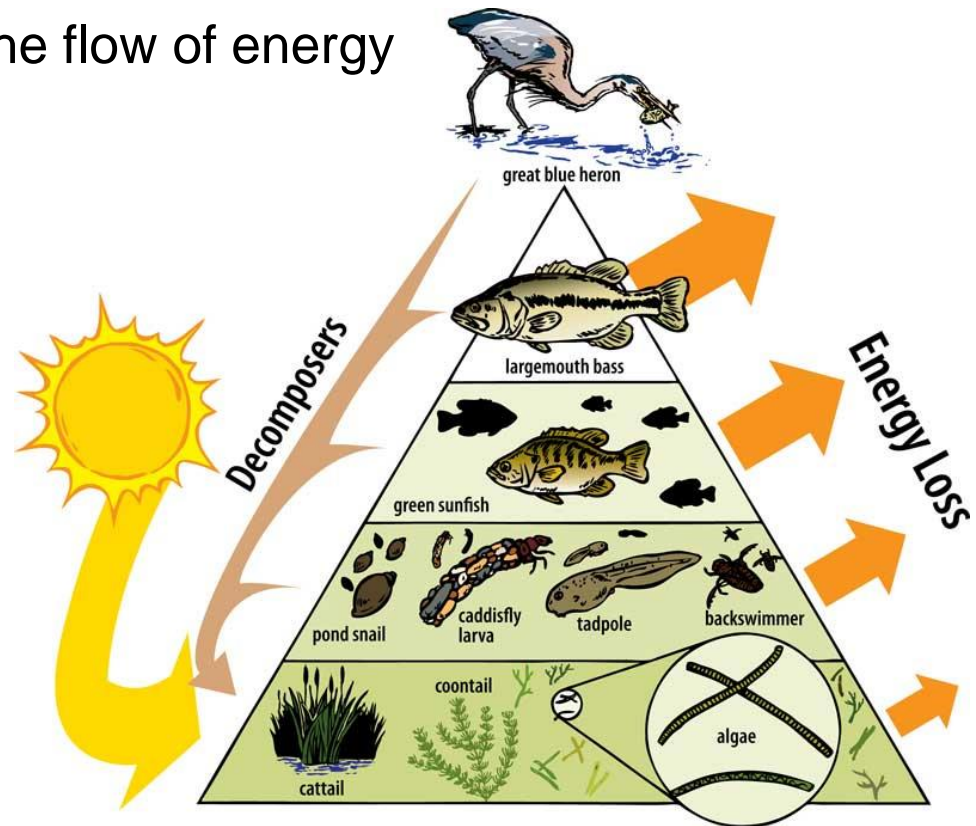
An energy pyramid shows the distribution of energy among trophic levels.

- An **energy pyramid** is a diagram that compares energy used by producers, primary consumers, and other trophic levels.



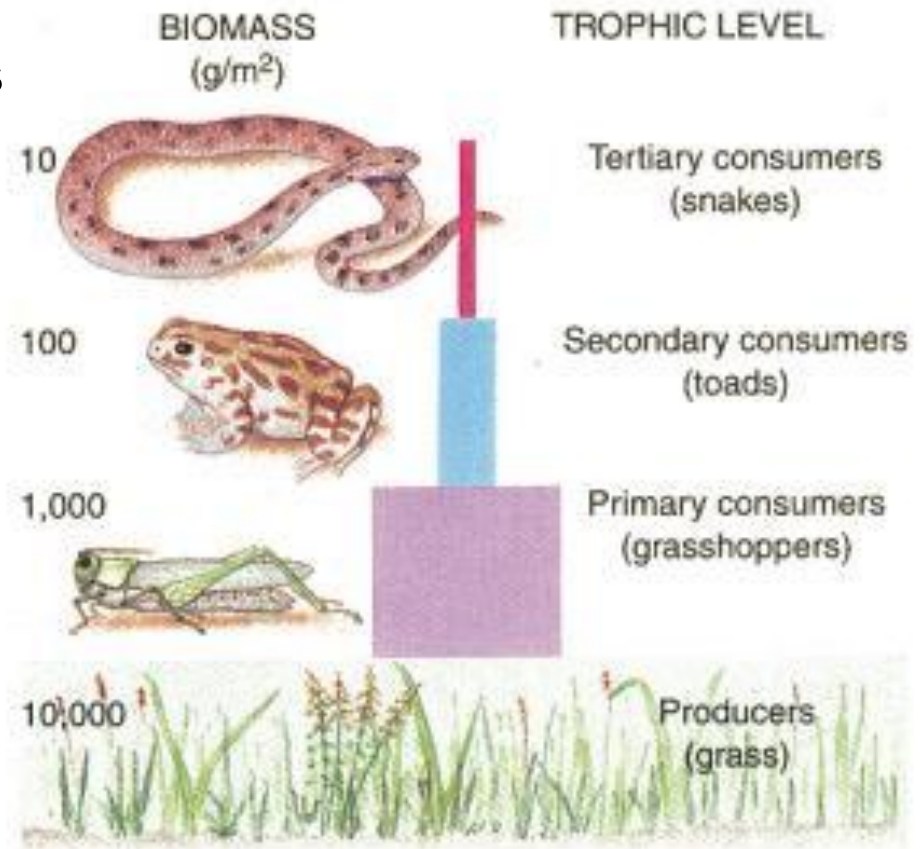
DRAW AN ENERGY PYRAMID!

- Include :
 - At least three trophic levels
 - Arrows showing the flow of energy



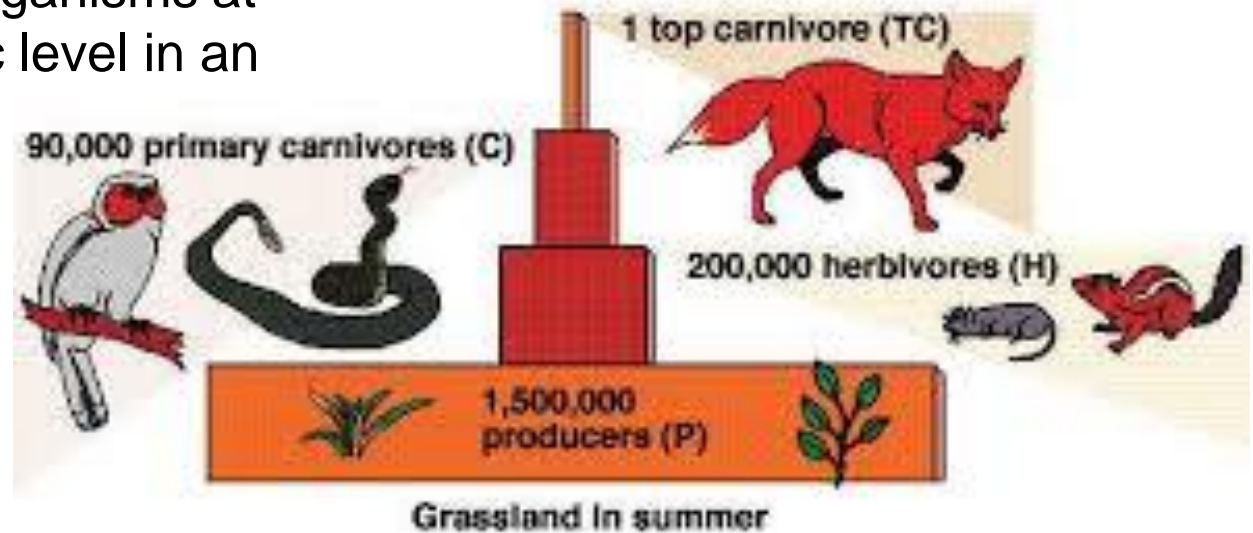
Other pyramid diagrams illustrate an ecosystem's biomass and distribution of organisms.

- Biomass pyramid: shows the mass of organisms required to support the trophic level above it.



Other pyramid diagrams illustrate an ecosystem's biomass and distribution of organisms.

- Pyramid of numbers: shows the number of individual organisms at each trophic level in an ecosystem.



Other pyramid diagrams illustrate an ecosystem's biomass and distribution of organisms.

- Inverted pyramids: both biomass and pyramid of numbers may appear inverted.

