Energy Flow in Ecosystems

Types of Biotic Organisms

Consumers
Consumers, or heterotrophs, gain energy by eating other organisms. Consumers that only eat producers (plants or their producs) are herbivores, and consumers that only eat other animals are called carnivores. Organisms that eat both plants and animals are omnivores.

Decomposers
Decomposers (detritivores) consume waste and dead organisms and help recycle biomass, the energy stored in these materials, by breaking it down into carbon, nitrogen and phosphorus.

Producers
Producers are called "autotrophs" because they make their own food through the process of photosynthesis. In it, chlorophyll-containing organisms use CO_2 and water to turn sun energy into glucose and O_2.

Food Chain

What is it?
Food chains model the transfer of energy from one organism to another in the form of food.

Primary Consumers
Primary consumers only eat producers (plant and plant products.)

Secondary Consumers
Secondary consumers eat primary consumers. Some secondary consumers, known as omnivores, also eat plants.

Organization
Energy flows from the Producer → Primary Consumer → Secondary Consumer → Decomposer.

Food Web

What is it?
Food webs show many overlapping food chains, modeling the flow of energy throughout an entire ecosystem.

Why use it?
The limited levels in food chains do not show many interactions among organisms in an ecosystem. Organisms may be part of many food chains and on multiple levels.

Food Web Balance
A balanced food web has an abundance of producers, many herbivores, and fewer carnivores and omnivores. This helps the ecosystem maintain and recycle biomass.

Decomposers in Food Webs
Many food webs do not include decomposers, but they are vital to balancing energy flow in an ecosystem. All organisms should have arrows pointed to decomposers.

Energy Pyramid

What is it?
Energy Pyramids help us compare how much energy is available to consume at each level of the food chain.

Energy Loss
Only around 10% of energy organisms consume is stored. The other 90% is used for life processes or lost as heat.

Energy Levels
The higher the level an organism is in the energy pyramid, the less energy is available to them. That is why there are fewer top level predators (also called apex predators.)

Size of the Pyramid
There are normally no more than 4 levels in an energy pyramid because the limited amounts of energy available at higher levels often cannot sustain organisms.