Energy Flow in Ecosystems Section 4-2

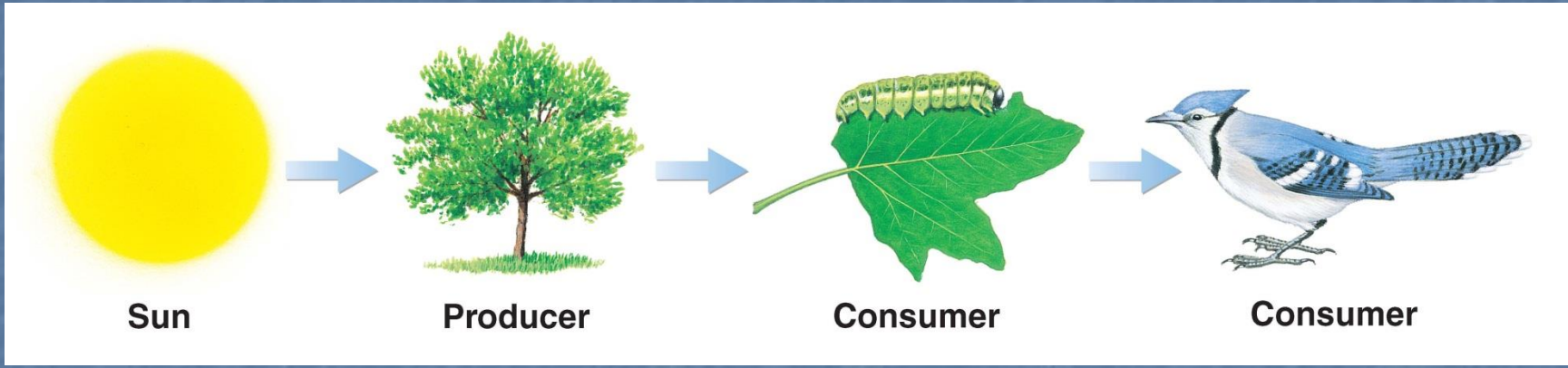
Trophic Levels

Key Idea: In an ecosystem, energy flows from the sun to producers to consumers to decomposers.

- A producer is a photosynthetic organisms, such as plants and algae, change light energy from the sun into energy that they can use to grow.
- A consumer is an organism that eats other organisms instead of producing their own food.

- A decomposer is an organism that breaks down the remains of animals, such as bacteria and fungi.
- A trophic level is each step in the transfer of energy through an ecosystem.

Trophic Levels

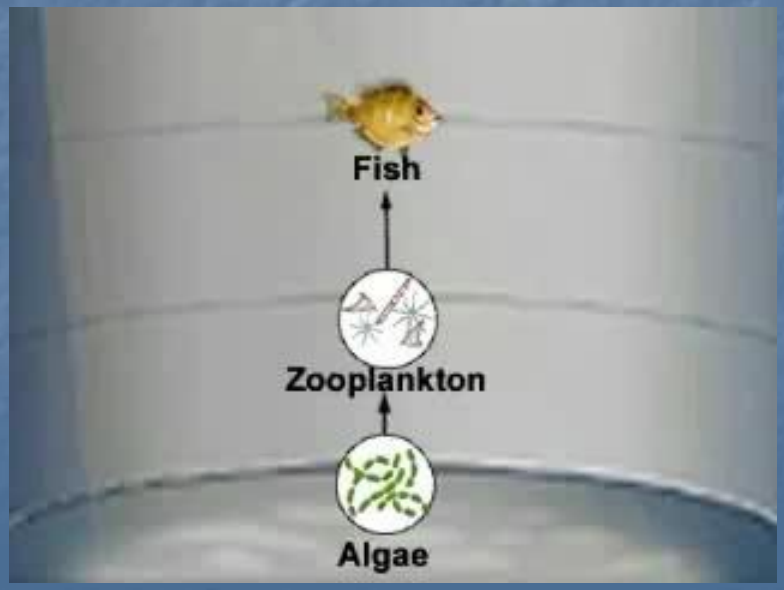


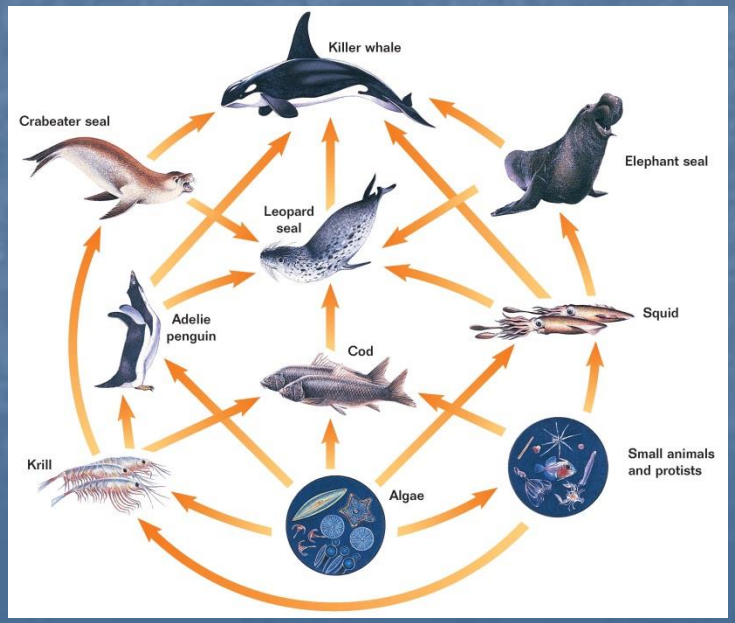
Food Chains

- Energy flows from one trophic level to the next, forming a food chain.
- First trophic level = producers (plants, algae)
- Second trophic level = herbivores (eat producers)
- Third trophic level = carnivores (eat herbivores)
- Fourth trophic level = Other carnivores (eat other carnivores)
- Omnivores are animals that are both herbivores and carnivores.

Food Web

- A food web is an interconnected group of food chains.
- Most organisms eat more than one kind of food.

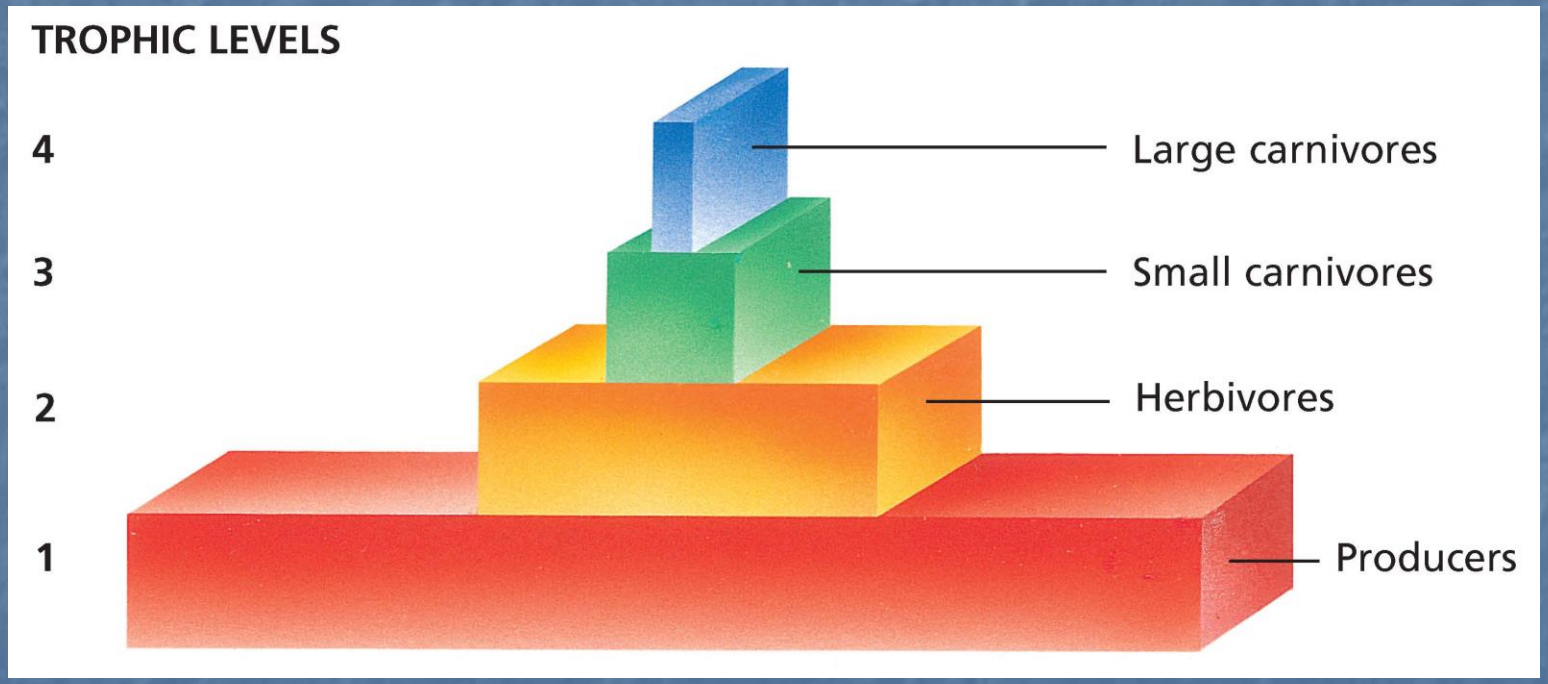




Loss of Energy

Key Idea: Energy is stored at each link in the food web. But some energy that is used dissipates as heat into the environment and is not recycled.

Energy Transfer through Trophic Levels



- An energy pyramid is a triangular diagram that shows an ecosystem's loss of energy, which results as energy passes through the ecosystem's food chain.

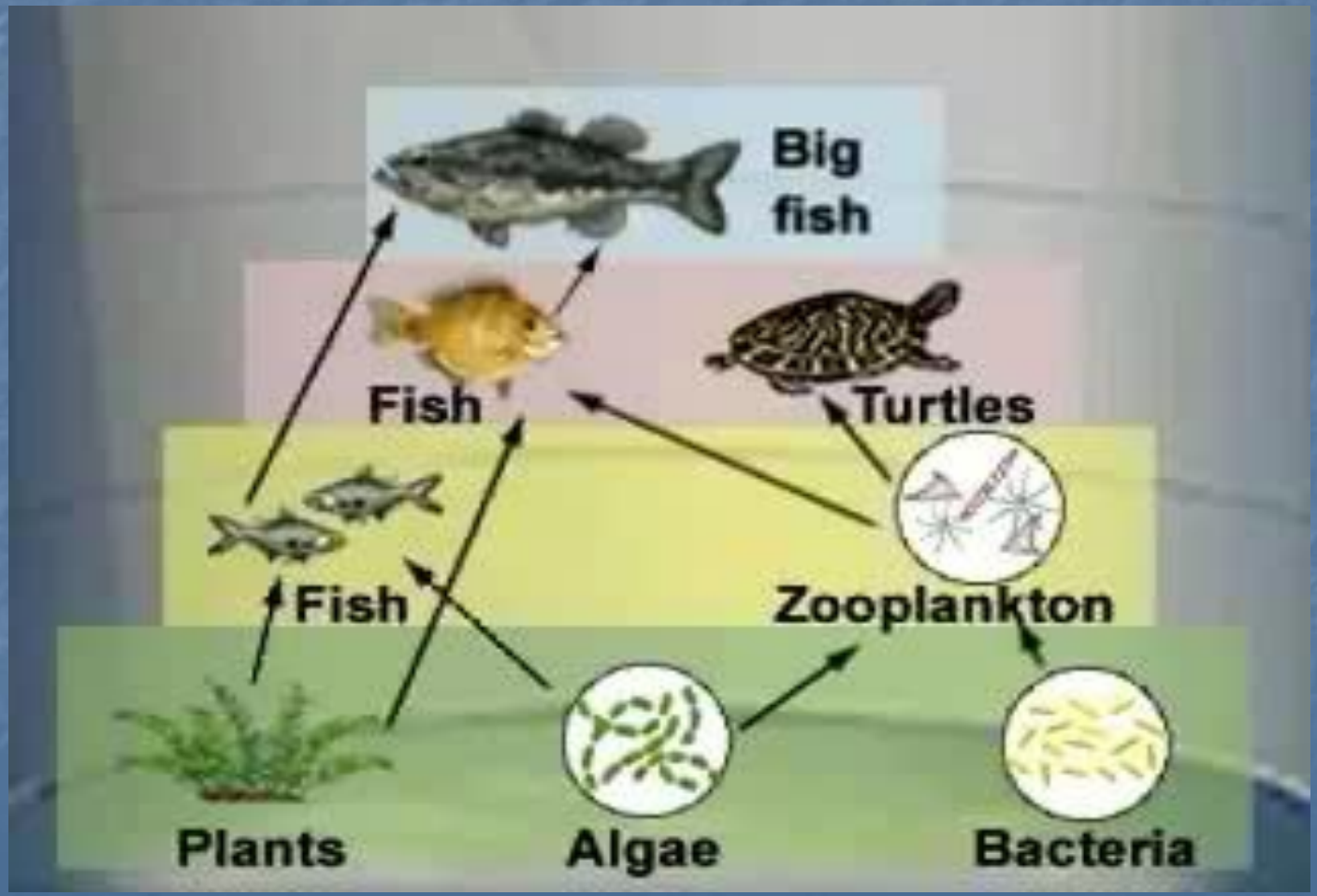
The Ten Percent Rule

- Only about 10% is stored in the animal's body as fat or as tissue. This amount stored energy is all that is available to organisms at the next trophic level that consume the animal.
- About 90% of it is converted into heat energy and is dispersed into the environment.

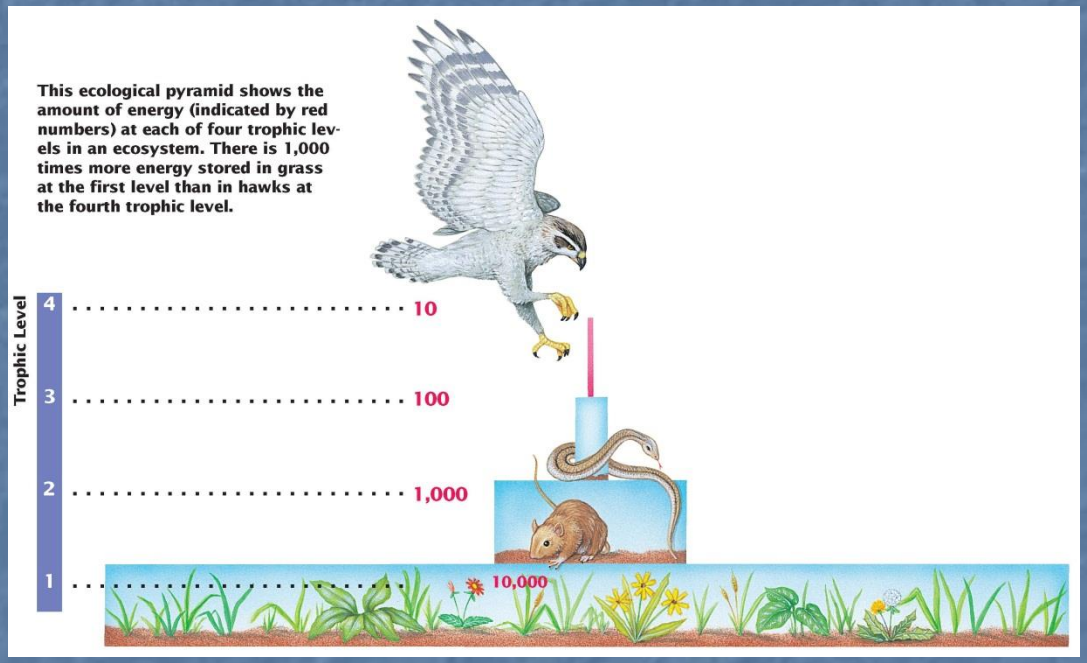
Energy Pyramid

- Each layer in the energy pyramid represents one trophic level.
- Producers = pyramid's base or lowest trophic level. (most energy)
- Herbivores = second level (less energy)
- Carnivores = higher levels (least energy)

Energy Pyramid



Amount of Energy at Four Trophic Levels



The energy stored by the organism at each trophic level is about one tenth the energy stored by the organisms in the level below.

If the prairie dog (second level) in a food pyramid contains 35,000 units of energy, how much of that energy can be stored in the eagle level (third level) of the food pyramid?

35,000 units x 10% = 3500 units