

Energy Pyramids

When an herbivore eats a plant, the **energy** in the plant tissues is used by the herbivore. But how much of that energy is transferred to the herbivore? Remember that plants are **producers**, bringing the energy into the ecosystem by converting sunlight into glucose. Does the plant use some of the energy for its own needs? Energy is the ability to do work, and the plant has plenty or "work" to do. So of course it needs and uses energy. It converts the **glucose** it makes into **energy** through **cellular respiration** just like other organisms. After the plant uses the energy from glucose for its own needs, the excess energy is available to the organism that eats the plant.

The herbivore uses the energy from the plant to power its own life processes and to build more body tissues. However, only about 10% of the total energy from the plant gets stored in the herbivore's body as extra body tissue. The rest of the energy is used by the herbivore. The next consumer on the food chain that eats the herbivore will only store about 10% of the total energy from the herbivore in its own body. This means the carnivore will store only about 1% of the total energy that was originally in the plant. In other words, only about 10% of energy of one step in a food chain is stored in the next step in the food chain. The majority of the energy is used by the organism or released to the environment.

Every time energy is transferred from one organism to another, there is a loss of energy. This loss of energy can be shown in an **energy pyramid** (pictured). Since there is energy loss at each step in a food chain, it takes many producers to support just a few carnivores in a community.

Plants or other photosynthetic organisms are found on the first level, at the bottom of the pyramid. The next level will be the herbivores, and then the carnivores that eat the herbivores. The energy pyramid shows four levels of a food chain, from producers to carnivores. Because of the high rate of energy loss in food chains, there are usually only 4 or 5 levels in the food chain or energy pyramid.

There just is not enough energy to support any additional levels.

