Energy Flow in an Ecosystem

ENERGY FLOW IN AN ECOSYSTEM

The flow of energy from producers to top consumers is called energy flow.

Energy flow is unidirectional.

Energy Transfer

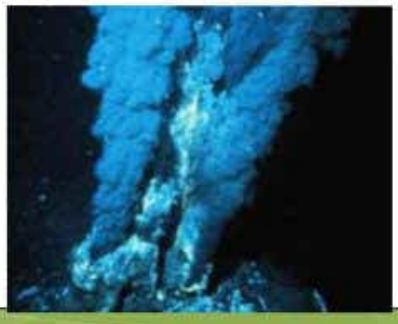
- Energy is the ability to do work
- 3 main paths in which energy flows
  - Producers
  - Consumers
  - Decomposers

Energy Flow

- Producers -autotrophs are organisms that produce their own energy
  - Photosynthetic autotrophs create energy from the sun

$$6CO_2 + 6H_2O + \text{solar energy} \longrightarrow C_6H_{12}O_6 + 6O_2$$

  - Chemoysynthetic autotrophs create energy from inorganic molecules (chemicals)



Energy Flow

- Consumers – organisms that can not make their own food
  - Types of consumers
    - Herbivores- eat producers
    - Carnivores- eat other consumers
    - Omnivores- eat both producers and consumers

Energy Flow

- Decomposers- organisms that feed on the "garbage" of an ecosystem
  - Examples:
    - fungi, bacteria, some insects, worms, etc.

Energy Flow

- Cellular Respiration-process of breaking down food to yield energy
  - Cells absorb oxygen and use it to release energy from foods

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{energy}$$

Energy Flow

- Trophic Levels

  -feeding steps in a food chain or food web, in which energy is transferred

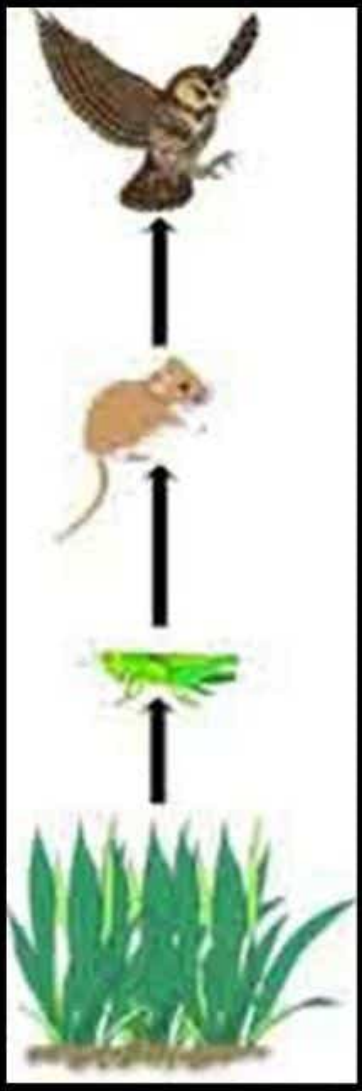
- Food Chain

  -transfer of energy from organism to organism

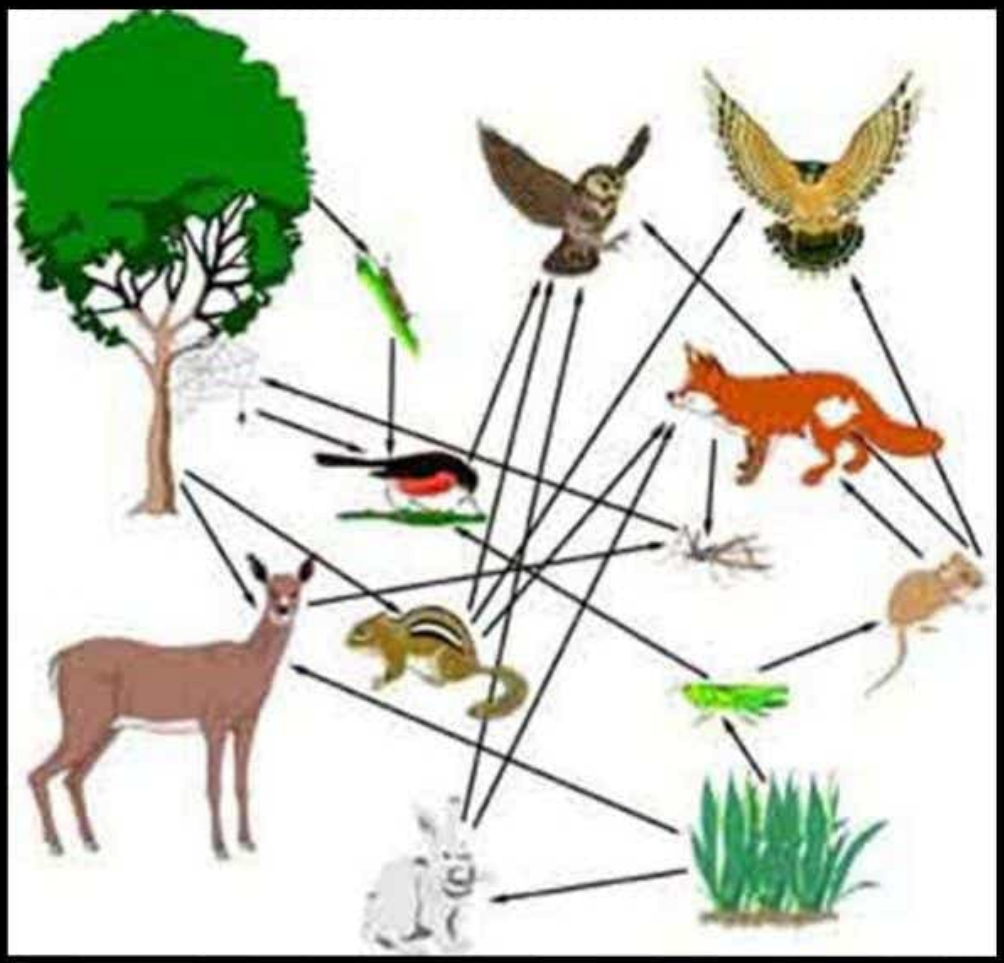
  Plant → Mouse → Snake → Owl

- Food Web

  -all the possible feeding relationships in an ecosystem



Food Chain



Food Web

Energy Flow

- The Energy Pyramid
  - Each link in the food chain results in a **loss of energy**
  - Roughly only 10% of energy available at one trophic level is transferred to the next level

- As you go up the trophic levels the number of organisms decreases
  - Example: Think of how many chipmunks you see, compare that to the number of hawks.


Tertiary
Consumers
1 kcal
Secondary
Consumers
10 kcal
Primary
Consumer
100 kcal
Producers
1,000 kcal

Energy flow and trophic levels