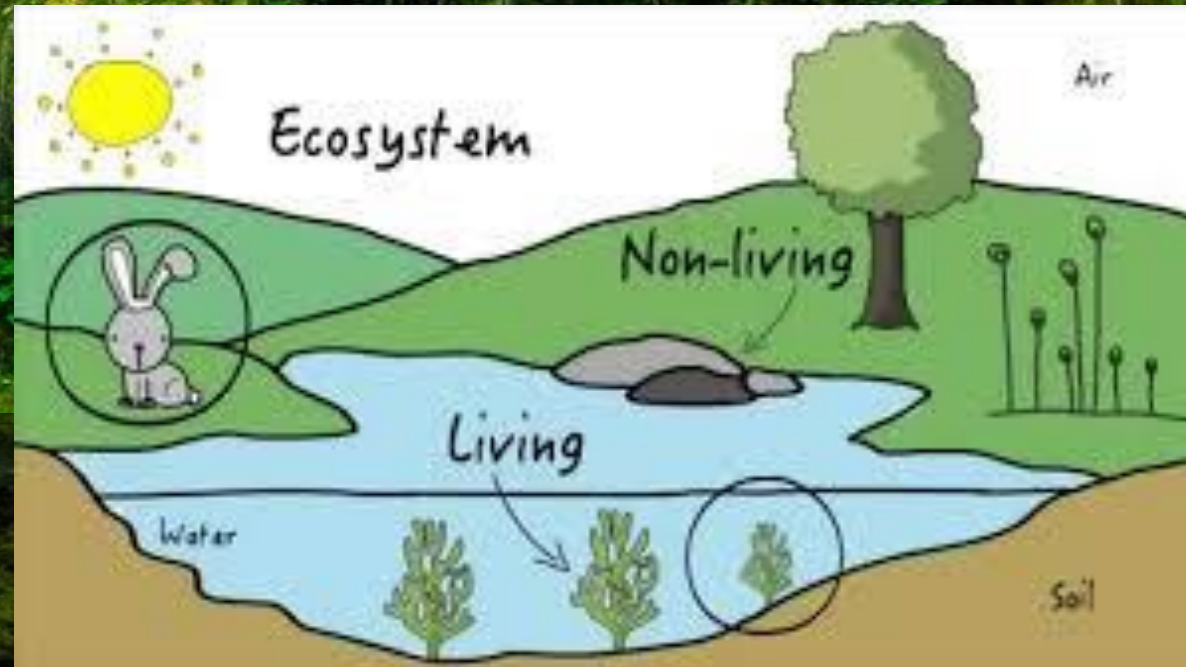


# ECOLOGY



Dr. Vijay K. Khorwal



# CHE 110: Environmental Studies

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Unit - 2

**Ecosystems**

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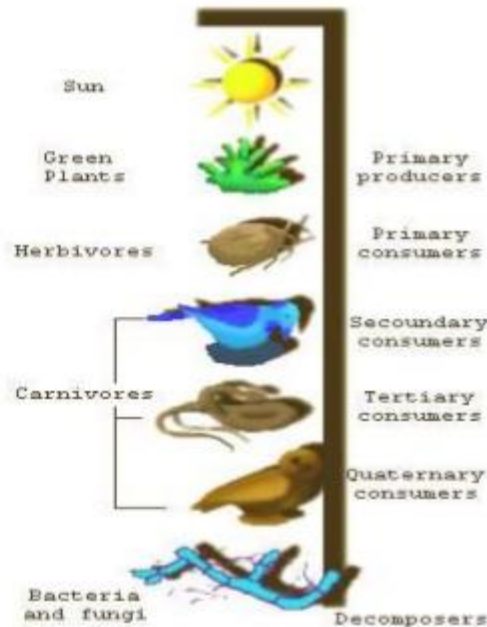


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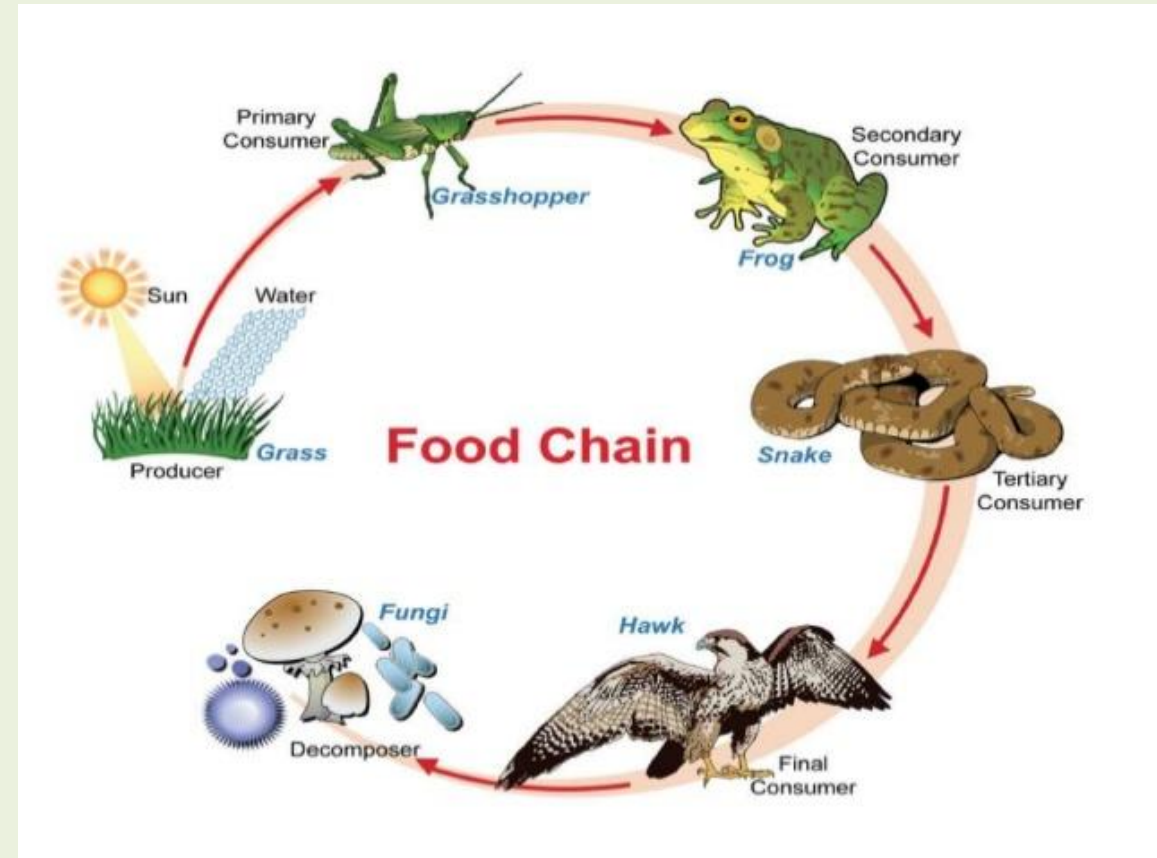
# Trophic Level

## Trophic Levels

- A trophic level is the position occupied by an organism in a food chain. Trophic levels can be analyzed on an energy pyramid.
- Producers are found at the base of the pyramid and comprise the first trophic level.
- Primary consumers make up the second trophic level.
- Secondary consumers make up the third trophic level.
- Finally tertiary consumers make up the top trophic level.

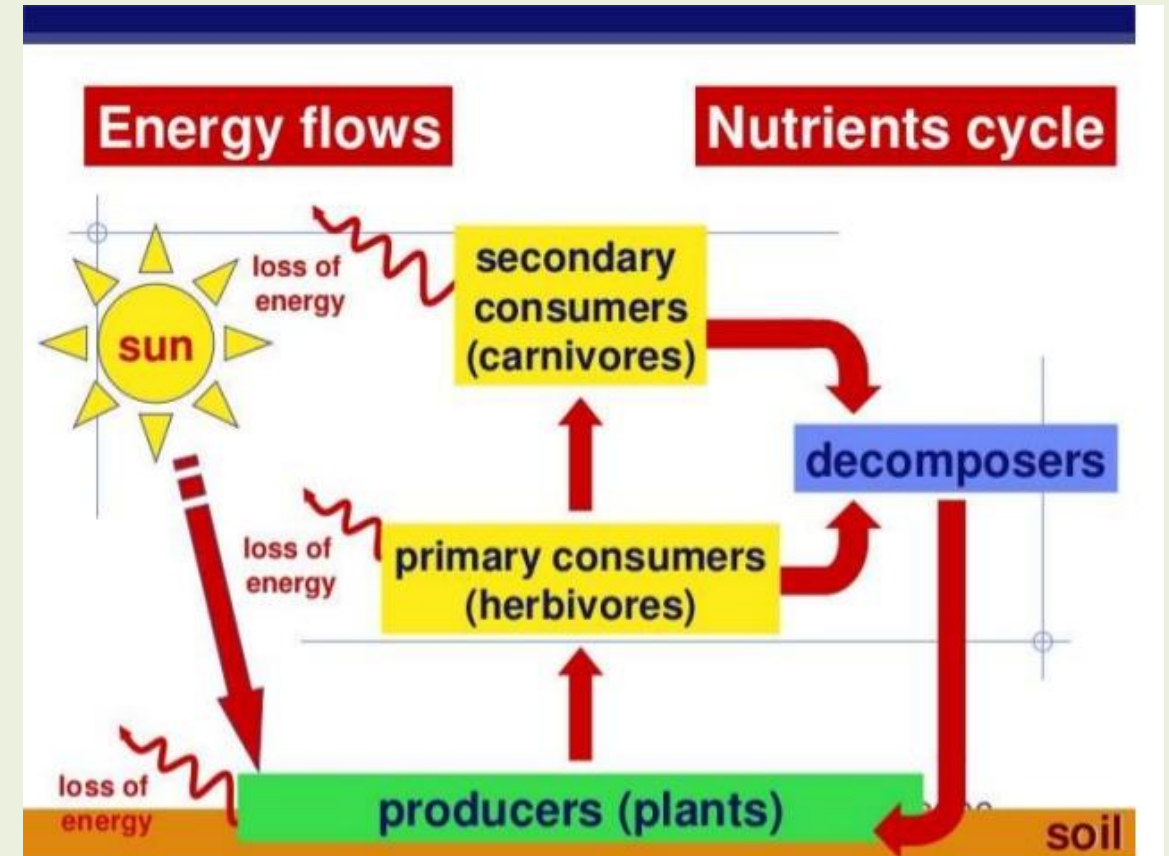
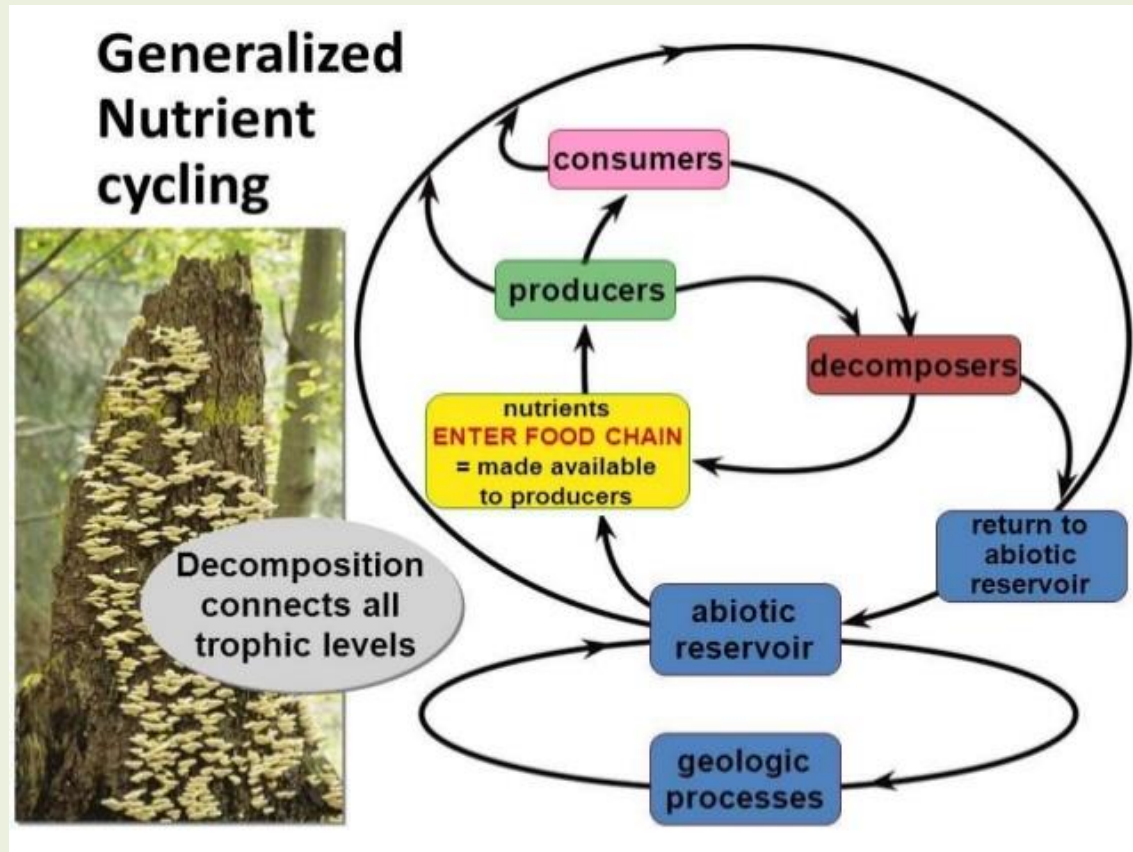


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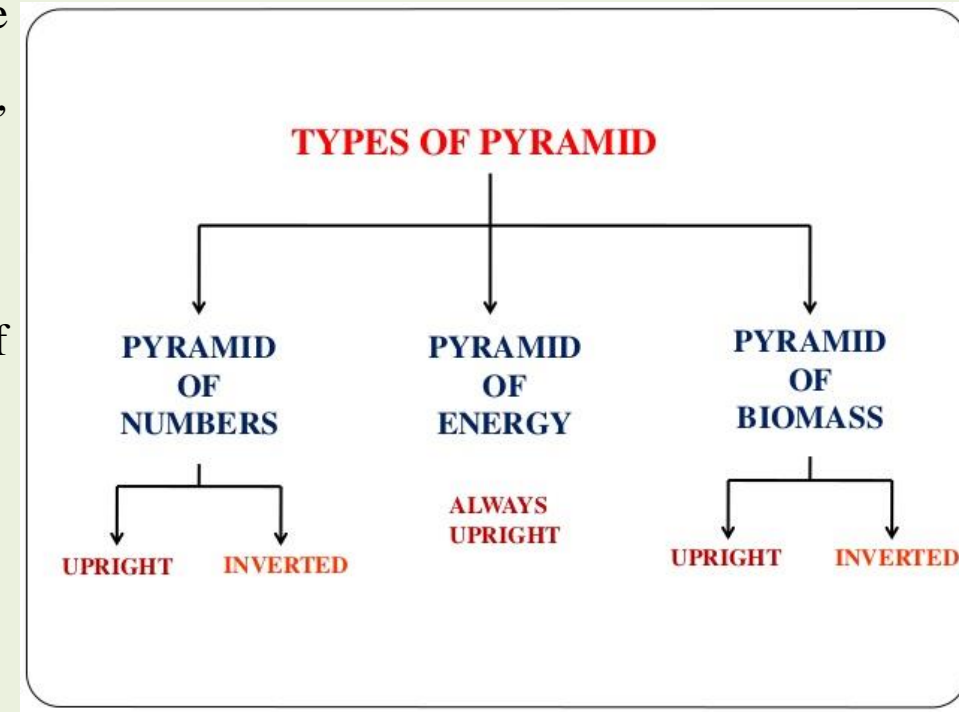


# Nutrients Cycle



# Ecological Pyramid

- Charles Elton develop the concept of **Ecological Pyramid in 1927**
- The graphical representations of different trophic levels in an ecosystem where producers occupy the base and the top consumer occupy the apex of the pyramid, is known as *ecological pyramid*.
- They are used to illustrate the feeding relationships between organisms.
- Food chains and food webs do not give any information about the numbers of organisms involved.
- This information can be shown through ecological pyramids.
- **Types of Ecological Pyramids**
  1. **Pyramid of number**
  2. **Pyramid of biomass**
  3. **Pyramid of energy**



[https://www.youtube.com/watch?v=iqK\\_PVK3svE](https://www.youtube.com/watch?v=iqK_PVK3svE)

# Ecological Pyramid: Pyramid of number

*The pyramid of numbers represents the number of organisms in each trophic level. This pyramid consists of a plot of relationships between the number herbivores (primary consumers), first level carnivore (secondary consumers), second level carnivore (tertiary consumers) and so forth. This shape varies from ecosystem to ecosystem because the number of organisms at each level is variable*

*Upright, partly upright and inverted are the three types of pyramids of numbers.*

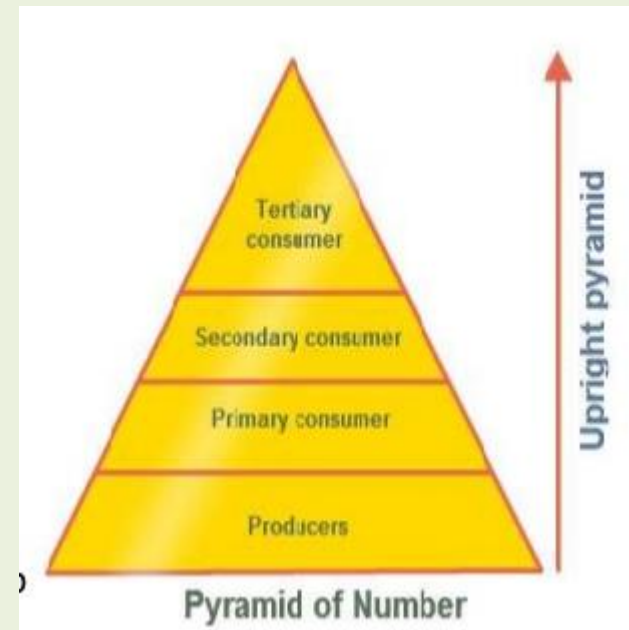
*An aquatic ecosystem is an example of upright pyramid where the number of organisms becomes fewer and fewer higher up in the pyramid.*

*A forest ecosystem is an example of a partially upright pyramid, as fewer producers support more primary consumers, but there are less secondary and tertiary consumers.*

*An inverted pyramid of numbers is one where the number of organisms depending on the lower levels grows closer toward the apex. A parasitic food chain is an example.*

**Usually upright.**

Inverted and spindle shaped only in some parasitic food chain and tree





# Ecological Pyramid: Pyramid of number

- Pyramid of number

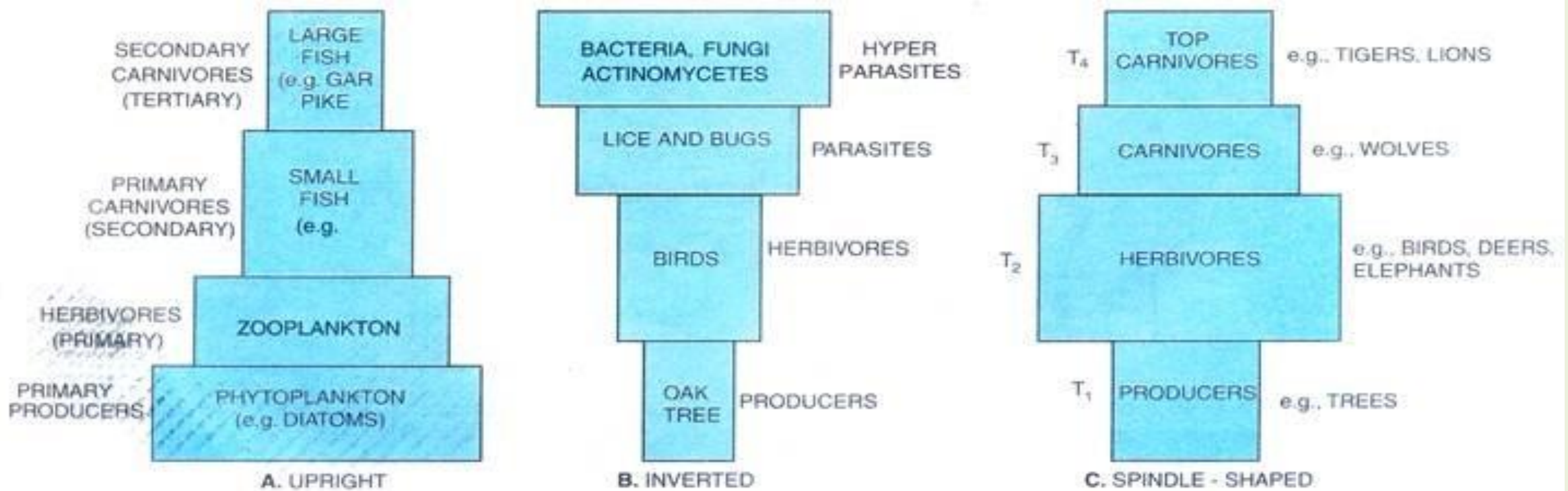
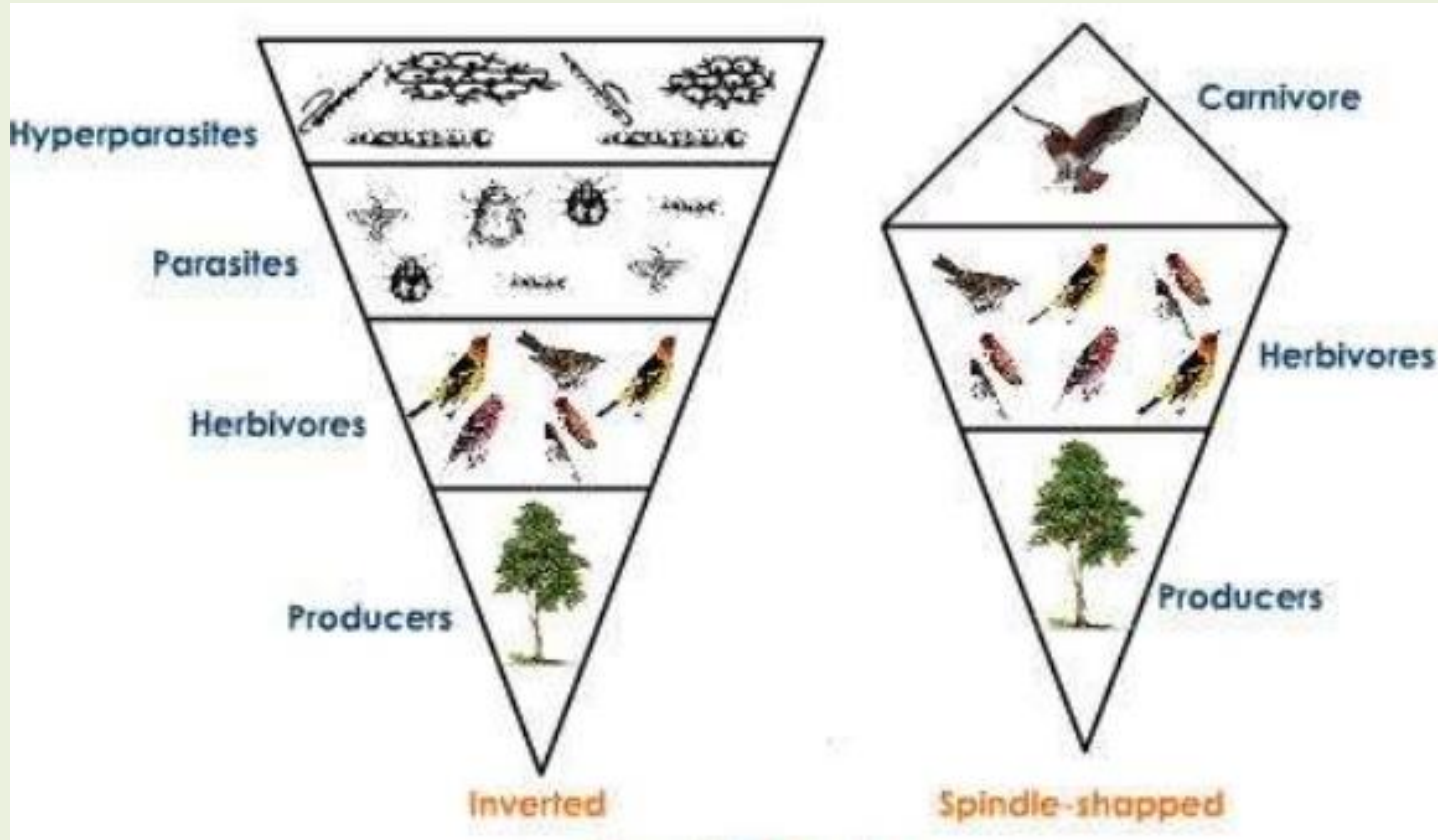
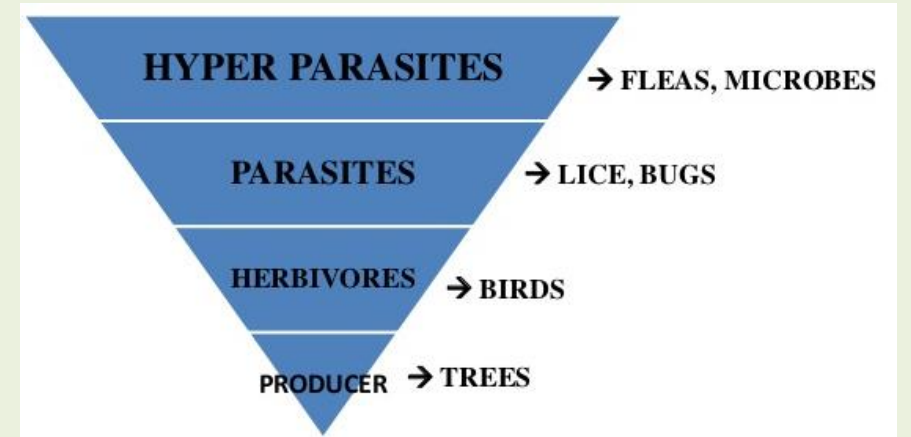
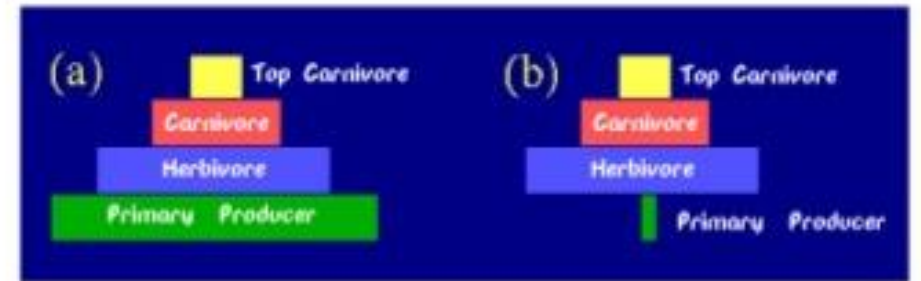


Fig. 14.15. Pyramids of numbers : A. In pond ecosystem; B. In parasitic food chain; C. Tree ecosystem.

# Ecological Pyramid: Pyramid of number

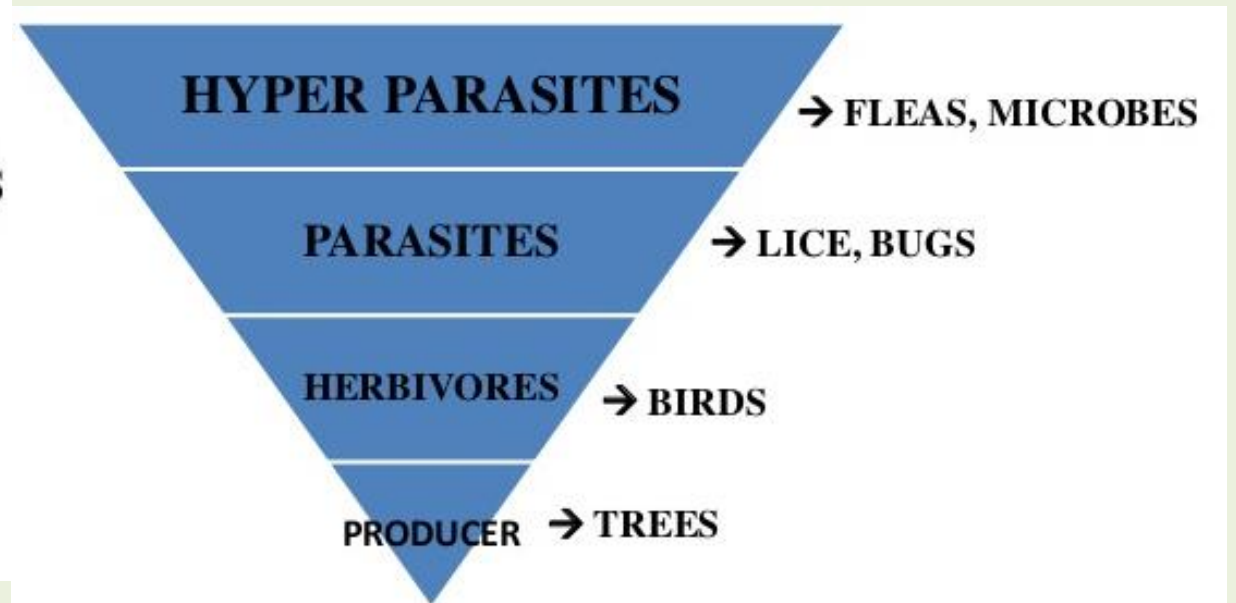
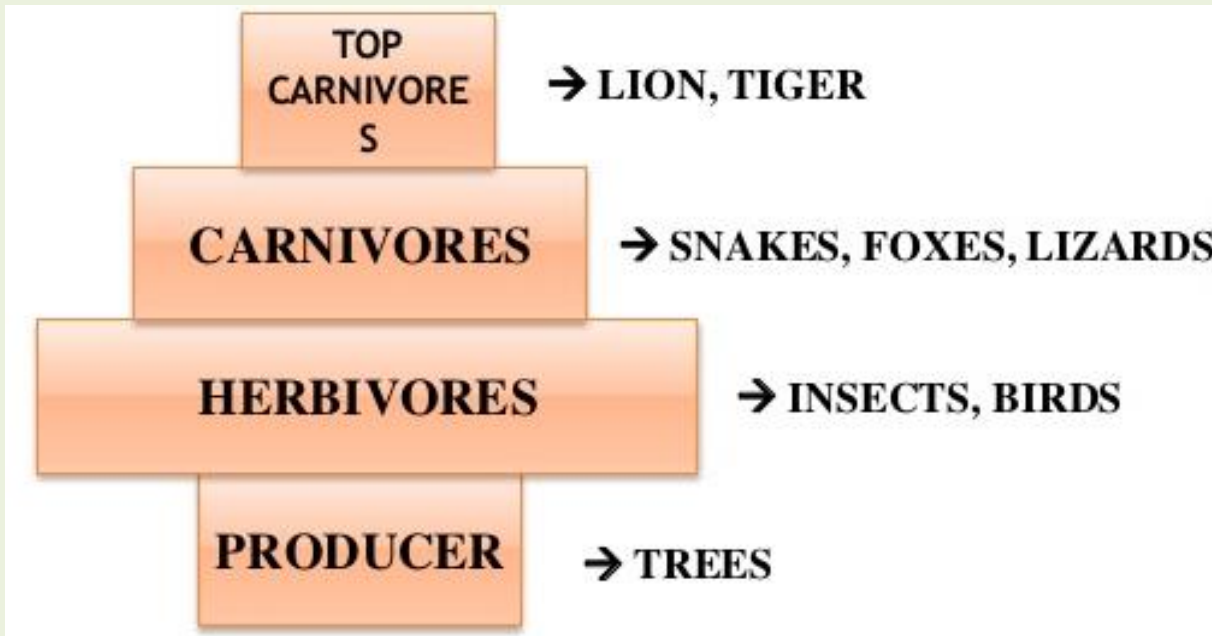


Pyramid of Numbers



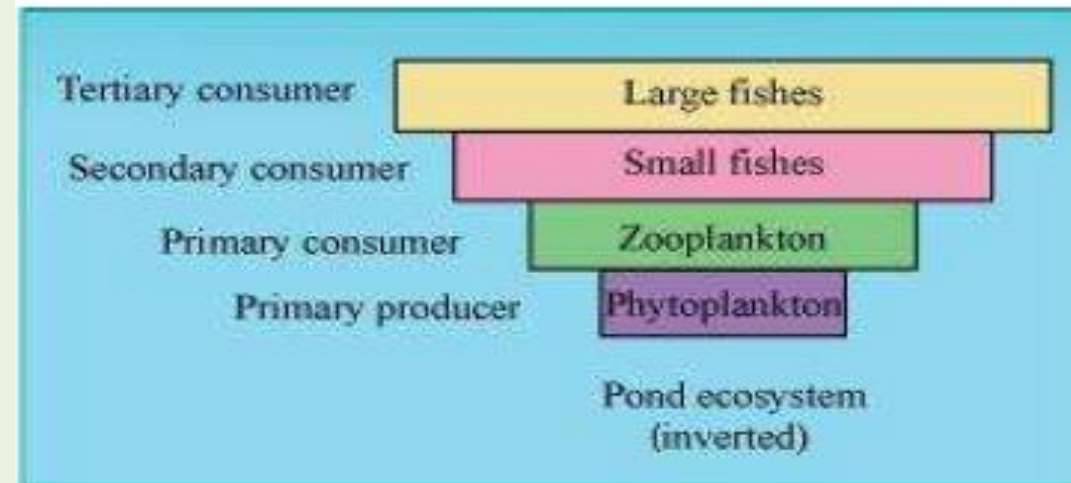
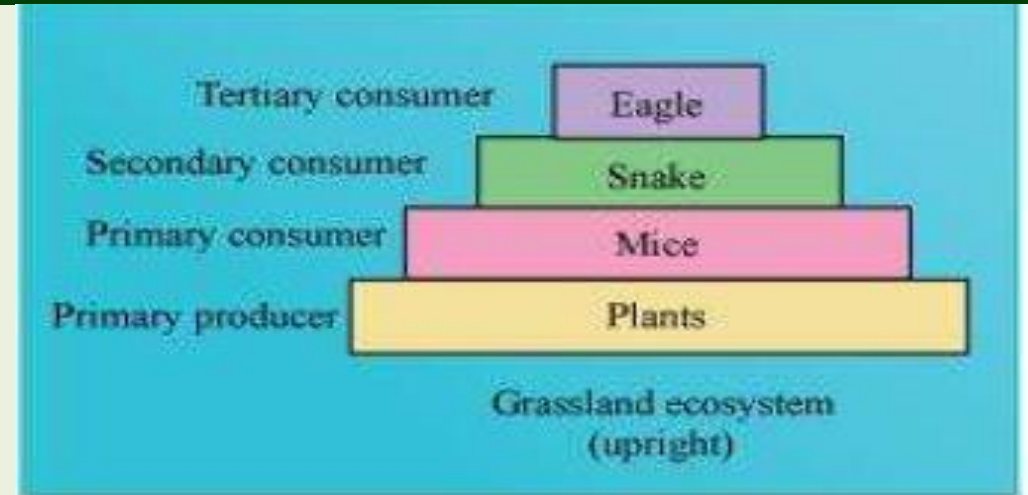


# Ecological Pyramid: Pyramid of number



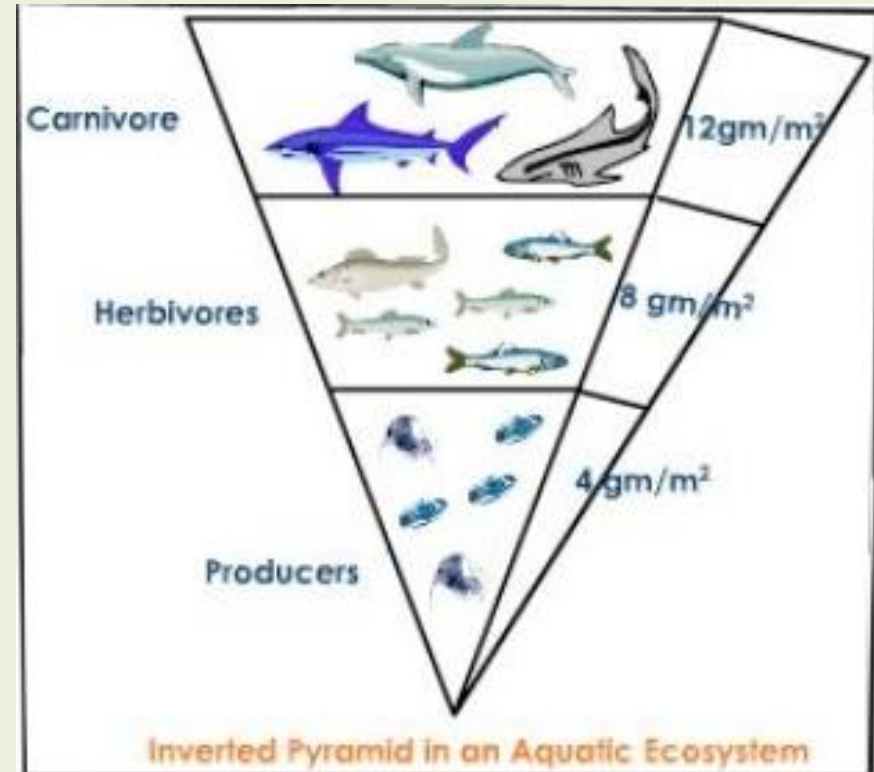
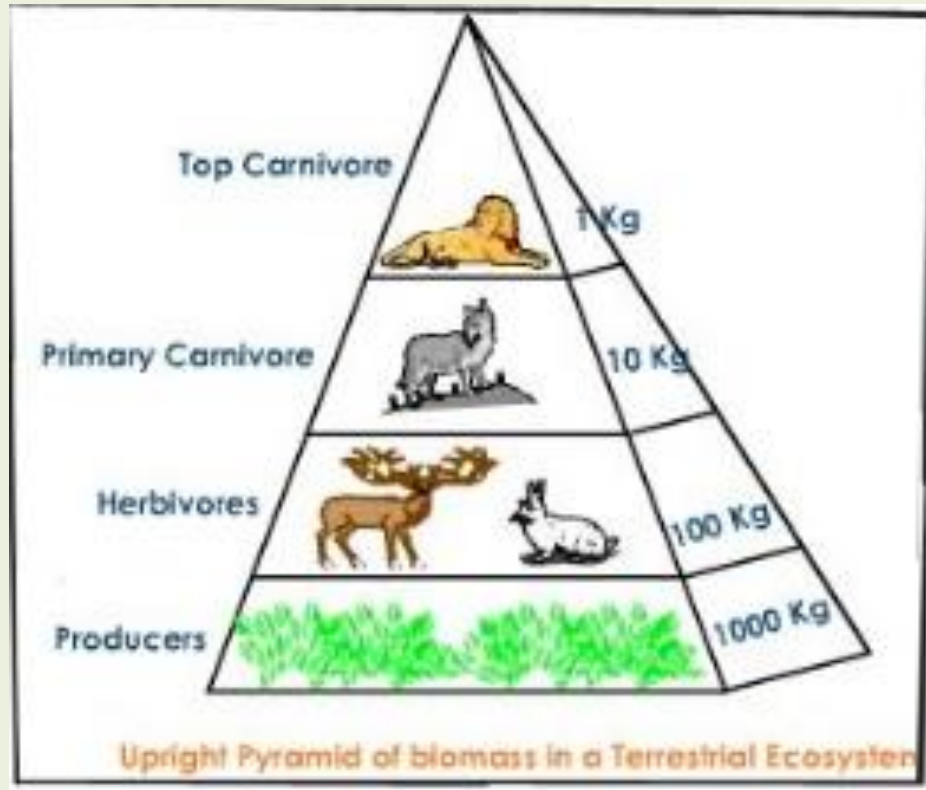
# Ecological pyramids: Pyramid of biomass

- ❑ Pyramid of biomass records the total dry organic matter of organisms at each trophic level in a given area of an ecosystem.
- ❑ The pyramid of biomass is used to show the total biomass of individuals at each trophic level.
- ❑ It is better than the pyramid of number for showing the relationships between organisms.





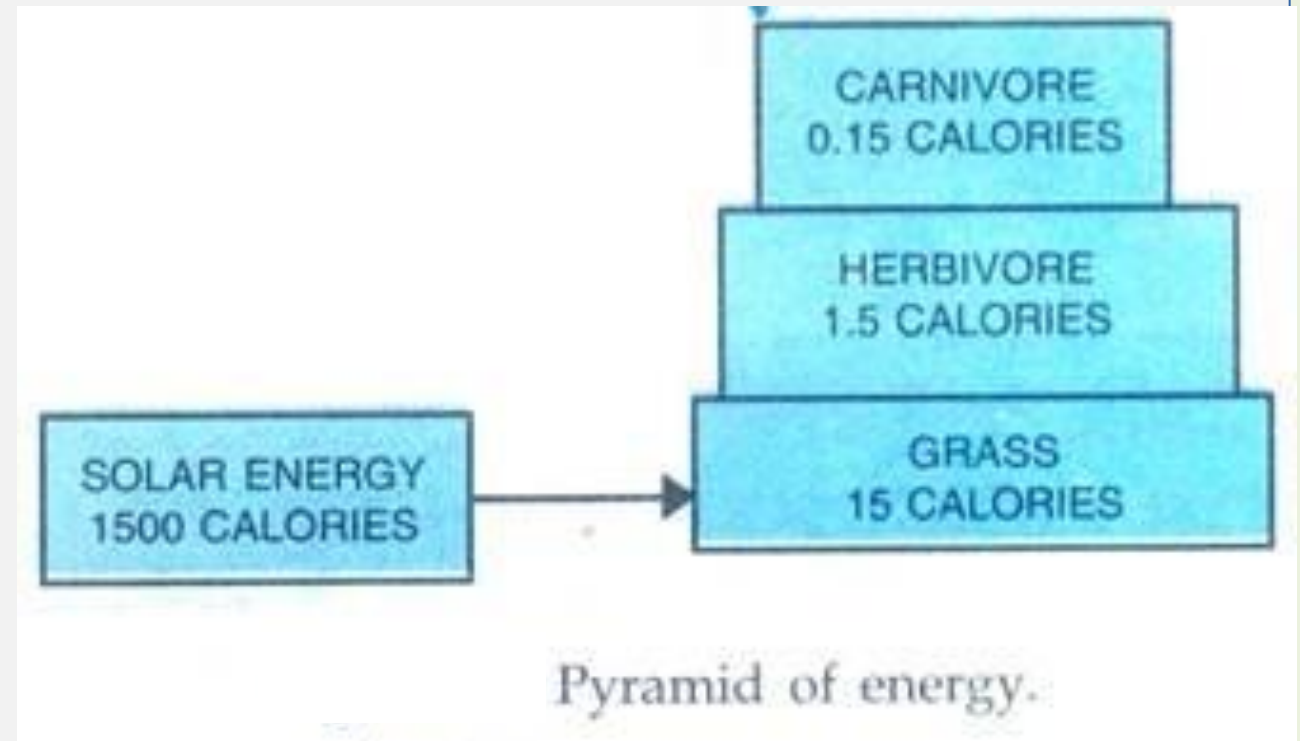
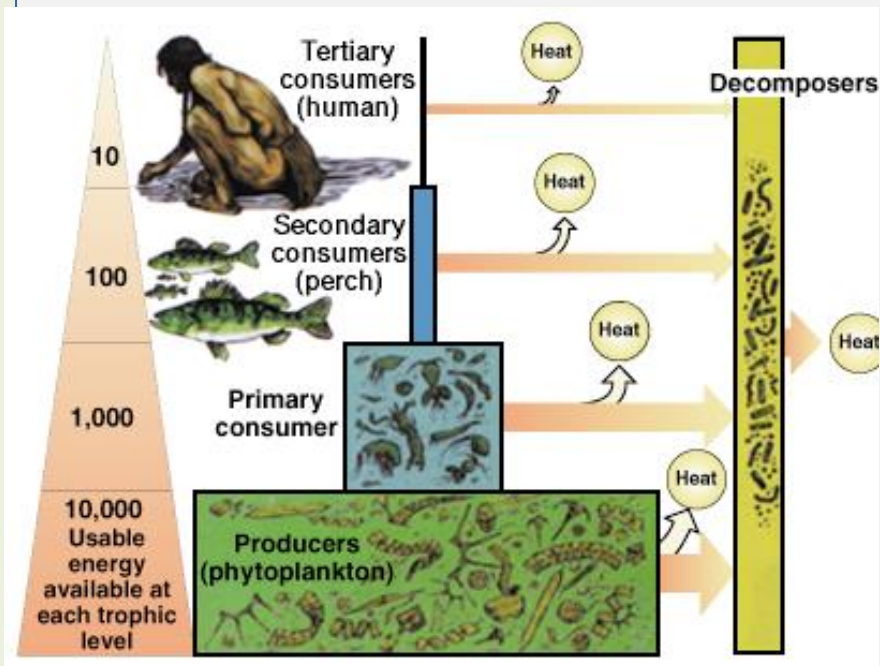
# Ecological pyramids: Pyramid of biomass



# Ecological pyramids: Pyramids of Energy

pyramid of energy is **always upright**

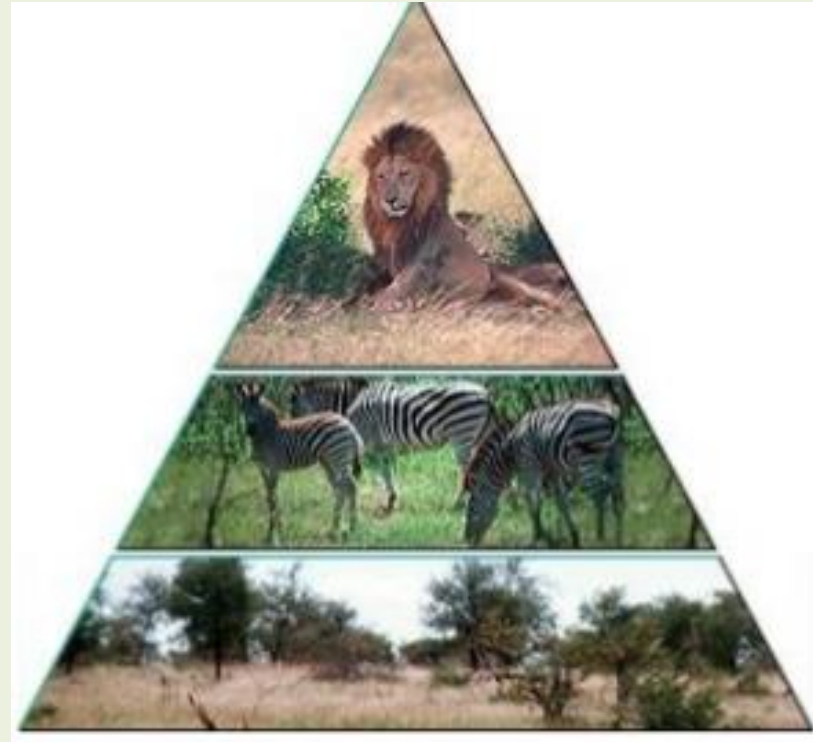
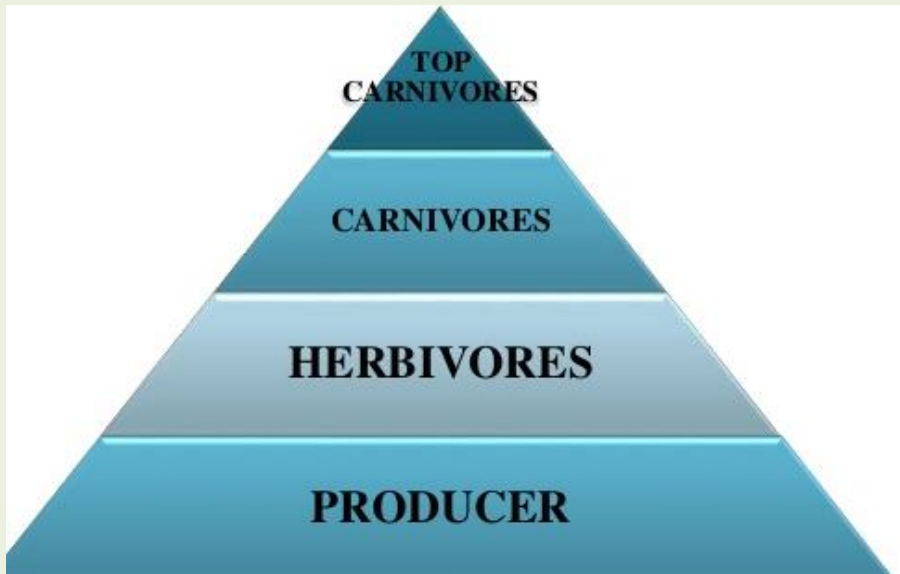
## ■ Pyramid of energy





# Ecological pyramids: Pyramids of Energy

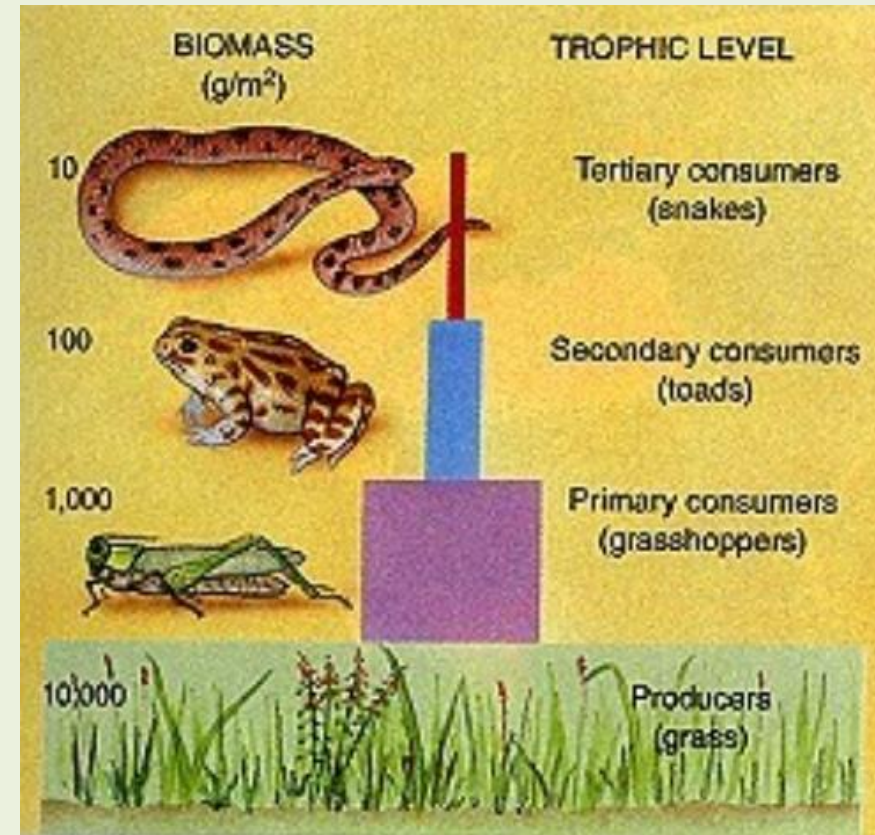
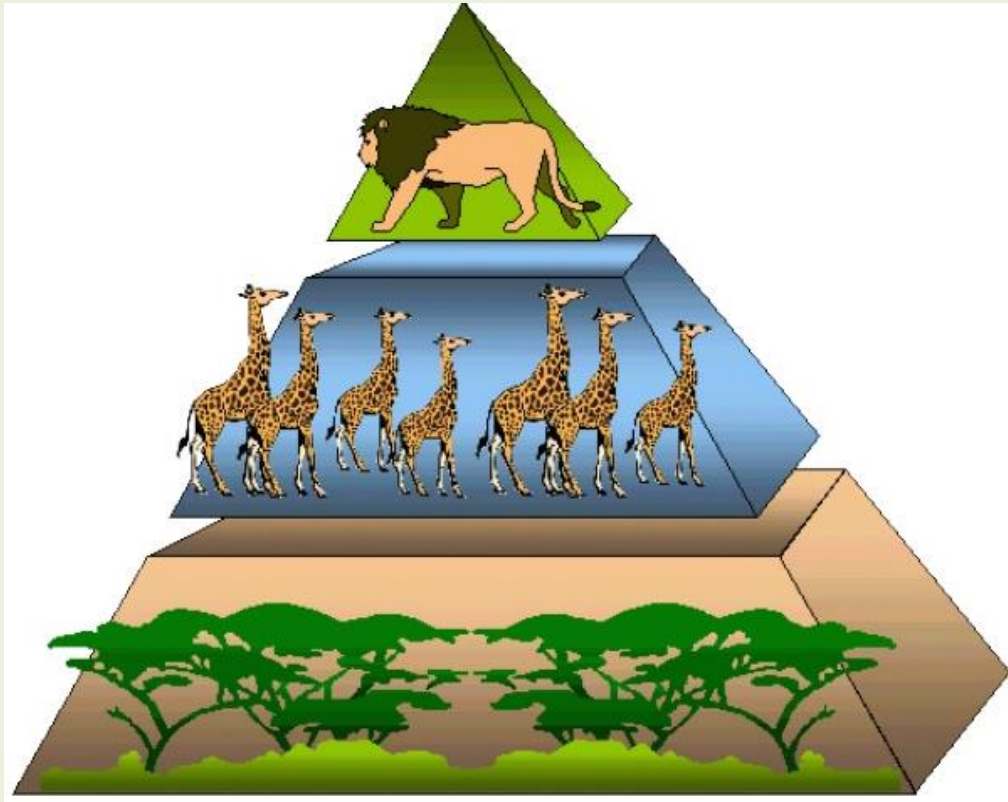
pyramid of energy is **always upright**



Producers are the bottom

# Ecological pyramids: Pyramids of Energy

pyramid of energy is **always upright**





# Production of biomass

- Primary production
  - Biomass production using photosynthesis
- Secondary production
  - Biomass production by consuming producers

## Homeostasis:

The ecosystem , by itself, tries to resist the change and maintain itself in equilibrium.

# Succession

- Ecological succession is the gradual process by which ecosystems change and develop over time.
- It is therefore a series of predictable temporary communities or stages leading up to a climax community.
- Each stage/temporary community is called a successional or seral stage.
- Each step prepares the land for the next successional stage.
- All habitats are in the state of constant ecological succession.
- Ecosystem is continuously changing and reorganizing as well as ecological succession refers to orderly that changes happening in composition or structure of ecosystem