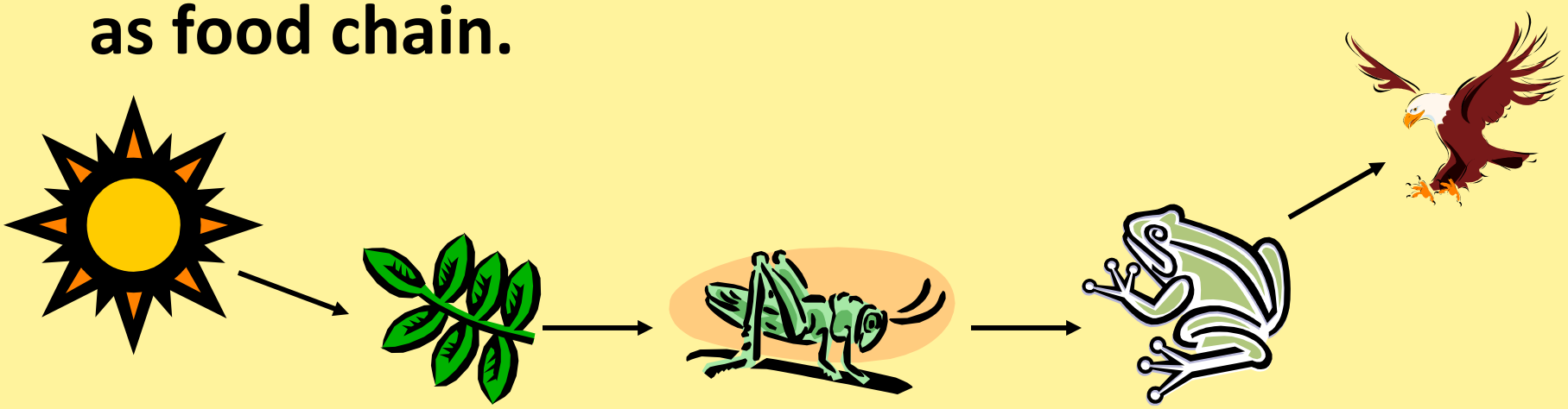
# Food Chain, Food Web & Ecological Pyramids

# FOOD CHAINS

# What is Food Chain?

**Flow of energy in an ecosystem is one way process. The sequence of organism through which the energy flows, is known as food chain.**

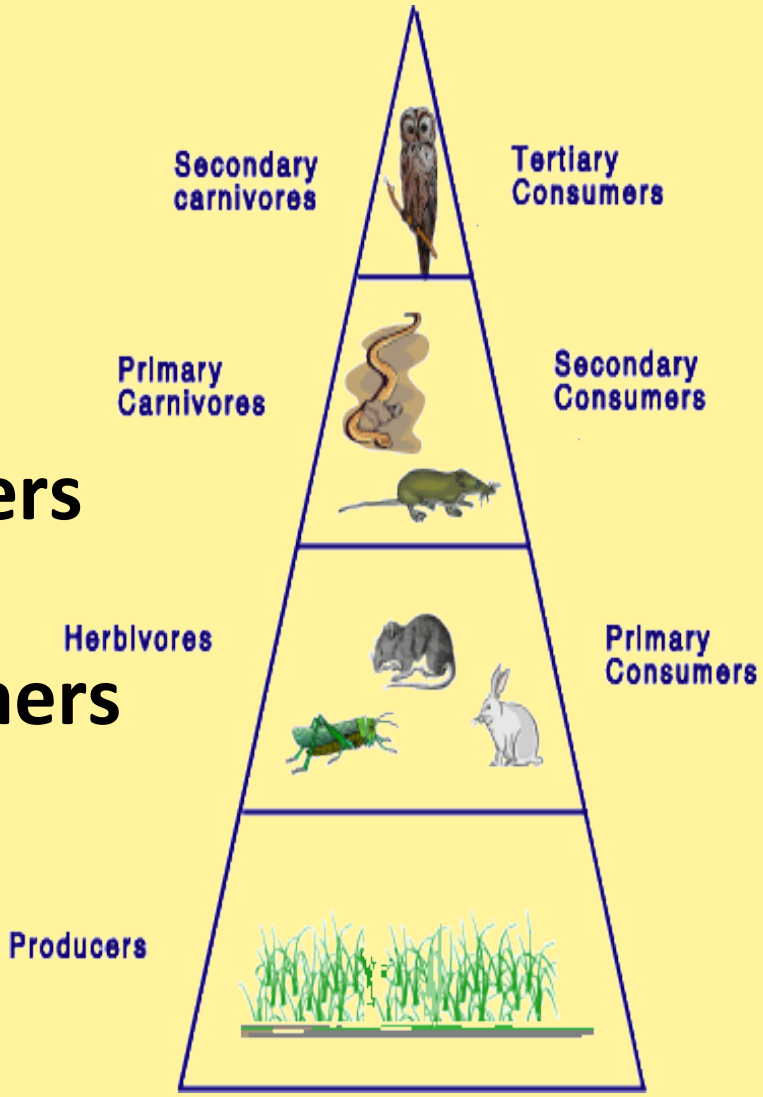


# Important facts

- In a food chain each organism obtains energy from the one at the level below.
- Plants are called **producers** because they create their own food through photosynthesis
- Animals are **consumers** because they cannot create their own food, they must eat plants or other animals to get the energy that they need.

# Tropic levels in a food chain

- Producers
- Consumers
  - (i) Primary consumers
  - (ii) Secondary consumers
  - (iii) Tertiary consumers
  - (iv) Quaternary consumers
- Decomposers



# Types of Food Chain

## (i) Grazing Food Chain

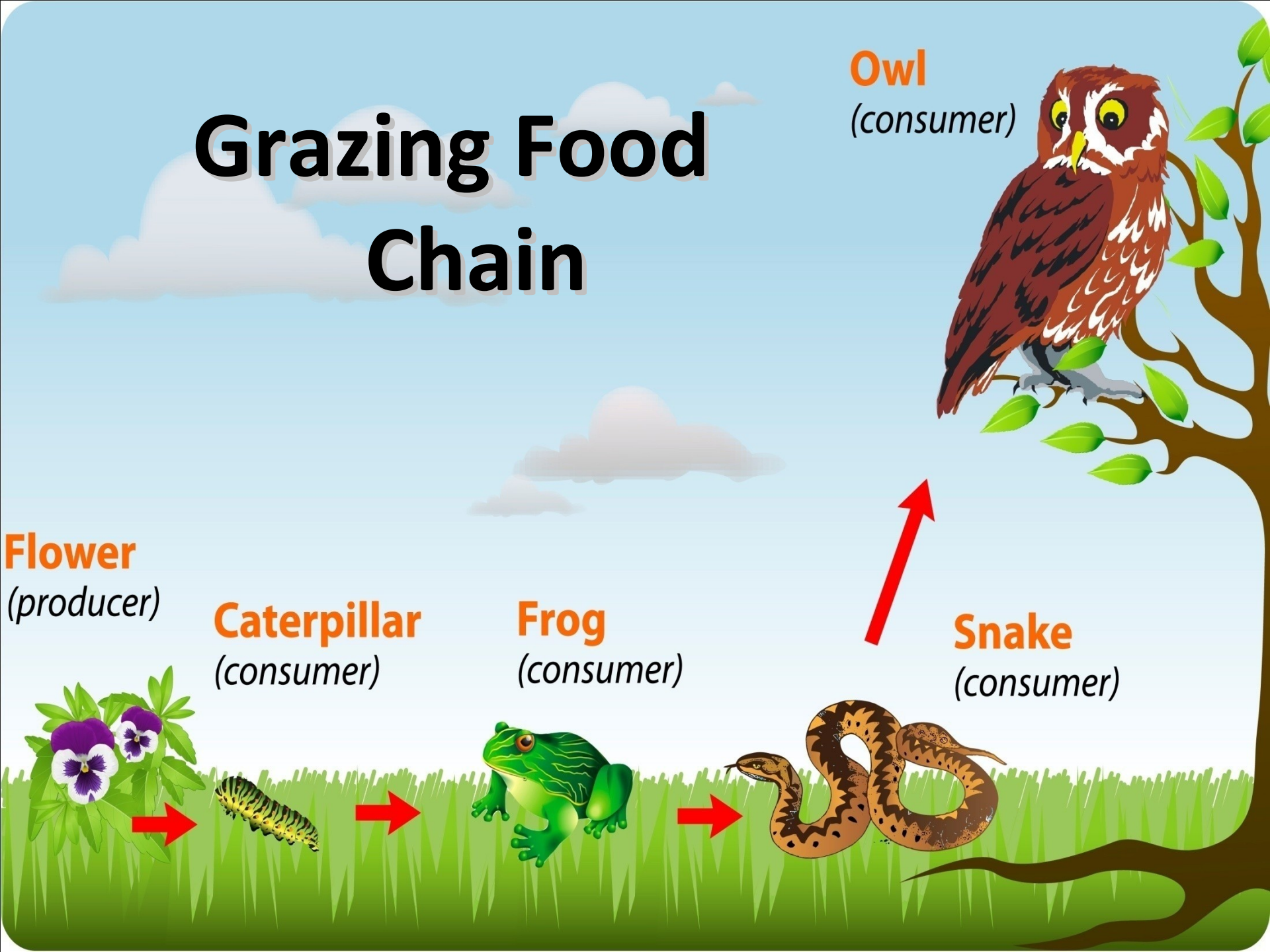
- The consumers utilizing plants as their food , constitute grazing food chain.

- This food chain begins from green plants and the primary consumer is herbivore.

- Most of the ecosystem in nature follows this type of food chain.

Ex: grass => grasshopper => birds => falcon

# Grazing Food Chain



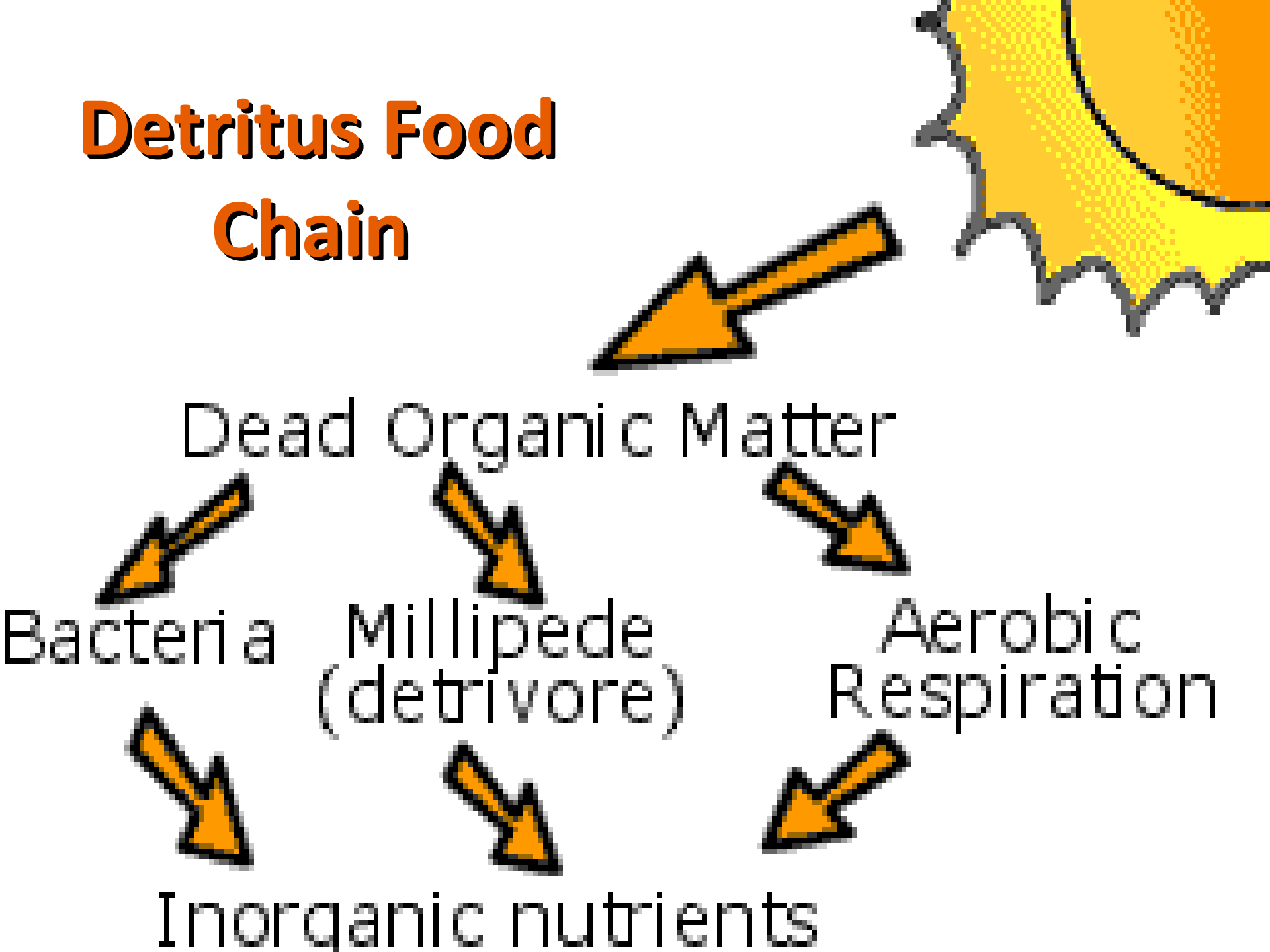
## (ii) Detritus food chain

- This type of food chain starts from dead organic matter of decaying animals and plant bodies to the micro-organisms and then to detritus feeding organism and to other predators.

- The food chain depends mainly on the influx of organic matter produced in another system.

- The organism of the food chain includes algae, bacteria, fungi, protozoa, insects, nematodes etc.

# Detritus Food Chain



# Significance of Food Chain

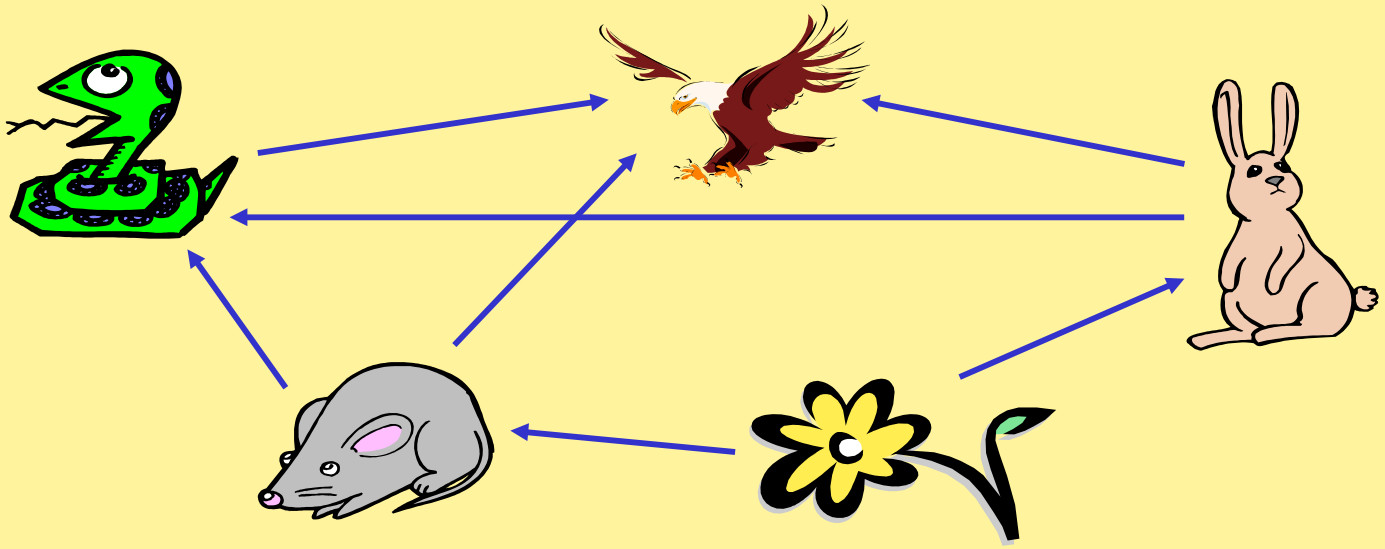
- The knowledge of food chain helps in understanding the feeding relationship as well as the interaction between organism and ecosystem.
- It also help in understanding the mechanism of energy flow and circulation of matter in ecosystem.
- It also helps to understand the movement of toxic substance and the problem associated with biological magnification in the ecosystem.


FOOD WEBS

# What is food web?

Food web can be defined as, "a network of food chains which are interconnected at various tropic levels, so as to form a number of feeding connections amongst different organisms of a biotic community".

It is also known as consumer-resource system.



# Important facts

- A **node** represents an individual species, or a group of related species or different stages of a single species.

- A **link** connects two nodes. Arrows represent links, and always go from prey to predator.

- The lowest tropic level are called **basal species**.

- The highest tropic level are called **top predators**.

- Movement of nutrients is cyclic but of energy is unidirectional and non-cyclic.

# Types of food web representation

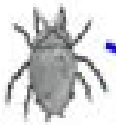
| | |
|---|---|
| TOPOLOGICAL WEBS | • These food webs simply indicate a feeding relationship. |
| FLOW WEBS | • Bio-energetic webs, or flow webs, include information on the strength of the feeding interaction. |
| INTERACTION WEB | • In interaction the arrows show how one group influences another. |

# Different food webs

- Soil food web
- Aquatic food web
- Food web in forest
- Food web of grassland
- Food web in terrestrial and aquatic ecosystem

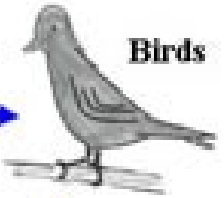
# The Soil Food Web

Nematodes - root feeders.

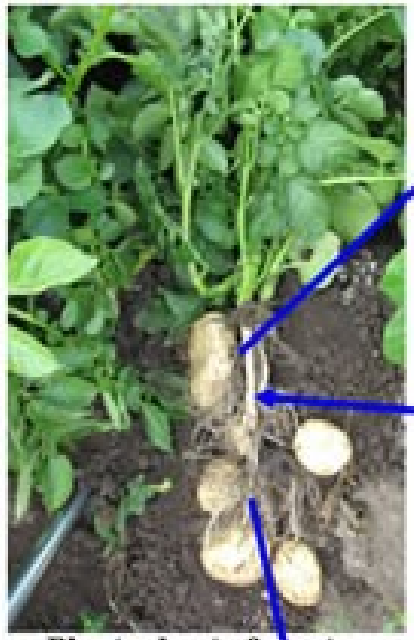


Arthropods - shredders

Arthropods - predators



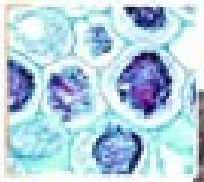
Birds



Plants shoots & roots.

Nematodes - fungal/bacterial feeders

Mycorrhizae

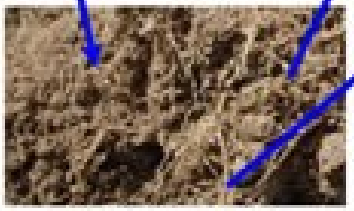


Fungi

Nematodes - Predators

Protozoa

Bacteria

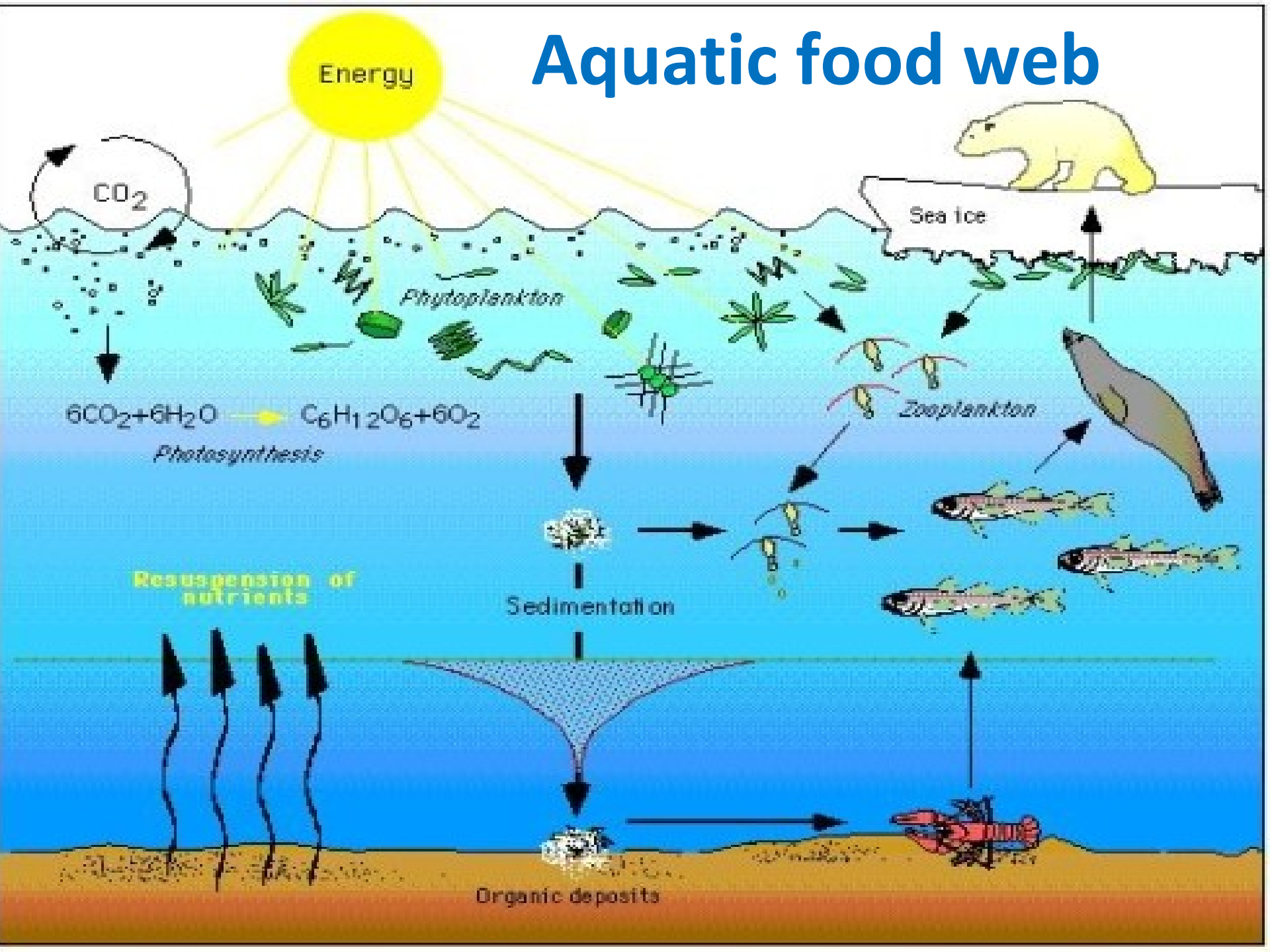


Organic matter

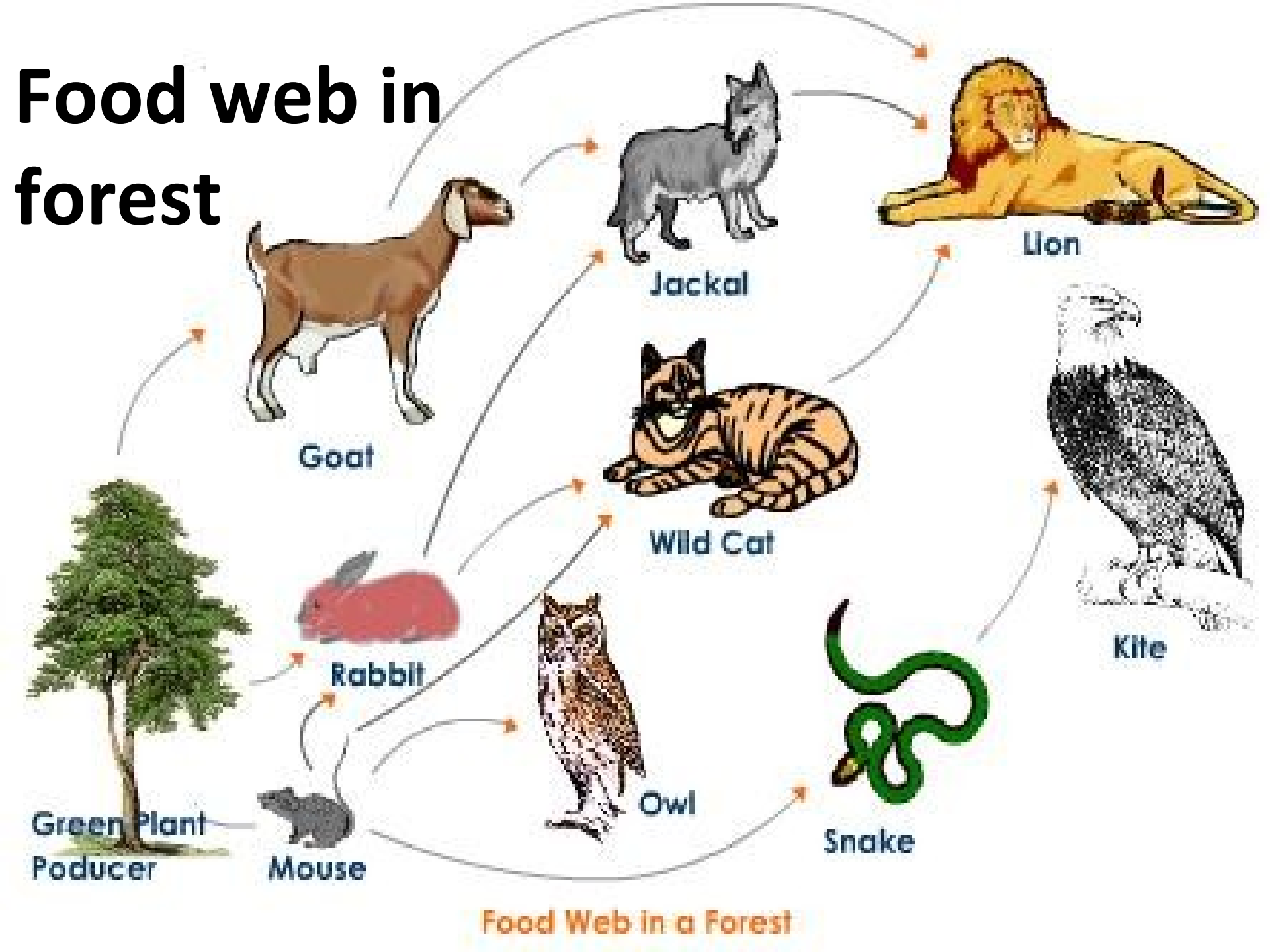
Earthworms

Animals

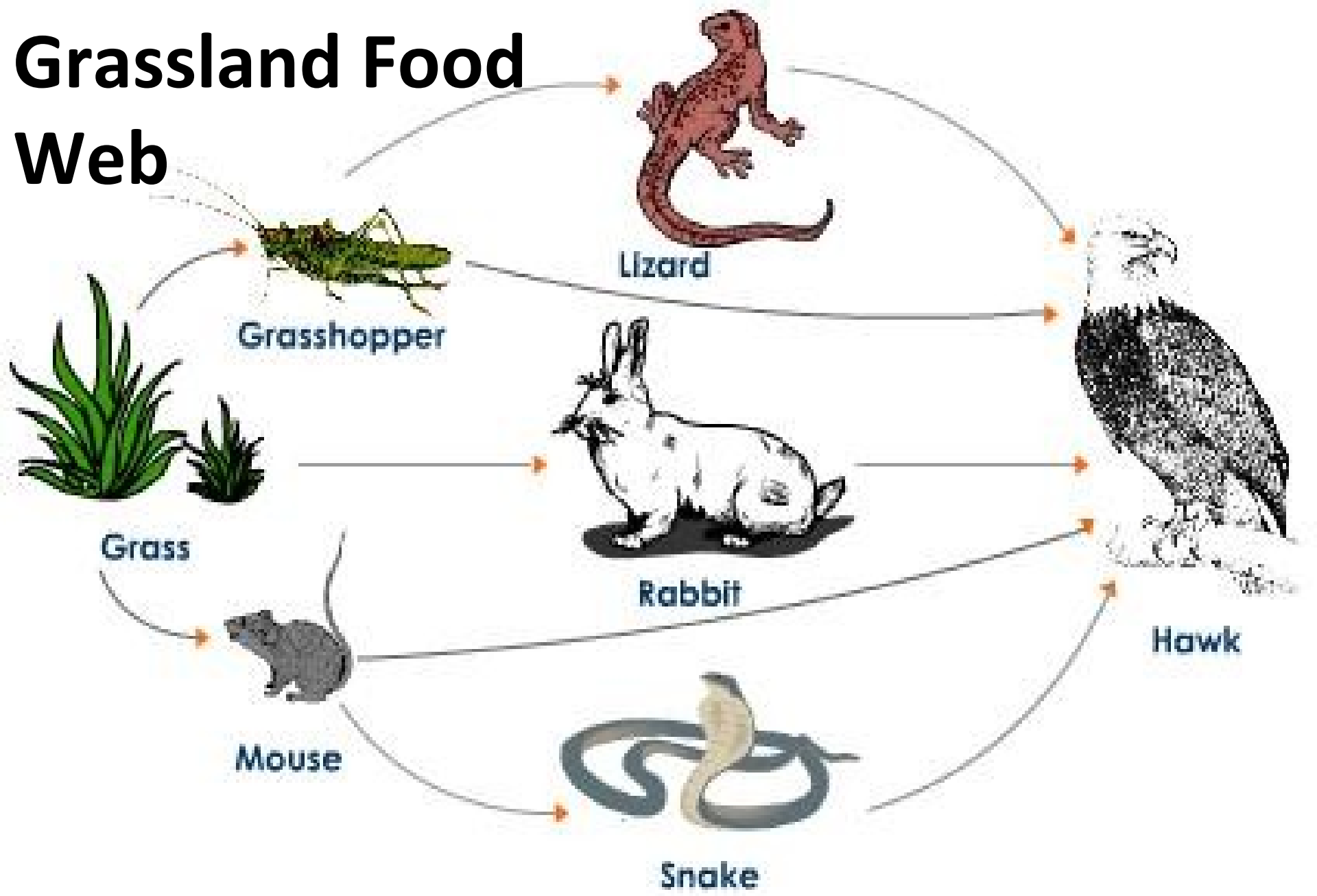
# Aquatic food web



# Food web in forest

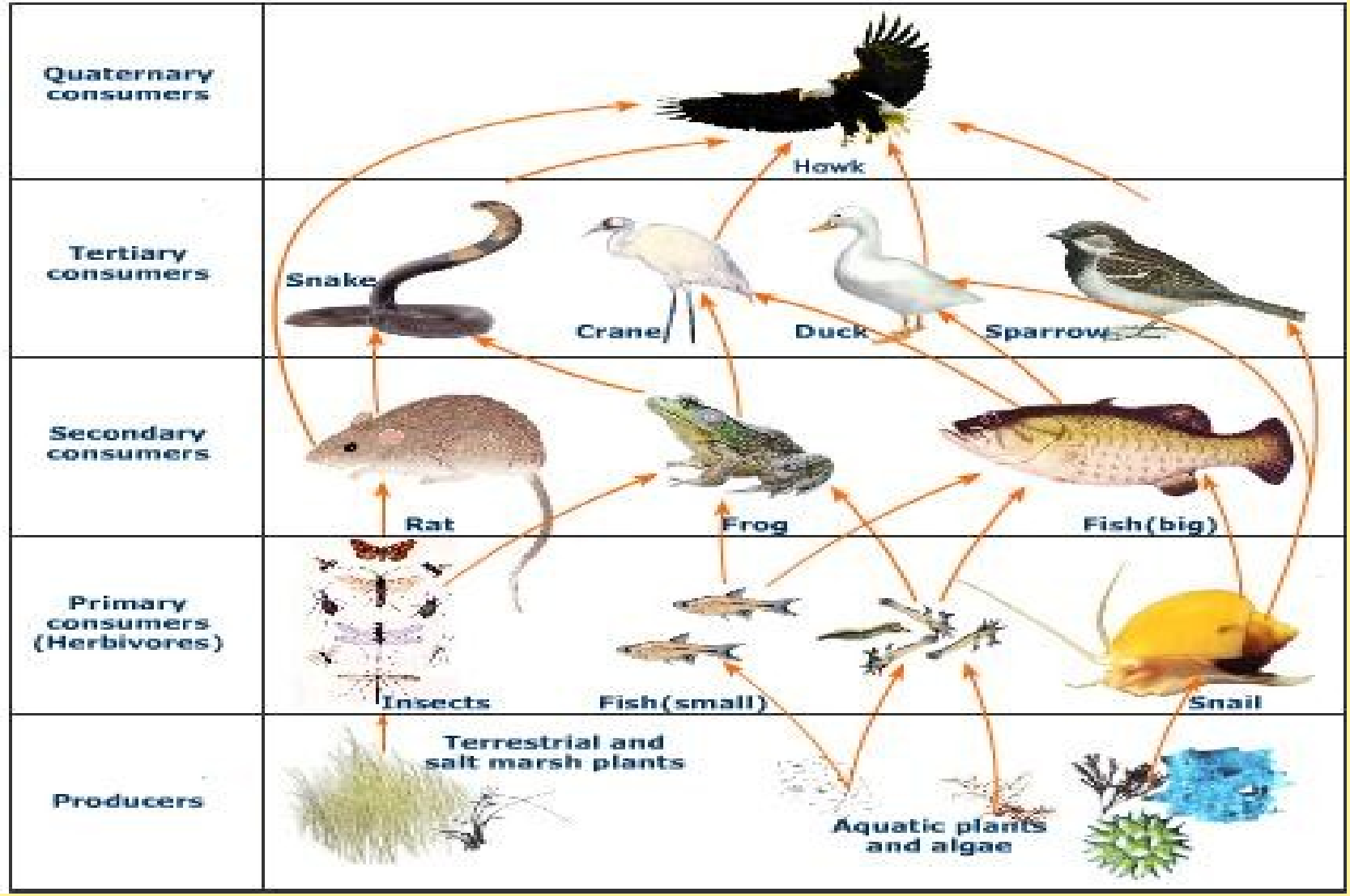


# Grassland Food Web




A Food Web in a Grassland Ecosystem With Five Possible Food Chains

# Food web in terrestrial and aquatic ecosystem



# Significance of Food Web

- Food webs distinguish levels of producers and consumers by identifying and defining the importance of animal relationships and food sources, beginning with primary producers such as plants, insects and herbivores.

- Food webs are important tools in understanding that plants are the foundation of all ecosystems and food chains, sustaining life by providing nourishment and oxygen needed for survival and reproduction.

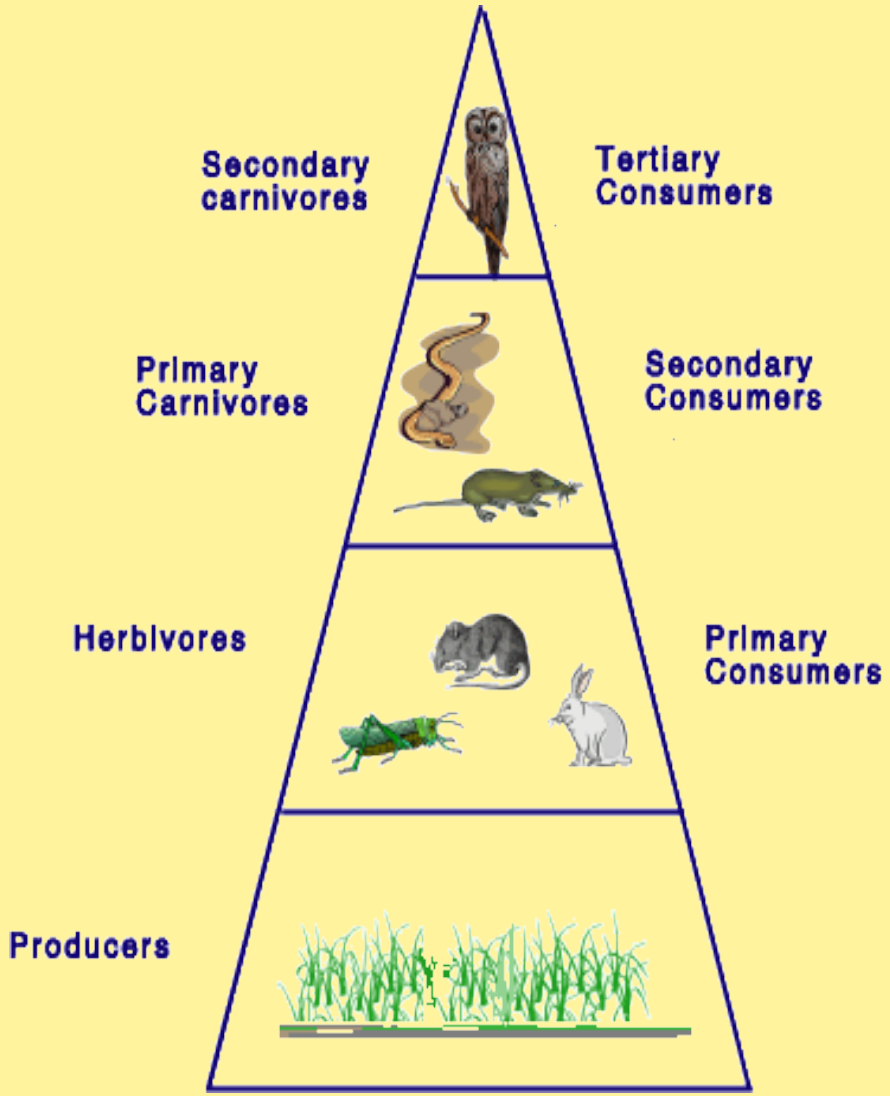
- The food web provide stability to the ecosystem.


ECOLOGICAL PYRAMIDS

# What are Ecological Pyramids?

- Ecological pyramids are graphical representations of the tropic structure ecosystem.

- Tropic levels are the feeding positions in a food chain such as primary producers, herbivores, primary carnivore etc.



# Types of Ecological Pyramid

Three types of ecological pyramids can usually be

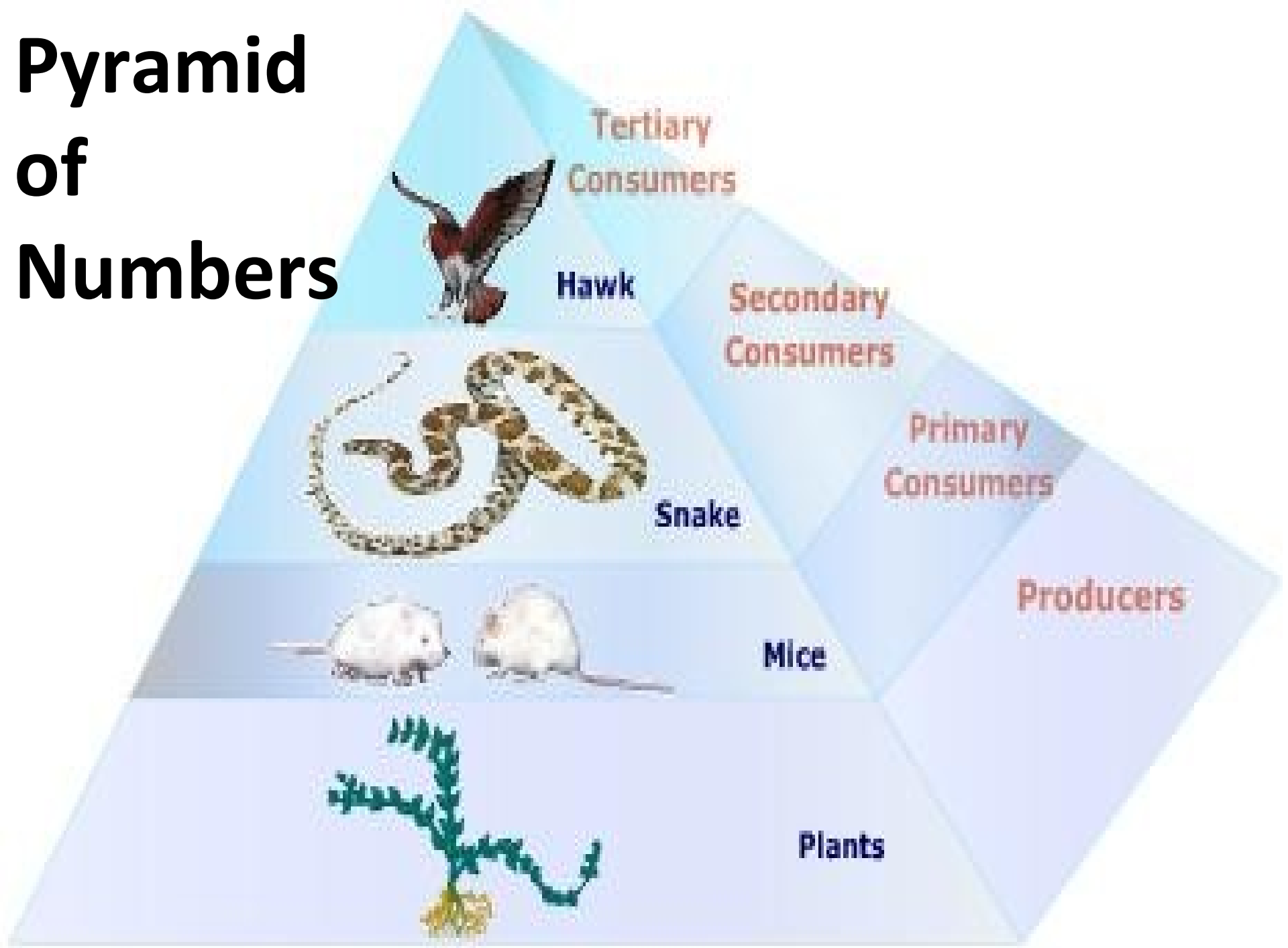
distinguished namely:

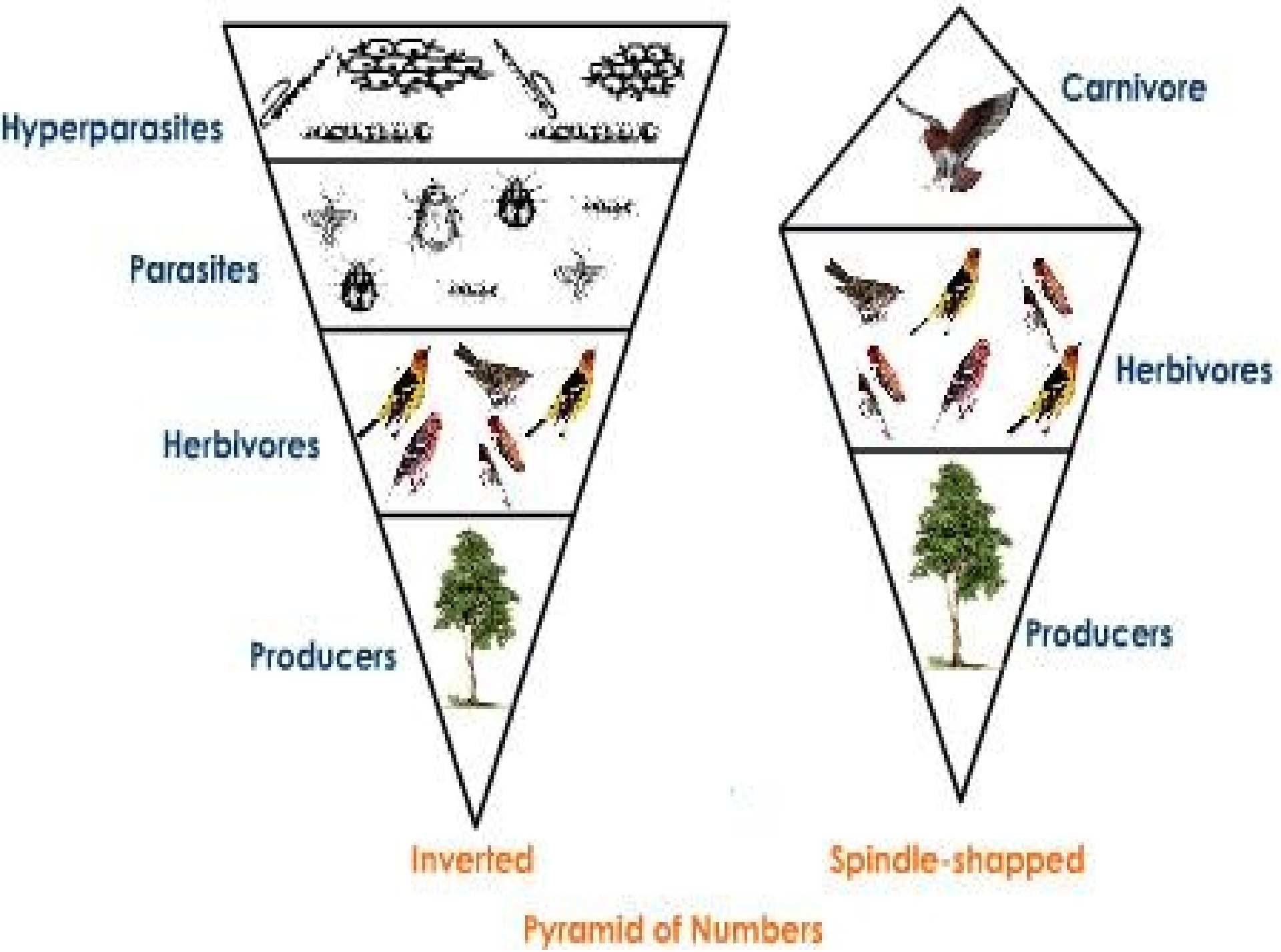
- Pyramid of numbers
- Pyramid of biomass
- Pyramid of productivity

# Pyramid of Numbers

- It is the graphic representation of number of individuals per unit area of various tropic levels.
- Large number of producers tend to form the base.
- Lower numbers of top carnivores occupy the tip

# Pyramid of Numbers




Hyperparasites
Parasites
Herbivores
Producers
Inverted
Carnivore
Herbivores
Producers
Spindle-shapped
Pyramid of Numbers

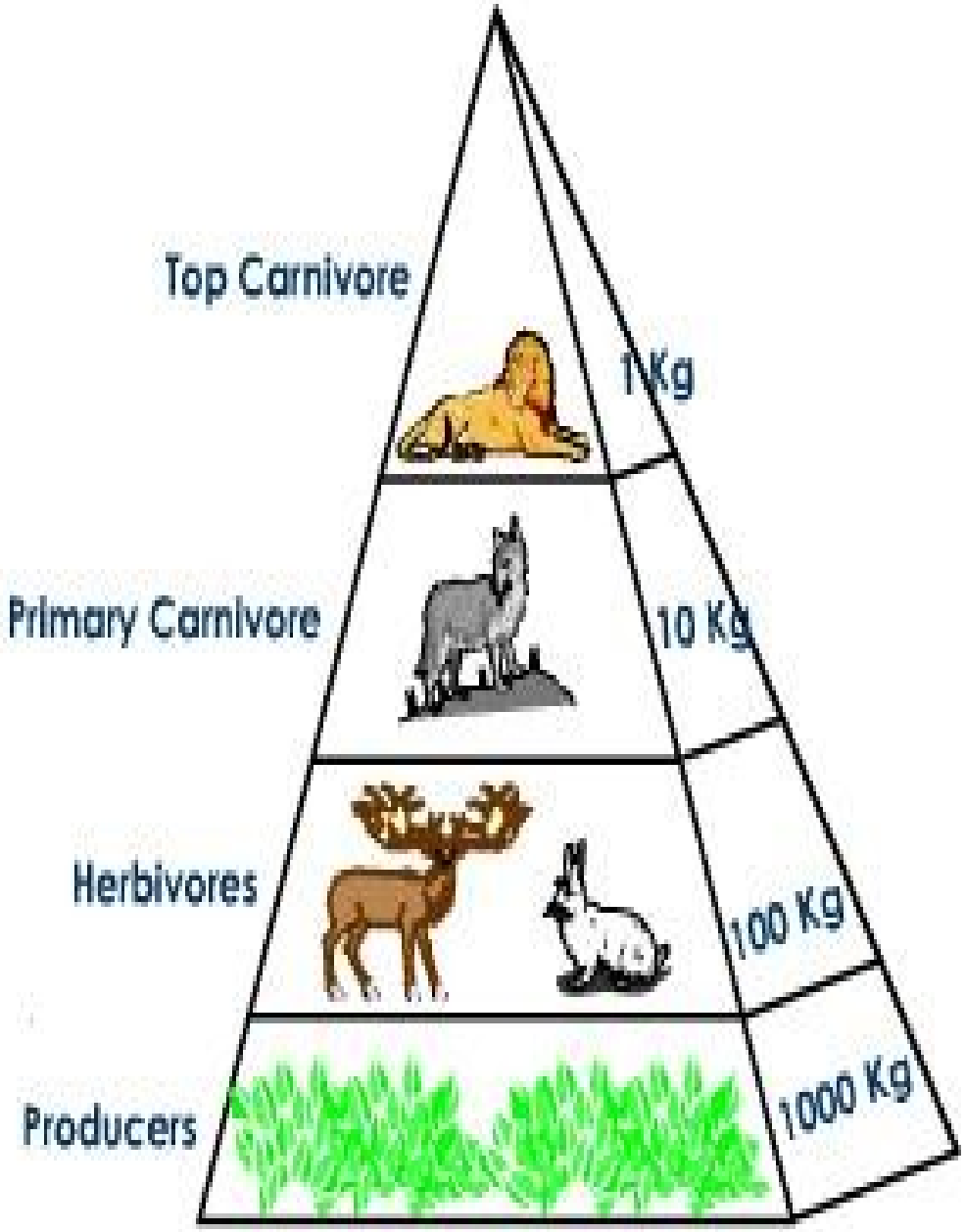
# Evaluating pyramid of numbers

| ADVANTAGES | DISADVANTAGES |
| --- | --- |
| Simple method of giving an overview | Number of specific species may be too great to measure accurately |
| Good for comparing changes to the ecosystem at different times | Does not take into account “juveniles” or immature forms |
| | All organisms are included regardless of size |

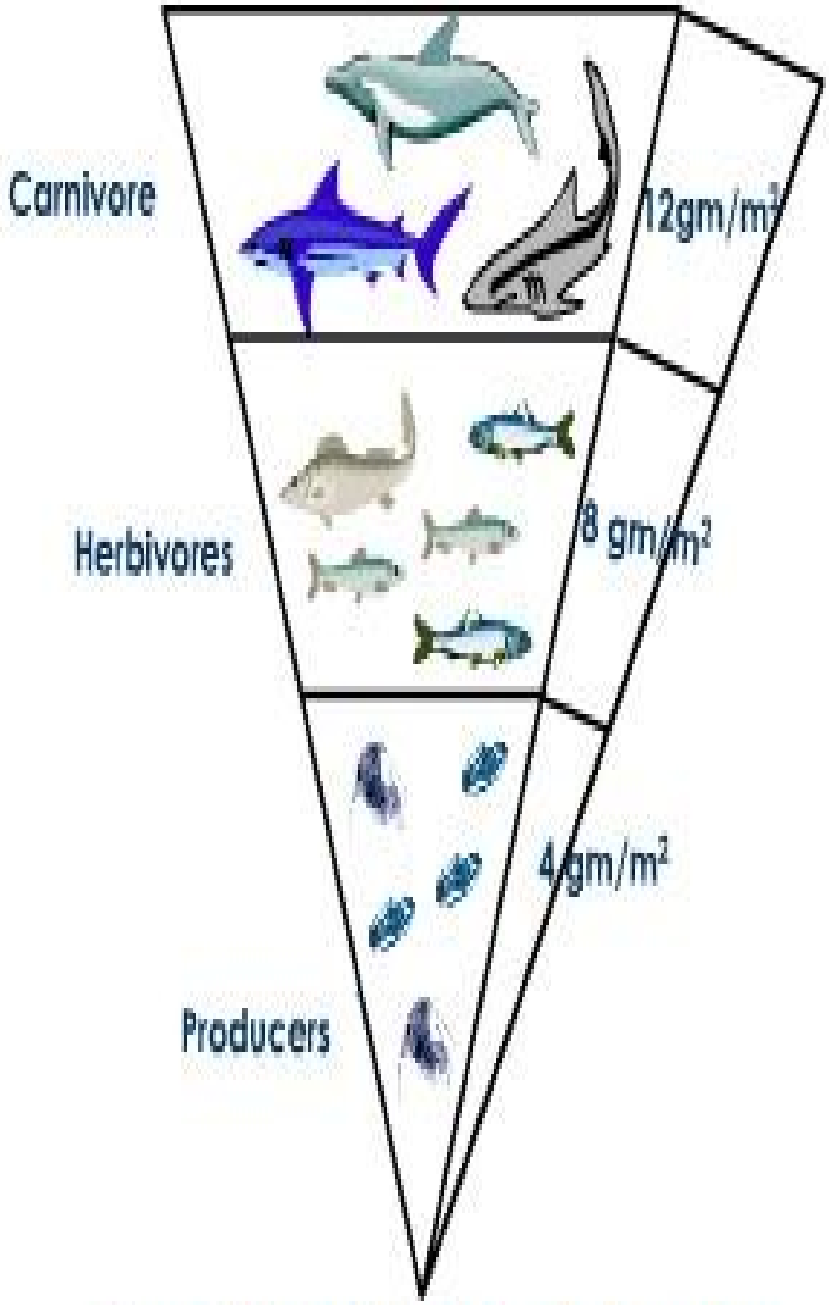
# Pyramid of biomass

- It is the graphical representation of biomass present per unit area at different tropic levels, with producers at the base and carnivores at the top.

- Biomass is calculated as
  mass of each individual X no. of individual at tropic levels




Upright Pyramid of biomass in a Terrestrial Ecosystem




Inverted Pyramid in an Aquatic Ecosystem

# Evaluating pyramid of biomass

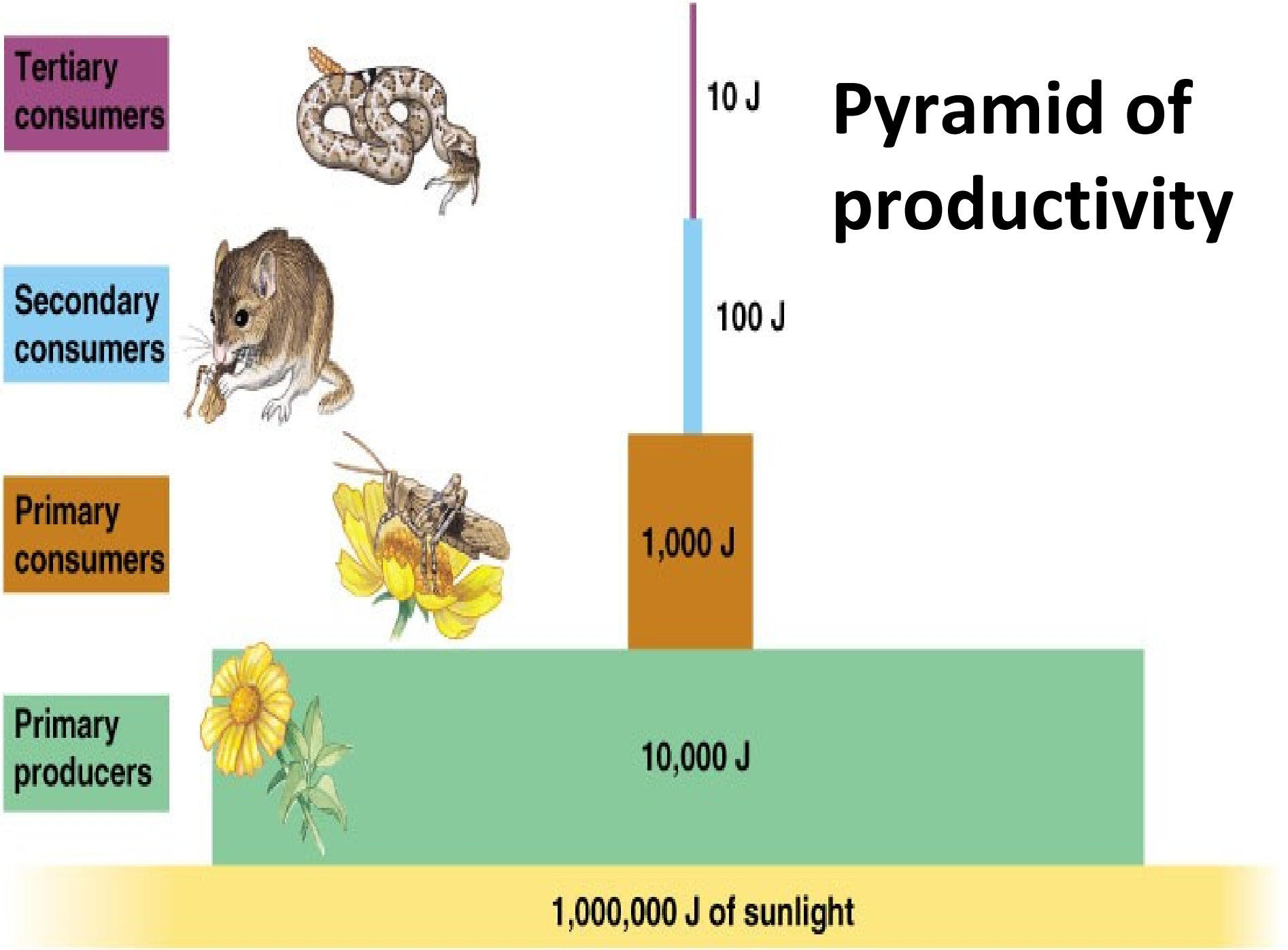
| ADVANTAGES | DISADVANTAGES |
| --- | --- |
| Overcomes the problems of pyramids of number | Only uses samples for population so difficult to measure biomass exactly |
| | Time of year influences result |
| | Organisms of same size do not necessarily have the same energy content |

# Pyramid of productivity

- Pyramid of productivity is a graphical representation of the flow of energy through each tropic level of a food chain over a fixed time period.

- The input of solar energy may be indicated by adding an extra to the base.

# Pyramid of productivity



# Evaluating pyramid of productivity

| ADVANTAGES | DISADVANTAGES |
| --- | --- |
| No inverted pyramids are obtained | It is difficult and cumbersome to collect energy data |
| Shows actual energy transfer | Problem occurs in assigning a species to a specific tropic level |
| Can be compared different ecosystems based on relative energy transfer | |

# Disturbances in ecosystem

- **Bioaccumulation** - When plants / animals take up a chemical from the environment and do not excrete it,the chemical builds up in the organism over time to a potentially lethal level.
- **Biomagnification** - Refers to the sequence of processes that results in higher concentrations of the chemical in organisms at higher levels in the food chain. The concentration of the chemical may not affect lower levels of the food chain but the top levels take in so much it can cause disease or death.
- **Extinction of species** – Due to decrease in population of various species the balance of various tropic levels is disturbed as a result some levels have more accumulation of species while others have very less population.


Made by:
6. Sakshee Bhaiswar
8. Shivani Hurkat
9. Sneha Dongarwar


Thank you ...