

Contents

- Food Chain,
- food web
- Ecological Pyramids

The function of an ecosystem can be studied under the three heads.

1. **Trophic Level Interaction** - gives idea about the energy flow through the ecosystem.

2. **Ecological Succession** - deals with the changes in features/members of an ecosystem over a period of time

3. **Biogeochemistry Trophic Level** - focused upon the cycling of essential materials in an ecosystem.

❑ Trophic Level Interaction -. Three concepts

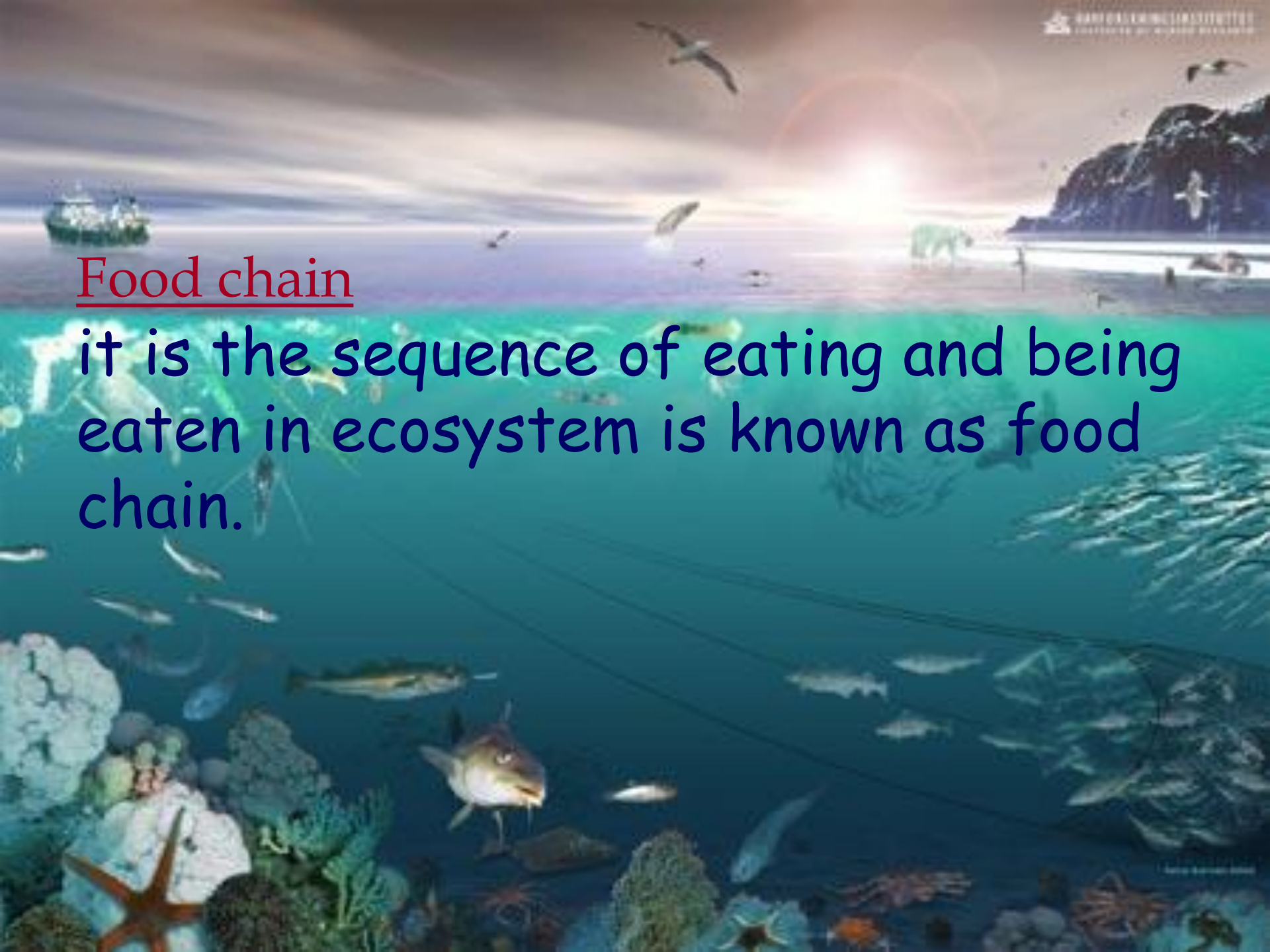
➤ **Food Chain**

➤ **Food Web**

➤ **Ecological Pyramids**

Food chain

it is the sequence of eating and being eaten in ecosystem is known as food chain.



- ❑ A food chain may be defined as, “ the transfer of energy and nutrients through a series of organisms with repeated process of eating and being eaten”.
- ❑ In an ecosystem, all the organisms are linked together with one another by food relationship.
- ❑ Each organism living or dead is potential food for some other organism.

Examples

- Grass → grasshopper → Frog → Snake → Hawk (Grassland ecosystem)
- Phytoplanktons → water fleas → small fish → Tuna (Pond ecosystem)
- Lichens → reindeer → Man (Arctic tundra)

FOOD CHAIN

OWL
(Consumer)



FLOWER
(Producer)



CATERPILLAR
(Consumer)

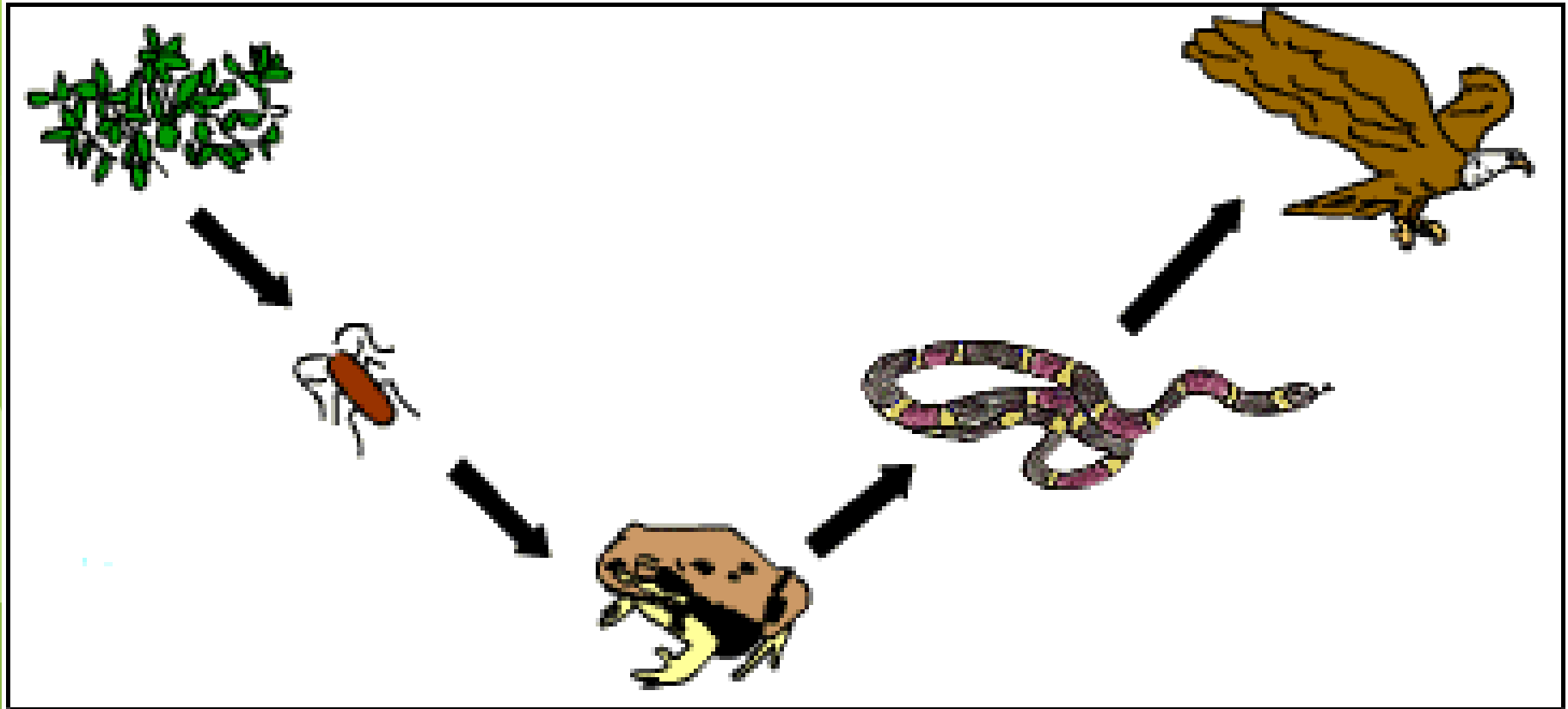
FROG
(Consumer)



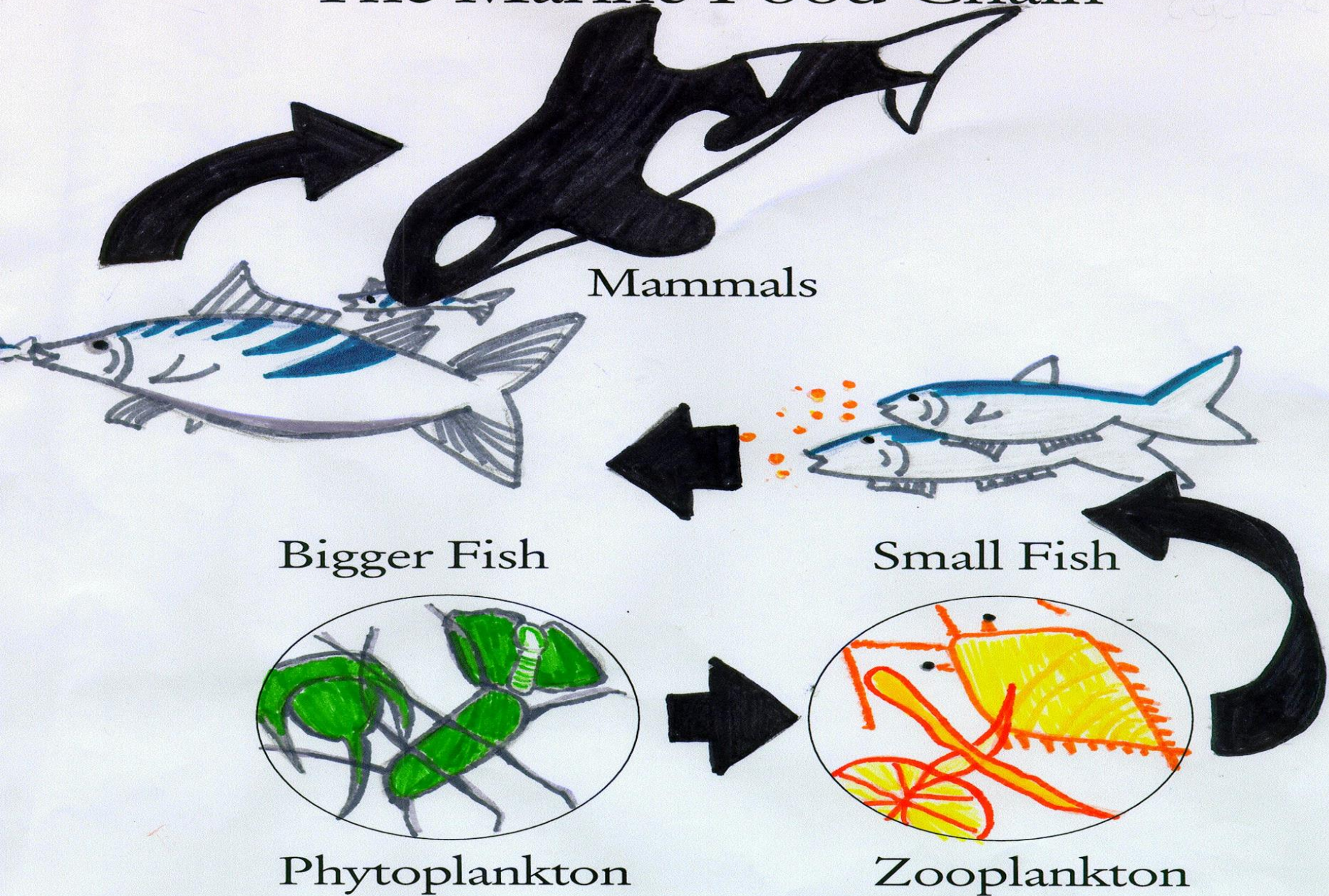
SNAKE
(Consumer)



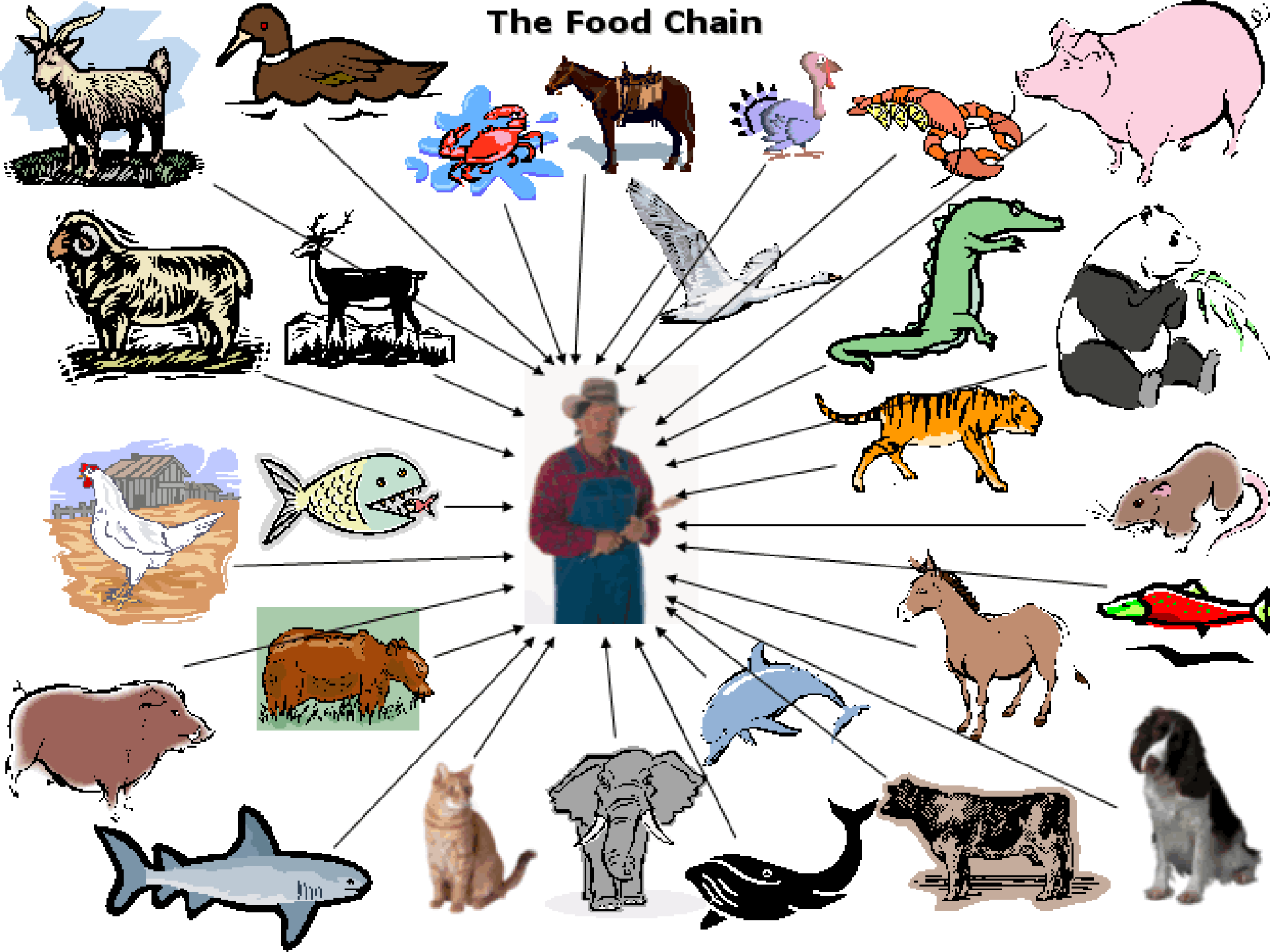
Food Chains



The Marine Food Chain



The Food Chain

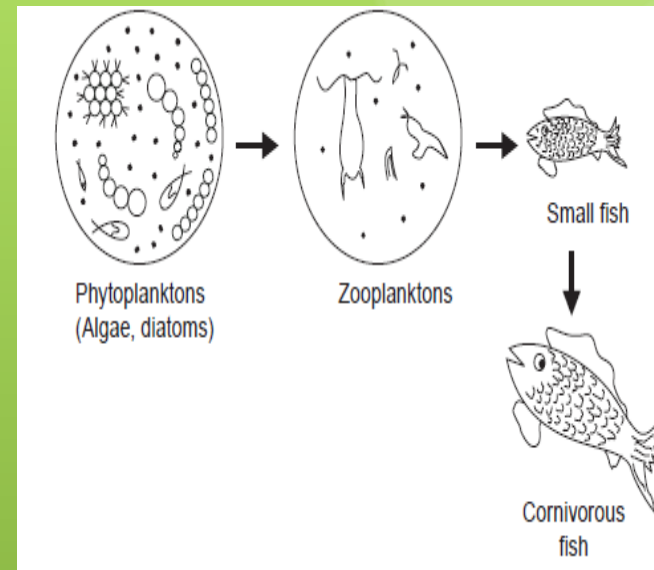


Types of food chains

- 1. Grazing Food chain
- 2. Detritous Food chain

Grazing Food chain

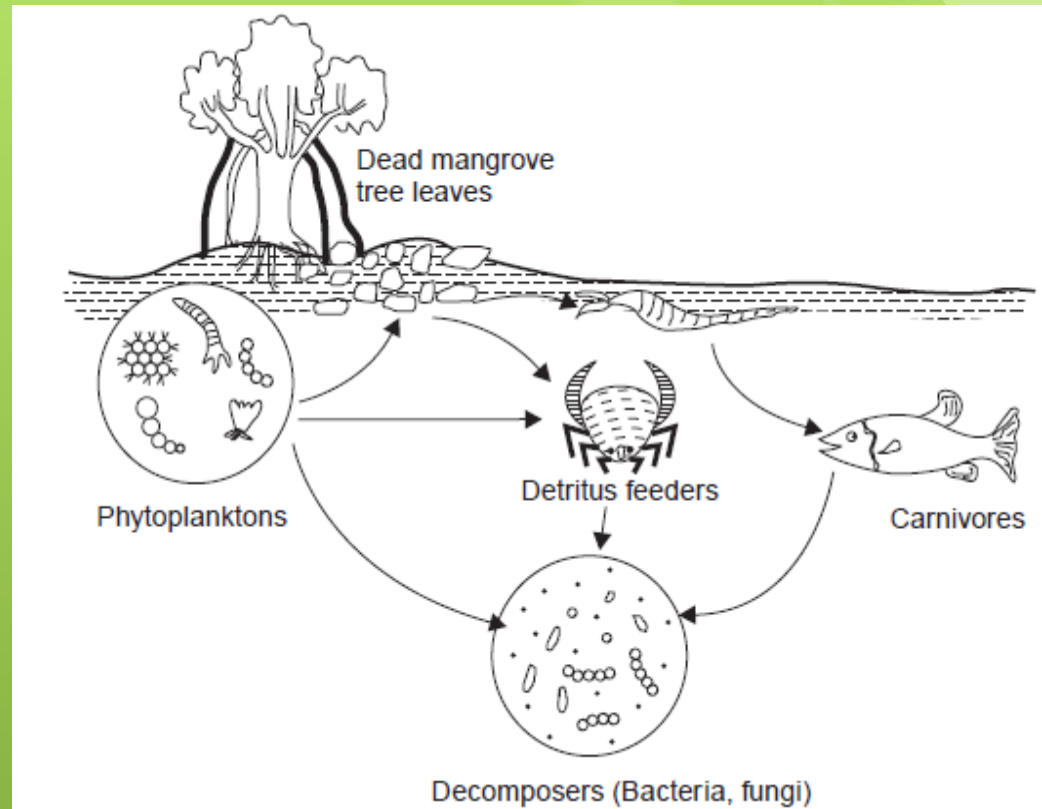
- It starts with green plants and culminates in carnivores.



Grass → Rabbit → Fox

Detritous Food chain

- It starts with dead organic matter which the detritivores and decomposers consume. Partially decomposed dead organic matter and even the decomposers are consumed by detritivores and their predators



Decomposers Vs. Detritivores?

- ❑ They actually are different, even though this difference is slight.
- ❑ Detritivores are organisms that feed on decomposing organic matter [ex: poop (fecal matter), leaf litter, detritus (marine snow)].
- ❑ Decomposers are organisms that consume **ONLY** dead organisms.

Decomposers Vs. Detritivores?

- ❑ detritivore feeds on large parts of decaying plant, animal matter, and on waste material.
- ❑ A decomposer consumes and breaks down dead organisms or waste matter into simple substances.

- ❑ They both get nutrition from dead organic matter.
- ❑ The difference is that **detritivores actually eat the organic matter** (like earthworms eating their way through the soil) **e.g. beetles, termites, ants, crabs, earthworms etc**

And

- ❑ **decomposers secrete enzymes to digest the organic matter and then absorb the resulting molecules (like bacteria or fungi do).**

❑ **Decomposers**: absorb nutrients on a molecular scale. They derive their nutrition by breaking down the complex organic molecules to simpler organic compounds and **ultimately into inorganic nutrients**. **Various bacteria and fungi** are decomposers.

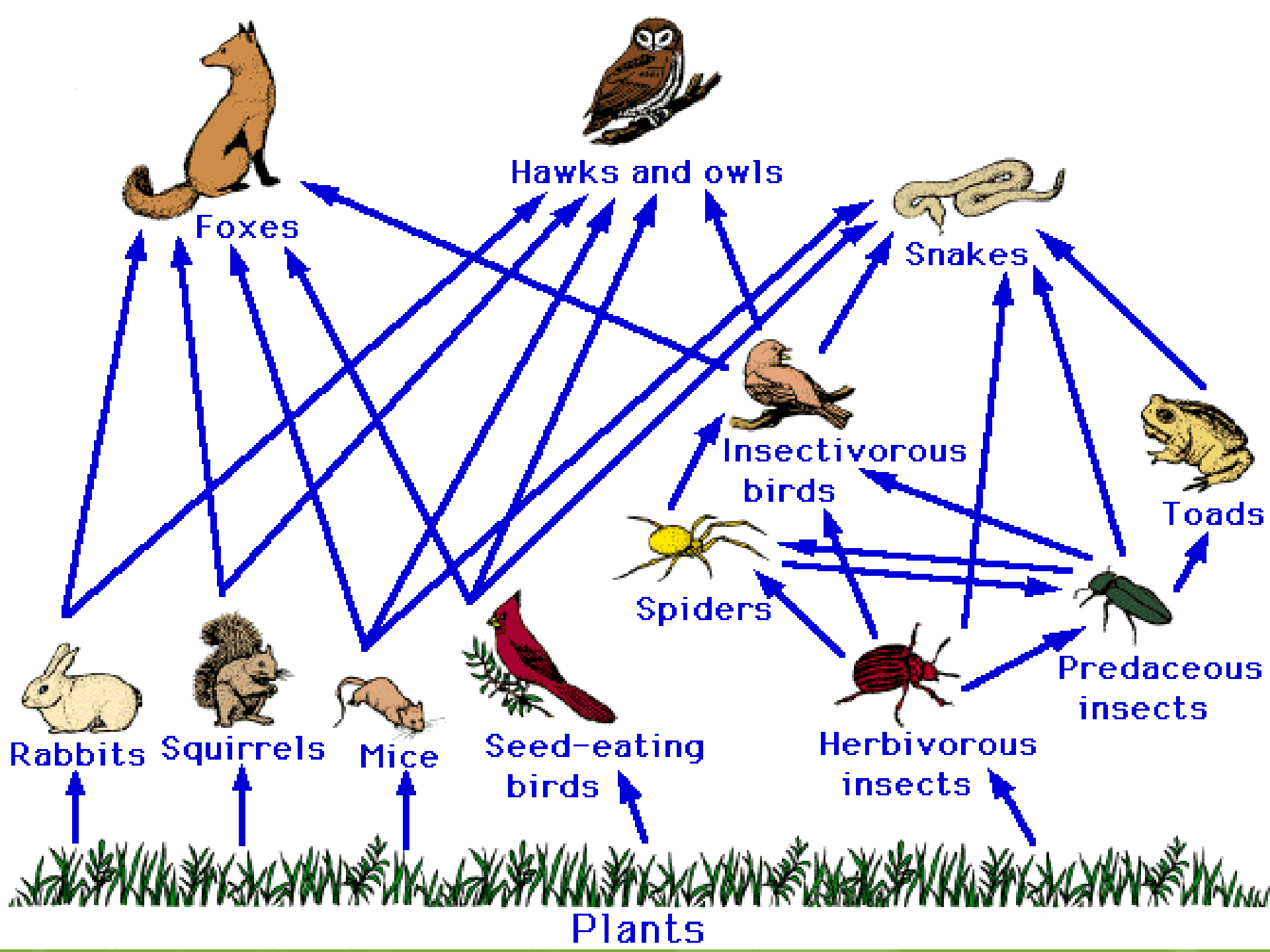
❑ **Detritivores**: ingesting dead organic matter

: might feed on the droppings of scavengers/hunters or on the parts of carcasses/skeleton left behind

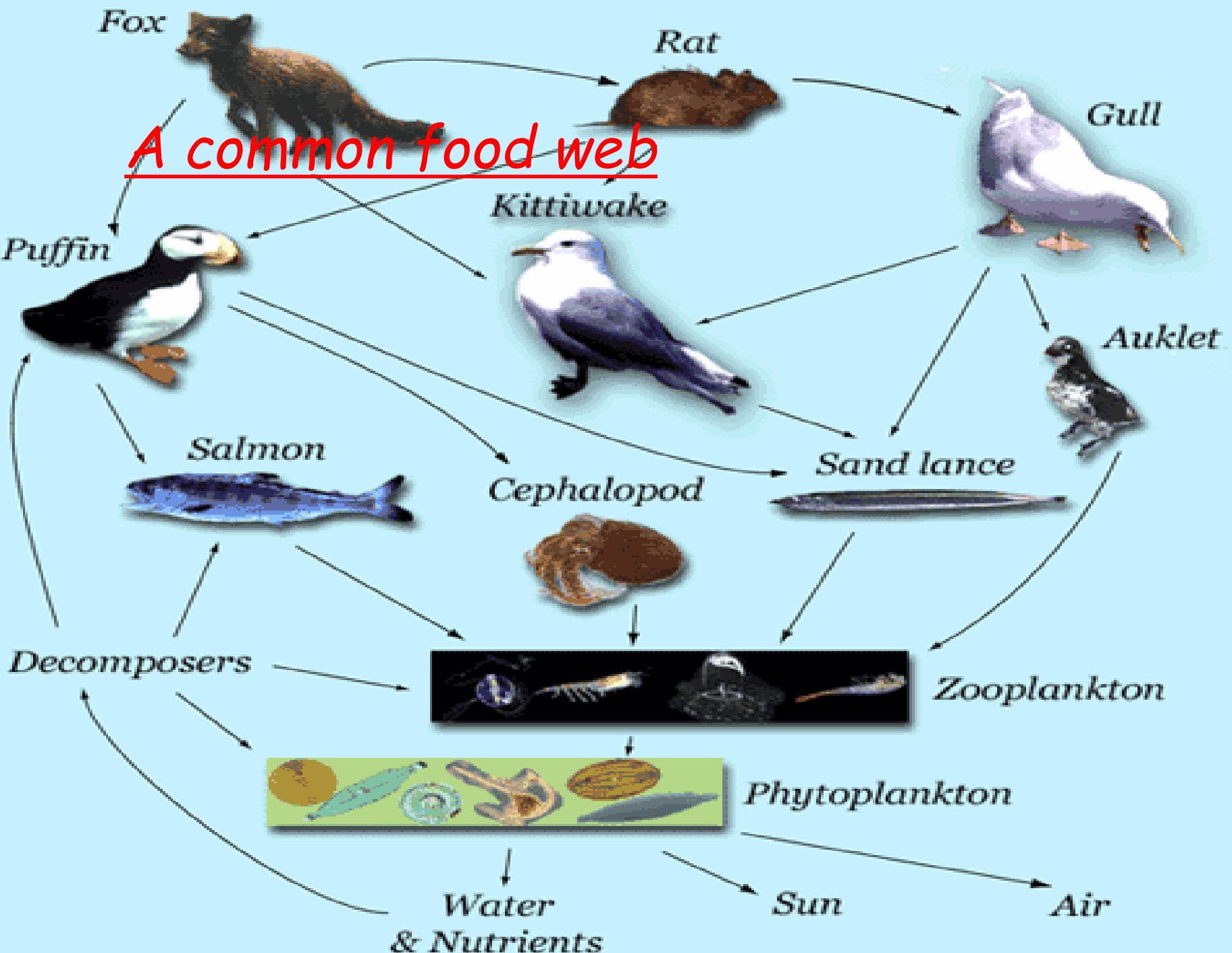
❑ **Scavengers**: generally being larger organisms which consume larger amounts of organic matter

Food Web

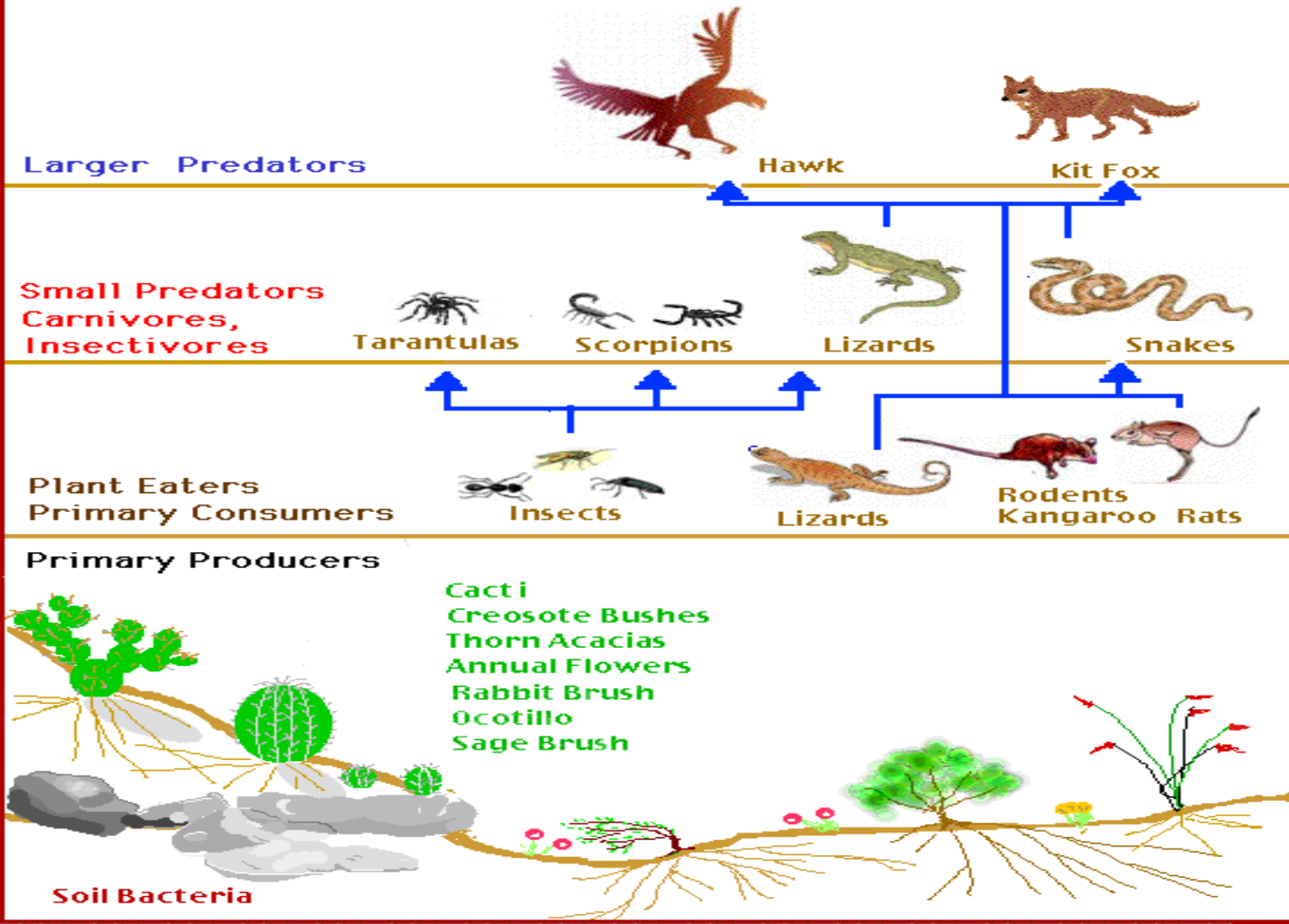
- ❖ Under natural conditions, the linear arrangement of food chains hardly occurs & these remains connected interconnected with each other through different types of organisms.
- ❖ Interlocking pattern of several interlinked food chains is termed as FOOD WEB.
- ❖ A food web is a network of food chains where different types of organisms are connected at different trophic levels, so that there are a number of options of eating and being eaten at each trophic level.



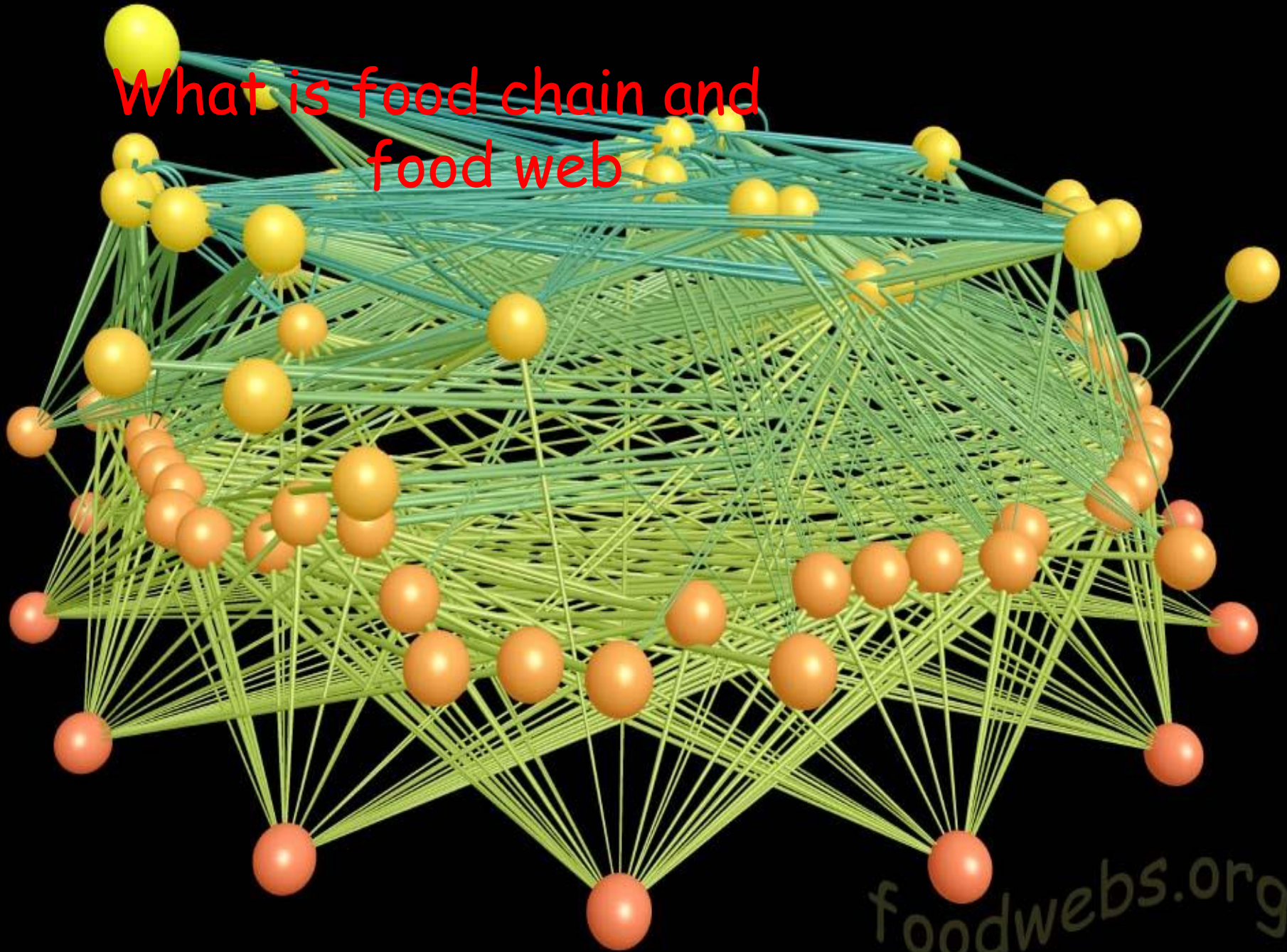
A common food web



A Food Web in the Desert Biome



What is food chain and food web



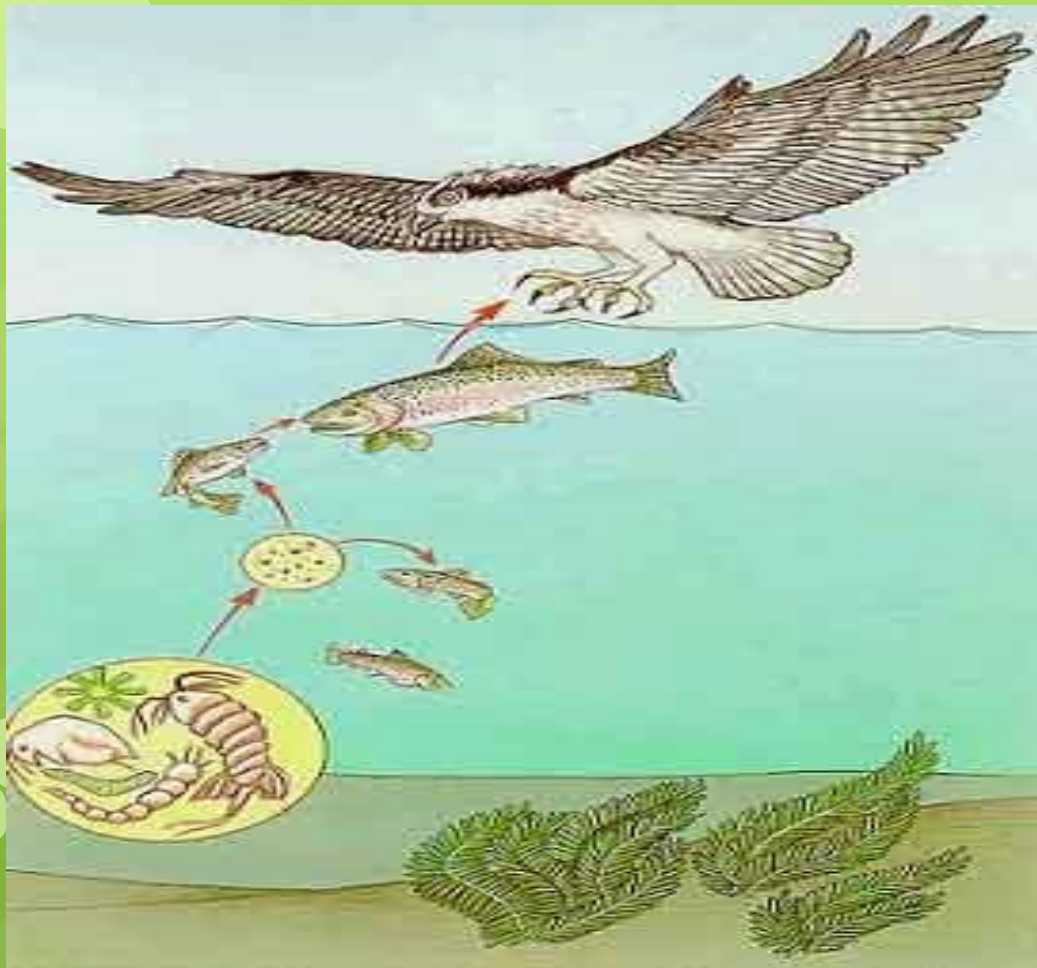
Significance of food chains and Food webs

- ❑ FC & FB play a very significant role in the ecosystem because the two most important functions of energy flow and nutrient cycling takes place through them.
- ❑ The fC also help in maintaining and regulating the population size of animals and thus, he maintain the ecological balance.

Trophic level

- ❑ The producers and consumers are arranged in the ecosystem in a definite manner and their interaction along with population size are expressed together as trophic level.

Trophic level





Carnivore



Carnivore



Carnivore



Herbivore



Plant

Quaternary consumers

Tertiary consumers

Secondary consumers

Primary consumers

Primary producers



Carnivore



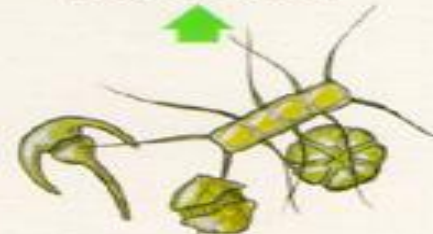
Carnivore



Carnivore



Zooplankton



Phytoplankton

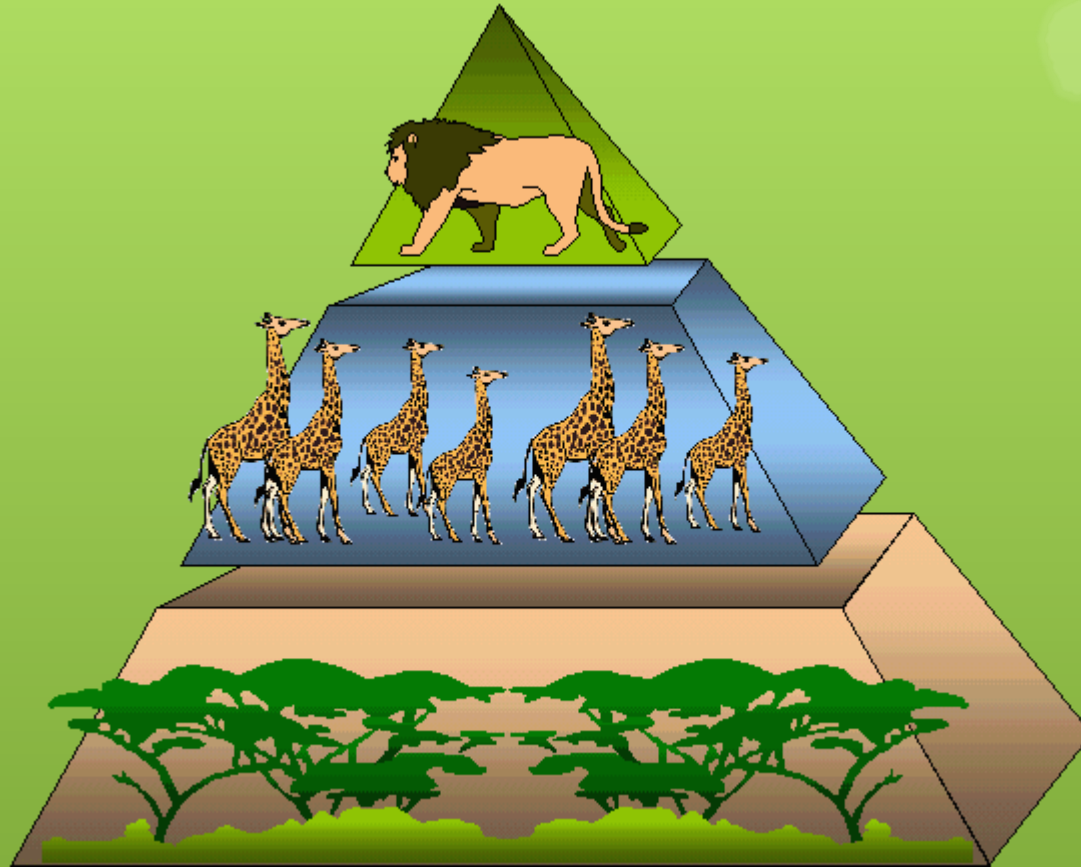
Ecological Pyramids:

- ❖ An "*Ecological pyramid*" is a graphical representation that shows the relative amounts of energy or matter contained within each trophic level in a food chain or food web.
- ❖ An ecological pyramid shows the relationship between consumers and producers at different trophic levels in an ecosystem
- ❖ There are **three ecological pyramids** recognized by ecologists:

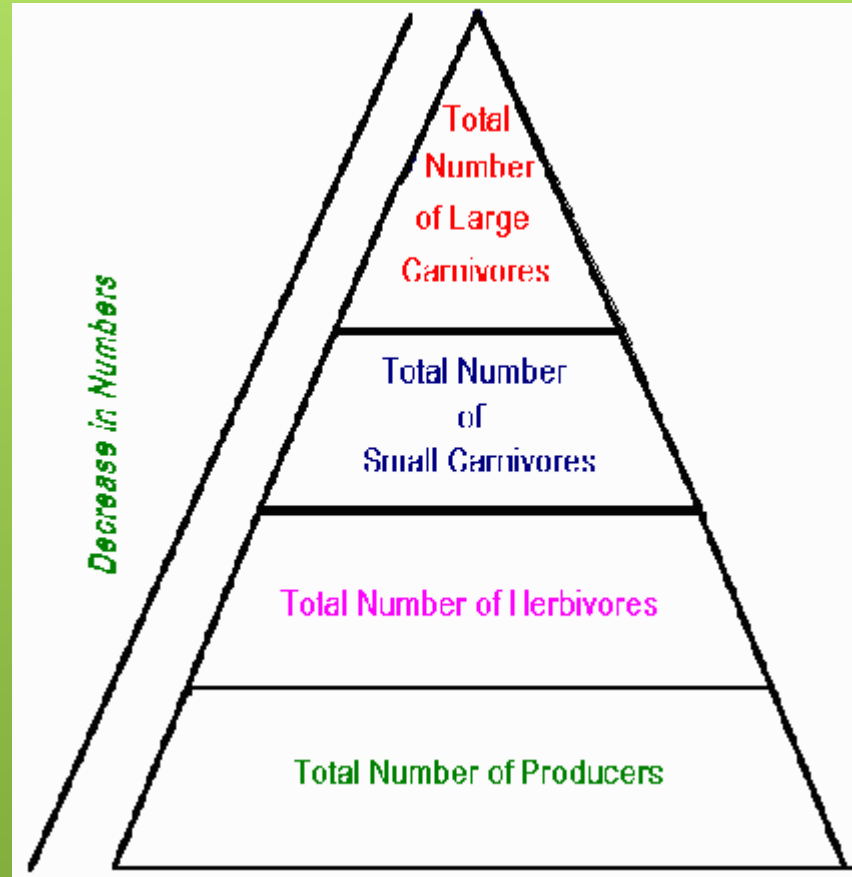
ECOLOGICAL PYRAMID

- ❑ Graphic representation of trophic structure and function of an ecosystem, starting with producers at the base and successive trophic levels forming the apex is known as an ecological pyramid.

ECOLOGICAL PYRAMID



Number pyramid



1) Pyramid of Numbers:

Shows the relative number of individual organisms at each trophic level.

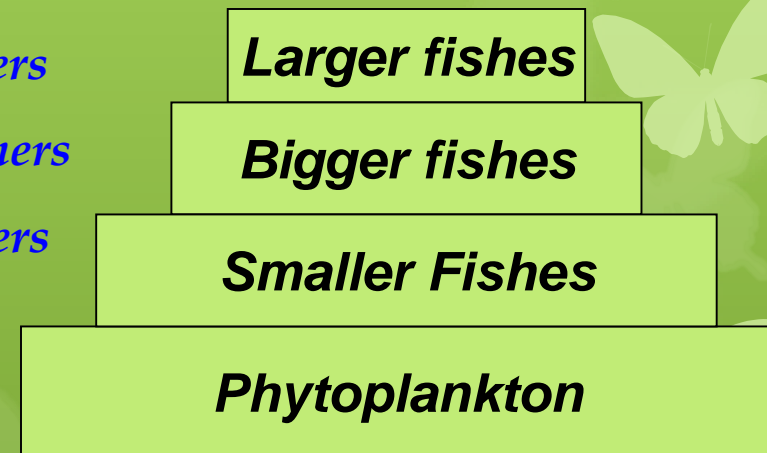


Forest Ecosystem



Grassland Ecosystem

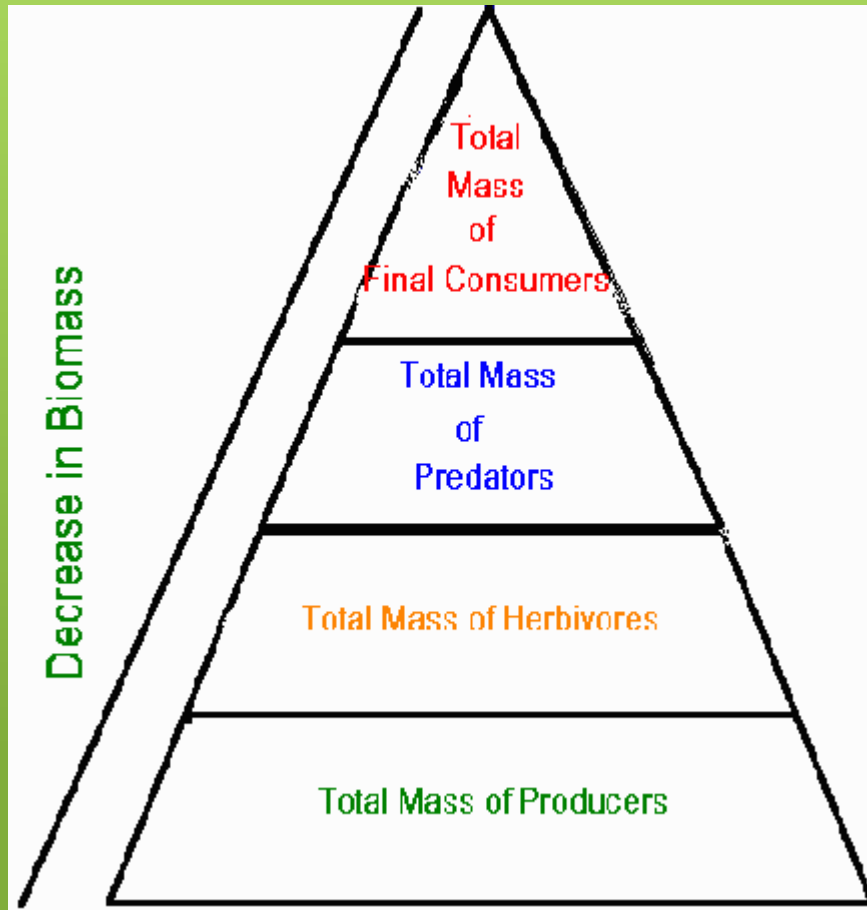
Tertiary Consumers
Secondary Consumers
Primary Consumers
Producers



Pond Ecosystem

2) Pyramid of Biomass:

❖ A pyramid of biomass represents the total dry mass (in grams per square metre of area) of all the organisms in each trophic level at a particular time.



**Snakes, Frogs,
Birds etc.**

**Cows Sheep,
Deer, Rabbit**

Grasses

Grassland Ecosystem

Carnivores

Herbivores

Producers

**Lion, Tiger,
etc.**

Elephant, Deer etc.

Trees

Forest Ecosystem

Fish, Water beetles etc.

Zooplanktons

Phytoplankton's

Pond Ecosystem

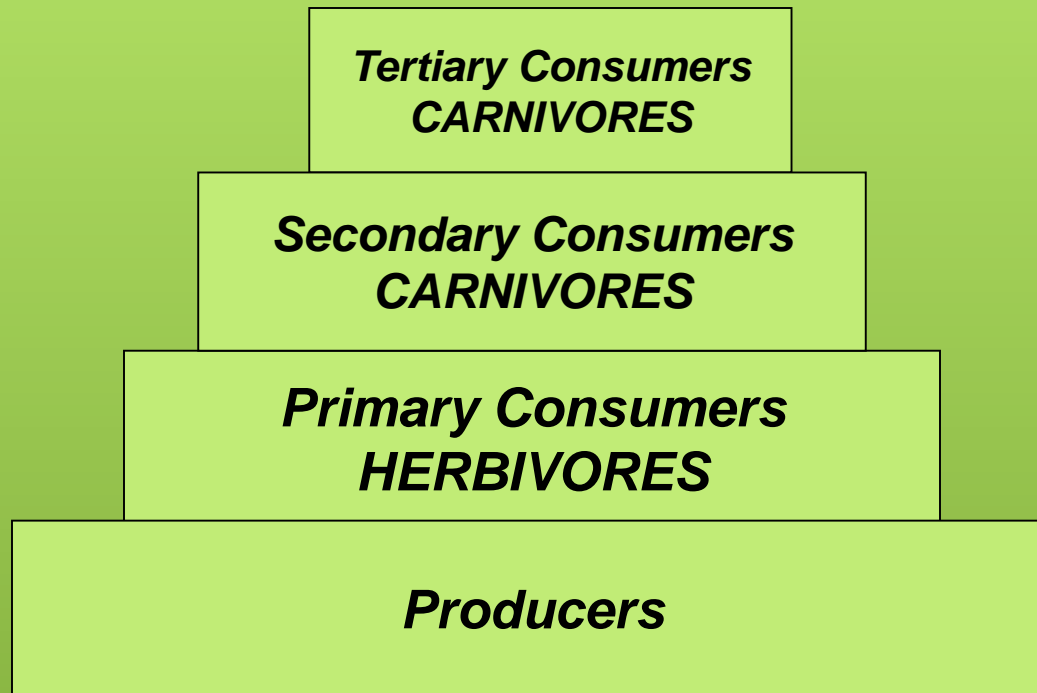
Carnivores

Herbivores

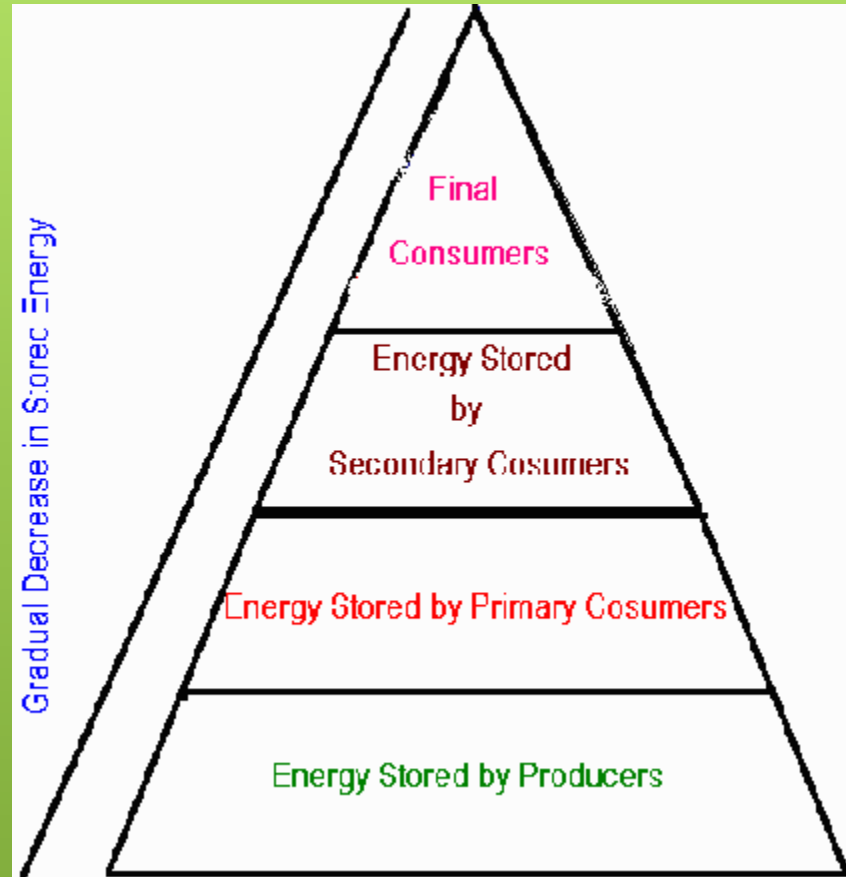
Producers

3) Pyramid of Energy:

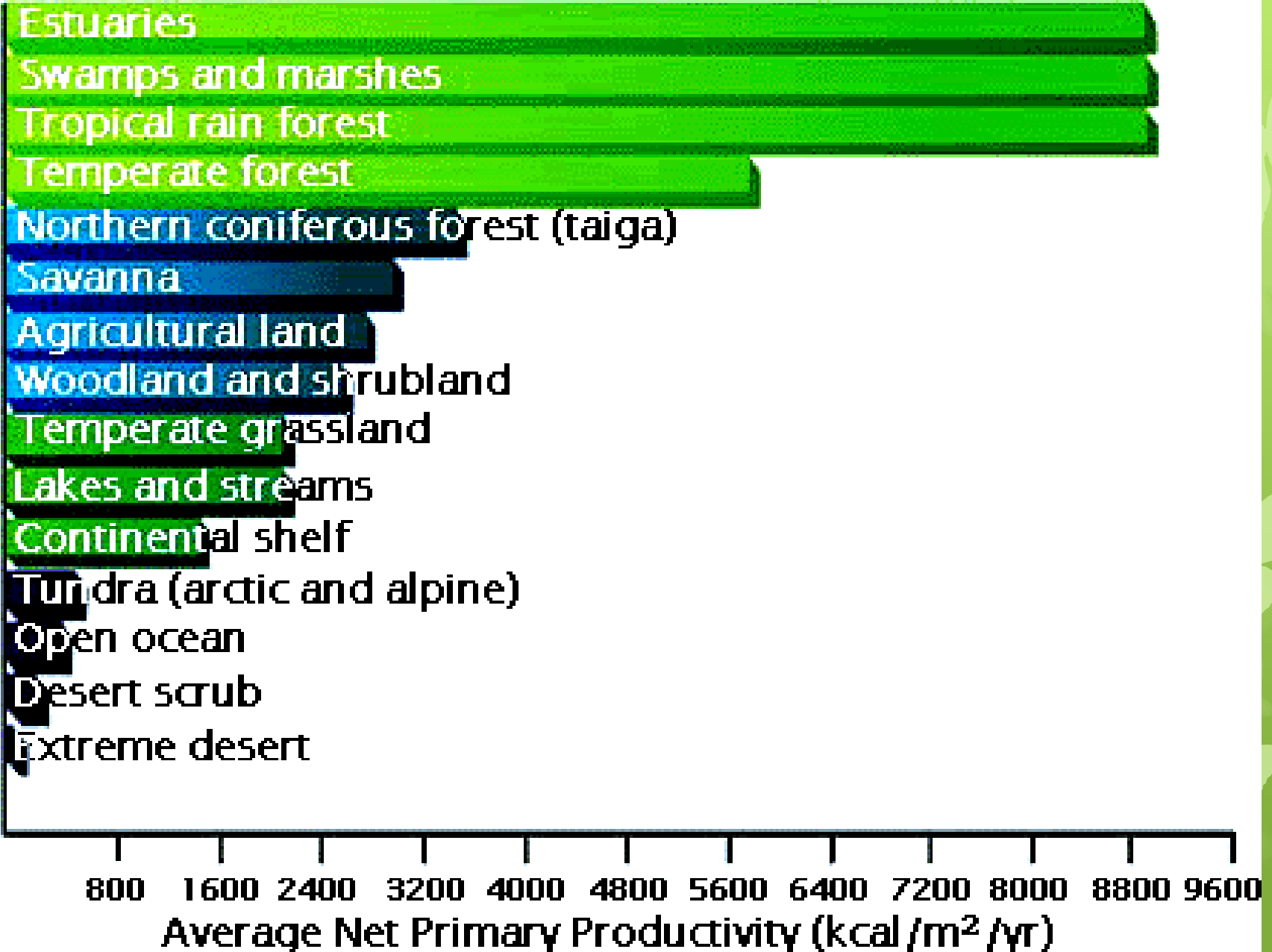
- ❖ A pyramid of Energy represents the rate of energy flow and/or productivity at successive trophic levels. The pyramid of energy are always upright.



Energy pyramid

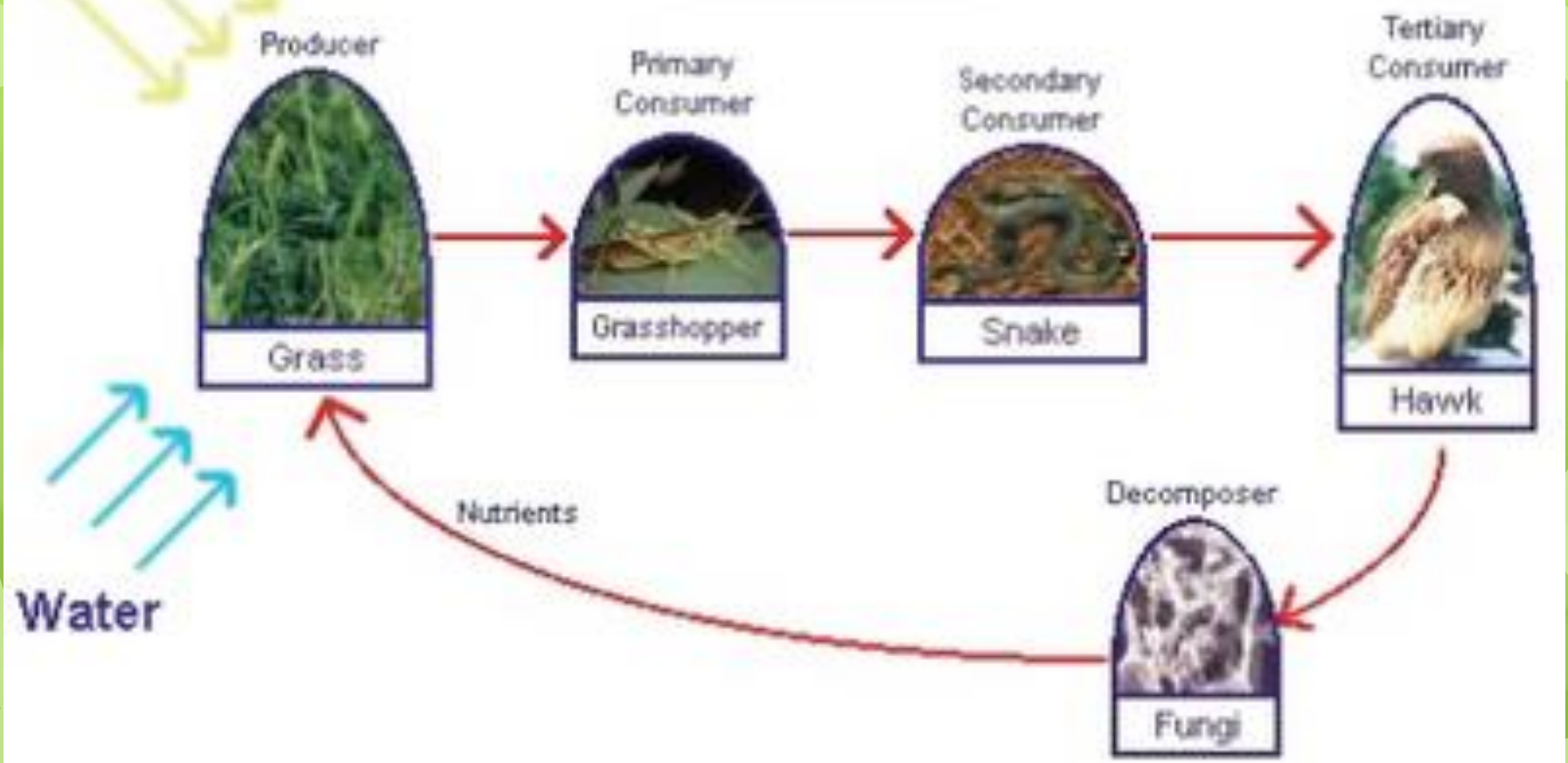


Type of Ecosystem

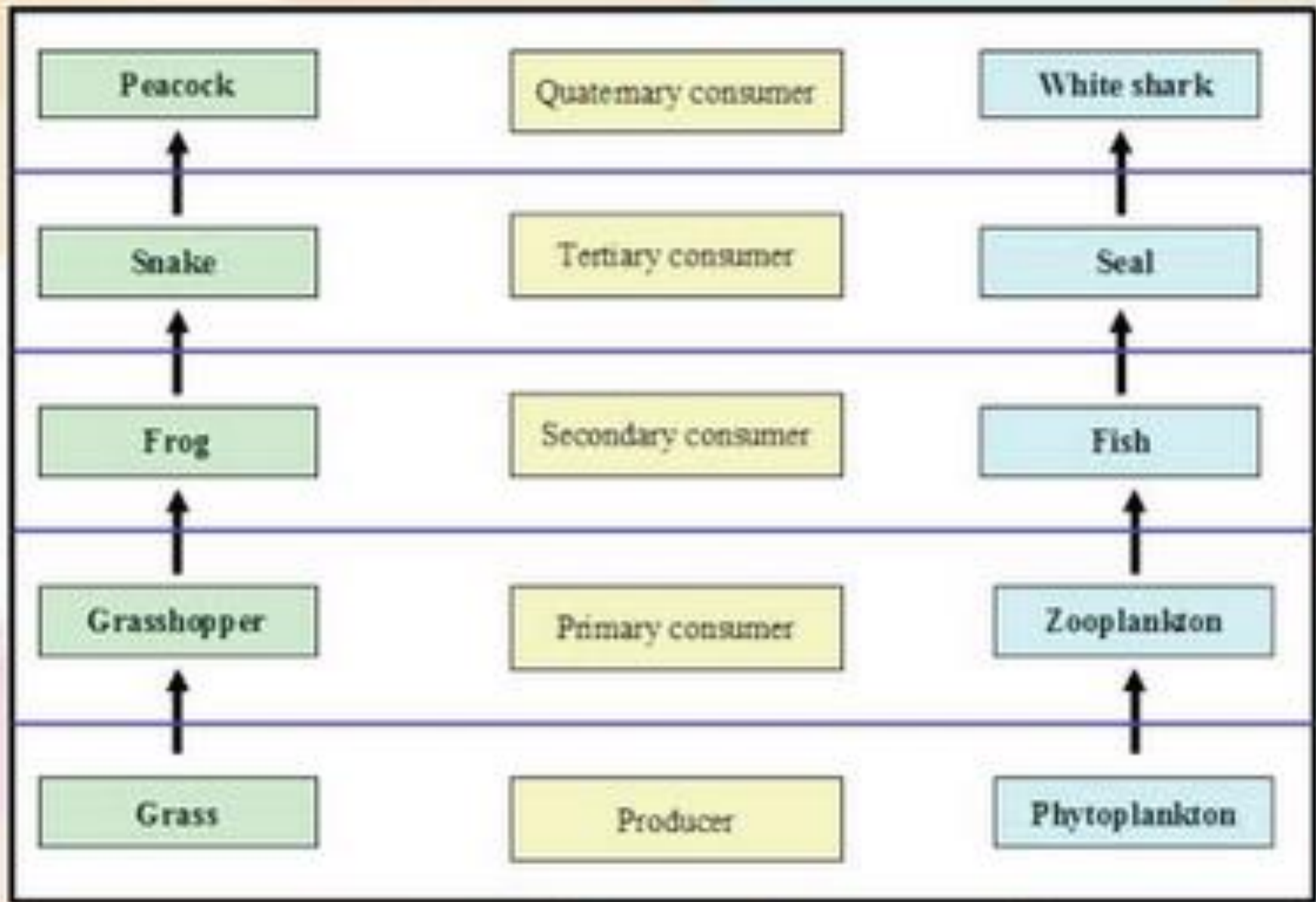


Sun

Food Chain



Role in Food Chain








Food Web

- interconnected food chains in ecosystem.



Trophic level

Functional role	Food chain
1. Producers	Perennial plants 
2. Primary consumers	Moth 
3. Secondary consumers	Frog 
4. Tertiary consumers	Snake 
5. Quaternary consumer (ultimate consumer)	Hawk 



Autotrophs

Heterotrophs

