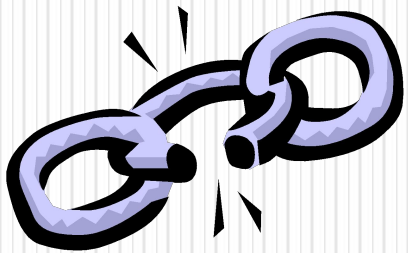
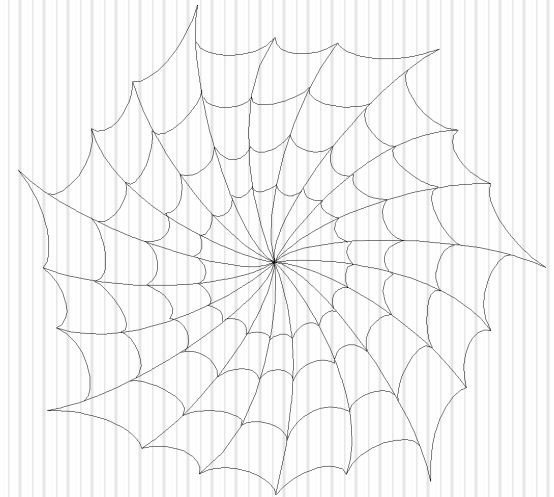


Food Chains & Food Webs

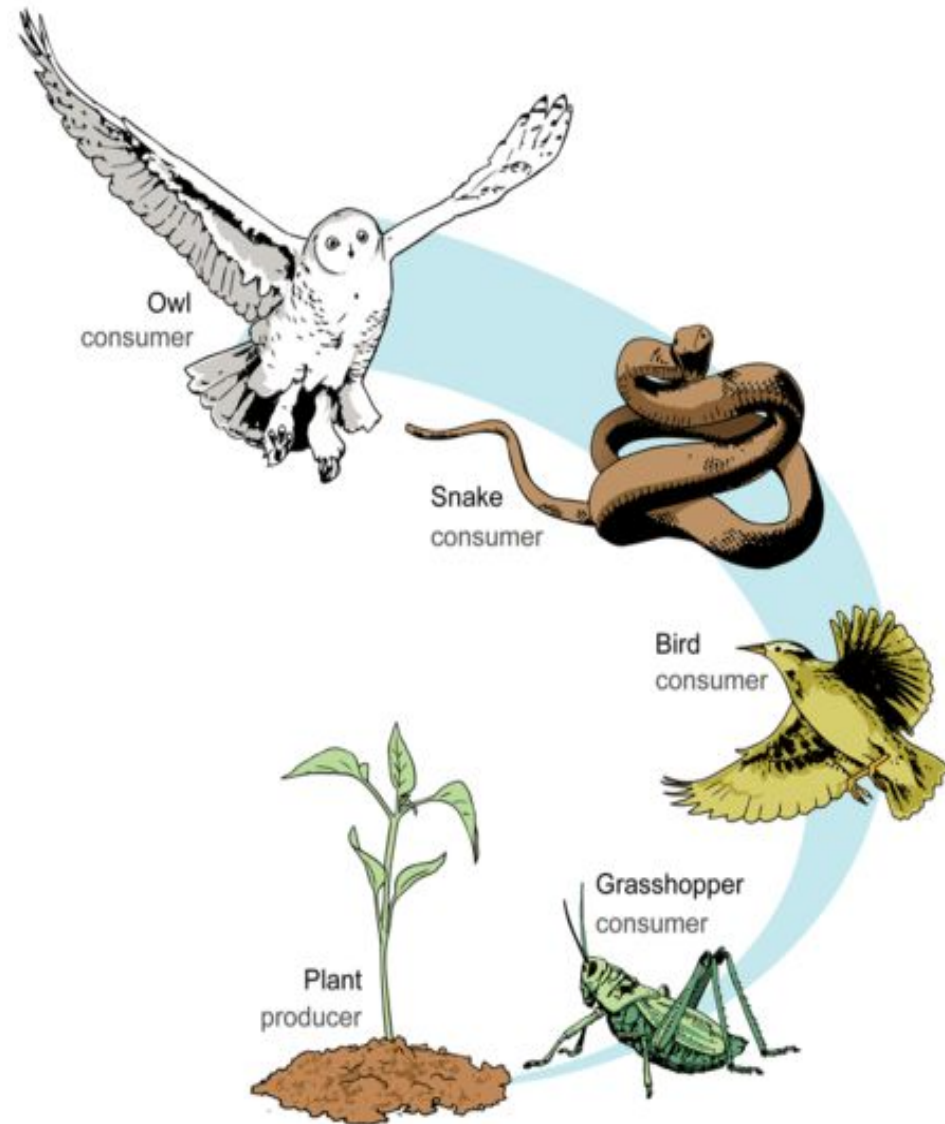


By:
Dr. Parveen Kumar
Asst. Professor



What is a Food Chain?

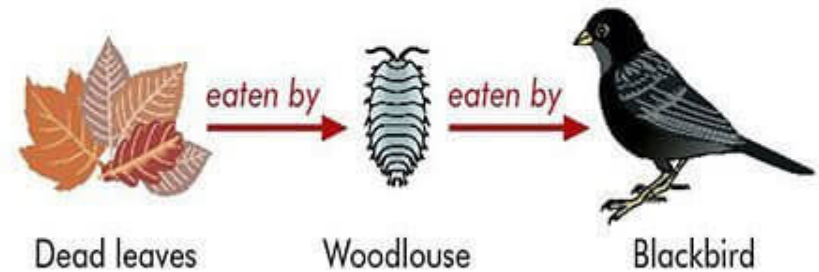
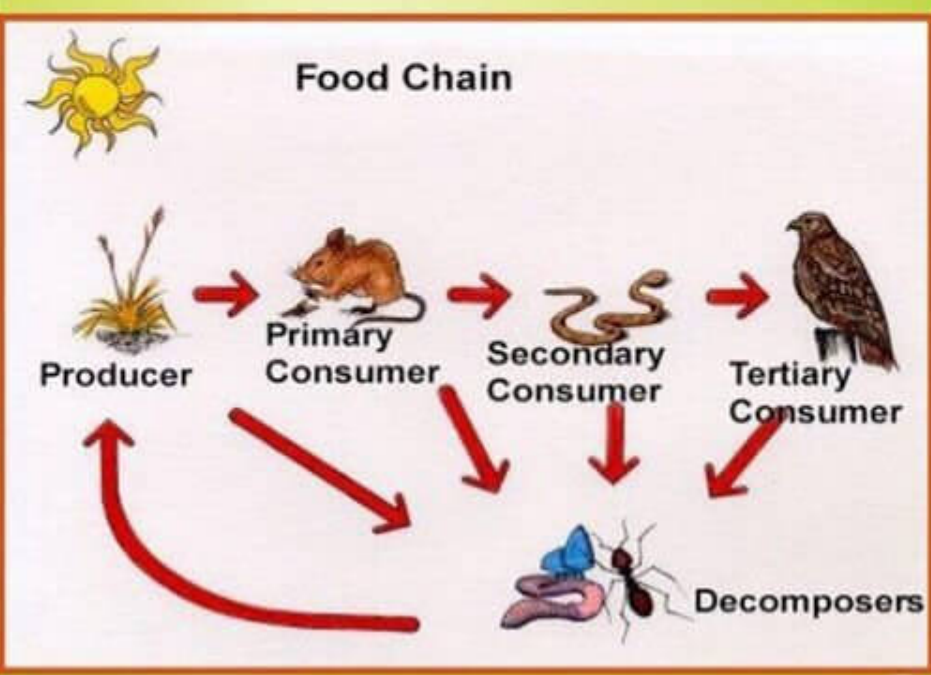
- **Food chain** - ‘a sequence of organisms, each of which uses the lower member of the sequence as a food source’.
- At each stage of food transfer **80-90%** of potential energy is lost as **heat**. Hence, no of steps are usually limited to **4-5** in a food chain.
- **Arrows** show the **flow of energy** and **transfer of materials** from one organism to another.
- **Producers & Consumers** — Herbivores, carnivores, omnivores.
- **Trophic/Food Levels**



GRAZING FOOD CHAIN

VS

DETRITUS FOOD CHAIN



- **Grazing Food Chain** – Starts from green plants
 - **Detritus Food Chain** – starts from dead organic matter
- Detritus** – Organic wastes and dead matter derived from grazing food chain.



Carnivore



Carnivore



Carnivore



Herbivore



Plant

Quaternary consumers

Tertiary consumers

Secondary consumers

Primary consumers

Primary producers



Carnivore



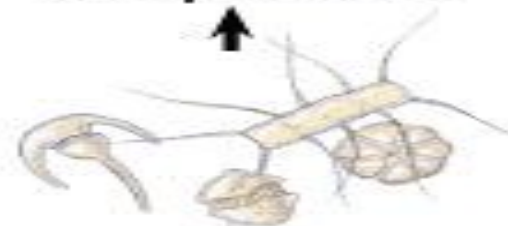
Carnivore



Carnivore



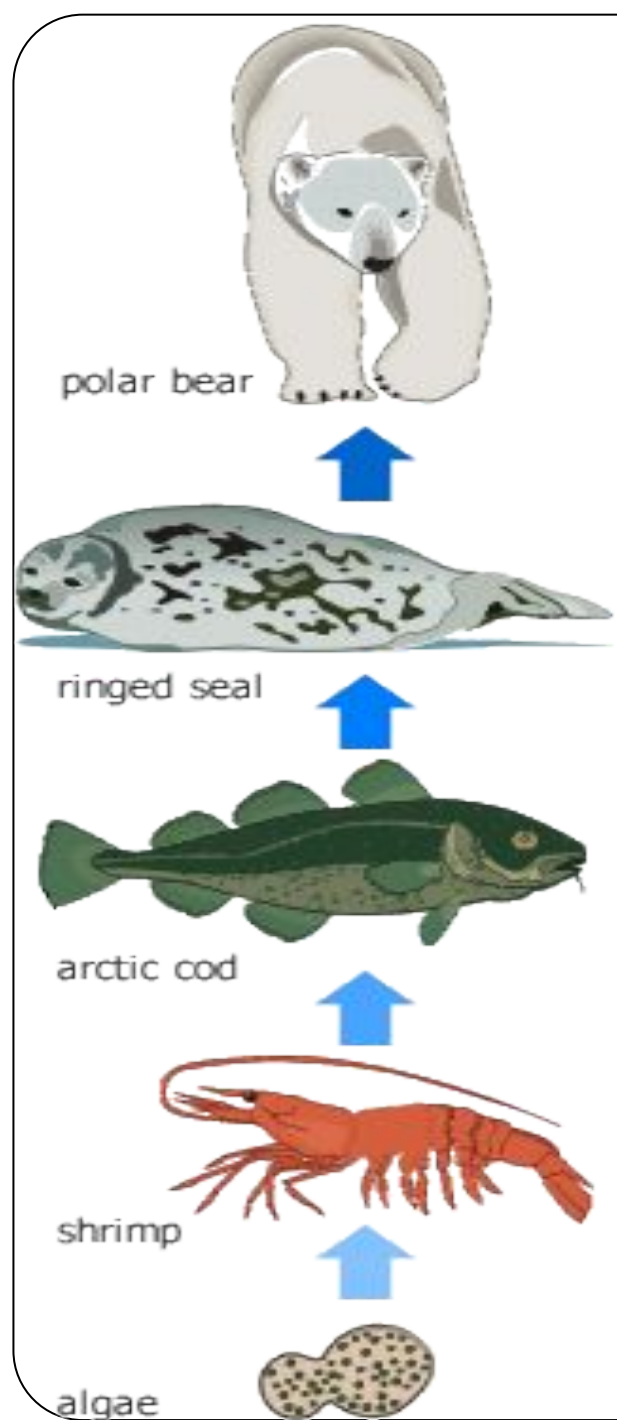
Zooplankton



Phytoplankton

A terrestrial food chain

A marine food chain



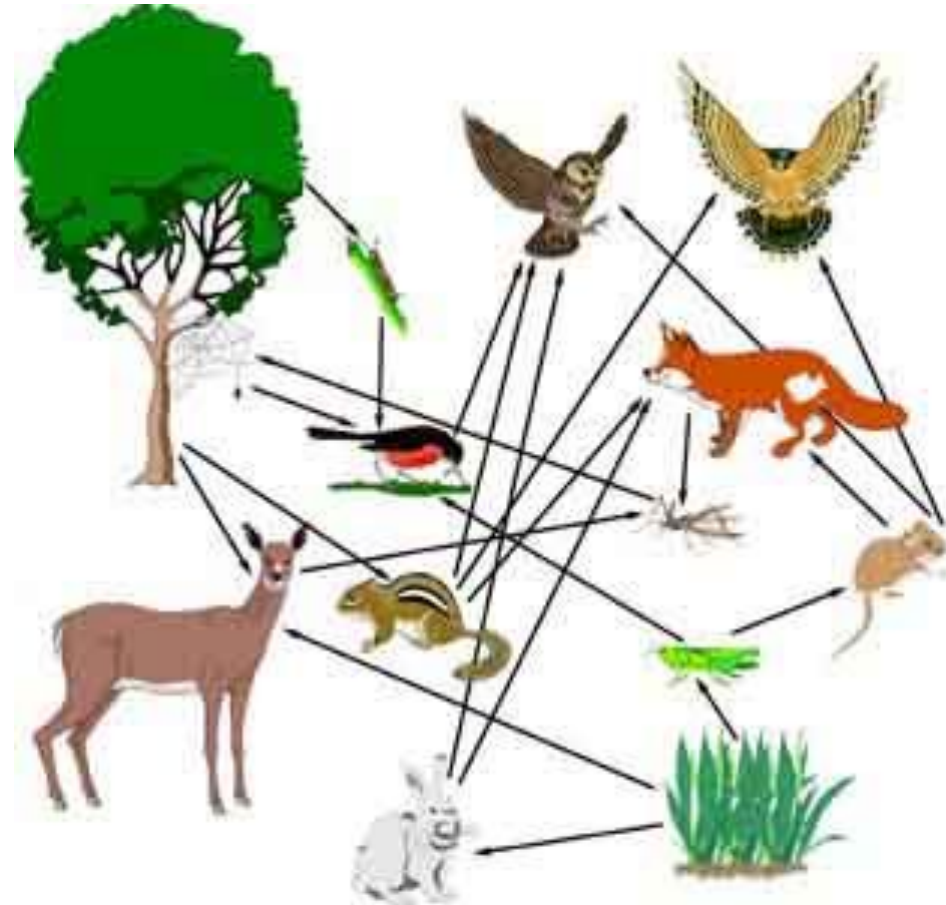
- ❑ In this food chain, what is the producer?
- ❑ What is the first level consumer?
- ❑ What is the second level consumer?
- ❑ Is the polar bear the 3rd level consumer? Explain.

Food Webs

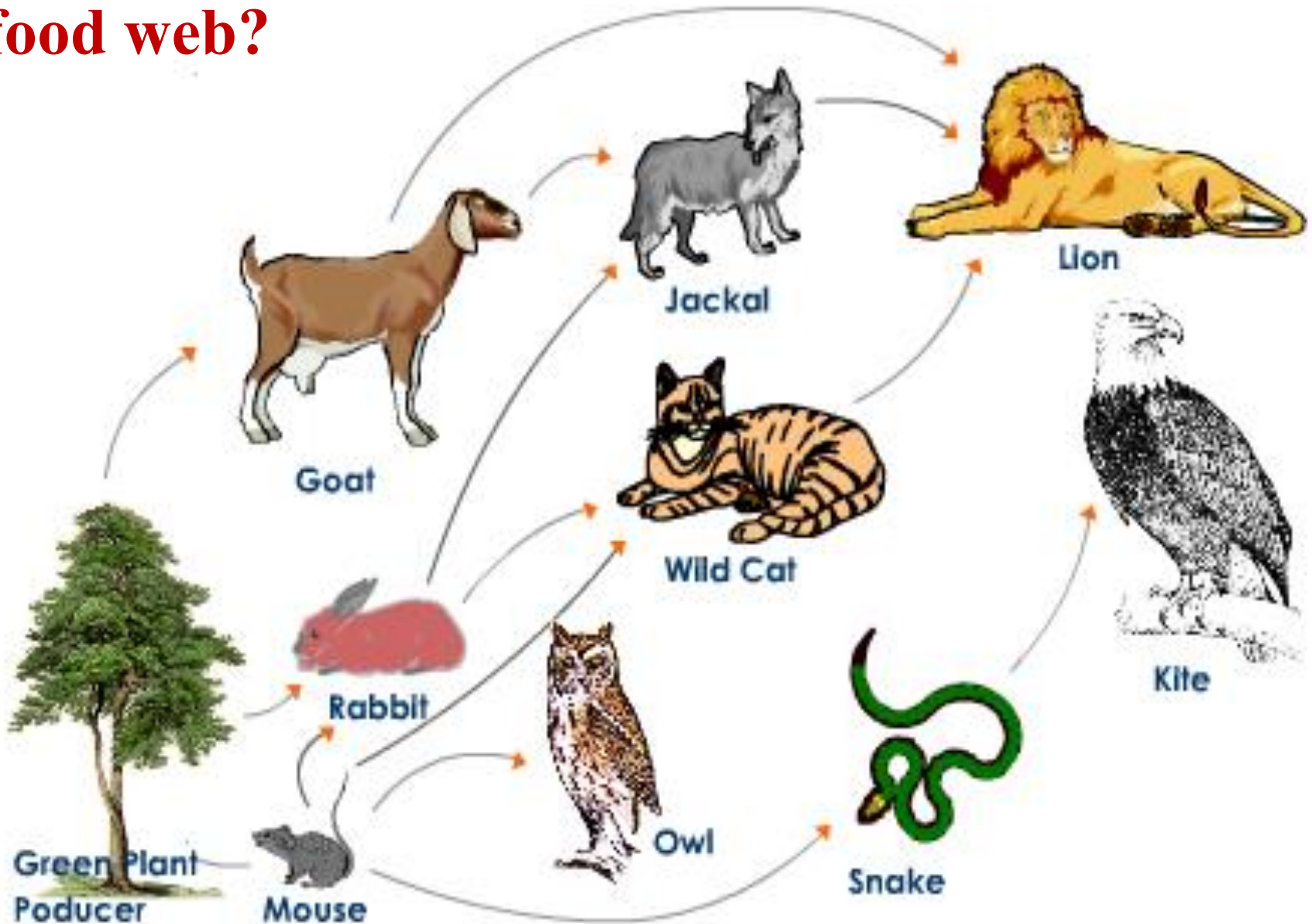


What is a Food Web?

- A food web is “**an interlocking pattern of food chains**”.
- Food chains don't operate as isolated sequences but are interconnected with each other forming **food web**.
- A **food chain** shows one pathway for energy from organism to organism in an ecosystem, but most animals get energy from more than one source.
- Help to maintain **ecological balance**. Balanced ecosystem is essential for survival of all living organisms of the system.

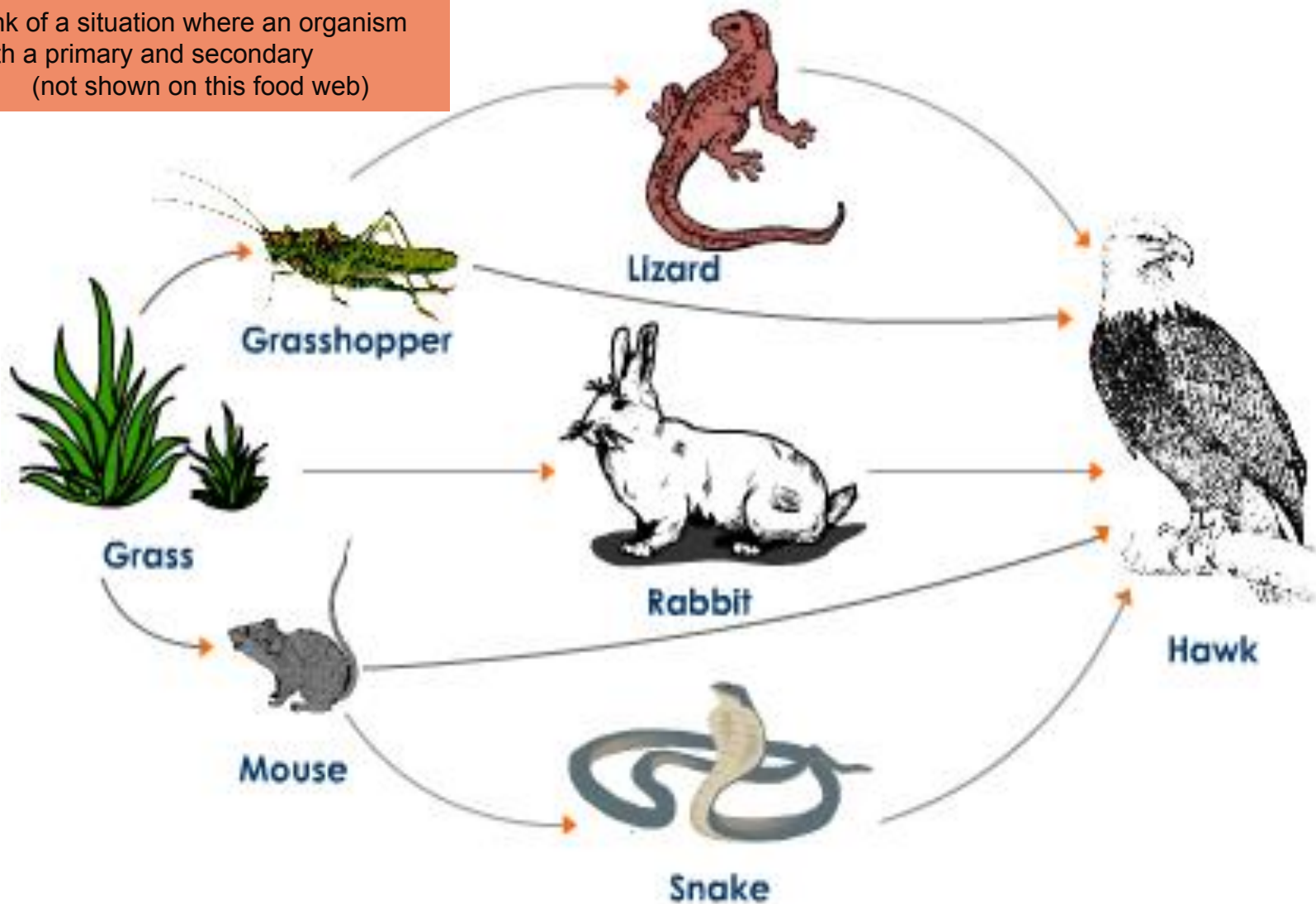


How many food chains can you make from this food web?



Food Web in a Forest

Can you think of a situation where an organism could be both a primary and secondary consumer? (not shown on this food web)



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

1. What are the producers? primary consumers? secondary consumers? tertiary consumer?
2. What organisms are competing for the same abiotic and biotic resources?
3. If removed from the food web, which organism would have the greatest impact on the overall food web? Explain.

FOOD WEB VS FOOD CHAIN

Food Chain Vs. Food Web

Food Chain

- ◆ Single linear pathway
- ◆ Isolated food chains decrease stability of the ecological community
- ◆ One individual occupies one trophic level only
- ◆ Less adaptive

Food Web

- ◆ Made of several interconnecting pathways
- ◆ More complex food webs increase the stability of ecological community
- ◆ One individual occupies many trophic levels
- ◆ More adaptive

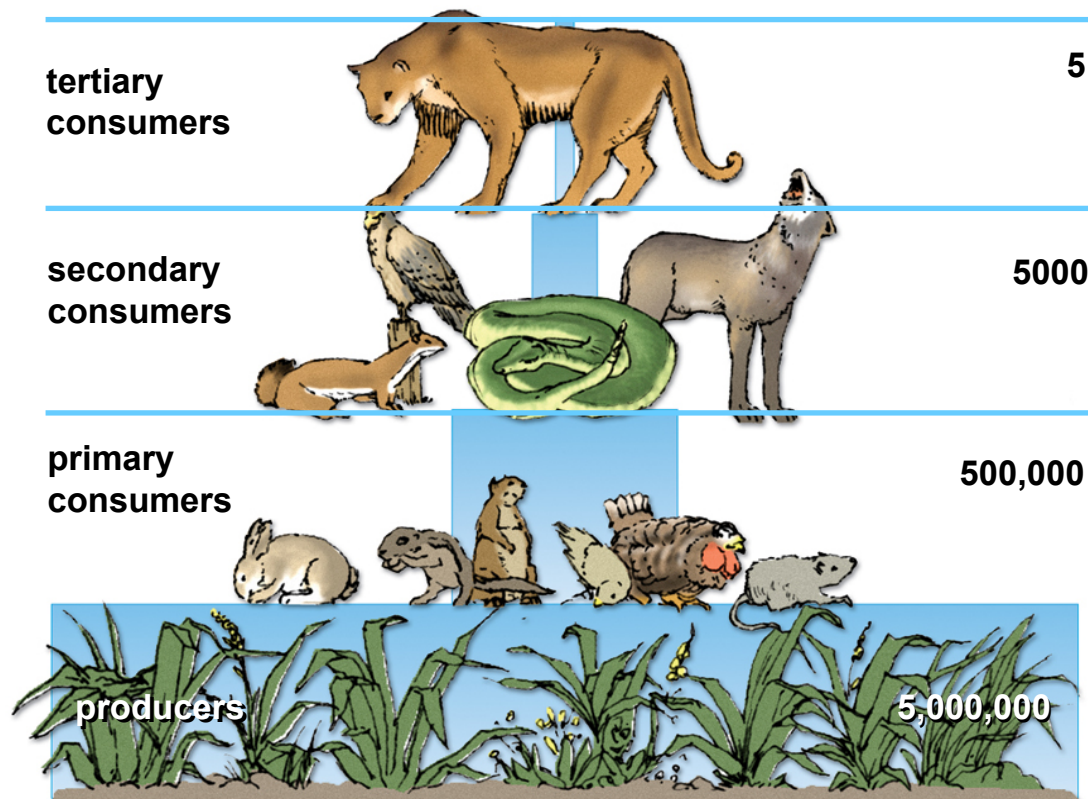
- ◆ Represents who-eats-who
- ◆ 10% of energy passes from one trophic level to another

Ecological Pyramids

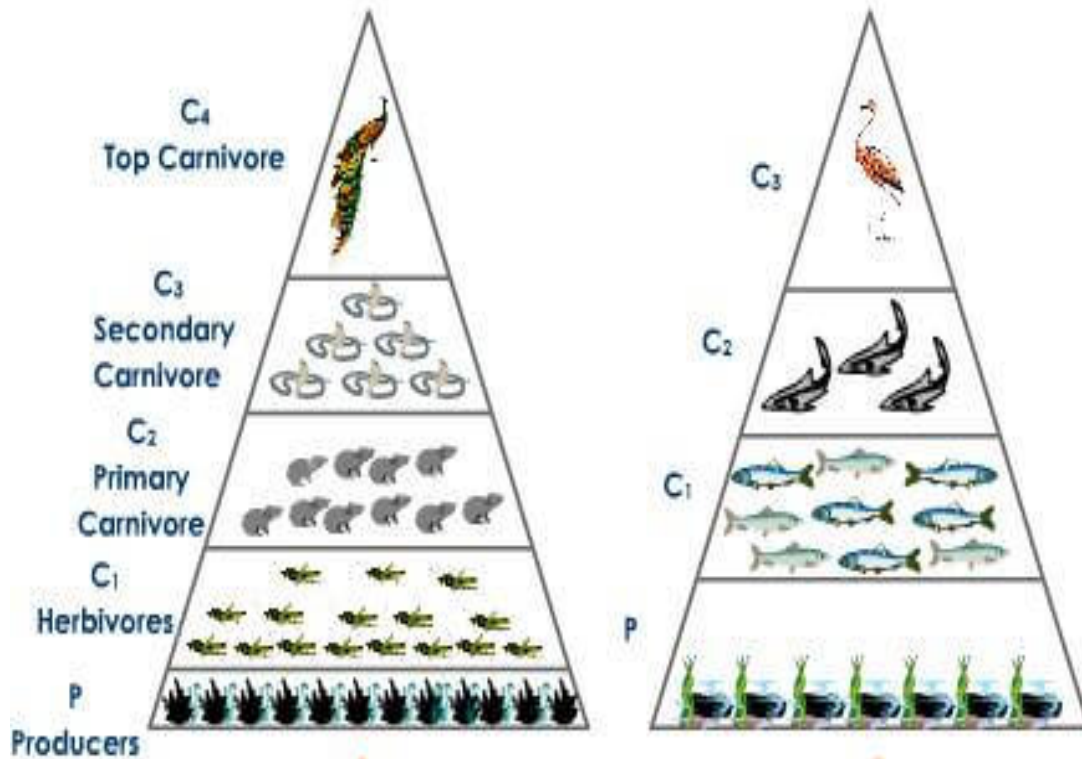
- **Charles Elton** (1927) gave concept of ecological pyramids.
- **Trophic structure** and also **trophic function** can be shown graphically using ecological pyramids.
- **Producers** form first level followed by primary (**Herbivores**), secondary, and tertiary consumers (**carnivores**).
- **Types:**
 - Pyramid of number
 - Pyramid of biomass
 - Pyramid of energy

Pyramid of Number

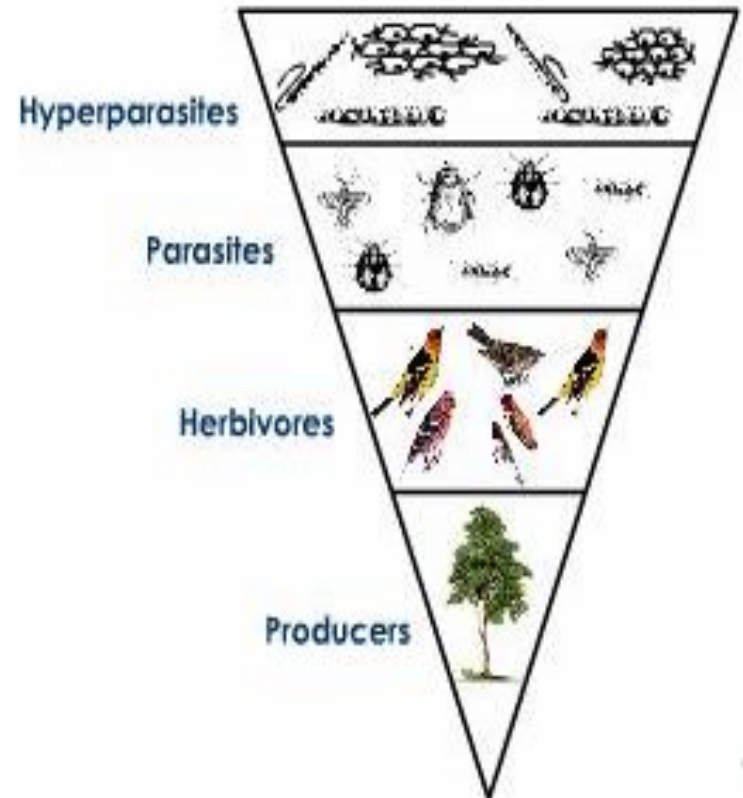
- A pyramid of numbers shows the numbers (m^{-2}) of individual organisms at each trophic level in an ecosystem.



- A vast number of producers are required to support even a few top level consumers.



Upright Pyramids of Numbers. (A) In a Grass Land (B) In a Pond

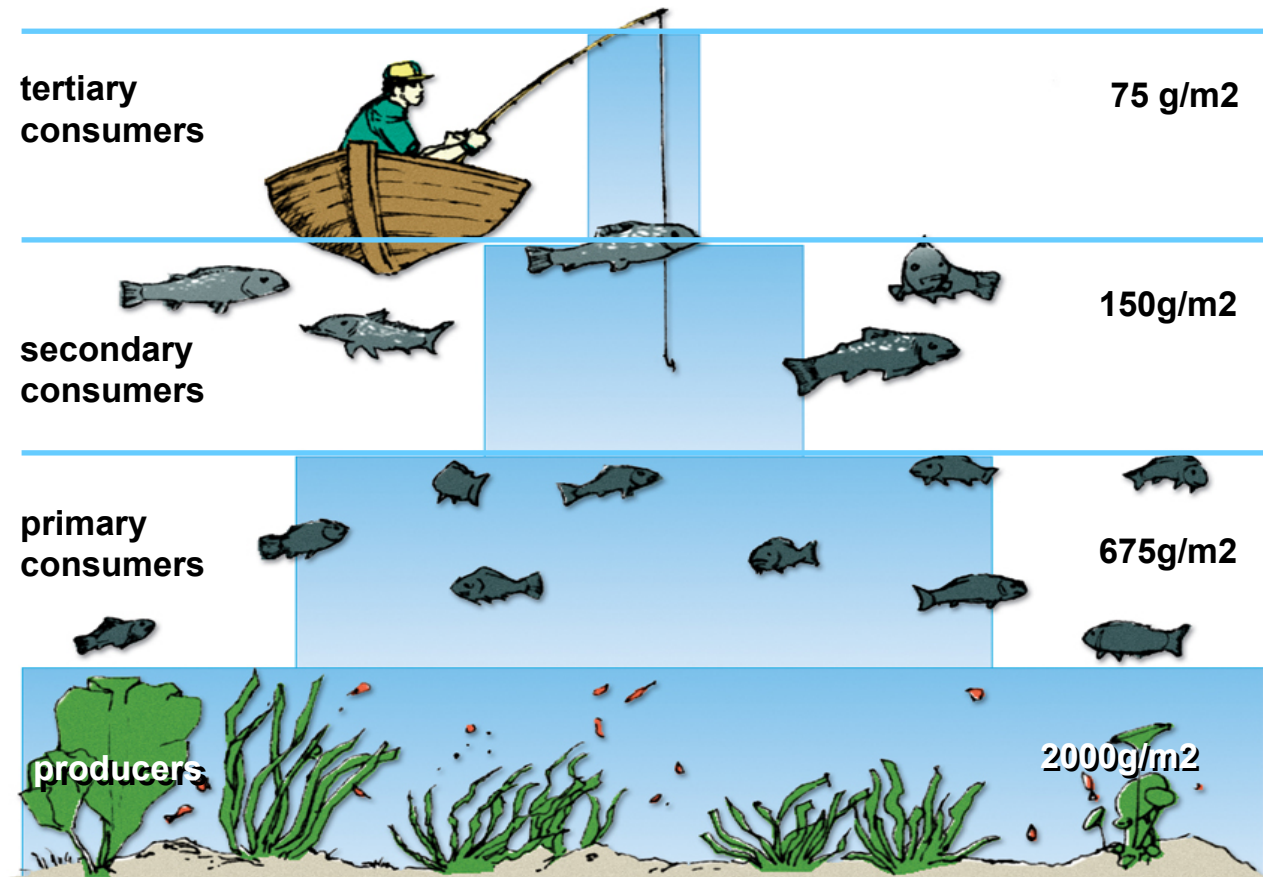


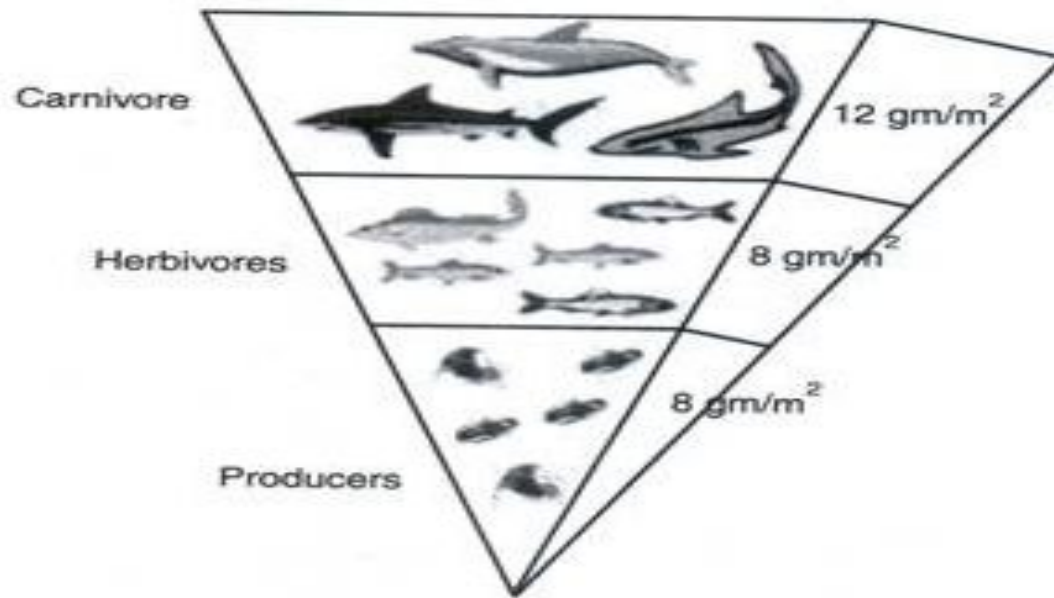
Inverted pyramid of number

Parasitic Food Chain

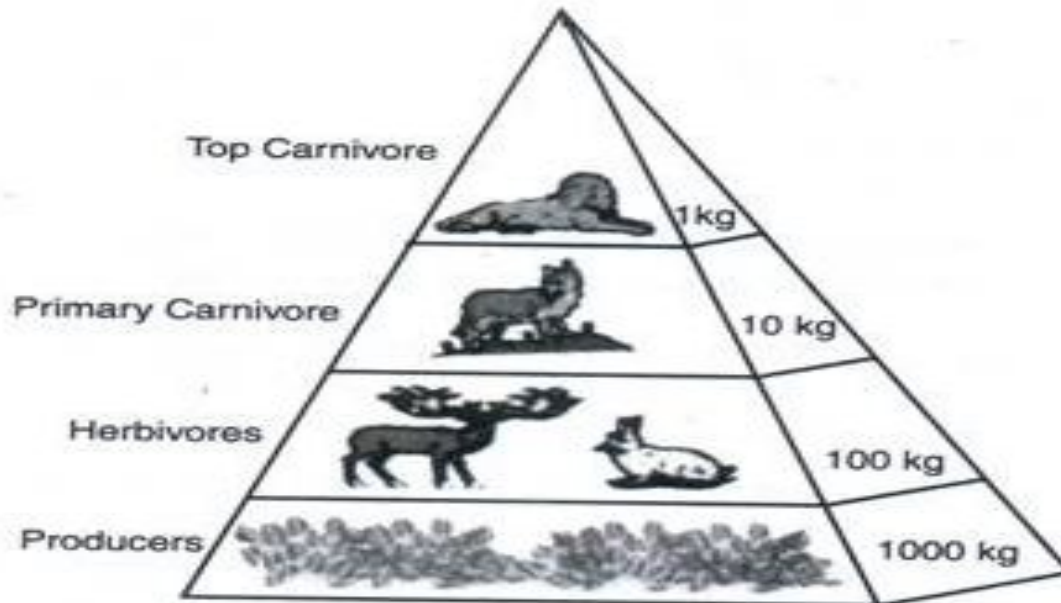
Pyramid of Biomass

- Biomass is a measure of the total dry mass of organisms in a given area.





Inverted Pyramid of Biomass in Aquatic Ecosystem



Upright Pyramid of Biomass for Grassland Ecosystem

Pyramid of Energy

- Energy pyramids are diagrams that show how much food energy is passed from one organism to another along the food chain.

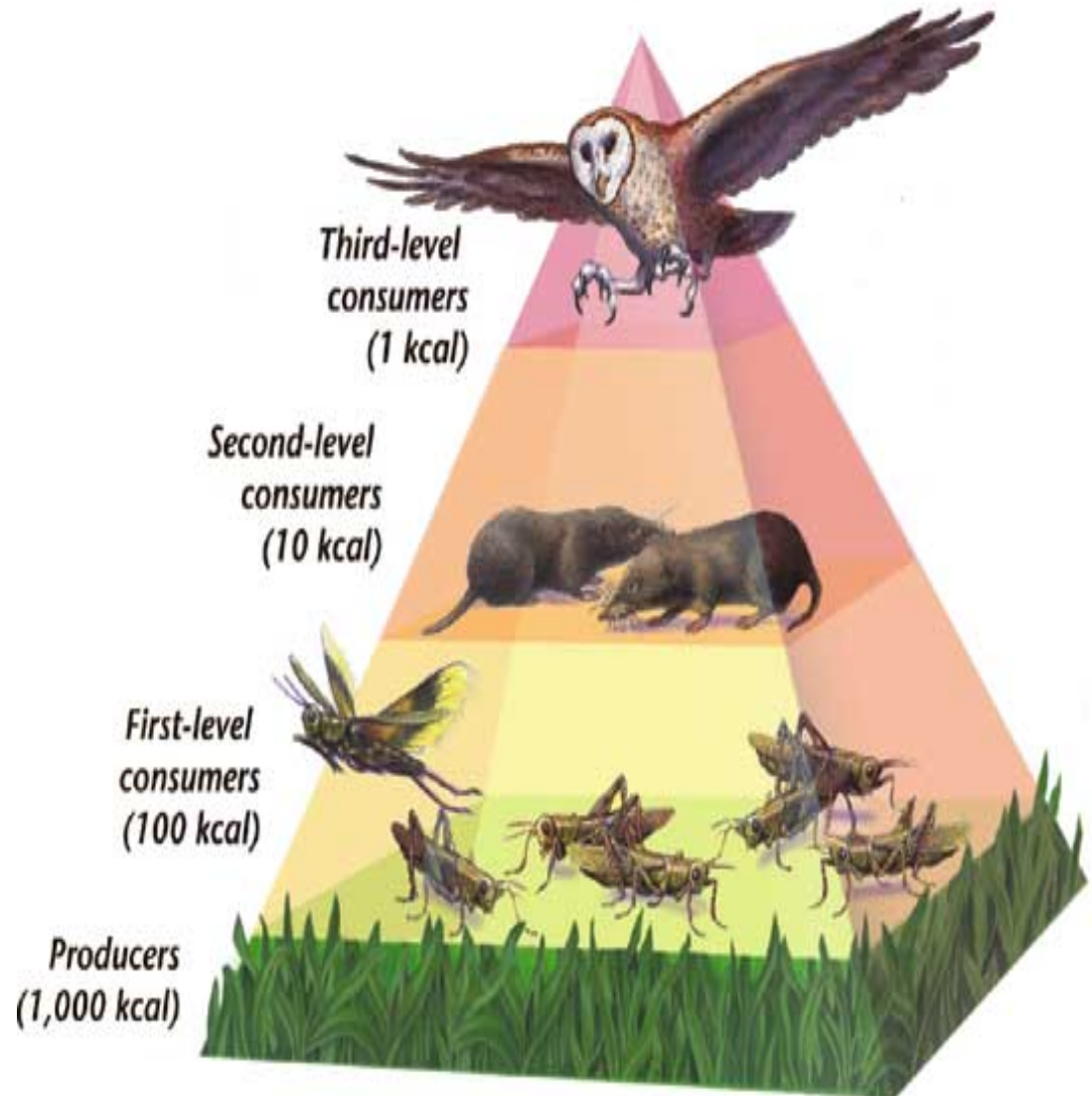
- The base represents producers, which have the most energy to pass on.

- The other levels represent consumers.

- As energy is transferred up the pyramid, it is lost.

- Only about **10%** of energy is passed to the next level.

- Always **upright**



Quiz

1. What is a producer?
2. What is a herbivore?
3. What is a secondary consumer?
4. What is meant by the terms predator and prey?
5. What might happen to the population of rabbits in a food chain if foxes were removed?
6. What do arrows in a food chain represent?

Answers

1. A producer is a green plant that makes its own food by photosynthesis
2. A herbivore is an animal that only eats plants
3. A secondary consumer is an animal that eats primary consumers
4. A predator is an animal that kills other animals for food. A prey is an animal that is hunted for food.
5. If foxes were removed, the population of rabbits would increase (because there are no predators)
6. Arrows in a food chain indicate the direction of energy flow



Thank
You