

UNIT 6

ENVIRONMENT

- ❖ **Environment;** an organism's home and its surrounding
- ❖ **Ecology** ; deal with the study of environment
- ❖ It concerned with the interrelation ship of organism with each other and with its environment
- ❖ **It deal** biological organization (organism population community ecosystem biomes biosphere) **above organism**
- ❖ Ecology do not deal with individual organism

6.1 ECOSYSTEMS

- ❖ A life supporting environment
- ❖ All animals and plants that live in an area along with that thing that affect them
- ❖ Composed of **biotic (living)** and **abiotic (non-living)** components
- ❖ **Abiotic components**
 - Non living component of the environment
 - Includes
 - **Sun light,**
 - **Rainfall,**
 - **Temperature,**
 - type of **soil** and **rocks,**
 - **Level of oxygen, water. Wind**

Biotic component

- ❖ The living organisms within an ecosystem which affect the ability of an organism to survive there
- ❖ Includes
 - **Disease causing microorganisms** and
 - **Parasites**
 - **predator** numbers,
 - **Food availability,**
 - **Competition**
- ❖ **Competition;** animal compete for food, water, , territory, mate
- ❖ Plant compete with each other for light, water and nutrient

6.2 FOOD RELATIONSHIP

- ❖ Based on the mode of nutrition organism divided into two
 1. **Autotrophs**
 2. **Heterotrophs**
- ❖ **Autotrophs** organisms that can make their own food
- ❖ Autotrophs can be divided into;
 - **Photo autotrophs (light feeders)**; a group of organisms that use sun light as primary source of energy to synthesis their own food **E.g. Green plants** because of making carbohydrate they are known as **producers**
 - **Chemo autotrophs**; a group of organisms that release energy from simple chemical reaction. E.g. **nitrifying bacteria, green sulfur bacteria**

Heterotrophs

- ❖ Organism that cannot synthesis their own food. they are called **consumer**
- ❖ Feed on other organism
- ❖ Can be divided as herbivores, carnivores, omnivores and decomposer
 - **Herbivores**; animal that feed on vegetation. E.g. caw, giraffe
 - **Carnivores**; animal that feed on animal flesh. E.g. Lion , cat
 - **Omnivores**; animal that feed on b plant and animal flesh. E.g. human ,rat
 - **Decomposers**; organism that break down dead bodies. E.g. bacteria, fungi

Food chains

- ❖ Is a simple and direct feeding relation ship
- ❖ Involves the transfer of energy and nutrient from one organism to another
- ❖ Energy flow from producer to consumer.

Producers

Consumers

- **Producers**; first trophic level. **Green plant**
- **Consumers** can be
 1. **Primary consumer**; second trophic level.
Herbivores and omnivores
 2. **Secondary consumer**; third trophic level.
Herbivores and omnivores
 3. **Tertiary consumer**; forth trophic level.
Carnivores
- **Omnivores** can occupy primary and secondary consumer

Food chains.....

- ❖ Decomposers are found at the end of food chain

❖ Grass → Caw → human

➤ **Grass**; first trophic level and producer

➤ **Caw**; second trophic level and primary consumer

➤ **Human**; third trophic level and secondary

leaves → grasshopper → rodent → leopard

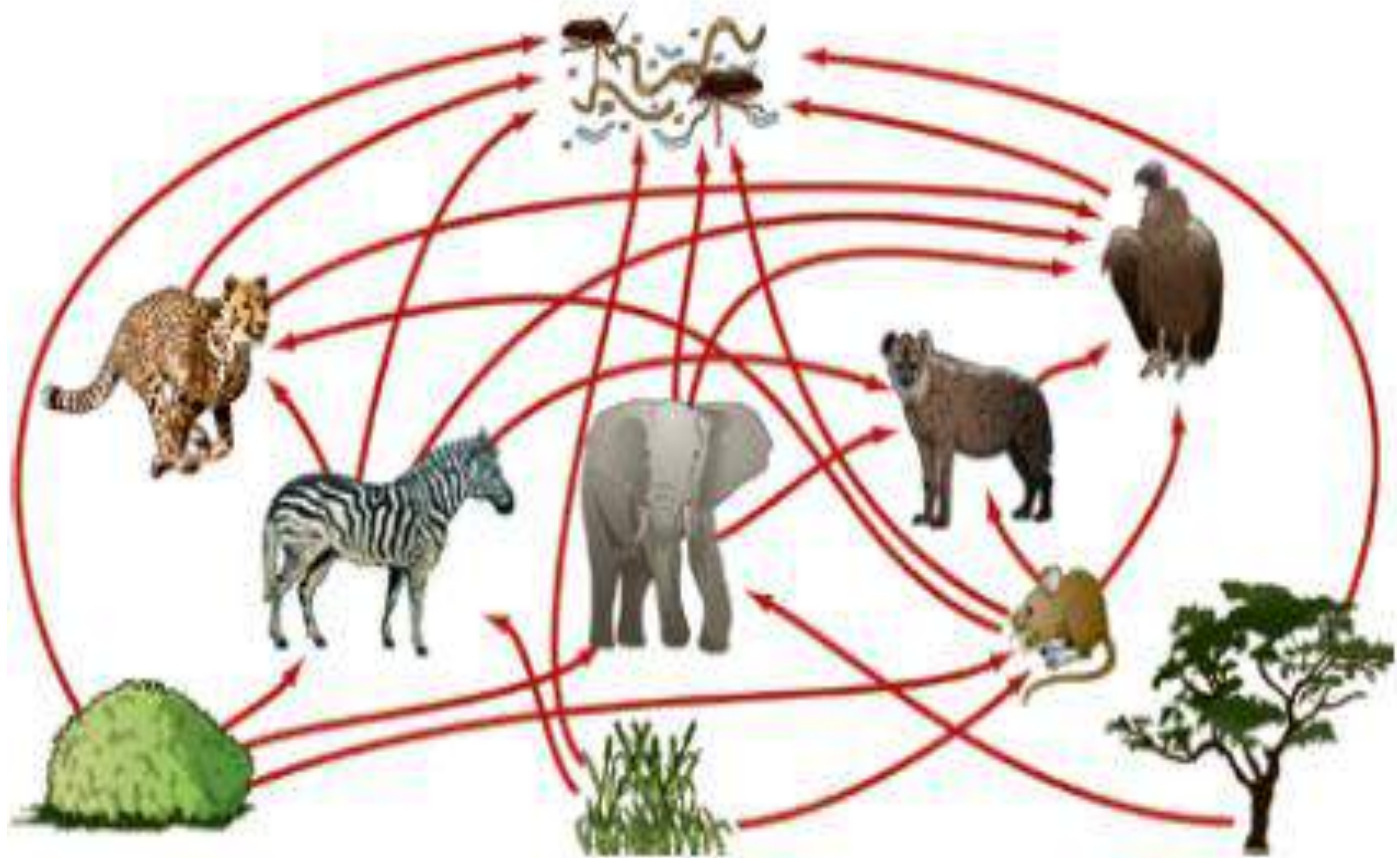
grass → zebra → lion

- ❖ **Aquatic food chain** start microscopic photosynthetic organism known as

➤ **Phytoplankton** → **phytoplankton** →
zooplankton → **Fish** → **Human**

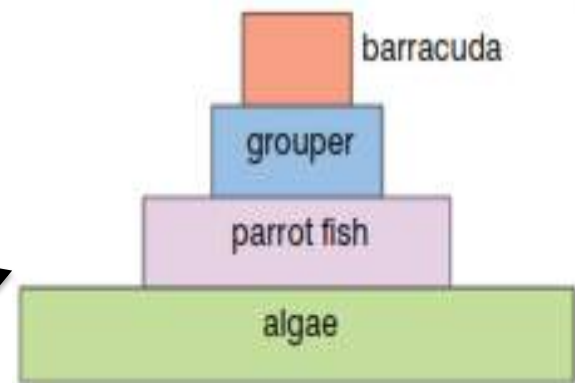
Food web

- ❖ Is a complex feeding interrelation between organism that consists many food chain
- ❖ The actual feeding relationships in a community



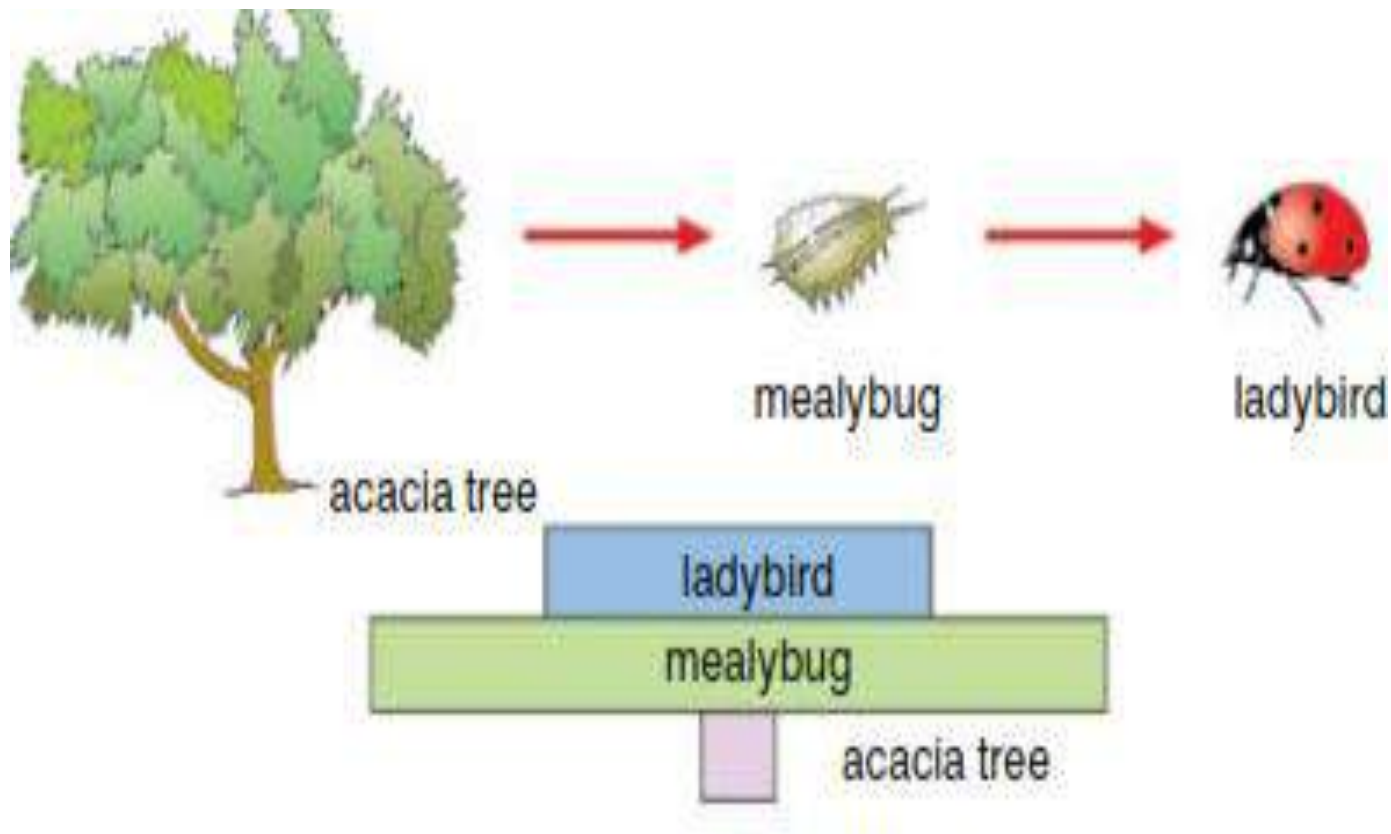
Ecological pyramid

- ❖ Is a geographical representation designed to show the bio-productivity At each trophic level in a given ecosystem
- ❖ Three type of ecological pyramid
 1. Pyramid of number
 2. Pyramid of biomass
 3. Pyramid of energy
- ❖ **Pyramid of number**
 - Pyramid made based on the number of organism in each trophic level.
 - In most ecosystem the number organism decrease from producer to consumer



Pyramid of number ...

- ❖ Sometimes pyramid of number does not accurately reflect ecological pyramid

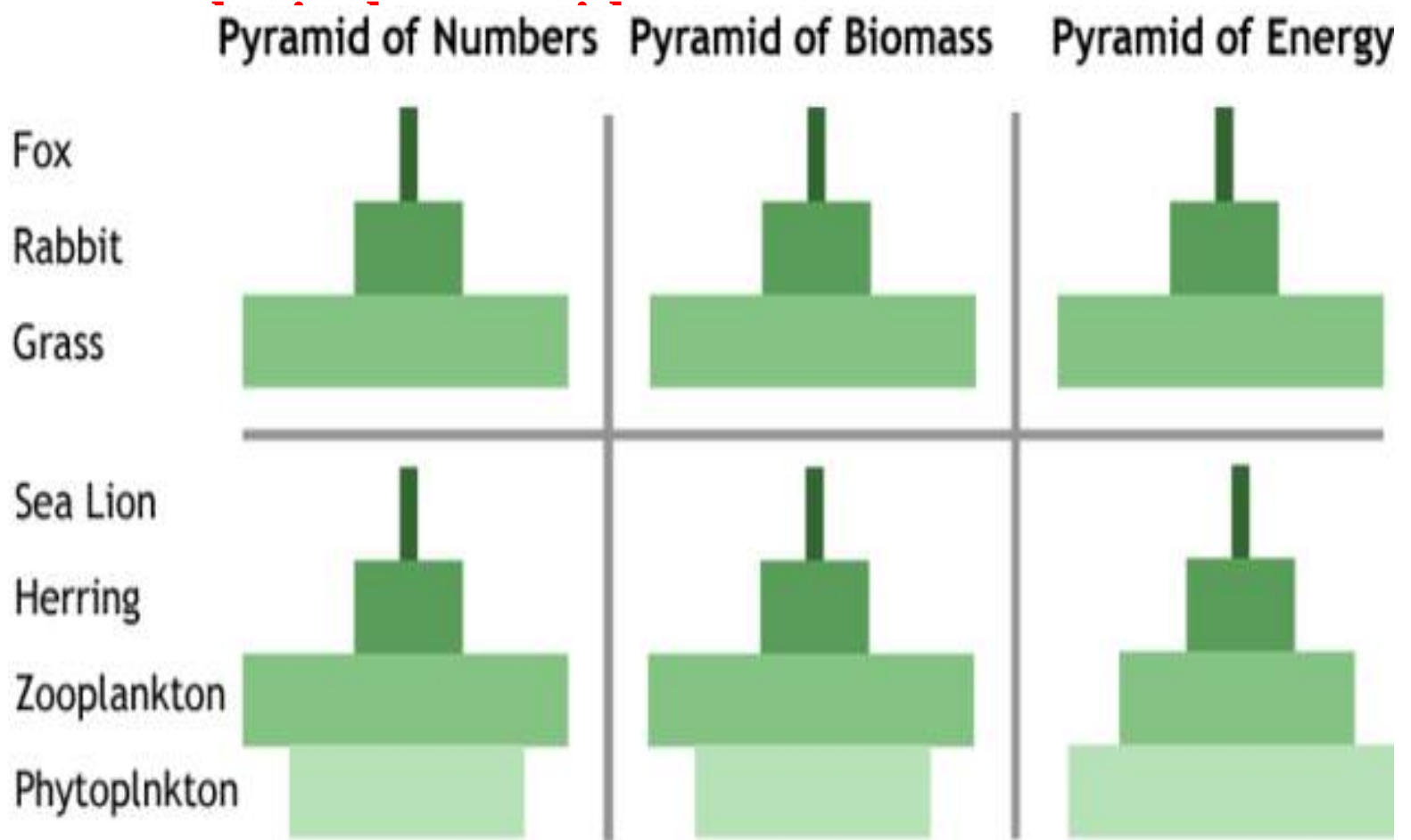


Pyramid of biomass

- ❖ **Biomass**; the total amount of organic matter
- ❖ Pyramid based on the dry mass of tissue of organism at each trophic level
- ❖ The total amount of biomass decrease as we go from producer to consumer
- ❖ At each trophic level biomass is lost by;
 - **Heat from respiration**
 - **Urine, faeces and to provide energy**
- ❖ **Limitation**
 - Gives equal value to tissue which differ in
 - Chemical Composition and energy value

Pyramid of energy

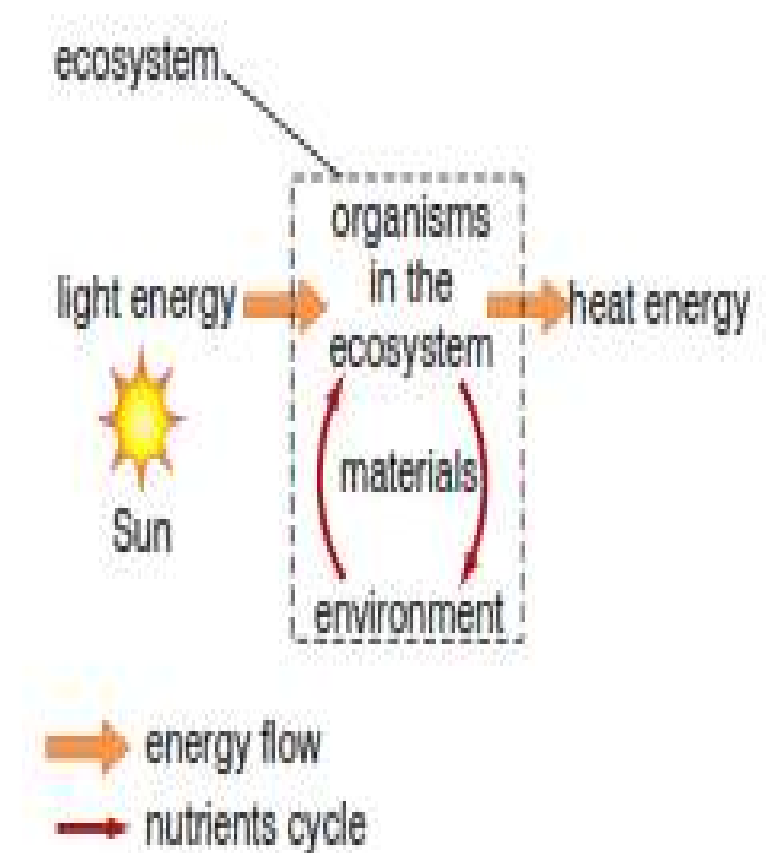
- ❖ Pyramid drawn based on the amount of energy produced at each trophic level
- ❖ It gives the most **accurate representation**



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6.3 RECYCLING IN NATURE

- ❖ **Nutrient** (carbon, nitrogen, sulfur, and water) recycled in an ecosystem between organism and environment
- ❖ **Decomposers (bacteria and fungi)** play a huge role in recycling
- ❖ **Energy** never recycling in an ecosystem

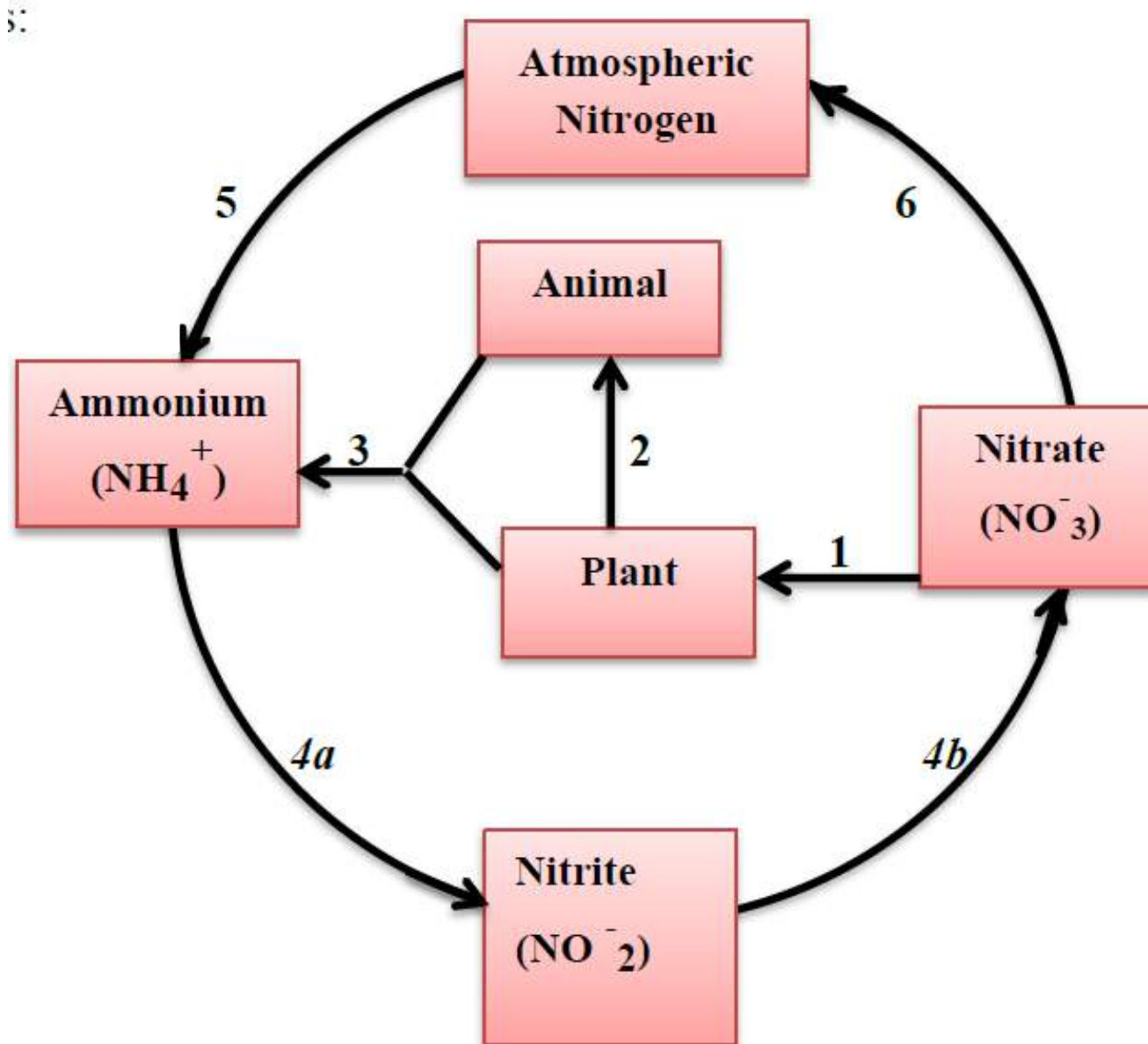


The nitrogen cycle

N₂ Is the part of protein, amino acid, DNA ATP

- 1) **Plant** absorb nitrate from the soil and make amino acid and protein
- 2) **Animal** obtains nitrogen by feeding of plant
- 3) **Putrefying /amonifying/ bacteria**; convert protein in dead bodies and their excretory product into ammonia
- 4) **Nitrifying bacteria** ; ammonium ion is oxidize into nitrates in two process 4a. Nitrosomonas 4b. Nitrobacter
- 5) **Denitrifying bacteria**; convert nitrates in soil into elemental nitrogen, reduce the amount of nitrogen in the soil
- 6) **Nitrogen fixing bacteria**; convert elemental nitrogen into ammonium ion
 - **Legumes (Pea, bean)**; in the root nodules of many legumes plant have symbiotically nitrogen fixing bacteria called rhizobium, which have the ability to fix nitrogen in the soil.

Nitrogen cycle



Carbon cycle

❖ Important process in carbon cycle

- ❖ **photosynthesis**; remove the amount carbon dioxide from the cycle
 - ❖ **respiration**;
 - ❖ **combustions**;
 - ❖ **decomposition**;
- } increase the amount of carbon dioxide in the atmosphere
- ❖ **Ozone**; layer of the atmospheres that protect the earth from harmful ultraviolet light from the sun
 - ❖ **Global warming**; is the rising of temperature on earth's surface as a result of accumulation of **green house gas like carbon dioxide and methane**
 - ❖ **Carbon dioxide CO₂** ; Increase as a result of human activity such as
 - **Combustion** Burning of fissile fuel,
 - **Deforestation**,
 - **Respiration**
 - ❖ **Methane**; It is increased in the atmosphere as a result of
 - Growth of rice in swampy condition
 - Digestive activity of cattle produce methane

ADAPTATIONS

- ❖ **Adaptations**; features of organism develop which make it possible for them to survive in a particular habitat
- ❖ **Animal in cold climate**
 - **Reduce surface area to volume** ratio, larger size like seal, whales and polar bear in order to prevent heat lost.
 - **Small extremities** like ear to reduce heat loss.
E.g. polar bear
 - **Thick layer of fat** under skin (blubber) to store more internal heat
 - Have **thick fur coat** on the outside will insulate an animal

Animal in dry climate

- ❖ The biggest challenge of animal live in desert
 - Coping with the lack of water
 - The rise of core body temperature
- ❖ Large surface area to volume ratio (small size) to loss more heat
- ❖ Obtains water from the food they eat
- ❖ Lot of sweat produced in order to cool the body
- ❖ Active in early evening and late evening
- ❖ Big ear like fennec fox to loss heat faster
- ❖ Thin fur coat in order to loss heat

Plant adaptation in desert

- ❖ Deep growing root system to absorb water
- ❖ Thick and fleshy stem, root to store more water
- ❖ **Sunken and few stomata** to reduce the amount of water loss
- ❖ **Thick waxy cuticle** to reduce the amount of water loss
- ❖ **Leaves are reduce** to reduce transpiration
- ❖ **Have curled leaves;** these reduce the surface area of the leaf and trap moist air around the leaf.

- ❖ **Camouflage**; is the ability of an animal to blend its color into the surrounding environment to avoid detection.
- ❖ Important both to predator (the prey does not see them coming) and to prey (they cannot be seen)
- ❖ **Arctic fox** change the **grey and browns** of their summer coat into pure white in winter