CHAPTER- 13
OUR ENVRONMENT

Content- Eco-system, Environmental problems, Ozone depletion, wastes production and their solutions, Biodegradable and non-biodegradable substances.

ECOSYSTEM

An ecosystem is a system consisting of biotic and abiotic components that function together as a unit.

- Biotic components- all the living things
- Abiotic components - non-living things like water, light, wind, soil etc.

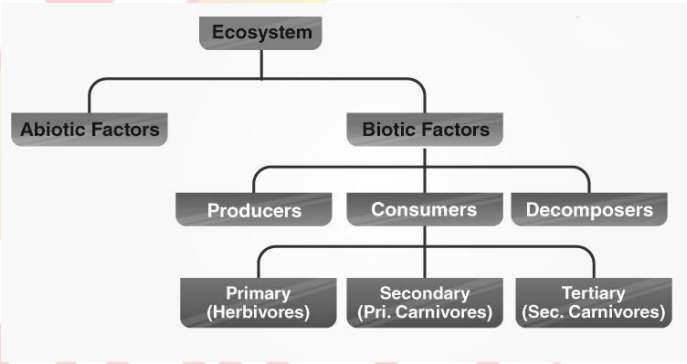
Ecosystem maintains a balance in the nature.

- Natural ecosystem – forest, pond, lake
- Man-made (artificial ecosystem)- crop fields, garden

Producer: autotrophic, perform photosynthesis e.g. green plants, blue green algae

Consumer: consume the food produced either directly from producer or indirectly by feeding on other consumers types of consumers:-

i- Herbivores – deer
ii- Carnivores – lion
iii- Omnivores – cat
iv- Parasites – bacteria



Decomposers: feed on dead and decomposed products. E.g. fungi, bacteria

Importance of Decomposers –

- Break down dead remains and waste products of organisms.
- Break down the complex organic substance into simple inorganic substances.
- Release minerals into the soil. Thus helps in maintaining the fertility of soil.
- Clean the environment
- Help in recycling the materials in the biosphere.

FOOD CHAIN

The sequence of living organisms in a ecosystem in which one organism consumes another organism to transfer food energy, is called a food chain.

For example

i- Grass---- Goat…Tiger
ii- Grass---- insects…..frog……snake.....eagle
iii- Planktons…..insects……fish……crane

TROPHIC LEVELS:

The various steps in the food chain at which the transfer of food (or energy) takes place is called trophic levels.
The different trophic levels are – Producers (T1), Primary consumers (herbivores-T2), Secondary consumers (primary carnivores -T2), Tertiary consumers(Sec carnivores -T3), Decomposers

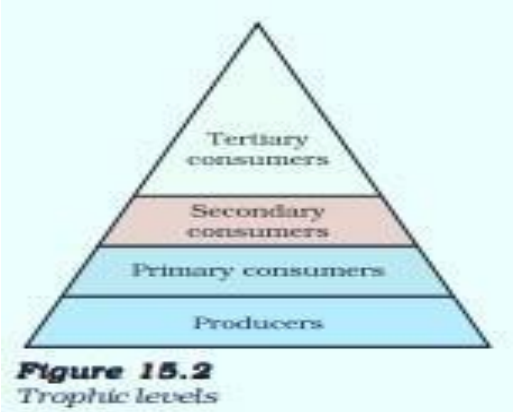
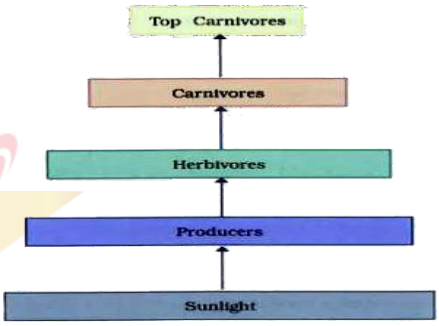


Figure 15.2
Trophic levels

Significance of Food Chains

- The food chain transfer energy from one trophic level to another.
- Autotrophs----------
  heterotrophs….....decomposers
- Only 10 % of energy is transferred from one trophic level to another. Rest of energy is lost as heat, into doing work, in digestion, growth, reproduction. It is called 10 % law.
- Help in study of food relationships and interactions among the various organisms in an ecosystem.



FOOD WEB

It is inter-connected food chains in an ecosystem.
It forms a network of relationship between various species.
In a food web, one organism may occupy a position in more than one food chain.
More stable food chain / food web means more stable ecosystem.

FOOD PYRAMID-

It is graphic representation of food chain.
It may be formed as, depicted as a pyramid having a broad base formed by producers and tapering to a point formed by end consumers.

BIOMAGNIFICATION

Accumulation of toxic pollutants at successive higher trophic level is called as bio magnification.

OZONE LAYER

- Ozone (O3) is a molecule formed by three atoms of oxygen.
- Ozone shields the surface of the earth from ultraviolet (UV) radiation from the Sun.
- UV radiation is highly damaging to organisms. It may cause even skin cancer in human beings.

- Ozone at the higher levels of the atmosphere is a product of UV radiation acting on oxygen (O2) molecule.
- The higher energy UV radiations split apart some molecular oxygen (O2) into free oxygen (O) atoms. These atoms then combine with the molecular oxygen to form ozone as shown—
- The ozone layer depletion takes place at higher rate. The major cause is chlorofluorocarbons (CFCs) which are used as refrigerants and in fire extinguishers.

BIODEGRADABLE AND NON BIODEGRADABLE WATSES

i- **Biodegradable Wastes**: These can be broken down by the biological processes. E.g. Food waste, plant parts, animal wastes, agricultural residue, paper etc. Decomposers can decompose these without harming ecosystem. Food waste, trees leaves, urine and fecal matter, sewage agricultural residue, paper, wood, cloth, cow-dung etc.

ii- **Non-biodegradable waste**- these can‘t be broken down by biological processes. E.g. - Chemical pesticides, DDT, mercury, lead, plastics, polythene bags etc. These wastes are major pollutants of the environment.

MAINTAININMG THE GARBAGE WE PRODUE

- Change in attitudes toward using only biodegradable items.
- Proper disposal of wastes
- Follow Sewage treatment norms
- 3 _R‘ principle- reduce , recycle, reuse

IMPORTANT QUESTIONS

Very Short Answer Type Question

Q1-The flow of energy in the food chain is unidirectional. Why?

Ans: Energy flows from sun to plants (autotroph), plants to animals (consumer).

Q 2- In a food chain, 10,000 joules of energy is available to the producer. How much energy will be available to the secondary consumer to transfer it to the tertiary consumer?

Ans: 10 J

Q 3- Producers always occupy the first trophic level in any food chain. Why?

Ans: Only producers have the ability to trap solar energy and manufacture organic food through the process of photosynthesis**.**

Q 4 - Name any two abiotic components of an environment.

Answer:

(a) Climatic factors (light, temperature, rainfall)

(b) Edaphic factor (Soil)

Q 5- Give any two ways in which biodegradable substance would affect the environment.

Ans: They keep the environment clean as they are easily decomposed.

They can easily go through the geochemical cycle with the help of decomposers.

Short Answer Type Question

Q6-What will happen if we kill all the organisms in one trophic level?

Ans: i- The organisms in specific trophic level will not be able to get the food

ii-It will cause a disturbance in food chain and therefore ecological imbalance will take place.

Q7- Why is a lake considered to be a natural ecosystem?

Ans: In Lake living organisms grow, reproduce and interact with other biotic and abiotic components. In lake different components carry out all activities in nature by themselves without any human interference; therefore it is referred to as a natural ecosystem.

Q 8 - How can we help in reducing the problem of waste disposal? List two ways.

Ans: i-Separation of biodegradable and non-biodegradable wastes

ii-Preparation of compost / vermicomposting from biodegradable waste

iii-Recycling of waste

Q 9- Which gas shield the surface of earth from harmful radiation of the sun. why these radiations are supposed to be harmful for us?

Answer- Ozone gas

Harmful radiation of the sun like UV radiation may causes skin cancer, cataract, fall in immunity in infants, decline in photosynthesis rate etc

Q 10- In a certain study conducted on the occurrence of DDT along food chains in an ecosystem, the concentration of DDT in grass was found to be 0-5 ppm. In sheep, it was 2 ppm and in man it was 10 ppm. Name the phenomenon and define?

Ans: Bio-magnification

Bio-magnification is the increase in the level of a toxic substance with each successive rise in the trophic level of a food chain.

Long Answer Type Questions

Q11- Why bacteria and fungi are called decomposers? List any two advantages of decomposers to the environment.

Answer: Decomposers degrade breakdown the complex organic substances into simple inorganic substances that go into the soil and are used up once more by the plants.

Advantages:

i- Clean environment by decomposing dead bodies of plants/ animals

ii- Replenish nutrients (Inorganic substance) into soil

iii- Helps in Nutrient recycling

Q12- Answer the followings-

i- What is ozone? How is it formed in the atmosphere?

ii- How ozone layer is useful

iii- Name the substances responsible for the depletion of ozone layer.

Ans:

i- Ozone is triatomic form of oxygen, O3. Ozone is formed in the upper atmosphere by the action of ultraviolet (UV) radiations over oxygen (O2)

ii- It protects us from harmful UV radiation of sun.

iii- The important ozone depleting substances chlorofluorocarbons (CFC), methane, N2O, chlorine.

Q13- (a) Write two harmful effects of using plastic bags on the environment. Suggest alternatives to the usage of plastic bags.

(b) List any two practices that can be followed to dispose of the waste produced in our homes.

Ans: (a) Harmful effects of using plastic bags :

(i) These are non-biodegradable substances. They cannot be decomposed and therefore remains as pollutants in nature for many years.

(ii) The plastic bags choke drains and causes waterlogging.

(iii) The pastic release harmful chemicals in soil, water slowly over to years.

Jute bags and cloth bags are the alternatives to the polyethene bags.

(b) Practices to dispose off the waste produced in our homes:

(i) Separation of biodegradable and non- biodegradable wastes.

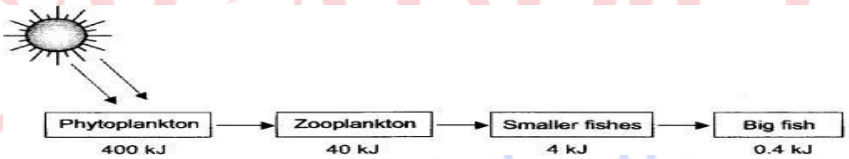
(ii)The biodegradable waste can be converted to manure.

(iii) Non-biodegradable waste should be disposed off at suitable places from where municipal authorities can pick them up and dispose properly and scientifically.

(iv) Reuse the waste

Q14- Draw a line diagram to show flow of solar energy in ecosystem

Ans:



Q 15- In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producer?

Ans : simple food chain

Plants ———> Deer ———> Lion.

As per 10 % law only 10 % of energy is transferred to next trophic level-

Energy available to deer = 100J x 10 = 1000 J

Energy available to plants = 1000 x 10 = 10,000 J.