Solution 21
Pesticides are non - biodegradable chemicals, so they get accumulated at each trophic level. Since humans occupy the top level in any food chain, so the maximum amount of harmful chemical pesticides gets accumulated in our bodies. This damages our health gradually.
Solution 22
The increase in concentration of harmful chemical substances like pesticides in the body of living organisms at each trophic level of a food chain is called biological magnification. The organism which occurs at the highest trophic level (on the extreme right side) in the food chain will have the maximum concentration of harmful concentration of harmful chemicals in its body. In this case grass is eaten by grasshopper; grasshopper is eaten by frog; frog is eaten by snake and finally snake is eaten by peacock. So, the food chain will be:

Grass ⟶ Grasshopper ⟶ Frog ⟶ Snake ⟶ Peacock

Since the peacock occurs at the highest trophic level (on the extreme right side) in this food chain, it will have the maximum concentration of harmful chemicals in its body.
Solution 23
The accumulation of harmful chemicals such as pesticides in the living organisms like plants, animals and humans (men) through the food chain is called bio-concentration of pesticides. DDT has accumulated in human body through food chains.
Solution 24
The household wastes are called garbage. It includes left -over food, fruit and vegetable peels, waste paper, unwanted plastic objects etc.
Solution 25
The various modes of waste disposal are:
(i) Recycling
(ii) Preparation of compost
(iii) Incineration
(iv) Landfill
(v) Sewage treatment
Solution 26
The solid wastes like papers, plastics and metals are recycled. For example - waste paper is send to paper mills where it is reprocessed to form new paper once again.
Solution 27
Preparation of compost is a method in which the disposal of household wastes such as left-over food, fruit and vegetable peels and leaves of potted plants can be converted into compost by burying in a pit dug into the ground and is used as manure.
Solution 28
Incineration means reducing to ashes. It is used to destroy the household waste, chemical waste and biological waste.
Solution 29
Most of the solid waste in urban areas is dumped in low line areas of ground and covered with earth to level the uneven ground. This method is called landfill.

Solution 30
The advantages of using disposable paper cups over disposable plastic cups are: (i) Paper cups are biodegradable. So, even if paper cups are thrown away after use, they will decompose (break down) automatically by the action of micro-organisms in due course of time. On the other hand, plastic cups are non-biodegradable. They will remain as such and pollute the environment. (ii) Paper cups can be disposed off by burning without causing much air pollution. On the other hand, burning of plastic cups produces toxic gases (poisonous gases) which causes too much air pollution.
Solution 31
The dirty drain water containing urine and faeces which is carried from our homes by the underground pipes (called sewers) is called sewage. Sewage is disposed off by treating it at the sewage treatment plant (or sewage works). The treatment of sewage produces clean water which is discharged into the river. The organic matter present in sewage is 'digested' in the digesters of sewage treatment plant to produce 'sewage gas' (which is kind of biogas) and manure.
Solution 32
Harmful effects of ozone depletion are:
(i) It can cause skin cancer.
(ii) It damages the eyes by causing the eye disease called cataract.
(iii) It damages the immune system by lowering the body's resistance to diseases.
Solution 33
If the ozone layer in the atmosphere disappears completely, then all the extremely harmful ultraviolet radiations coming from the sun would reach the earth. These ultraviolet radiations would cause skin cancer and other ailments in men and animals, and also damage the plants.
Solution 34
(a) The energy from sun flows through various trophic levels. The food and energy are transferred from producer organisms to herbivores and from herbivores to carnivores, through the food chain. First Step - The green plants trap solar energy with the help of green pigment called chlorophyll which converts the sunlight energy into chemical energy. This gets stored as carbohydrates in the plants. About 1% of the sun's energy falling on the leaves is used by the plants in the process of photosynthesis and stored as chemical energy of food. The plants utilize the stored energy for their metabolic activities like respiration and growth. Some of the energy is not utilised and it is released as unusable heat into the environment. Second Step - The plants are eaten up by herbivores and the chemical energy of plants is transferred to them. The herbivores utilize this energy for various metabolic activities and release unused energy as heat energy to the environment.
Third Step - The herbivores are eaten up by carnivores. The chemical energy stored in the flesh of herbivores is transferred to the carnivores and they utilise this energy for their metabolic activities like respiration and growth and some of the energy which remains unutilised, is released into the environment. This process of transfer of energy is repeated with large carnivores and so on.

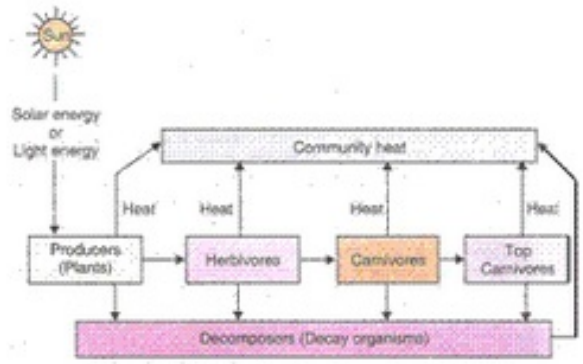


Diagram to show the transfer of energy in a food chain.

(b) The flow of energy in the ecosystem is said to be unidirectional because the energy lost as heat from the living organisms of a food chain cannot be reused by plants in photosynthesis.
Solution 35
(a) Ozone is a poisonous gas. It is made up of three atoms of oxygen combined together. It is formed high up in the atmosphere by the action of ultraviolet radiation on oxygen gas. The high energy ultraviolet radiation (UV radiation) coming from the sun splits oxygen gas into free oxygen atoms.

$$\underset{\text{Oxygen molecule}}{O_2} \xrightarrow[\text{(From sun)}]{\text{UV radiation}} \underset{\text{Oxygen atom}}{O} + \underset{\text{Oxygen atom}}{O}$$

The free oxygen atoms thus produced are very reactive. One oxygen atom reacts with an oxygen molecule to form an ozone molecule:

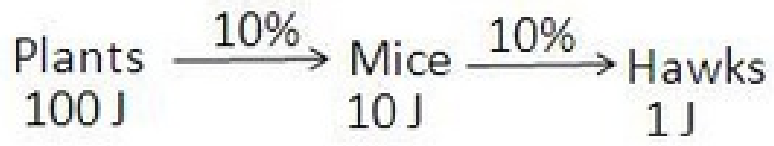
$$\underset{\text{Oxygen molecule}}{O_2} + \underset{\text{Oxygen atom}}{O} \longrightarrow \underset{\text{Ozone molecule}}{O_3}$$

(b) Ozone layer protect us from harmful effects as it absorbs most of the ultraviolet radiations coming from the sun and prevents them from reaching the earth.
(c) UNEP - United Nation Environment Program. In 1987, in an attempt to protect ozone layer, the United Nations Environment Program (UNEP) forged an agreement among its member countries to freeze CFC production at 1986 levels.
Solution 36
(a) The energy enters the living components of the ecosystem through the process of photosynthesis. (b) (i) The producer level in the food chain are plants, so 100 J of energy is available in plants as food. Applying the 10% law to the above food chain:
1. According to the 10% law, 10% of energy of plants will be available as food in mice. Thus, the energy available to mice will be 10% of 100 J, which is 10 J.
2. The energy available to snakes will be 10% of 10 J, which is 1 J.
3. The energy available to hawks will be 10% of 1 J, which is 0.1 J.

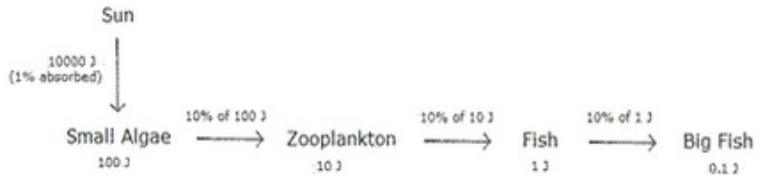
$$\underset{100\ J}{\text{Plants}} \xrightarrow{10\%} \underset{10\ J}{\text{Mice}} \xrightarrow{10\%} \underset{1\ J}{\text{Snakes}} \xrightarrow{10\%} \underset{0.1\ J}{\text{Hawks}}$$

(ii) The producer level in the food chain is plants, so 100 J of energy is available in plants as food. Applying the 10% law to the above food chain:
1. According to the 10% law, 10% of energy of plants will be available as food in mice. Thus, the energy available to mice will be 10% of

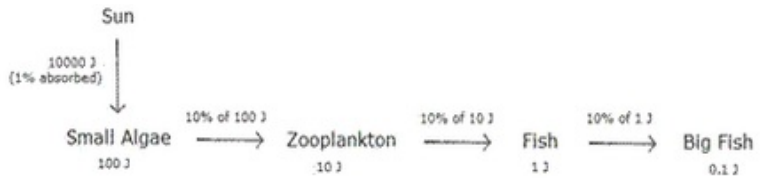
100 J, which is 10 J.
2. The energy available to hawks will be 10% of 10 J, which is 1 J.



Hawks will get more energy in food chain
(i) because in this food chain there are three trophic levels so the energy available will be more as compared to food chain
(ii) which has four trophic levels.
Solution 37
(a) Food chain generally consists of three or four steps because after that the energy available for the next organism will be so small that it will be insufficient to sustain the life of that organism.
(b)
(i) Small algae can trap only 1% of the sun's energy falling on them. 1% of 10,000 J is 100 J, so the small algae have 100 J of energy available.
(ii) Small algae are eaten up by zooplankton. According to the 10% law, 10% of 100 J is 10 J of energy which is available in zooplankton.
(iii) The zooplankton will transfer 10% of its 10 J energy to the fish. Thus, the food energy available to the fish will be 10% of 10 J, which is 1 J.
(iv) 10% of 1 J will be transferred to big fish which will be 0.1 J. The above result can be clearly shown as:



Solution 38
(a) The law given by Lindeman is 10% law. According to 10% law, only 10% of the energy entering a particular trophic level of organisms is available for transfer to next higher trophic level.
(b) (i) Paddy can trap only 1% of the sun's energy falling on them. 1% of 10,000 J is 100 J, so paddy have 100 J of energy available in them as food.
(ii) Paddy is eaten up by mice. Now according to the 10% law, 10% of 100 J is 10 J of energy which is available in mice.
(iii) The mice will transfer 10% of its 10 J energy to the snake. Thus, the food energy available to the snake will be 10% of 10 J, which is 1 J.
(iv) 10% of 1 J will be transferred to hawk which will be 0.1 J.



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