**Unit-I**

**INTRODUCTION**

Environmental

5thjune \_ World Environmental day

11thjuly \_ World Population day

16thjuly \_ World Food day

24thoct \_ UNO(United National Organization)

15thsep \_ National Engineers Day

28thfeb \_ National Science Day

Environment :-

The word environment was derived from French word “Environner” which means Encircle (or) Surrounding.

 (or)

 Environment means surroundings of organisms in which they live.

 (or)

Environment can be defined as one’s surroundings of organisms. i.e., living and non-living things.

Environmental studies:-

The detailed study of environment and its induced changes on organisms and vice versa.

 It is a inter disciplinary subject.

The information or content present in environment studies drawn from Geology, Botony ,Physics ,Chemistry ,Biology ,Economics ,Engineering ,etc.,

Scope of Environmental Studies:-

The scope of environment studies is huge and covers the large no. of areas and aspects which are broadly listed below.

1. Eco systems
2. Bio diversity
3. National resources
4. Environment pollutions
5. Environment problems
6. Economy and Environment
7. Social issues and etc.,

Importance of Environment Studies:-

Environment Studies deals with most important issues belongs to all thus it is important to all.

1. Environment Studies how man can derive benefits from environment without destroying it.
2. It tells about hygenicliving conditions.
3. It is important for economy and welfare of human society.
4. It directs attention towards the problems of population explosion, environmental pollution, various social issues and the methods of solving such problems.
5. It helps to understand different food changes, food webs and ecological balance in nature.
6. It creates civil scene and awareness on political and ecological inter dependence of the modern world.
7. It tells the need to respect and follow the environment facts.

Objectives or Goals:-

1. To know the important of environment studies.
2. To educate or motivate the students / people for learning for various environment studies.
3. To create awareness about the need of protecting the environment.
4. To know the need of alternate energy resources.

Components of Environment:-

The components of environment are classified into 2 types.

1. Abiotic components.
2. Biotic components.

Abiotic components:-

The Abiotic components of environment are non-living things which include soil, water, wind, air, sunlight, etc.,

 These are grouped into 3 types.

1. Atmosphere
2. Lithosphere
3. Hydrosphere
4. Atmosphere :-

Atmosphere is a thin layer of mixed gases around the earth upto 500km. It is a gaseous envirtar , which consisting essential gases and elements for life. The main function of atmosphere is filtering the UV radiation coming from sun and maintaining heat balance around the earth. The atmosphere consisting 4 major regions. They are

1. Troposphere
2. Stratosphere
3. Mesosphere
4. Ino&Thermosphere
5. Troposphere :-

It is the lower most layer of the atmosphere which extends upto 8 to 18 km above the earth surface.

Temperature in this region drops to -500 c to -600c. It contains above 3/4thof the atmospheric mass. In this region all living organisms are exists.

1. Stratosphere :-

It extends upto 50 km above the earth surface. Temperature in this region increases upto -40c. It has sufficient amount of ozone gas. Hence it is called ozone (layer) sphere. It absorbs UV radiations. It is free from clouds and aeroplanes fly in this zone. The combination of Troposphere and Stratosphere from about 99.9% of the mass the atmosphere.

1. Mesosphere :-

It is a portion above the stratosphere which extends upto 80 to 90 km. The temperature in this region drops to -120F to -80.4c. Hence it is cold sphere.

1. Ino&Thermosphere :-

It extends upto 500km. In this sphere molecules are characterized as Ions. Hence it is called Ino sphere. Beyond the sphere temperature reached to 2000c.

1. Lithosphere :-

The solid component of earth is called Lithosphere. It is a source of many essential materials required for the biotic community most of the human as well as natural activities need space for their location and development. The earth consisting three important layers.

They are crust, mantle and core.

* Crust:-
* Its thickness about 90-100 km.
* Its surface is covered with soil and composition of crust is very complex containing oxygen, nitrogen, sodium, potassium, iron, carbon, magnesium, etc. ,
* It is 31.5% of the mass of the earth.
* Mantle :-
* Its thickness about 2900km.
* It is in molten state, main elements are in oxide form (SiO2, MgO, Fe2O8, etc.,).
* It is 68% of the mass of the earth.
* Core :-

- Its radius about 3400km which is divided into two parts.

- They are outer core and inner core.

- Outer core is in liquid and inner core is in solid state.

- Nickel and Iron are the chief / major elements.

1. Hydrosphere:-

 Water component of earth is called hydrosphere. It consists oceans, seas, glaciers, rivers, lakes and ground water. About 70% of earth surface is occupied / covered by hydrosphere. In that 97% of water available as salt water,2% of water locked in the polar region as ice and remaining 1% water is available as surface and ground water.

Biotic components / Biosphere:-

The biosphere is aassembrage/composition of plants,animals and microorganism. It is the region of the earth where life exists. Since Biosphere is large and complex for better understanding it is divided into small units called eco-systems.

# Eco-systems:-

In 1935 A.G. Tansley introduced the term eco-system.

Eco-system has been defined as “A system of inter action of organism with one another and their surrounding”.

Eg: Forest, river, Mountain, grassland, Garden, etc.,

Characteristics of Eco-system:-

* Eco-system is a fundamentalunits of Ecology.
* It consists both biotic and abiotic components.
* The function of eco-system is cycling of materials and flow of energy.
* The boundary of eco-system is not rigidly/stable defined and it is flexible.
* The amount of energy needed to maintain an eco-system depends on its structure.

Eg: pond,river,sea.

Classification:-

 Eco-system

1. Natural 2. Artificial
2. Terrestial / Land b. Aquatic

 Fresh water Marine water

 Running Standing

 The Eco-system is classified into two types.

1. Natural system.
2. Artificial system.
3. Natural system:-

These are developed and govern by nature. These are capable of operating and maintaining themselves without any human interaction.

Eg: Forest, ocean, River, desert.

On the basis of type of habitat these are sub-divided into 2 types.

1. Terrestial Ecology
2. Aquatic Ecology
3. Terrestial Ecology:-

These systems relates to biotic components living on the land.

Eg: Forest, Ocean, Mountain, grassland, etc.,

1. Aquatic Ecology:-

System relates to biotic components living in water and are two types.

1. Fresh water Eco-logy\_ pond, river, lake.
2. Marine water Eco-logy\_ Oceans, seas.

2. Artificial Eco-system:-

These are created and maintained by man for his different needs and desires. The man has to control biotic community as well as physical and chemical environment.

Eg: Agriculture land, Garden, Aquaculture pond, Aquarium, etc.,

Structural Component of Eco-system:-

Each and every Eco-system has two major components which are functioning in an inter-related manner. They are

1. Biotic components
2. Abiotic components
3. Biotic components:-

The living organisms include plants, animals and micro-organisms are the biotic components of an eco-system. Based on their nutritional behavior, they are grouped into 3 types

1. Producers
2. Consumers
3. Decomposers
4. Producers or Autotrophs:-

Organisms that are capable of making their required food themselves. Mostly green plants can prepared their acquired energy by utilizing atmospheric Co2, water and nutriants in the presence of sunlight.

 sunlight

6Co2+6H2O C6H12O6+6O2

Eg: plants, Algae, photo synthetic bacteria.

1. Consumers or Heterotrophs:-

Organisms which depend on other for their acquired energy are known as consumers are classified into 3 types.

* + - * Herbivores /Primary
			* Carnivores / Secondary
			* Omnivores / Tertiary
* Herbivores / Primary:-

Herbivores are the consumers that eat plants and seeds for their energy. (vegetarian diet ).

Eg: Rabbits, cow, goat.

* Carnivores / Secondary:-

The organisms that feed on herbivores are called Carnivores.

Eg: Snake, Frog, Lion, tiger.

* Omnivores /Tertiary:-

Omnivores eat both plants and animals such as human, rat.

1. Decomposers /Saptrotrophs:-

Decomposers break down the dead organic matter into simple inorganic nucleance and release to environment.

Eg: Micro-organisms.

1. Abiotic components:-

There are non-living things of an Eco-systems which are two types.

Physical parameters such as rain, water, sunlight, soil.

Chemical parameters such that these are inorganic nutrients like carbon, hydrogen, nitrogen, calcium, Co2, etc., and Organic substances like carbohydrates, amino acids, proteins, etc.,

Functions Of eco-system:-

1. Energy flow through the cycling of nutrients:-
2. Existing of food chains:-

A food chain is a model that shows the flow of energy from an organism to series of organism in an Eco-system

Grass Grasshoppers Frog Snake Hawk.

Leaf Rabbit Man

Food chains are two types.

* + - Grazing food chain:

Starts from living pants, Algae and goes on to herbivores on to carnivores.

* + - Dertitus food chain:

It initiates from dead matter into microorganisms.

1. Existing of food web:-

It is a network of food chain where different types of organisms are connected at different trophic levels. This means that several food chains are connected together to from food web. Food webs gives greater stability for an Eco-system.

# Biodiversity:-

 The word biodiversity is introduced by the biologist E.O. Wilson in 1985.

Biodiversity refers to the variety and variability among living organisms n Eco-system.

The study of biodiversity needs for its conservation purpose.

Classification:-

 The biodiversity is classified into 3 different but closely related aspects. They are

1. Genetic diversity
2. Species diversity
3. Eco-system diversity
4. Genetic diversity:-

Variation of jeans with in species causes several varieties which are slightly differ from each other each other is called Genetic diversity. The variation can be in size, shape, quality, resistance to insects and decreases.

Eg: variation of rice shows variation at the genetic level and differ in their colour, size, shape and nutrients content.

1. Specific diversity:-

The no. of species or variety of species present in an Eco-system is called species diversity. It is a common level of diversity, it represents richness of a species in a particular place.

 Category no. of Billion (1 billion=100 crores)

 Human 7.2

 Bacteria 2.165\*1021

 Land plants 721\*1021

 Insects 31416\*1018

1. Eco-system diversity:-

It is variety of Eco-system in a given place. It shows variations in biological communities, trophic structure, food webs and also physical parameters.

Eg: variety of habitats in grassland, forest and aquatic Eco-systems.

Values of biodiversity:-

There are several ways that biodiversity in various forms are useful to humans. They are

* + - Direct values
		- Indirect values
* Direct values:-

These values are also called commodity values which are assign to the products of biodiversity harvested by the people.

These can be further subdivided as

1. Consumptive use values
2. Productive use values
3. Consumptive use values:-

These are direct use values where the biodiversity products are consumed directly by human.

Eg: vegetables, fruits, milk, honey, etc.,

1. Productive use values:-

These are the commertially use values where the biodiversity products are manufactured, marketed and sold.

Eg: Paper, furniture, clothes, leather, products, etc.,

* Indirect values:-

Biodiversity provides indirect benefits to us, which are difficult to quantity and are many types.

1. Natural services
2. Social / cultural values
3. Aesthetic values
4. Optional values
5. Ethical values
6. Natural services / Non-consumptive:-

These have benefits such as rainfall, soil protection, air purification, flood control, climate regulation, predicting the natural disasters, etc.,

1. Social / cultural values:-

These are values associated with social life, customs, religious, aspects of people.

Eg: Worship of trees like Thulasi, neem, X-mas tree, etc.,

1. Aesthetic values:-

Many species of birds, animals, aquatic falls and gardens are appreciated for their view millions of people enjoying with world watching, wildlife watching, hunting, natural history studying, fishing, etc., In inspites the musicians, painters, writers, poets and other artists. These are all some examples of aesthetic rewards of biodiversity.

1. Optional values:-

The optional values of species or biodiversity is defined as its potential to provide our economic benefits in the near future. These includes potential of biodiversity.

i.e., presently unknown and need to explore.

 e. Ethical values:-

Moral justification for conservation of biodiversity is based on belief. These values tells to people that they have beauties to pleasure and protect the biodiversity.

Threats to Biodiversity:-

During the last century loss of biodiversity has been increasing studies. So that 30% of all natural species will be extinct by 2015. Due to human impact on eco-system this extinction rate is accelerated. If the present trend continuous million kinds of plants animals and microorganisms may be disappear.

Reasons for loss of biodiversity:-

 There are several ways that biodiversity is affected by human activities. They are

1. Habitat values:-

Habitat is a natural home of organisms where to survive and rebuilt their species. The habitat is destroyed by man for his settlement, irrigation, mining, dam, etc., as a consequence of this species must either adopt the changes or move to elsewhere or eventually die.

1. Poaching:-

It is illegal killing of wild life for their meat, skin and other valuable organs. It is a civiour threat to wild life.

Elephants - Ivary

Tiger – Skin

Rhinoes – Horns

Bear – Variety of body parts.

1. Land degradation
2. Desertification
3. Floods
4. Over grazing
5. Industrialization
6. Urbanization
7. Transportation, etc.,

Conservation of Biodiversity:-

The enormous value of biodiversity due to their direct and indirect benefit emphasys the need to protect the biodiversity. A no. of measures are now being taken the world over to conserve biodiversity.

There are two approaches of biodiversity conservation.

* + In situ conservation
	+ Ex situ conservation
* In situ conservation:-

It is a mode of conserving the species in its natural habitat under this type of conservation the entire eco system is protected.

i.e., all the constituent species which are known and unknown are conserved.

Under this type of conservation several projects have been established in our country they are biosphere reserves, national parks, sanctuaries, reserved forest, protected areas.

Biosphere Reserves:-

 The biosphere reserves conserve some representative eco system as a goal for a long time. It protect larger areas of natural habitat and often include two or more national parks.

Eg: Sundarbans– West Bengal

 Nanda Devi –Uttarkhand

Manas – Assam

Similipal - Odissa

National parks:-

A national park is an area dedicated for the conservation of wildlife along with its environment. Grazing of domestic animals, foresty activities are prohibited national park.

Each National park usually aims at conservation of particular species of a wildlife along with its environment.

 Eg: Gir – Lion - Gujarath

 Periyar – Tiger &Eleplants - Kerala

 Ranthambar National park – Tigers - Rajasthan

 Kaziranya National park – Rhino – Assam

Santuaries:-

Santueries are also protected areas where shooting of wildlife and birds are allowed under the control of highest authority.

Eg: Pulicat – bird sanctuary - Andhra Pradesh

 Ghana – bird sanctuary – Rajasthan

Hazaribagh – wildlife – Bihar

* Ex situ conservation:-

Ex situ conservation is the maintainance and breeding of undangered species under circum conditions & locations. It refer to conservation of species in suitable location outside their national habitat.in this method animals are put in zoological parks and plants in Botanical gardens under artificially managed conditions.

Eg: zoo’s, botanical gardens, Genetic resources, Tissue culture.