

SEMESTER – IV

OPTIONAL COURSE - ENVIRONMENTAL EDUCATION

Credits: 4

Marks: 100

E-Learning Study Material

Course Learning Outcomes

At the end of this course, the student teacher will be able to understand the fundamentals of Environmental Education and Ecosystems.

Fundamentals of Environmental Education

Environment: Meaning, Components (Biotic and Abiotic) -Natural Resources (Water, Forests, Wild Life, Fisheries, Biodiversity) - Concept of Ecosystem: Ecological Pyramids and Food Web - Human Ecology: Human beings as part of the Environment and Human adaptations to Environment- Environmental Education: Meaning, Objectives, Nature, Scope, Guiding principles and Importance of Environmental Education.

Meaning of Environment

The environment is everything that is around us. Environment means the surroundings or conditions in which a person, animal, or plant lives or operates. It also means the natural world, as a whole or in a particular geographical area. The environment is the sum total of water, air, and land, inter-relationships among themselves and also with the human beings, other living organisms and property.”

Components (Biotic and Abiotic) of Environment

It can be living (biotic) or non-living (abiotic) things. It includes physical, chemical, and other natural forces. The sum total of all surroundings of a living organism, including natural forces and other living things, which provide conditions for development and growth as well as danger and damage. Non-living things and conditions like mountains and valleys, rivers and streams, rocks and soils, sunlight and heat, and rain and snow make up the physical part of the environment.

The three types of environments

From a biological point of view, all environments in the Universe can be categorized into one of three types: uninhabitable, uninhabited habitat or inhabited habitat.

BIODIVERSITY

Biodiversity in India is unique. This means many of the life forms that are found in our country are found nowhere else in the world. A key to understanding this uniqueness is the knowledge of the habitats and ecosystems where these plants and animals are located.

Ecosystems -Concept of Ecosystem

What is a simple definition of an ecosystem?

An ecosystem is a large community of living organisms (plants, animals, and microbes) in a particular area. The living and physical components are linked together through nutrient cycles and energy flows. Ecosystems are of any size, but usually, they are in particular places.

Types of ecosystems

The major types of ecosystems are forests, grasslands, deserts, tundra, freshwater and marine. The word “biome” may also be used to describe terrestrial ecosystems which extend across a large geographic area, such as tundra.

Formation of ecosystems

An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life. Ecosystems contain biotic or living, parts, as well as abiotic factors, or nonliving parts.

Components of ecosystems

An ecosystem includes all of the living things (biotic - plants, animals, and organisms) in a given area, interacting with each other, and also with their non-living environments (abiotic -weather, earth, sun, soil, climate, atmosphere).

VARIOUS TYPES OF ECOSYSTEMS

Terrestrial Ecosystem.

We live in terrestrial ecosystem. They are those zones or regions where organisms (animals, plants, etc.) live and develop in the soil and in the air that surrounds a certain terrestrial space. In these places, it is assumed that living things that inhabit the ecosystem find everything they need to be able to survive.

Pond as an ecosystem

A pond or lake ecosystem includes biotic (living) plants, animals and micro-organisms, as well as abiotic (non-living) physical and chemical interactions. Pond and lake ecosystems are prime examples of lentic ecosystems. Lentic refers to stationary or relatively still water, from the Latin *lentus*, which means sluggish.

MARGINAL ECOSYSTEM are people-induced ecosystems. Usually occurring in the circumference of other ecosystems, these are converted systems of forests, cropland, and coastal areas.

MANGROVE ECOSYSTEM are located in saltwater and muddy portions of the coastline where the freshwater from the rivers and saline water from seas meet. It provides food and shelter to various marine organisms from its prop roots.

SEAGRASS ECOSYSTEM are called the meadows of the sea. They are the source of food for plant-eating animals such as seacows or dugong, sea urchins, turtles, and other fishes. □ The shady effect of seagrass protects the organisms from strong sunlight and temperature and salinity fluctuations. It also acts as nurseries for the very young fishes and ensures the sustainability of fish production.

SOFTBOTTOM ECOSYSTEM

URBAN ECOSYSTEMS - Refers to the loci of human activities.

The importance of ecosystems are:

1. They are habitats for diverse species.
2. Provide raw materials for pharmaceutical products.

3. Provide raw materials for breeding higher-yielding strains.

Food Chains, Food Webs, and Ecological Pyramids.

A food chain is the simplest path that energy takes through an ecosystem. Energy enters from the sun. Each level in the transfer of energy is a trophic level. Organisms at each level use energy in cellular respiration and heat loss and store the rest.

Food chain is a linear sequence of organisms which starts from producer organisms and ends with decomposer species. Food web is a connection of multiple food chains. Food chain follows a single path whereas food web follows multiple paths. From the food chain, we get to know how organisms are connected with each other.



FIGURE 1.1 FOOD CHAIN

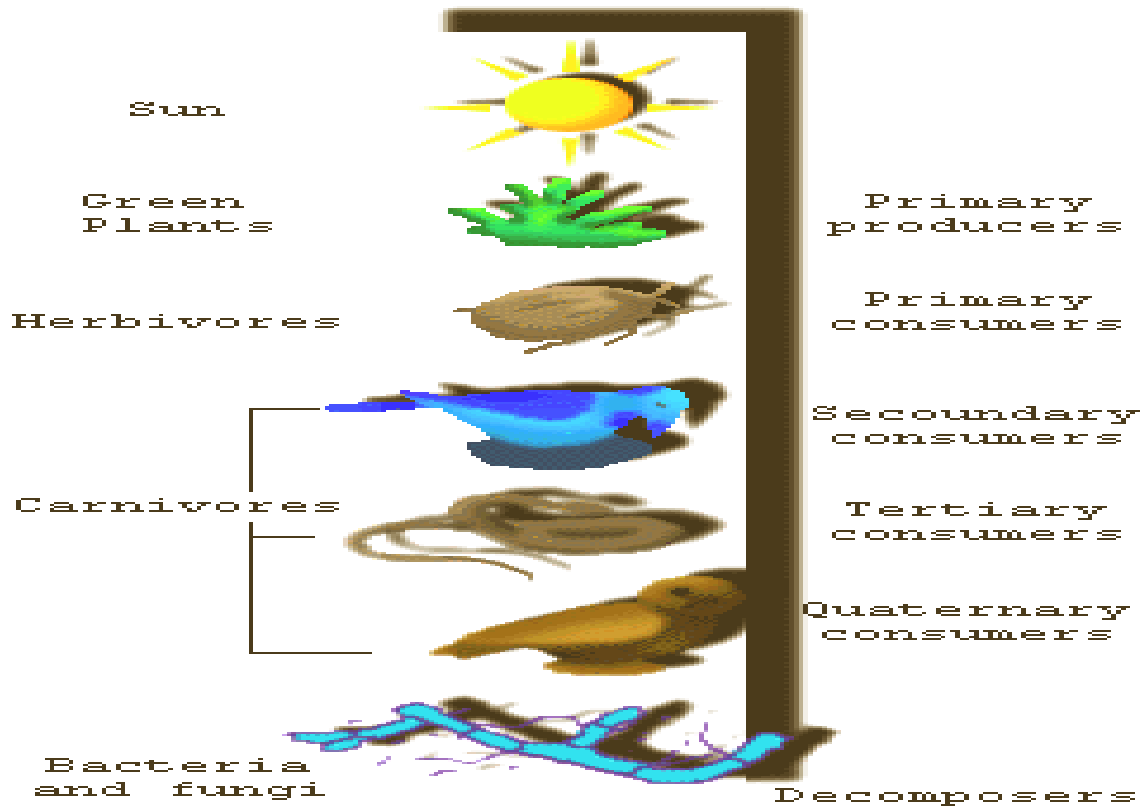


FIGURE:1.2 ECOLOGICAL PYRAMID

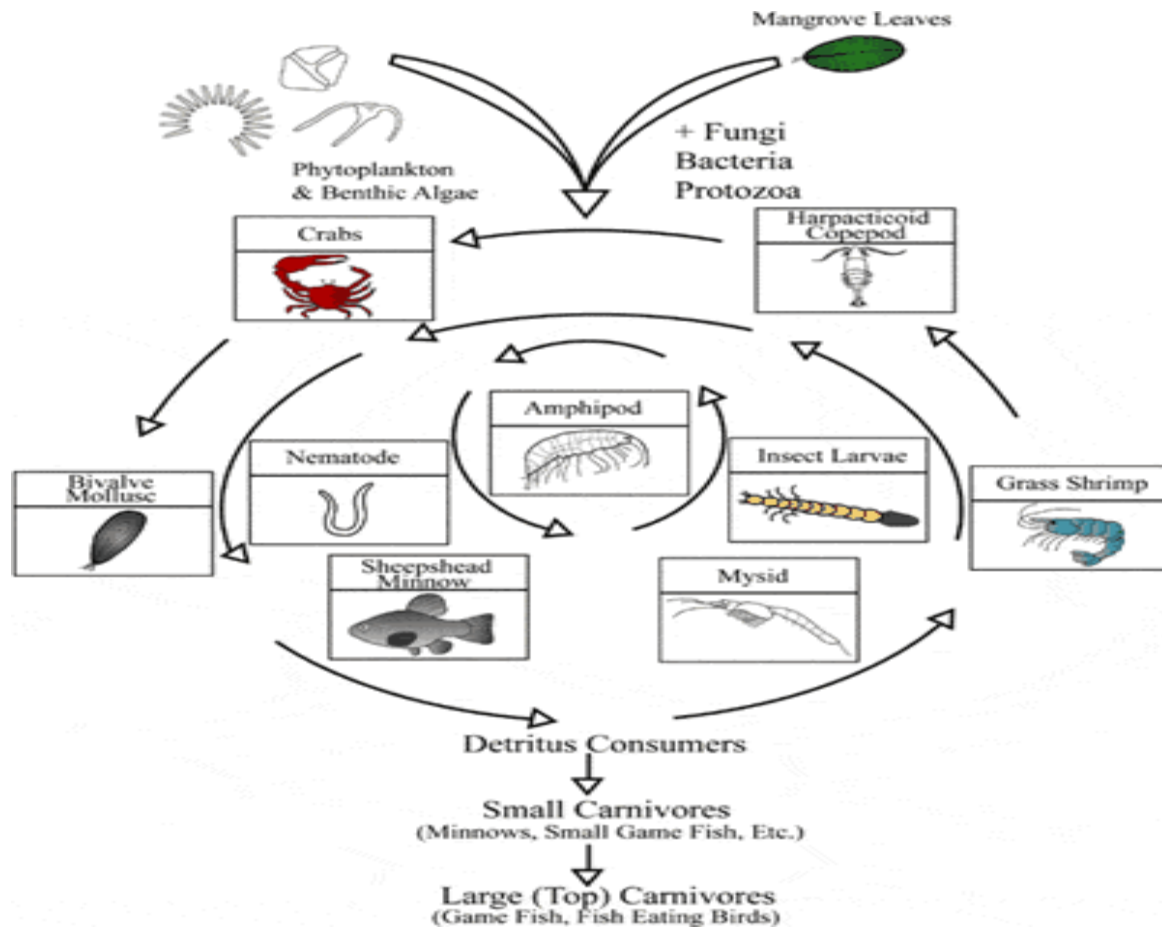


FIGURE:1.3 ECOSYSTEM



FIGURE:1.4

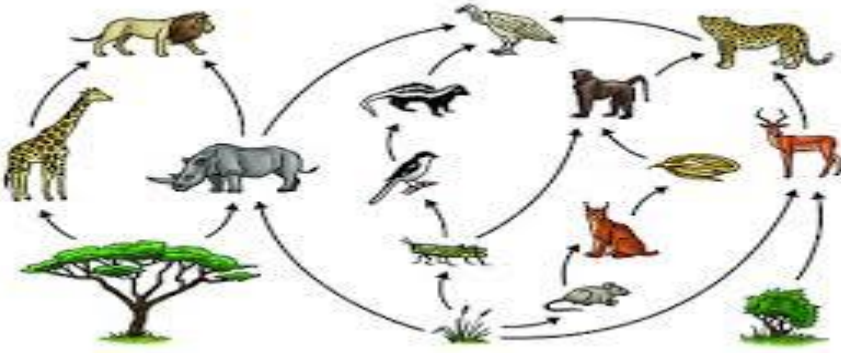


FIGURE:1.5 FOOD WEB

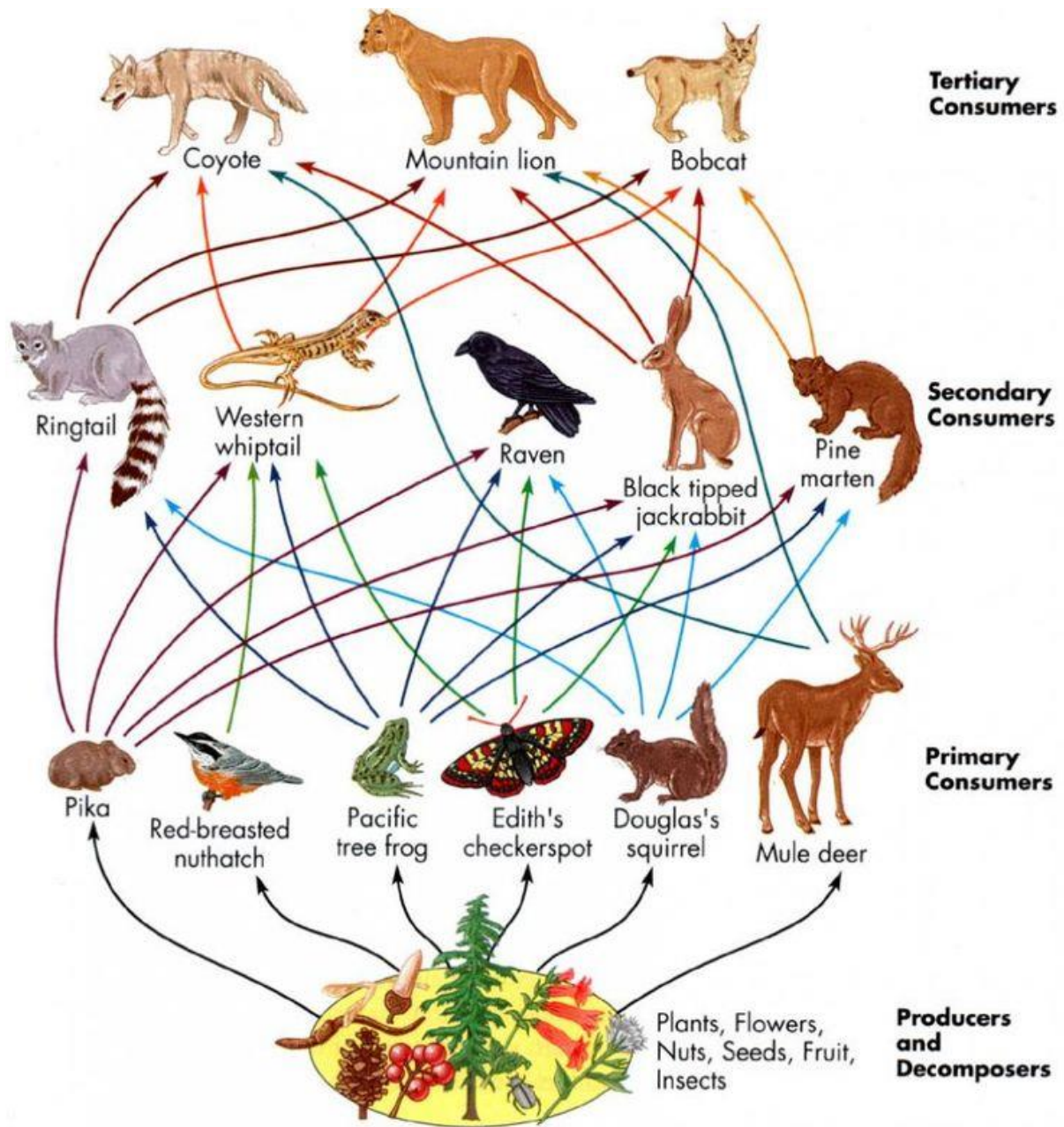


FIGURE: 1.6 FOOD WEB- ECOLOGICAL PYRAMID

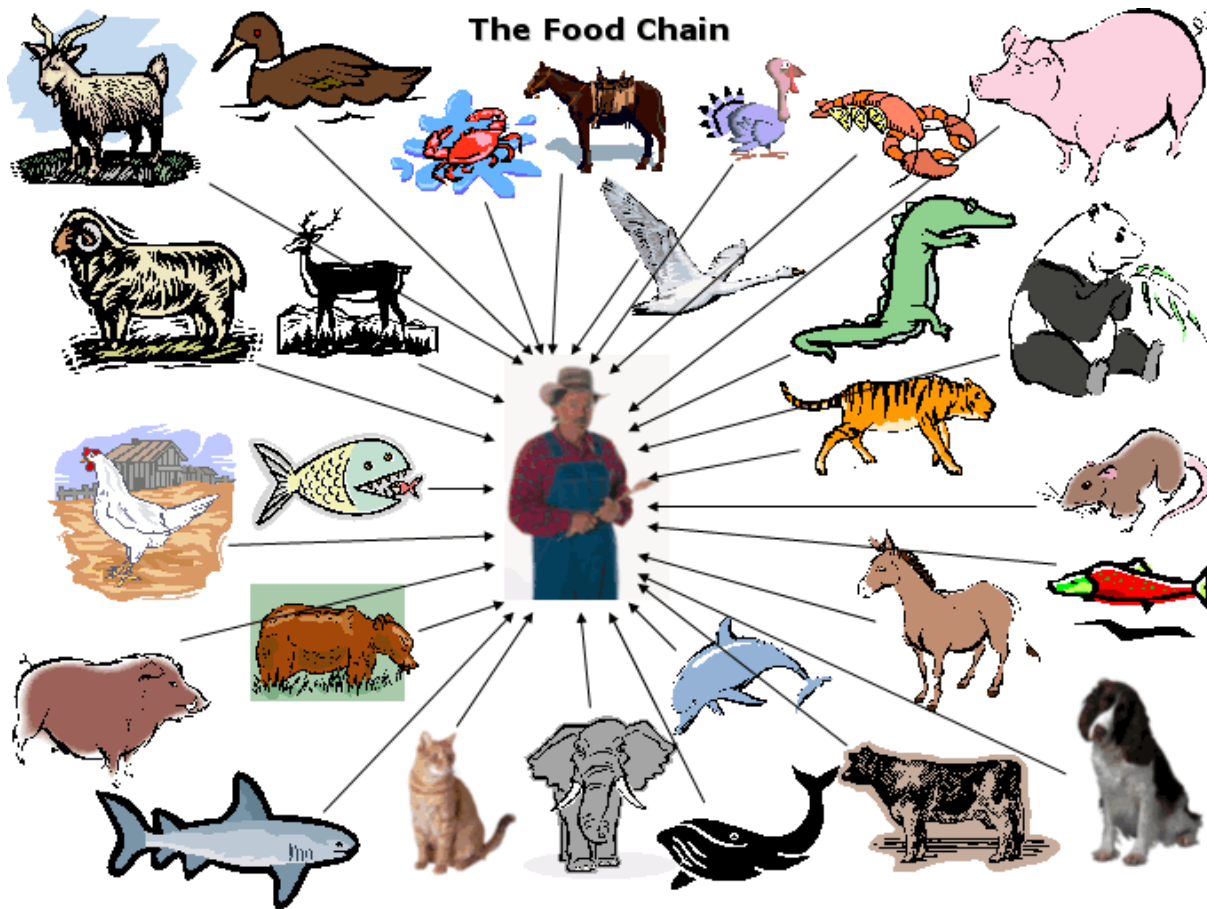


FIG:1.7 HUMAN RELATIONSHIP WITH OTHER LIVING THINGS

Environmental Education: Meaning, Objectives, Nature, Scope, Guiding principles and Importance of Environmental Education

Environmental Education is a multidisciplinary academic field that systematically studies human interaction with the environment in the interest of solving complex problems with regard to the relationship between human beings and the environment. Environmental studies bring together the principles of sciences, commerce, economics, and social sciences so as to solve contemporary environmental problems.

Environmental Education refers to organizing efforts to teach how natural environments function and particularly, how human beings can manage behavior and ecosystems to live sustainably. It is a multi-disciplinary field integrating disciplines such as Biology, Chemistry, Physics, Ecology,

Earth Science, Atmospheric Science, Mathematics and Geography. The term often implies education within the school system from primary to post-secondary.

Environmental education is a process aimed at developing a world population that is aware and concerned about the environment and its associated problems and which has the knowledge, attitudes, commitments, and skills to work individually and collectively towards the solution of current problems and for the prevention of new ones.

According to Odem, “Environmental education is the education of biological and physical environment which surrounds human.

The EPA also has a list of the components of what should be gained from EE.

- Awareness and sensitivity to the environment and environmental challenges
- Knowledge and understanding of the environment and environmental challenges
- Attitudes of concern for the environment and motivation to improve or maintain environmental quality
- Skills to identify and help resolve environmental challenges.
- Participation in activities that lead to the resolution of environmental challenges.

References

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Rao,V.K., & Reddy, R. S.(2005). Environmental education. Common Wealth Publishers.

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Sharma,V.S .(2008).Environmental education. Anmol Publications.

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Web Resources

<https://www.ceeindia.org/>

<https://www.epa.gov/education/what-environmental-education>

<https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-education>

<https://www.toppr.com/bytes/what-is-environmental-education/>

https://www.researchgate.net/publication/261133541_A_text_book_of_Environmental_Education

<https://ncert.nic.in/desm/pdf/environment-edu/eei.pdf>

<https://ncert.nic.in/textbook/pdf/lebo116.pdf>

<https://ncert.nic.in/desm/env-edu.php>