ENVIRONMENTAL EDUCATION (49)

Aims:

1. To develop an understanding of eco-systems and their interrelations.
2. To develop an awareness about the utilization, overexploitation of natural resources.
3. To recognize the need for keeping pollution under control in order to maintain the quality of life.
4. To develop the ability to identify, analyse and reflect upon different environmental concerns.
5. To acquire skills to collect, analyze and interpret data and information relating to environmental problems.
6. To develop skills for effectively tackling problems related to the local environment.
7. To adopt practices that help in promoting balance in nature by making judicious utilization of resources and materials.
8. To acquire leadership qualities through participation in specifically designed activities.
9. To develop love, affection, sensitivity and a sense of responsibility towards all living beings.
10. To participate in activities and programmes for protecting, preserving and conserving the environment and its resources.
11. To appreciate and respect legal provisions for protection of animals and plants.
12. To imbibe the essence of environmental values and ethics in order to live in harmony with nature.

CLASS IX

There will be one paper of two hours duration carrying 80 marks and Internal Assessment of 20 marks.

The theory paper will have two sections:

***Section A (Compulsory)** will contain short answer questions covering the entire syllabus.*

***Section B** will consist of questions, which will require detailed answers. There will be a choice of questions in this section.*

THEORY – 80 Marks

1. Understanding Ecosystem

(a) Types of ecosystem - forest, grassland, desert, aquatic, coastal, marine.

An understanding of environment and ecosystems- basic definitions of the two.

Terrestrial ecosystems like forest, grassland and desert – general climate, type of flora and fauna of each.

Aquatic ecosystems like marshes, swamps, ponds, lakes, rivers, estuaries, marine – general climate, type of flora and fauna of each.

(b) Interaction between biotic and abiotic factors.

Biotic component consisting of producers, consumers, decomposers.

Abiotic or nonliving components such as air, soil, water and climatic factors like sunlight, temperature, humidity and wind.

(c) Energy flow and its importance, cycles of nutrients in terrestrial and aquatic (fresh water and marine) ecosystems, nature's mechanism in maintaining balance.

Understanding flow of energy as linear and nutrient flow as cyclic. Flow of energy to be explained by linking with the laws of thermodynamics - 'Energy is neither created, nor destroyed' and 'No energy transfer is 100% efficient'. Concept of circulation of nutrients within an ecosystem.

(d) Destruction of ecosystem due to changing patterns of land use; factors responsible for this - population growth, migration, industrialization and urbanization, dwelling units, transport, encroachment on water bodies, forests and agricultural land, shifting cultivation, facilities for tourism, pilgrimage, recreation and adventure; construction of large dams, war and mining.

Encroachment on forests and other ecosystems. Pressure on forests due

to mining, logging, increased demand for agricultural land, construction of dams, pressure due to tourism, pilgrimage, etc. Pressure on natural resources due to population growth, urbanisation, industrialization, etc.

(e) Impact of ecosystem destruction - loss of habitat, stress on resources.

Change in climatic conditions, reduced rainfall, drying up of rivers, depletion of aquifers, floods and droughts, loss of topsoil and desertification, loss of species, loss of biomass. Impact on agricultural practices.

(f) Conservation of ecosystem - alternative practices including indigenous conservation practices, planning for proper land use.

Understanding indigenous conservation practices like those of Bishnois in Rajasthan.

(g) Role of Environmental Impact Assessment (EIA) in maintaining the quality of the environment.

Meaning of EIA, aims and advantages of EIA, broad steps in EIA.

2. **Depletion of Resources**

(a) Natural resources: - air, water, soil, metals, minerals, forests and fuels.

Importance of these resources in our daily life.

(b) Causes of depletion of resources - over-use/irrational use, non-equitable distribution of resources, technological and industrial development, population growth.

Almost all activities of human society have degraded the environment physically, chemically, biologically and ethically.
Technological inputs have yielded high yielding varieties, which reduces the products of agricultural residue such as fodder, etc.; indiscriminate use of fertilizers and pesticides. Mining, industries, energy generation, automobiles, urbanisation leading to defacement of land, deforestation, deterioration of hydrological resources.

(c) Impact of resource depletion

Imbalance in nature, shortage of materials, struggle for existence; slackening of economic growth.

Deforestation, desertification, loss of wild life, removal of top soil, exhaustion of ground water, depletion in the population of lions, elephants, tigers.

(d) Practices for conservation of resources - search for alternatives, promotion of renewable resources.

Advantages and disadvantages of renewable resources when compared to non renewable resources. Study of the functioning of biogas, solar, wind and hydro power.

3. **Waste generation and management**

(a) Sources of waste - domestic, industrial, agricultural, commercial and other establishments.

Domestic waste: paper, glass, plastic, rags, kitchen waste, etc.

Industrial: mining operations, cement factories, oil refineries, construction units.

Agricultural: plant remains, animal waste, processing waste.

Municipal: sewage, degradable and non-degradable waste from offices, etc.

(b) Classification of waste - bio-degradable, non-biodegradable; toxic, non-toxic, bio-medical.

Bio degradable waste: paper, rags, vegetable peels.

Non-bio degradable waste: plastic, styrofoam, cans and glass.

Biomedical waste: needles, syringes, soiled dressings, pathological waste from hospitals, medical labs.

Toxic waste: radioactive waste, mercury, lead, DDT.

Non Toxic waste.

(c) Impact of waste accumulation - spoilage of landscape, pollution, health hazards, effect on terrestrial, aquatic (fresh water and marine) life.

Self-explanatory.

(d) Need for management of waste.

Self-explanatory.

(e) Methods of safe disposal of waste - segregation, dumping, composting, drainage, treatment of effluents before discharge, incineration, use of scrubbers and electrostatic precipitators.

Segregation of domestic waste into biodegradable and non-biodegradable by households; sweeping from gardens to be converted to compost; sewage treatment plants, incinerators in group housings.

Scope and limitations of incinerators. Potential and limitation of equipment like ESP, scrubbers in industries.

(f) Need for reducing, reusing and recycling waste.

Methods would involve governmental, social and individual initiatives.

Governmental initiatives: not building large dams for generating hydro electric power which leads to less land being submerged and less displacement of people. Improving efficiency of existing technologies and introducing new ecofriendly technologies.

Social initiatives: creating awareness and building trends of sensitive use of resources and products, e.g. reduced use of electricity, etc.

Individual: developing an ethical environmental consciousness e.g. refusing use of polybags, styrofoam containers, etc; reusing: plastic and glass containers; recycling: e.g. paper – this will reduce demand on wood and save trees.

(g) Legal provisions for handling and management of waste.

Need for legal provisions.

Limitations of legal provisions for managing wastes.

4. Environmental Values and Ethics

(a) Human rights, fundamental duties and value education.

Human rights, fundamental duties: self-explanatory.

The environmentally conscious may choose to carry cloth bags, use organic manure. Apart from one's own home, also make efforts to see that the surroundings are cleaned, e.g: the neighbourhood – plant more trees, respect for other people's things; this will evoke respect for their colony, city and country.

(b) Women and Child Welfare.

Understanding the position of women in the urban and rural society and examining their role in evolving and protecting environmental values and ethics in the use of natural resources.
Perceiving the need to empower and include women in decision making regarding local environmental issues.

Ensuring safe spaces of learning and play for children.

Understanding the importance of women and child healthcare.

INTERNAL ASSESSMENT – 20 Marks

Students are required to complete one case study and one project from the list given.

The activities suggested below are neither exhaustive nor prescriptive. Teachers may design their own set of activities keeping in view the overall objectives of teaching and learning of Environmental Education at this stage. They will have to make use of local flora and fauna and the available resources and facilities and take cognizance of local environmental problems. The learners should be encouraged to initiate action on their own.

Suggested list of assignments

1. Visit a few establishments in the locality, such as motor repair workshops, kilns, pottery making units, fish and vegetable markets, restaurants, dyeing units. Find out the types of wastes and methods prevalent for their disposal. On the basis of the information collected, suggest measures to improve the environmental conditions.
2. Prepare a report on the changing patterns of land use during the last five years in the village, city, region and state through collection of information from different sources about the area of land

utilized for:

- housing,
- markets, hospitals, schools and other facilities,
- construction of roads, and
- industries.

3. To identify economically and environmentally-friendly alternatives in order to deal with the scarcity of resources such as fuels in the locality.
4. Visit a nearby hospital or health center and collect information about diseases caused due to the prevailing environmental conditions.
5. Plan and execute awareness campaigns through community participation on major environmental problems at the local and/or national levels, like deforestation, energy conservation, air pollution due to automobiles and noise pollution.
6. Disseminate information through bulletin boards/school magazines about the impact of construction of large dams, natural disasters like floods, droughts or cyclones on the ecosystem.
7. List different types of industries in the States and collect information about the types of raw materials used, modes of their procurement and disposal of wastes generated. Classify these industries as polluting or environment friendly and suggest possible ways of reducing pollution caused by these units.

INTERNAL ASSESSMENT IN ENVIRONMENTAL EDUCATION - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Investigation/Gathering Data	Analysis/Inference	Solutions Alternatives/ Innovations	Presentation
Grade I (4 marks)	Follows instructions with understanding; modifies if needed. Background information correct. Level of awareness high.	Is able to ask correct questions. Knows whom to ask, when and how. Can deal with more than one variable.	Analyses systematically. Can see sequences or correlation. Can segregate fact from opinion.	Innovative ideas presented. Alternatives suggested.	Accurate. Feasible, neat, well labelled diagrams. Index and references given.
Grade II (3 marks)	Follows instructions step-by-step. Awareness is good. Background information correct.	Is able to ask questions and identify whom to ask, when and how. Can handle two variables only.	Makes observations correctly. Analysis fair.	Alternatives presented. Innovative but not practical.	Accurate. Neat, well labelled diagrams. Index and references given.
Grade III (2 marks)	Follows simple instructions only. Awareness basic. Background information sketchy.	Needs help with the investigations. Has suggestions but cannot decide.	Observation - help needed. Needs guidance to see correlations or sequence.	Obvious solutions presented. Not innovative.	A bit disorganised, but neat and accurate. Either index or references missing.
Grade IV (1 mark)	Follows some instructions but confused. Has to be made aware. Background information incorrect in places.	Needs to be told what questions to be asked, whom to ask or where to gather the data from.	Detailed instructions required to draw inferences. Charts have to be made.	Thinks of solutions under guidance.	Poorly organised. Some points missing. Index and references missing.
Grade V (0 mark)	Confused about instructions. Has to be made aware. Needs help with background information.	Gets stuck at every step. Questionnaire has to be formulated.	Even with help, analysis is not clear. Takes teacher's word for it.	Solutions not forthcoming.	Overall impression very poor. Not very accurate.