

ENVIRONMENTAL EDUCATION

1. AIMS

The Learner

- understands the environment & its totality the interrelationships in the living world and the complexity of the environmental problems
- understands the types of occupational hazards and their causes
- handles hazardous materials and processes in the work place in a safe and environment friendly manner
- takes precautions for occupational safety and for maintaining safe work environment
- assesses environmental problems and handles them effectively
- understands the concepts of sustainable development
- integrates issues of sustainability into a range of consumption and livelihood pattern
- correlates the effect of various global environmental concerns.
- develops skills to undertake projects and activities concerning various environmental issues .
- appreciates the relationship between environment & development
- appreciates potential of rural development programmes, agencies and models.
- initiates appropriate action to protect & improve the environment
- imbibes values to live in harmony with nature and empathy for all life forms .

Content

Vocational Education at the Higher Secondary Stage prepares students for the world of work. Vocational courses are intended to: help learners to become more skillful, productive and efficient workers or technicians. It is important for every learner in vocational stream to perceive and evaluate the impact of .his/her activities on the environment as a part of professional work. It is, therefore, essential that learners of vocational stream acquire attitudes and behaviours desirable for environmental improvement safety management and sustainable development.

This stage is viewed as critical since it is the terminal stage of education for a large number of students who would be joining the world of work through self or wage employment. In view of this it ,is expected that learners at this stage would not only comprehend the concepts of environment end appreciate the need for environmental protection but also, acquire skills and imbibe habits to effectively deal with environmental problems by taking necessary actions at the workplace.

- Impact of development on environment - changing pattern of land use, land reclamation, deforestation, resource depletion, pollution and environmental degradation.
- Impact of liberalization and globalization on - agriculture and industries, dislocation of manpower and unemployment, implications for social harmony.
- Role of society in development and environment - public awareness through education, eco-clubs, population education programme, campaigns, public participation in decision making.

III Environmental Pollution and Global Issues

- Air, water (fresh marine) soil pollution - sources and consequences.
- Noise and radiation pollution,- sources and consequences.
- Solid, liquid and gaseous pollutants.
- Handling of hazardous materials and processes; handling and management of hazardous wastes.
- Ozone layer depletion and its effect.
- Greenhouse effect, global warming and climatic changes and their effects on human society, agriculture, plants and animals.
- Pollution related diseases.
- Disasters - natural (earthquakes, droughts, floods, cyclones, land slides) and man made (technological and industrial); their impact on the environment ; prevention, control and mitigation.
- Strategies for reducing pollution and improving the environment.

IV. Safe Work Environment and Occupational Hazards

- Safe work environment adequate light ventilation, cleanliness, good house keeping.
- Safety awareness and management - safety precautions - home and work (laboratory, workshop, work site); safe handling of equipment and materials.

- Occupational, safety-proper posture, safe design, safe operation and proper maintenance of machinery and work place.
- Occupational hazards-physical, chemical, mechanical, electrical, biological, radiational and psychological
- Accidents and disasters (natural and man made) - prevention, control and management and their mitigation.
- Major hazards in industries and occupations- fire, explosion, toxic release.
- First aid measures.
- Laws and regulations related to occupational health and safety.

ENVIRONMENTAL EDUCATION

Class XII

There will be two papers in this subject :

Paper – I – Theory - 3 hours 50 marks

Paper - II - Practical /Project work 50 marks

Paper – I THEORY 3 HOURS 50 MARKS

Part – A Compulsory objective type of questions covering the entire syllabus of class XI and class XII carrying 20 marks.

Part – B Will have 10 questions candidates will have to answer 6 questions carrying 5 marks each = 30 marks. The questions would require detailed answers .

PRACTICAL 50 MARKS

Paper – II The Practical/project work carrying 30 marks needs to be undertaken under the guidance of the teacher .The project will be evaluated by a Visiting Examiner (who has specific expertise in the content of the project work) appointed locally and approved by the Council .Students are recommended to complete two case studies and one project from the list given.

I. Environmental Actions

- Meeting basic human needs-food, water, shelter and fuel for all
- Population control,
- Changing consumption patterns
- Prevention and control of environmental pollution
- Waste management, - reduce, reuse, recycle.
- Environmental protection and conservation - role of governmental agencies and International organizations.
- Legal provisions for environmental management - national and international
- Community movements for ecological restoration and conservation of environment like Van Mahotsava, Chipko. Silent valley Project tiger, Ganga action plan, Joint Forestry Management (JFM)]. Students participation in tree rearing, social and agro-forestry

II. Sustainable Development

- Concept of sustainable development
- Concept of sustainable consumption
- Need for sustainable development for improving quality of life for the present and future.
- Challenges for sustainable development - social, political and economic considerations.

- Support base for sustainable development - political and administrative. will, dynamic and flexible policies, appropriate technologies, comprehensive view and revision mechanism, humane approach.
- Developing skilled manpower .
- Role of individual and community.
- Role of national and international agencies (both governmental & non governmental).

III Rural Development and Environment.

- Human resources and natural resources.
- Resource mapping.
- Health and sanitation.
- Rural infrastructure.
- Rural industrialisation - agro based and other industries.
- Planning and management of rural development-role of Panchayats,governmental agencies, Self Help Groups(SHGs) women empowerment, rural financing.
- Rural development models – Gandhian model, growth centre model , meta industrial village of solar age culture, watershed based models; case studies on land reforms and cooperative movements.

IV. Development Programmes and Appropriate Technology

- Agriculture and allied sector .
- Harnessing water resources.
- Employment.
- Planning, management and implementation - role of governmental agencies. like Council for Advancement of People's Action and Rural Technology (CAPART), Department of Science and Technology (DST), Social Welfare Board (SWB), National Dairy Development Board (NDDB).
- Role of Non-governmental organisations (NGOs) in developmental processes.
- Appropriate Technology- concept, meaning and scope(eco-friendly technologies),criterion and selection of appropriate technology (AT).
- Examples of application of appropriate technology - study of project. Profiles (land and water management, waste recycling, non conventional energy solar,

wind , bio-based, housing, farm and non- farm sectors).

- Environment friendly enterprises – concept and indicators.

Paper II – PRACTICAL & PROJECT WORK CLASSES XI & XII

Exemplar Projects and Activities

It is expected that students will undertake at least two projects or activities in each year one of which should be undertaken individually and prepare a report in each case. Teachers may plan and design projects and activities depending upon the local situations, available resources and environmental issues of concern. The projects and activities given below are only suggestive and not prescriptive.

1. To study the changes that have taken place in a given land area of a city /village locality/market during the last five years in respect of at least five parameters like number of houses, residents and families, food habit, number of household goods in a family, consumption of water, electricity and fuels including that for personal vehicles by a family, sources of noise (public address system being used, television, radio, and vehicles on the road), common facilities like number of schools, hospitals, shops, theatres, public conveniences, public utilities, public transport; number of factories, industries and/or the facilities for production and processing of goods, loss of water bodies, types and quantity of wastes, their disposal and treatment facilities with a view to discussing the patterns of changes and impact on the environment and quality of life. A specific project on these aspects may be
 - To study the changes that have taken place in a given land area during last five years in respect of number of houses, residents and families and prepare a report on their effects on civic amenities like availability of water, electricity and fuels; drainage system ,disposal of wastes including night soil.
2. To study the environmental profile of a town /locality/village in respect of population density, green cover, educational level of residents, social problems and sources of pollution and their effect on air, water and soil.

- 3 To improvise two models of green houses of similar dimensions made from low cost/no cost materials. Place them in the open under identical conditions and put some potted plants in one of them . Note the temperature inside and outside both the green houses every two hours from dawn to dusk for two weeks. Explain the reasons for the difference in temperature, if any, between the two green houses.
- 4 To study for a period of one month, the status of sanitary conditions and methods of waste disposal of a given locality vis- a- vis the role of Panchayat, Municipality or Corporation and prepare an action plan to the role of make the conditions more environmental friendly.
- 5 To investigate the impact of a large manufacturing unit on the local environment. The parameters could be land use, the ratio of covered area and open spaces, raw materials used for production, inputs like electricity and water, types of waste generated and modes of waste disposal, the use of environment friendly and efficient technology, types of pollutants emitted or discharged, the average health status of the employees and residents in the area.
- 6 To study the impact of changes in agricultural practices or animal husbandry including poultry, piggery, fishery, apiculture over a period of time on the local environment of a given locality or village . The components for analysis may include: types of crops, land area under cultivation, mechanisation use of electricity, mode of irrigation and agro chemicals, agro-wastes and their disposal, types of animal breeds and their feed ; types of shelter and health care, methods of preservation and processing of products and animal wastes and their disposal. Suggest an action plan for modifying the prevailing practices so as to make them environment friendly and sustainable.
- 7 To collect samples of water from different sources and study their physical characteristics like turbidity, colour, odour, measure of pH, the nature of suspended and dissolved impurities and pollutants, the presence of toxic materials like mercury, lead, arsenic, fluorine and the presence of living organisms. For testing the presence of toxic materials and living organisms, the help of a local laboratory or institution may be taken, if available. To identify the most polluted sample of water and locate the sources of its pollution. To devise an action plan to mobilize public opinion for checking the pollution.

- 8 To study the practices followed in the region for storage, preservation, transportation and processing of perishable or non-perishable farm products and to assess the extent of wastage due to faulty practices.
- 9 To prepare a status report on the prevalence of child labour in a given area through simple surveys on children engaged as domestic help and as workers in farms, establishments and manufacturing units. The survey may be in respect of age group, education, wages, working hours, working conditions, safety in the work place, health, handling hazardous materials and the like. Units dealing with hazardous materials and processes may be identified and an action plan for mobilising public opinion against the practice of child labour may be prepared.
- 10 To make a list of raw materials used by the family for preparing different types of dishes. To identify the plants and animals and their parts from which each food material is obtained. Also to make a list of plants on which the animals listed depend for their food. To name the processes, if any, in which action of micro organisms is made use of to identify those plants and animals, which are found in the locality. To prepare a report supported with diagrams photographs/pictures/graphs to focus on the Importance of bio diversity in providing food to human beings
- 11 To conduct a survey through observations and interviews about prevailing work environment of an establishment such as workshop, factory, manufacturing unit, hospital or any other related to a specific vocation and to prepare a report highlighting the presence or absence of the desirable environmental conditions.
- 12 To study through observations and interviews practices followed by the workers in handling hazardous chemicals or hazardous processes and to prepare an action plan suggesting strategies for remedial measures.
- 13 To prepare a model action plan for generation of biogas and other useful products from biodegradable and non-bio degradable wastes on the basis of data collected for a village or locality indicating environmental and economic benefits.
- 14 To study through observations and interviews the extent of adherence for the prescribed norms of safety in the manufacturing units and automobile workshops in the locality and to prepare a report thereon.

3. **Teaching Learning Strategies:-**

Teaching Learning of Environmental Education at this stage would require a different perspective as compared to teaching learning of Environmental Education up to the secondary level. The focus of the expected learning outcomes would be on developing a deeper understanding of environmental phenomena and their ramifications at national and international levels, besides developing the capacity to contribute meaningfully towards the strengthening of the process of sustainable development. In addition, the development of an attitude for striking a balance between an earnest desire for continuous improvement of the environment through promotion of efficient eco-friendly technologies and actions required for resolving national & international environmental issues. Learners at this level would also be expected to exhibit leadership qualities in promoting community participation in resolving environmental issues. The teaching-learning strategies would, therefore, be geared to achieving these objectives, which may include the following components:-

- Providing opportunities to personally observe and analysing environmental issues related to sustainable development.
- Providing opportunities for critical analyses of the issues and problems related to Environmental Education through group discussions and brain storming sessions and working out their plausible solutions.
Undertaking case studies and surveys in the field of Environmental Education.
- Conducting community based projects to help learners identify environmental problems and their causes.
- Providing opportunities for interaction at various forums for sharing of experiences about the national and global perspectives of the environment.
- Providing opportunities for conducting experiments and drawing conclusions with regard to environmental problems .
- Organizing campaigns & drives with community participation.

In addition, since vocational education prepares students for the world of work, the teaching-learning mechanism should also contribute to developing participatory skills positive attitudes and values in the students and to tackle the multiple environmental challenges at work place and at home. For this purpose, more emphasis should be given on project works, field and industry visits, experimentation, activity-based learning, analysis and problem solving, etc. Use of information and communication technology, multi-media and audio-visual aids needs to be encouraged.

4. **Evaluation :**

Evaluation of Environmental Education at the Higher Secondary stage (vocational streams will have both the components-theory and practice. The theory papers will pitch at developing a higher level of understanding analysis synthesis critical examination of issues and providing logical arguments In favour of and against certain propositions. . Situations calling for in depth analysis and evaluation could be provided Group and institutional evaluation will also find a place.

The practical aspects could be assessed in a variety of ways through intern, assessment of : laboratory work, workshop practice, project work, case studies, surveys, field; projects/studies, participation and drives for community mobilization and the like . Students behaviour and performance during these activities will need to be assessed and recorded. These records should be used to provide feedback to students and to take remedial measures to bring necessary improvement in the students learning. For practical work, cumulative grades will be awarded based on assessment during the term. No practical examination will be held at the end of the term.

For theory, the evaluation will be continuous and comprehensive consisting of internal assessment and terminal examination theory will be based on, assignments an periodical continuous and end of term examination there will be a written test in theory . Weightage to continuous and end of term assessment will be 60:60. Practical and theory grades will be shown separately. However for giving cumulative grades weightage to practical and theory will be 60 : 40.