

## Classes XI - XII

### **Aims:**

#### **The learner**

- To develop an in-depth understanding of various environmental issues and concerns of national and global importance.
- To develop a balanced view of the relationship between environment and development.
- To understand basic concepts related to sustainable development vis-à-vis improvement of quality of life.
- To develop a deeper concern for the environment and a sense of commitment and responsibility to take proactive action.
- To appreciate the variety in living organisms and recognize India as a mega- diversity nation.
- To appreciate the role of the individual, community, national and international agencies in resolving environmental problems.
- To practice ways of bringing about qualitative improvement in the environment by assuming leadership role.
- To identify self with one's environment with an attitude to personally contribute towards its improvement.
- To respect customs and traditions related to local conservation practices and accept indigenous eco-friendly technologies.
- To develop skills to undertake and participate in investigative studies on various environmental issues; and
- To motivate others and participate in social and community activities in dealing with environmental problems.

# CLASS XI

There will be two papers in the subject:

**Paper I:** Theory – 3 hours ...70 marks

**Paper II:** Practical/Project Work – ... 30 marks

## PAPER I - THEORY

*There will be one paper of three hours duration carrying 70 marks.*

*The 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.

### 1. Man and Environment

- (i) Dimensions of environment - physical, biological and social.
- (ii) Human being as a rational and social partner in environmental actions.
- (iii) Society and environment in India; Indian traditions, customs and culture - past and present.
- (iv) Population and environment.
- (v) Impact of human activities on environment:
  - environmental problems of urban and rural areas.
  - natural resources and their depletion.
  - stress on civic amenities; supply of water and electricity, waste disposal, transport, health services.
  - vehicular emissions.
  - urbanization - land use, housing, migrating and floating population.

### 2. Environment and Development

- (i) Economic and social needs - as basic considerations for development.
- (ii) Agriculture and industry as major sectors of development.
- (iii) Social factors affecting development – poverty, affluence, education, employment, child marriage and child labour; human health – HIV/AIDS, social, cultural and ethical values.
- (iv) Impact of development on environment – changing pattern of land use; land reclamation, deforestation, resource depletion, pollution and environmental degradation.
- (v) Impact of liberalization and globalization on - agriculture and industries, dislocation of manpower and unemployment, implications for social harmony.

- (vi) Role of society in development and environment - public awareness through education, eco-clubs, population education programme, campaigns, public participation in decision making.

### **3. Environmental Pollution and Global Issues**

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

### **4. Energy**

- (i) Changing global patterns of energy consumption - from ancient to modern times.
- (ii) Energy consumption as measure of quality of life.
- (iii) Rising demand for energy, gap between demand and supply (Indian context).
- (iv) Conventional energy sources - fossil fuels and firewood, potential (Indian context) and limitations of each source, methods of harnessing and environmental consequences of their use.
- (v) Non-conventional energy sources- types of non-conventional sources (bio-mass, solar, wind, ocean, hydel, geothermal, nuclear), potential (Indian context) and limitations of each source, methods of harnessing and their environmental consequences, need to promote non-conventional energy sources.
- (vi) Conservation of energy sources - efficiency in production, transportation and utilization of energy.
- (vii) Planning and management of energy; future sources of energy - hydrogen, alcohol, fuel cells.
- (viii) Enhancing efficiency of the devices and optimizing energy utilization.

## **PAPER II – PRACTICAL/PROJECT WORK**

Guidelines for Practical/Project Work are given at the end of this syllabus.

# CLASS XII

There will be two papers in the subject:

**Paper I:** Theory – 3 hours ... 70 marks

**Paper II:** Practical/Project Work – ... 30 marks

## PAPER I - THEORY

*There will be one paper of three hours duration carrying 70 marks.*

*The 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.

### 1. Biodiversity

- (i) Concept and value of biodiversity.
- (ii) Types of biodiversity - species, eco and genetic.
- (iii) Balance in nature.
- (iv) Biodiversity for sustenance of mankind.
- (v) Resource limitations.
- (vi) Ecological role of biodiversity.
- (vii) Interdependence between different species.
- (viii) India as a mega diversity nation.
- (ix) Economic potential of biodiversity.
- (x) Loss of biodiversity - threatened, endangered and extinct species.
- (xi) Strategies for conservation of biodiversity - insitu and exsitu.
- (xii) Mitigating people-wild life conflict.

### 2. Environmental Management

- (i) Need for environmental management vis-à-vis development.
- (ii) Aspects of environmental management - ethical, economic, technological and social.
- (iii) Legal provisions for environmental management.
- (iv) Approaches for environmental management - economic policies, environmental indicators, setting of standards, information exchange and surveillance.

### **3. Sustainable Development**

- (i) Concept of sustainable development.
- (ii) Concept of sustainable consumption.
- (iii) Need for sustainable development for improving quality of life for the present and future.
- (iv) Challenges for sustainable development - social, political and economic considerations.
- (v) Support base for sustainable development - political and administrative will, dynamic and flexible policies, appropriate technologies, comprehensive review and revision mechanism, humane approach.
- (vi) Developing skilled manpower.
- (vii) Role of individual and community.
- (viii) Role of national and international agencies (both governmental and non-governmental).

### **4. Sustainable Agriculture**

- (i) Need for sustainable agriculture.
- (ii) Green revolution - impact on environment.
- (iii) Importance of soil for crops.
- (iv) Irrigation systems, use of manure and fertilizers.
- (v) Crop protection - major plant pests, and diseases, measures for their control – agrochemicals.
- (vi) Impact of agrochemicals on environment.
- (vii) Elements of sustainable agriculture - mixed farming, mixed cropping, crop rotation, biological and economic consideration, use of bio-fertilizers and bio pesticides, biological pest control, integrated pest management.
- (viii) Applications of biotechnology in crop improvement.
- (ix) Management of agricultural produce – storage, preservation, transportation and processing.

## PAPER II – PRACTICAL/PROJECT WORK

### Classes XI and XII

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

### Exemplar Projects and Activities

It is expected that the 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. Projects and activities may be planned and designed 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 habits, 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 systems being used, television, radio and vehicles on the road), common facilities like number of schools, hospitals, shops, theatres, public convenience, 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. Improvise two models of greenhouses of same dimensions made from low cost / no cost materials. Place them in open under identical conditions and put some potted plants in one of them. Note the temperature inside and outside both the greenhouses every two hours from dawn to dusk for two weeks. Explain the reasons for the differences in temperature, if any, between the two green houses.
4. Collect data on monthly consumption of electricity and fuels from at least five families, any two commercial establishments and for public utilities in a given locality. Plan strategies to educate consumers to economize the consumption of electricity and fuel by reducing their over use, misuse and improper use.

5. To study for a period of one month the status of sanitary conditions and methods of waste disposal of a given locality vis-à-vis the role of Panchayat, Municipality or Corporation and prepare an action plan to make the conditions more environment friendly.
6. To investigate impact of an industry or a large manufacturing unit on local environment. The parameters could be land use, ratio of covered area and open space, raw materials used for production, inputs like electricity, water or any other, types of waste generated and modes of waste disposal, use of environment friendly and efficient technology, types of pollutants emitted or discharged, average health status of the employees and residents in the area.
7. To study the impact of changes in agricultural practices or animal husbandry including poultry, piggery, fishery, apiculture over a period of time in a given locality or village on local environment. The components for analysis may include: types of crops, land area under cultivation, mechanization, use of electricity, mode of irrigation and agrochemicals, agro-wastes and their disposal, types of breeds and animal feed, types of shelter and health care, methods of preservation and processing of products, animal wastes and their disposal. Suggest an action plan to modify the prevailing practices so as to make them environment friendly and sustainable.
8. Collect samples of water from different sources and study their physical characteristics like turbidity, colour, odour; measure of pH, nature of suspended and dissolved impurities and pollutants, presence of toxic materials by testing presence of mercury, lead, arsenic, fluorine and presence of living organisms. Test the presence of toxic materials and living organisms with the help of local laboratory or institution may be taken, if available. Identify the most polluted sample of water and locate the sources of its pollution. Devise an action plan to mobilize public opinion for checking the pollution.
9. To study the practices followed in the region for storage, preservation, transportation and processing of perishable or nonperishable farm products and to assess the extent of wastage due to faulty practices.
10. To study the status of an endangered species listed for the region by collecting information through different sources and observation, if possible and to assess the reasons for its diminishing number. Suggest ways and means to protect the species.
11. To prepare a status report on prevalence of child labour in a given area through simple surveys on children engaged as domestic help and as workers in farms, commercial establishments and manufacturing units. The survey may be in respect of age group, education, wages, working hours, working conditions, safety in work place, health, handling hazardous materials and the like. Units dealing with hazardous materials and processes may be identified and an action plan to mobilize public opinion against practice of child labour may be prepared.
12. Conduct a survey of plants and trees in the locality and collect information about their cultural, economic and medicinal values from local people and available literature. Prepare an action plan for the propagation of trees that are most valuable in terms of their cultural, economical and medicinal use.

13. Prepare a flow chart to show different steps involved in the supply of tap water from source (river, bore well) to houses in the locality. Collect information from the concerned authorities about the quantity of water processed and the amount of energy required at each stage. Compute the energy spent for supplying 1 kilolitre of water to the consumer. Plan and execute a campaign to educate the community members about the implications of wastage of water in terms of energy.
14. Make a list of raw materials used by the family for preparing different types of dishes. Identify the plants and animals and their parts from which each food material is obtained. Also make a list of plants on which the animals in the list depend for their food. Name the processes, if any, in which action of microorganisms is made use of. Identify those plants and animals, which are found in the locality. Prepare a report supported with diagrams/photographs/pictures/graphs to focus on the importance of biodiversity in providing food to human population.

**NOTE: No question paper for practical work will be set by the Council.**