ICSE Syllabus



2024

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Syllabus

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ENVIRONMENTAL APPLICATIONS (89)

Candidates offering Environmental Science (Group II) are not eligible to offer Environmental Applications (Group III).

Aims:

1. To acquire knowledge of the origin and functioning of the natural system and its correlation with the living world.
2. To develop an understanding that human beings, plants and animals are part of a natural phenomenon and are interdependent.
3. To appreciate influence of human activity on the natural processes.
4. To develop awareness of the need and responsibility to keep the natural system in a condition that it sustains life.
5. To develop sensitivity in personal attitudes to environmental issues.
6. To develop a keen civic sense.
7. To develop a sense of responsibility and concern for welfare of the environment and all life forms which share this planet.
8. To develop a sound basis for further study, personal development and participation in local and global environmental concerns.
9. Understand 'development' to intervene in the relationships between society and the natural environment.
10. To participate in local issues through carefully monitored projects.
11. To create awareness about the role of local communities in sustainable growth.
12. To develop an understanding of how local environments, contribute to the global environment.

CLASS IX

*There will be **one** written paper of **two hours** duration carrying 100 marks and Internal Assessment of 100 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.*

THEORY – 100 Marks

1. Introduction

Broad introduction to the current environmental problems. Magnitude of these problems and appreciation of the complexity of issues involved. This is to be done through-

- *presenting facts and statistics.*
- *inter-linking facts to generate a broad perspective.*
- *understanding frameworks and systems that contribute to the problem under study.*

Our main environmental problems:

(i) Understanding ecosystems- threats and conservation measures.

Major causes of ecosystem destruction. The extent of forest cover left in India and the world today. For instance, India is left with about 4.6% protected forest cover. The rate of destruction. Efforts being undertaken to save the forests. Names of some organisations which are involved and understanding of conservation measures. Examples of successful cases.

(ii) Resource depletion.

The consequences of major resources being depleted. Use of local and international examples. For example, petroleum products are likely to last only a few more decades.

(iii) Waste generation.

Issues of waste generation and disposal. A few prominent examples like dumping of nuclear waste and other hazardous wastes in developing countries by developed countries. Basel Convention.

(iv) Economic disparities.

The extent of poverty in India and in the world. The nature of poverty in developed countries and developing countries - in rural and urban areas. Consequences and implications with reference to the lifestyles and aspirations of communities and society. Developmental paradigms and the politics of poverty.

(v) Land use.

Changing patterns of land use. Modern agriculture. Issues related to water.

2. Basic Ecology

To give a clear understanding of ecological concepts. The learning will be enhanced if live examples are used with as many outdoor classes as possible.

(i) Biotic and abiotic components of an ecosystem.

Classification. Understanding role.

(ii) Food chains, food web and trophic levels.

To understand the use of these tools as a means of understanding ecosystems.

(iii) Ecological niche, habitat and microhabitat.

The criticality of the role of each species in an ecosystem. The difference between habitat and microhabitat.

(iv) Succession.

How forests regenerate. Kinds of succession - primary and secondary.

(v) Ecotypes.

The influence of external factors like climate and soil (micro habitat) on organisms.

(vi) Flow of energy through an ecosystem.

Sun as the primary source of energy. Linear flow of energy versus cyclical flow of nutrients.

(vii) Concept of species.

To understand the sovereignty of species. The importance of critical minimum size of species population.

(viii) Extinction of species.

Effects of extinction.

(ix) Introduced species.

The impact of introduced species on indigenous species and ecosystems - competition, habitat destruction, diseases etc., e.g. Acacia, Subabul, Lantana.

(x) Endemic species.

Inter-relationship with other organisms, their evolution, the extreme adaptability to local environments.

(xi) Keystone species.

Understanding that while all species have a niche, some species play a more critical role as they are keystone species, e.g. crocodile, sharks, fungi.

(xii) Kinds of ecosystems.

Study a range of ecosystems, the life that they support, their uniqueness, etc.

Suggested Activities/Visits:

- *Visit a surviving ecosystem and do a rapid assessment.*
- *Study natural communities of your neighbourhood like bird, insect population, etc.*

3. Conservation of Ecosystems

(i) Conservation strategies*:*

- *Species approach including CITES.*
- Ecosystem approach including formation of National parks, sanctuaries and Biosphere reserves.
- Wildlife management.

What is the extent of forest cover left in the world? What are the threats faced by forests? What are the different kinds of strategies that are being used to conserve forests? The above three are broad examples. Students should be made aware of the scope and limitation of the above approaches. Study an example of each kind.

(ii) Value of bio-diversity.

Study the value of bio-diversity from different viewpoints - ecological, economic, health, food and aesthetic.

Suggested Activities/Visits:

- *Visit to a national park /any protected area.*
- *Interaction with a group involved in conservation.*

4. Dynamics of Development and Resource Use

Understanding development

(i) People as resources.

To gain an understanding that most development issues arise due to not recognising people as valuable resources. Importance of generating employment.

(ii) Impact of scale and kind of technology on resources.

Understanding the model of modern development and the impact of industrialising and automating on the economy, people and resources. Short-term and long-term accounting. Depletion of resources. Resource scarcity and economic consequences.

(iii) Urbanisation and its impact.

Causes and consequences of rapid, unplanned urbanisation - impact on infrastructure, services and provision of basic amenities.

(iv) Ecological footprint of a city.

Study two sample cities to see the extent of ecological impact on surroundings and also the actual extent of resource supply to the city. Extent of waste generated in a city in a day. Ratio of biodegradable and non-biodegradable matter. The need to sort garbage. E.g. Chennai generates 3500 tons of garbage a day of which only 800 tons is non bio-degradable. Dumping of hazardous wastes particularly in developing countries. The Basel convention.

(v) Population (questioning Malthus, carrying capacity).

Self-explanatory.

(vi) Poverty

Dynamics of urban and rural poverty, relationship to social structure - the dynamics of the decline of traditional opportunities and occupations.

Suggested Activities/Visits:

- *Visit a rehabilitation site.*
- *Visit NGOs working in the field of development.*

5. Understanding Land use

(i) Agriculture.

(a) Traditional farming methods.

Study a few traditional methods of farming - region specific and crop specific. Management of commons. Farming as an activity of the whole community.

(b) Traditional varieties and their adaptability to local environments.

Study characteristics of a few sample crops drawn from different climatic and soil conditions.

(c) The impact of green revolution practices.

Study the impact of green revolution practices on soil, water, local crop varieties, food production, economy, small farmers and distribution using Punjab as an example; contribution to food security.

(d) Food scarcity in the midst of plenty.

To understand and analyse the distribution system.

Suggested Activities/Visits:

- *Visit to a modern chemical farm and an organic farm.*
- *Visit the wholesale market.*
- *Understand the flow of grain from farmer to the shop.*

(ii) Towards a world without hunger

(a) Introduction to new and old organic farming practices.

- Do nothing farming – Fukuoka.
- Bio-dynamic farming - Rudolph Steiner.
- Permaculture – Mollison.
- Integrated farming practices.
- Low Input Sustainable Agriculture (LISA).

Study the different farming practices - possibly through visits - if possible by growing crops on small patches of land.

(b) Assessment of Biotechnology.

Is biotechnology the answer to the various environmental issues around food production or is it yet another technological disaster waiting to happen.

(c) Global food security, food aid.

How to achieve food security?

Is food aid the right answer?

Is sustainable agriculture and subsistence farming the answer to the problem of food security - or is it necessary to achieve a judicious balance of the above with monocropping for building a national buffer of food grains.

Suggested Activities/Visits:

- *Try farming in small plots using different practices.*

INTERNAL ASSESSMENT- 100 Marks

*Students are recommended to complete **two** case studies and **one** project from the list given below.*

Suggested list of Projects/Case studies for topics from the syllabus-

Basic Ecology

Projects

(i) Where have all the sparrows gone?

Sparrows used to be one of the most common birds in India and are disappearing at a phenomenal rate across the country as has been recorded by various groups. Why has this happened? What could be the reason? They seemed pretty adaptive creatures and have inhabited human dwellings for a long time.

A study will help understand the fragility of a species' existence on earth and the various conditions that could make it disappear.

(ii) Why conserve turtles?

Turtles have managed to survive for 200 million years and are now on the brink of extinction. Development of the last few decades has brought about this situation.

Studying this will help the student understand the reasons for the disappearance of turtles- the main reason being trawling and trawlers are not merely killing turtles. Trawling is ravaging ocean ecosystems and creating under sea deserts. It will also help understand the role of turtles in ocean ecosystems.

There is also much north- south politics around conservation like the Tuna dolphin issue and the shrimp - turtle issue.

(iii) Importance of green areas in a city.

(iv) Importance of mangroves.

Case Study

Study different kinds of existing ecosystems like the Sundarbans, the Sholas, rainforests, scrub forests, etc. for the bio-diversity they contain and the pressures they face. (Preferably an ecosystem that is nearby.)

Conservation of Ecosystems

Projects

(i) Zoos as places for conservation of species.

(ii) Insects as keystone species.

(iii) How can I conserve a piece of land in my neighbourhood?

(iv) Understand the conflict with the usage of CITES - Dolphins and Tuna, Turtles and Shrimp, Norway, Japan and whales, culling elephants in Africa, etc.

(v) Project Tiger, Project Elephant

(vi) The study of plight of Jarawas in the Andamans [Tribals and their relationship to the environment].

(vii) Protecting and conserving forests, rivers, oceans, etc; strategies, difficulties.

(viii) Is there effective legislation for addressing the environmental concerns?

Dynamics of Development and Resource use

Project

Conduct a study of a selected area.

Case Studies

(i) NGO /peoples groups working with impact of large projects and/or human rights issues.

(ii) Assessing the impact of women's mobilisation and empowerment.

(iii) Child labour reports.

(iv) Development in a tribal region.

(v) Sourcing of livelihood in a traditional community.

(vi) Comparative studies.

When a student finds it too difficult to understand a context very different from his own, it becomes valuable to generate parameters by which one's own context may be compared to that which one is studying. Alternately, it is possible to choose two related / opposite / parallel contexts and assess them through the same parameters. For example, if one is studying the usage of income in different economic classes, it is possible to compare expenditure on the basis of-

- primary requirements like food, shelter and clothing;
- entertainment;
- travel;
- buying of utility and luxury items;
- health;
- educational facilities;
- services, etc.

(vii) Consumer group reports.

Understanding Land Use

(a) Agriculture

Case Studies

(i) Public Distribution Systems (PDS).

(ii) Alternatives to PDS like the targeted PDS.

(iii) Starvation in Orissa & Andhra Pradesh.

(iv) Agricultural practices of a small and large farmer.

(b) Towards a world without hunger

Project

Is bio-technology the answer to the world's food problems?

Case Studies

(i) The case of Bt Cotton.

(ii) Terminator and traitor technology.

(iii) The case of golden rice.

(iv) Bio-piracy.

Mapping - What I can do

By the end of the year the students would have gained exposure to various environmental issues. It is important for them to find personal solutions to many of the problems as this will empower them to find creative solutions to larger issues and the learning can be solution centred rather than problem centred. There are many areas listed which fall within the students' scope of intervention. The students can be invited to choose the areas they would like to invest in.

(i) In my home.

a. Energy consumption -projects to minimise, eliminate, use alternate sources.
b. Fossil fuel usage - minimise, use public transport, cycle.
c. Water consumption.
d. Sourcing food items - organic, farmer, small retailer, large corporation and supermarket.
e. Sourcing clothes - handloom, mass produced machine loom goods, branded products, imported clothing, and designer wear.

This is just a sample list to show possible personal initiatives.

(ii) In my school.

a. Carrying out paper audits.
b. Minimising or avoiding plastic altogether.
c. Making school a litter free zone or plastic free zone.
d. Planting and taking care of trees, herb gardens, vegetable gardens.
e. Maintaining patches of land.

(iii) In my neighbourhood.

a. Help in teaching under-privileged children.
b. Work with preventive health care and basic first aid.
c. Sanitation- learning about and promoting low cost decentralised systems.
d. Rainwater harvesting- setting up pits.
e. Separation of garbage - vermicomposting of bio-degradable waste.
f. Spread awareness of the four R's -Reduce, Reuse, Recycle, Refuse.
g. Care for neighbourhood animals - Rabies shots, deworming, feeding, etc.

CLASS X

*There will be **one** paper of **two hours** duration carrying 100 marks and Internal Assessment of 100 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.*

THEORY – 100 Marks

1. Caring for our Basic Resources

(i) Caring for our Soil

(a) Causes and consequences of soil erosion.

Study improper land use, deforestation, overgrazing, etc and also the impact of soil erosion on food production, generation of wastelands, silting of waterways and dams.

(b) Soil conservation strategies.

- Contour bunding.
- Tree breaks.
- Check dams.

A study of solutions and their applicability. Examples such as Auroville's work and Tarun Bharat Sangh's work.

(c) Fuel wood crisis.

To develop an understanding in students that a very large section of Indians still use firewood as fuel, the impact it has on nature in terms of a fast dwindling resource and the pressure put on surviving forests. Impact on health of the poor, particularly women, from inhaling the smoke.

(d) Waste generation - its toxicity and its impact on life and land.

The politics of waste dumping, the unmanageable wastes that we generate, leaching of toxins from landfills into water bodies, agricultural lands, and issues around incinerating waste.

(e) Treatment of wastes:

- Effluent treatment plants.
- Biological treatment.
- Strategies to reuse waste.

Evolving solutions to treat wastes. The scope and limitation of end of the pipe treatment.

- Combating deforestation.

JFM, community forestry.

(f) Alternatives to timber

Design solutions-alternate materials, etc.

Suggested Activities/ Visits:

- *Visit an industry to study waste generated and waste treatment.*
- *Make models of Chula for reduced firewood consumption.*
- *Model of solar cooker.*
- *Setting of compost pit.*

(ii) Caring for our Air

(a) Technical methods to control air pollution.

Electro static precipitators, cyclone separators, wet scrubber, bag filters, fluid bed boilers.

(b) Strategies to reduce air pollution -

- Economic

  Penalties and subsidies, Bubble theory.
- Technical

  Hybrid vehicles, alternate fuels, alternate energy vehicles.
- Traffic management.

  Study of Curitiba in Brazil, synchronised signals, use of lanes, one-way roads, etc.

(c) Legislation as a means to reduce air pollution.

The role of law in controlling and reducing pollution with examples like the Taj Mahal trapezium, Delhi city, etc.

(d) Remote sensing satellites and their applications.

Why is it such a good tool? What can it be used for?

(e) International norms on air pollution.

What are the International norms on air pollution? How are they drawn? Limitations with the implementing.

Example: Euro 1, Euro 2.

Suggested Activities/ Visits:

- *Visit to a pollution control board.*
- *Interaction with an NGO working in the field of environment.*

(iii) Caring for our Water

(a) Techniques of watershed management

Conserving water bodies; Study of indigenous examples like the Eri system of Tamil Nadu or Rajasthan's traditional systems and newly evolving modern techniques of water management; Ramsar convention.

(b) Rain water harvesting.

- *Roof water harvesting through percolation pits, etc.*
- *Water harvesting in rural areas through check dams, bunds etc.*

The need for the above and the scope.

(c) Small dams versus large dams.

An analysis - can many small dams replace a large dam? Do large rivers require large dams only?

Issues around large dams.

Scope and limitation of small dams.

Other possibilities like Micro hydel, Mini hydel, run off the river.

(d) Water recycling.

The scope of water recycling and importance.

(e) Alternatives to existing sewage treatment like dry compost toilets.

Decentralised answers to centralised ones, Use of decomposed night soil as a fertiliser as in China.

Suggested Activities / Visits

- *Carry out rain water harvesting in the neighbourhood.*
- *Visit a catchment area of the city.*
- *Visit to a nearby dam.*

2. Resource use

(i) Impact of globalisation on environment.

Understanding the basic intention of globalisation; the possibility and challenge of a global economy; impact of globalisation on developing countries - increased disparities, national debt and recession; impact on human resources and natural resources.

(ii) Role of NGOs in sustaining environment.

Study the work of a few NGOs.

Choose an international, national and a local NGO working in different areas - issue based, women's collectives and child welfare organisations.

(iii) Evolving a sustainable growth paradigm e.g., Gandhi. Large-scale development versus Village community based self-sufficient growth.

What does sustainability mean?

GDP versus Growth paradox. (Questioning the notion that increase in power will bring about economic growth and this in turn will alleviate poverty.)

How to integrate the principle of sustainability in development?

Gandhi's model of decentralised governance like Panchayati Raj.

A study of a few working examples like Khadi, Dastkar, Auroville, Gandhi gram.

(iv) North - South divide.

Patterns of resource use in the North and the South and the impact they have on the environment of both the regions.

Suggested Activities / Visits

- *Visit to a Khadi production centre or other such units.*

3. Appropriate Eco-friendly Technologies

(i) Scope and limitation of indigenous technology and modern technology.

Study an industry like fishing and/or weaving - where both technologies are practised.

(ii) Need for developing intermediate and appropriate technology.

To be studied through the analysis of the power sector - the limitation of all conventional sources and the scope of alternate energy sources.

(iii) Developing least cost options.

Environment Impact Assessments (EIA), their role including impacts while planning and the method to develop least cost options.

Dynamics of implementation.

Scope of grass root upward planning rather than trickle down planning.

(iv) Natural resource accounting.

What is natural resource accounting? How to go about it? - Basic understanding with the aid of examples.

Suggested Activities / Visits

- *Visit a modern power plant.*
- *Visit a village with traditional occupation like weaving, pottery, etc.*
- *Visit a Bio-gas plant.*

4. Initiatives I can take

(i) In my local environment.

(ii) In my future career choice.

(iii) In supporting initiative in my State or Country.

By the end of Class X, the student must have a working understanding of the broad impact that his /her personal decisions can have on the environment and on society. The implications of such an understanding are that:

- *the student is responsible for choices made.*
- *he/she is capable of mobilising responses to things that happen into meaningful and productive action.*
- *in whatever career context the student may function in later life, there is scope for applying environmental sensitivity.*
- *there is a clear connectedness to people and a capacity to interpret processes and decisions in society and governance and its impact on people.*

This can be brought about by discussions in class or facilitated through any other empowering process.

INTERNAL ASSESSMENT – 100 Marks

Students are recommended to complete **two** case studies and **one** project from the list given below.

Suggested list of Projects/ Case studies for topics from the syllabus.

1. Caring for our Basic Resources

(i) ***Caring for our soil***

Projects

- *How can a society produce less waste?*
- *Examine the problem of plastic.*
- *Setting up a safe plastic disposal system in a city.*
- *What are toxic wastes?*
- *Should oceans act as waste dumps?*

Case Studies

- *Tarun Bharat Sangh's work in Alwar.*
- *Case study of Anna Hazare's work in Ralegoan Siddhi.*
- *Auroville's afforestation effort.*
- *Environmental effects of mining, brick industry.*
- *Use of resources in a city. Compare with the resources used in a rural community.*
- *India's growing population problem - a critical analysis.*

(ii) Caring for our Air

Projects

- *Monitor pollution in busy traffic places.*
- *Role of vehicles in causing respiratory health problems.*

- *Is better public transport an answer to reducing air pollution in cities?*

Case Studies

- *Generating power through burning garbage - is it a good way of dealing with garbage?*
- *Medical waste disposal through incineration - is there an option?*
- *Can pollution be reduced by better city planning [one way lanes, synchronized signals etc].*
- *Bhopal gas tragedy.*
- *Chernobyl tragedy.*

(iii) Caring for our Water

Project

- *Is water being wasted through the modern sewage disposal system in cities?*

Case Studies

- *Water shortage in Kerala and Chirapunji.*
- *Rajasthan's water conservation systems.*
- *Salt water intrusion.*
- *Ground water depletion.*
- *Contamination of surface water.*
- *Laws relating to rain water harvesting in cities.*
- *The politics of water sharing like the Cauvery issue.*
- *Narmada issue.*
- *The Tehri dam issue.*
- *The three gorges project in China.*

2. Resource Use

Projects

- *Assess the impact of any movement related to displacements or violations.*
- *Look at Governmental and Non-Governmental supports to promote local initiative in the area of sustainable growth.*

Case Studies

- *Reports by NGOs on Globalisation impacts.*
- *Captive minds captive lives – Vandana Shiva.*
- *The unseen worker – National Foundation of India.*
- *Excerpts from E.F. Schumacher's work "small is Beautiful".*
- *Voluntary action and Gandhian approach – D.K. Oza.*
- *J.C. Kumarappa's writing.*
- *Gandhi's writings.*

3. Appropriate Eco-friendly Technologies Projects

- *Can Non-conventional sources meet the growing demand for power?*

Case Studies

- *Dr. A.K.N. Reddy's work in creating a network of villages in Tumkur district based on appropriate technologies.*
- *MNES publications.*

Guidelines for evaluating Project Work

The project has to be evaluated for the efficacy of the following steps:

1. Coming up with a clear question or problem statement, which will be the basis of the student's project research. This is critical because without a clear question the research tends to be broad and unfocussed, with the student tending to gather whatever information is available rather what they need to have.

   Criteria of evaluation for this stage will therefore include definition in terms of the focus and clarity of the question.

2. Formulating an action plan, which states the steps to be taken to move the question forward.

   Criteria of evaluation for this stage will include how pragmatically the plan takes the question forward.

3. Gathering primary data

   50% - 70% of information gathered needs to be primary data i.e., data gathered by the student by going into the field.

   This may involve evolving a questionnaire for social issues and formats for ecology related projects. Sample size and type have to be adequate and scrutinized carefully.

   Criteria of evaluation for this stage will therefore be based on quantum of fieldwork and efficacy of sampling.

4. Secondary data

   Secondary data from books, Internet and other publications is used only as a basis to substantiate, analyse and to construct an argument.

   Criteria of evaluation for this stage will therefore include appropriate choice and use of secondary data.

5. Collating data and generating solutions

   This phase after the gathering of the data is one of stock taking i.e. putting together of information. The data is then analysed and the solutions generated. The initial project report is put together.

Criteria of evaluation for this stage will therefore include sifting and organisation of relevant data, complexity of analysis in terms of number and relevance of parameter chosen and feasibility and innovation of solutions generated.

6. Project Report

   The research the student does is submitted as a project report comprising of the following:

   i. Statement of the topic, issue or problem being studied / researched.
   ii. Statement of the action plan.
   iii. Presentation of data using different methods such as bar charts/ pie diagram etc. A clear distinction has to be made between primary and secondary data.
   iv. Analysis of data.
   v. Solutions offered.
   vi. Personal learning for the student.
   vii. Bibliography and acknowledging resource persons.

   Criteria of evaluation for this stage will therefore include readability, precision, neatness and indexing.

   Therefore, the evaluation is on-line and does not base itself entirely on the project report.

7. **VIVA-VOCE** (Optional)

   A viva may be conducted with the subject teacher and an External Examiner who could be another teacher from the school itself or an experienced person from the environmental field, preferably a researcher.

   The purpose of the viva is to give the student an opportunity to converse with an expert in the field regarding his / her project. This would help to deepen the learning for the students and help them understand the lacunae in their thinking and process.

Guidelines for evaluating Case Studies

Case studies unlike projects are not based on primary data but entirely on secondary data mostly about a particular event or case.

The student presents it as a report about 1500 words long. It may be evaluated for:

- Comprehensiveness;
- Accuracy;
- Range of sources;
- Inferences drawn;
- Connections made;
- Perspective gained, etc.

Marks may be awarded on the following break up:

Project	-	30
Case studies	-	20
Total	**-**	**50**

EVALUATION

The assignments/project work is to be evaluated by the subject teacher and by an External Examiner. The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class.**

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks	**(100 Marks)**
Subject Teacher (Internal Examiner)	50 marks
External Examiner	50 marks

The total marks obtained out of 100 are to be sent to the Council by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the Council's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN ENVIRONMENTAL APPLICATIONS - 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.