

PROJECT BOOK IN ENVIRONMENTAL EDUCATION FOR CLASS IX



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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FOREWORD

The National Curriculum Framework (NCF) – 2005, recommends that children's life at school must be linked to their life outside school. This recommendation has been implemented in the new textbooks published since 2006, in all major subjects. In the context of environment-related awareness, NCF-2005's vision implies an approach which cuts across the traditional boundaries separating one subject from another. According to this approach, knowledge of environmental concerns and the activities, which might deepen this knowledge and develop a positive attitude, need to be infused in the subject matter of all areas of the school curriculum at different stages. *The National Focus Group on Habitat and Learning*, which amplifies the NCF-2005 perspective, says: "The human habitat displays tremendous variability in space and time and its understanding has to be locale specific albeit in the context of a global vision. A great deal of the knowledge of the environment lies with India's barefoot ecologists, the people at the grassroots..."

NCF-2005 perceives school children as ecologists in their own right who need to be nurtured by a flexible school routine and teachers who engage with children in the construction of knowledge. In addition to the environment-related subject matter and activities incorporated in the syllabus and textbooks of all the major subjects, the National Council of Educational Research and Training (NCERT) has now decided to bring out project books for students of Classes VI to X. The books comprising this series attempt to build capacity for critical and multi-disciplinary thinking and a positive and problem-solving attitude. They aim at exposing students to the real-life world around them, both in nature and society, in order to enable them to examine, assess and interpret the problems and concerns related to the environment. The ultimate goal is to promote a socio-cultural ethos which facilitates India's attempt to pursue the path of ethically sound and sustainable development. The activities included in this series of books require extensive and continuous observation and

documentation which would enable students and teachers to notice patterns in phenomena. Uploading of the results of such projects on publicly accessible websites will gradually help the nation to create a transparent and comprehensive database on the environment.

The success of this effort crucially depends on the interest and enthusiasm that school principals, teachers, parents and civil society in general show in encouraging children to carry out the projects and activities outlined in the present series. It is extremely important that students' project work is assessed in a holistic manner, giving due regard to the motivation and enthusiasm of each student rather than through the conventional system of evaluation which ignores individuality and originality.

NCERT appreciates the hard work put in by the Project Book Development Committee in preparing this series and we are especially grateful to Professor Madhav Gadgil for guiding the work of this Committee. Several teachers contributed to the development of this book; we are grateful to their principals for making this possible. We are indebted to the institutions and organisations which have generously permitted us to draw upon their resources, material and personnel. NCERT is thankful to Professor Mrinal Miri and Professor G.P. Deshpande who co-chaired the National Monitoring Committee appointed by the Ministry of Human Resource Development to oversee the implementation of NCF-2005. We thank Dr Kiran Chhokar, Programme Director, Centre for Environmental Education, Delhi, for her invaluable inputs during the meeting of the National Monitoring Committee. As an organisation committed to systemic reforms and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement of this important series.

New Delhi
9 January 2009

Director
National Council of Educational
Research and Training

NOTE TO THE STUDENTS

Environmental issues have become a topic of discussion and debate in every nook and corner of the world. The print as well as electronic media has been giving a special attention to these issues. At this very crucial juncture, it is but our responsibility to contribute every possible bit to safeguard our environment. By now you are well aware about the various environmental concerns, such as, pollution; scarcity of food and water; health and diseases; deforestation, flood, earthquake, etc. You have also learnt about many of these concerns in various chapters in the textbooks. We already have enough awareness about environmental issues pertaining to our locality, state or country. Let us now become active participants in these issues so that we ourselves work on the problems, find out the causes, and also come out with certain solutions and share our findings with our society. This is the basic purpose of bringing out this project book.

It would be a futile attempt to work on problems for which we will not succeed in collecting the data required for our study. Also, it would not be possible to work on problems, which are encountered not in our vicinity but somewhere very far from where we stay. Therefore, in this project book the development team has tried its best to come out with twenty such projects which you can take up, irrespective of the place you belong to. Yet, you may still find that some of the methodologies suggested may not be exactly workable for you. You have every freedom to modify them to your convenience in consultation with your teachers.

You may not be able to take up all the twenty projects in one academic session due to time constraint. But we encourage you to complete as many projects as possible, with a minimum of two projects. For group work, we suggest each member contribute equally towards the completion of the project. Many

of the projects would require collection of information or data from various sources. While obtaining this information we advise you to be prepared and meticulous. Also be calm, modest and do not hurt the sentiments of others. Do not forget to take prior permission or authorisation letter from your school in case you have to visit any institute organisation or offices.

It is our inherent duty to preserve and conserve the planet we live in. So, we must all try to contribute in whatever possible way we can. Take up the project in this spirit and work with a new zeal and enthusiasm. *'You must be the change you wish to see in the world'.*

NOTE TO THE TEACHERS

Keeping the ideology of infusing environmental issues and concerns in different textbooks intact as in the Upper Primary stage, the textbooks for Class IX, irrespective of the subjects, have adequately discussed these issues wherever it found its relevance. Ample opportunities have been provided to students to actively engage themselves in activities pertaining to these. This project book has been prepared as an attempt to further students' involvement and active participation in environmental issues. This will enable them to understand the environmental problems in their vicinity, work on them to obtain first hand information, and come out with their own meaningful solution. This book also contains twenty projects with the headings–title, background, methodology, conclusion and activities that can be taken up as follow up actions. The topics have been chosen keeping in view the environmental concerns that have been discussed in various textbooks for the class. An attempt has been made to make the projects workable in different corners of the country. However, modifications in the methodology or in the title itself are expected to meet the diverse local specific environmental concerns of different regions.

As the students reaches Class IX, they will be able to identify their local environmental concerns to a certain extent. It is here that they be given more space and opportunity to come out with innovative ideas and approaches to work on projects. Nevertheless, the role of teachers as a facilitator and guide will be instrumental for the successful completion of the projects. For this, teachers would be required to assign appropriate projects to each student, modify and fine tune the methodologies, keep track of the developments and also help the students wherever necessary to complete the task smoothly.

Teachers are expected to ensure that students take up as many projects as possible but with a minimum of two projects by each student.

Evaluation strategy can be prepared independently by the teacher concerned to evaluate the projects. The teacher concerned will decide whether evaluation should be done for every step of the project or on completion of each project. Whether marks or grades are to be allotted is left to the discretion of the teacher or the school authorities. Whatever pattern the teacher or school employs for evaluation, the marks or grades should be shown in the students' report card. There should be no pass or fail grading. Every student should have completed a minimum of two projects at the end of the academic session and thus should be considered pass.

Last, but not the least, this attempt of introducing project book is to bring about attitudinal change in the students towards environmental concerns and nurture them to become a concerned and responsible citizen.

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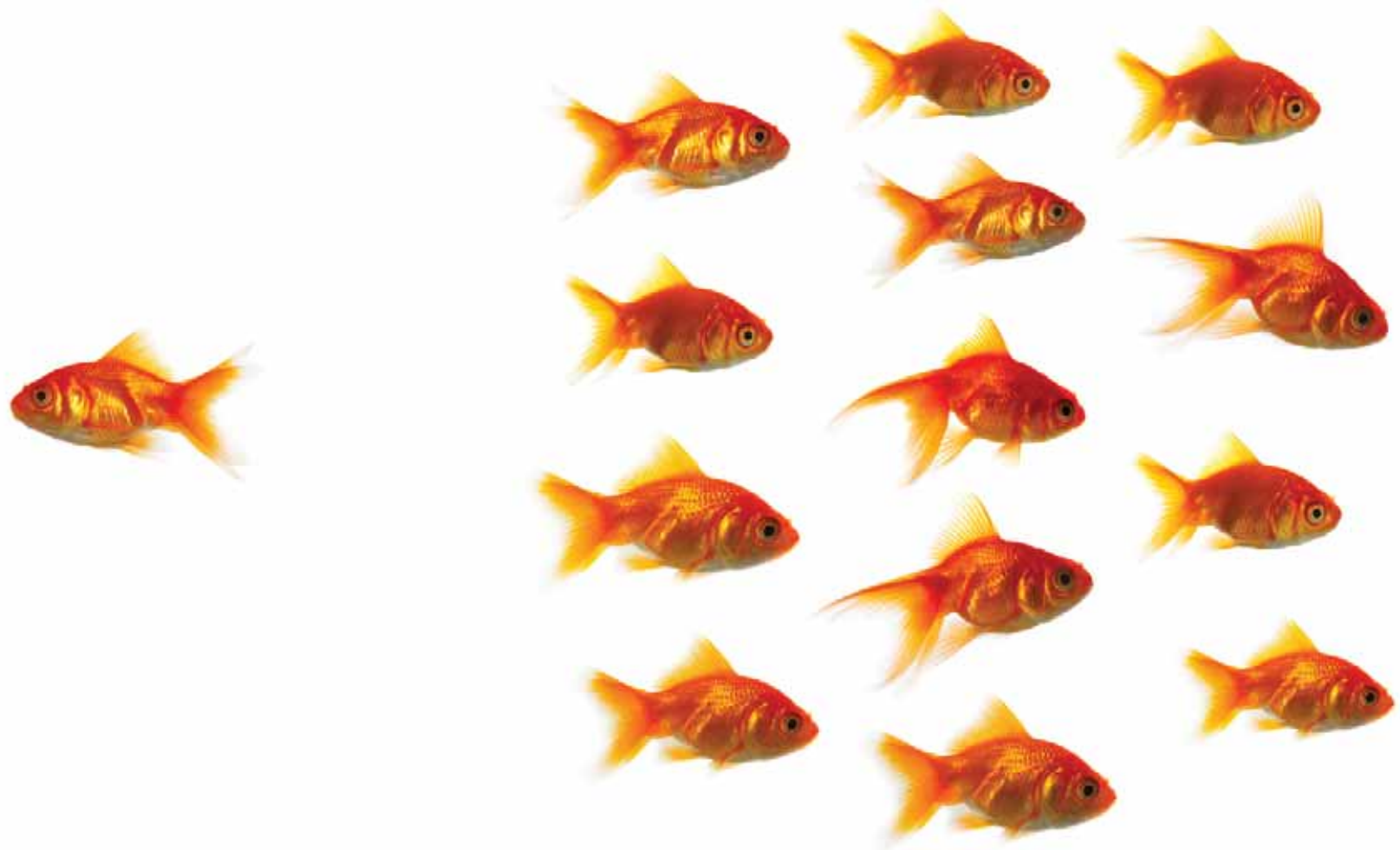
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You must be the change you wish to see in the world
~ Mahatma Gandhi

1. Locally available medicinal plants

Objective

To develop appreciation for medicinal qualities of plants.



AMALTAS

Background

Vegetation consists of different types of trees, shrubs and herbs. Many of these plants have medicinal qualities and are used to treat different types of diseases. We may find some such plants in our locality or neighbourhood.



ALOE VERA

Methodology

1. Talk to your teacher, elders in the family or neighbourhood and identify plants which are used as medicines traditionally or locally.
2. Note the special features of the medicinal plants that would help in their identification.
3. Gather the following information through interaction with knowledgeable persons. You may take the help of local medical practitioners (Ayurvedic doctors).
 - (a) Which part of a particular plant is used for treating a disease or disorder?
 - (b) How is it processed for use for a particular ailment?
 - (c) How many medicinal plants could you find in your locality?

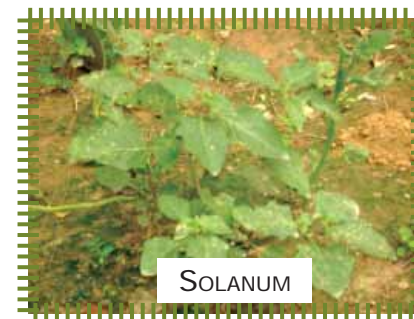
- (d) Are these medicinal plants cultivated or do they grow in the wild?
 - (e) Are these plants, or their parts, used without concern for their survival and growth?
 - (f) Has there been any effort for conservation and propagation of these medicinal plants?
4. Make drawings or take photographs of the plants that you have studied.

Conclusion

Conclude your observations in the form of a report with drawings and photographs of the parts of the plants used for medicinal purpose. Give the local as well as the scientific names, if possible, of each plant.

Follow-up

1. Display the report with photos and drawings in your class.
2. Organise an awareness campaign for conservation of medicinal plants at the local level to emphasise on their judicious use and plantation.
3. Grow at least one medicinal plant in your house or school or the neighbourhood.



2. Reducing farmer's woes: alternate cropping

Objective

To develop understanding about alternative patterns of cropping for sustainable agriculture.



Background

Increasing demand for food due to ever-rising population has created a pressure on agriculture for more production. Excessive use of fertilisers and water for increasing production may be counterproductive for sustainable agriculture. There is a need, therefore, to adopt alternative methods so as to make agriculture more productive. Cropping patterns such as mixed cropping and inter-cropping are alternatives to monocropping and are helpful in retaining the fertility of the soil. This is also a possible solution to farmer's woes of crop failure.

Methodology

1. Visit a crop field nearest to your village or locality and talk to the farmers.
2. Interview them and find out the types of crop they sow in their farms and also the area they cultivate.
3. Find out what each farmer is growing and note if they are growing one or many crops.

4. Find out if any farmer has switched over to mixed cropping and intercropping in recent past. If so, what were the reasons and how has that benefited the farmer.
5. If they are growing more than one crop, ask the farmer about the pattern of sowing – is it at random or in rows.
6. Enquire from the farmers the yield they obtain per unit area in each case.
7. Ask them about the type of fertilisers or manures they use and the amount of each type used. Also find out the type of irrigation used.
8. Find out the various alternatives that farmers plan in case of a crop failure.
9. Tabulate the information.

Farmer No.	Pattern of crops	No. of crops	Names of crops	Manure/ Fertiliser used (Yes/No)	Output/ Yield	Remark
1.						
2.						
3.						

Conclusion

Prepare a report based on your observations and data collected about the form of agri/cropping pattern that gives more yield and is more economical.

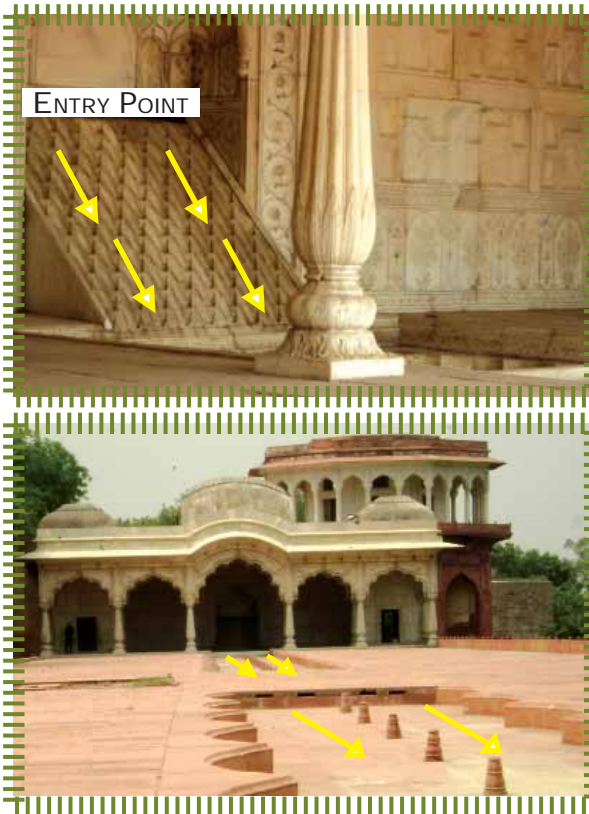
Follow-up

1. Find out other practices which can make agriculture sustainable.
2. Prepare an appropriate methodology for a project to find out whether genetically modified crops should be cultivated.

3. Water supply and waste-water disposal systems prevalent in the past

Objective

To study water supply and waste water disposal systems that were in use in earlier times.



Background

There are many forts, palaces and monuments of historical importance. Detailed information of famous monuments is available on the period when these were constructed, who constructed them and the architecture of that period. However, not much is known about the life style and civic facilities available in that period. It may be interesting to study about water supply and drainage systems prevalent at that time.

Methodology

1. Select a historical place that is accessible easily or close to your place of stay.

Water supply in the Red Fort: River Yamuna supplied water to the Fort. The water flowing through the Fort also provided a cooling system. The passage of water is shown with arrows in the pictures.

2. Collect information related to the monument such as:

- (a) When was it built?
- (b) What was the material used for construction?
- (c) Who built it?
- (d) What was the purpose for its construction?
- (e) How were water requirements of the people living/working/guarding in and around the place met with when it was built?
- (f) What were the arrangements made for safe disposal of waste-water and to drain out rain water?



Information can be collected from the Department of Archaeology (if any), archaeological books or local guides.

Conclusion

Prepare a report based on your study. The report should highlight the merits and shortcomings of the systems and also their impact on important historical events, if any.

Follow-up

Share the information with your peers.

4. Precipitation and soil erosion in the mountain ecosystem

Objective

To identify the relation between rainfall and soil erosion.



Background

There are many natural and manmade factors which are responsible for soil erosion. Precipitation – rainfall and snow-fall – is one of the prime factors for such erosion. Soil as a resource supports human survival in so many ways. When erosion takes place it leaches away the valuable top soil of the area. The eroded materials that fall into rivers make the water turbid. Silting results in floods and even changes the course of the river.

Methodology

1. Go to a nearby river site and collect samples of water in transparent bottles from the river before rains, during the rains and after the rains.

2. Make sure that the sample of water collected each time is collected in similar containers and the volume of the sample is also the same.
3. Keep the samples undisturbed and find out the time the solid particles take to settle down in each case.
4. Decant the water after the solid particles settle down and compare the amount of sediments for each sample.

Conclusion

Prepare a report on your study giving possible reasons for variation in the amount of sediments in different samples.

Follow-up

Find out the various measures by which soil erosion can be checked.



In India about 130 million hectare of land (45% of total geographical area) is affected by serious soil erosion through shifting cultivation, cultivated wastelands, sandy areas, deserts and water logging.

5. Our household service providers



Background

All of us know about the various basic service providers and helping hands without whom our lives would be very difficult. The mechanic who fixes electrical appliances, water lines; the mason who constructs houses for living; the vendors who bring things of requirement are some of the very important household service providers. There are also others like doctors, engineers, lawyers, teachers, shopkeepers and domestic workers whose services are very important.

Methodology

This can be a group project. The class can be divided into groups and collect data from different service providers based on the given questionnaire.

Objective

To know about the social lives and environment of people with different occupations and trades.

Questionnaire

1. What is the average income of the family?
2. Do they have any additional source of income?
3. What type of house do they live in?
4. Are water, electricity and other amenities available to them?
5. How do they go to their workplace?
6. How many hours do they work in a day?
7. What are the major occupational hazards and difficulties they face?
8. Do they enjoy a weekly off ?
9. How do they spend their leisure time?
10. Who takes care of the children in case the mother is also working?
11. What about their children's education?

Conclusion

Based on the data collected, prepare a brief report.

Follow-up

Reports can also be shared with other classes of your school.



6. Life in a village



Background

Most of the people in the rural areas are engaged in primary activities such as farming, keeping livestock, fishing or other related small scale and cottage industries. A large number of people may also be landless farm labourers, daily wagers and service providers. Basic facilities like safe drinking water, medical facility, education, transportation, etc. may not be easily available to them.

Methodology

This is a group project. The students can collect data about the people living in the village based on the following questionnaire.

Objectives

- (i) To find out distribution of land and other resources in rural areas.
- (ii) To find out the status of employment in the area.

Questionnaire

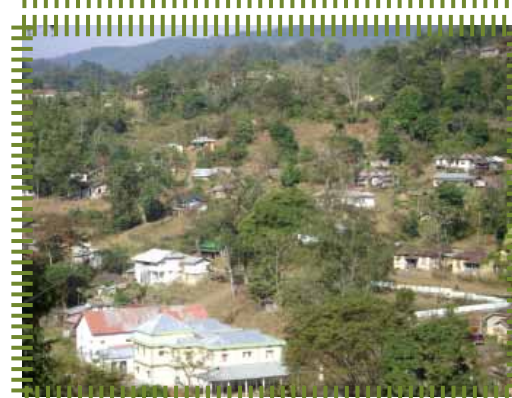
1. Collect the land utilisation data from the Panchayat, Revenue or Block Development Office.
2. How many roads lead to the village? How many pass through it?
3. What is the occupation that the villagers are commonly engaged in?
4. Find out the different welfare schemes running in the village (you can get this information from the Panchayat, Revenue or Block Development Office) and enquire whether they know about those welfare schemes.
5. Is there any person getting any benefit from such schemes?
6. Is there any health centre, doctor or school?

Conclusion

Based on the study of different group members, prepare a brief report on life in that village.

Follow-up

1. Display your report in your class or the bulletin board of your school.
2. Draw a topographical map of the village.



7. Food affordability

Background

India is an agricultural country. Food is essential for life and as such necessary amount of food should be available to all the people. However, a large section of our population is deprived of adequate food supply due to different reasons such as less production, unavailability and non-affordability. Whatever the reason, it leads to malnutrition and other nutritional disorders among those who are deprived of adequate food.



Methodology

This project can be done in a group. Data can be collected based on the given questionnaire. Respondents could be both male and female, mainly from economically weaker sections.

Objective

To be sensitised to the subject of food insecurity among the vast section of the people.

Questionnaire

1. What is the gross income of the family?
2. What is the household expenditure pattern on different items such as food, clothing, housing, fodder, medicines, entertainment, education, transport?
3. Is the expenditure marked for food items enough to meet the food requirement?
4. Is enough food available for all the persons? If not, why?
5. From where do they get the food items?
6. What is the approximate cost and affordability of nutrition per person in the family?
7. Which deficiency disease is prevalent? Is malnutrition prevalent?

Conclusion

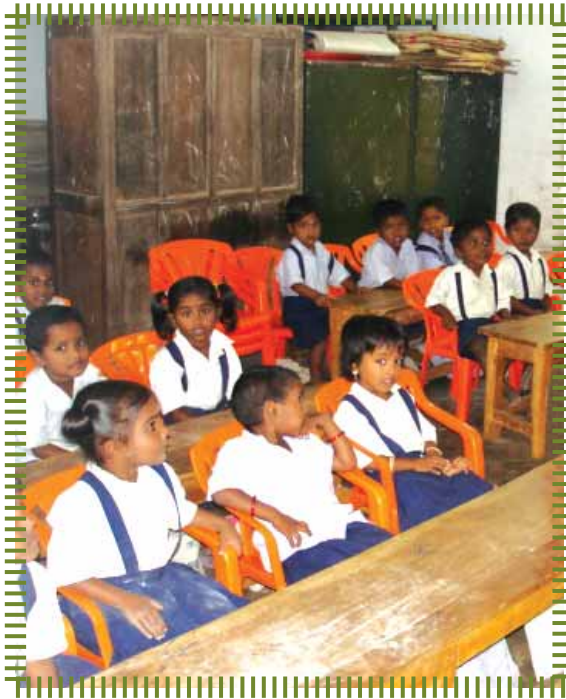
Write a report about the food security of the respondents based on your observation.

Follow-up

1. Organise a campaign to sensitise people and make them aware of less expensive nutritious food.
2. Organise a campaign to sensitise people about consuming locally available food items.



8. People as resource



Background

Expenditure on education and health of the people is a good investment. Investment in human capital yields a return similar to investment in monetary capital. The society gains directly and indirectly in terms of the standards of skilled manpower for industry, farming, low mortality rate, better spread of education, etc. An educated and healthier population is an asset of a country and can lead to the progress of the nation.

Methodology

Students can do this project individually or in groups. The data can be collected based on the suggested questionnaire. The survey should be done randomly for 20 individuals.

Objective

To appreciate the impact of investment in education and health of people.

Questionnaire

1. How many members are there in the family?
2. How many schools (primary, upper primary, secondary) are there in the neighbourhood?
3. How many earning members are educated?
4. What is the level of their education and income?
5. Do all the children including girls go to school?
6. What measures are taken when any member of the family falls sick?
7. Is medical facility easily accessible?
8. What are the practices followed to keep the family healthy?

Conclusion

Compare the information collected by different group members. Also write a brief note on how income is related to education and health.

Follow-up

Share your findings with your classmates. Display them on the bulletin board.



9. Modern agriculture and its impact on environment

Objective

To investigate the impact of modern agricultural practices on the environment.



Background

With the advent of technological advancements in agriculture such as better irrigation systems, use of high yielding seeds, fertilisers, pesticides, multiple cropping system, etc. farmers are getting better yields and profits. However, most of these practices, if not properly monitored or judiciously practised, can have an adverse effect on the quality and fertility of soil, water table, quality of water in river and lakes and others.



Methodology

The project should be carried out in groups.

1. Select an area where modern agri-practices are being followed.
2. Select another area where traditional practices of agricultural farming are followed.

3. Find out the yield per unit area in each case for the same crop.
4. Collect samples of water from ponds, wells, lake or tanks, if any, from the area surrounding the agriculture fields. Test the water samples with the help of pH papers.
5. Find out the alkalinity or acidity of the soil with the help of pH paper.
6. If a microscope is available, examine a drop of each sample for presence of living organisms.
7. The above information can be further substantiated from the village elders, agriculture scientists, and Block Development Officers of the area.
8. Obtain more information about soil and water.

Conclusion

Compare the two situations and present your report based on the data collected.

Follow-up

Share your experience with your classmates, and the people involved in agriculture and users of the water.



Agriculture implements and machines such as tractor, power tiller, power threshers, sprinklers, drip irrigation, animal drawn implements, self propelled reaper, paddy transplanter, etc. are available on subsidy at the rate of 25% of the cost of equipment subject to certain ceiling limits under Central Sector Plant Schemes.

10. Physiographic division of India and the lifestyles of people



Background

Physical features of land are diverse like mountains, plains, deserts and coastal areas. These physical features do have an impact on the lifestyle of people inhabiting them. Trade, agriculture, other modes of livelihood, and other cultural aspects like festivals, clothing, shelter, music, etc. are all affected by the physical features of the area.

Methodology

1. Choose any one physiographic division of India, preferably in which your school is located.
2. Identify the geographical characteristics of that region.
3. Find out which aspect of life is influenced by the physical environment and the reasons for its

Objectives

- (i) To identify the characteristics of physiographic division of India.
- (ii) To identify the impact of this division on the lifestyle of the people living there.



influence. Are these aspects also reflected in songs, dances, festivals, food habits, clothing or costumes, shelter, etc. of the place?

4. Collect photographs, audio and video tapes, picture postcards and related slides to include in your report.

Conclusion

Prepare a report on how the physical environment influences the lifestyle of people based on your study.

Follow-up

1. Display your study in the form of a wall magazine on your school bulletin board.
2. Share the audio and video tapes with your classmates and friends.



11. Use and abuse of water bodies



Background

Quality and quantity of water flowing through a river determine its sustainable usefulness or value as a resource. Due to several human activities, for example, agricultural run off, industrial effluents and domestic discharges, rivers are getting polluted. Sometimes water is diverted through canals for agricultural and other activities, thereby reducing the flow of water downstream. As river water is a vital

resource for humans, livestock and vegetation, it needs to be conserved and used judiciously.

Methodology

1. Choose a river or any water body such as lake, pond, etc. in your own region.
2. Mark its location on the map of India.
3. If you have chosen a river, mark its course on the map of India. Find out information related to the river such as its source, destination, major cities all along its bank, etc. and also mark them on the map.

Objective

To realise how changes in the utilisation pattern of water have affected water bodies.

4. Select 200 to 250 km stretch of the river and find out the cities and industrial units such as power plants, breweries, tanneries, textile mills located in the selected area which utilise the river water and discharge their effluents in the river.
5. Find out if the water is diverted to any irrigation canal in the selected regions.
6. Find out how the water bodies are being polluted. What are the major pollutants discharged into the water bodies?
7. If you have chosen any other water body, collect information about the various sources of pollution that is deteriorating the quality of water.

Information can be obtained from various sources like newspapers, magazines, government agencies, such as those involved in River Action Plan, NGOs, etc.

Conclusion

Based on the information collected by you, prepare a report and present it in the class.

Follow-up

Prepare charts to show the different ways in which water bodies are polluted and display them on your school bulletin board.



12. Cut on paper, cut on pollutants

Objective

To practise economy on use of paper.



Background

Present developments determine the course of the future to a large extent. We all know that paper is made out of wood, and we get wood from trees. However, we often waste paper. At the rate at which we are consuming paper, we may end up exhausting our valuable resource – trees. It is, therefore, essential to adopt economical means of using paper not only to conserve trees but also to reduce the production of effluents from paper factories.

Methodology

1. Collect information about the process of making paper.
2. Find out what are the various resources used in making paper. Also find out the quantities of these resources.
3. Find out the effect of the process of making paper on the environment.
4. Collect information about the approximate amount of paper used by a student of Class IX in terms of sheets used in notebooks.
5. Think of different ways of using paper judiciously, like using both sides of sheets, and make a list.



Conclusion

Write a report on consumption of paper analysing the information that you have collected.

Follow-up

1. Present your report in your class. Presentation can be in the form of power point or using charts.
2. This project may be extended and students may write articles to newspapers on the issue.



Recycling of paper produces the greatest overall reduction in the emission of greenhouse gases. This is because decomposing matter in landfills causes the emission of methane gas, which is a major greenhouse gas.

13. Human lifestyle and its effect on the environment

Objective

To understand the lifestyles of people and their interaction with the environment.



Background

Love and respect for the environment and the ideas of conservation and preservation have made possible the preservation of habitats and heritage through generations. This approach to life has undergone a change in both urban and rural areas.



Methodology

1. Choose a place, preferably a village or a rural habitat, to find out how life is lived there and its interconnection with nature.
2. Collect information about how lifestyles have changed in the last 25 years, of the people living in that area, through interactions and interviews with elders. Information can be collected about consumerism, wasteful habits, generation of waste and pollutants, etc.
3. Compare the changes that have taken place over a period of time.

Conclusion

Sum up the ideas based on the information you have collected and your interactions with local people and prepare a report on how human activities have changed the environment.

Follow-up

Students may bring it out as a publication of the school.

On an average, each individual produces 500g of waste every day. Urban India produces 1, 20, 000 tonnes of waste each day, Delhi: 7, 405 tonnes, Mumbai: 7, 025 tonnes, Chennai: 3, 500 tonnes, Kolkata: 3, 200 tonnes.



14. Bond of love between humans and animals

Background

It is not strange to notice people and animals living together and displaying their love and affection. We also see that people are very fond of their pets and love to spend time with them. One might have heard or read many stories of animal-human love and relationships which are very interesting and, sometimes, fascinating. Animals and humans are equal occupants of this planet. Many animals need our care or protection. But some people are indifferent to the pain and misery of animals around them and are sometimes even cruel to them. There are also organisations which are working for animal rights, prevention of cruelty to animals, etc.

Methodology

1. Collect anecdotes or stories about human-animal friendship from friends, elders, other animal lovers in the locality, books or magazines.
2. Also collect information, episodes or experiences in which cruelty towards animals led to harmful consequences for humans or animals.
3. Find out about animal rights and also find out the activities of organisations working for animal rights.

Objectives

- (i) To appreciate the bond of love between man and animals.
- (ii) To become aware of animal rights and the need to protect them.



Conclusion

Write a report on animal-human relationships and conclude how animal-human friendship enriches animal rights and prevents cruelty on animals.

Follow-up

Visit a zoological park and find out how the animals there are taken care of.

15. Responsible tourism



Background

Tourism is beneficial to both the tourists and the people associated with the trade. Tourists undertake travel for recreation, aesthetic satisfaction, appreciation of beauty, culture and for religious purposes. Health tourism and adventure tourism are becoming popular. Tourism brings prosperity, employment and professional progress to tourist spots. It also promotes understanding between people of different regions. But excess human activities cause damage to the environment and put pressure on civic amenities of tourist spots and places.

Objectives

- (i) To understand the importance of tourism for individual and economic purposes.
- (ii) To understand that excess human activities related to tourism can have adverse effects on the environment.

Methodology

1. Choose a tourist place preferably close to your locality.
2. Find out when and why it is visited by tourists.
3. How do local people benefit from the tourist activity?
4. Find out the adverse effects on the local people and the environment.
5. Collect the above information through personal observation, interview of local people and other sources such as newspapers, magazines and the media.



Conclusion

Write a report of the activities you carried out and present it in your class.

Follow-up

1. The report may be sent to the tourism department, environment ministry and local Panchayat with a request to take preventive measures.
2. Students can be asked to write poems, articles or paint on the theme "Man versus Nature".



16. Kitchen garden



Background

Many houses/homes have ample free space. As a hobby people tend to make use of this freely available space for kitchen gardens. Kitchen gardens have a variety of seasonal vegetables which can, to some extent, meet the requirements of the family without completely relying on vegetables from the market. Besides involving the family members in physical activity, this practice also helps the family in saving money and keeps them physically active and healthy.

Methodology

1. Find out in your neighbourhood the homes that have kitchen gardens and those who do not have a kitchen garden even though they have open space.

Objectives

- (i) To understand the economics of a kitchen garden.
- (ii) To encourage the utilisation of leisure time for productive purposes.

2. Find out from those that have kitchen gardens, the different kinds of vegetables they grow.
3. Find out the amount of money they spend on seeds, saplings, manure, pesticides and irrigation.
4. Also find out from both kinds of households about the vegetables they buy from the market.
5. Enquire from each of the households the amount of money they spend on vegetables per week.
6. Tabulate your data and compare the expenditure incurred by the households.
7. Find out the creative pleasure they derive from a successful production.
8. Prepare a report of your study.



Conclusion

Based on your study conclude whether having a kitchen garden is economically beneficial or not.

Follow-up

Present your report in the class or in the morning assembly.

17. Quality of water



Background

The drinking water that we get is contaminated with various dissolved substances such as calcium, iron, aluminium salts, etc. which often cross the permissible limits. The water in extreme cases may receive effluents from factories, small textile, printing and dyeing units or farm run-offs. Outright harmful constituents such as arsenic, fluorides, copper, mercury and lead are also present in drinking water in wide parts of India. These substances cause serious ailments. It is worthwhile to find out by simple means the presence of the various impurities.

Methodology

1. Collect samples of water (about 200 ml) from different sources, e.g. handpumps, wells, tube wells, tanks, ponds, rivers and taps.

Objective

To study the presence of dissolved matter in water from different sources and relate it to its suitability for drinking purpose.

2. Filter the suspended matter from the water samples by passing through a cotton plug kept in a funnel.
3. Now take 100 ml of each sample separately.
4. Evaporate water from each sample till dry. For this, take water in a steel vessel and heat gently till all the water has evaporated.
5. Collect the dry mass separately and weigh it.
6. Identify the impurities by analysing the solid residue, if possible.

Conclusion

Draw your conclusion about the amount of dissolved matter in water.

Follow-up

If possible, find out with the help of experts/scientists the harmful constituents present in the dry mass and present it before the class and community.

Idols made from non-biodegradable, hazardous materials like Plaster of Paris and coated with toxic paints containing mercury, cadmium, lead and carbon when immersed into seas and other water bodies contaminate the water.



18. Save endangered species

Objective

To become aware of the need to save endangered species.

Background

All the living organisms, be it plants, animals or microorganisms, have a specific role to play in the ecosystem in which they exist. Some of these organisms face the risk of becoming extinct because of decreasing numbers that are caused by destruction of their habitat, hunting, poaching, excessive utilisation, etc. These are called endangered species. Many countries, including India, have laws that forbid hunting of such species. Endangered animals are also preserved in reserved forests. However, some species are also dying silently. We need to do something to prevent their extinction in order to maintain the ecological balance.



LION-TAILED MACAQUE



BROW-ANTLERED DEER

Methodology

1. List ten endangered species, each under the categories of birds and other animals of both land and water in our country.
2. Locate and describe the regions to which they belong (for example on a map).
3. Find out the causes of their declining numbers.
4. Prepare a flow chart to show the decrease in their numbers over the past ten years.

5. List the sanctuaries, national parks and reserve forests where these endangered species are looked after.
6. List steps which can save them from extinction.

Conclusion

Prepare a report on the basis of your study giving pictures and habitats of the animals.

Follow-up

1. Try to publish the study in a magazine or a newspaper.
2. Try to find out the reasons why certain species have become extinct in the past.
3. Organise a debate in your class on whether cloning of endangered animals is an appropriate solution for their conservation.



BENGAL TIGER

About 500 one-horned rhinoceros have been killed by poachers over the past 20 years in the Kaziranga National Park in Assam. Experts believe that the rhino-horns, purported to have aphrodisiac properties, are smuggled to China or sold in other Asian markets. In the Middle East the horns are used to make ornamental dagger handles. The horns can sell for upto US\$ 35, 000 a kilogram.

19. Rainwater harvesting



Background

There cannot be life without water. Rain and snowfall are the two sources of fresh water which replenish underground water, lakes, rivers, and other water bodies. But a lot of rainwater also goes waste. Water being a scarce resource, and its ever increasing use with the growing population and development, it needs to be utilised judiciously. Every drop of water is precious and one of the ways to meet the growing demand for water is through rainwater harvesting.

Objectives

- (i) To understand the importance of water.
- (ii) To participate in spreading awareness about rainwater harvesting.

Stepwells, also called *bawdi* or *baoli* are in essence, wells in which the water can be reached by descending a set of steps.

<< View of a *Bawdi* at Fatehpur, Shekhawati

Methodology

1. Find out different methods of rainwater harvesting in different parts of the country from different sources like magazines, newspapers, internet, etc.
2. Find out the current methods practised in your state.
3. Compare two households/localities – one practising rainwater harvesting and the other not, in terms of water availability for domestic purposes.



Johad is a traditional pucca rainwater storage tank, mainly used for drinking purposes. The above is a view of a Johad at village Thathawata, Rajasthan.

Conclusion

Write a report based on the information that you have collected.

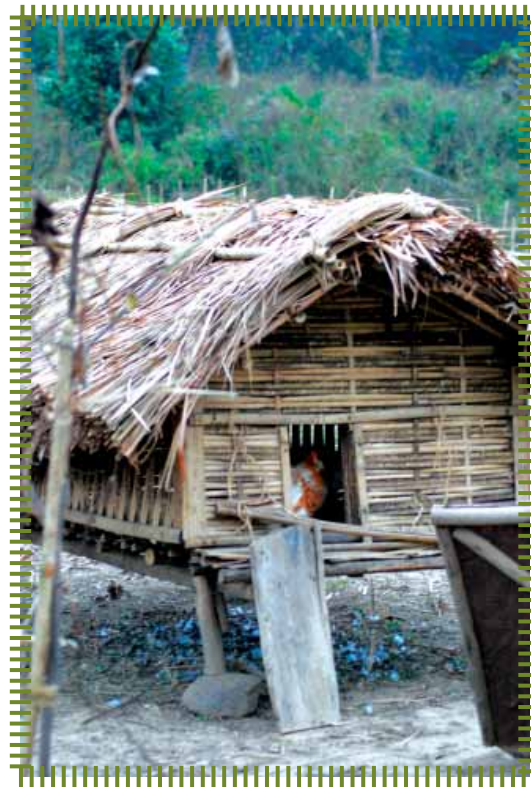
Follow-up

1. Based on your comparative study of different rainwater harvesting methods, recommend the most suitable method for your area.
2. Advocate the practice of rainwater harvesting in your school/home/locality.

20. Animal breeding for increased production

Objective

To find out the quantity of milk production in different varieties of cattle.



Background

With the rise in the demand of milk and milk products, the production of milk has increased enormously. These have been made possible due to animal breeding. Different high yielding varieties of animals are bred so as to increase the production of milk and meat.

Methodology

1. Visit a cattle farm where milk is produced in large quantities.
2. Speak with the manager or caretaker of the farm and find out the following:
 - (a) The varieties of animals that are reared in the farm for increased milk production.
 - (b) From where do they get such varieties of animals?

- (c) The amount of milk produced per high yielding cattle per day in the farm.
- (d) The amount of milk produced per cattle per day by ordinary cattle.
- (e) Find out if any artificial methods are adopted to increase the production.

Conclusion

Conclude your study by writing a paragraph about the varieties of animals that produce more quantity of milk.

Follow-up

Visit a poultry farm and find out the varieties that are reared for egg and chicken production.

The per capita availability of the milk in India is about 221 g per day, but this is still very low as compared to developed nations or the world average of 285 g per day.



[illegible]

Notes

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