

TEACHERS' HANDBOOK
ON
ENVIRONMENTAL EDUCATION
FOR CLASSES XI-XII

**Department of Education in Science
and Mathematics**

विद्यया ऽ मृतमश्नुते



एन सी ई आर टी
NCERT

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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-based syllabus for the higher secondary stage. The present Teacher’s Handbook provide guidelines for its transaction. This book attempts to build capacity for critical and multi-disciplinary thinking and a positive and problem-solving attitude. It aims 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 book requires 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 encouragement that school principals, teachers, parents and civil society in general show for encouraging children to carry out the projects and activities outlined in the book. 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 Handbook Development Committee in preparing this series and we are especially grateful to Professor Madhav Gadgil, Chairperson, Advisory Group in Environment Education 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.

New Delhi
9 January 2009

Director
National Council of Educational
Research and Training

PREFACE

Environmental issues can be appreciated only in the broader context of the system as a whole; not only in terms of trees and tigers or greenhouse gases and rise of global temperature; but also in terms of people and the demand they generate for tiger skin coats and the institutions combating as well as promoting poaching; or people and the demand they generate for cars and motorbikes and the institutions combating as well as promoting global warming. This Handbook, therefore, begins with a concrete case study illustrating how one may view environmental issues from a systems perspective. The case study also provides several systems diagrams to demonstrate how to organise and depict one's understanding of the overall systems context. The teachers are encouraged to emphasise this systems view and try to apply it in teaching the various topics in the syllabus. The students are expected to have acquired adequate understanding of the basics of the various topics by tenth standard, and it is not expected that at this stage we go into any additional material. Rather, the students may be given a comprehensive systems view of the environment while dealing with these topics. Thus, they may be asked to generate systems diagrams similar to those provided in the introduction in relation to various aspects of the different syllabus topics being studied.

Another notable feature of environmental issues is their tremendous variability. Every year floods of Brahmaputra take on new manifestations, each wheat field of Punjab or rice field of Kerala has its own set of weeds, soil micro-organisms, beneficial animals such as spiders, as well as insect pests. Each day problems of traffic congestion on streets of Delhi, Mumbai or Chennai take on new forms. These details are important and environmental issues are therefore best appreciated in terms of first-hand experiences. The curriculum, therefore, emphasises student activities as the main vehicle of learning. The Handbook suggests that these activities are best formulated as testable hypotheses. A set of exemplar hypotheses is presented in the Handbook. These are meant to be framed in such a fashion that one can come up with a set of observations, which would be practically feasible as student projects, and

which can lead to either confirmation or rejection of the hypothesis under consideration. What is important is that the hypotheses should be testable; it is not essential that they are necessarily valid. Indeed, many hypotheses could very well be rejected, for they are primarily meant to stimulate thinking, and investigation. Such student activities cannot, of course, lead to definitive conclusions. However, it is hoped that they could contribute to a gradual advancement of our currently very limited understanding of status and ongoing changes in India's environment.

We wish to emphasise that the set of hypotheses and the ancillary methodology suggested in the Handbook is merely illustrative. While teaching the various syllabus topics the teachers and students should continually attempt to come up with similar testable hypotheses appropriate to their own local context in the light of the topic. The teachers are encouraged to be creative, and to stimulate the students' creativity so as to generate a whole range of new hypotheses pertinent to different syllabus topics and to the tremendously variable local context of our vast country.

The world, and with it India, is moving into the Information Age, an age of openness and transparency. This has tremendously enhanced everyone's access to information and more importantly opened up the possibilities of ordinary people, not just experts, participating in generation of knowledge. World Wide Web and the new Web 2.0 technology is a key to this enterprise of collaborative knowledge generation. The Handbook explores these possibilities in the section on Information Management. All the schools are encouraged to set up their own websites, or become associated with another appropriate website and upload results from the student projects on the web. Such transparency would not only help augment other citizens' understanding of environmental issues; it will enhance student's motivation by opening up possibilities of public recognition of her/his contribution. The schools may additionally set up wiki sites and invite all interested citizens, as also experts to add value to the material from student projects posted on such sites. NCERT will also endeavour to support such attempts through material made available on its own website.

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Do You Know

According to the 86th Constitutional Amendment Act, 2002, free and compulsory education for all children in 6-14 year age group is now a Fundamental Right under Article 21-A of the Constitution.

**EDUCATION IS NEITHER A
PRIVILEGE NOR FAVOUR BUT A
BASIC HUMAN RIGHT TO
WHICH ALL GIRLS AND WOMEN
ARE ENTITLED**

*Give Girls
Their Chance !*



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NOTE TO THE TEACHERS

Dear Teachers

You must perhaps be aware the National Curriculum Framework (NCF)–2005 envisages that learning in all the three domains—cognitive, conative and affective—be imparted without unnecessarily increasing the curriculum load on the child. Also the National Policy on Education (NPE)–1986, directs that all national concerns and issues to promote values such as India’s common cultural heritage, egalitarianism, democracy and secularism, equality of the sexes, protection of the environment, etc., should cut across the different curricular areas. Accordingly, NCERT has taken care that environmental concerns are infused in different curricular areas in a graded manner till Class X. Different activities and project works are suggested in the textbooks to provide live contact with the world around them.

At the higher secondary stage, to ensure the continuation of proactive action towards the environment, NCERT proposes a project-based compulsory qualifying course comprising a core and projects for all students. The core focuses on interconnected nature of the physical–biological–social–economic system pertinent to environmental issues. The core course, detailed under seven major topics would be tackled through deliberations and presentations in a seminar mode. It is suggested that a class may be divided into seven groups and a topic may be assigned to each group. Group members may choose a group leader if they wish. The group will prepare on the topic in consultation with the teacher. The group will present a seminar on the topic where all other groups will also be present. The concerned teacher will evaluate the group giving the seminar and also the groups reacting to it, and keep a record. So, there will be a continuous evaluation of the understanding of different groups while the core components are being transacted. One period per week will be allotted for these sessions. On completion of the core course children will be assessed on similar lines (the chapter on evaluation discusses in details the assessment procedure).

All students will do at least one project under the guidance of a teacher. An individual student or a group

of students may select a topic for the project. Students need to develop a working hypothesis and prepare a detailed project proposal. The project proposal will include the calendar of activities to be undertaken. The teacher facilitator will closely monitor these activities.

All teachers will act as facilitators from the inception to the completion of the project irrespective of the area of specialisation she/he is associated with teaching at the higher secondary stage. One teacher will be associated with a maximum of ten students per class but the number can vary depending on the situation. The teachers as facilitator will closely monitor the working of the project and keep a record of it.

On completion of the project the student will produce the report. In case of group project the teacher will keep a record of the different tasks performed by the group members. However, a joint project report will be presented for evaluation.

The project-based learning would ensure learning in the affective domain which would bring forth good, sensitive, rational citizens.

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