MAIN THEME AND SUB-THEMES
FOR
State Level Science and Environment Exhibitions for Children 2012 – 2013

The National Council of Educational Research and Training, New Delhi organizes **Jawaharlal Nehru National Science and Environment Exhibition for Children** (**JNNSEEC**) every year. The organisation of **State Level Science and Environment Exhibitions for Children (SLSEEC)** in all states, union territories etc. constitute the first phase of JNNSEEC.

MAIN THEME FOR SLSEEC 2012 -13
Science and Society

The identified six sub-themes are:

(i) Industry;
(ii) Natural resources and their Conservation;
(iii) Transport and Communication;
(iv) Information and Education Technology;
(v) Community Health and Environment; and
(vi) Mathematical Modelling.

TITLE OF ONE-DAY SEMINAR
Year of Mathematics – 2012

The Guidelines for Preparation of Exhibits and Models and Organising State Level Science and Environment Exhibitions for Children 2012 – 13 can be downloaded from the NCERT website

http://www.ncert.nic.in/departments/nie/desm/publication/pdf/SLSEEC_English.pdf

Contact Address:

Dr. Gagan Gupta
Coordinator, SLSEEC and JNNSEEC
Department of Education in Science and Mathematics
National Council of Educational Research and Training
Sri Aurobindo Marg, New Delhi 10016

Phone: 011 26962332; Fax: 011 26561742
email: jnnesec2012@yahoo.com

बच्चों के लिए राज्य स्तरीय विज्ञान एवं पर्यावरण प्रदर्शनीयाँ 2012-2013

मुख्य विषय तथा उप-विषय

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्, नई दिल्ली द्वारा प्रतिवर्ष आयोजित होने वाली

बच्चों के लिए जवाहरलाल नेहरू राष्ट्रीय विज्ञान एवं पर्यावरण प्रदर्शनी

के प्रथम भाग की तैयारियों के रूप में

बच्चों के लिए राज्य स्तरीय विज्ञान एवं पर्यावरण प्रदर्शनियों

का आयोजन सभी राज्यों, संघ राज्य क्षेत्रों, तथा अन्य संस्थाओं द्वारा किया जाता है।

वर्ष 2012-2013 में आयोजित होने वाली राज्य स्तरीय प्रदर्शनियों का मुख्य विषय निम्न है:

विज्ञान और समाज

इस प्रदर्शनी के लिए चुने गए छः उप-विषय निम्न हैं:

1. उद्योग;
2. प्राकृतिक संसाधन एवं उनका संरक्षण;
3. परिवहन एवं संचार;
4. सूचना एवं शिक्षा प्रौद्योगिकी;
5. सामुदायिक स्वास्थ्य एवं पर्यावरण; तथा
6. गणितीय प्रतिरूपण।

एक-दिवसीय गोष्ठी का विषय निम्न है:

गणित वर्ष 2012

वर्ष 2012-2013 में आयोजित होने वाली सभी राज्य स्तरीय विज्ञान एवं पर्यावरण प्रदर्शनियों के लिए प्रदर्शों, मॉडलों को बनाने तथा उनके प्रदर्शन के लिए आवश्यक दिशानिर्देश परिषद् की वेबसाइट से डाउनलोड किये जा सकते हैं:

http://www.ncert.nic.in/departments/nie/desm/publication/pdf/SLSEEC_Hindi.pdf

सम्पर्क पता:
डॉ. गगन गुप्त
समन्वयक, एसएलएसईईसी तथा जेएनएनएसईईसी
विज्ञान तथा गणित शिक्षा विभाग
राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
श्री अरविन्द मार्ग, नई दिल्ली 110016
फोन: 011 26962332 फैक्स : 011 26561742
ई-मेल: jnnesec2012@yahoo.com

बच्चों के लिए
राज्य स्तरीय विज्ञान एवं पर्यावरण प्रदर्शनियाँ-2012-13
तथा
40वीं जवाहरलाल नेहरू राष्ट्रीय विज्ञान एवं पर्यावरण प्रदर्शनी-2013

प्रदर्शों तथा मॉडलों को बनाने के लिए एवं
प्रदर्शनियाँ आयोजित करने हेतु

दिशानिर्देश

STATE LEVEL SCIENCE AND ENVIRONMENT EXHIBITIONS FOR CHILDREN–2012–13

and

40TH JAWAHARLAL NEHRU NATIONAL SCIENCE AND ENVIRONMENT EXHIBITION FOR CHILDREN–2013

GUIDELINES

FOR THE PREPARATION OF EXHIBITS AND MODELS, AND Organising Exhibitions

CONTENTS

1 Guidelines for the Preparation of Exhibits and Models

Introduction

All children are naturally motivated to learn and are capable of learning. They are natural learners and knowledge is the outcome of their own activity.

Children learn through interactions with the environment around, nature, things and people–both through actions and through languages. They construct knowledge by connecting new ideas to their existing ideas based on materials / activities presented to them. The structuring and restructuring of ideas are essential features as children progress in learning. They actively engage with the world around them, exploring, responding, inventing, working things out, and interpreting. In order to stimulate creativity and inventiveness in science, National Curriculum Framework emphasises on activities, experiments, technological modules etc. It also encourages implementation of various curricular activities (even if these are not part of the examination) through a massive expansion of non-formal channels such as organisation of science and environment exhibition at the national level for school students, with feeder events at school/ block / tehsil / district / region / state levels. The objective must be to search and nurture inventive / creative talent among students. The curriculum framework further envisages the upgradation of current activity in this regard by many orders of magnitude, through coordination of state and central agencies, NGOs, teacher associations etc., financial support and mobilisation of experts in the country. Such a movement should gradually spread to every corner of India and even across South Asia, unleashing a wave of creativity and scientific temper among young students and their teachers.

Science is a powerful way of investigating and understanding the world. Therefore, the teaching of science must enable children to examine and analyse their everyday experiences. Every resource must be explored to enable children to express themselves and to handle objects. Concerns and issues pertaining to the environment should be given importance on all possible occasions through a wide range of activities involving outdoor project works. Some of the information and understanding, flowing from such activities and projects could contribute to the elaboration of a publicly accessible database, which would in turn become a valuable educational resource. Well-planned student projects may lead to knowledge generation. Such projects may then get a place for display in various science exhibitions.

The National Council of Educational Research and Training (NCERT), New Delhi organises Jawaharlal Nehru National for Science and Environment Exhibition for Children (JNNSEEC) every year for popularising science and environmental education amongst children, teachers and public in general. This exhibition is a culmination of various exhibitions organised in the previous year by the States, UTs and other organisations at district, zonal, regional and finally at the state level. Selected entries from all States and Union Territories, the Kendriya Vidyalaya Sangathan, the Navodaya Vidyalaya Samiti, Department of Atomic Energy Central Schools, CBSE affiliated public (independent) Schools and Demonstration Multipurpose Schools of Regional Institutes of Education participate in this national level exhibition. Like in the past several years such exhibitions are to be organised from district to state level during 2012 - 13 too. These would form the first phase of preparation for the JNNSEEC to be

organised in November 2013. To create a caring community in a well developed society, the main theme for the State Level Science and Environment Exhibitions for Children (SLSEEC) – 2012-13 would be '**Science and Society**'.

We confront many crucial issues as a rapidly progressing society, which are directly or indirectly related to science. Among these issues, there are a number of daily and real life situations. There are various problems related to agriculture, industry, global warming, resource depletion, energy resources, pollution, health, nutrition, transport and communication, disaster management, environment etc. Children need to be aware of such situations, issues and problems that the society is facing. It is aimed to empower them to apply their scientific knowledge and their mathematical understanding to solve them in order to sustain well being of people of modern society. Children should understand how human societies unlimited use of natural resources affects the quality of life and environment. Children need to be encouraged to appreciate and participate in the responsible use of science for the benefit of the society. They should also have a scientific vision about different issues and the ability to acquire and process information about scientific developments and their long term implications on society and environment.

The main objectives of the exhibitions are:

- to provide a forum for children to pursue their natural curiosity and inventiveness to quench their thirst for creativity;
- to make children feel that science is all around us and we can gain knowledge as well as solve many problems also by relating the learning process to the physical and social environment;
- to lay emphasis on the development of science and technology as a major instrument for achieving goals of self-reliance and socio-economic and socio-ecological development;
- to highlight the role of science and technology for producing good quality and environmental friendly materials for the use of society;
- to encourage children to visualise future of the nation and help them become sensitive and responsible citizens;
- to analyse how science has developed and is affected by many diverse individuals, cultures, societies and environment;
- to develop critical thinking about global issues to maintain healthy and sustainable societies in today's environment;
- to apply mathematics and information technology to visualise and solve problems pertaining to everyday life etc.
- to appreciate the role of science in meeting the challenges of life such as climate change, opening new avenues in the area of agriculture, fertiliser, food processing, biotechnology, green energy, disaster management, information and communication technology, astronomy, transport, games and sports etc.
- to create awareness about environmental issues and concerns and inspiring children to devise innovative ideas towards their mitigation.

It is envisaged that children and teachers would try to analyse all aspects of human endeavor with a view to identify where and how the new researches and developments in science and technology can bring and sustain progress of society leading to improvement for the challenges of life. The organisation of science and environment exhibitions would also provide opportunities to all participating students, teachers and visitors to get acquainted with different kind of equipments, devices and techniques. This exercise would enable the students and teachers to generate scientific ideas for addressing various problems of the society and environment.

In order to facilitate the preparation of exhibits and models for display and the organisation of State Level Science and Environment Exhibitions for Children during 2012 -13, six sub-themes have been identified. These are:

1. Industry;
2. Natural resources and their Conservation;
3. Transport and Communication;
4. Information and Education Technology;
5. Community Health and Environment; and
6. Mathematical Modelling.

The importance of each sub-theme in the context of the main theme and a number of ideas for development of exhibits are given below. However, these ideas are only suggestive.* Participants are free to develop exhibits based on other related ideas of their choice.

THEME: SCIENCE AND SOCIETY

1. INDUSTRY

India has abundant natural resources and its economy depends largely on the proper utilization of the resources. The industrial development of India over the past six decades of planned progress is indeed spectacular. The country is now, more or less, self-sufficient in the production of consumer goods and some basic items like iron, steel, and aluminum. Service industries like tourism and banking are also growing. Power generation has been substantially stepped-up to fuel a variety of industries and infrastructure adequately built-up for the future progress. The potential for generating hydroelectric power in north-eastern part of the country has not developed because the region falls within a major earthquake zone. Among India's major large scale industries are: Cotton and silk textile industry with over a twelve hundred textile mills; iron and steel industry with six integrated steel plants and over 220 mini-steel plants; jute; sugar; cement; aluminum; electronics; jewellery; heavy machines and electrical equipment; light engineering; glass; leather goods; paper, chemicals and fertilizers; pharmaceuticals; petroleum; shipbuilding; sports; dairy; fisheries and other agricultural products; handicrafts etc. The knowledge-based information technology industry is one of the most promising sectors in India. The IT sector alone accounts for over Rupees Fifty Billion in revenue. Tourism has also emerged as an instrument for employment generation, poverty alleviation and sustainable human development. Presently the direct employment in tourism industry is estimated to be about 1.5 million. The emphasis is not only to accelerate industrial development but also make the Indian industries internationally competitive.

The spectacular industrial development over the last few years has led to the replacement of the communities of nature by man-made communities. However, the principles that govern the life of natural communities have to be observed if these man-made communities are to thrive. Deforestation, overgrazing, indiscriminate mining and tree felling, and faulty tillage practices have led to sever soil erosion. Over-irrigation and over harvesting of agricultural lands has resulted into salinity of water, water-logging and land degradation. Overuse of tube-wells has substantially lowered down the underground water table. Destruction of lush tree covers has occurred due to the need of more agricultural and residential lands to meet the challenges due to over-population. Industrial effluents, forest fire and unplanned growth have led to severe water and air pollution. The eco-system represents a stable equilibrium of various physical and biological factors that have been operating in the past. The organic continuity of the system rests on a delicate network of independent relationships. The air, the water, the man and the animals, plants and planktons, the soil and bacteria are all invisibly inter-linked in a life-sustaining system we call the environment. All living organisms have survived by adjusting themselves to the

Exhibits that involve curricular areas and low-cost technologies are also welcome to participate.

environment and attuning their lives to its rhythm.

Industrial growth cannot be sustained without scientific and technological development. To maintain the growth and progress of industries and their development, the country needs trained technologists and a scientifically literate population. There has been a tremendous industrial development in our country since independence, especially with the rapid advancement in the availability of global information and its dissemination. It has led to better living standards for the people of our country-both rural and urban.

The need for indigenous development of technology in the present age, when the world is fast changing, is of paramount importance as it has been recognized as one of the most important factors for all round development in different types of industries. The objective of this sub-theme is to help the children understand the importance of science and technology in various types of industries and try to think of ways and means to increase production of different kinds of goods to meet the future needs of the growing population possibly at a low cost. The exhibits / models in this sub-theme may include:

- models of improved versions of various types of machines and manufacturing plants;
- schemes / designs to help reduce production cost and conservation of raw materials;
- use of eco-friendly innovations that may help in increasing the industrial production;
- innovative methods of exploration and processing of minerals, crude oil etc.;
- issues related with the service industries like tourism, banking, IT etc.;
- plans for proper management of natural resources and environment;
- monitoring the changes in wildlife caused by the human encroachment;
- devices or methods that control pollution;
- impact of pollution on living and non-living;
- devices to control and measurement of the noise, air, soil, water pollution;
- study of chemical spills in industry;
- awareness about various aspects of environment and disposal of harmful effluents;
- preservation, conservation and management of soil;
- analysis of soil samples for their components;
- ecological studies of plants and animals;
- experiments with biodegradability;
- efficient methods of harvesting and using plankton;
- effect of lubricants on gears;
- study and record varying water levels, over the year, in the water body, surrounding environment;
- design and development of an automatic weather recording device;
- study of air and water purification methods;
- ozone destruction experiments etc.;
- use of innovations / improvements that may help in increasing production in various industries, such as textiles, engineering goods, machine tools, chemicals, drugs and pharmaceuticals including life-saving drugs, vaccines and devices and eco-friendly plastics etc. to improve the quality of life;
- improved / indigenous design / working models of devices which may be used on small scale for production / manufacture of utility items of daily life;
- schemes / designs to help reduce production cost and conservation of raw materials;
- indigenous / innovative techniques for exploration / conservation / recycling / processing of minerals and other natural resources;
- improved / improvised / innovative technologies associated with weaving, pottery, metal work, dyeing, printing and other crafts practiced in cottage industry and suggestions for new designs;
- working models to demonstrate equipment / processes / devices / technologies / designs, which may help facilitate the domestic work;

- working models of devices/equipment to demonstrate the control and measurement of noise, air, water and soil pollution arising due to industrial development and suggestions for treatment of industrial wastes, specially toxic, so that we may live in a clean environment;
- working models to show efficient disposal of harmful effluents from industries. Also, suggestions for safe disposal of radioactive waste and ways and means to dispose off non-biodegradable waste from kitchens of hotels and restaurants and also disposal of wastes from hospitals etc.

2. Natural resources and their Conservation

Earth natural resources are finite. It means that if we use them continuously we will eventually exhaust them. Conservation of natural resources preserves the ecological diversity and our life supporting systems – water, air and soil.

India has abundant natural resources and its economy depends largely on the proper utilization of these resources. Deforestation, overgrazing, indiscriminate mining and faulty tillage practices have led to severe soil erosion. Over irrigation and over harvesting of agricultural lands have resulted into salinity of soil, water logging and land degradation. Overuse of tube-wells has substantially lowered down the underground water table. Industrial effluents, forest fire and unplanned growth have led to sever water and air pollution. Over 2.4 billion people lack access to proper sanitation facilities and 1.1 billion people lack access to safe drinking water. Shortage of natural resources cripples public health system also.

All conventional sources of energy are exhaustible. Development of conventional forms of energy for meeting the growing needs is the main task. Fossil fuels supply nearly 75 per cent of the world's energy. But fossil fuels are being depleted hundred thousand times faster than they are being formed. At the current rate of consumption, known reserves of petroleum will be exhausted in about 35 years, natural gases in about 50 years and coal some time within 200 years.

In the context of global sustainability, the great concern about energy is not about diminishing supplies. It is rather than our current models of harnessing energy are unsustainable because of environmental, economic, geographical and equity issues. Our current energy models rely on (i) fossil fuels that cause smog and acid rain and are linked with global warming; (ii) traditional biomass fuels that provide about 10 per cent of world energy, but contribute to deforestation, desertification and air pollution; (iii) hydroelectric power stations that provide about 05.5 per cent of energy consumed but linked with environmental refugee; (iv) Nuclear power stations that provide just over 6 per cent of world energy but generated radioactive wastes that require long term safe disposal. Redesigning system of utilization and conservation of energy could not only minimize environmental impacts but also provide tremendous economic opportunities to fast developing country like India.

The alarming changes in our natural world are matters of concern. Over half of India's natural forests re gone, one third of its wetland are drained out, 70 percent of its surfaces are polluted, 8 percent of land is occupied by garbage, 40 percent of its mangroves are wiped and with continued hunting and trades of wild animals and commercially valuable plants, thousands of plants and animal species are heading towards extinction. According to a major report of World Wide Fund for Nature (WWF), the world's largest independent conservation body of wildlife population, no one can escape the impact of biodiversity loss because reduced biodiversity translates into graeter vulnerability to natural disaster and greater effects from global warming. We have not only degraded our natural resources but are also now using them beyond an environmentally sustainable level: 25 percent nore than the planet can replace.

The air, the water, the man, the animals, the plants and planktons, the soil and bacteria are

all invisibly inter-linked in a life sustaining system of the earth.

In this scenario, we need to design, develop and innovate new and economically viable technologies to harness and conserve natural resources. This sub-theme is expected to make the children think of various ways and means for making efficient use of available natural resources. The exhibits/models in this sub-theme may pertain to:

- plans for proper management of natural resources and monitoring of the changes in wildlife population caused by human encroachment;
- restoration of degraded areas and habitat of natural biodiversity;
- ecological studies of plants and animals;
- efficient methods of harvesting and using plankton;
- schemes/designs to help reduce production cost and conservation of various raw materials;
- sustainable land use practices/ecologically sustainable farming methods;
- recycling of water, materials, solid wastes;
- devices/methods that control air/water/land pollution;
- impact of pollution on living and non-living;
- preservation/conservation/management of soil/water;
- factors necessary for soil formation;
- analysis of soil samples for their components;
- stopping depletion of essential micronutrients in the soil;
- forest conservation/management;
- various ways of harnessing geothermal energy such as energy from hot springs/geothermal desalinization/geothermal heating – controlling heating and cooling of a building using underground heat by vertical/horizontal loops/geothermal power/electricity generated from naturally occurring geological heat sources;
- models of green building/environment building which harvest energy, water and materials;
- green roof technologies/roof mounted solar technologies such as solar water heater, solar lighting system;
- heating system of a building by solar heater;
- devices to make breeze funneling towards your home;
- solar cooker/solar distiller/solar dryer for food processing/solar heated houses;
- solar thermal electricity/community solar project;
- innovative designs and installation of solar tower;
- projects for measuring availability of solar/wind energy in a given area;
- model of wind turbine for domestic use with vertical/horizontal axis;
- wind mill/water mill for grinding grains/drawing water from the well and to generate electricity;
- water sensitive urban design to mitigate water shortage;
- use of tidal waves/ocean currents/salinity gradient for generating electricity;
- river water sharing and its efficient and equitable use;
- desilting and renovation of ponds, tanks and reservoirs;
- technologies to manage water shortages and water surpluses;
- self regulating water harvesting system/rainwater harvesting and storage in a manner that evaporation and transportation losses are minimised;
- waste water treatment and recycling;
- participatory watershed development and management;
- community gardening;
- development of low cost technology for producing potable water;
- sea water use along the coastal areas for raising mangrove and salicomia plantation together with agriculture;
- stabilisation of sand dunes by growing thorny bushes;
- model of canals to minimise losses by water seepage;
- innovative/improvised designs for

reducing waste in extraction and processing of minerals;
- innovative methods of exploration and preserving minerals and crude oil etc.;
- cost effective heating and cooling system of buildings etc.;
- models to control loss of natural resources due to disasters etc.

- wave energy from oscillating water conversion / tidal barrage generator etc;
- energy from biomass such as seaweeds, human / animal wastes, keeping in view environmental concerns;
- improvised technologies for effective usage of bio-fuels;
- innovative designs of bio gas / bio mass plant;
- impact of bio-energy on food security;
- models / designs of fuel-efficient automobiles / machines;
- production of electrical energy from mechanical energy / nuclear resources;
- mechanism of extraction, storage and processing of fossil fuels,
- study of air tides;
- effects of landscaping and architecture on energy consumption etc.

3. Transport and Communication

The Scientific and technological information available today has revolutionized worldwide means of communication, which plays a key-role in the growth and development in all walks of life. Increased production in agriculture and industry also require an efficient transport system for transporting raw materials and finished products from one part of the country of other. Tremendous developments in the field of transport and communication have been made to meet the growing demands due to increasing number of users. The communication network in the world has undergone a sea change with the use of satellite and other communication systems. These global changes have influenced the quality of life in our country.

There has been a global expansion of electronic information in recent times. This has greatly helped in improving upon the quality of life. Millions of computers in this world are connected through the Internet, facilitating the accessibility to information within a ultra short time. Use of fax, mobile phone, e-mail, have become a common day affair in all walks of life. The convergence of multiple communication systems have revolutionised learning and knowledge sharing. The ability to access and manage these information and knowledge repositories is important in the development of both the individual as well as the society.

Children should be exposed to communication technology and to appreciate its role in human affairs. They need to adapt / adopt new technologies to collect, process, analyse, synthesise, evaluate and share knowledge with others.

The objective of this sub-theme is promoting innovations in knowledge networks involving transport and communication technology in all segments of the society. Children need to reason and communicate to solve problems and to understand effective use of information and communication technology for a variety of purposes.

The exhibits / models in this sub-theme may pertain to:

- indigenous / improvised / Improved devices for world-wide communication of verbal / printed / pictorial information;
- improvised / Indigenous models for efficient transport and fast communication especially Internet for communication in rural areas;
- working models of fuel efficient / pollution-free designs of automobiles / other vehicles;
- models showing use of innovative / inexpensive / locally available materials / designs for construction / maintenance of roads / railway tracks of vehicles;
- innovative ideas for efficient management of road, rail, water and air transport systems, e.g. better safely measure, especially unmanned railway crossings checking / control of pollution, providing immediate relief to accident victims, etc;
- models showing preparedness for disaster-both natural and man-made

management;

- working models of devices for recording and reproduction of audio-visual material for entertainment and recreation, use of computers in motion pictures including cartoons, animation, graphics and television;
- working models of printing technology - communication with graphics and multi-media and low-cost methods;
- working model of efficient transport system in metropolitan/ urban and rural areas;
- working model/charts of GPRS enabled vehicular movement;
- demonstrating the principle and functioning of modern devices of communication;
- designs for making existing operation of communication more efficient;
- showing the use of information technology for preservation and conservation of soil/ water management and maping of water resources;
- showing the use of information technology for developing improved designs of machineries for textiles, engineering goods, machines, tools, chemicals, drugs and pharmaceuticals, plastics and ecofriendly materials;
- demonstrating the use of information technology in developing improved designs/indigenous designs/devices, which may be used on a small scale for production/manufacturing of utility items of daily use;
- showing applications of communication technology in making innovative designs of weaving, pottery, metal and leather wares, dyeing, printing and other crafts practiced in cottage industry;
- developing innovative designs/models of multimedia equipments/materials and packages for the children with special needs, especially with visual and audio impairment;
- exploring uses/applications of transport and communication technology in generating employment/eradicating illiteracy;
- technologies of emerging web designs/ effective use of bookmark sharing;
- projects against attack aimed on information services/cyber security;
- technologies in forecasting and warning of cyclones, floods and storms;
- improvised/improved devices for effective transport and communication between various emergency services, namely medical, police, military and other administrative bodies/committees;
- information management from ships and oceans buoys - use of radars in cyclone detection/information management and early warning system for flash floods;
- use of geo-stationary satellites in providing information pertaining to meteorological processes etc.;
- emergency mechanisms and mobilization centers/improvement in communication and transportation systems etc.

4. Information and Education Technology

We live in a highly globalised and interconnected world. There has been a global expansion of electronic information in recent times. This has greatly helped in improving upon the quality of life. Today, computers and other electronic gadgets are being increasingly connected with each other through local area as well as global networks. Millions of computers in this world are connected to the Internet, facilitating the accessibility to information within a very short time. Information of every conceivable topic of human interest is being put up on the internet by individuals and institutions. Use of fax, mobile phone, e-mail, web chat rooms, social network sites etc. has become a common day affair in all walks of life. The convergence of multiple communication systems has revolutionized learning and knowledge sharing. The ability to access and manage these information and knowledge re-

positories is important in the development of both the individual as well as the society.

To live and work in information rich technological society, children should be exposed to experiences that encourage them to value the ever increasing capacity of information technology and to appreciate its role in human affairs. They need to adapt/ adopt new technologies to collect, process, analyse, synthesise, evaluate and share knowledge with others. The task of management of information and its processing for development oriented information and inclusive society requires a fairly good amount of skill. These skillful persons can be responsible for the use of processed information in the progress of different areas of education, agriculture, health and nutrition energy, transport and communication, various industries, technological aids, clean environment, availability of portable water, different kinds of materials, meeting the challenges of climate change, financial management and many more.

With the use of information technology, education has become global. One can choose to study many qualifications through distance and supported learning. One may work through the course at home in his or her own time, with the help of printed study materials and often also through videos, DVDs, web based resources etc. One can also communicate with the instructor and with other fellow students by mail, e-mail, social networking sites, web chat rooms, and fax; In this changed scenario, the use of information and education technology undoubtedly helps in improving upon the quality of teaching and learning of any subject. Suitable indigenous technologies can be developed for designing and fabricating educational aids for teaching all subjects including science, technology and mathematics.

The objective of this sub-theme is promoting innovations in knowledge networks involving information and education technology in all segments of the society. Children need to reason and communicate to solve problems and to understand effective use of information and education technology for a variety of purposes.

The exhibits/models in this sub-theme may pertain to:

- demonstrating how the information in any of the areas mentioned above can be accessed;
- demonstrating the principle and functioning of modern advices of communication. Such as television and radio (AM/FM) mobile phone, fax, e-mail, internet etc. and accessing and downloading information from them;
- designs for making existing operation of communication more efficient;
- showing the use of information technology for preservation and conservation of soil/ water management and mapping of water resources;
- showing applications of information technology for improving upon the quality of seeds of fruits, vegetables and flowers and breeds of plants and animals by the use of biotechnology;
- showing the use of information technology for developing improved designs of machineries for textiles, engineering goods, machines, tools, chemicals, drugs and pharmaceuticals, plastics and eco friendly materials;
- demonstrating the use of information technology in developing improved designs/indigenous designs/devices, which may be used on a small scale for production/ manufacturing of utility items of daily use;
- applications of information and communication technology in making innovative designs of weaving, pottery, metal and leather wares, dyeing, printing and other crafts practiced in cottage industry;
- use of information technology for developing devices to demonstrate the control and measurement of noise, air, water and soil pollution due to rampant industrial development;
- efficient use of multimedia in making the teaching-learning process more interesting and effective/in enhancing creativity of children and teachers;

- development software with testing mechanism inbuilt in them which may help individual students to learn at their own pace;
- developing innovation designs / models of multimedia equipments / materials and packages for the children with special needs, especially with visual and audio impairment;
- exploring uses / applications of information and communication technology in generating employment / eradicating illiteracy;
- technologies of emerging web designs / effective use of bookmark sharing;
- projects against attack aimed on information services / cyber security.
- technologies in forecasting and warning of cyclones, floods and storms;
- better information and public address systems in the event of disaster to prevent chaos and confusion;
- improvised / improved devices for effective communication between various emergency services-medical, police, military and other administrative bodies / committees.
- information management from ships and oceans buoys-use of radars in cyclone detection / information management and early warning system for flash floods;
- use of geo-stationary satellites in providing information pertaining to meteorological processes; etc.
- designing and fabrication of effective educational models by using indigenous raw materials;
- innovative and inexpensive models of audio-visual equipment (specially multimedia);
- low–cost educational toys, games, puppetry etc.;
- curriculum based low cost demonstrations such as

  (a) transformation and conservation of mechanical energy (roller-coaster, Archemedes Screw etc.);
  (b) conservation of angular momentum (revolving chair) and linear momentum (Newton's cradle);
  (c) illusions;
  (d)propagation of sound and light waves; demonstrations of various phenomenon;
  (e) endothermic and exothermic chemical reactions;
  (f) effect of friction on gravity;
  (g) measurement of speed of sound - echo tube;
  (h) resonance in organ pipes;
  (i) simple harmonic motions and superposition of harmonic motions;
  (j) levers and pulleys etc.
- study of formation of images on a T.V. tube;
- use of low-cost semi-connductor lasers in classroom activities;
- voice communication with infrared light and fiber optics;
- reproduction of the Stanley Miller Experiment: 'The Origin of Life';
- study of phosphorence as a tool for geologists;
- use of internet;
- applications in education using the computer as an education tool; simulations in science and non-sience areas etc.

5. Community Health and Environment

Health is an overall state of body, mind and social well being that implies to an individual and people. Our health is continuously under the influence of both endogenous (within) and exogenous (around) environment and therefore a matter of great concern especially in the rapidly growing society to cope up with newer scientific and technological inventions. When people are healthy, they are more efficient at work. This increases productivity and bring economic prosperity. Health also increases longevity of the people and reduces infant and maternal mortality. When the functioning of one or more organs or systems of the body is adversely affected, characterized by various sign and symptoms, a state of disease is reflected.

The health is broadly affected by genetic disorders, infections and lifestyle but multi-factorial causes are more prevalent in case of many diseases. In case of genetic disorders, deficiencies / defects are inherited from parents and the best examples are hemophilia and

colour blindness, however, diseases like cancer and diabetes mellitus are also known to have genetic basis, these are non-infectious.

Further, many diseases last for short period of time called acute diseases like common cold but many other ailments last for longer duration and even as much as life time like tuberculosis, they are chronic diseases. The cancer is one of the most dreaded chronic diseases of human beings and is a major cause of death all over the globe. Transformation of normal cells into cancerous neo-plastic cells may be induced by physical, chemical or biological agents. Ionizing radiations like X-rays, gamma rays and non ionizing radiations UV causes DNA damage leading to neo-plastic transformation. Chemical carcinogens present in tobacco smoke have been identified as a major cause of lung cancer. Cancer causing viruses are also known, they possess genes called viral oncogenes.

Infectious agents comprises of a wide group of organisms called pathogens, they are viruses, bacteria, fungi, protozoan and multicellular worms, insects etc. The diseases caused by these organisms include influenza, dengue fever, AIDS, typhoid, cholera, malaria, ringworms, filariasis etc. The pathogens live under different environmental conditions and have great potential to adapt to the environment within the host. For example, the pathogens that enter the gut know the way of surviving in the stomach at low pH and resistance to various digestive enzymes. Pathogenic attack to an individual and spread to someone else takes place through air, water, soil, physical contact and also through other animals. Such animals are thus the intermediaries and are called vectors. In many instances the body is able to defend itself from most of these infectious agents through the immune system. Acquired immunity is pathogen specific; however, we also possess innate immunity from birth.

Our health is adversely affected due to many environmental hazards that lead to several kinds of infection in the body. With increasing population, demand for food, water, home, transport, energy etc are increasing causing tremendous pressure on our natural resources and thereby contributing to pollution of air, water and soil. The lifestyle including food and water we take, tendency for junk/fast food, rest and exercise, habits and drugs and alcohol abuse is another challenge to our health. Increasing level of obesity, early detection of hyperglycemia and hypertension is a great cause of worry from the health point of view. Continuous efforts of scientists, technologists, doctors and naturalist have brought many new ways of safety and security to our life. Major inventions in bio-medical diagnostics, new vaccines and antibiotics, surgical methods and genetic engineering have given relief to the mankind. Mortality age has gone up, infant and maternal mortality gone down and epidemics are much under control. Awareness towards meditation and traditional knowledge of herbal medicines has influenced community helath.

The present sub-theme is proposed with the objectives; to bring awareness among the youth about health and factors affecting our health, to explore new scientific, technological and biomedical interventions in prevention and cure, to analyze the role of self and society in keeping our environment healthy in order to maintain good health and promote innovative ideas for better management.

The exhibits and models in this sub-theme may pertain to:

- demonstration of health and differentiation from the state of ill health. Health and disease;
- demonstration of factors affecting the health, different ailments in the body;
- showing and designing activities on infectious and non-infectious diseases, relationship with causative factors and their sources;
- innovation to develop control measures at different levels, role various agencies;
- presenting medical assistance and facilities, rural/urban and gender aspects;
- sensitising people to be careful in health maters, explore the possibilities and make use of the facilities available;

- development of knowledge-base and understand new scientific, technological aids in bio-medical area;
- demonstration of means and ways to adopt methods for self concentration and meditation and their uses;
- demonstration of known facts and research findings in different medical systems like Indian, Modern, Homeopath etc.;
- demonstration of lifestyle and relationship with good and bad health based on known facts and researches;
- demonstration of the role of traditional knowledge of herbal products for community health; etc.

6. Mathematical Modelling

Mathematical modelling is the process of transformation of a physical situation into mathematical analogies with appropriate conditions. Physical situations need some physical insight into the problem. Then it is solved by using various mathematical tools like percentage, area, surface area, volume, time and work, profit and loss, differential equations, probability, statistics, linear, nonlinear programming, etc. It is a multi-step process involving identifying the problem, constructing or selecting appropriate models, fighting out what data need to be collected, deciding number of variables and predictors to be chosen for greater accuracy, testing validity of models, calculating solution and implementing the models. It may be an iterative process where we start from a crude model and gradually refine it until it is suitable for solving the problem and enables us to gain insight and understanding of the original situation. It is an art, as there can be a variety of distinct approaches to the modeling, as well as science, for being tentative in nature.

In mathematical modelling, we neither perform any practical activity nor interact with the situation directly, e.g. we do not take any sample of blood from the body to know the physiology, and still our mathematical tools reveal the actual situations. The rapid development of high speed computers with the increasing desire for the answers of everyday life problems have led to enhanced demands of modelling almost every area. The objective of this sub-theme is to help children to analyse how mathematical modelling can be used to investigate objects, events, systems and processes. It can be visualized by Fig. 1.

The exhibits / models in this sub-theme may pertain to:

- mathematical modelling to solve various problems of our everyday life / environment related problems;
- mathematical modelling and computer simulation of climate dynamics / production of weather phenomena based on a number of predictors;
- mathematical modeling in physical geography such as rotation and revolution of earth, precession and equinoes etc.;
- mathematical modelling to predict orbital path of comets, meteors and other minor planets;
- mathematical modelling to show how disease might spread in human in the event of epidemics / bioterrorism;
- mathematical modelling to predict the devastating effects of wars / nuclear explosions;
- mathematical modelling to show spread of forest fire depending on the types of trees, weather and nature of the ground surface;
- mathematical modelling to demonstrate the action of medicines in human system;
- mathematical modelling of the working of heart, brain, lungs, kidneys, bones and endocrine system;
- computer diagnosis of human diseases;
- mathematical modelling of fluid flow in drain, spillways, rivers, etc.;
- using mathematical modelling and computer simulation to improve cancer therapy / wound healing / tissues formation / corneal wound healing;
- mathematical modelling of intracelular biochemical reactions and metabolisms;
- mathematical modelling to describe traffic flow / stock market options;

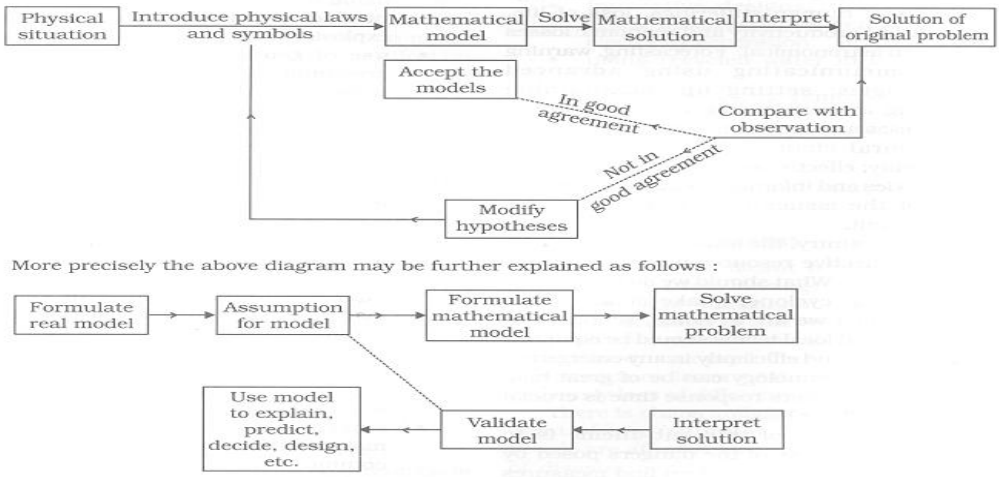

Fig. 1: A Mathematical Model

- studies of storage and retrieval techniques for computer systems;
- data manipulation and information management techniques;
- statistics and random number problems;
- developing video games;
- mathematical modelling for increasing production of crops;
- mathematical modelling on balance of carbon cycle;
- mathematical modelling on social insects such as honeybees, termites etc. to know how they use local information to generate complex and functional patterns of communication;
- mathematical modelling of maximum speed in fibre optic links;
- mathematical modelling of highly abstract problems arising from control and communication processes in the brain;
- mathematical modelling of urban city planning;
- mathematical modelling to prevent an unwanted future/to understand various natural and unnatural phenomena;
- mathematical modelling to show the effect of climate changes/global warming;
- mathematical modelling for predicting future population and knowing the impact of population;
- mathematical modelling for increasing production of crops etc.

2 GUIDELINES FOR ORGANISING ONE-DAY SEMINAR ON YEAR OF MATHEMATICS – 2012

NOTE: *The One-Day Seminar should preferably be organised one day before the organisation of State Level Science and Environment Exhibition for Children (SLSEEC).*

The importance of Mathematics has been realized since ancient periods. It is often seen that the students who obtain good marks in mathematics also get good marks in other subjects too. Mathematics does not only help in day-to-day situations but also develops logical reasoning, abstract thinking and imagination. It enriches life and provides new dimensions to thinking. The struggle to learn abstract principles develops the power to formulate and understand arguments and the capacity to see inter-relations among concepts. It also helps us understand and make better patterns, maps, appreciate area and volume and see similarities between shapes and sizes. Mathematics students do well not only in conventional areas of engineering but also in computers, corporate world, management, finance, administration and in teaching too. One can be an expert in mathematics only by understanding and enjoying it and not by rote learning. Mathematics is not less even for mental exercises. Increasing popularity of number puzzles and sudokus in news papers and magazines is an evidence of it. Progress in science, engineering and technology is difficult without an expertise in mathematics. Having realized this fact and to attract youth towards mathematics, Government of India has decided to celebrate the birth anniversary of great Indian mathematician Late Shriniwas Ramanujam – 22 December as National Mathematics Day.

Famous mathematician Ramunujam was born on 22 December 1887 in Erode, Tamilnadu. In his life span of just 32 years and without any formal training in pure mathematics, Ramanujam miraculously contributed in the complex fields of mathematical analysis, number theory, infinite series, continued fraction etc. In order to commemorate his 125th birth anniversary, National Council of Educational Research and Training, New Delhi is celebrating year 2012 as Year of Mathematics.

During the Year of Mathematics activities are planned to (i) increase the public appreciation and understanding of Mathematics; (ii) making people aware of and appreciate the contribution of Indian mathematicians (Arya Bhatta, Bhaskaracharya, Pingala, Sridharacharya et al.); (iii) increase the interest of young people in Mathematics; (iv) generate interaction among people in mathematics through electronic media (or social networking websites etc.) and thus generate enthusiasm for mathematics; (v) generate awareness among people as to how mathematics could be useful in facing challenges of 21st century; and (vi) make people aware of the aesthetic sense and beauty of mathematics.

During this One-Day Seminar on Year of Mathematics, children, teachers, parents and all concerned are invited to generate ideas. The activities in this seminar may include:

- Organising hands-on activities and Games in mathematics;
- Encouraging the designing of projects in mathematics to generate enthusiasm in the recent trends of development and research in mathematics;
- Appreciating the contribution of Indian mathematicians in society;
- Making people aware of contributions of mathematics in the development of other subject areas;
- Publicising the usefulness of mathematics in the development of mankind in bringing it to the present stage;
- Organising poster exhibition-cum-competitions highlighting usefulness and wonders of mathematics;
- Organising invited talks by experts in mathematics in the schools;
- Display of low-cost exhibits and models conveying curricular topics;
- Screening of slide shows, demonstrations experiments etc.

3 GUIDELINES FOR ORGANISING THE STATE LEVEL SCIENCE AND ENVIRONMENT EXHIBITIONS FOR FOR CHILDREN – 2012-2013

OBJECTIVES

The purpose of science an environment exhibitions is to develop scientific attitude in the young generation of our country to make them realise the interdependence of science, technology and society and the responsibility of the scientists of tomorrow. These objectives may be achieved by presenting the exhibits as an exciting experience of creativity of children, innovations through improvisations of science kits, and various devices and models for providing solutions to many present and future socio-economic problems particularly those confronted in the rural areas, using available materials and local resources.

The exhibition will help children and teachers to learn from each other experiences and motivate them to design and develop something new and novel. It will also provide a medium for popularising science and increasing awareness among the public towards it. The objectives of organising science exhibitions may briefly be put as follows:

- stimulating interest in science and technology and inculcating scientific spirit in younger generation;
- exploring and encouraging scientific and technological talent among children;
- inculcating in them a sense of pride in their talent;
- making children realise the relationship between science and technology and society;
- understanding the need for proper management for the optimum utilisation of resources and prevailing technologies;
- providing exploratory experiences, encouraging creative thinking and promoting psychomotor and manipulative skills among children through self devised exhibits or models or simple apparatus;
- encouraging problem solving approach and developing the appropriate technologies, especially for rural areas and integrating scientific ideas with daily life situations;
- inculcating intellectual honesty, team spirit and aesthetic sense among the participants;
- popularising science among masses and creating an awareness regarding the role of science and technology in socio-economic and sustainable growth of the country;
- developing appropriate techniques for communication of science, technology and its management; and
- creating awareness about environmental issues and concerns and inspiring children to devise innovative ideas towards their mitigation.

CALL FOR ENTRIES

The main theme for the State Level Science and Environment Exhibitions for Children (SLSEEC) – 2012-2013 and for the 40th Jawaharlal Nehru National Science and Environment Exhibition for Children (JNNSEEC – 2013) would be '**Science and Society**'. The identified six sub-themes are:

1. Industry;
2. Natural resources and their Conservation;
3. Transport and Communication;
4. Information and Education Technology;
5. Community Health and Environment; and
6. Mathematical Modelling.

In order to facilitate the preparation of exhibits and models for display in district to state level exhibitions during 2012-2013, *Guidelines for the Preparation of Exhibits and Models* are also being communicated.

i. Children from all schools [including government, government-aided, public and

private, catholic, mission, armed-forces (Army, Air Force, Navy, Sainik, BSF, ITBP, Assam-Rifles, CRPF, Police etc.), DAV management, Maharshi Vidya Mandir, Saraswati Vidya Mandir, Central Tibetan Schools, Navyug, Municipality, Bhartiya Vidya Bhavan, Science Clubs etc.] are eligible to participate in State Level Science Exhibitions. Preference may be given for students in senior classes (i.e. in secondary and higher secondary stages).

Note for all State Level Exhibitions coordinators belonging to state/UT governments:

Following organisations conduct their own science exhibitions separately:

- Kendriya Vidyalaya Sangathan;
- Navodaya Vidyalaya Samiti;
- Department of Atomic Energy Central Schools;
- CBSE affiliated Public Schools (independent schools); and
- Demonstration Multipurpose Schools of Regional Institutes of Education.

These organisations send their selected entries for consideration for participation in Jawaharlal Nehru National Science and Environment Exhibition for Children (JNNSEEC) - 2013 to the NCERT directly. Therefore, it may please be ensured that entries belonging to these organisations are not forwarded to NCERT.

ii. Wide publicity should be given for inviting entries. *Guidelines for the Preparation of Exhibits and Models for display in district to state level exhibitions during 2012-2013 should be provided to all schools.* These guidelines may also be translated in local languages, if possible, and be given wide publicity. This may also be given on the Internet website(s) of the respective states/ union territories and other participating organisations. It is also envisaged that guidelines be printed in local language(s), Hindi, and English in the form of a booklet for their dissemination among all the schools for generating the ideas for developing the exhibits and models. These guidelines can also be viewed on NCERT website (*www.ncert.nic.in*).

iii. Public Sector Undertakings, Industries, and other Non-government Organisations working in the areas (where these science exhibitions are organised) may also be invited to participate as the exhibits displayed by them would be of instructional value for the children and teachers.

Screening, Evaluation and Monitoring of Entries for SLSEEC

1. A screening committee should be set up to finalise the selection of entries from the various institutions for participation in the State Level Science and Environment Exhibition for Children in case Districts/ Regional Level Science Exhibitions are not being organised by the state/UT.
2. The Screening Committee may consist of representatives of SISE/SIE and some selected representative institution(s). All records about the meeting of the committee should be maintained. The selection procedure adopted should lay more emphasis on the quality of the exhibits rather than quantity. *It should be ensured that the exhibits are not crude and hazardous* and have good finish and are presentable.
3. The above mentioned Screening Committee or a separate panel of judges should evaluate the exhibits according to the criteria of evaluation attached herewith. Best three exhibits in each sub-theme from each category, viz., higher secondary and others must also be selected by the said panel of judges.
4. A separate list of the selected entries of the exhibits and models under each sub-theme (to be displayed in the state level science exhibition) must be prepared. This must contain the name of the exhibit/ model, names of the student(s) and guiding teacher(s), name of the school and a brief information about the exhibit (may be in two sentences only). This list may also be distributed among all participating children and teachers. A copy of this list should be forwarded to NCERT together with the formal report of the exhibition.

   Such a list may be prepared in accordance with the NCERT un-priced publication on "List of Exhibits", to be displayed in the National Exhibition. It is published every year and distributed to all participating children, teachers, and visitors during the exhibition. *A copy of this may be obtained from the NCERT.*
5. A formal report of the State Level Science and Environment Exhibition and One-Day Seminar should reach NCERT **within one month** after the conclusion of the exhibition. It should include the following:
   - i Dates and venue of exhibition.
   - ii Proformas I - V duly filled up.
   - iii List of schools participating and the number of students/teachers participating as per the proforma attached. Break-up of the male and female participants should also be given. It should also reflect on the number of rural and urban schools, that participated in the exhibition.
   - iv List of entries of the exhibits and models being displayed in the state level exhibition, as explained in paragraph-4 above. Number of exhibits displayed under each sub-theme should also be mentioned separately.
   - v Highlights of the exhibition including other activities such as lectures, film shows, book exhibition etc. and participation of other scientific/ industrial organisations.
   - vi Panel of judges for evaluating the exhibits/models displayed in the exhibition (in accordance with the Criteria for Evaluation of Exhibits).
   - vii List of selected exhibits being sent for consideration for display in 40th JNNSEEC - 2013 bearing the name of

student, teacher, school, etc. and their write ups for consideration for participation in JNNSEEC -2013.
(A proforma for information about the exhibit / model is also attached for this purpose - Proforma V).

viii Number of visitors to the exhibition.

The Report

and

Proformas I-V

should strictly follow the above format and be forwarded

within one month

after the conclusion of the exhibition to :

Dr. Gagan Gupta
Coordinator

State Level Science and Environment Exhibitions for Children - 2012-13
and
Jawaharlal Nehru National Science and Environment Exhibition for Children - 2013

Department of Education in Science and Mathematics
National Council of Educational Research and Training
Sri Aurobindo Marg, New Delhi 110 016

Phone: 011-26962332; **Fax:** 011-26561742

e-mail: *jnnesec2012@yahoo.com*

Website: www.ncert.nic.in

Criteria for Evaluation of Exhibits in SLSEEC

The Jawaharlal Nehru National Science and Environment Exhibition for Children (JNNSEEC) is organised every year by the NCERT. It receives entries for consideration for participation from States/UTs selected from the State Level Science and Environment Exhibitions held in the preceding year. In order to keep a uniform criteria for evaluating the exhibits in all States/UTs and on the basis of the feedback received from different agencies, the following criteria for judging the exhibits is suggested (the percentage given in bracket are suggestive weightages):

1. Involvement of children's own creativity and imagination (20 per cent);
2. Originality and innovations in the exhibit/ model (15 per cent);
3. Scientific thought/ principle/ approach (15 per cent);
4. Technical skill, workmanship and craftsmanship (15 per cent);
5. Utility/educational value for layman, children etc.; (15 per cent)
6. Economic (low cost), portability, durability, etc. (10 per cent); and
7. Presentation - aspects like demonstration, explanation, and display (10 per cent).

It is further suggested to divide the entries into two categories, viz., (i) upto elementary stage (upto class VIIII; and (ii) secondary and higher secondary stage (Classes IX - XII). On the basis of the criteria suggested above, three entries from each sub-theme may be selected and forwarded to NCERT for consideration for participation in JNNSEEC-2013. Besides the popularisation of science, the objective of this activity is to search and nurture inventive or creative talent among children. Judges are requested to evaluate the entries on the basis of pupils' involvement. Imagination and innovations made by the child in designing the exhibit/model should be assessed. They should also judge whether the model is traditional or an improvement over the traditional model or it is innovative. Various skills involved in constructing the exhibit and model, the degree of neatness and craftsmanship may also be taken into account. *Every effort must be made to rule out the tendency of procuring the ready-made exhibits/models.*

General layout of the exhibit, relevance, clarity of charts accompanying the exhibit and overall attractiveness to the layman and children should also be assessed. Working models should be encouraged.

Criteria for Evaluation of Exhibits for Consideration for Participation in Jawaharlal Nehru National Science and Environment Exhibition for Children (JNNSEEC)

Selected entries from all State Level Science and EnvironmentExhibition for Children (SLSEEC) organised in different states, union territories and other organisations are forwrded to the NCERT for consideration for participation in Jawaharlal Nehru National Science and Environment Exhibition for Children (JNNSEEC). JNNSEEC is organised every year by the NCERT in a state/union territory on rotation basis usually around the birth anniversary of Pandit Nehru, that is 14 November (Children's Day). These entries are forwarded to NCERT in Proforma V (given in this booklet.) An exemplary write-up of an exhibit is also given at the end of this booklet. At NCERT, these entries are screned and short-listed on the basis of their write-ups. For this purpose the following criteria for evaluating the write-ups of exhibits is undertaken (the percentage given in bracket are weightages):

1. Originality and innovations in the exhibit/ model (25 per cent);
2. Scientific thought/ principle/ approach (20 per cent);
3. Utility/educational value for layman, children etc.; (20 per cent)
4. Economic (low cost), portability, durability, etc. (15 per cent); and
5. Presentation of write-up: (20 per cent).

State _____ Duration_____

STATE LEVEL SCIENCE AND ENVIRONMENT EXHIBITIONS FOR CHILDREN - 2012-2013

THEME: SCIENCE AND SOCIETY

VENUE: .....

JUDGES' PROFORMA FOR EVALUATION OF PARTICIPATING ENTRIES–SUB-THEME-WISE

Sub-theme

(Please tick mark on the sub-theme being evaluated)

(i) Industry; (ii) Natural resources and their Conservation; (iii) Transport and Communication; (iv) Information and Education Technology; (v) Community Health and Environment; and (vi) Mathematical Modelling

Sl. No.	Code of the Exhibit	Involvement of Children's Own Creativity and Imagination 20 %	Originality/ Innovations in the Exhibit/ Model 15 %	Scientific Thought/ Principle/ Approach 15 %	Technical Skills/ Workmanship/ Craftsmanship 15 %	Utility/ Education Values for Layman and Children 15 %	Economic (low cost)/ Portability/ Durability 10 %	Presentation 10%	Total 100 %
1.	...	...	...	...	...	...	...	...	...
2.	...	...	...	...	...	...	...	...	...
3.	...	...	...	...	...	...	...	...	...
4.	...	...	...	...	...	...	...	...	...
5.	...	...	...	...	...	...	...	...	...
6.	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...

Date: _____

Signature .....

Name :

Designation and Affiliation:

EXPENDITURE NORMS

The 'Grant-in-Aid' provided by the NCERT to respective states/UTs is a **catalytic grant** for organising the State Level Science Exhibitions and Seminar on 'Popularisation of Science'. States and UTs are expected to spend the additional expenditure, if any, from the state funds. The funds given to the States/UTs are to be utilised *exclusively for meeting the travel and boarding costs of participating students and their teachers and experts.* It is suggested that the following norms of payment may be followed:

1. For Organising One-Day Seminar

(i) The seminar should be organised one day before the organisation of SLSEEC or during the days of exhibition in morning/evening hours.

(ii) Honorarium to **four** (**two** outstation and two local) experts/scientists may be disbursed at the rate of Rs 1000.00 each.

Note : The expert/scientist should be preferably from a research institute/ laboratory/ university.

(iii) Travelling allowance to two outstation experts/scientists from a maximum distance of 500 km may be disbursed as per the state/central government rules.

(iv) Daily allowance and incidental charges to **two** outstation experts/scientists for a maximum of three days may be disbursed as per state/central government rules.

(v) Conveyance charges to **two** local experts/scientists may be disbursed as per state/central government rules.

(vi) Contingency grant for tea/coffee with light snacks: typing/photocopying/ cost of transparencies/transparency pens/CDs etc: Rs. 2,500.00.

1. For Organising the SLSEEC

(i) Honorarium to **four** (local) judges may be disbursed at the rate of Rs. 1000.00 each. **NCERT faculty members should not be provided any Honorarium from this head, if invited as a judge in the exhibition.**

(ii) Only one student and one teacher may be permitted to participate with each exhibit. However, for more than one teacher may be permitted to participate.

(iii) Travelling allowance: actual second class sleeper rail/bus (non-AC) fare.

(iv) Incidental charges: Rs. 50.00 each way for outward and inward journeys subject to a maximum of Rs. 100.00 provided the journey time by rail or bus is more than 6 hours. For journeys less than 6 hours no incidental charges should be paid.

(v) Boarding expenses: Rs.80.00 per head per day for each participant for a maximum of 4 days. *In case if the boarding facilities are not provided by the organisers then a sum of Rs.120.00 per person may be provided as daily allowance (DA).*

(vi) Local conveyance charges may be disbursed as per state/central government rules.

(vii) contingency grant for typing/ photocopying etc. Rs. 2,500/-

It is necessary to **maintain a separate account** for the expenditure of the grants-in-aid provided by the NCERT and the same should be forwarded to the NCERT, along with all relevant vouchers and receipts, in original **WITHIN ONE MONTH OF THE CLOSE OF THE EXHIBITION** for adjustment in the NCERT account. Proforma I is given for convenience. All vouchers may be signed by the Coordinator/In-charge of the exhibition. All those vouchers/receipts that are in regional language should accompany with a translated copy in English certified by the Coordinator/In-charge of the State Level Science Exhibition to facilitate audit and settlement of accounts. Only those

Vouchers/Receipts against such items of expenditure, which are covered under the expenditure norms, may please be sent to this department for adjustment/settlement of accounts. All payments exceeding Rs 5000/- should be supported by payee's receipt with a revenue stamp.

It may please be ensured that each Voucher/Receipt against the expenditure is duly verified for the amount and then passed for payment. The specimen of this certificate is indicated below for convenience:

Verified and passed for payment of Rs. .....(Rupees ..... only).

Signature of the Co-ordinator/Incharge
State Level Science and Environemt
Exhibition for Children (SLSEEC) - 2012-13

Seal .

The Report

and

Proformas I-V

Should strictly follow the above format and be forwarded

within one month

after the conclusion of the exhibition to :

Dr. Gagan Gupta
Co-ordinator

State Level Science and Environment Exhibitions

for Children - 2011-12
and
Jawaharlal Nehru National Science and Environment Exhibition for Children - 2012

Department of Education in Science and Mathematics
National Council of Educational Research and Training
Sri Aurobindo Marg, New Delhi 110 016

Phone: 011 26962332; Fax: 011-26561742

e-mail: jnnesec2012@yahoo.com

Website: www.ncert.nic.in

4 PROFORMAS

STATE LEVEL SCIENCE AND ENVIRONMENT EXHIBITION FOR CHILDREN - 2012-2013

Proforma I

MAINTENANCE OF ACCOUNTS

State/Union Territory: _____

Dates of Exhibition: _____

Venue of Exhibition: _____

Voucher No.	Receipt			Expenditure				Signature of Coordinating Officer
	Date of Receipt	Particulars of Grant	Amount Received	Voucher No.	Date of Expenditure	Particulars (Head-wise)	Amount Spent	
		Draft No. Date						
		Other income, if any						
					Balance Refunded to NCERT, if any, vide			
		Total				**Total**		

Certified that the expenditures have been made in accordance with the norms and Guidelines as given by the NCERT for organising the State Level Science and Environment Exhibition for Children. It is also certified that no other voucher is included.

Date

Signature of the In-Charge (Controlling Officer)
Official Seal

STATE LEVEL SCIENCE AND ENVIRONMENT EXHIBITION FOR CHILDREN - 2012-2013

Proforma II

INFORMATION ABOUT PARTICIPATING SCHOOLS

State/Union Territory: _____

Dates of Exhibition: _____

Venue of Exhibition: _____

Type of School*	No. of Schools	Tribal/ Rural/ Urban	Number of Exhibits/ Models	Participants from the School						
				Teachers			Students			
				Male	Female	Total	Boys	Girls	Total	SC/ST
G	T									
	R									
	U									
LB	T									
	R									
	U									
PA	T									
	R									
	U									
PU	T									
	R									
	U									
Total										

* **G. Government**: A Government School is that which is run by the State Government or Central Government or Public Sector Undertaking or an Autonomous Organisation completely financed by the Government;

L.B. Local Body: A Local Body School is that which is run by Panchayati Raj and Local Body Institutions such as Zila Parishad, Municipal Corporation, Municipal Committee or Cantonment Board;

P.A. Private Aided: A Private Aided School is that which is run by an individual or a private organisation and receives grants from the Government or Local Body;

P.U. Private Unaided: A Private Unaided School is that which is managed by an individual or a private organisation and does not receive any grant from the Government or Local Body.

State Level Science and Environment Exhibition for Children - 2012-2013

Proforma III

Information about Nature and Number of Exhibits Displayed

Theme: Science and Society

State/Union Territory: _____

Dates of Exhibition: _____

Venue of Exhibition: _____

Sub-themes	Natural and Number of Exhibits Displayed				Total No. of Exhibits
	Innovative/Improvised Apparatus/Working Model	Static Model	Study/Survey Report	Any other	
Industry					
Natural Resources and their Conservation					
Transport and Communication					
Informationa and Educational Technology					
Community Health and Environment					
Mathematical Modelling					
Grand Total					

State _____ Duration _____

STATE LEVEL SCIENCE AND ENVIRONMENT EXHIBITION FOR CHILDREN - 2012-2013

Proforma IV

PANEL OF JUDGES - SUB-THEME-WISE*

VENUE ....

THEME : SCIENCE AND SOCIETY

Sub-theme:
(Please tick mark on the sub-theme being evaluated)

(i) Industry; (ii) Natural resources and their Conservation; (iii) Transport and Communication; (iv) Information and Education Technology; (v) Community Health and Environment; and (vi) Mathematical Modelling

Sl. No.	Name(s) of the Judge(s)	Designation	Official Address, Phone Fax, e-mail	Residential Address Phone, Mobile
1.				
2.				
3.				
4.				

* Respective judges may have their opinions, suggestions and comments about the organisation of science and environment exhibition. NCERT welcomes all such opinions. Kindly enclose them on separate sheets.

40TH JAWAHARLAL NEHRU NATIONAL FOR SCIENCE AND ENVIRONMENT EXHIBITION FOR CHILDREN (JNNSEEC) - 2013

Theme : Science and Society

Proforma V

INFORMATION ABOUT THE EXHIBIT/MODEL

1. TITLE OF THE EXHIBIT/MODEL (IN BLOCK LETTERS) _____
   _____

2. Sub-theme: (***Tick only one and strike out all others***)
   (i) Industry; or
   (ii) Natural Resources and their Conservation; or
   (iii) Transport and Communication; or
   (iv) Information and Education Technology; or
   (v) Community Health and Environment; or
   (vi) Mathematical Modelling.

3. NAME(S) OF CONTRIBUTING STUDENT(S) (IN BLOCK LETTERS) _____ (M/F); Class _____
   _____ (M/F); Class _____
   _____ (M/F); Class _____
   _____ (M/F); Class _____

4. NAME(S) OF GUIDING TEACHER(S) (IN BLOCK LETTERS) _____ (M/F)
   _____ (M/F)

5. SCHOOL AND COMPLETE POSTAL ADDRESS (IN BLOCK LETTERS) :

   .....

   .....

   .....State/UT.....Pin .....

   Phone: .....; Email .....

6. Type of school* Government/Local Body/Private Aided/Private Unaided/Any other (Please Specify)
   _____ _____

7. Affiliation of the School State Board/ICSE/CBSE
   Any other (Please Specify) _____

8. Location of the School Tribal/Rural/Urban

9. Nature of the Exhibit/Model (A) Innovative/Improvised Apparatus
   (B) Working/Static Model/Study Report
   Any Other (Please Specify) _____

10. Whether Dark Room Space is needed for the Display of Exhibit: Yes/No

* **G.** **Government:** A Government School is that which is run by the State Government or Central Government or Public Sector Undertaking or an Autonomous Organisation completely financed by the Government;

L.B. **Local Body:** A Local Body School is that which is run by Panchayati Raj and Local Body Institutions such as Zila Parishad, Municipal Corporation, Municipal Committee or Cantonment Board;

P.A. **Private Aided:** A Private Aided School is that which is run by an individual or a private organisation and receives grants from the Government or Local Body;

P.U. **Private Unaided:** Private Unaided School is that which is managed by an individual or a private organisation and does not receive any grant from the Government or Local Body.

11. Source of inspiration / help for preparing the exhibit / model:
(Please explain briefly about the nature and form of help received from the following):

(i) From Teachers / School

_____

_____

(ii) From Parents

_____

_____

(iii) From Peer Group

_____

_____

(iv) Any other

_____

_____

12. Brief Summary (Please explain the purpose (or aim) and the scientific principle involved in the exhibit / model in not more than three lines).

_____

_____

13. Write-up of the Exhibit / Model **(not more than 1,000 words) in the following format.**
[Note: *Proper submission of the write-up will ensure that if selected for participation in the 40th Jawaharlal Nehru National Science and Environment Exhibition for Children (JNNSEEC) – 2013, it will be considered for publication in* the booklet *entitled: Structure and Working of Science Models.* For convenience an exemplary write-up is also given here.]:

I. *Introduction*
   (i) Purpose (or Rationale) behind the development or construction of the exhibit; and
   (ii) The scientific principle involved.

II. *Description*
   (i) Materials used for the construction;
   (ii) Construction and working of the exhibit / model; and
   (iii) Applications, if any.

III. *References*
   Books, journals or magazines referred for preparation of the exhibit / model.

IV. *Illustrations*
   (i) Black and white line and labelled diagram of the model, illustrating the working of the exhibit / model.
   (ii) Close-up photographs of the exhibit / model.

Note: (i) Please neither pin nor paste the photographs of the exhibits. Enclose them in a separate envelope. Description of the photograph may be written on its back.
(ii) Please do not enclose the photographs of participating student(s) and their guide teacher(s).

(Signatures of all students and teachers)

5 An Exemplary Write-up of an Exhibit "Solor AC — Solar Chimney" Displayed in the 38th Jawaharlal Nehru National Exhibition for Science and Environmental Education for Children—2011 (Patna, Bihar)

Student
Ravneet Kaur

Government Senior Secondary School
Mohinder Ganj, Rajpura
Punjab

Teacher
Bhushan Kumar
Bant Kaur

Introduction

This exhibit can help us to meet the challenge of scarcity of electricity and on global warming by reducing the use of electricity.

Materials Used

For Solar AC

Wood, water pipes, brick stone, storage box and black paint.

For Solar Chimney

Teflon (hard polythene sheet), black polythene sheet, nails, cotton threads, black paint, turbine, dynamo and galvanometer.

Construction

For Solar AC

A small house of wood is made, a black painted chimney is connected inside from the roof of the house. An underground one meter deep hole is dug out away from the house. The hole is connected with a water pipe to house floor and hole. Hole is provided with brick stones and water.

For Solar Chimney

A black coloured sheet is put on the ground. A polythene sheet is attached from centre with a water pipe. The water pipe under the polythene sheet is provided with some inlets. Turbines are placed in these inlets. The polythene sheet is spread over the black sheet and is kept above the ground level with the help of nails. The polythene sheet is tied to the nails with the help of cotton thread. The structure appears like an inverted umbrella. Turbines are connected to the galvanometer through a dynamo. Thus, we can generate electricity from solar energy which is a non-conventional source.

Working

For Solar AC

During day time the sunlight falls on chimney, the temperature of chimney rises. We know that hot air rises up. As a result of a very high temperature inside the chimney, the air inside the

chimney comes out into atmosphere and a suction is created behind. In order to overcome this suction, naturally the hot air inside the building rises up towards chimney. In this way, hot air from inside the building is exhausted. As the pipe is connected with a brick box containing water to overcome the suction created in building, the air comes from the brick box in the building through the inlet pipe. When air flows over water, it carries moisture along with. It makes the room cool. Thus natural AC is made without any use of electricity.

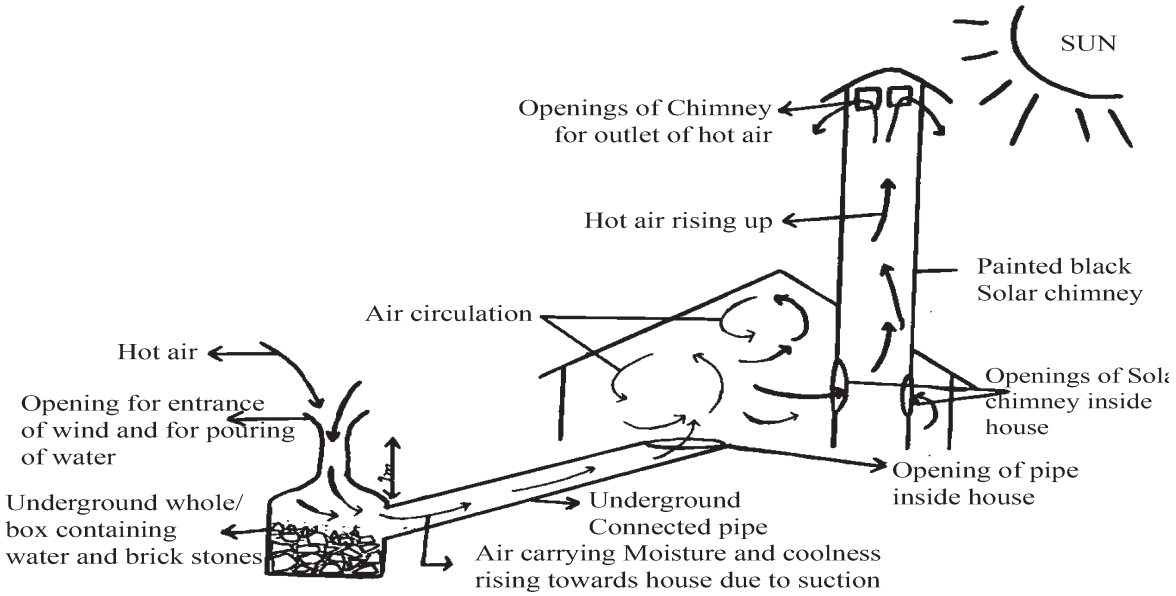

Fig. 1: Solar AC

For Solar Chimney

In this system when sun light falls from the collector area, the heat is collected over that surface due to green house effect. The temperature of air below the collector area rises. Chimney is painted black so that it can trap more heat. Some turbines which are placed at the inlet chamber of chimney will start rotating as the air inside chimney on becoming hot arises, the air in collector area rises towards chimney. Hot air in the collector rises and comes in atmosphere through chimney rotating the turbine that can produce electricity. The suction creation in collector area is being replaced by air from outside and suction in chimney is replaced by air from collector area.

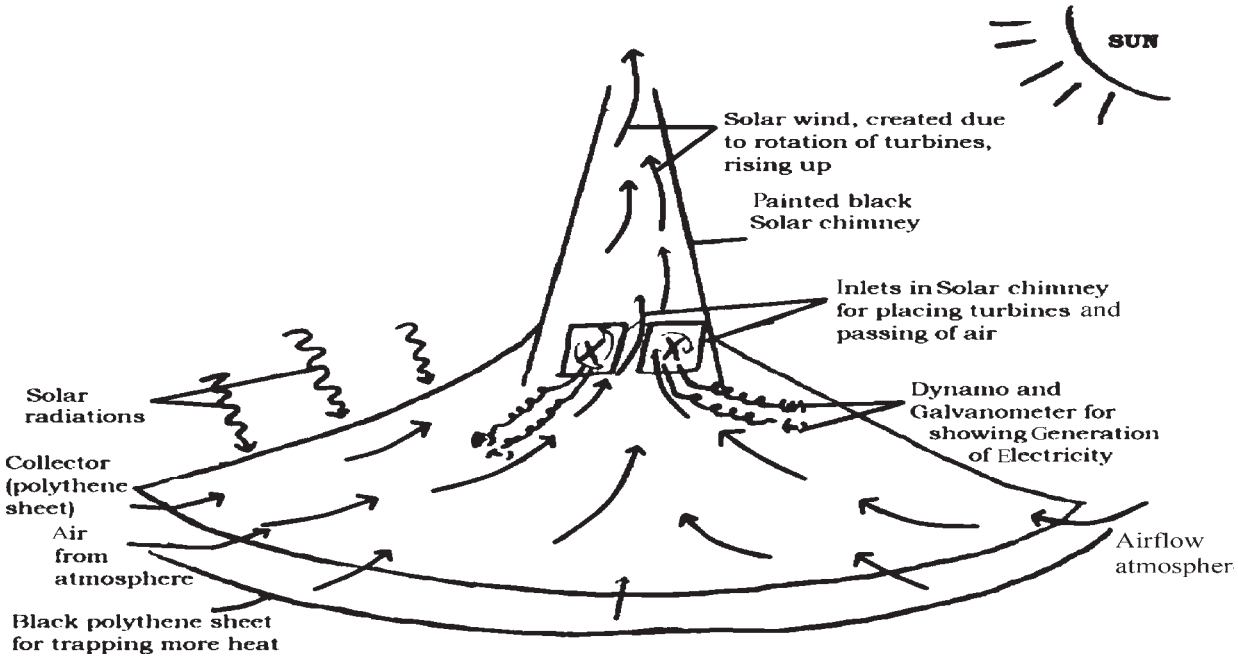

Fig. 2: Solar Chimney

ADVANTAGES

It saves electricity, economic in use and efficient. It can reduce global warming. It can utilise the heat energy trapped in desert area. It uses a non-conventional source of energy.