☎

Website: www.cbse.nic.in 23231667

CENTRAL BOARD OF SECONDARY EDUCATION

(An Autonomous Organization under the Union Ministry of Human Resource Development, Govt. of India)

'Shiksha Sadan', 17-Rouse Avenue, New Delhi – 110 002

CBSE/Sc.Exh.JS acad/2011 **Dated: 18.04.2011**

Circular No.31

All Heads of Institutions
Affiliated to the Board

Subject: Organisation of CBSE Science Exhibition 2011

Dear Principal

The purpose of Science exhibitions is to develop scientific attitude in the young generation of our country to make them realize 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 exhibitions 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 popularizing science and increasing awareness among the public towards it. The objectives of organizing science exhibitions may briefly be put as follows:

- stimulating interest in science and technology and inculcating scientific spirit in younger generations;
- exploring and encouraging scientific and technological talent among children;
- inculcating in them a sense of pride in their talent;
- providing exploratory experiences, encouraging creative thinking and promoting creative thinking and promoting psychomotor and manipulative skills among children through self devised exhibits or models or simple apparatus;
- encourage problem solving approach and developing the appropriate technologies, especially for rural areas and integrating scientific ideas with daily life situations;
- popularizing science among masses and creating an awareness regarding the role of science and technology in socio-economic and sustainable growth of the country;

The Board has initiated many steps in the recent past to provide such experiences. One such step refers to organisation of Science Exhibitions at Regional and National levels. The event is aimed at providing a common platform to schools, teachers and students to given shape to their creative and innovative ideas. Based on the past experience of enthusiastic response from schools, it has again been decided to organize the Science exhibitions for the year 2011. These exhibitions are likely to be organized at Regional level in the month of July/August and at National level in the month of September/October,2011.

The main theme and sub-themes for this year's Science Exhibition are:

Main Theme: Scienceand Technology for challenges in life.

Sub-Themes:

- **Bio-diversity-Conservation and Sustenance**
- **Agriculture and technology**
- **Green Energy**
- **Transport and Communication**
- **Community health and Environment**
- **Mathematical modeling**

The following **key aspects** of the exhibition may be kept in mind for participation:

(i) Any participating school can prepare a maximum of **two** exhibits/projects/models.

(ii) The Participating school/team will have to **bear all expenses** related to participation in the exhibition.

(iii) The exhibit/model may be either
   (i) A working model or
   (ii) An investigation-based project

(iv) The school team may be represented by a maximum of **two students per exhibit** and **one escort Science Teacher.**

(v) The exhibit/project may include
- A working model to explain a concept, principle or a process
- An indigenous design of a machine/device
- An innovative/inexpensive design or technique.
- Application of basic principles of Science/technology
- Scheme/design of a device or machine to reduce the production cost
- Investigation-based study

(vi) The request for participation along with the enclosed registration form and fee is to be sent directly to the **respective regional officer.**

(vii) The schools in Delhi region may send it to **Regional Officer, Central Board of Secondary Education, PS 1-2, Institutional Area, I.P. Extension, Patparganj, Delhi-110 092.**

(viii) Irrespective of the number of exhibits, every participating school will pay a participation fee of **Rs.400/-.** This payment should be made in the form of a demand draft in favour of **Regional Officer, CBSE** payable at respective city where the Regional Office is situated.

(ix) The last date for registration for participation in the event is **June 15, 2011**.

(x) The first stage of exhibition will be held at two different venues in every region. However, if the number of participating schools from a particular region is very large, the number of venues may be increased to three.

(xi) The selected **best fifteen** exhibits/ schools at every regional level venue will be eligible to participate in the National level exhibition.

(xii) The exhibits/projects will be **evaluated** by the experts as per the following **criteria:**

- Involvement of children's own creativity and imagination 20%
- Originality and innovations in the exhibits 15%
- Scientific thought/principle/approach 15%
- Technical skill/workmanship and craftsmanship 15%
- Utility/educational value for layman, children 15%
- Economic aspect, portability, durability 10%
- Presentation-Explanation and demonstration 10%

(xiii) The actual dates for the regional level exhibition will be communicated to every school **individually** as well as through CBSE website **www.cbse.nic.in** by **July 10, 2011.**

(xiv) A brief **write-up** about the main theme and sub-theme is enclosed for reference. The participating schools may prepare the exhibits/projects on any one of the sub-themes satisfying one or more of the stated parameters.

(xv) Greater emphasis may be given to **investigation based innovative projects** to kindle curiosity, originality and creativity in the students.

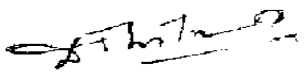
(xvi) Attractive awards/cash prizes are given to exhibits/students who are among the best twenty models at the national level.

The above information may be brought to the notice of all concerned, particularly the science faculty in the school and the students. The **request for participation** along with enclosed registration form, registration fee and other details may be sent to **respective Regional Officers** before due date. For any other information in this regard, you may contact at **jsacad@yahoo.co.in**

You may also send any specific suggestions or observations in this regard to the undersigned at the above e-mail address.

Thanking you,

Yours faithfully,



(D.T.S. Rao)
JS (Acad.)

Copy with a request to respective Heads of Directorates/KVS/NVS/CTSA as indicated below to also disseminate the information to all concerned schools under their jurisdiction:

1. The Commissioner, Kendriya Vidyalaya Sangathan, 18-Institutional Area, Shaheed Jeet Singh Marg, New Delhi-110 016.
2. The Commissioner, Navodaya Vidyalaya Samiti, A-28, Kailash Colony, New Delhi.
3. The Director of Education, Directorate of Education, Govt. of NCT of Delhi, Old Secretariat, Delhi-110 054.
4. The Director of Public Instructions (Schools), Union Territory Secretariat, Sector 9, Chandigarh-160 017.
5. The Director of Education, Govt. of Sikkim, Gangtok, Sikkim – 737 101.
6. The Director of School Education, Govt. of Arunachal Pradesh, Itanagar-791 111
7. The Director of Education, Govt. of A&N Islands, Port Blair-744 101.
8. The Secretary, Central Tibetan School Administration, ESS ESS Plaza, Community Centre, Sector 3, Rohini, Delhi-110 085.
9. All the Regional Officers of CBSE with the request to send this circular to all the Heads of the affiliated schools of the Board in their respective regions.
10. The Education Officers/AEOs of the Academic Branch, CBSE.
11. The Joint Secretary (IT) with the request to put this circular on the CBSE website.
12. The Library and Information Officer, CBSE
13. EO to Chairman, CBSE
14. PA to CE, CBSE
15. PA to Secretary, CBSE
16. PA to Director (Acad.)
17. PA to HOD (AIEEE)
18. PA to HOD (Edusat)
19. PRO, CBSE

D.T.S Rao
JS (Acad.)

CBSE SCIENCE EXHIBITION 2011

Guidelines for preparation of Exhibits and Models

In order to facilitate the preparation of exhibits and models for display and the organization of State Level Science Exhibitions during 2011, six sub-themes have been identified. These are:

1. Biodiversity: Conservation and Sustenance;
2. Agriculture and technology;
3. Green Energy;
4. Transport and Communication;
5. Community Health and Environment; and
6. Mathematical Modeling.

The importance of each sub-theme in the context of the main theme and 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.

Sub-Theme 1 Biodiversity: Conservation and Sustenance

Biodiversity (or biological diversity) refers to variability of living organisms of terrestrial, marine and other aquatic ecosystems. Entire aspect of biodiversity can be grouped in three categories i.e, Genetic Diversity (variations of genes within the organisms of a species), Species Diversity (variation of species within a region) and Ecosystem Diversity (variation in the form of vegetation and other wild life in a broad ecosystem). Human has always been the greatest beneficiary of the biodiversity as it provides food, medicines and industrial products. It is estimated that the total number of species variety of different living forms are around 10 millions. Out of such an enormous number, only 1.5 millions have been identified so far. Such a variety of living organisms is important from the point of view of sustenance of life forms on earth. All these varieties of various life forms have coevolved over the period of time since the origin of life on earth. The variety of different species, their habitats and ecosystem help maintaining a balance of life forms as well as resources on earth. A drastic change in the habitat or ecosystem leads to depletion in the variety of species and also extinction.

Thus protection and conservation of biodiversity is not only important from the point of view of fulfillment of our need, rather it is equally or even more important for the very survival of human and other living organisms on the earth. Also, we need to understand the concept of a strong, safe and secure nation. For this, we must not forget the aspects of a healthy, productive and safe environment besides food, education, economy and national security.

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

- Exhibits showing the methods of measurement of biodiversity;
- Models showing the significance and importance of the biodiversity;
- Strategy for ecological restoration of the micro and macro habitat;

- Impact of climate change on biodiversity and their remedial measures;
- Impact Assessment study of various developmental activities on biodiversity;
- Strategy/ methods for the presentation and protection of threatened / rare/ endangered plants and / or animals;
- Assessment of the impact of various human activities on the biodiversity of a region;
- Identification of plants of medicinal value in the biodiversity rich area;
- Report of already known medicinal plants from a new area;
- Impact of monoculture in forest during afforestation and reforestation;
- Studies on the impact of introduction of exotic species in a natural ecosystem;
- Causes and impact of deforestation due to various river valley projects;
- Causes and impact on biodiversity rich hilly region due to construction of large dams;
- Causes and impact of deforestation due to various industrial activities;
- Inventorisation of biological resources in different regions/ parts of the country;
- Strategy for sustainable use of genetic resources / germ plasm;
- Reclamation of wasteland and revival of their biological potential through microorganism conservation;
- Understanding of the intricate relationships and linkages between plants and animal species in an ecosystem;
- Role of biological sciences including biotechnology in multiplication of the rare, endangered and endemic species;
- Strategies for in situ conservation of wild life by multiplication and restoration of threatened, rare and endangered species; etc.

Sub-theme 2 Agriculture and Technology

The main aim of this sub-theme is to make our school children and teachers realize the need of studying and removing the constraints responsible for knowledge gap on rural professions. Just as the green revolution of the 1960 enhanced our self-confidence about our agriculture and industrial capabilities, a knowledge revolution is now necessary to enhance our agricultural and industrial competitiveness. Technology, training, techno-infrastructure and trade are the four pillars of sustained agricultural and industrial progress and agrarian prosperity.

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

- Studies of climatic change on the agriculture;
- Managing crop yield due to climatic change arising from global warming;
- Eco-forestry of protect and restore eco-system for sustainable forest practices/preserving and enhancing forest biodiversity;
- Preservation and conservation of soil and judicious use of water;
- Growing fodders in hydro-panic environment;
- Indigenous designs of farm machinery, agriculture implements and practices;
- Application of biotechnology and genetic engineering to agriculture for improved and high yielding varieties;
- Application of biotechnology and genetic engineering in improving breeds and production of animal products that are used as food;
- Improved / improvised method of processing, preservation, storage and transport of animal products;

- Application of biotechnology, microbiology, genetic engineering and genomics to agriculture for improved and high yielding varieties;
- Use of biotechnology for economically and ecologically sustainable biofuels;
- Ecologically sustainable farming methods;
- Organic fertilizers versus chemical fertilizers;
- Environment friendly measures of pest control;
- Harnessing of animal products keeping environment concerns;
- Innovative/inexpensive/improved/indigenous technologies/methods of storage/preservation/ conservation/ transport of agricultural products and good materials;
- Growing plants without seeds;
- Identification of medicinal plants and their applications;
- Effects of radiation. Electric and magnetic fields on the growth of plants and protective measures;
- Sugar levels in plant sap at different time and dates;
- Genetic variations among plants;
- 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.;
- Plan 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 pollutions;
- 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 of varying water levels over the years in the water body, surrounding environment;
- Design and development of an automatic weather recording device;
- Ozone destruction experiments; etc.

Sub-theme-3 Green Energy

The terms 'green energy' is used for those energy sources which are considered to be environment friendly. This term is synonymous with the widely accepted terms 'renewable energy'. Renewable energy sources can be renewed, regenerated or replenished over a short period of time through natural processes. These energy sources, therefore, are perennial. These are perceived to produce less pollutants and result in lower environmental pollution and

carbon emission. It has already been shown in India and in many other countries that it is possible to reduce the energy consumption without compromising with the quality of required energy services. The most logical way to reduce energy consumption is to use available energy in the most efficient manner and to minimize energy wastage.

The main purpose of this sub-theme is to make children feel the need to study and analyse various aspects of green energy. These include its generation, transmission, distribution and management besides realizing its cost effectiveness and positive impact on the environment and society.

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

- Green roof technologies/roof mounted solar technologies such as solar water heater, solar lighting system/heating system of building by solar heater;
- Devices to make breeze funneling towards your home / natural cooling of the house;
- Designs of insulated bricks for very cold / hot places/ methods of heat retention in material / heat control in the design of house;
- Green bricks using waster materials / different innovative materials for furniture / construction / road laying;
- Innovative designs of solar cooker / solar distiller / solar dryer for food processing / solar heated houses;
- Solar thermal electricity / community solar project;
- Innovative designs for installation of solar tower/mounting solar panels for electrification in buildings;
- Hybrid solar lighting (solar illumination by routing daylight into the interior part of the building by reflecting a focused beam of sunlight through optical fiber cables ;)
- Studies of variation in sunshine intensity at a given place for developing indigenous method of its usage;
- Projects for measuring availability of solar/ wind energy in a given area;
- Wind turbines for domestic use with vertical / horizontal axis;
- Design of low noise wind farm;
- Innovative/indigenous design of domestic hydroelectric generator /wind/ water mill for grinding grains/ drawing water from the well and to generate electricity;
- Use of tidal waves/ oceans currents/ salinity gradient for generating electricity;
- Wave energy from oscillating water column/ ocean thermal energy;
- Tidal barrage generator / conversion / production of energy from tornadoes/ floods/ cyclones;
- Innovative designs of geothermal house / green building/ environment building which harvest energy, water and various materials / self sufficient, sustainable village/ office/ home designs;
- Various ways of harnessing geothermal energy such as energy from hot springs/ electricity generated from naturally occurring geological heat sources;
- Geothermal desalinization/ geothermal power/ geothermal heating controlling heating and cooling of a building using underground heat by vertical / horizontal loops;
- Production of electrical energy from mechanical energy/ nuclear resources;
- Energy from biomass such as seaweeds, human/ animal wastes, keeping in view environmental concerns;
- Improvised designs of biogas/ biomass plant/ improvised technologies for effective usage of biofuels;
- Fuel farming / bio diesel from plant oils (obtained from canola, palm oil, micro algae oil, waste vegetable oil etc ;)

- Low cost liquid fuel (bio-ethanol, bio-methanol from cellulose biomass by improving conversion techniques);
- Impact of bio-energy on food security;
- Role of nanotechnology and superconductivity in harnessing energy;
- Innovations in batteries/ inverters/ photovoltaic cells to reduce cost;
- Usage of technology for production, storage, transport for using hydrogen/ methane/ CNG as fuel;
- Designs/ models of fuel-efficient automobiles/ machines;
- Innovative designs of internal combustion engine which can function on various boifuels;
- Innovations in mechanism of extraction, storage and processing of fossil fuels; etc.

Sub-Theme 4 Transport and communication

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/ railways tracks;
- Innovative ideas for efficient management of road, rail, water and air transport systems, e.g. Better safety 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 recoding 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/ charts of GPS 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 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;
- Showing application 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.

Sub-theme 5 Community Health and Environment

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/models in this sub-theme may pertain to;

- Demonstration of health and differentiation from the state of ill health;
- 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 of various agencies;
- Presenting medical assistance and facilities, rural\urban and gender aspects;
- Sensitizing people to be careful in heath matters, 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.

Sub-theme 6 Mathematical Modelling

Mathematical modeling is the process of transformation of a physical situation into mathematical analogies with appropriate conditions. Physical situation 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 modeling, 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 modeling almost every area. The objective of this sub-theme is to help children to analyse how mathematical modeling can be used to investigate objects, events systems and processes.

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

- Mathematical modeling to solve various problems of our everyday life/ environment related problems;
- Mathematical modeling and computer simulation of climate dynamics/production of weather phenomena based on a number of predictors;
- Mathematical modeling physical geography such as rotation and revolution of earth, precession and equinoes etc.;
- Mathematical modeling to how disease might spread in human in the event of epidemics/bioterrorism;
- Mathematical modeling to show spread of forest fire depending on the types of trees, weather and nature of the ground surface;
- Mathematical modeling of the working of heart, brain, lungs, kidneys, bones and endocrine system;
- Computer diagnosis of human diseases;
- Mathematical modeling of fluid flow in drain, spillways, rivers, etc.;
- Using mathematical modeling and computer simulation to improve cancer therapy/wound healing/tissues formation/corneal wound healing;
- Mathematical modeling of intracellular biochemical reactions and metabolism;
- Mathematical modeling to describe traffic flow/stock market options;
- Studies of storage and retrieval techniques for computer systems;
- Data manipulation and information management techniques;

- Statistics and random number problems;
- Developing video games;
- Mathematical modeling on social insects such as honeybees, termites etc, to know how they use local information to generate complex and functional patterns of communication;
- Mathematical modeling of maximum speed in fibre optic links;
- Mathematical modeling of highly abstract problems arising from control and communication process in the brain;
- Mathematical modeling of urban city planning;
- Mathematical modeling to prevent an unwanted future/to understand various natural and unnatural phenomena;
- Mathematical modeling to show the effect of climate changes/ global warming;
- Mathematical modeling on balance of carbon cycle, etc.
- Mathematical modeling for predicting future population and knowing the impact of population;
- Mathematical modeling for increasing production of crops.

CBSE REGIONAL LEVEL SCIENCE EXHIBITION, 2011
REGISTRATION FORM

1. Name of the School ----------

2. Complete address (including state)with Tel.no./ Fax/ e-mail ----------
---

3. Region ----------

4. Title of the Exhibits/ Projects ----------
---

5. Sub-theme of the exhibit (see enclosed information) (i) ----------
(ii) (If applicable)----------

6. Details of registration fee/ draft

Draft Number and dated ----------

Amount and Bank ----------

7. Brief write up of the Exhibit/ Project including

(a) Scientific Principle
(b) Method/ Procedure followed
(c) Unique features of the exhibit
(d) Applications in different domains of life
(e) Further scope of the exhibit/ project

(The complete write-up of the exhibit not to exceed 200 words)

---

8. Name of the participant students

a. ----------

b. ----------

---

9. Name of the escort teacher (with mobile no.)----------

Principal's Signature_____

Full Name----------