

# Guidelines to Organize Science Exhibition at School/ Block/Tehsil/District/State Level

## Introduction

The RMSA provides financial support to organize Science Exhibition in every district for enhancing knowledge and skills among the youth. To make them realize the interdependence of science, technology and society and the responsibility of the scientists of tomorrow. The RMSA has initiated this innovative platform but institutional and community support and participation voluntarily in the respective district shall be an added advantage to promote science culture in the society.

In order to develop scientific instinct among the youth, the National Curriculum Framework (NCF)-2005 encourages implementation of various curricular activities viz. organization of “Science Exhibition” at school, block, tehsil, district, region and state levels. The vision of this activity is the exploration of the surrounding resources to enable children to express themselves. The science instinct among the children begins at the unit (school) in the form of student projects; materials and activities. The following objectives could be illustrated:

## Objectives

- To provide a forum to nurture science and inventive interest from the surrounding environment and connecting new ideas to their existing ideas from materials and activities;
- To explore and encourage scientific and technological talent and creative thinking among children and inculcate in them a sense of pride in their talent;
- To develop an understanding about the role of science and technology to meet the needs of the society;
- To analyse how science and technology have affected individuals, cultures and societies;
- To motivate the youth that science and technology are instrument for achieving self-reliance in socio-economic development; and
- To encourage them as an architect of the nation and visualize future of the nation;

To meet the above objectives, the Science Exhibition could be organized under the following tentative themes.

## Themes for Science Exhibition

- Environmental issues: causes and consequences of climatic change;
- Biodiversity: Conservation and Sustenance
- Life science in human welfare;
- Alternative energy (green energy or bio-fuel) as a substitute of hydrocarbon energy;
- Information and Communication Technology; and
- Mathematics-physical science and Sports;

To formulate innovative ideas, approach and imagination, the above themes are divided into different sub-themes. These will be helpful for them to develop insights in the preparation of exhibits and models.

### **Environmental issues: causes and consequences of climatic change**

- Impact of climate change on the surrounding environment viz. farming/agriculture, animal (domestic and wild) and health (man, animal and aquatic life);
- Measures to control ill impact of natural calamities viz. earthquake, drought, flood, famine, storms, typhoon, etc.;
- Waste land use for the rehabilitation of landless people;
- Demonstrate balancing of carbon and hydrological cycles to reduce carbon dioxide in atmosphere;
- Green school; teaching and learning;
- Innovative designs/methods to manage/recycle solid and liquid wastes and use of recycled products;
- Methods of ground water recharging;

### **Biodiversity: Conservation and Sustenance**

- Methods of measurement of biodiversity and importance of the biodiversity;
- 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;
- Impact of monoculture in forest during afforestation and reforestation;
- Eco-forestry/farm forestry to meet 4Fs (Fodder, Fuel, Fiber and Food)
- Impact of deforestation due to various human activities (river valley projects, construction of large dams, industrial activities, etc.)

### **Life science in human welfare**

- Ecological and behavioural study of plants, aquatic life and animals;
- Restoration of degraded natural biodiversity;
- Sustainable land use practices and farming methods;
- Innovative, inexpensive, improved and indigenous technologies and methods for irrigation, harvesting, storage, processing, preservation and transportation;
- Conventional biotechnological practices for high yielding seeds and breeding of animals;
- Organic farming/organic fertilizers (liquid manure and green manure) preparation of vermicompost;
- Biological measures of pest and insect control;
- Development of low cost technologies for producing potable water, local method for purification of water; innovative technologies to manage water shortages and water surpluses;
- Identification and collection of locally available medicinal plants to control diseases and pest control;

- Development of nutritional food from the surrounding resources; and
- Awareness building to mitigate dreadful diseases viz. HIV/AIDS, cancer, diabetes, etc.

### **Alternative Energy: Green Energy**

- Innovative and cost effective solar technologies for lighting in the rural electrification without access of grid electricity;
- Designs of biogas/biomass plant and improved technologies for effective usage of biofuels;
- Impact of bio-energy on food security;
- Fuel farming, bio diesel from plant oils (obtained from canola, palm oil, micro algae oil, waste vegetable oil, etc);
- Innovative and indigenous designs for hydroelectric generator; wind and water mill for grinding grains, drawing water from the well and to generate electricity;
- Use of tidal waves/ocean currents/ salinity gradient for generating electricity;
- Innovations in batteries/inverters/ photovoltaic cells to reduce cost;
- Designs/models of fuel-efficient automobiles/machines;
- Innovative designs of internal combustion engine which can function on various biofuels;
- Designing of insulated bricks for cold and hot places; methods of heat retention and heat control in the design of house;
- Innovative designs for enhancing efficiencies of existing lighting system, automobiles, machines, stoves, chulhas, etc; and
- Innovative designs/technologies of environmental friendly electricity generation from the available of local resources;

### **Transport and Communication Technology**

- Fuel efficient/pollution-free designs of automobiles other vehicles;
- Innovative ideas for efficient management of road, rail, water and air transport systems,
- Demonstrate the principle and functioning of modern devices viz. television and radio, mobile phone, fax, e-mail, internet etc.
- Use of multimedia in making the teaching-learning process to enhance creativity of children and teachers;
- Developing software which can help individual students to learn at their own pace;
- Developing innovative designs/models for the children with special needs with visual and audio impairment;
- Use ICT to popularize the knowledge and skills to design machineries for textiles, engineering goods, chemicals, and pharmaceuticals, etc.
- Applications of ICT in making innovative designs of weaving, pottery, metal and leather wares, dyeing, printing and other crafts practiced in cottage industry;
- Exploring uses/applications of information and communication technology in generating employment/ eradicating illiteracy; and
- Use ICT to popularize the agricultural best practices

## Mathematical Modeling and Sports

- Showing innovative calculating methods and equations to solve lengthy and time consuming problems;
- Correlate sports with mathematics viz. speed of a cricket and tennis ball; bouncing of a tennis ball with a wall;
- Computer simulations to demonstrate that how a ball/shuttle cock gets deflected when it strikes at different parts of a bat/racket with different speed;
- Mathematical modeling of the functioning of heart, brain, lungs, kidneys, bones and endocrine system;
- Computer diagnosis of human diseases;
- Mathematical modeling to describe traffic flow/stock market options; and
- Data manipulation and information management techniques

## Selection of the Participants (Children)

The participants shall be from secondary schools of class IX and X students and exceptionally outstanding performer of class VI, VII and VIII standard students may be given chance. For the selection of students, the following criteria could be applicable (the percentages given in bracket are weightages):

Sl. No.	Criteria for Selection of a student/participant	Weightages in percentage
1	Creative imagination	15
2	Scientific thought and approach	15
3	Originality and innovations in the model	15
4	Technical skill (Art & Craftsmanship)	15
5	Economic (low cost/portability/durability)	15
6	Presentation (demonstration & explanation)	15
7	Educational value for the children and his/her performance in the class	10

## Planning to Organize the District Level Science Exhibition

- Wide publicity through radio, TV, posters, banners, booklets and newspapers should be given for inviting entries;
- If possible, these guidelines may also be translated in local languages.
- This may also be given on the Internet website(s) of the respective states/union territories and other participating organizations;
- At least two months before, guidelines for the preparation of Exhibits and Models for display should be provided to all schools by the district Organizing Committee. The school should send the name of the participants (students and teacher) and sub-themes/models (**Proforma-1**).

## Screening Committee

- A district level screening committee needs to be constituted to finalize the selection of entries from the schools/institutions;

- It may consist representatives of District Education Officers and some selected representative institution(s).
- All records about the meeting of the committee should be maintained.
- The selection procedure 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.*

### **Judges in the Exhibition**

- The judges shall be the scientists as per the above mentioned themes. They should be from the research institutes/ laboratories/ universities/colleges level faculties (**Proforma-2**).

### **How to Display the Exhibits and Models in the Exhibition**

- A separate stall for each theme/ sub-theme of the exhibits and models should display;
- Names of the student(s) and guiding teacher(s), name of the school and brief information about the exhibit (may be in two sentences only).

### **Timeframe of the Exhibition**

- The exhibition could be organized three months before and after of school's examination; and preferably in the months of off rainy season.

### **Planning at the School Level**

The school display sub-themes, date and venue of the district level science exhibition in the school notice board. The school level science exhibition shall be conducted to select the entries for district level participation. To make more competitive, schools may organize science exhibitions at block/tehsil level and the expenditure could be met by the community contribution. However, schools would send their selected entries to the district organizer as per the given format (**Proforma-3**). There shall be **four students and one teacher** from every school.

### **Public-Private Partnership**

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

### **Expenditure Suggestions**

Financial support provided by the RMSA to respective districts to organize "Science Exhibition" to develop science and technology instinct among the youth. Districts are expected to spend the additional expenditure, if any"

- From the district funds, contribution by the research institutes/laboratories/NGOs/communities/individuals are exclusively on travel and boarding of participating students and their teachers and experts.

- Public-private partnership with industrial houses, public sector undertaking, etc. could be explored for publicity and awards.
- Conveyance and boarding charges of the screening committee may be incurred by the District RMSA/District Education Officer (DEO)
- Conveyance of the organizing committee manage by the district RMSA

The tentative suggestions for expenditure are given in the table.

Sl. No.	Heads of Expenditure	Expenditure in Rupees
1	Travelling and food@ Rs. 100/participant and 5participants (4 students+ one teacher) from one school. 100 school shall participate in a district(100x100x 5)=Rs.50000.00	50000.00
2	Awards for 10 best models @ Rs. 1000 (1000x10)=Rs. 10000.00	10000.00
3	Banner, poster, photocopies, telephone, etc	5000.00
4	Light snacks to all participants	20000.00
5	Report Writing, Publication and Postal Expenses to dispatch to schools	15000.00
Total		100000.00

### Report Writing

A formal report of the exhibition shall be prepared within one monthafter the conclusion of the exhibition. It should include the followings:

- Theme, dates and venue of the exhibition;
- Number of schools (rural and urban) and the number of students/teachers participated;
- Number of entries of the exhibits and models being displayed; under each sub-theme should also be mentioned separately;
- Highlights of the exhibition including participation of other scientific/industrial organizations;
- Criteria for Evaluation of Exhibits and Models by the Panel of judges; and
- Findings and recommendation

### Follow up of the Science Exhibition

- The best practices shall be popularized through radio, TV, Internet website, newspapers, periodicals, etc.; and
- A concise booklet shall be published to distribute all schools, scientific research institutions/laboratories, libraries and NGOs,

## Proforma-1

### District Level Science Exhibition for Secondary School Children-2012-13 Information about participating School

Name of the School

Block/Tehsil

District

State/UT

Dates of Exhibition

Venue of Exhibition

Type of School by Locations (R=Rural, U=Urban and T=Tribal), circle the option	Number of Exhibits/Models	Participants from the School					
		Students			Teachers		
		Boys	Girls	Total	Male	Female	Total
R							
U							
T							
R							
U							
T							
Total							

## Proforma-2

### District Level Science Exhibition for Secondary School Children-2012-13 Panel of Judges – Sub-theme-wise

Venue:

Date:

**Sub-themes:**

*Environmental issues: Causes and consequences of climatic change/Life science in human welfare/Alternative energy (green energy or bio-fuel)/Information and Communication Technology/and Mathematics-physical science and Sports*

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

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

### Proforma-3

#### Information about Nature and Number of Exhibits/Models by the Participating School in District Level Science Exhibition-2012-13

Name of the School

Block/Tehsil

District

State/UT

Dates of Exhibition

Venue of Exhibition

Themes	Name of the Sub-themes	Nature and Number of Exhibits/Models			Any other	Total No. of Exhibits/Models
		Creative	Scientific	innovations		
Environmental issues-climatic change						
Biological science in human welfare						
alternative energy (green energy)						
Information and Communication Technology						
Mathematics-physical science and Sports						